



Date: 15 Dec 2011

Product Category: Analog (Thermal, Power Management & Safety)

Device Family:  

Notification subject: CCB 1111 Initial Notice: Qualification of 3L & 5L SOT-223 at LPI assembly site.

Notification text: PCN Status:
Initial notification

Microchip Parts Affected:

See attachments of affected catalog part numbers (CPN) labeled as...

PCN_CYER-09BCPT724_Affected_CPN.xls

PCN_CYER-09BCPT724_Affected_CPN.pdf

Description of Change:

Qualification of 3L & 5L SOT-223 at LPI assembly site.

Impacts to Data Sheet:

One of the package drawing dimensions have been affected although it is still compliant to JEDEC requirements. Please reference MCHP document DS-00049 for details at the following link (requires link to be copied and pasted into a browser window).

http://www.microchip.com/stellent/groups/techpub_sg/documents/packagingspec/en012702.pdf

Reason for Change:

To improve on time delivery performance

Change Implementation Status:

In Progress

Estimated First Ship Date:

February 25, 2012 (date code: 1209)

NOTE: Please be advised that during the transition period customers may receive pre and post change parts, due to existing inventory of the pre changed parts.

Markings to Distinguish Revised from Unrevised Devices:
Traceability code

Revision History:
December 15, 2011: Issued initial notification.

Attachment(s): [PCN_CYER-09BCPT724_Affected_CPN.pdf](#) [PCN_CYER-09BCPT724_Affected_CPN.xls](#) [PCN_CYER-09BCPT724_Qual Plan.pdf](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to change your product/process change notification (PCN) profile please log on to our website at <http://www.microchip.com/PCN> sign into myMICROCHIP to open the myMICROCHIP home page, then select a profile option from the left navigation bar.

To opt out of future offer or information emails (other than product change notification emails), click here to go to [microchipDIRECT](#) and login, then click on the "My account" link, click on "Update profile" and un-check the box that states "Future offers or information about Microchip's products or services."

Product Change Notification - CYER-09BCPT724

Parts Affected

MCP1754
MCP1791
MCP1824
MCP1825
MCP1826
MCP1703
MCP1754S
MCP1790
MCP1824S
MCP1825S
MCP1826S
TC1108
TC1262
TC1264
TC2117
TC32M

PCN_CYER-09BCPT724
CATALOG_PART_NBR
MCP1754T-1802E/DC
MCP1754T-3302E/DC
MCP1754T-5002E/DC
MCP1791T-3002E/DC
MCP1791T-3302E/DC
MCP1791T-5002E/DC
MCP1791T-5002E/DCV01
MCP1824T-0802E/DC
MCP1824T-1202E/DC
MCP1824T-1802E/DC
MCP1824T-2502E/DC
MCP1824T-3002E/DC
MCP1824T-3302E/DC
MCP1824T-3E02E/DC
MCP1824T-5002E/DC
MCP1824T-ADJE/DC
MCP1825T-0802E/DC
MCP1825T-1202E/DC
MCP1825T-1802E/DC
MCP1825T-2502E/DC
MCP1825T-3002E/DC
MCP1825T-3302E/DC
MCP1825T-5002E/DC
MCP1825T-ADJE/DC
MCP1826T-0802E/DC
MCP1826T-1202E/DC
MCP1826T-1802E/DC
MCP1826T-2502E/DC
MCP1826T-3002E/DC
MCP1826T-3302E/DC
MCP1826T-5002E/DC
MCP1826T-ADJE/DC
MCP1703-1202E/DB
MCP1703-1502E/DB
MCP1703-1802E/DB
MCP1703-2502E/DB
MCP1703-2802E/DB
MCP1703-3002E/DB
MCP1703-3302E/DB
MCP1703-4002E/DB
MCP1703-5002E/DB
MCP1703T-1202E/DB
MCP1703T-1502E/DB
MCP1703T-1802E/DB
MCP1703T-2402E/DB
MCP1703T-2502E/DB
MCP1703T-2802E/DB
MCP1703T-3002E/DB
MCP1703T-3301E/DB
MCP1703T-3302E/DB

MCP1703T-4002E/DB
MCP1703T-5002E/DB
MCP1754S-3302E/DB
MCP1754S-5002E/DB
MCP1754ST-3302E/DB
MCP1754ST-5002E/DB
MCP1790-3002E/DB
MCP1790-3002E/DB
MCP1790-3302E/DB
MCP1790-3302E/DB
MCP1790-3302E/DBVAO
MCP1790-3302E/DBVAO
MCP1790-5002E/DB
MCP1790-5002E/DB
MCP1790-5002E/DBVAO
MCP1790-5002E/DBVAO
MCP1790T-3002E/DB
MCP1790T-3002E/DB
MCP1790T-3302E/DB
MCP1790T-3302E/DB
MCP1790T-3302E/DBVAO
MCP1790T-3302E/DBVAO
MCP1790T-5002E/DB
MCP1790T-5002E/DB
MCP1790T-5002E/DBV01
MCP1790T-5002E/DBV01
MCP1790T-5002E/DBV02
MCP1790T-5002E/DBV02
MCP1790T-5002E/DBVAO
MCP1790T-5002E/DBVAO
MCP1824ST-0802E/DB
MCP1824ST-1202E/DB
MCP1824ST-1802E/DB
MCP1824ST-2502E/DB
MCP1824ST-3002E/DB
MCP1824ST-3302E/DB
MCP1824ST-5002E/DB
MCP1824SUT-1202E/DB
MCP1825S-0802E/DB
MCP1825S-1202E/DB
MCP1825S-1802E/DB
MCP1825S-2502E/DB
MCP1825S-3002E/DB
MCP1825S-3302E/DB
MCP1825S-5002E/DB
MCP1825ST-0802E/DB
MCP1825ST-1202E/DB
MCP1825ST-1802E/DB
MCP1825ST-2502E/DB
MCP1825ST-3002E/DB
MCP1825ST-3302E/DB
MCP1825ST-5002E/DB

MCP1825SUT-1202E/DB
MCP1826S-0802E/DB
MCP1826S-1002E/DB
MCP1826S-1202E/DB
MCP1826S-1802E/DB
MCP1826S-2502E/DB
MCP1826S-3002E/DB
MCP1826S-3302E/DB
MCP1826S-5002E/DB
MCP1826ST-0802E/DB
MCP1826ST-1002E/DB
MCP1826ST-1202E/DB
MCP1826ST-1802E/DB
MCP1826ST-2502E/DB
MCP1826ST-3002E/DB
MCP1826ST-3302E/DB
MCP1826ST-5002E/DB
TC1108-2.5VDB
TC1108-2.5VDBTR
TC1108-2.7VDB
TC1108-2.7VDBTR
TC1108-2.8VDB
TC1108-2.8VDBTR
TC1108-3.0VDB
TC1108-3.0VDBTR
TC1108-3.3VDB
TC1108-3.3VDBTR
TC1108-5.0VDB
TC1108-5.0VDBTR
TC1262-2.5VDB
TC1262-2.5VDBTR
TC1262-2.8VDB
TC1262-2.8VDBTR
TC1262-3.0VDB
TC1262-3.0VDBTR
TC1262-3.3VDB
TC1262-3.3VDBMR
TC1262-3.3VDBTR
TC1262-5.0VDB
TC1262-5.0VDBTR
TC1264-1.8VDB
TC1264-1.8VDBTR
TC1264-2.5VDB
TC1264-2.5VDBTR
TC1264-3.0VDB
TC1264-3.0VDBTR
TC1264-3.3VDB
TC1264-3.3VDBTR
TC2117-1.8VDB
TC2117-1.8VDBTR
TC2117-2.5VDB
TC2117-2.5VDBTR

TC2117-3.0VDB
TC2117-3.0VDBTR
TC2117-3.3VDB
TC2117-3.3VDBTR
TC32MCDB
TC32MCDB713
TC32MEDB
TC32MEDB713



MICROCHIP

QUALIFICATION PLAN

PCN #: CYER-09BCPT724

**Date:
Nov. 10, 2011**

**Qualification of 5L SOT-223 at LPI assembly site. The
3L SOT-223 will qualify by similarity.**

Distribution

Surasit P.
Wanphen L.
Wichai K.
Gerry O.

Rangsun K.
A. Navarro
R. Sharma

Microchip Technology (Thailand) Co., Ltd.
14 Moo 1 T. Wangtakien A. Muangchacherngsao,
Chacherngsao, Thailand, 24000
Tel. (6638) 857119-45, 857311-19 ext. 1231
Fax (6638) 857149-50

Purpose: _____ Qualification of 5L SOT-223 at LPI assembly site. The 3L SOT-223 will qualify by similarity.

MP code: _____ VKAB3

Part No.: _____ MCP1791

BD No: _____ BDM-000078 rev.A

CCB No: _____ 1111

Package:

Type _____ 5L SOT223

Die thickness: _____ 11 mils

Die size: _____ 62.5 x 63.4 mils

Lead frame:

Paddle size: _____ 152X86

Material _____ PMC-90 (PSJ China)

Process _____ Stamped

Lead Lock _____ No

Wire:

Material _____ Au (MEM Malaysia)

Die Attach Epoxy:

Part Number _____ CRM-1064L (Sumitomo Japan)

Conductive _____ YES

Mold Compound: _____ G600 (Sumitomo Taiwan)

Lead finish _____ Matte Tin

Reliability Test plan: _____ See attached, STD Package Reliability Test plan on each package.

Test Name	Conditions	Sample Size	Min. Qty of Spares per Lot (should be properly marked)	Qty of Lots	Total Units	Fail Accept Qty	Est. Dur. Days	Special Instructions
Standard Pb-free Solderability	JESD22B-102E; Perform 8 hour steam aging for Matte tin finish and 1 hour steam aging for NiPdAu finish prior to testing. Standard Pb-free: Matte tin/ NiPdAu finish, SAC solder, wetting temp 245°C for both SMD & through hole packages.	22	5	1	27	> 95% lead coverage	5	Standard Pb-free solderability is the requirement. SnPb solderability (backward solderability—SMD reflow soldering) is required for any plating related changes and highly recommended for other package BOM changes.
Backward Solderability	JESD22B-102E; Perform 8 hours steam aging for Matte tin finish and 1 hour steam aging for NiPdAu finish prior to testing. Backward: Matte tin/ NiPdAu finish, SnPb solder, wetting temp 215°C for SMD.	22	5	1	27	> 95% lead coverage	5	
Wire Bond Pull - WBP	Mil. Std. 883-2011	5	0	1	5	0 fails after TC	5	30 bonds from a minimum of 5 devices.
Wire Bond Shear - WBS	CDF-AEC-Q100-001	5	0	1	5	0	5	30 bonds from a minimum of 5 devices.
Physical Dimensions	Measure per JESD22 B100 and B108	10	0	3	30	0	5	
Lead Integrity	JESD22 B105	5	0	1	5	0 (No lead breakage or cracks)	5	10 leads from each of 5 parts. Not required for SMD, only required for through-hole.
External Visual	Mil. Std. 883-2009/2010	All devices prior to submission for qualification testing	0	3	ALL	0	5	
HTSL (High Temp Storage Life)	+175 C for 504 hours or 150°C for 1008 hrs. Electrical test pre and post stress at +25C.	45	5	1	50	0	10	Must be in progress at time of package release to production, but completion is not required for release to production.
Preconditioning - Required for surface mount devices	+150°C Bake for 24 hours, moisture loading requirements per MSL level + 3X reflow at peak reflow temperature per Jedec-STD-020C for package type; Electrical test pre and post stress at +25°C. Perform SAM analysis using the standard sample size. MSL-1 @ 260°C	231	15	3	738	0	15	Spares should be properly identified, 77 parts from each lot to be used for HAST, Autoclave, Temp Cycle test.

Test Name	Conditions	Sample Size	Min. Qty of Spares per Lot (should be properly marked)	Qty of Lots	Total Units	Fail Accept Qty	Est. Dur. Days	Special Instructions
HAST	+130°C/85% RH for 96 hours. Electrical test pre and post stress at +25°C.	77	5	3	246	0	10	Spares should be properly identified. Use the parts which have gone through Pre-conditioning.
Unbiased HAST	+130°C/85% RH for 96 hrs or +110°C/85% RH for 264 hrs. Electrical test pre and post stress at +25°C.	77	5	3	246	0	10	Spares should be properly identified. Use the parts which have gone through Pre-conditioning.
Temp Cycle	-65°C to +150°C for 500 cycles. Electrical test pre and post stress at 25C temp; 3 gram force WBP, on 5 devices from 1 lot, test following Temp Cycle stress.	77	5	3	246	0	15	Spares should be properly identified. Use the parts which have gone through Pre-conditioning.



MICROCHIP

**Packaging
Specification**

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

Trademarks

The Microchip name and logo, the Microchip logo, dsPIC, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC³² logo, rPIC and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.


FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MXDEV, MXLAB, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Application Maestro, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniscient Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICKit, PICtail, REAL ICE, rLAB, Select Mode, Total Endurance, TSHARC, UniWinDriver, WiperLock and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

All other trademarks mentioned herein are property of their respective companies.

© 1998-2011, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 978-1-61341-863-5

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC[®] MCUs and dsPIC[®] DSCs, KEELOQ[®] code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
== ISO/TS 16949:2009 ==

PACKAGING SPECIFICATION

TABLE OF CONTENTS

SIDEBRAZE Family	13
CERDIP Family	17
CERQUAD Family	31
SOT Family	37
DDPAK Family	79
PDIP Family	87
SPDIP Family	103
PLCC Family	109
SOP Family	129
SOIC Family	133
DFN Family	179
PDFN Family	199
TDFN Family	203
UDFN Family	211
QFN Family	217
UQFN Family	251
MSOP Family	259
SSOP Family	275
TSSOP Family	283
TSOP and VSOP Families	295
VSOP Family	295
LQFP Family	299
MQFP Family	305
TQFP Family	313
CSP Family	333
TFBGA Family (Formerly XBGA Family)	347
TLA Family	351
Appendix A: Revision History	359
Appendix B: Control Dimensions	369
Overview of Microchip Die/Wafer Support	371
Worldwide Sales and Service	374

PACKAGING SPECIFICATION

NOTES:

Package Index

CERAMIC SIDE BRAZED DUAL IN-LINE PACKAGE [SIDEBRAZE] FAMILY

8-Lead Ceramic Side Brazed Dual In-Line with Window (JW) .300"	14
14-Lead Ceramic Side Brazed Dual In-Line with Window (JW) .300"	15
28-Lead Ceramic Side Brazed Dual In-Line with Window (JW) .300"	16

CERAMIC DUAL IN-LINE PACKAGE [CERDIP] FAMILY

8-Lead Ceramic Dual In-Line (JA) .300 Body	18
8-Lead Ceramic Dual In-Line with Window (JW) .300" Body	19
14-Lead Ceramic Dual In-Line (JD) .300 Body	20
14-Lead Ceramic Dual In-Line with Window (JW) .300" Body	21
16-Lead Ceramic Dual In-Line (JE) .300 Body	22
18-Lead Ceramic Dual In-Line with Window (JW) .300" Body	23
20-Lead Ceramic Dual In-Line with Window (JW) .300" Body	24
24-Lead Ceramic Dual In-Line (JG) .600 Body	25
28-Lead Ceramic Dual In-Line (JN) .600 Body	26
28-Lead Ceramic Dual In-Line with Window (JW) .300" Body	27
28-Lead Ceramic Dual In-Line with Window (JW) .600" Body	28
40-Lead Ceramic Dual In-Line (JK) .600 Body	29
40-Lead Ceramic Dual In-Line with Window (JW) .600" Body	30

CERAMIC CHIP CARRIER PACKAGE [CERQUAD] FAMILY

68-Lead Ceramic Leaded (CL) Chip Carrier with Window	32
68-Lead Ceramic Leaded (CL) Chip Carrier with Window Land Pattern	33
84-Lead Ceramic Leaded (CL) Chip Carrier with Window	34
84-Lead Ceramic Leaded (CL) Chip Carrier with Window Land Pattern	35

SMALL-OUTLINE TRANSISTOR PACKAGE [SOT] FAMILY

SC70 – 3-Lead Plastic Small Outline Transistor (LB)	38
SC70 – 3-Lead Plastic Small Outline Transistor (LB) Land Pattern	39
SC70 – 5-Lead Plastic Small Outline Transistor (LT)	40
SC70 – 5-Lead Plastic Small Outline Transistor (LT) Land Pattern	41
SC70 – 6-Lead Plastic Small Outline Transistor (LT)	42
SC70 – 6-Lead Plastic Small Outline Transistor (LT) Sheet 2	43
SC70 – 6-Lead Plastic Small Outline Transistor (LT) Land Pattern	44
SOT-23 – 3-Lead Plastic Small Outline Transistor (NB)	45
SOT-23 – 3-Lead Plastic Small Outline Transistor (NB) Land Pattern	46
SOT-23 – 3-Lead Plastic Small Outline Transistor (TT)	47
SOT-23 – 3-Lead Plastic Small Outline Transistor (TT) Land Pattern	48
SOT-23 – 5-Lead Plastic Small Outline Transistor (CT)	49
SOT-23 – 5-Lead Plastic Small Outline Transistor (CT) Land Pattern	50
SOT-23 – 5-Lead Plastic Small Outline Transistor (OT)	51
SOT-23 – 5-Lead Plastic Small Outline Transistor (OT) Land Pattern	52
SOT-23 – 6-Lead Plastic Small Outline Transistor (CH)	53
SOT-23 – 6-Lead Plastic Small Outline Transistor (CH) Land Pattern	54
SOT-23 – 6-Lead Plastic Small Outline Transistor (CHY)	55
SOT-23 – 6-Lead Plastic Small Outline Transistor (CHY) Land Pattern	56
SOT-23 – 6-Lead Plastic Small Outline Transistor (OT)	57
SOT-23 – 6-Lead Plastic Small Outline Transistor (OT) Land Pattern	58
SOT-23A – 3-Lead Plastic Small Outline Transistor (CB)	59
SOT-23A – 3-Lead Plastic Small Outline Transistor (CB) Land Pattern	60
SOT-89 – 3-Lead Plastic Small Outline Transistor Header (MB)	61
SOT-89 – 3-Lead Plastic Small Outline Transistor Header (MB) Land Pattern	62
SOT-89 – 5-Lead Plastic Small Outline Transistor Header (MT)	63
SOT-89 – 5-Lead Plastic Small Outline Transistor Header (MT) Land Pattern	64
SOT-143 – 4-Lead Plastic Small Outline Transistor (RC)	65
SOT-143 – 4-Lead Plastic Small Outline Transistor (RC) Land Pattern	66

Package Index

SOT-223 – 3-Lead Plastic Small Outline Transistor (DB)	67
SOT-223 – 3-Lead Plastic Small Outline Transistor (DB) Land Pattern	68
SOT-223 – 5-Lead Plastic Small Outline Transistor (DC)	69
SOT-223 – 5-Lead Plastic Small Outline Transistor (DC) Land Pattern	70
SOT-385 – Leadless Wedge Module Plastic Small Outline Transistor (WM)	71
TO-92 – 3-Lead Plastic Transistor Outline (TO)	72
TO-92 – 3-Lead Plastic Transistor Outline (ZB)	73
TO-220 – 3-Lead Plastic Transistor Outline (AB)	74
TO-220 – 5-Lead Plastic Transistor Outline (AT)	75
TSOT – 5-Lead Plastic Thin Small Outline Transistor (OS)	76
TSOT – 5-Lead Plastic Thin Small Outline Transistor (OS) Land Pattern	77
DOUBLE DECA-WATT PACKAGE [DDPAK] FAMILY	
3-Lead Plastic (EB)	80
3-Lead Plastic (EB) Land Pattern	81
5-Lead Plastic (ET)	82
5-Lead Plastic (ET) Land Pattern	83
7-Lead Plastic (EK)	84
7-Lead Plastic (EK) Land Pattern	85
PLASTIC DUAL IN-LINE PACKAGE [PDIP] FAMILY	
8-Lead Plastic Dual In-Line (P) 300 mil	88
8-Lead Plastic Dual In-Line (PA) 300 mil	89
14-Lead Plastic Dual In-Line (P) 300 mil	90
14-Lead Plastic Dual In-Line (PD) 300 mil	91
16-Lead Plastic Dual In-Line (P) 300 mil	92
16-Lead Plastic Dual In-Line (PE) 300 mil	93
18-Lead Plastic Dual In-Line (P) 300 mil	94
20-Lead Plastic Dual In-Line (P) 300 mil	95
24-Lead Plastic Dual In-Line (P) 600 mil	96
24-Lead Plastic Dual In-Line (PG) 600 mil	97
28-Lead Plastic Dual In-Line (P) 600 mil	98
28-Lead Plastic Dual In-Line (PI) 600 mil	99
40-Lead Plastic Dual In-Line (P) 600 mil	100
40-Lead Plastic Dual In-Line (PL) 600 mil	101
64-Lead Shrink Plastic Dual In-Line (SP) 750 mil	102
SKINNY PLASTIC DUAL IN-LINE PACKAGE [SPDIP] FAMILY	
24-Lead Skinny Plastic Dual In-Line (PF) 300 mil	104
24-Lead Skinny Plastic Dual In-Line (SP) 300 mil	105
28-Lead Skinny Plastic Dual In-Line (PJ) 300 mil	106
28-Lead Skinny Plastic Dual In-Line (SP) 300 mil	107
PLASTIC LEADED CHIP CARRIER PACKAGE [PLCC] FAMILY	
20-Lead Plastic Leaded Chip Carrier (L)	110
20-Lead Plastic Leaded Chip Carrier (L) Square Land Pattern	111
28-Lead Plastic Leaded Chip Carrier (L)	112
28-Lead Plastic Leaded Chip Carrier (L) Square Land Pattern	113
28-Lead Plastic Leaded Chip Carrier (LI)	114
28-Lead Plastic Leaded Chip Carrier (LI) Square Land Pattern	115
32-Lead Plastic Leaded Chip Carrier (L)	116
32-Lead Plastic Leaded Chip Carrier (L) Rectangle Land Pattern	117
44-Lead Plastic Leaded Chip Carrier (L)	118
44-Lead Plastic Leaded Chip Carrier (L) Square Land Pattern	119
44-Lead Plastic Leaded Chip Carrier (LW)	120
44-Lead Plastic Leaded Chip Carrier (LW) Square Land Pattern	121
68-Lead Plastic Leaded Chip Carrier (L)	122

Package Index

68-Lead Plastic Leaded Chip Carrier (L) Square Land Pattern	123
68-Lead Plastic Leaded Chip Carrier (LS)	124
68-Lead Plastic Leaded Chip Carrier (LS) Square Land Pattern	125
84-Lead Plastic Leaded Chip Carrier (L)	126
84-Lead Plastic Leaded Chip Carrier (L) Square Land Pattern	127
PLASTIC SMALL-OUTLINE PACKAGE [SOP] FAMILY	
8-Lead Thermally Enhanced Plastic Outline (SE) Narrow 3.90 mm Body	130
8-Lead Thermally Enhanced Plastic Outline (SE) Narrow 3.90 mm Body Sheet 2	131
8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow 3.90 mm Land Pattern	132
PLASTIC SMALL-OUTLINE PACKAGE [SOIC] FAMILY	
8-Lead Plastic Small Outline (SN) Narrow 3.90 mm	134
8-Lead Plastic Small Outline (SN) Narrow 3.90 mm Sheet 2	135
8-Lead Plastic Small Outline (SN) Narrow 3.90 mm Land Pattern	136
8-Lead Plastic Small Outline (OA) Narrow 3.90 mm	137
8-Lead Plastic Small Outline (OA) Narrow 3.90 mm Sheet 2	138
8-Lead Plastic Small Outline (OA) Narrow 3.90 mm Land Pattern	139
8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow 3.90 mm Body	140
8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow 3.90 mm Body Sheet 2	141
8-Lead Thermally En Plastic Small Outline (SE) Narrow 3.90 mm Land Pattern	142
14-Lead Plastic Small Outline (SL) Narrow 3.90 mm Body	143
14-Lead Plastic Small Outline (SL) Narrow 3.90 mm Body Sheet 2	144
14-Lead Plastic Small Outline (SL) Narrow 3.90 mm Land Pattern	145
14-Lead Plastic Small Outline (OD) Narrow 3.90 mm Body	146
14-Lead Plastic Small Outline (OD) Narrow 3.90 mm Body Sheet 2	147
14-Lead Plastic Small Outline (OD) Narrow 3.90 mm Land Pattern	148
16-Lead Plastic Small Outline (SL) Narrow 3.90 mm Body	149
16-Lead Plastic Small Outline (SL) Narrow 3.90 mm Body Sheet 2	150
16-Lead Plastic Small Outline (SL) Narrow 3.90 mm Land Pattern	151
8-Lead Plastic Small Outline (SM) Medium 5.28 mm	152
8-Lead Plastic Small Outline (SM) Medium 5.28 mm Sheet 2	153
8-Lead Plastic Small Outline (SM) Medium 5.28 mm Land Pattern	154
16-Lead Plastic Small Outline (SO) Wide 7.5 mm Body	155
16-Lead Plastic Small Outline (SO) Wide 7.5 mm Body Sheet 2	156
16-Lead Plastic Small Outline (SO) Wide 7.5 mm Land Pattern	157
16-Lead Plastic Small Outline (OE) Wide 7.5 mm Body	158
16-Lead Plastic Small Outline (OE) Wide 7.5 mm Body Sheet 2	159
16-Lead Plastic Small Outline (OE) Wide 7.5 mm Land Pattern	160
18-Lead Plastic Small Outline (SO) Wide 7.5 mm Body	161
18-Lead Plastic Small Outline (SO) Wide 7.5 mm Body Sheet 2	162
18-Lead Plastic Small Outline (SO) Wide 7.5 mm Land Pattern	163
20-Lead Plastic Small Outline (SO) Wide 7.5 mm Body	164
20-Lead Plastic Small Outline (SO) Wide 7.5 mm Body Sheet 2	165
20-Lead Plastic Small Outline (SO) Wide 7.5 mm Land Pattern	166
24-Lead Plastic Small Outline (SO) Wide 7.5 mm Body	167
24-Lead Plastic Small Outline (SO) Wide 7.5 mm Body Sheet 2	168
24-Lead Plastic Small Outline (SO) Wide 7.5 mm Land Pattern	169
24-Lead Plastic Small Outline (OG) Wide 7.5 mm Body	170
24-Lead Plastic Small Outline (OG) Wide 7.5 mm Body Sheet 2	171
24-Lead Plastic Small Outline (OG) Wide 7.5 mm Land Pattern	172
28-Lead Plastic Small Outline (SO) Wide 7.5 mm Body	173
28-Lead Plastic Small Outline (SO) Wide 7.5 mm Body Sheet 2	174
28-Lead Plastic Small Outline (SO) Wide 7.5 mm Land Pattern	175
28-Lead Plastic Small Outline (OI) Wide 7.5 mm Body	176

Package Index

28-Lead Plastic Small Outline (OI) Wide 7.5 mm Body Sheet 2	177
28-Lead Plastic Small Outline (OI) Wide 7.5 mm Land Pattern	178
PLASTIC DUAL FLAT NO LEAD PACKAGE [DFN] FAMILY	
6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) 2x2x0.9 mm Body	180
6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) 2x2x0.9 mm Body Sheet 2	181
6-Lead Plastic Dual Flat No Lead Package (MA) 2x2x0.9 mm Land Pattern	182
6-Lead Plastic Dual Flat No Lead Package (ME) 2x3x0.9 mm	183
6-Lead Plastic Dual Flat No Lead Package (MH) 3x3x0.9 mm	184
8-Lead Plastic Dual Flat No Lead Package (MC) 2x3x0.9 mm	185
8-Lead Plastic Dual Flat No Lead Package (MC) 2x3x0.9 mm Land Pattern	186
8-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm	187
8-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm Sheet 2	188
8-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm Land Pattern	189
8-Lead Plastic Dual Flat No Lead Package (MD) 4x4x0.9 mm	190
8-Lead Plastic Dual Flat No Lead Package (MD) 4x4x0.9 mm Sheet 2	191
8-Lead Plastic Dual Flat No Lead Package (MD) 4x4x0.9 mm Land Pattern	192
8-Lead Plastic Dual Flat No Lead Package (MF) 6x5 mm Punch Singulated	193
8-Lead Plastic Dual Flat No Lead Package (MF) 6x5 mm	194
8-Lead Plastic Dual Flat No Lead Package (MF) 6x5 mm Land Pattern	195
10-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm Body	196
10-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm Body Sheet 2	197
10-Lead Plastic Dual Flat No Lead Package (MF) 3x3x0.9 mm Land Pattern	198
HIGH POWER DUAL FLAT NO LEAD PACKAGE [PDFN] FAMILY	
8-Lead High Power Dual Flat No Lead Package (MF) 5x6x1 mm	200
8-Lead High Power Dual Flat No Lead Package (MF) 5x6x1 mm Sheet 2	201
PLASTIC THIN DUAL FLAT NO LEAD PACKAGE [TDFN] FAMILY	
6-Lead Plastic Thin Dual Flat, No Lead Package (MY) 2x2x0.8 mm Body	204
6-Lead Plastic Thin Dual Flat, No Lead Package (MY) 2x2x0.8 mm Body Sheet 2	205
8-Lead Plastic Dual Flat No Lead Package (MN) 2x3x0.75 mm	206
8-Lead Plastic Dual Flat No Lead Package (MN) 2x3x0.75 mm Sheet 2	207
8-Lead Plastic Dual Flat No Lead Package (MN) 2x3x0.75 mm Land Pattern	208
10-Lead Thin Plastic Dual Flat, No Lead Package (MN) 3x3x0.8 mm Body	209
10-Lead Thin Plastic Dual Flat, No Lead Package (MN) 3x3x0.8 mm Body Sheet 2	210
PLASTIC DUAL FLAT NO LEAD PACKAGE [UDFN] FAMILY	
8-Lead Plastic Dual Flat No Lead Package (MU) 2x3x0.5 mm	212
8-Lead Plastic Dual Flat No Lead Package (MU) 2x3x0.5 mm Land Pattern	213
10-Lead Plastic Ultra Thin Dual Flat No Lead (NAY) 3x3x0.5 mm Body	214
10-Lead Plastic Ultra Thin Dual Flat No Lead (NAY) 3x3x0.5 mm Body Sheet 2	215
PLASTIC QUAD FLAT NO LEAD PACKAGE [QFN] FAMILY	
16-Lead Plastic Quad Flat No Lead Package (NG) 3x3x0.9 mm Body	218
16-Lead Plastic Quad Flat No Lead Package (NG) 3x3x0.9 mm Body Sheet 2	219
16-Lead Plastic Quad Flat No Lead Package (NG) 3x3x0.9 mm Land Pattern	220
16-Lead Plastic Quad Flat No Lead Package (MG) 3x3x0.9 mm	221
16-Lead Plastic Quad Flat No Lead Package (MG) 3x3x0.9 mm Sheet 2	222
16-Lead Plastic Quad Flat No Lead Package (MG) 3x3x0.9 mm Land Pattern	223
16-Lead Plastic Quad Flat No Lead Package (ML) 4x4x0.9 mm	224
16-Lead Plastic Quad Flat No Lead Package (ML) 4x4x0.9 mm Land Pattern	225
20-Lead Plastic Quad Flat No Lead Package (ML) 4x4x0.9 mm	226
20-Lead Plastic Quad Flat No Lead Package (ML) 4x4 Land Pattern	227
20-Lead Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm	228
20-Lead Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm Land Pattern	229
24-Lead Plastic Quad Flat No Lead Package (MJ) 4x4x0.9 mm	230

Package Index

24-Lead Plastic Quad Flat No Lead Package (MJ) 4x4 mm Land Pattern	231
28-Lead Plastic Quad Flat No Lead Package (MK) 4x4x0.9 mm	232
28-Lead Plastic Quad Flat No Lead Package (MK) 4x4x0.9 mm Land Pattern	233
28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm	234
28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Sheet 2	235
28-Lead Plastic Quad Flat No Lead Package (MQ) 5x5 mm Land Pattern	236
28-Lead Plastic Quad Flat No Lead Package (ML) 6x6 mm	237
28-Lead Plastic Quad Flat No Lead Package (ML) 6x6 mm Land Pattern	238
28-Lead Plastic Quad Flat No Lead Package (MM) 6x6x0.9 mm	239
28-Lead Plastic Quad Flat No Lead Package (MM) 6x6x0.9 mm Land Pattern	240
40-Lead Plastic Quad Flat No Lead (ML) 6x6X0.9 mm	241
40-Lead Plastic Quad Flat No Lead (ML) 6x6X0.9 mm Sheet 2	242
40-Lead Plastic Quad Flat No Lead (ML) 6x6X0.9 mm Land Pattern	243
44-Lead Plastic Quad Flat No Lead Package (ML) 8x8 mm	244
44-Lead Plastic Quad Flat No Lead Package (ML) 8x8 mm Land Pattern	245
64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body 7.15 mm Exp Pad	246
64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body 7.15 mm Exp Pad Sheet 2	247
64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Land Pattern	248
64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body with 5.40 Exposed Pad	249
64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body with 5.40 Exposed Pad Sheet 2	250
PLASTIC ULTRA THIN QUAD FLAT NO LEAD PACKAGE [UQFN] FAMILY	
28-L Plastic Ultra Thin Quad Flat No Lead Package (MV) 4x4x0.5 mm Body	252
28-L Plastic Ultra Thin Quad Flat No Lead Package (MV) 4x4x0.5 mm Body Sheet 2	253
40-L Plastic Ultra Thin Quad Flat (MV) 5x5 mm	254
40-L Plastic Ultra Thin Quad Flat (MV) 5x5 mm Sheet 2	255
40-L Plastic Ultra Thin Quad Flat No Lead (MV) 5x5 mm Land Pattern	256
48-L Plastic Ultra Thin Quad Flat No Lead (MV) 6x6x0.5 mm Body	257
48-L Plastic Ultra Thin Quad Flat No Lead (MV) 6x6x0.5 mm Body Sheet 2	258
PLASTIC MICRO SMALL-OUTLINE PACKAGE [MSOP] FAMILY	
8-Lead Plastic Micro Small Outline Package (MS)	260
8-Lead Plastic Micro Small Outline Package (MS) Sheet 2	261
8-Lead Plastic Micro Small Outline Package (MS) Land Pattern	262
8-Lead Plastic Micro Small Outline Package (UA)	263
8-Lead Plastic Micro Small Outline Package (UA) Sheet 2	264
8-Lead Plastic Micro Small Outline Package (UA) Land Pattern	265
10-Lead Plastic Micro Small Outline Package (MS)	266
10-Lead Plastic Micro Small Outline Package (MS) Sheet 2	267
10-Lead Plastic Micro Small Outline Package (MS) Land Pattern	268
10-Lead Plastic Micro Small Outline Package (UN)	269
10-Lead Plastic Micro Small Outline Package (UN) Sheet 2	270
10-Lead Plastic Micro Small Outline Package (UN) Land Pattern	271
PLASTIC MICRO SMALL-OUTLINE PACKAGE [QSOP] FAMILY	
16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150"	272
16-Lead Plastic Shrink Small Outline Narrow Body (QR) Land Pattern	273
SHRINK SMALL OUTLINE PACKAGE [SSOP] FAMILY	
20-Lead Plastic Shrink Small Outline (SS) 5.30 mm	276
20-Lead Plastic Shrink Small Outline (SS) 5.30 mm Land Pattern	277
24-Lead Plastic Shrink Small Outline (SS) 5.30 mm	278
24-Lead Plastic Shrink Small Outline (SS) 5.30 mm Land Pattern	279
28-Lead Plastic Shrink Small Outline (SS) 5.30 mm	280
28-Lead Plastic Shrink Small Outline (SS) 5.30 mm Land Pattern	281

Package Index

PLASTIC THIN SHRINK SMALL-OUTLINE PACKAGE [TSSOP] FAMILY

8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm.....	284
8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Land Pattern	285
14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm.....	286
14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Sheet 2	287
14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Land Pattern	288
16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm.....	289
16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Sheet 2	290
16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Land Pattern	291
20-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm.....	292
20-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Land Pattern	293

PLASTIC THIN SMALL-OUTLINE PACKAGE [TSOP] AND VERY SMALL OUTLINE PACKAGE [VSOP] FAMILY

28-Lead Plastic Thin Small Outline (TS) 8x20 mm	296
28-Lead Plastic Very Small Outline (VS) 8x13.4 mm.....	297

PLASTIC LOW-PROFILE QUAD FLATPACK PACKAGE [LQFP] FAMILY

32-Lead Plastic Low-Profile Quad Flatpack (PL) 7x7x1.40 mm.....	300
144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm.....	301
144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Sheet 2.....	302
144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body Land Pattern	303

PLASTIC METRIC-QUAD FLATPACK PACKAGE [MQFP] FAMILY

44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm.....	306
44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm Land Pattern	307
44-Lead Plastic Metric Quad Flatpack (PQ) 10x10x2.0 mm	308
44-Lead Plastic Metric Quad Flatpack (PQ) 10x10x2.0 mm Land Pattern.....	309
64-Lead Plastic Metric Quad Flatpack (BU) 14x14x2.7 mm	310
64-Lead Plastic Metric Quad Flatpack (BU) 14x14x2.7 mm Land Pattern.....	311

PLASTIC THIN-QUAD FLATPACK PACKAGE [TQFP] FAMILY

32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm.....	314
32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body Land Pattern.....	315
44-Lead Plastic Thin Quad Flatpack (PT) 10x10x1.0 mm.....	316
44-Lead Plastic Thin Quad Flatpack (PT) 10x10x1.0 mm Body Land Pattern.....	317
64-Lead Plastic Thin Quad Flatpack (PF) 14x14x1.0 mm.....	318
64-Lead Plastic Thin Quad Flatpack (PF) 14x14x1.0 mm Land Pattern.....	319
64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1.0 mm.....	320
64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1.0 mm Body Land Pattern.....	321
80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1.0 mm.....	322
80-Lead Plastic Thin Quad Flatpack (PF) 14x14 mm Body Land Pattern.....	323
80-Lead Plastic Thin Quad Flatpack (PT) 12x12x1.0 mm.....	324
80-Lead Plastic Thin Quad Flatpack (PT) 12x12x1.0 mm Body Land Pattern.....	325
100-Lead Plastic Thin Quad Flatpack (PF) 14x14x1.0 mm.....	326
100-Lead Plastic Thin Quad Flatpack (PF) 14x14 mm Body Land Pattern.....	327
100-Lead Plastic Thin Quad Flatpack (PT) 12x12x1.0 mm.....	328
100-Lead Plastic Thin Quad Flatpack (PT) 12x12x1.0 mm Body Land Pattern.....	329
144-Lead Plastic Thin Quad Flat Pack (PH) 16x16 mm Body	330
144-Lead Plastic Thin Quad Flat Pack (PH) 16x16 mm Body Sheet 2.....	331
144-Lead Plastic Thin Quad Flat Pack (PH) 16x16 mm Body Land Pattern.....	332

CHIP SCALE PACKAGE [CSP] FAMILY

4-Lead Chip Scale Package (CS) square	334
4-Lead Chip Scale (CS) square Sheet 2.....	335
4-Lead Chip Scale Package (CS) Land Pattern square.....	336

Package Index

4-Lead Chip Scale (CS) rectangle	337
4-Lead Chip Scale (CS) rectangle Sheet 2	338
4-Lead Chip Scale (CS) Land Pattern rectangle	339
5-Lead Chip Scale Package (CS)	340
5-Lead Chip Scale Package (CS) Sheet 2	341
5-Lead Chip Scale Package (CS) Ball Pattern 2x1x2 mm Land Pattern	342
8-Lead Chip Scale Package (CS)	343
8-Lead Chip Scale Package (CS) Sheet 2	344
8-Lead Chip Scale Package (CS) Ball Pattern 3x2x3 mm Land Pattern	345

BALL GRID ARRAY PACKAGE [TFBGA] FAMILY

121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm	348
121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Sheet 2	349
121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Land Pattern	350

THERMAL LEADLESS ARRAY PACKAGE [TLA] FAMILY

20-Lead Thermal Leadless Array Package (TL) 3x3x0.7 mm Exposed Pad	352
20-Lead Thermal Leadless Array Package (TL) 3x3x0.7 mm Exposed Pad Sheet 2	353
36-Lead Thermal Leadless Array Package (TL) 5x5x0.9 mm Exposed Pad	354
36-Lead Thermal Leadless Array Package (TL) 5x5x0.9 mm Exposed Pad Sheet 2	355
44-Lead Thermal Leadless Array Package (TL) 6x6x0.9 mm Exposed Pad	356
44-Lead Thermal Leadless Array Package (TL) 6x6x0.9 mm Exposed Pad Sheet 2	357

Package Index

NOTES:

Packaging Diagrams and Parameters

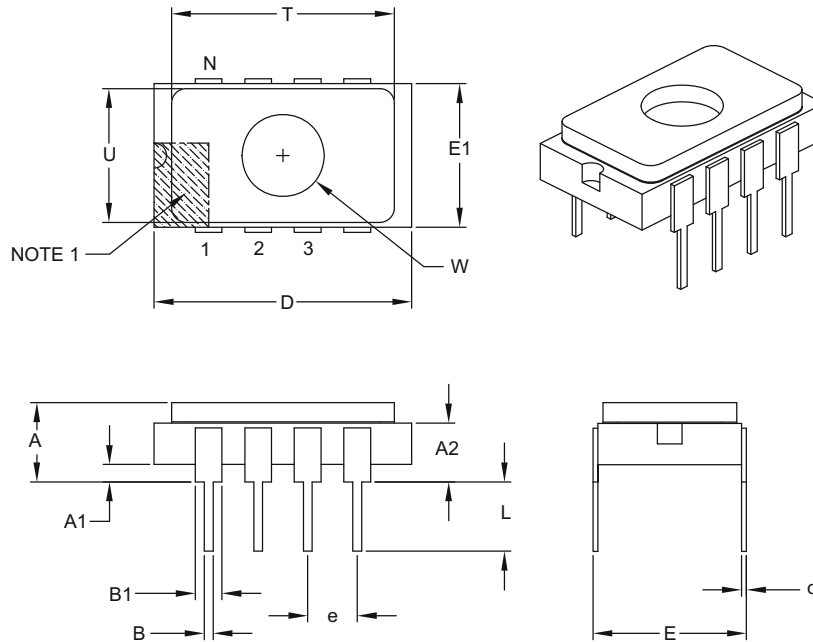
SIDEBRAZE Family

Ceramic Side Brazed Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	.085	–	.200
Top of Body to Seating Plane	A2	.103	–	.143
Standoff	A1	.025	–	.070
Package Width	E1	.280	–	.310
Overall Length	D	.500	–	.540
Tip to Seating Plane	L	.125	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	B1	.045	–	.065
Lower Lead Width	B	.015	–	.022
Overall Row Spacing §	E	.300	–	.325
Window Diameter	W	.161	–	.171
Lid Length	T	.440	–	.460
Lid Width	U	.260	–	.280

Notes:

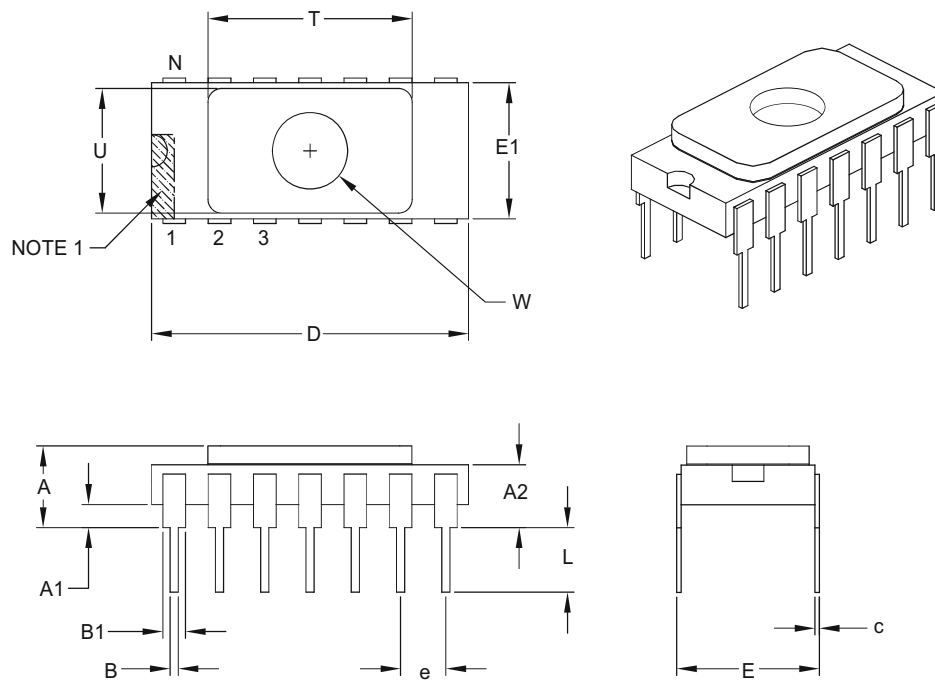
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension, Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	.085	–	.200
Top of Body to Seating Plane	A2	.100	–	.140
Standoff	A1	.025	–	.070
Package Width	E1	.280	–	.310
Overall Length	D	.693	–	.770
Tip to Seating Plane	L	.125	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	B1	.045	–	.065
Lower Lead Width	B	.015	–	.022
Overall Row Spacing §	E	.300	–	.325
Window Diameter	W	.161	–	.171
Lid Length	T	.440	–	.460
Lid Width	U	.260	–	.280

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

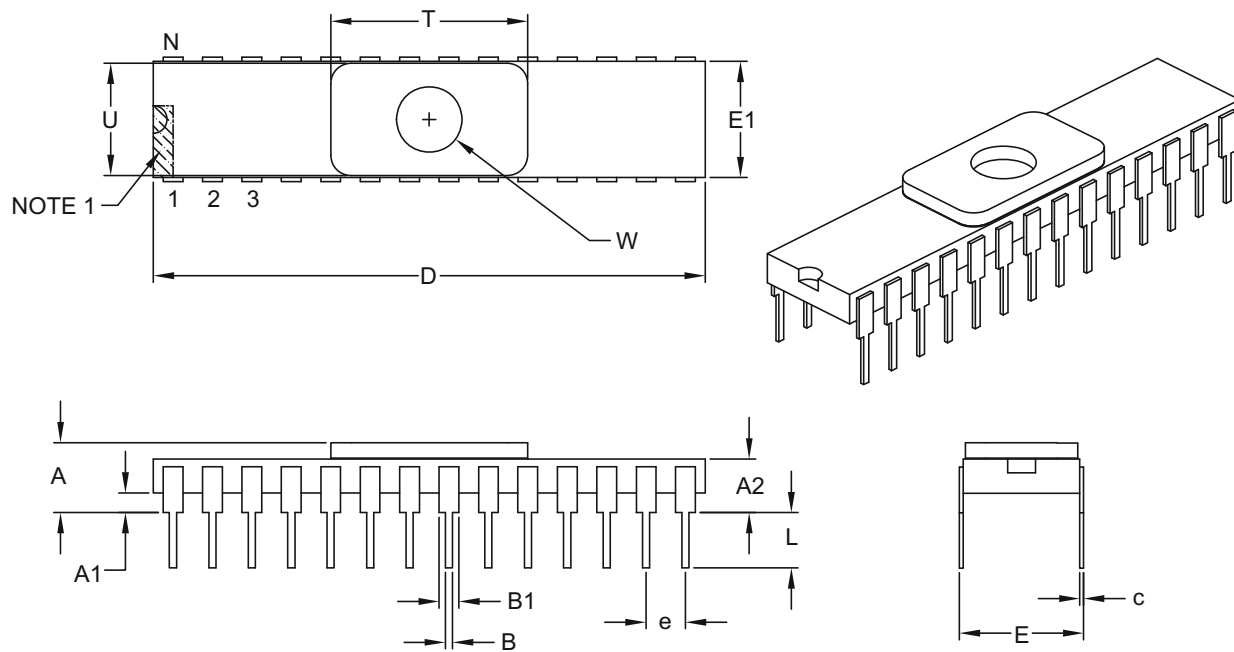
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-107B

Packaging Diagrams and Parameters

28-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		.100 BSC		
Top to Seating Plane	A		.085	–	.200
Top of Body to Seating Plane	A2		.115	–	.155
Standoff	A1		.025	–	.070
Package Width	E1		.280	–	.310
Overall Length	D		1.380	–	1.420
Tip to Seating Plane	L		.125	–	.200
Lead Thickness	c		.008	–	.015
Upper Lead Width	B1		.045	–	.065
Lower Lead Width	B		.015	–	.022
Overall Row Spacing §	E		.300	–	.325
Window Diameter	W		.161	–	.171
Lid Length	T		.490	–	.510
Lid Width	U		.275	–	.295

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-084B

Packaging Diagrams and Parameters

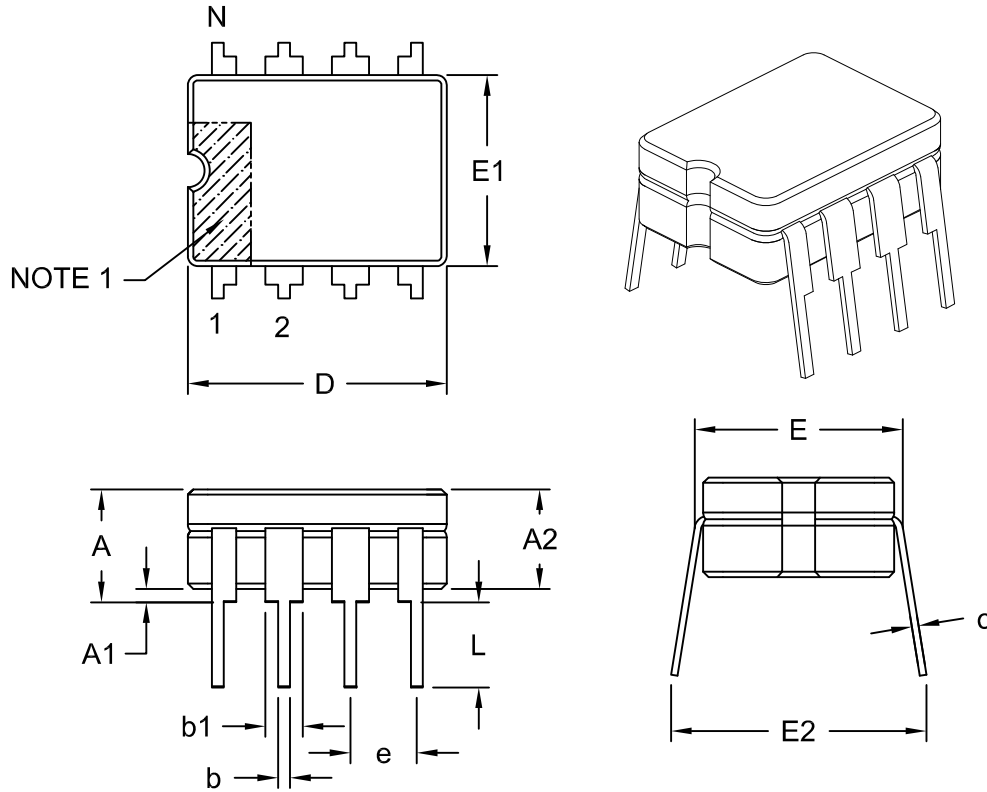
CERDIP Family

Ceramic Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Ceramic Dual In-Line (JA) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.320
Ceramic Pkg. Width	E1	.230	.248	.300
Overall Length	D	.370	.380	.400
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.314	-	.410

Notes:

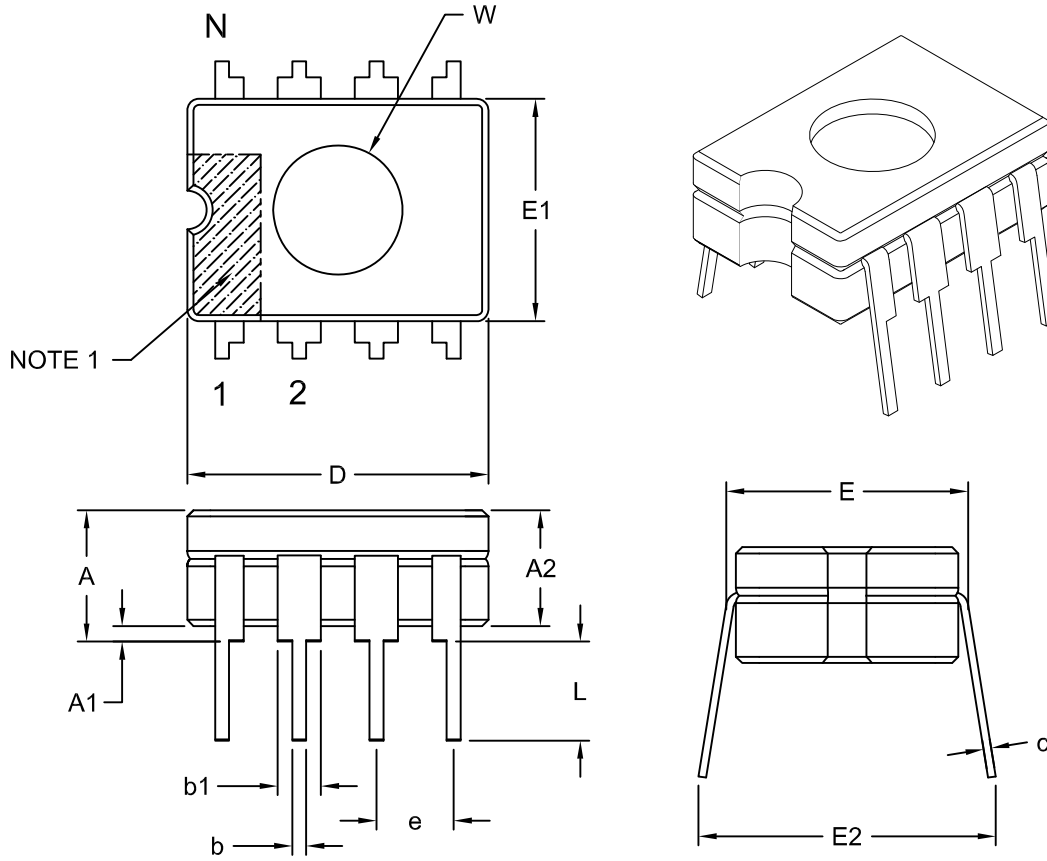
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

8-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.320
Ceramic Pkg. Width	E1	.230	.248	.300
Overall Length	D	.370	.380	.400
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.314	-	.410
Window Diameter	W	.267	.270	.273

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

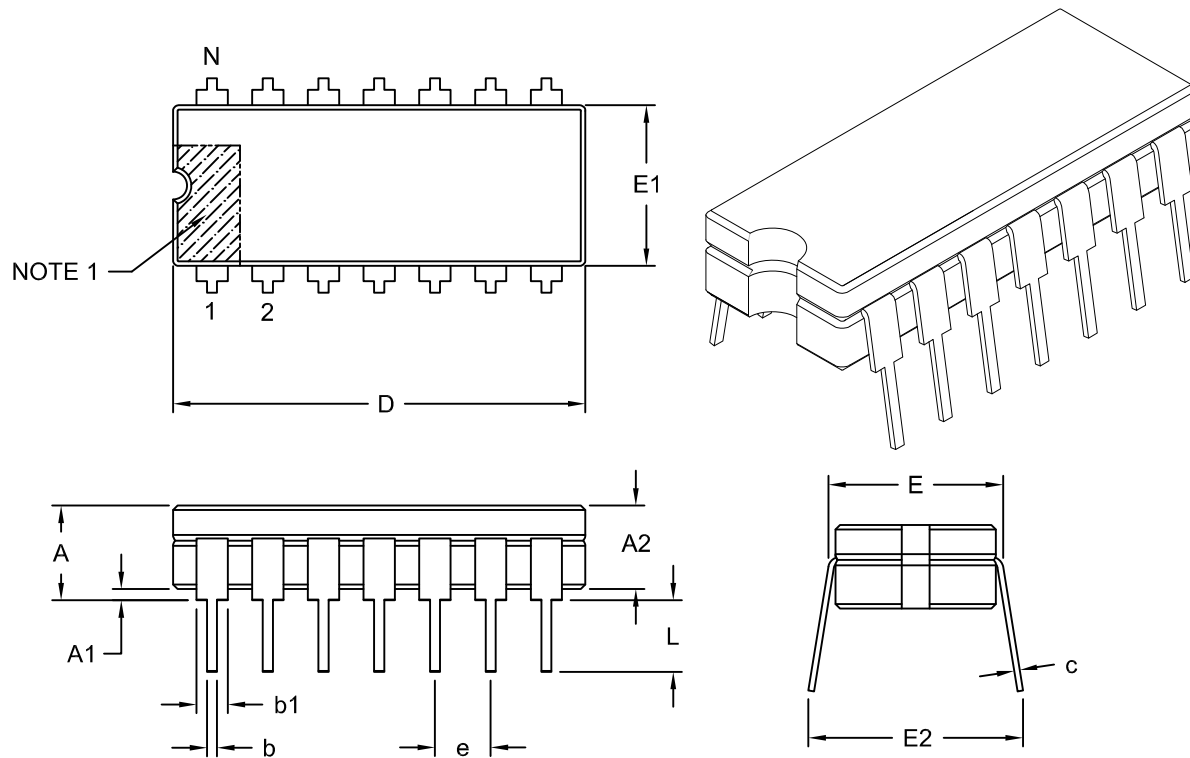
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-027C

Packaging Diagrams and Parameters

14-Lead Ceramic Dual In-Line (JD) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder-to-Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.230	.288	.300
Overall Length	D	.740	.760	.780
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

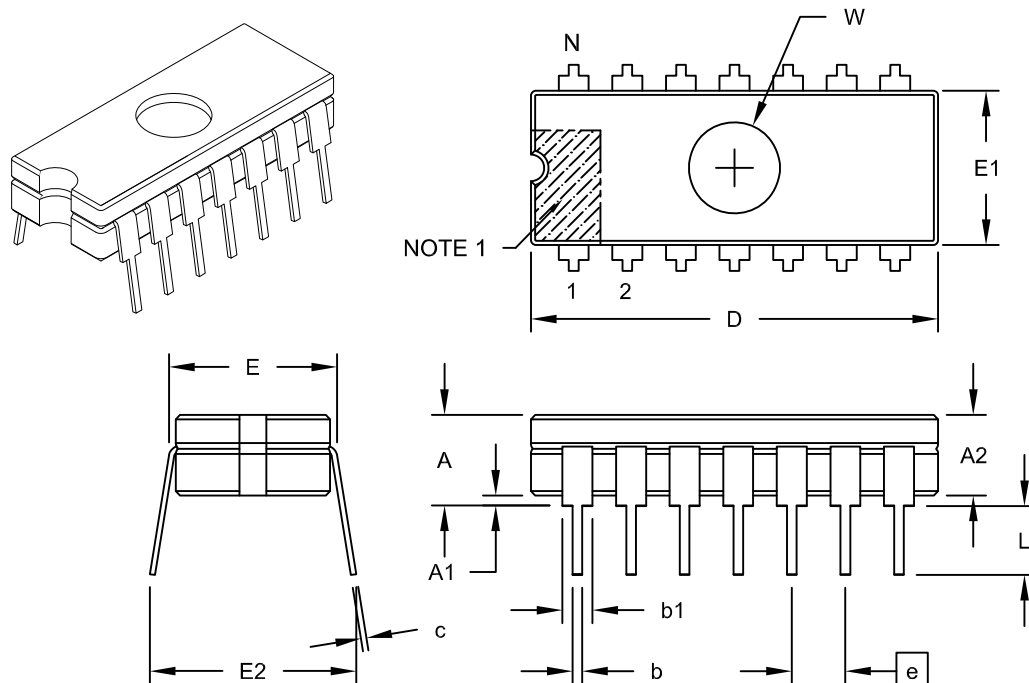
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-002C

Packaging Diagrams and Parameters

14-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.230	.288	.300
Overall Length	D	.740	.760	.780
Window Diameter	W	.125	.170	.210
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

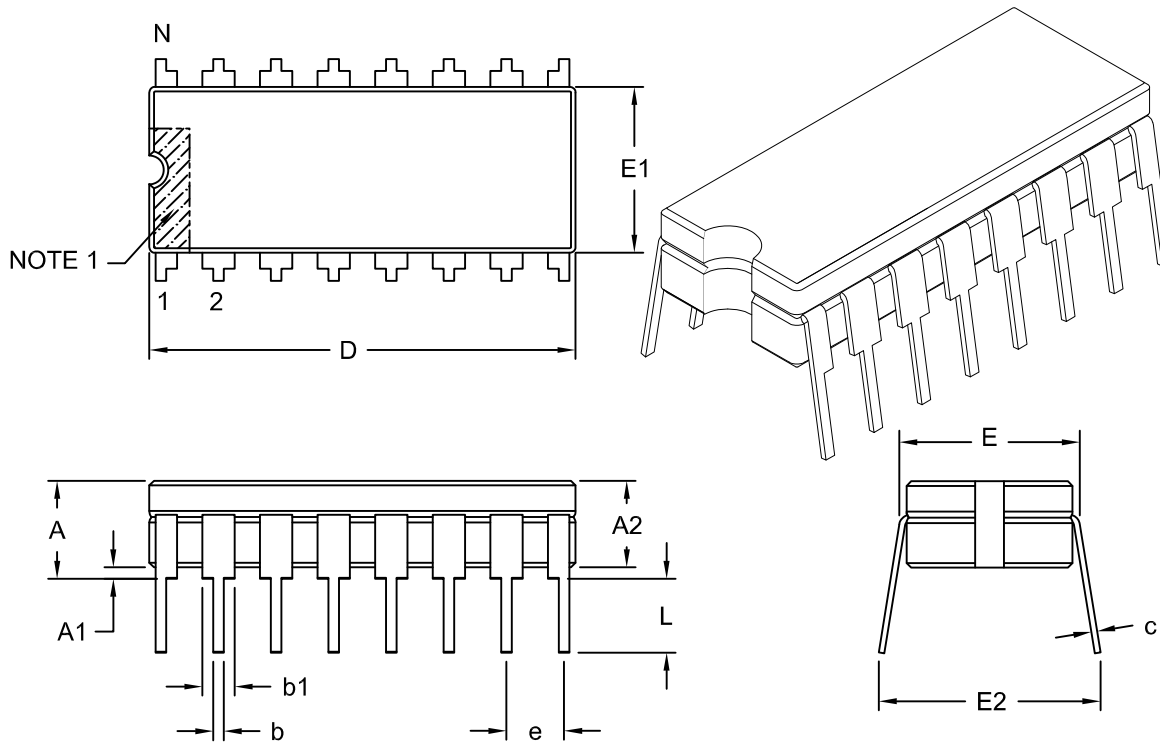
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-099C

Packaging Diagrams and Parameters

16-Lead Ceramic Dual In-Line (JE) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.245	.288	.300
Overall Length	D	.740	.760	.780
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

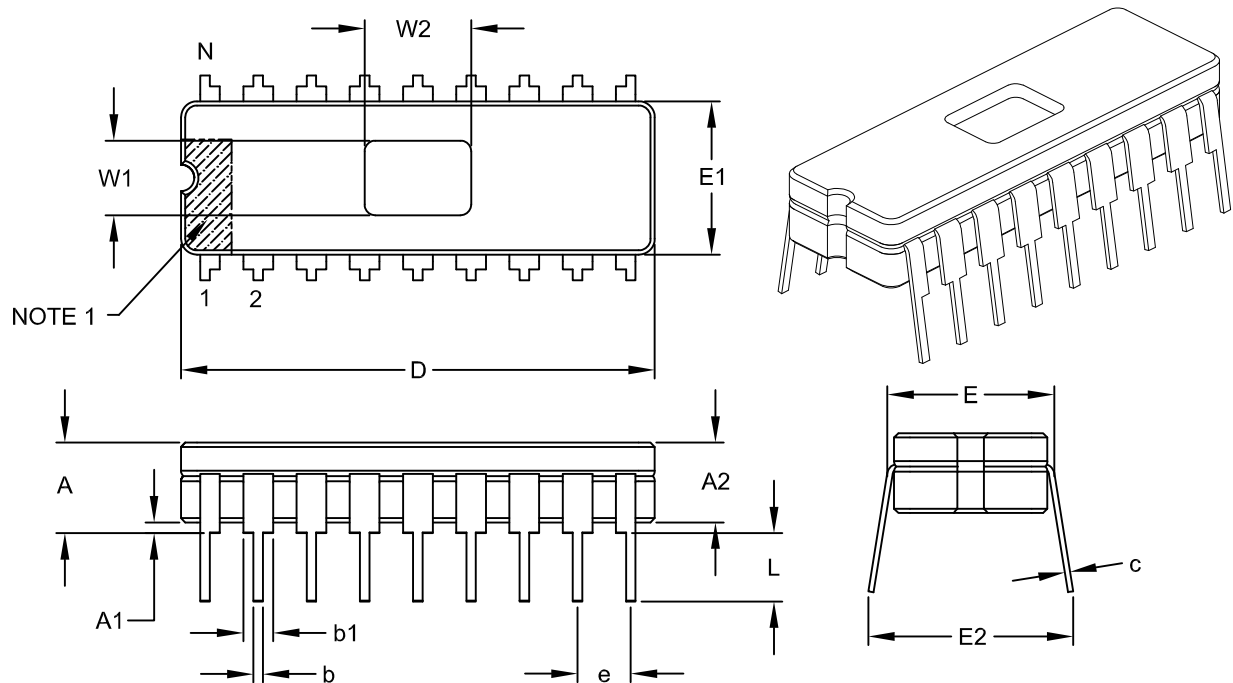
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-003C

Packaging Diagrams and Parameters

18-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Pkg. Width	E1	.280	.288	.296
Overall Length	D	.882	.890	.910
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Width	W1	.130	.140	.150
Window Length	W2	.190	.200	.210

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

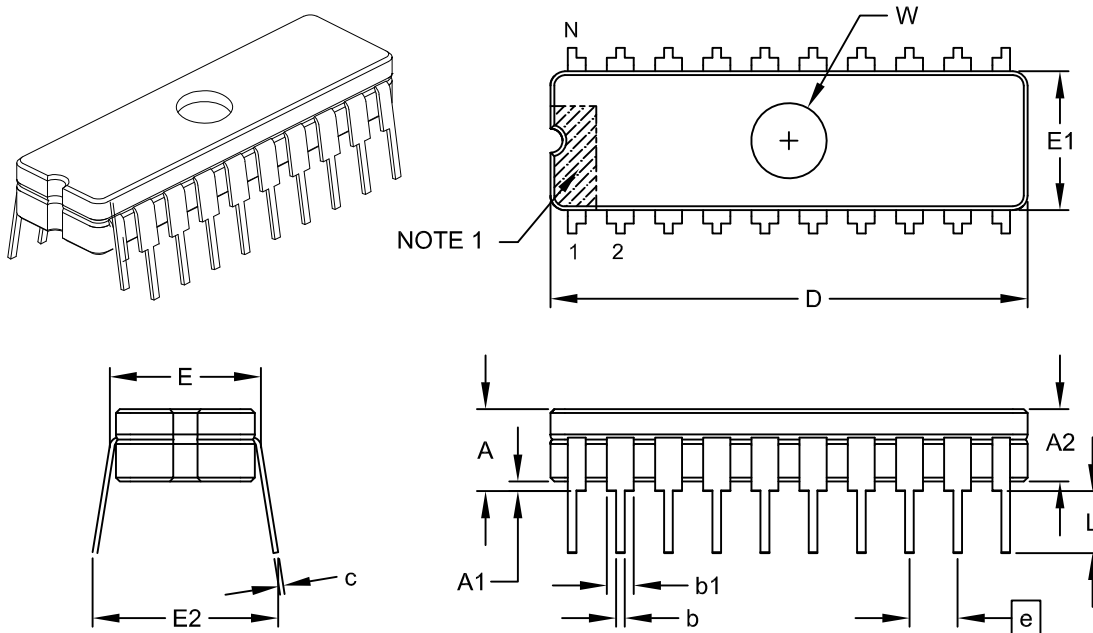
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-010C

Packaging Diagrams and Parameters

20-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	.942	.950	.970
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Diameter	W	.167	.170	.173

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

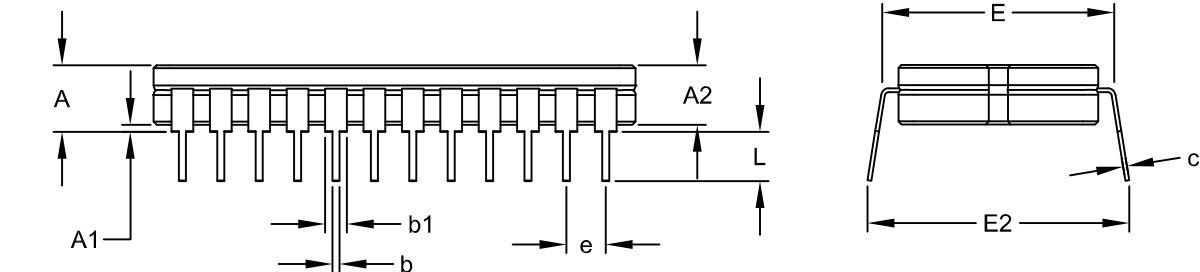
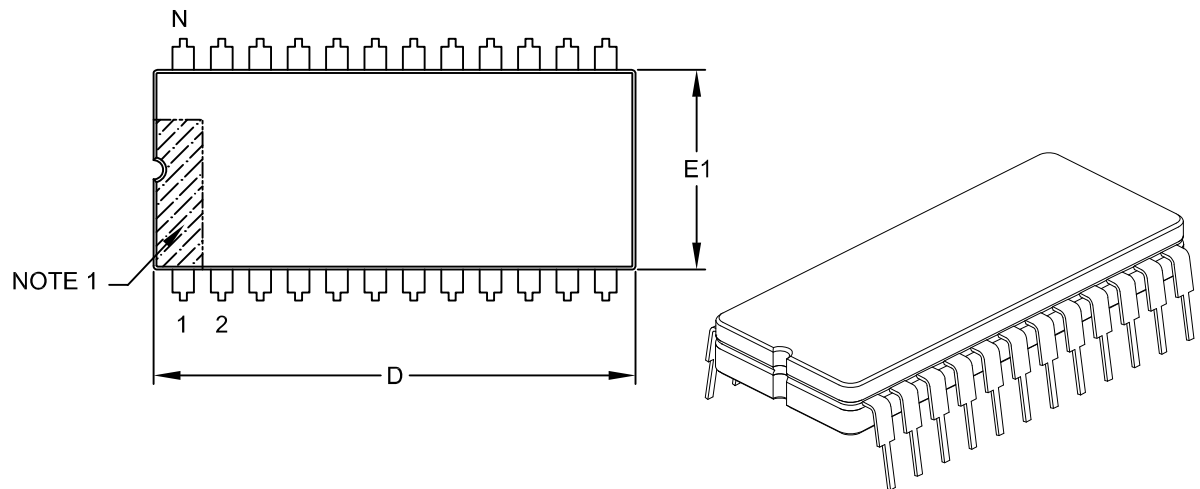
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-115C

Packaging Diagrams and Parameters

24-Lead Ceramic Dual In-Line (JG) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Pkg. Width	E1	.510	.520	.540
Overall Length	D	1.240	1.250	1.270
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

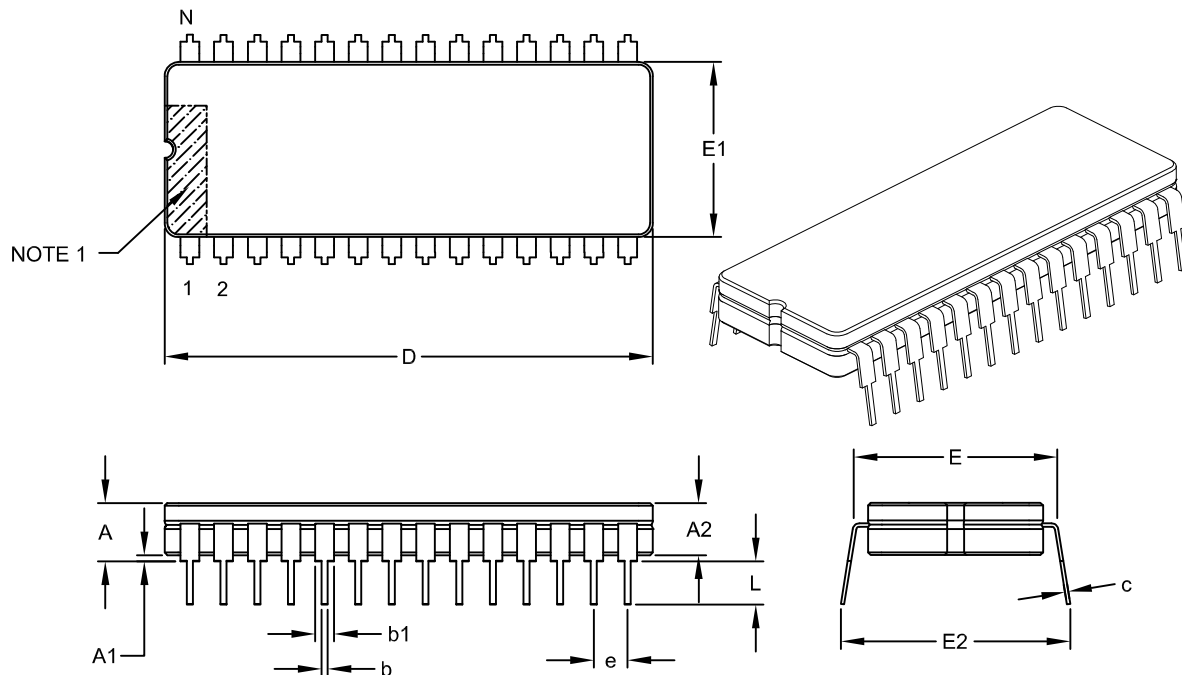
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line (JN) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Pkg. Width	E1	.510	.520	.540
Overall Length	D	1.440	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

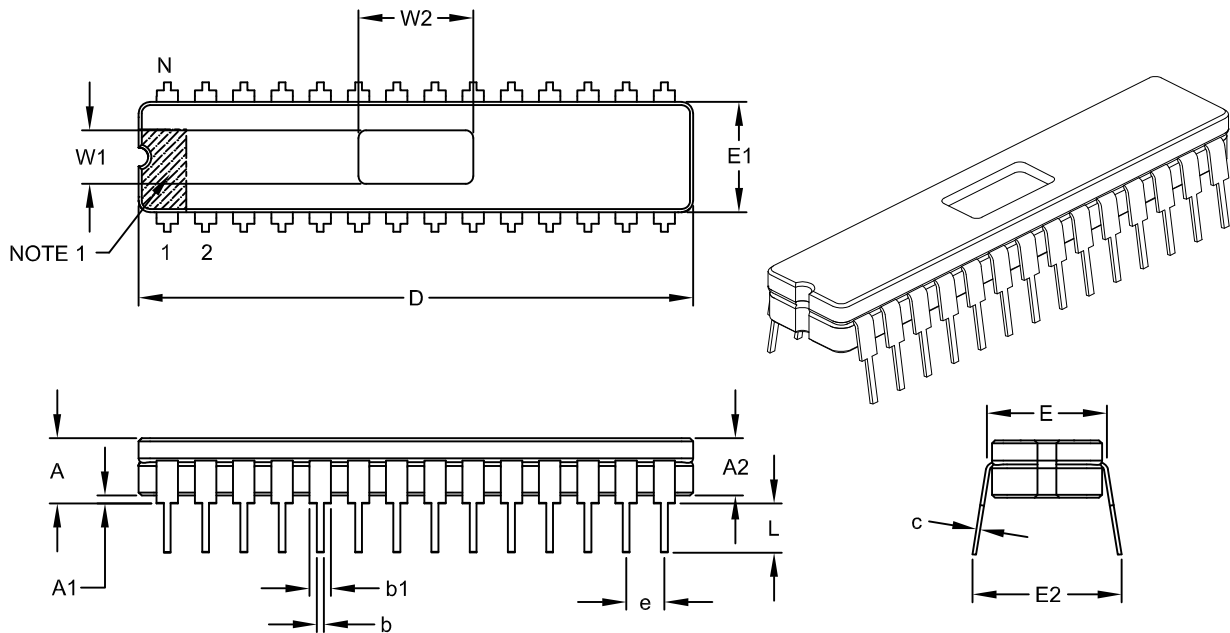
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-006C

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	1.442	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Width	W1	.130	.140	.150
Window Length	W2	.290	.300	.310

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

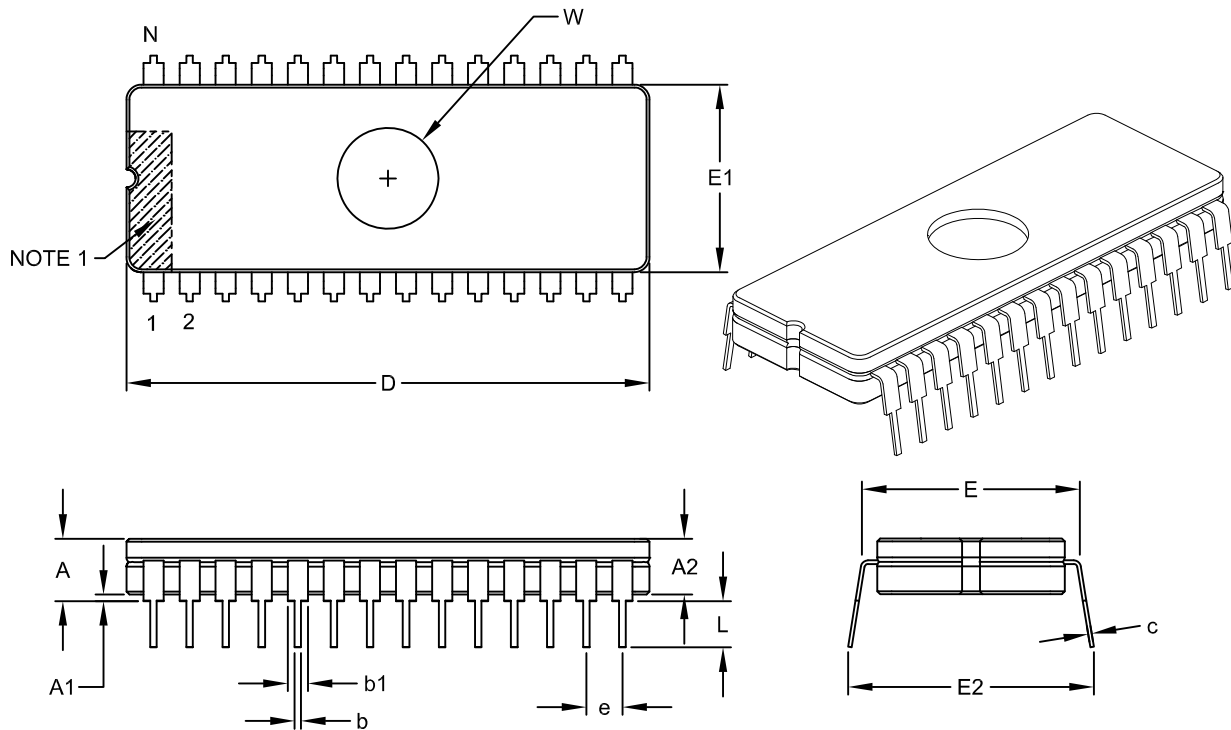
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-080C

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.540
Overall Length	D	1.440	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.270	.280	.290

Notes:

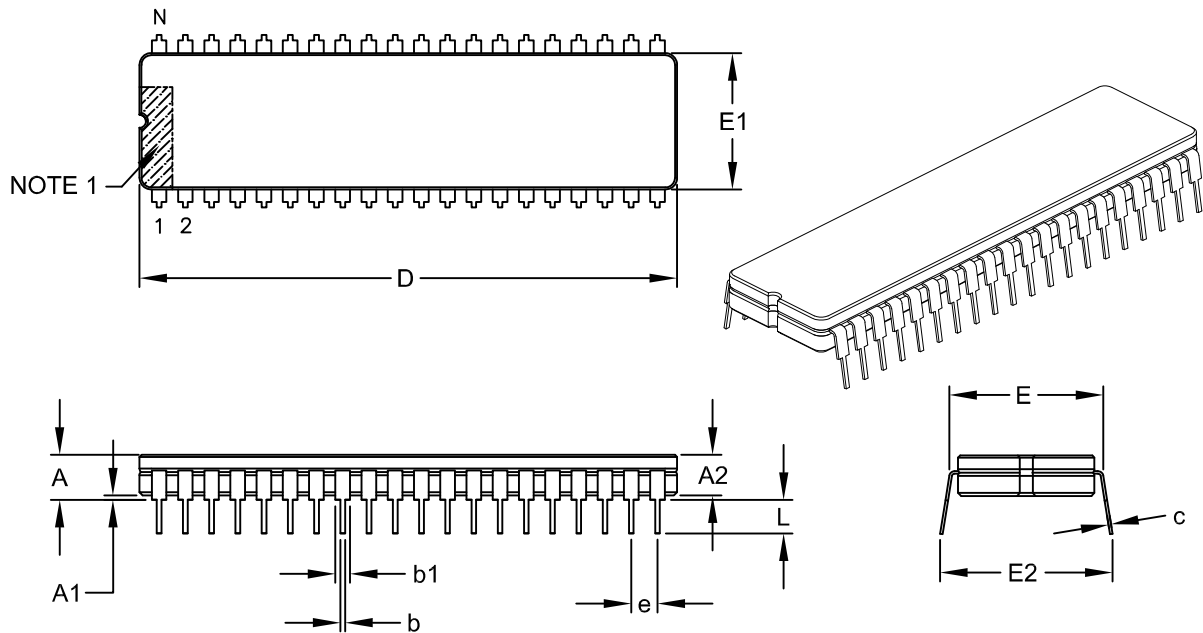
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Ceramic Dual In-Line (JK) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		Units	INCHES		
			MIN	NOM	MAX
Number of Pins	N		40		
Pitch	e		.100 BSC		
Top to Seating Plane	A	-	-	.225	
Ceramic Package Height	A2	.140	-	.175	
Base to Seating Plane §	A1	.015	-	-	
Shoulder to Shoulder Width	E	.590	-	.625	
Ceramic Package Width	E1	.510	.520	.540	
Overall Length	D	2.030	2.050	2.070	
Tip to Seating Plane	L	.125	-	.200	
Lead Thickness	c	.008	-	.015	
Upper Lead Width	b1	.045	-	.065	
Lower Lead Width	b	.015	-	.023	
Overall Row Spacing	E2	.620	-	.710	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

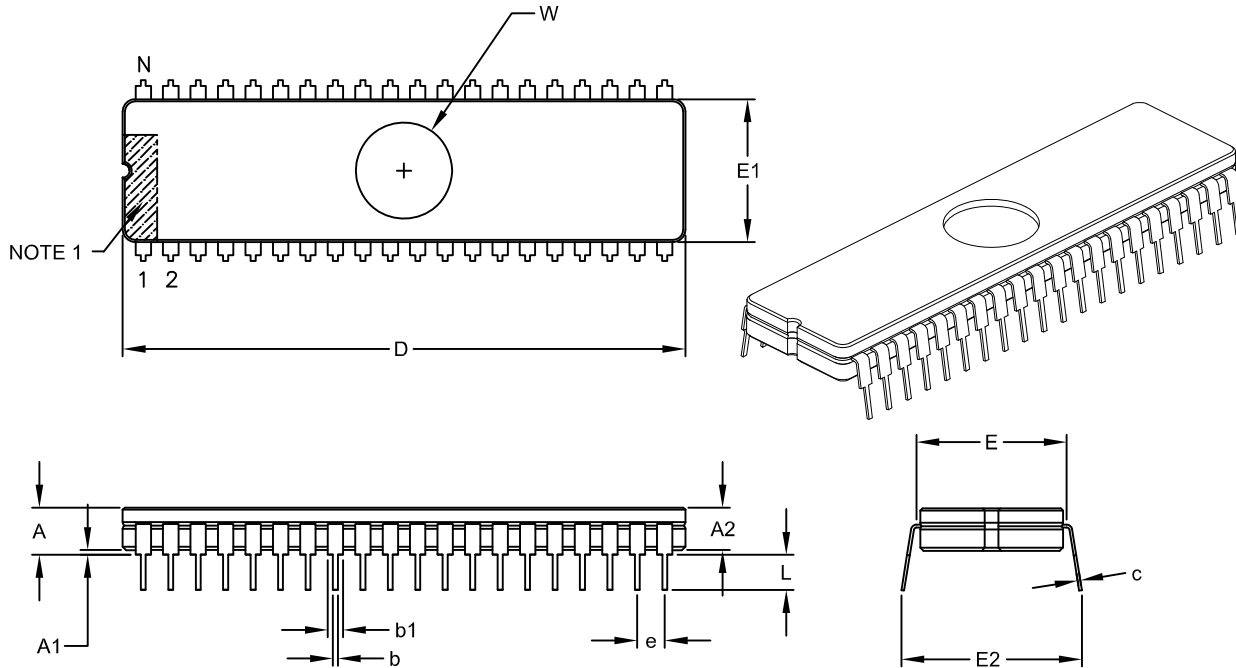
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-008C

Packaging Diagrams and Parameters

40-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.583
Overall Length	D	2.030	2.050	2.070
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.340	.350	.360

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

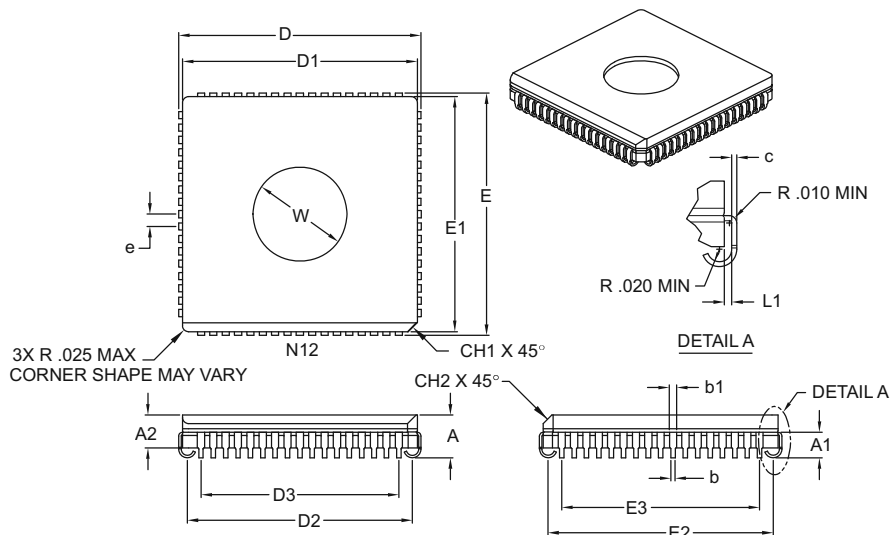
CERQUAD Family

Ceramic Leaded Chip Carrier Packages

Packaging Diagrams and Parameters

68-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	68		
Pitch	e	.050 BSC		
Overall Height	A	.155	.172	.190
Package Thickness	A2	.132 REF		
Lead Height	A1	0.90	.100	.120
Side Chamfer	CH2	.035 REF		
Corner Chamfer	CH1	.040 REF		
Overall Package Width	E	.985	.990	.995
Overall Package Length	D	.985	.990	.995
Ceramic Package Width	E1	.930	.950	.965
Ceramic Package Length	D1	.930	.950	.965
Overall Lead Centers	E3	.800 REF		
Overall Lead Centers	D3	.800 REF		
Footprint Width	E2	.880	.910	.940
Footprint Length	D2	.880	.910	.940
Lead Length	L1	.006	–	–
Lead Thickness	c	.006	.007	.010
Upper Lead Width	b1	.026	.029	.032
Lower Lead Width	b	.017	.019	.021
Window Diameter	W	.370	.380	.390

Notes:

- Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

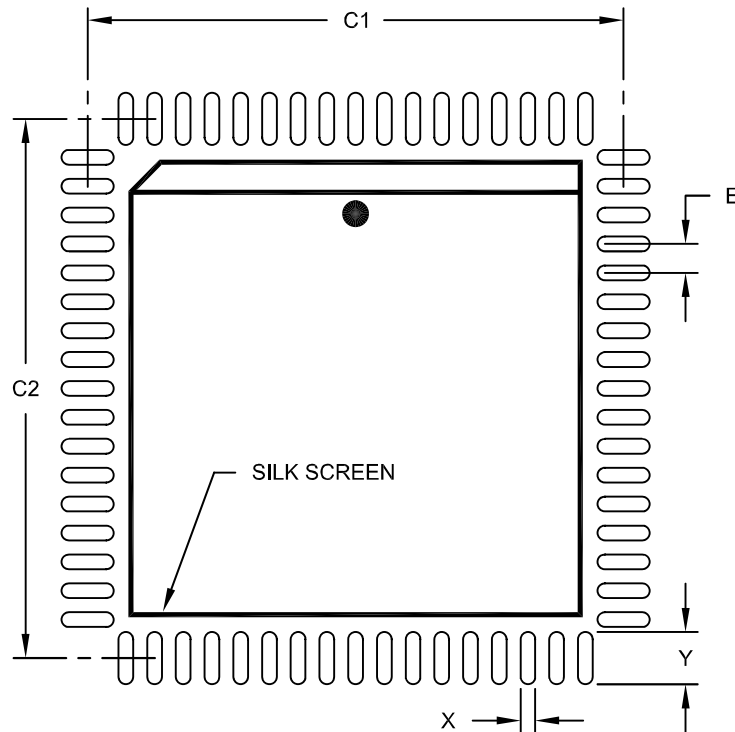
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-097B

Land Pattern (Footprint)

68-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.933	
Contact Pad Spacing	C2		.933	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

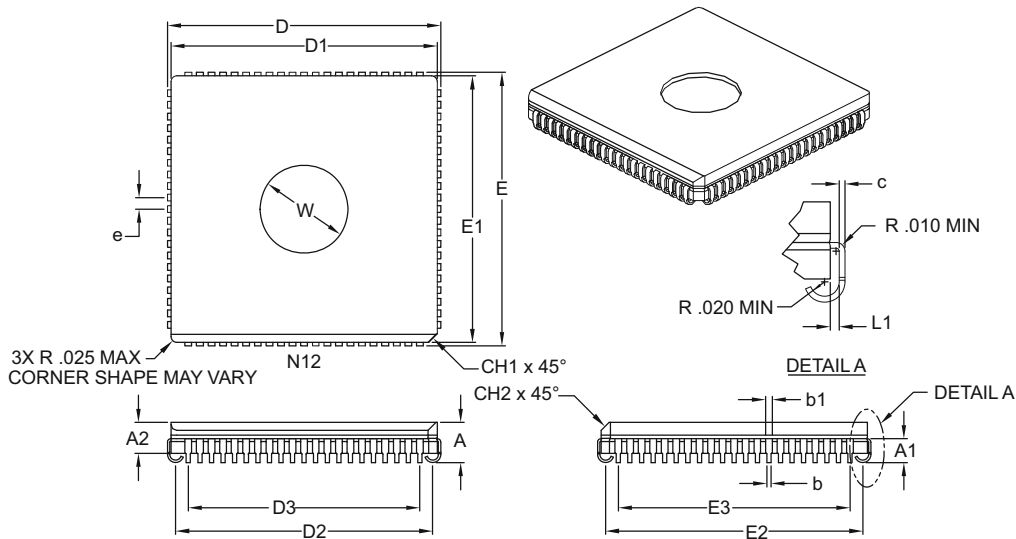
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2097A

Packaging Diagrams and Parameters

84-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	84		
Pitch	e	.050 BSC		
Overall Height	A	.155	.172	.190
Package Thickness	A2	.132 REF		
Lead Height	A1	0.90	.100	.120
Side Chamfer	CH2	.035 REF		
Corner Chamfer	CH1	.040 REF		
Overall Package Width	E	1.185	1.190	1.195
Overall Package Length	D	1.185	1.190	1.195
Ceramic Package Width	E1	1.130	1.150	1.165
Ceramic Package Length	D1	1.130	1.150	1.165
Overall Lead Centers	E3	1.00 REF		
Overall Lead Centers	D3	1.00 REF		
Footprint Width	E2	1.080	1.110	1.140
Footprint Length	D2	1.080	1.110	1.140
Lead Length	L1	.006	–	–
Lead Thickness	c	.006	.007	.010
Lower Lead Width	b	.017	.019	.021
Upper Lead Width	b1	.026	.029	.032
Window Diameter	W	.395	.400	.405

Notes:

- Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

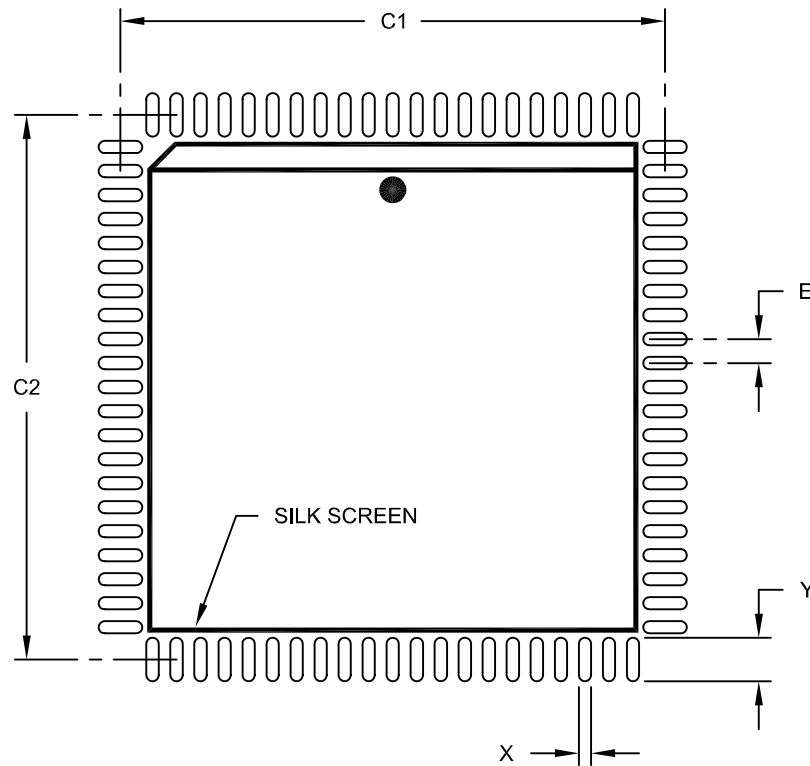
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-112B

Land Pattern (Footprint)

84-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E		.050	
Contact Pad Spacing	C1		1.134	
Contact Pad Spacing	C2		1.134	
Contact Pad Width (X84)	X			.026
Contact Pad Length (X84)	Y			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2112A



MICROCHIP

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

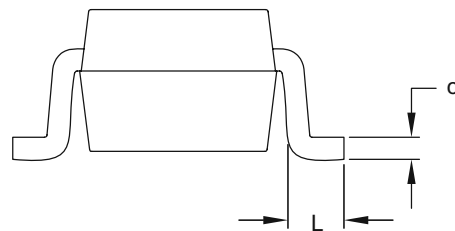
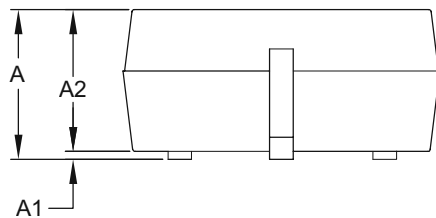
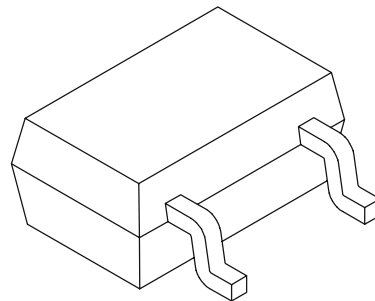
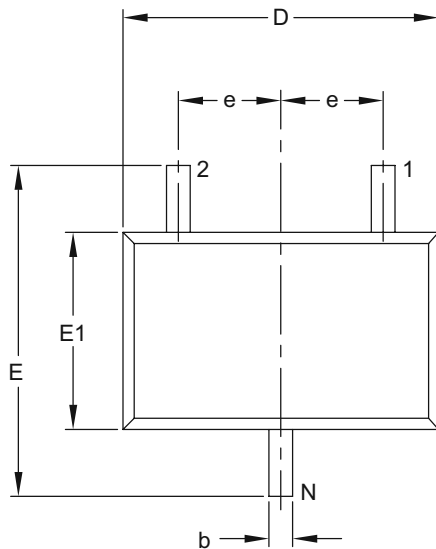
SOT Family

Small Outline Transistor Packages

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	–	1.10
Molded Package Thickness	A2	0.80	–	1.00
Standoff	A1	0.00	–	0.10
Overall Width	E	1.80	2.10	2.40
Molded Package Width	E1	1.15	1.25	1.35
Overall Length	D	1.80	2.00	2.25
Foot Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.15	–	0.40

Notes:

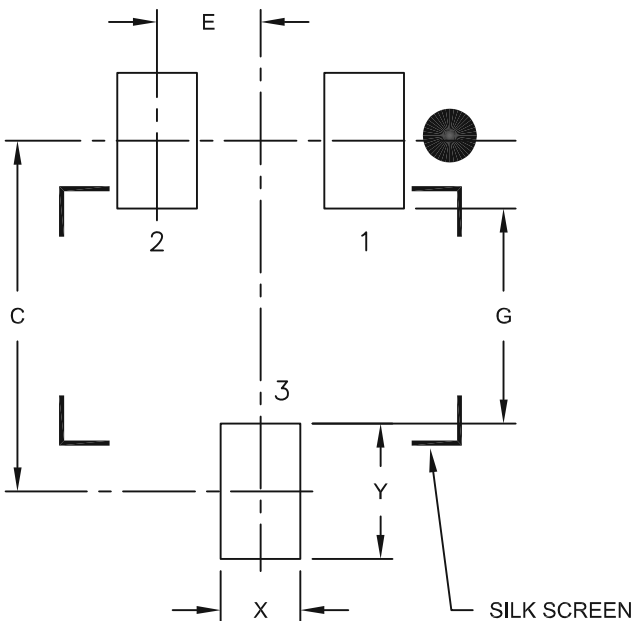
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.50
Contact Pad Length	Y			0.95
Distance Between Pads	G	1.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

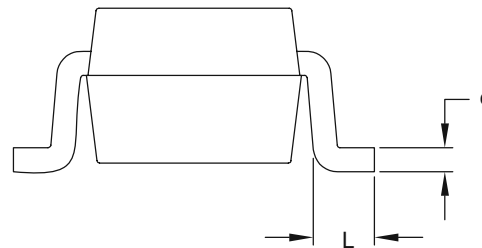
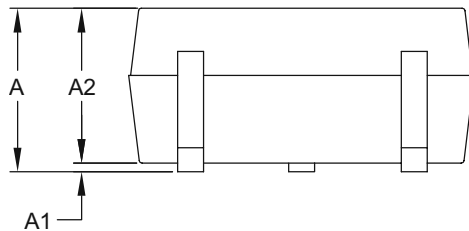
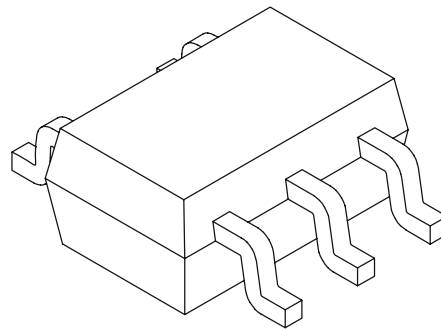
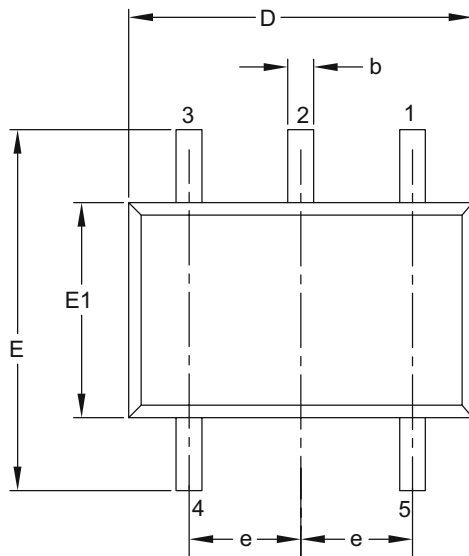
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2060A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	5		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	–	1.10
Molded Package Thickness	A2	0.80	–	1.00
Standoff	A1	0.00	–	0.10
Overall Width	E	1.80	2.10	2.40
Molded Package Width	E1	1.15	1.25	1.35
Overall Length	D	1.80	2.00	2.25
Foot Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.15	–	0.40

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

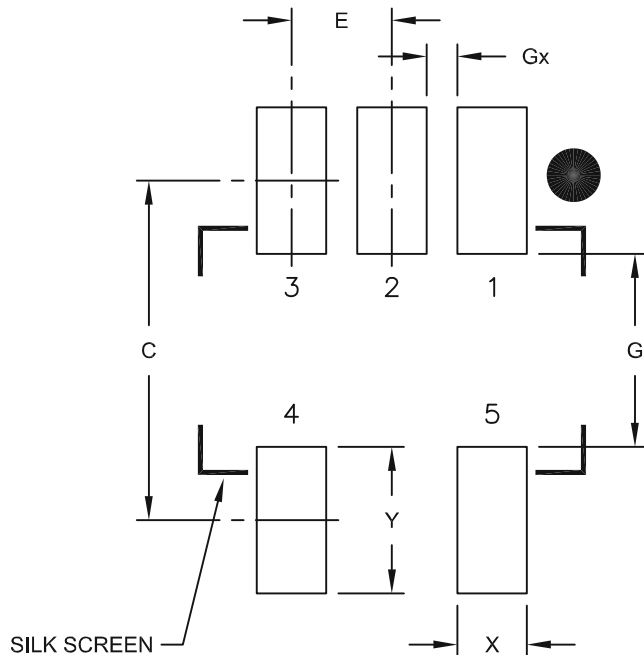
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-061B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.45
Contact Pad Length	Y			0.95
Distance Between Pads	G	1.25		
Distance Between Pads	Gx	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

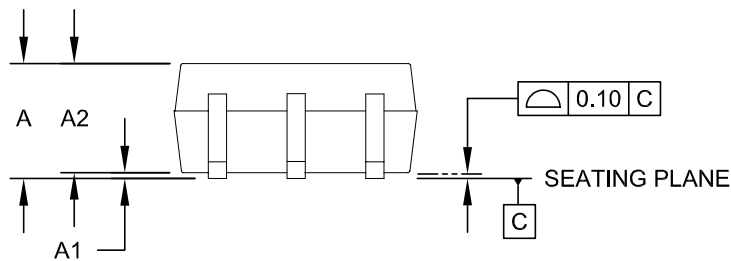
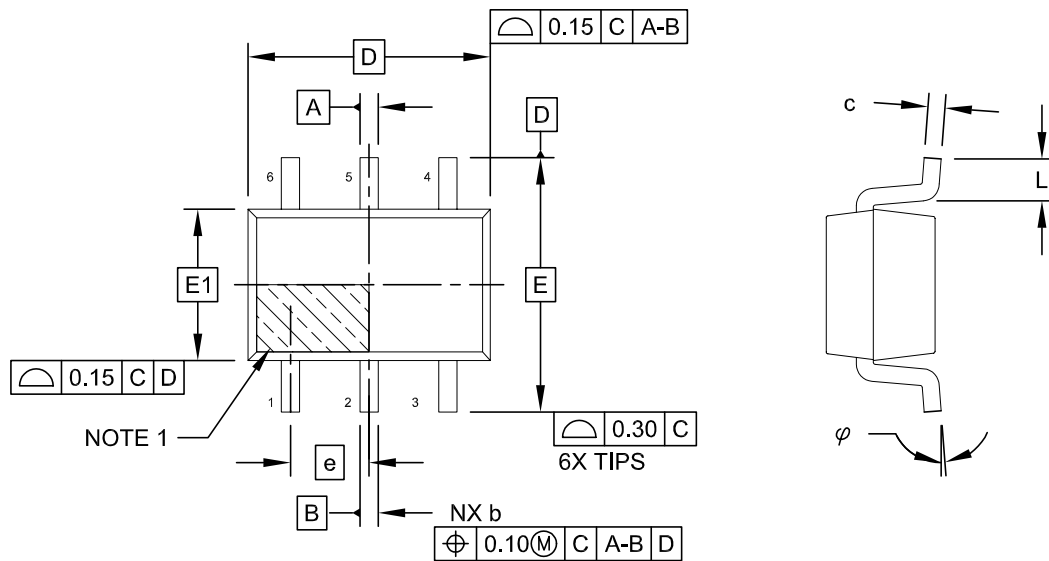
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2061A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (LT) [SC70]

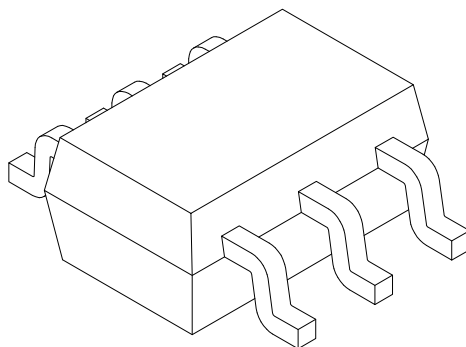
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	-	1.10
Molded Package Thickness	A2	0.70	0.90	1.00
Standoff	A1	0.00	-	0.10
Overall Width	E	2.10 BSC		
Molded Package Width	E1	1.25 BSC		
Overall Length	D	2.00 BSC		
Foot Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	-	0.22
Lead Width	b	0.15	-	0.30

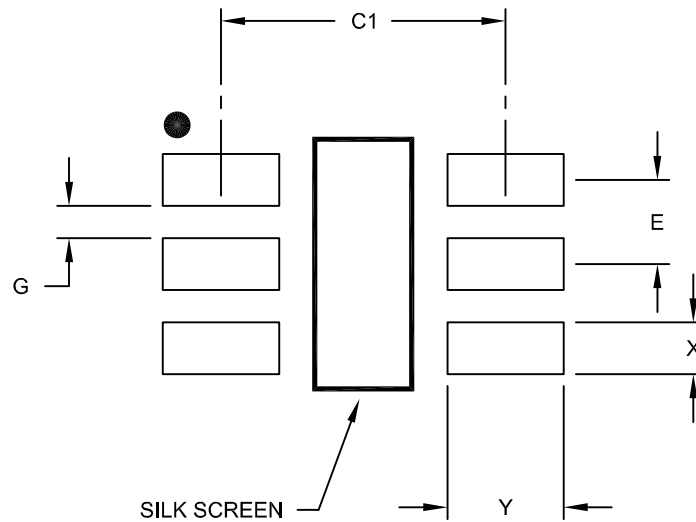
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packageing>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width (X6)	X			0.40
Contact Pad Length (X6)	Y			0.90
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

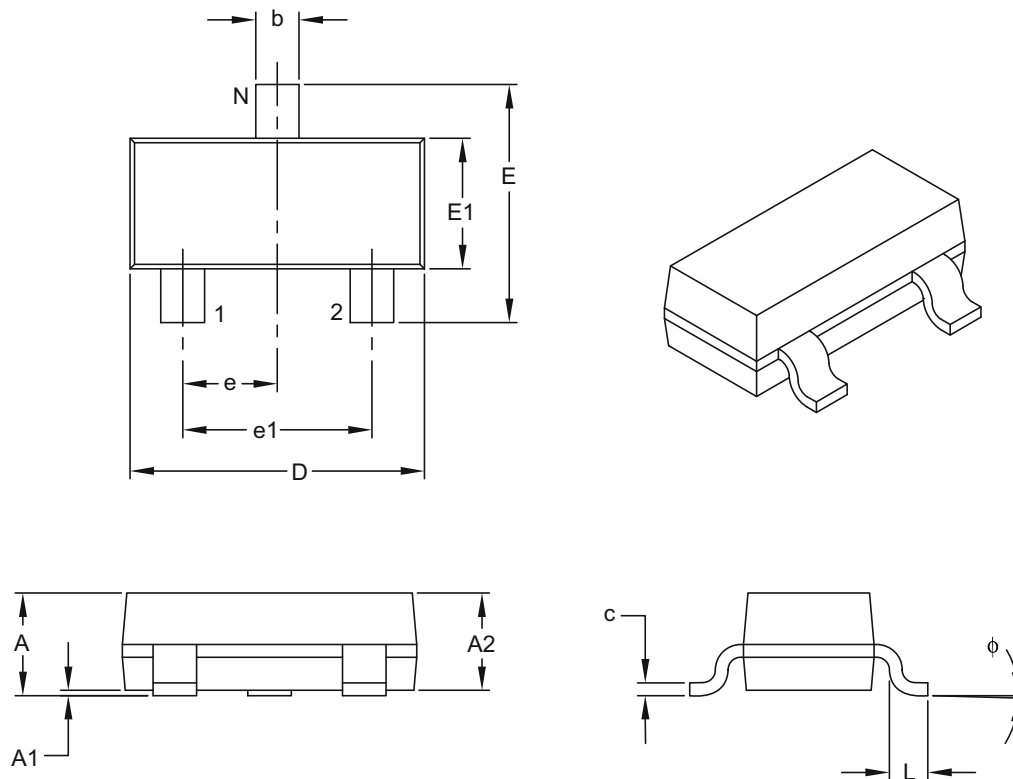
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2151A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	3		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.89	–	1.12
Molded Package Thickness	A2	0.79	0.95	1.02
Standoff	A1	0.01	–	0.10
Overall Width	E	2.10	–	2.64
Molded Package Width	E1	1.16	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Foot Angle	ϕ	0°	–	10°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.54

Notes:

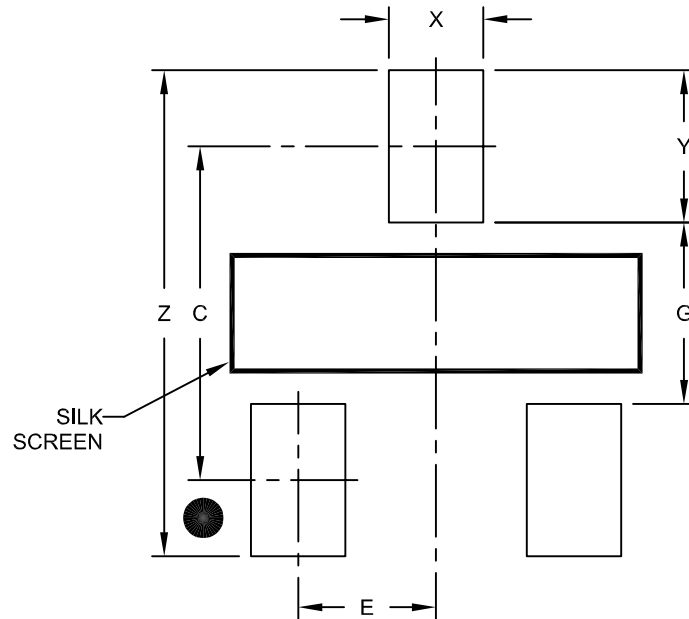
1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.30	
Contact Pad Width (X3)	X			0.65
Contact Pad Length (X3)	Y			1.05
Distance Between Pads	G	1.25		
Overall Width	Z			3.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

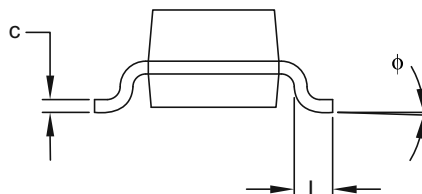
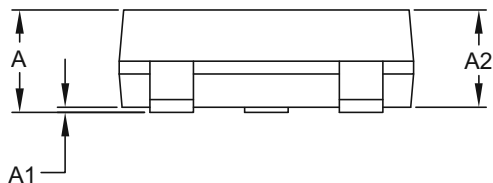
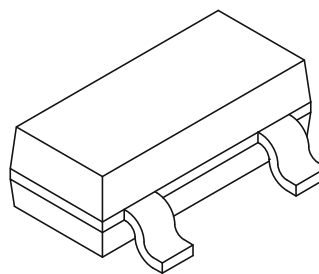
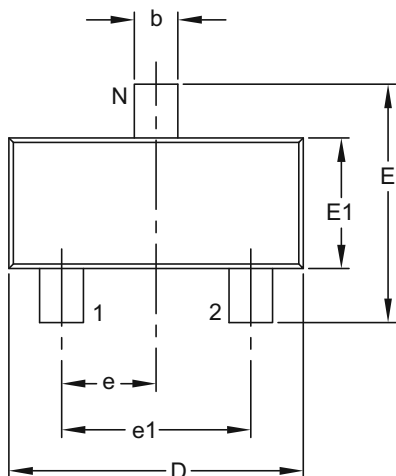
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	3		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.89	–	1.12
Molded Package Thickness	A2	0.79	0.95	1.02
Standoff	A1	0.01	–	0.10
Overall Width	E	2.10	–	2.64
Molded Package Width	E1	1.16	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Foot Angle	φ	0°	–	10°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.54

Notes:

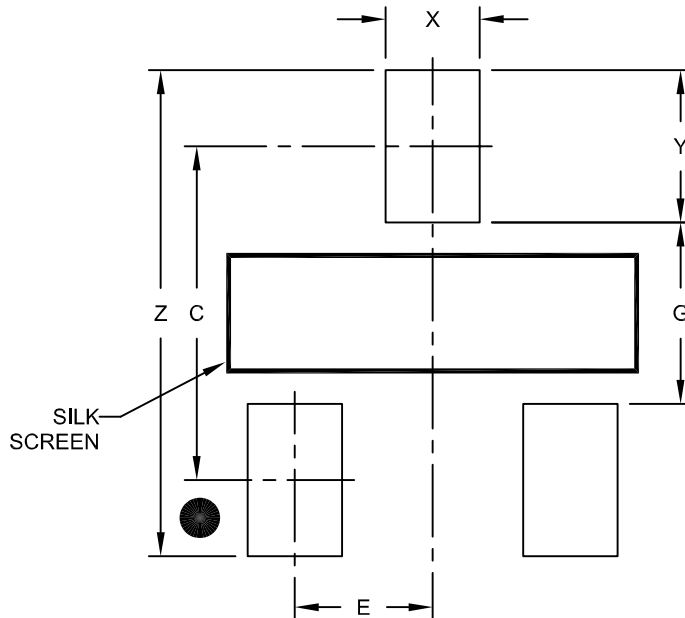
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.30	
Contact Pad Width (X3)	X			0.65
Contact Pad Length (X3)	Y			1.05
Distance Between Pads	G	1.25		
Overall Width	Z			3.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

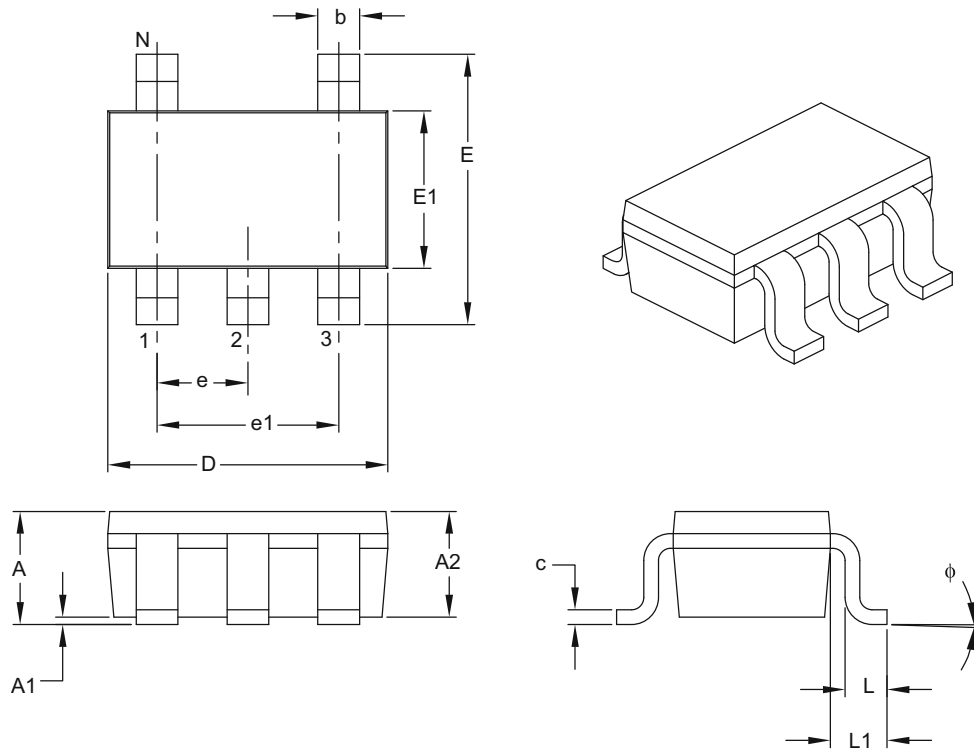
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	5		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

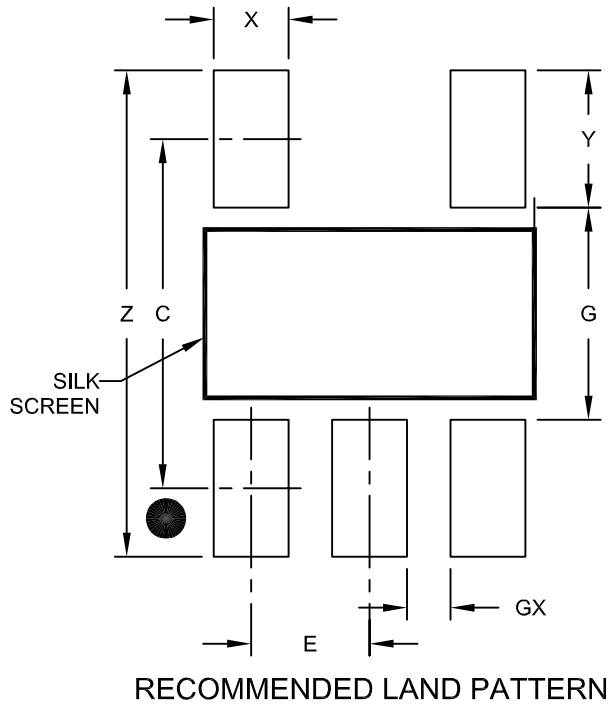
1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

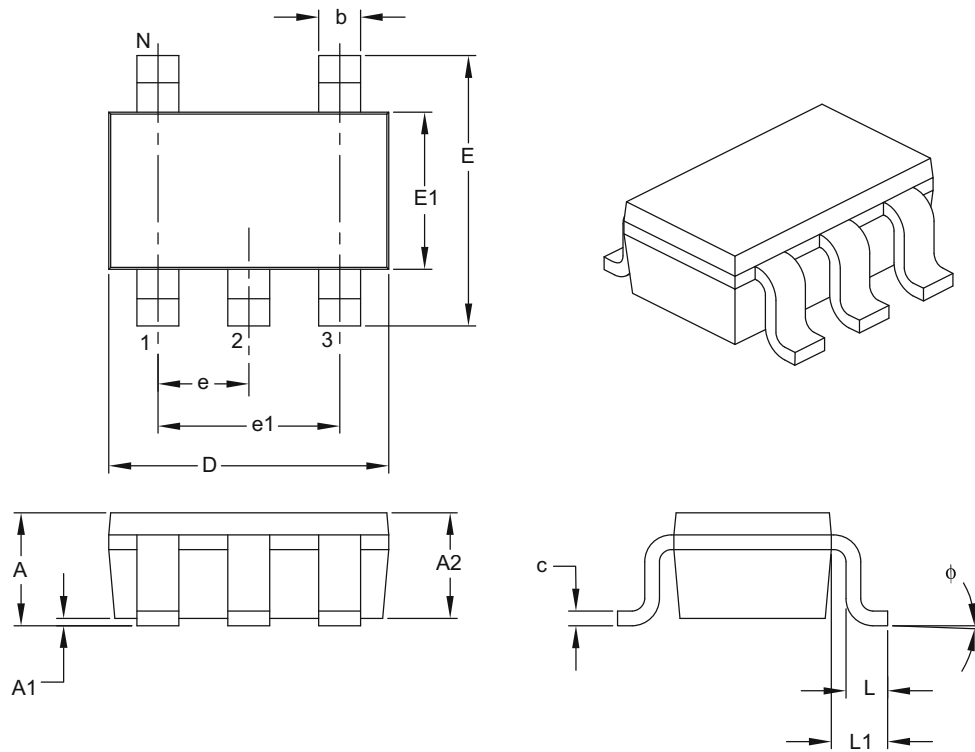
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	5		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	φ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

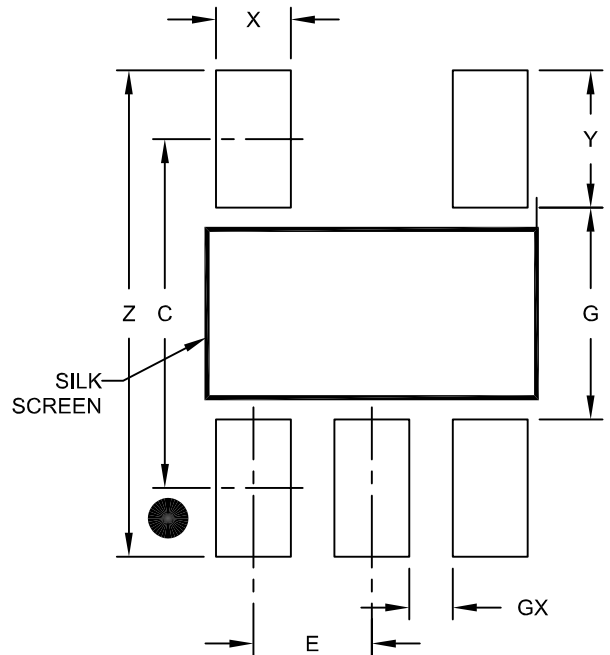
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

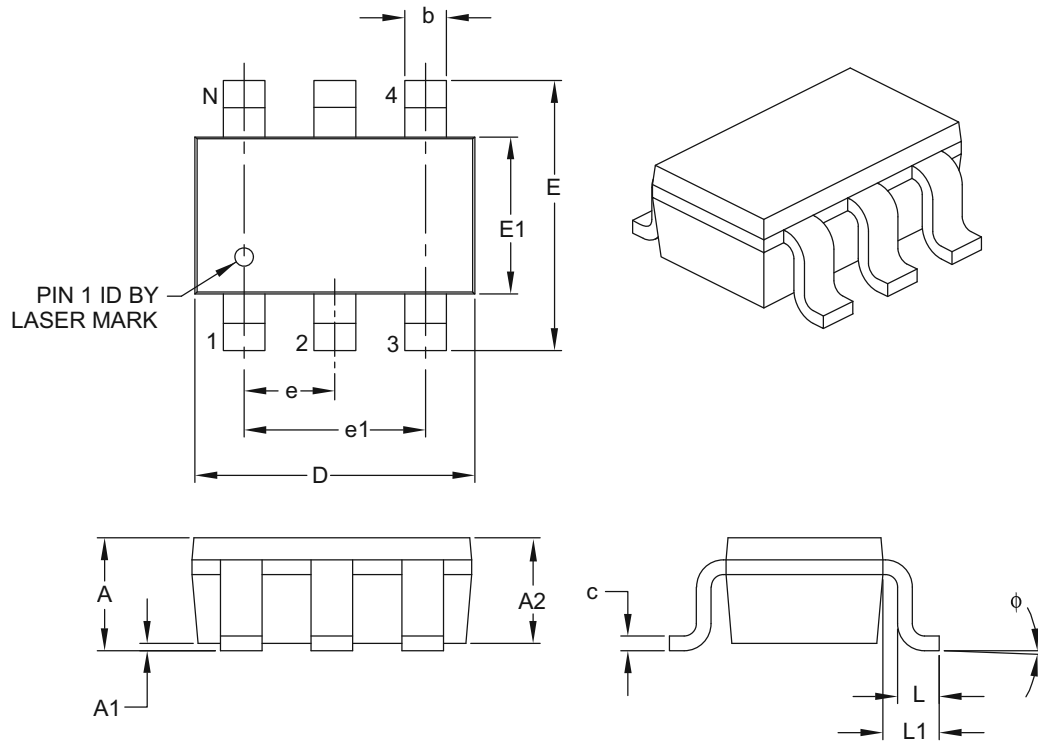
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0,95 BSC		
Outside Lead Pitch	e1	1,90 BSC		
Overall Height	A	0,90	–	1,45
Molded Package Thickness	A2	0,89	–	1,30
Standoff	A1	0,00	–	0,15
Overall Width	E	2,20	–	3,20
Molded Package Width	E1	1,30	–	1,80
Overall Length	D	2,70	–	3,10
Foot Length	L	0,10	–	0,60
Footprint	L1	0,35	–	0,80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0,08	–	0,26
Lead Width	b	0,20	–	0,51

Notes:

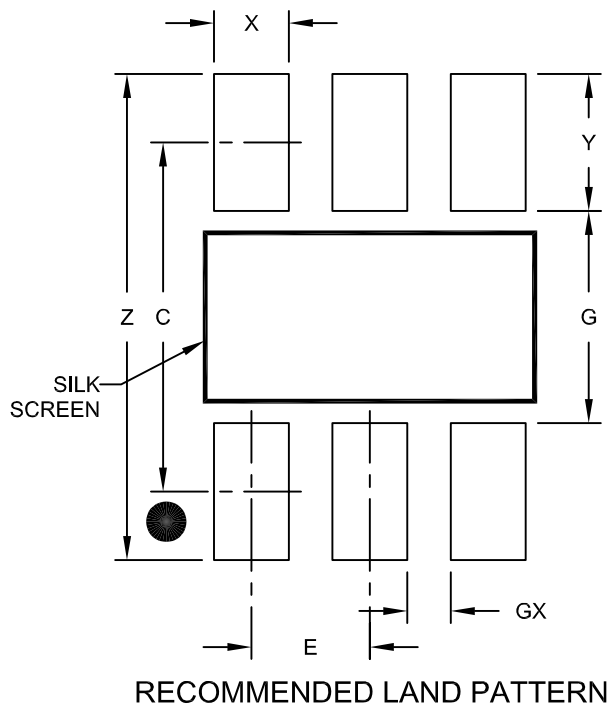
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

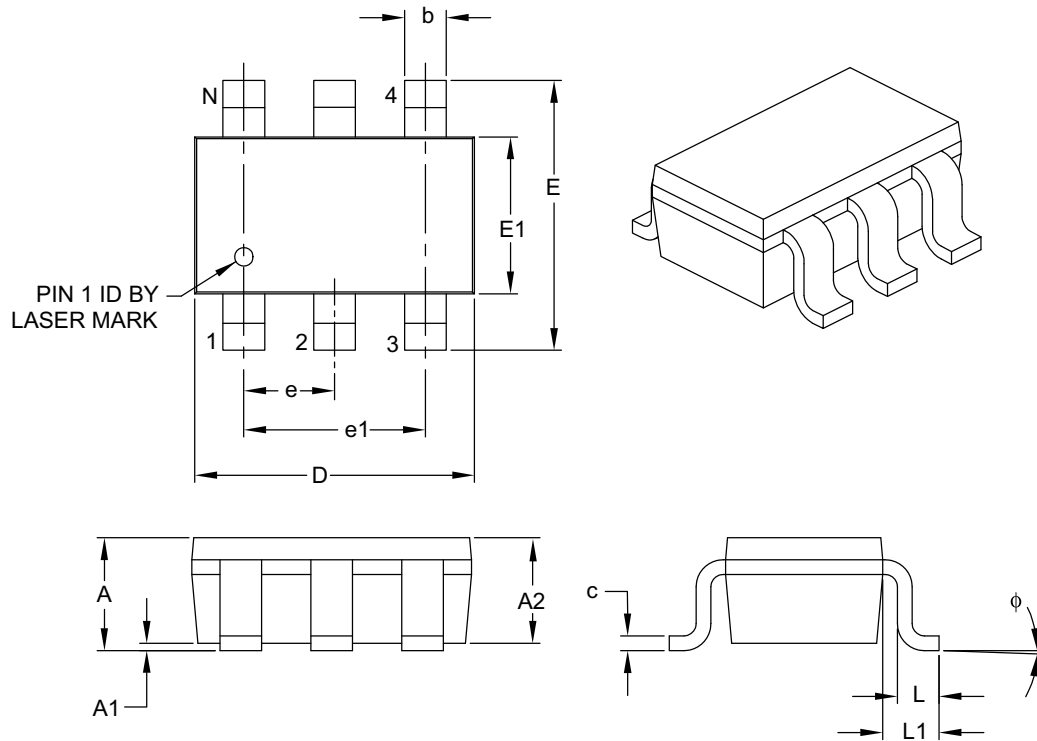
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

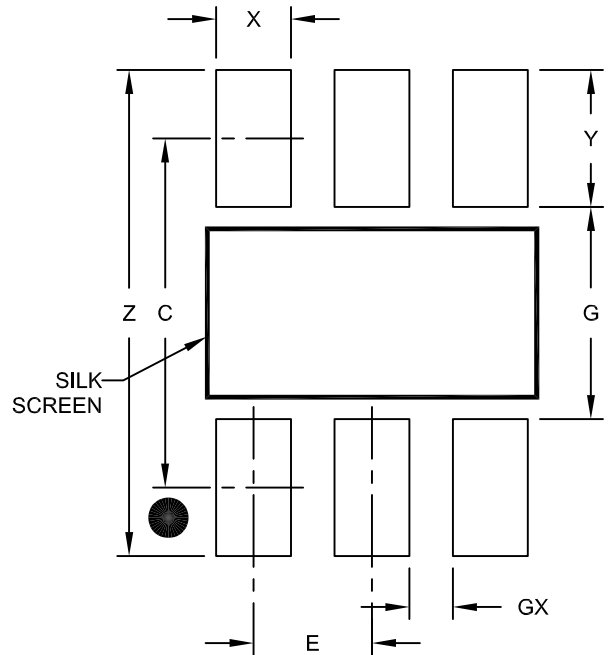
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

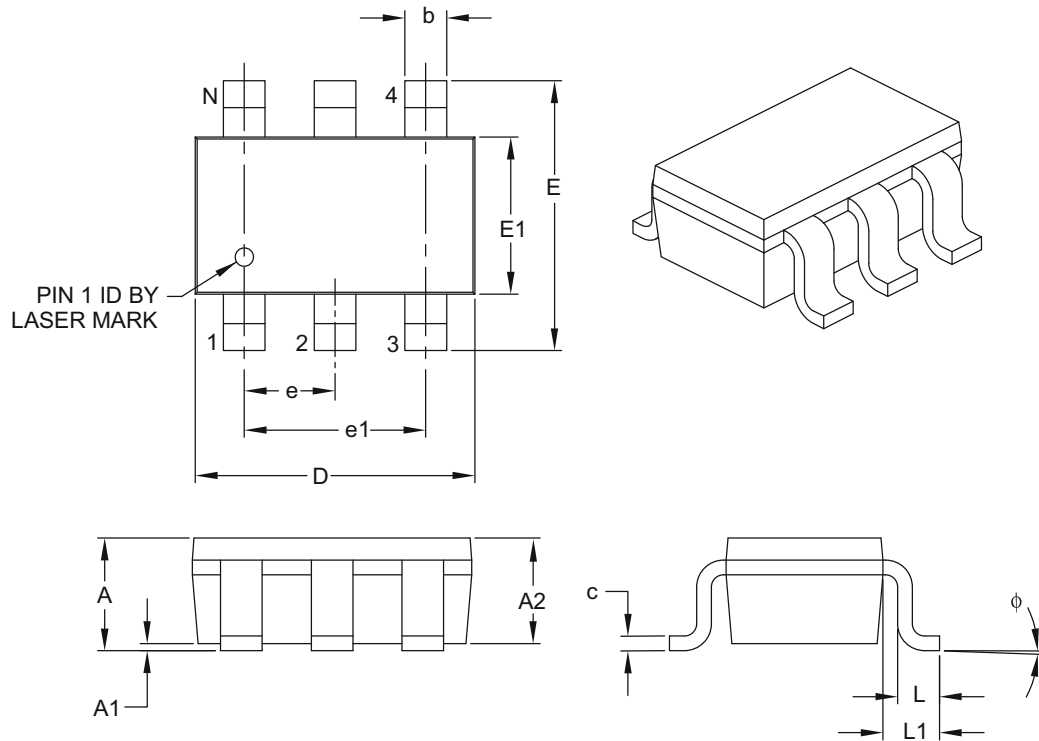
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

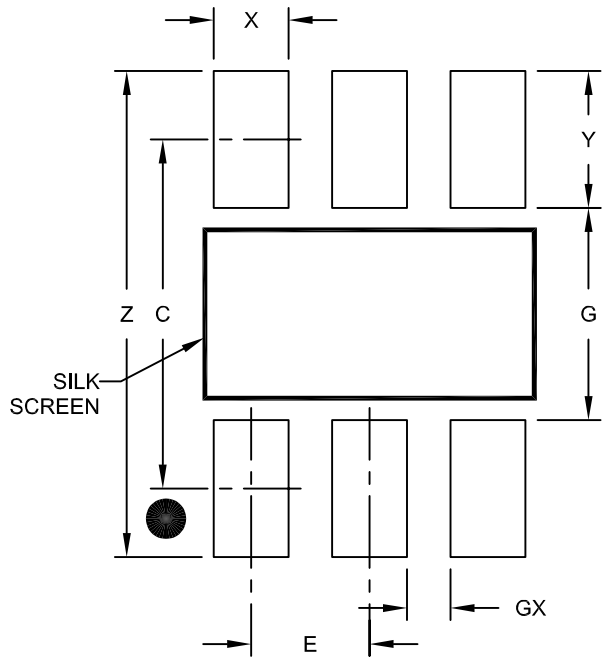
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

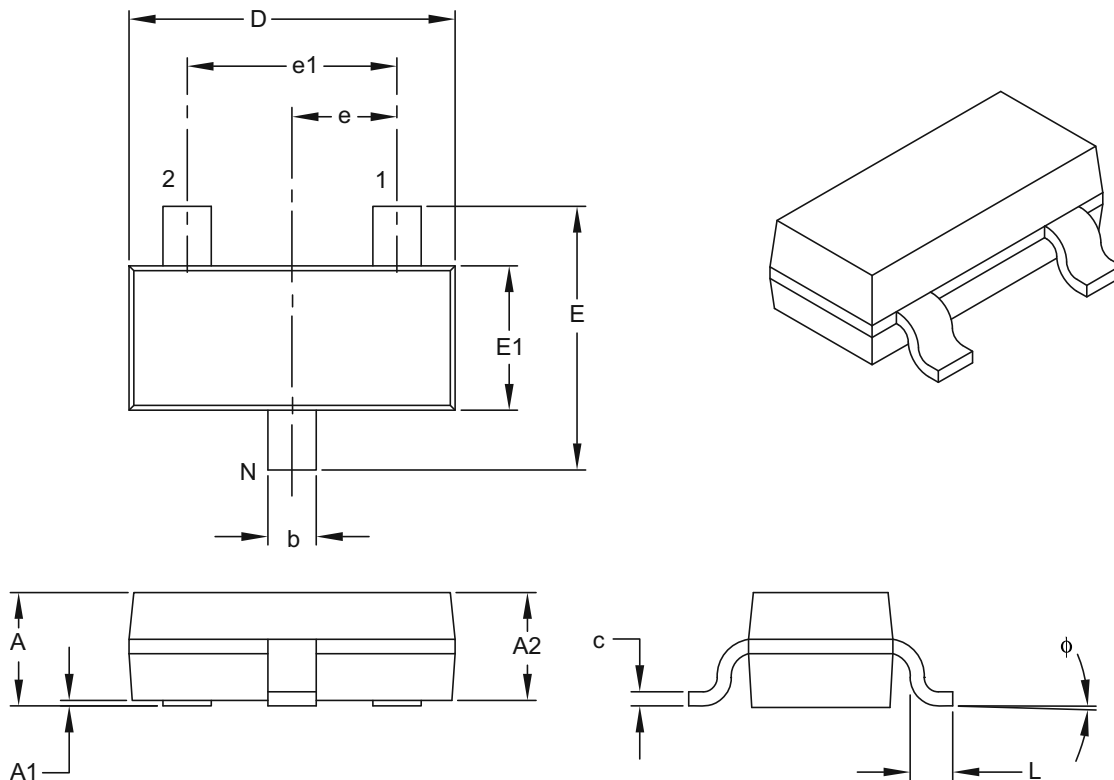
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	3		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.89	–	1.45
Molded Package Thickness	A2	0.90	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.10	–	3.00
Molded Package Width	E1	1.20	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.15	–	0.60
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.09	–	0.26
Lead Width	b	0.30	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

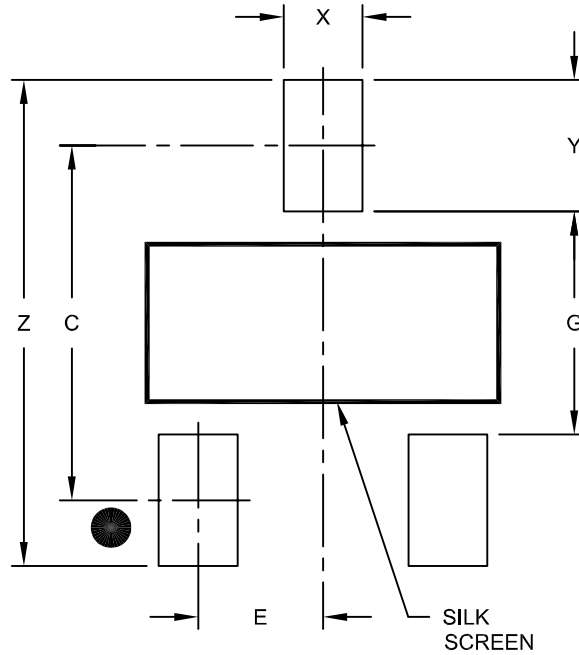
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-130B

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.70	
Contact Pad Width (X3)	X			0.60
Contact Pad Length (X3)	Y			1.00
Distance Between Pads	G	1.70		
Overall Width	Z			3.70

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

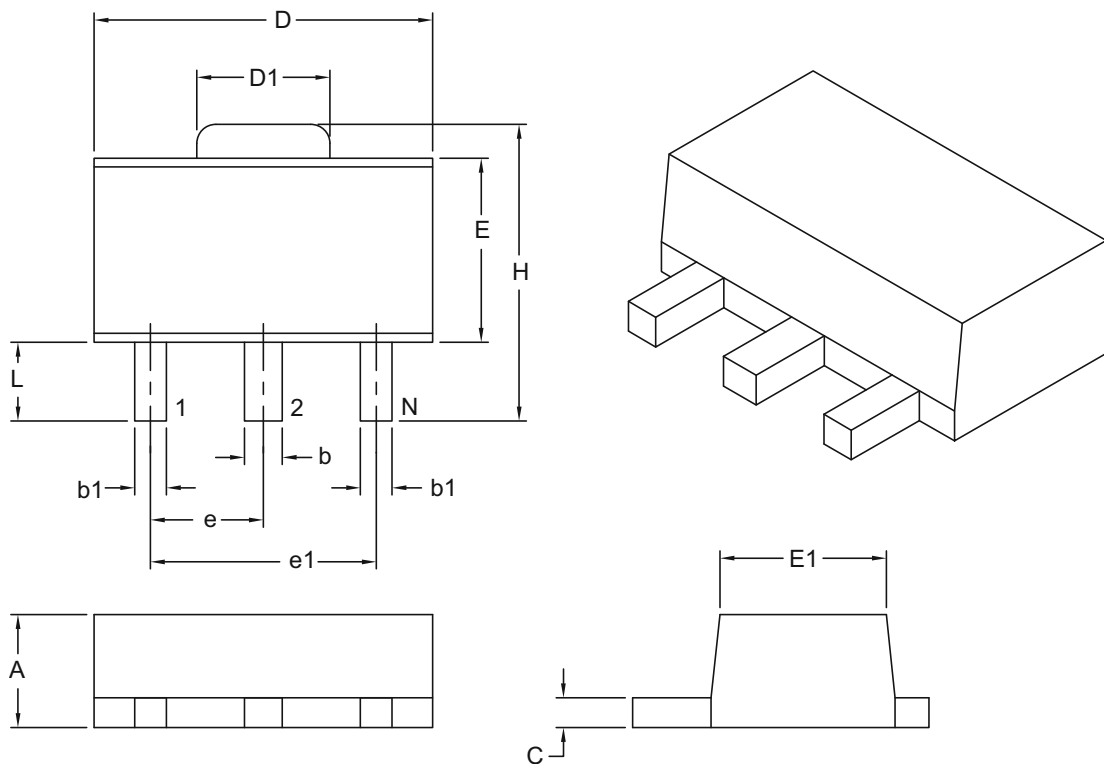
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2130A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor Header (MB) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS	
		MIN	MAX
Number of Leads	N	3	
Pitch	e	1.50 BSC	
Outside Lead Pitch	e1	3.00 BSC	
Overall Height	A	1.40	1.60
Overall Width	H	3.94	4.25
Molded Package Width at Base	E	2.29	2.60
Molded Package Width at Top	E1	2.13	2.29
Overall Length	D	4.39	4.60
Tab Length	D1	1.40	1.83
Foot Length	L	0.79	1.20
Lead Thickness	c	0.35	0.44
Lead 2 Width	b	0.41	0.56
Leads 1 & 3 Width	b1	0.36	0.48

Notes:

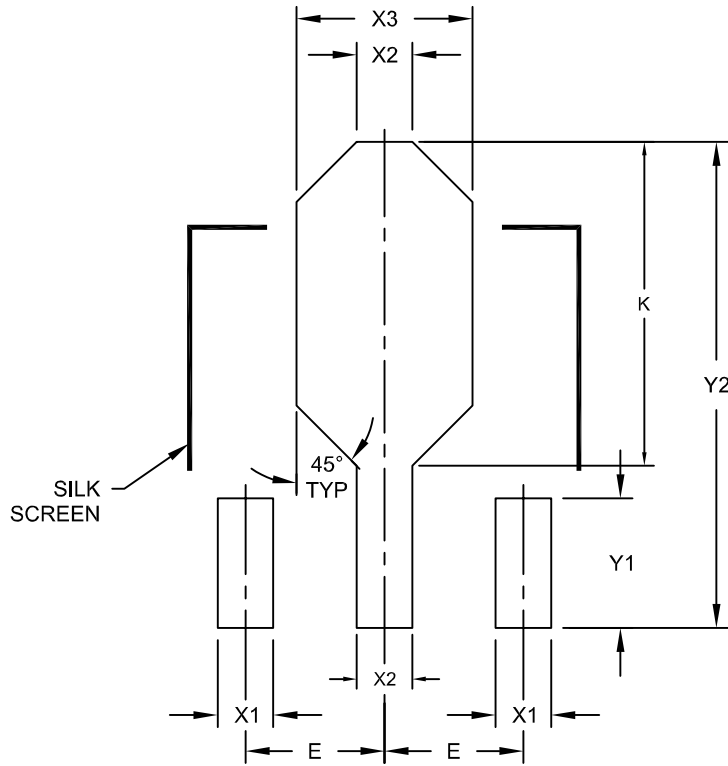
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor Header (MB) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.50 BSC		
Contact Pads 1 & 3 Width	X1				0.48
Contact Pad 2 Width	X2				0.56
Heat Slug Pad Width	X3				1.20
Contact Pads 1 & 3 Length	Y1			1.40	
Contact 2 Pad Length	Y2				4.25
-	K		2.60		2.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

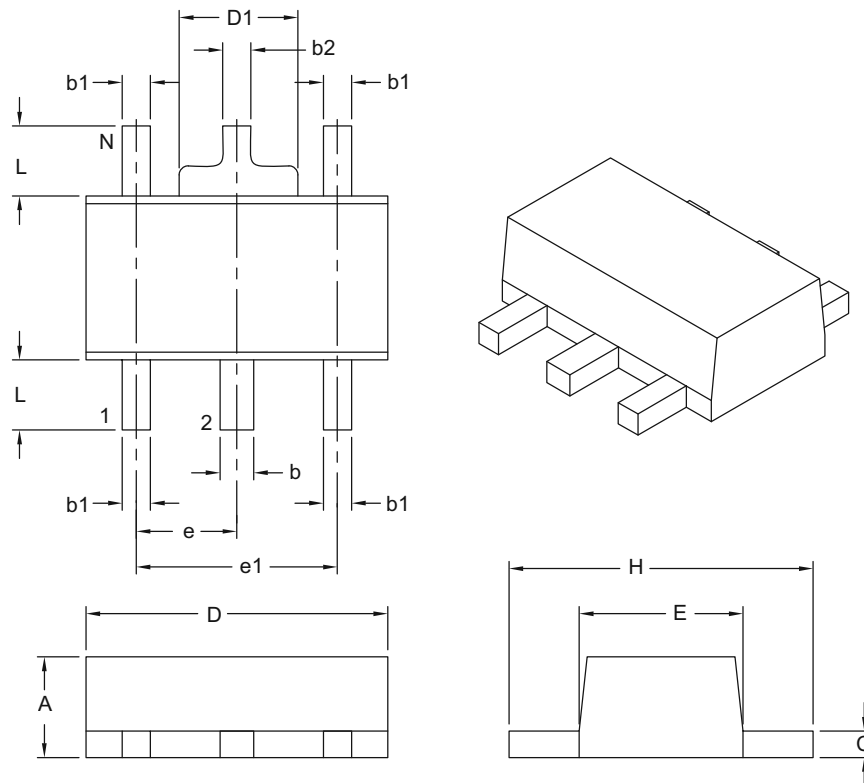
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2029A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	MILLIMETERS	
		MIN	MAX
Number of Leads	N	5	
Lead Pitch	e	1.50 BSC	
Outside Lead Pitch	e1	3.00 BSC	
Overall Height	A	1.40	1.60
Overall Width	H	3.94	4.50
Molded Package Width	E	2.29	2.60
Overall Length	D	4.40	4.60
Tab Width	D1	1.40	1.83
Foot Length	L	0.80	1.20
Lead Thickness	c	0.35	0.44
Lead 2 Width	b	0.41	0.56
Leads 1, 3, 4 & 5 Width	b1	0.36	0.48
Tab Lead Width	b2	0.32	0.48

Notes:

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

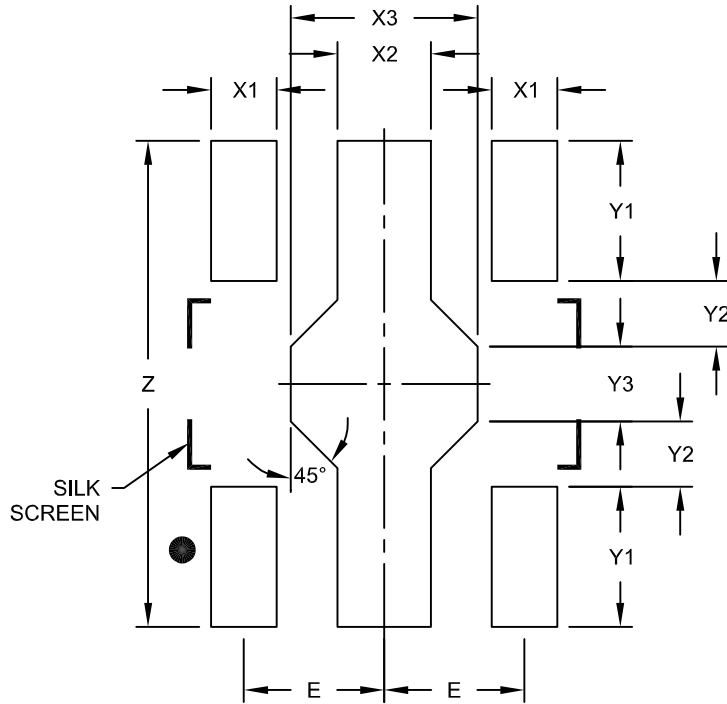
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-030B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
		MIN	NOM	MAX
	Dimension Limits			
Contact Pitch	E	1.50 BSC		
Contact Pad Width (X4)	X1			0.70
Contact Pad Width	X2		1.00	
Contact Pad Width	X3		2.00	
Contact Pad Length (X4)	Y1		1.50	
Contact Pad Length (X2)	Y2		0.70	
Contact Pad Length	Y3		0.80	
Overall Length	Z		5.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

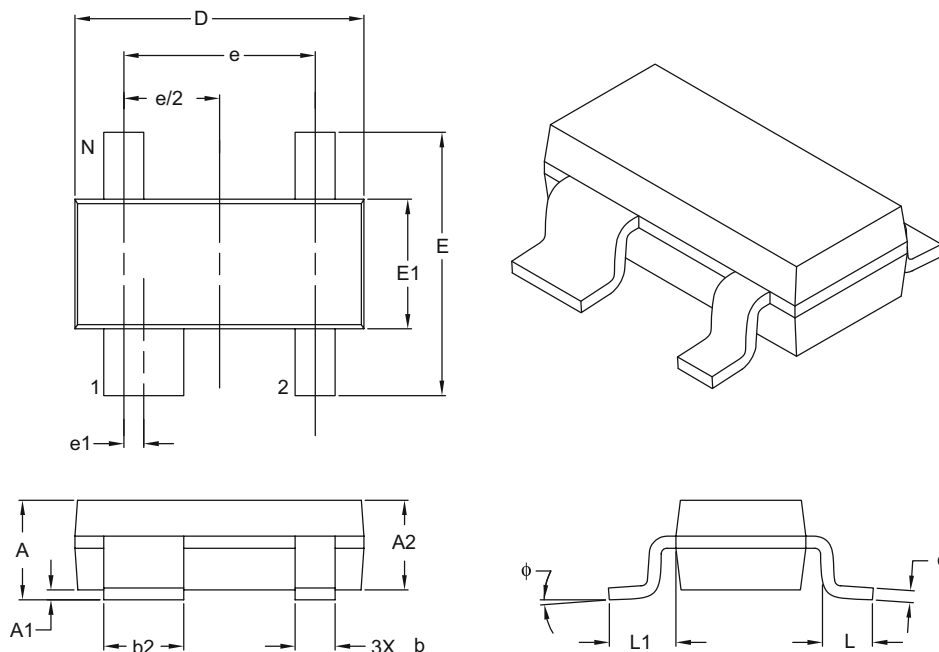
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2030C

Packaging Diagrams and Parameters

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	4		
Pitch	e	1.92 BSC		
Lead 1 Offset	e1	0.20 BSC		
Overall Height	A	0.80	—	1.22
Molded Package Thickness	A2	0.75	0.90	1.07
Standoff §	A1	0.01	—	0.15
Overall Width	E	2.10	—	2.64
Molded Package Width	E1	1.20	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Footprint	L1	0.54 REF		
Foot Angle	φ	0°	—	8°
Lead Thickness	c	0.08	—	0.20
Lead 1 Width	b1	0.76	—	0.94
Leads 2, 3 & 4 Width	b	0.30	—	0.54

Notes:

- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

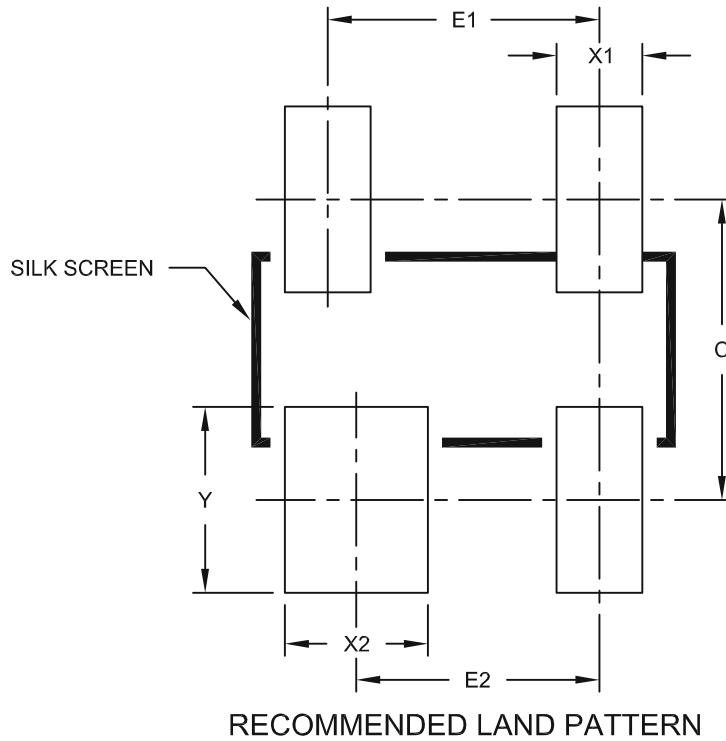
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-031B

Land Pattern (Footprint)

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E1	1.90 BSC		
Contact Pitch	E2	1.60 BSC		
Contact Width	X1			0.60
Contact Width	X2			1.00
Contact Length	Y			1.30
Contact Pad Spacing	C		2.10	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

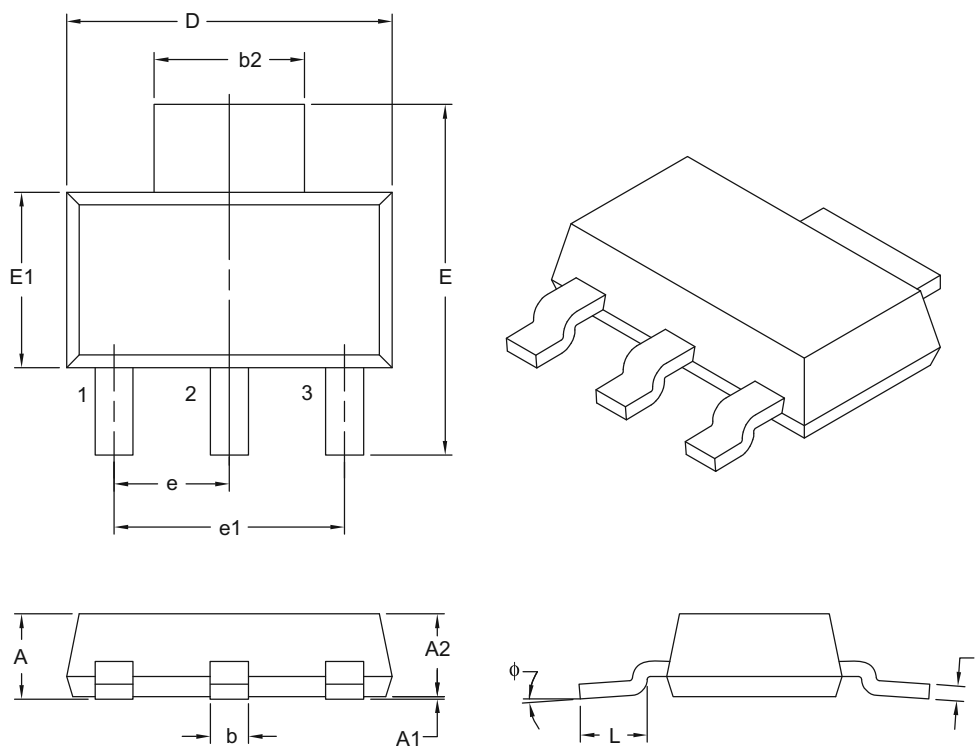
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2031A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	3		
Lead Pitch	e	2.30 BSC		
Outside Lead Pitch	e1	4.60 BSC		
Overall Height	A	–	–	1.80
Standoff	A1	0.02	–	0.10
Molded Package Height	A2	1.50	1.60	1.70
Overall Width	E	6.70	7.00	7.30
Molded Package Width	E1	3.30	3.50	3.70
Overall Length	D	6.30	6.50	6.70
Lead Thickness	c	0.23	0.30	0.35
Lead Width	b	0.60	0.76	0.84
Tab Lead Width	b2	2.90	3.00	3.10
Foot Length	L	0.75	–	–
Lead Angle	ϕ	0°	–	10°

Notes:

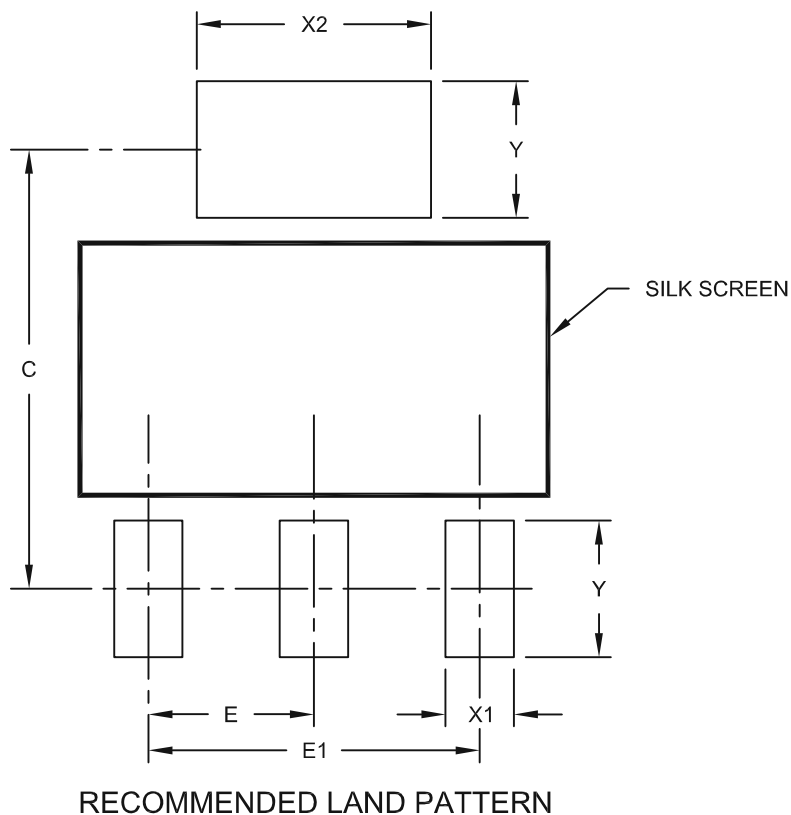
1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	2.30 BSC		
Overall Pitch	E1	4.60 BSC		
Contact Pad Spacing	C		6.10	
Contact Pad Width	X1			0.95
Contact Pad Width	X2			3.25
Contact Pad Length	Y			1.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

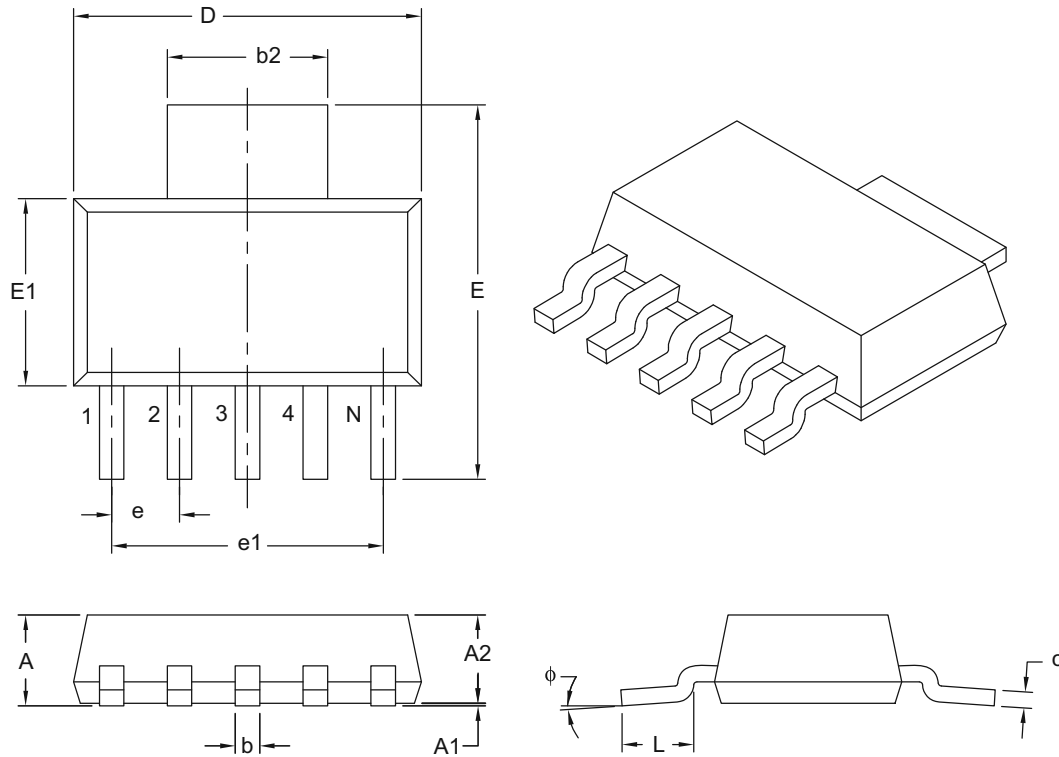
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2032A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	5		
Lead Pitch	e	1.27 BSC		
Outside Lead Pitch	e1	5.08 BSC		
Overall Height	A	–	–	1.80
Standoff	A1	0.02	0.06	0.10
Molded Package Height	A2	1.55	1.60	1.65
Overall Width	E	6.86	7.00	7.26
Molded Package Width	E1	3.45	3.50	3.55
Overall Length	D	6.45	6.50	6.55
Lead Thickness	c	0.24	0.28	0.32
Lead Width	b	0.41	0.457	0.51
Tab Lead Width	b2	2.95	3.00	3.05
Foot Length	L	0.91	–	1.14
Lead Angle	ϕ	0°	4°	8°

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

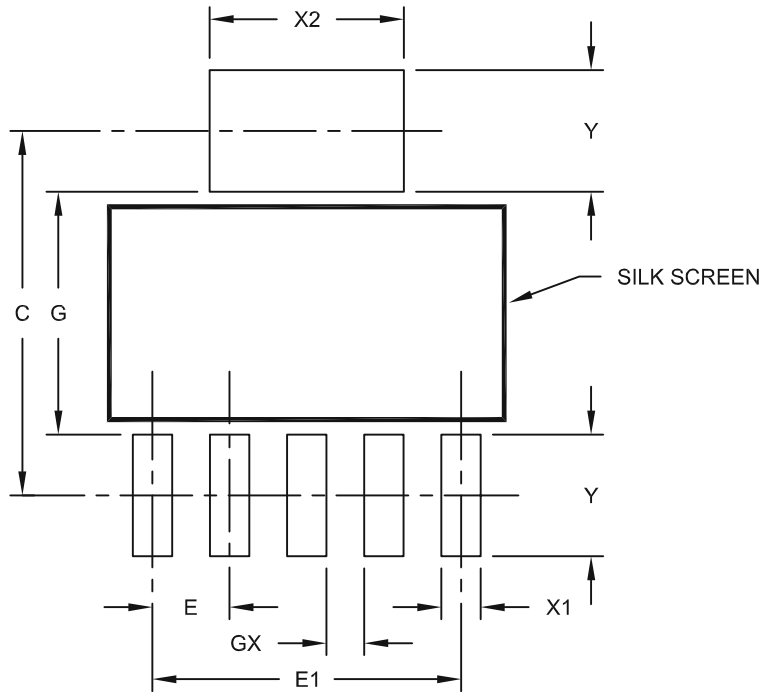
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-137B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		MILLIMETERS		
		MIN	NOM	MAX
Pad Pitch	E	1.27 BSC		
Overall Pad Pitch	E1	5.08 BSC		
Pad Spacing	C		6.00	
Pad Width	X1			0.65
Pad Width	X2			3.20
Pad Length	Y			2.00
Distance Between Pads	G	4.00		
Distance Between Pads	GX	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

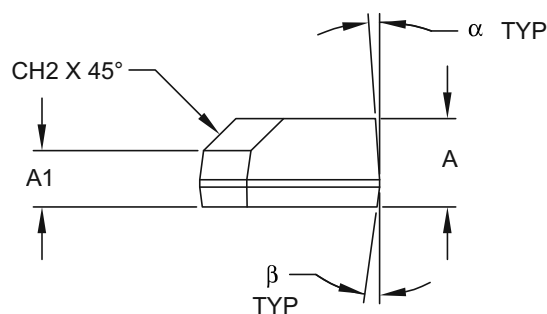
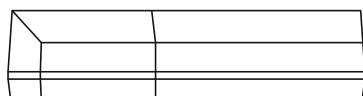
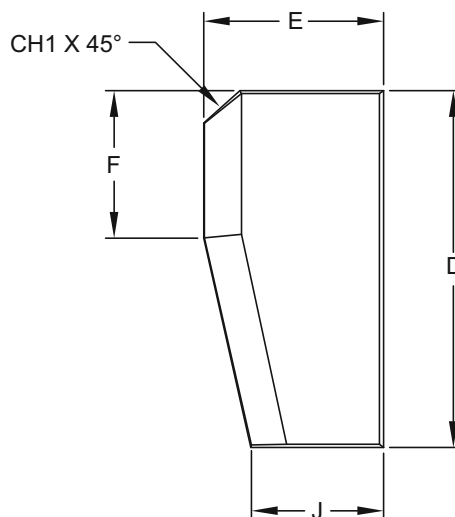
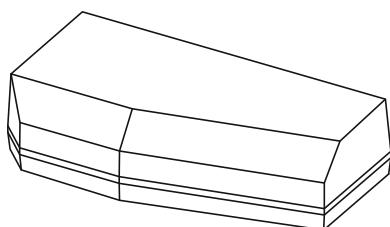
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2137A

Packaging Diagrams and Parameters

Leadless Wedge Module Plastic Small Outline Transistor (WM) [SOT-385]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Overall Height	A	2.90	3.00	3.05
Bottom of Package to Chamfer	A1	1.90	2.00	2.10
Overall Width	E	6.00	6.10	6.20
Overall Length	D	12.00	12.10	12.20
Width at Tapered End	J	4.40	4.50	4.60
Length of Flat	F	4.90	5.00	5.10
Chamfer Distance, Horizontal	CH1	1.00	1.10	1.20
Chamfer Distance, Vertical	CH2	1.00	1.10	1.20
Mold Draft Angle Top	α	4°	6°	8°
Mold Draft Angle Bottom	β	4°	6°	8°

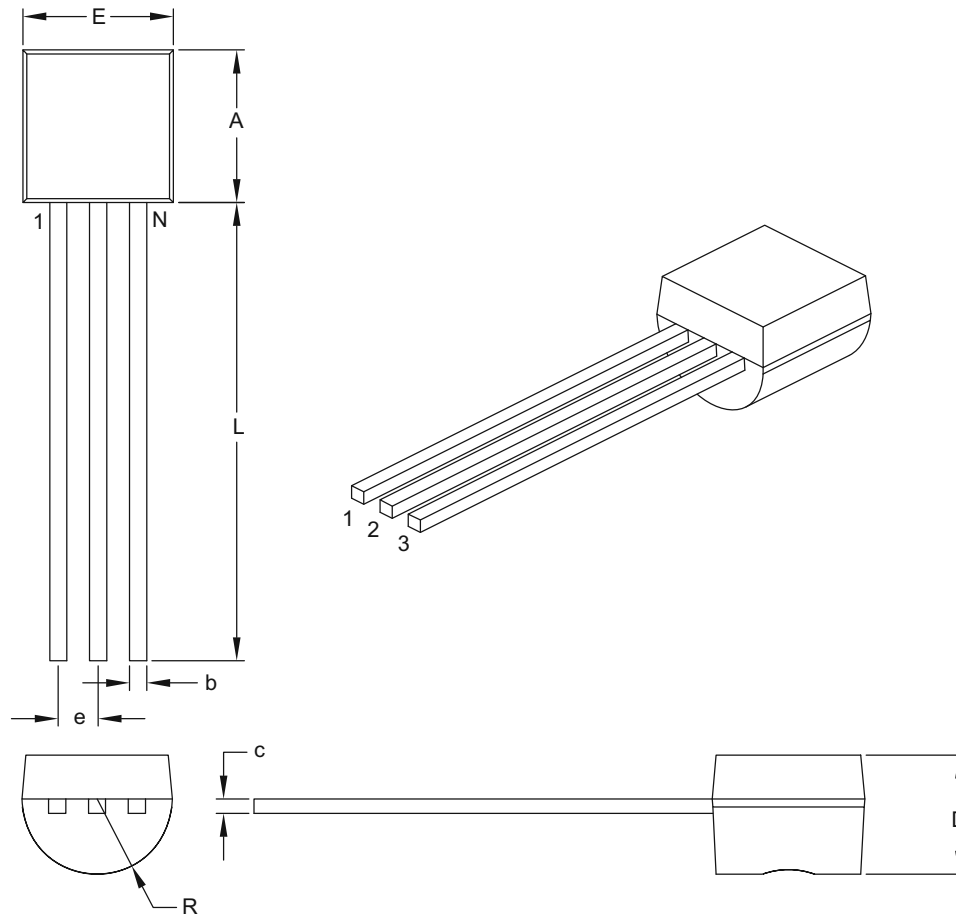
Note:

1. Dimensions D, E, F and J do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (TO) [TO-92]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES	
		MIN	MAX
Number of Pins	N	3	
Pitch	e	.050 BSC	
Bottom to Package Flat	D	.125	.165
Overall Width	E	.175	.205
Overall Length	A	.170	.210
Molded Package Radius	R	.080	.105
Tip to Seating Plane	L	.500	–
Lead Thickness	c	.014	.021
Lead Width	b	.014	.022

Notes:

- Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

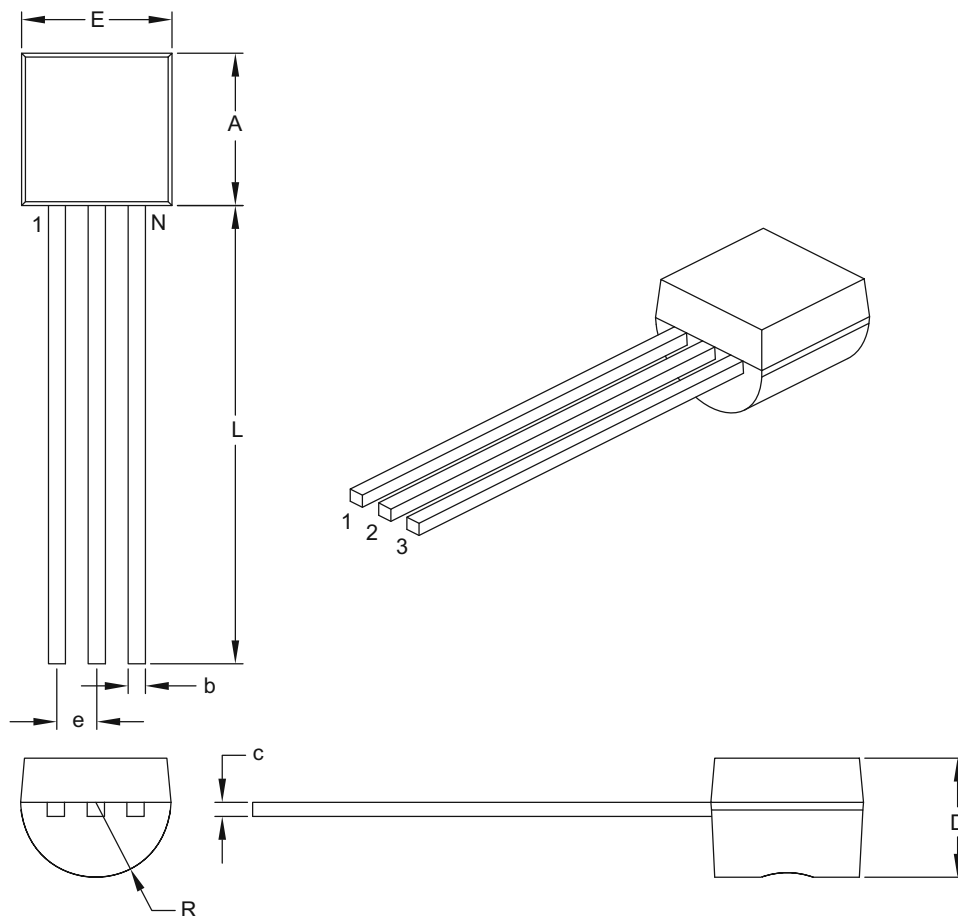
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (ZB) [TO-92]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES	
		MIN	MAX
Number of Pins	N	3	
Pitch	e	.050 BSC	
Bottom to Package Flat	D	.125	.165
Overall Width	E	.175	.205
Overall Length	A	.170	.210
Molded Package Radius	R	.080	.105
Tip to Seating Plane	L	.500	–
Lead Thickness	c	.014	.021
Lead Width	b	.014	.022

Notes:

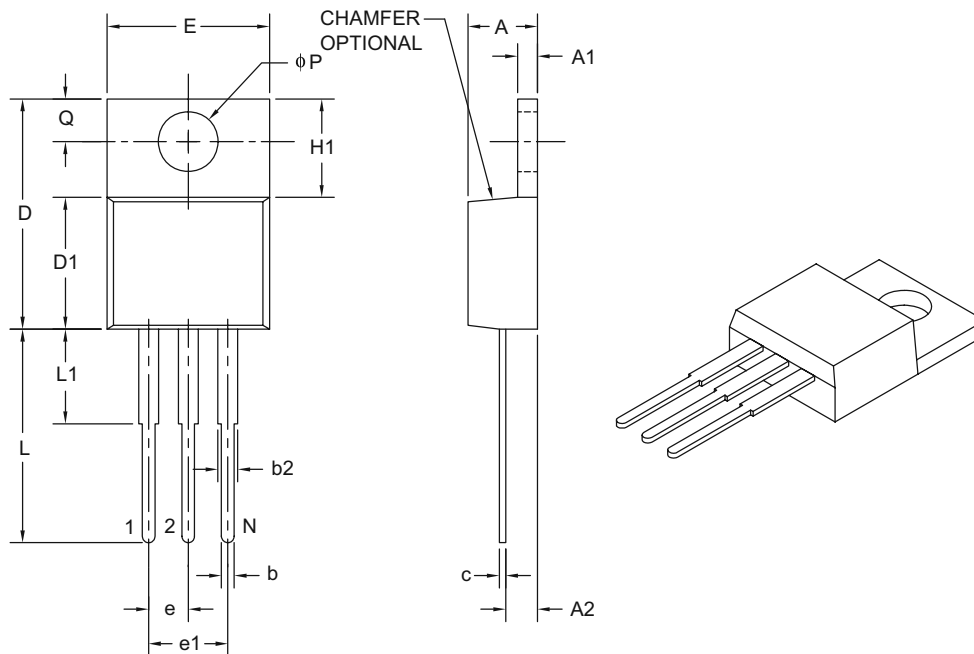
1. Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (AB) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	.100 BSC		
Overall Pin Pitch	e1	.200 BSC		
Overall Height	A	.140	–	.190
Tab Thickness	A1	.020	–	.055
Base to Lead	A2	.080	–	.115
Overall Width	E	.357	–	.420
Mounting Hole Center	Q	.100	–	.120
Overall Length	D	.560	–	.650
Molded Package Length	D1	.330	–	.355
Tab Length	H1	.230	–	.270
Mounting Hole Diameter	φP	.139	–	.156
Lead Length	L	.500	–	.580
Lead Shoulder	L1	–	–	.250
Lead Thickness	c	.012	–	.024
Lead Width	b	.015	.027	.040
Shoulder Width	b2	.045	.057	.070

Notes:

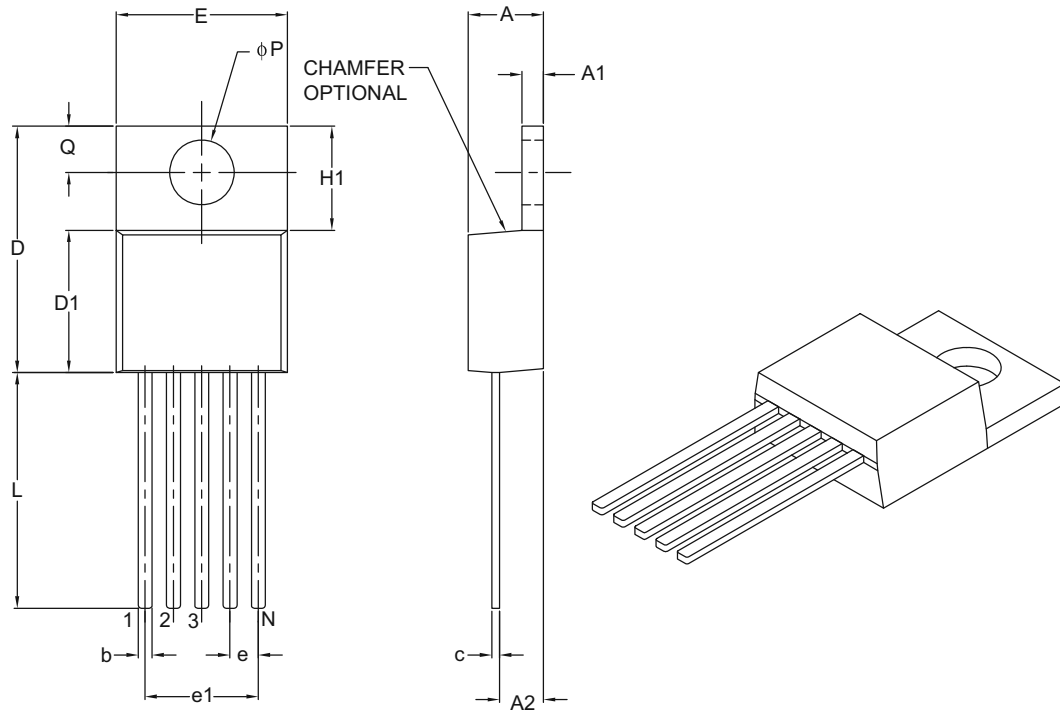
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

5-Lead Plastic Transistor Outline (AT) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	5		
Pitch	e	.067 BSC		
Overall Pin Pitch	e1	.268 BSC		
Overall Height	A	.140	–	.190
Overall Width	E	.380	–	.420
Overall Length	D	.560	–	.650
Molded Package Length	D1	.330	–	.355
Tab Length	H1	.204	–	.293
Tab Thickness	A1	.020	–	.055
Mounting Hole Center	Q	.100	–	.120
Mounting Hole Diameter	φP	.139	–	.156
Lead Length	L	.482	–	.590
Base to Bottom of Lead	A2	.080	–	.115
Lead Thickness	c	.012	–	.025
Lead Width	b	.015	.027	.040

Notes:

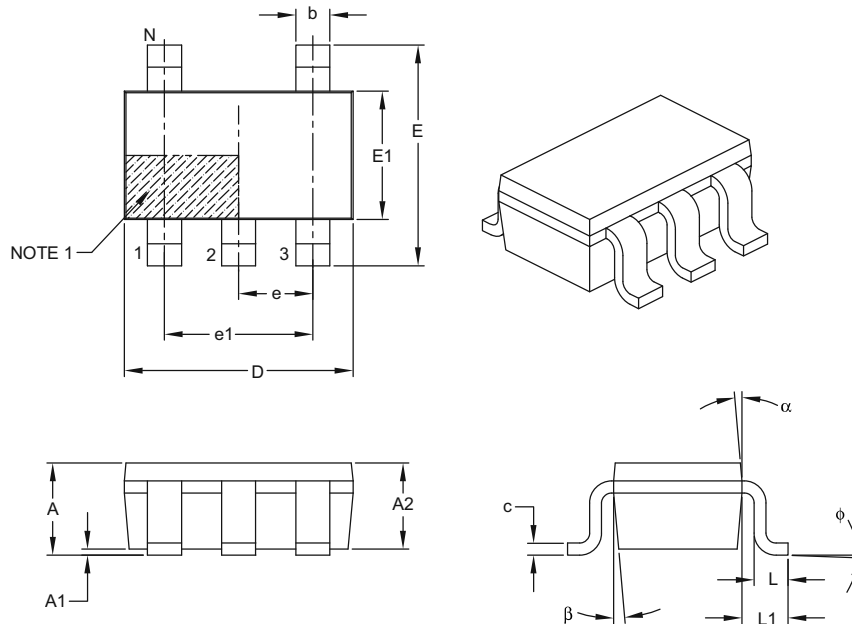
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	5		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	–	–	1.10
Molded Package Thickness	A2	0.70	0.90	1.00
Standoff	A1	0.00	–	0.10
Overall Width	E	2.80 BSC		
Molded Package Width	E1	1.60 BSC		
Overall Length	D	2.90 BSC		
Foot Length	L	0.30	0.45	0.60
Footprint	L1	0.60 REF		
Foot Angle	ϕ	0°	4°	8°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.50
Mold Draft Angle Top	α	4°	10°	12°
Mold Draft Angle Bottom	β	4°	10°	12°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

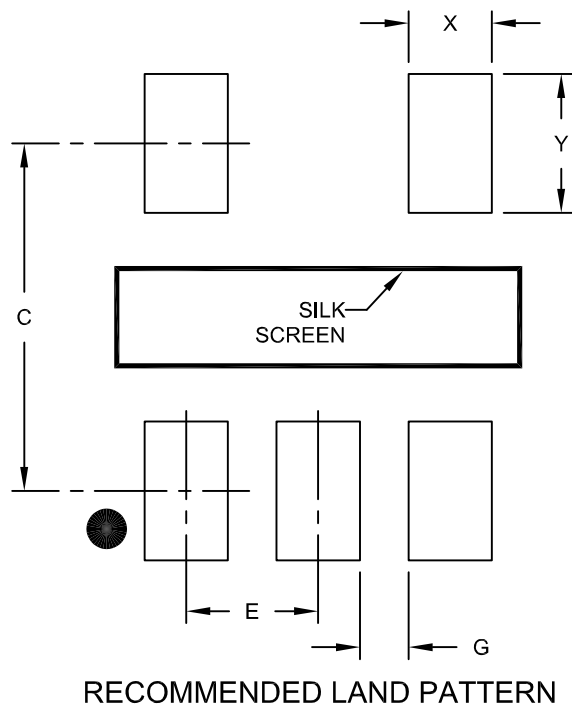
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	0.35		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2128A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

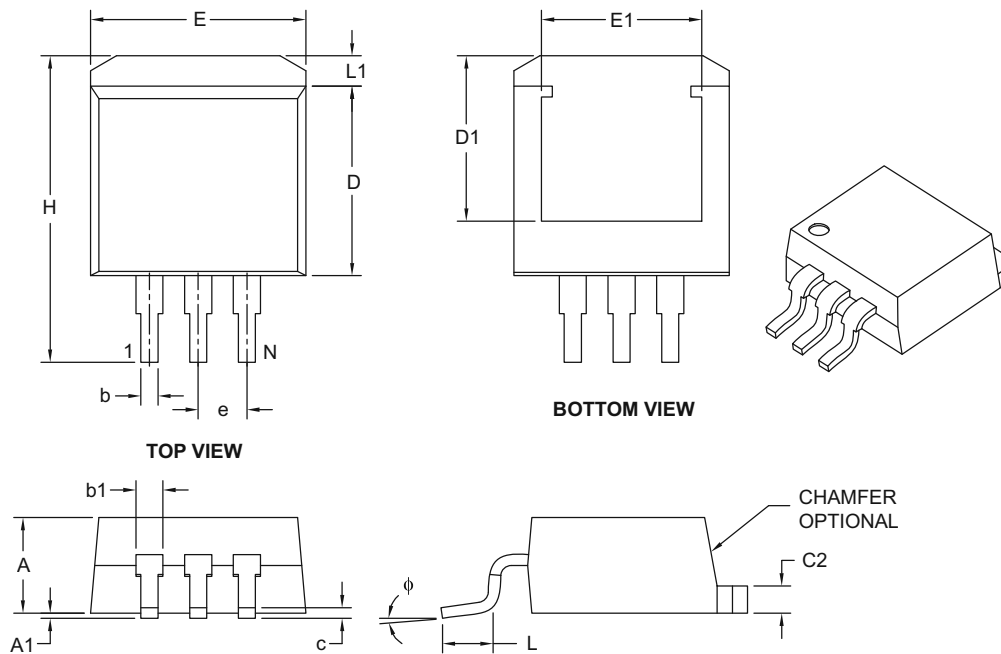
DDPAK Family

Double Deca-Watt Packages

Packaging Diagrams and Parameters

3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	.100 BSC		
Overall Height	A	.160	–	.190
Standoff §	A1	.000	–	.010
Overall Width	E	.380	–	.420
Exposed Pad Width	E1	.245	–	–
Molded Package Length	D	.330	–	.380
Overall Length	H	.549	–	.625
Exposed Pad Length	D1	.270	–	–
Lead Thickness	c	.014	–	.029
Pad Thickness	C2	.045	–	.065
Lower Lead Width	b	.020	–	.039
Upper Lead Width	b1	.045	–	.070
Foot Length	L	.068	–	.110
Pad Length	L1	–	–	.067
Foot Angle	φ	0°	–	8°

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

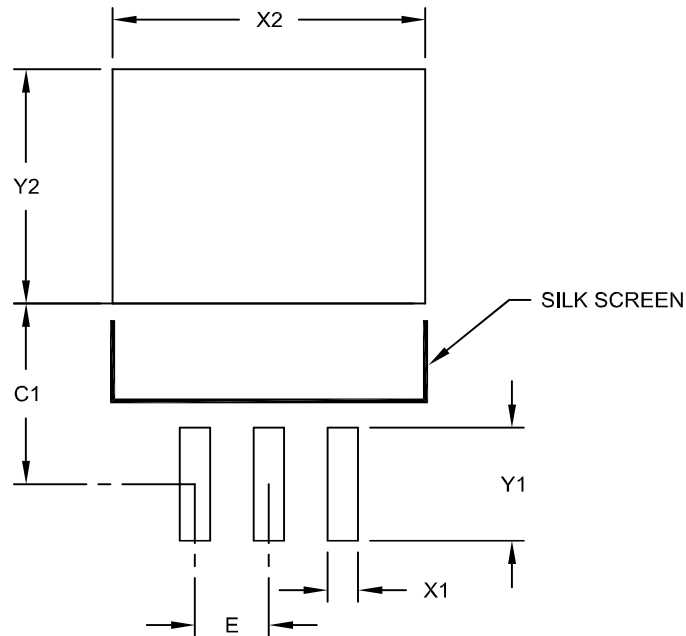
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-011B

Land Pattern (Footprint)

3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	INCHES		
		Dimension	MIN	NOM
Contact Pitch	E		.100 BSC	
Pad Width	X2			.423
Pad Length	Y2			.327
Contact Pad Spacing	C1		.252	
Contact Pad Width (X3)	X1			.041
Contact Pad Length (X3)	Y1			.157

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

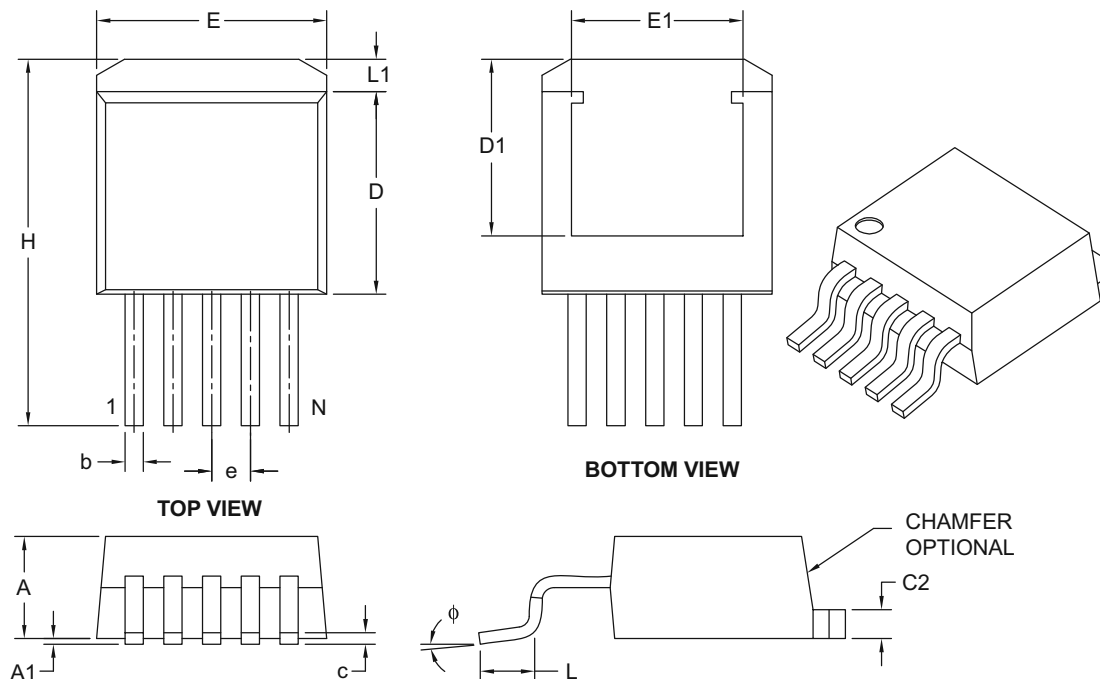
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2011A

Packaging Diagrams and Parameters

5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	5		
Pitch	e	.067 BSC		
Overall Height	A	.160	–	.190
Standoff §	A1	.000	–	.010
Overall Width	E	.380	–	.420
Exposed Pad Width	E1	.245	–	–
Molded Package Length	D	.330	–	.380
Overall Length	H	.549	–	.625
Exposed Pad Length	D1	.270	–	–
Lead Thickness	c	.014	–	.029
Pad Thickness	C2	.045	–	.065
Lead Width	b	.020	–	.039
Foot Length	L	.068	–	.110
Pad Length	L1	–	–	.067
Foot Angle	ϕ	0°	–	8°

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

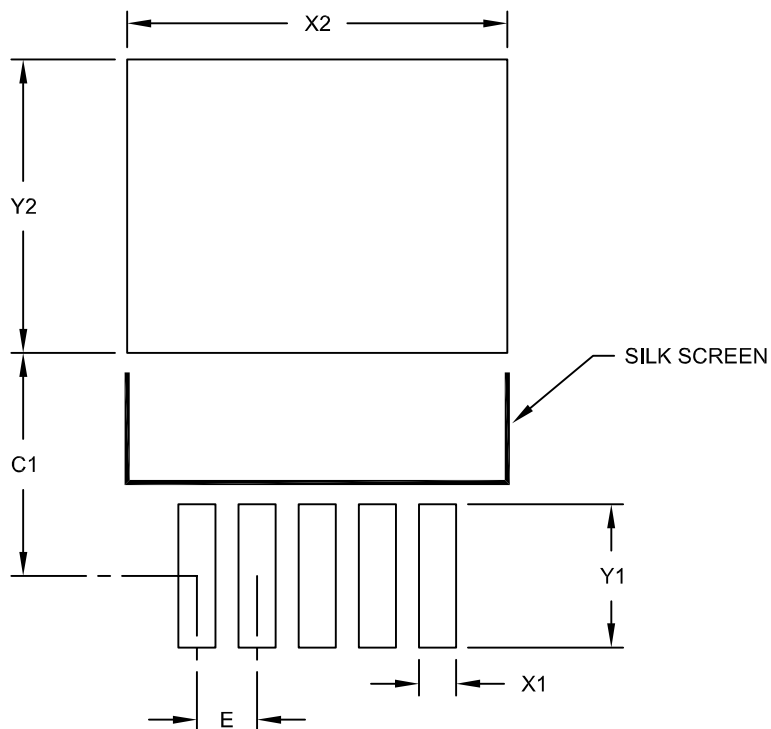
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-012B

Land Pattern (Footprint)

5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		INCHES		
		MIN	NOM	MAX
	Units			
	Dimension Limits			
Contact Pitch	E	.067 BSC		
Optional Center Pad Width	X2			.423
Optional Center Pad Length	Y2			.327
Contact Pad Spacing	C1		.248	
Contact Pad Width (X5)	X1			.041
Contact Pad Length (X5)	Y1			.159

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

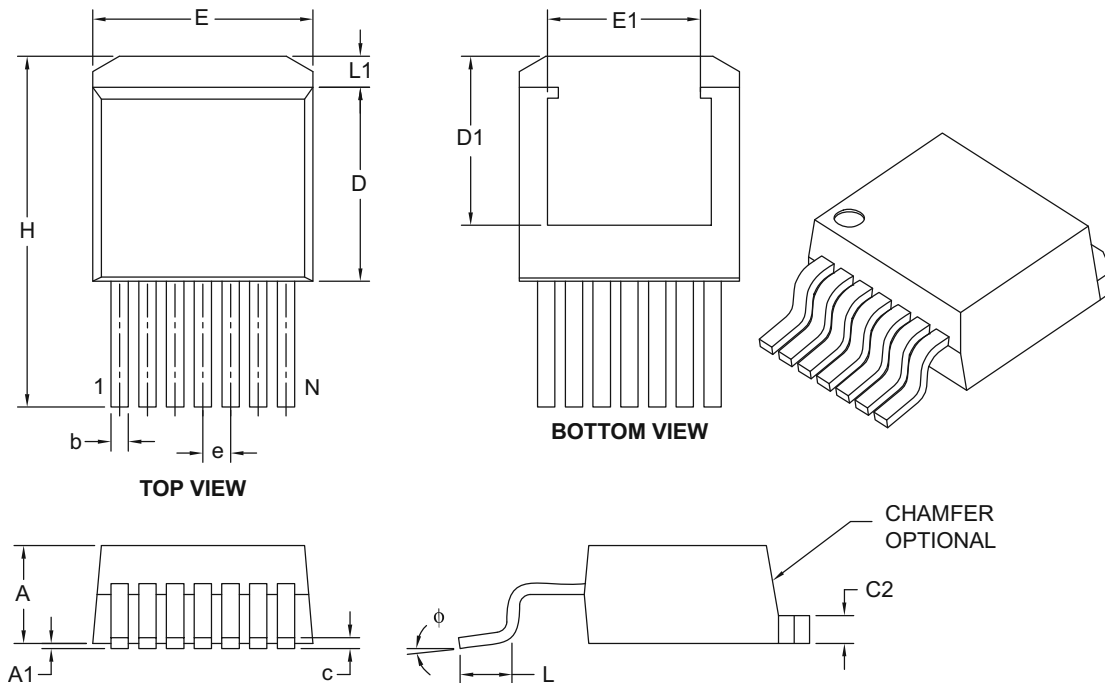
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2012A

Packaging Diagrams and Parameters

7-Lead Plastic (EK) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		7		
Pitch	e		.050 BSC		
Overall Height	A		.160	–	.190
Standoff §	A1		.000	–	.010
Overall Width	E		.380	–	.420
Exposed Pad Width	E1		.245	–	–
Molded Package Length	D		.330	–	.380
Overall Length	H		.549	–	.625
Exposed Pad Length	D1		.270	–	–
Lead Thickness	c		.014	–	.029
Pad Thickness	C2		.045	–	.065
Lead Width	b		.020	–	.037
Foot Length	L		.068	–	.110
Pad Length	L1		–	–	.067
Foot Angle	φ		0°	–	8°

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

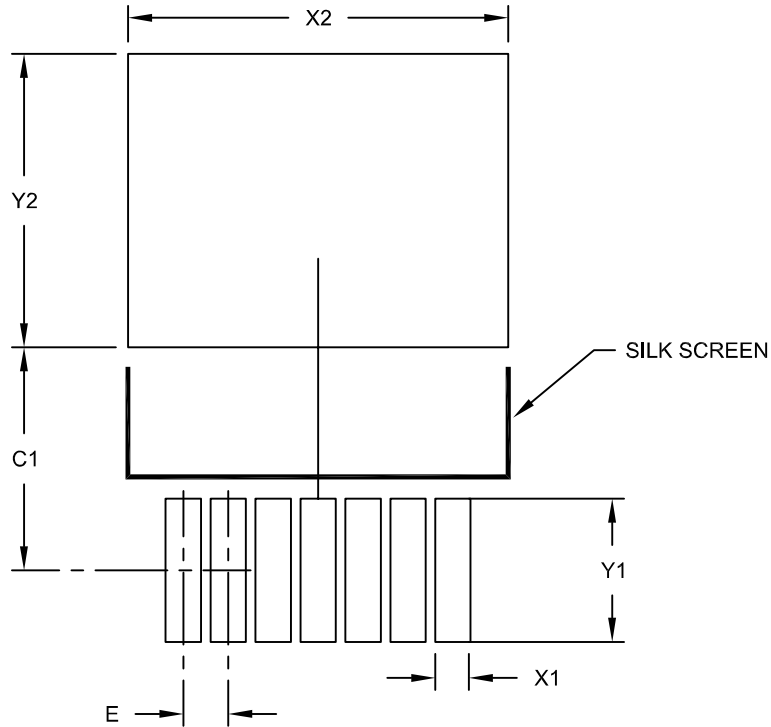
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-015B

Land Pattern (Footprint)

7-Lead Plastic (EK) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
		MIN	NOM	MAX
Dimension Limits				
Contact Pitch	E	.050 BSC		
Optional Center Pad Width	X2			.423
Optional Center Pad Length	Y2			.327
Contact Pad Spacing	C1		.248	
Contact Pad Width (X7)	X1			.039
Contact Pad Length (X7)	Y1			.159

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2015B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

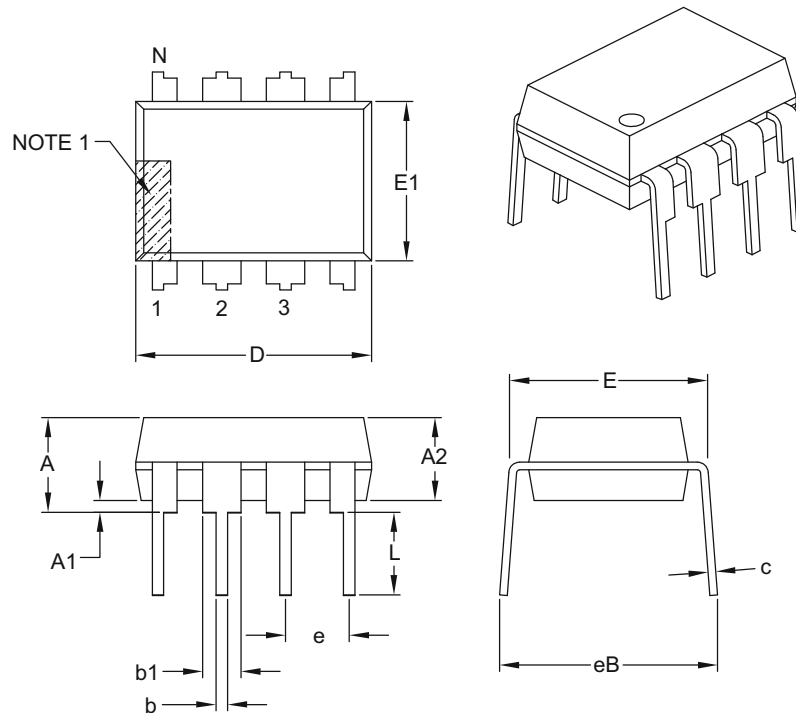
PDIP Family

Plastic Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

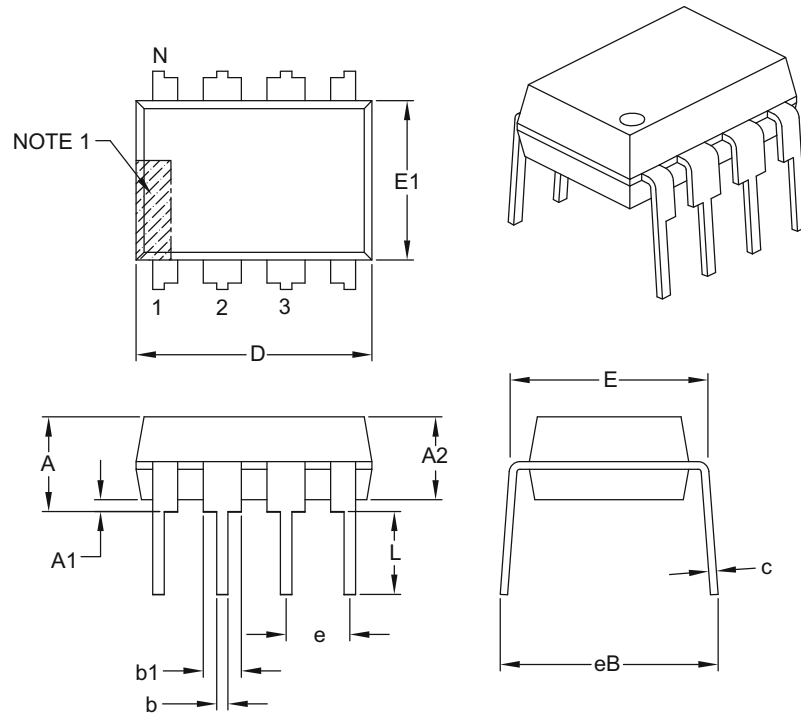
- Pin 1 visual index feature may vary, but must be located with the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

8-Lead Plastic Dual In-Line (PA) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

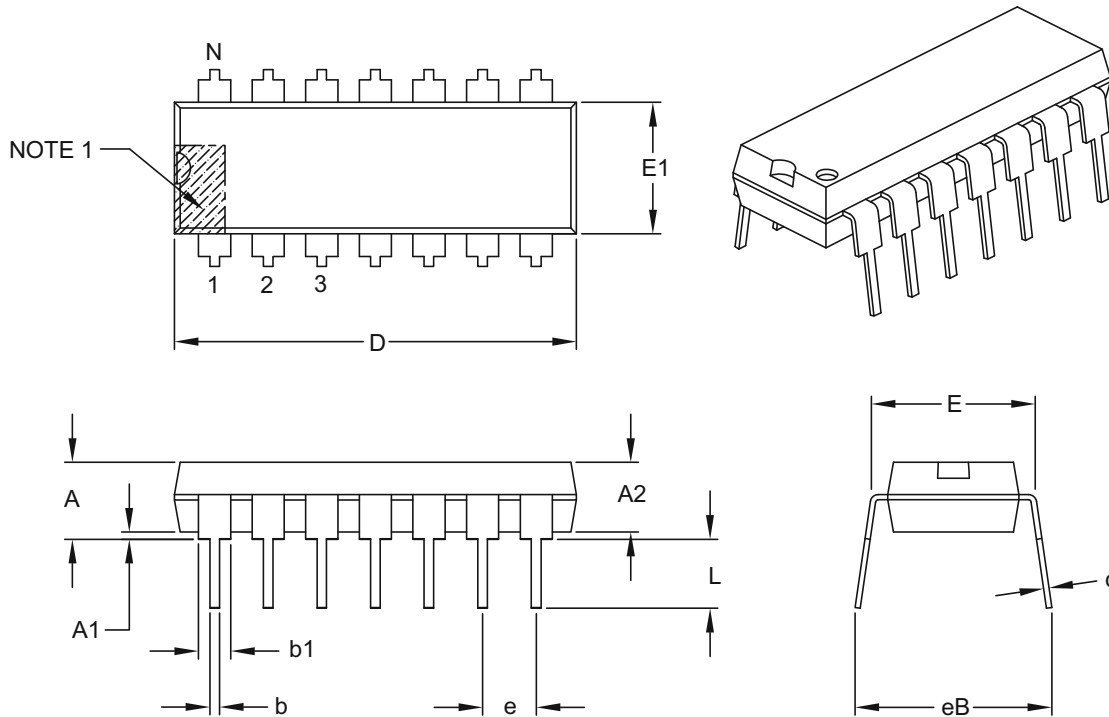
1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		14		
Pitch	e		.100 BSC		
Top to Seating Plane	A	–	–	.210	
Molded Package Thickness	A2	.115	.130	.195	
Base to Seating Plane	A1	.015	–	–	
Shoulder to Shoulder Width	E	.290	.310	.325	
Molded Package Width	E1	.240	.250	.280	
Overall Length	D	.735	.750	.775	
Tip to Seating Plane	L	.115	.130	.150	
Lead Thickness	c	.008	.010	.015	
Upper Lead Width	b1	.045	.060	.070	
Lower Lead Width	b	.014	.018	.022	
Overall Row Spacing §	eB	–	–	.430	

Notes:

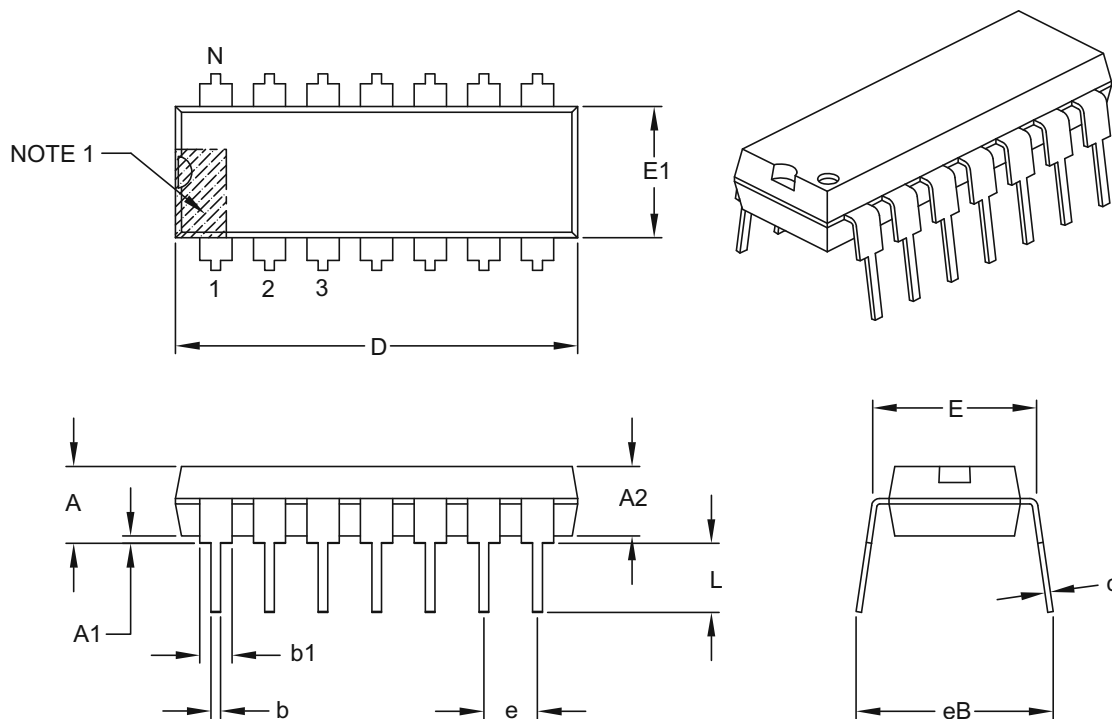
- Pin 1 visual index feature may vary, but must be located with the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Plastic Dual In-Line (PD) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.750	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

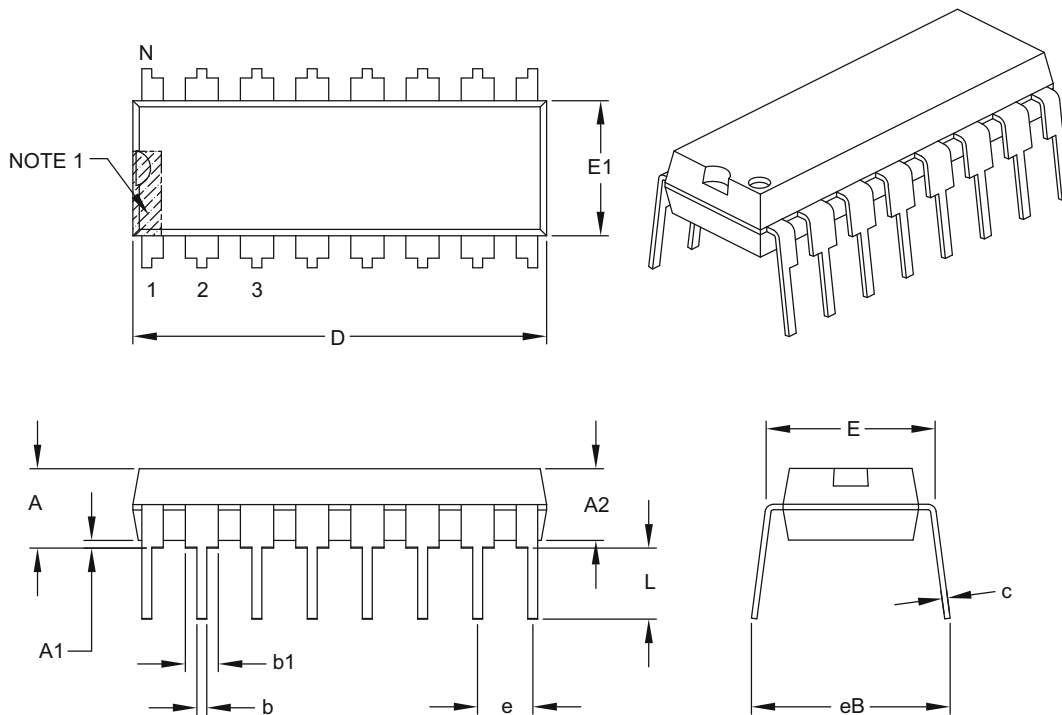
- Pin 1 visual index feature may vary, but must be located with the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

16-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.755	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

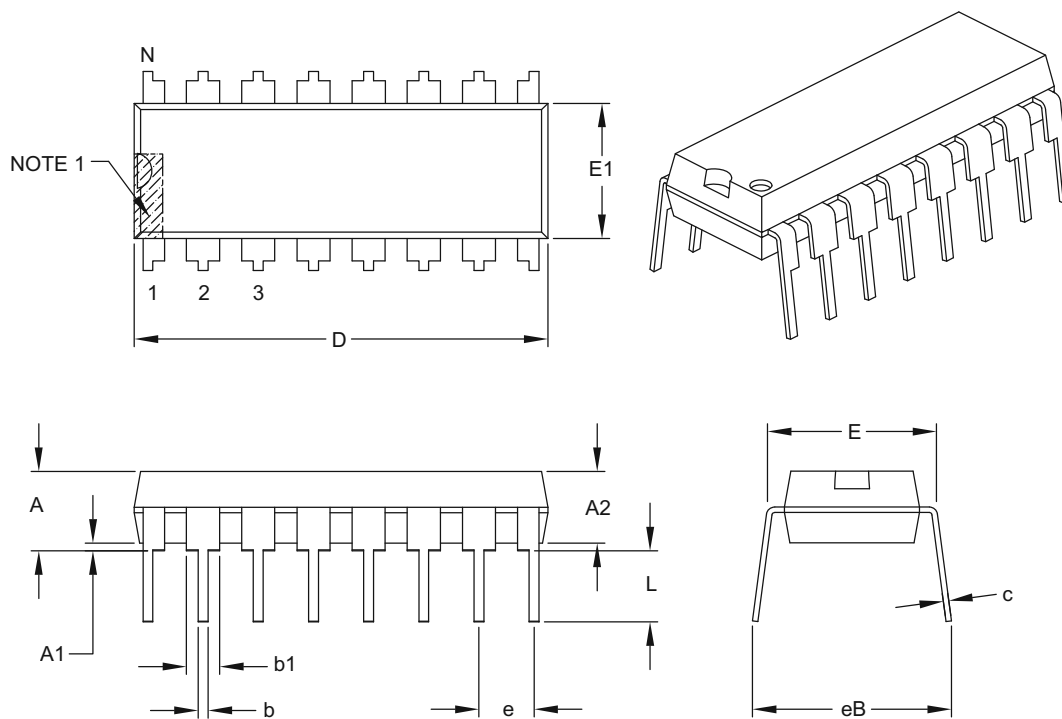
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

16-Lead Plastic Dual In-Line (PE) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.755	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

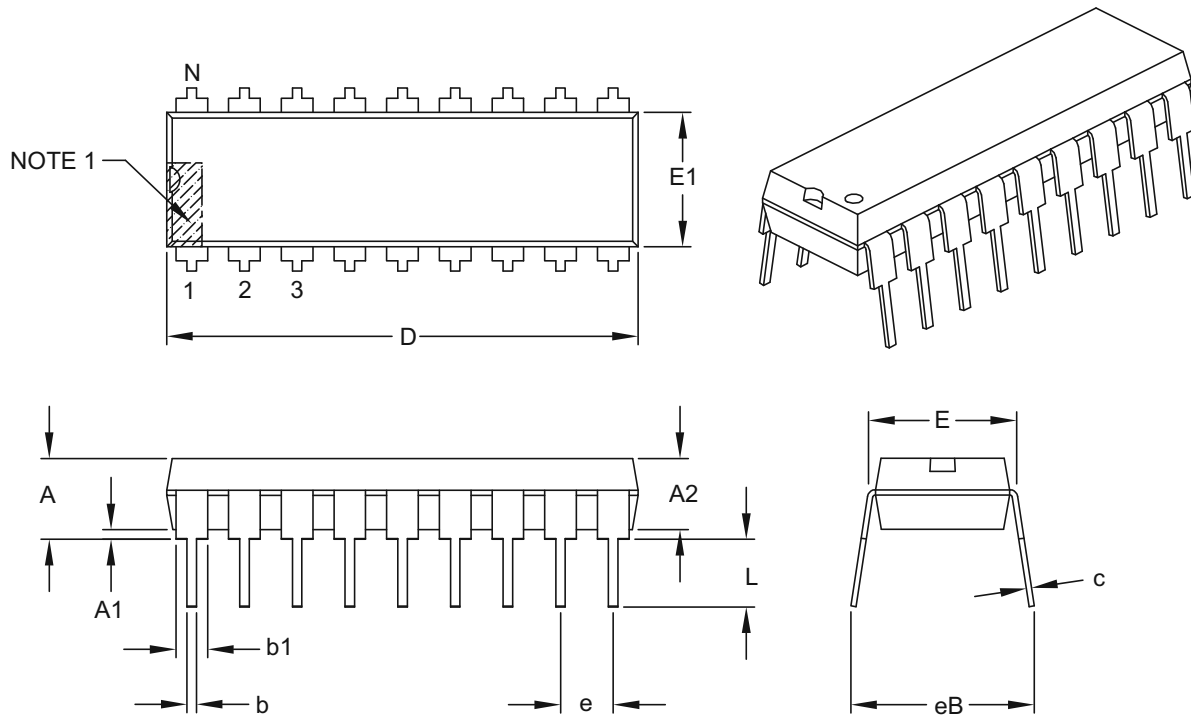
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.880	.900	.920
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.014
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

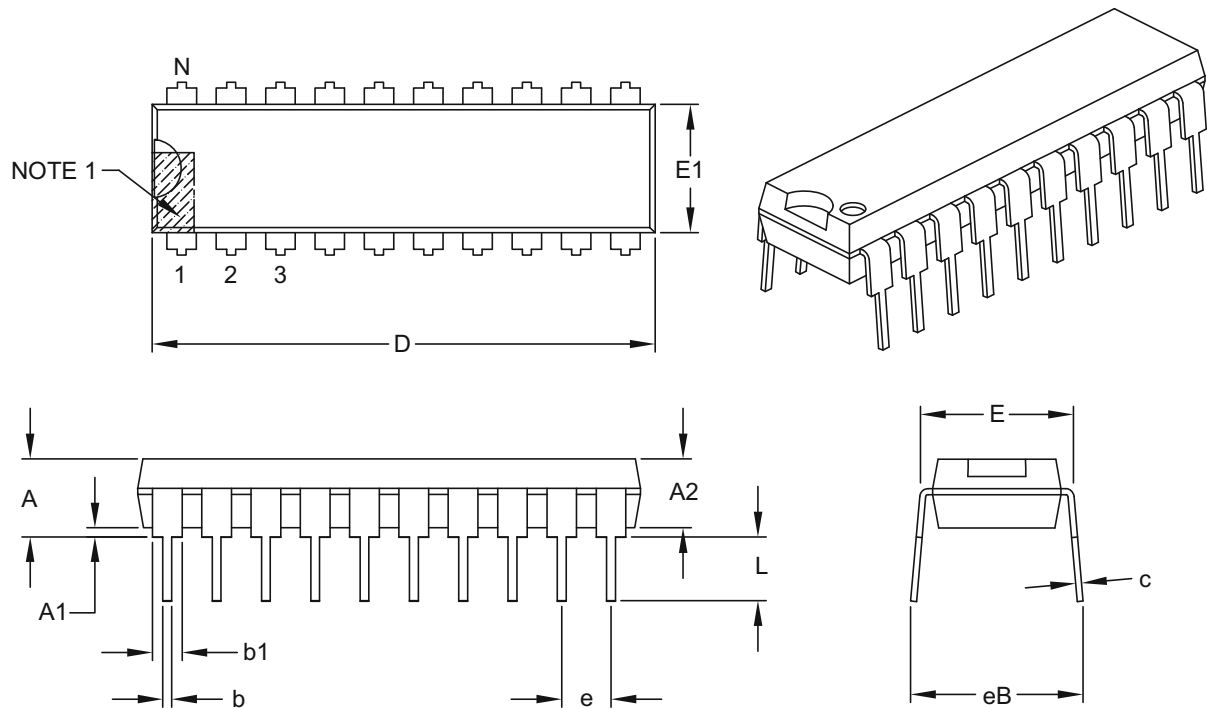
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

20-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.980	1.030	1.060
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

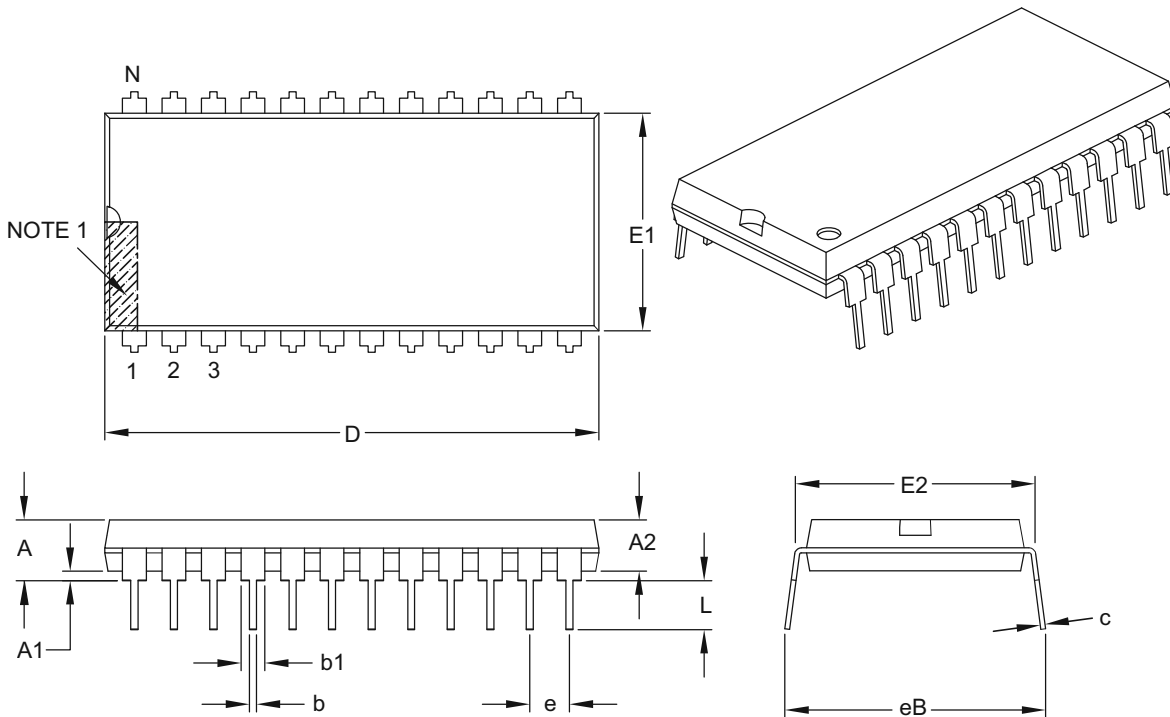
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

24-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.150	–	1.290
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

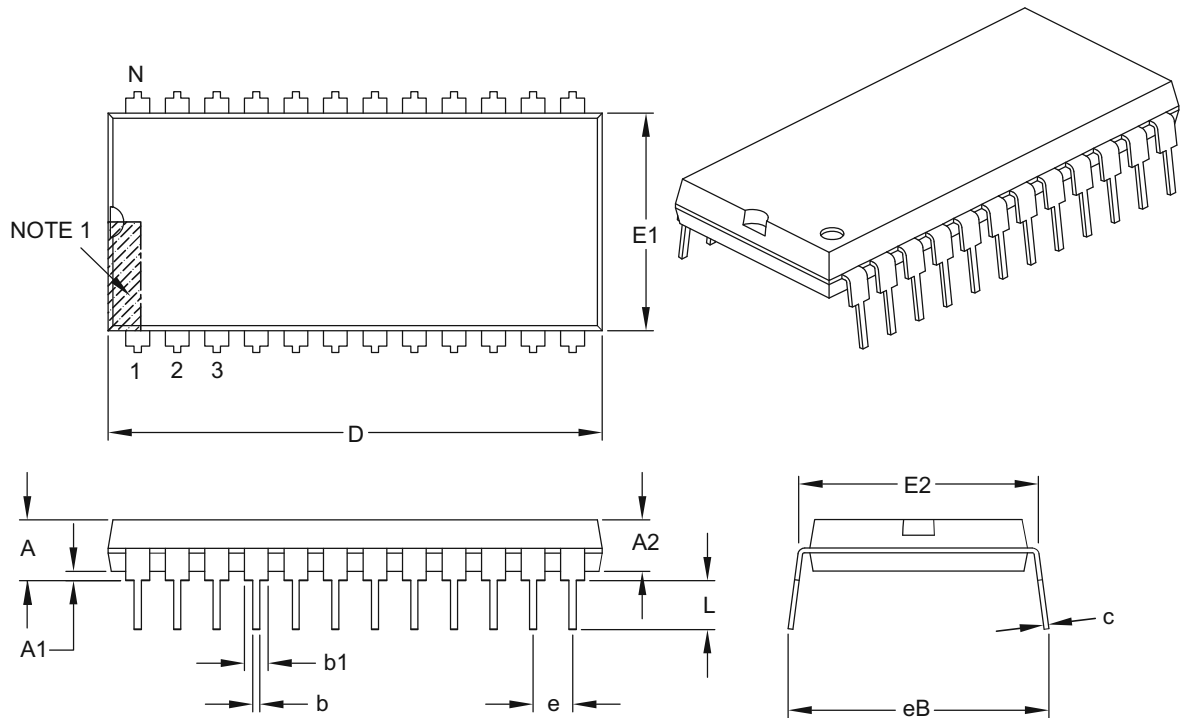
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

24-Lead Plastic Dual In-Line (PG) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.150	–	1.290
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

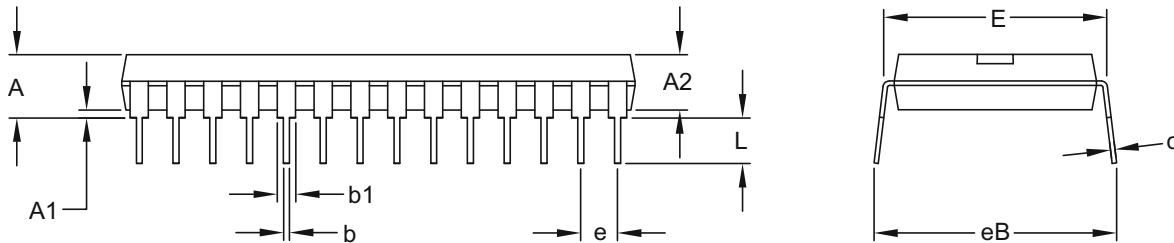
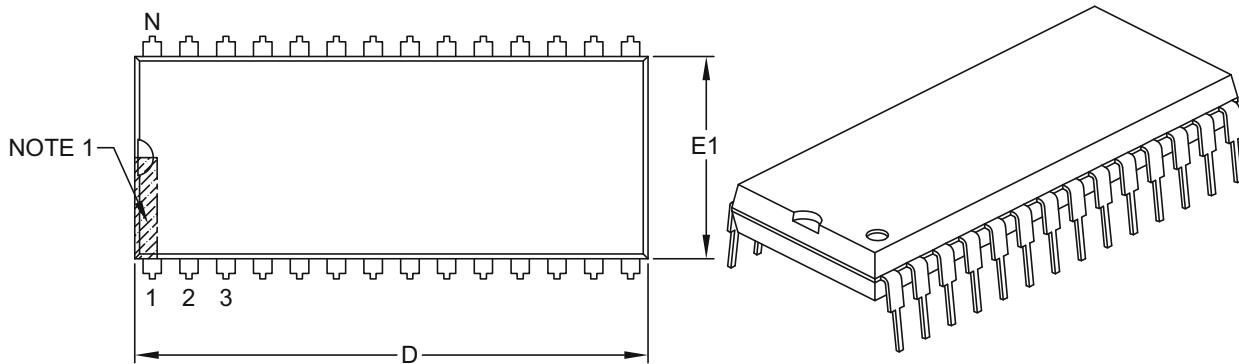
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.380	–	1.565
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

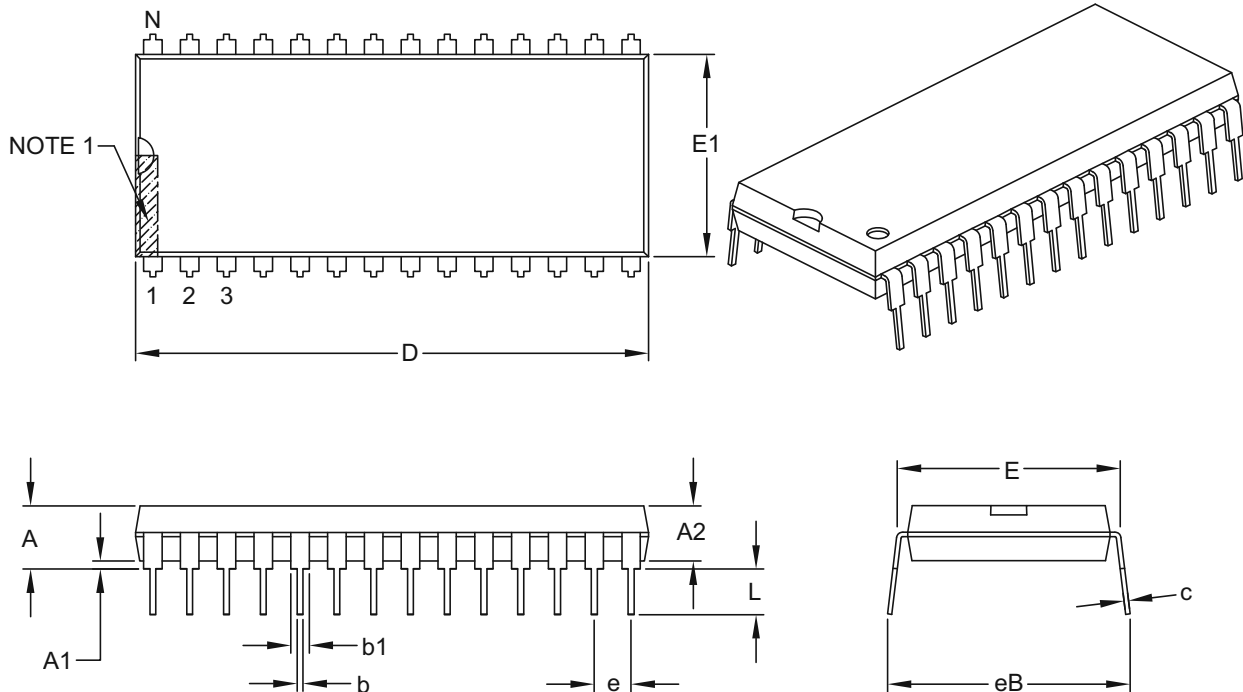
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Plastic Dual In-Line (PI) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.380	–	1.565
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

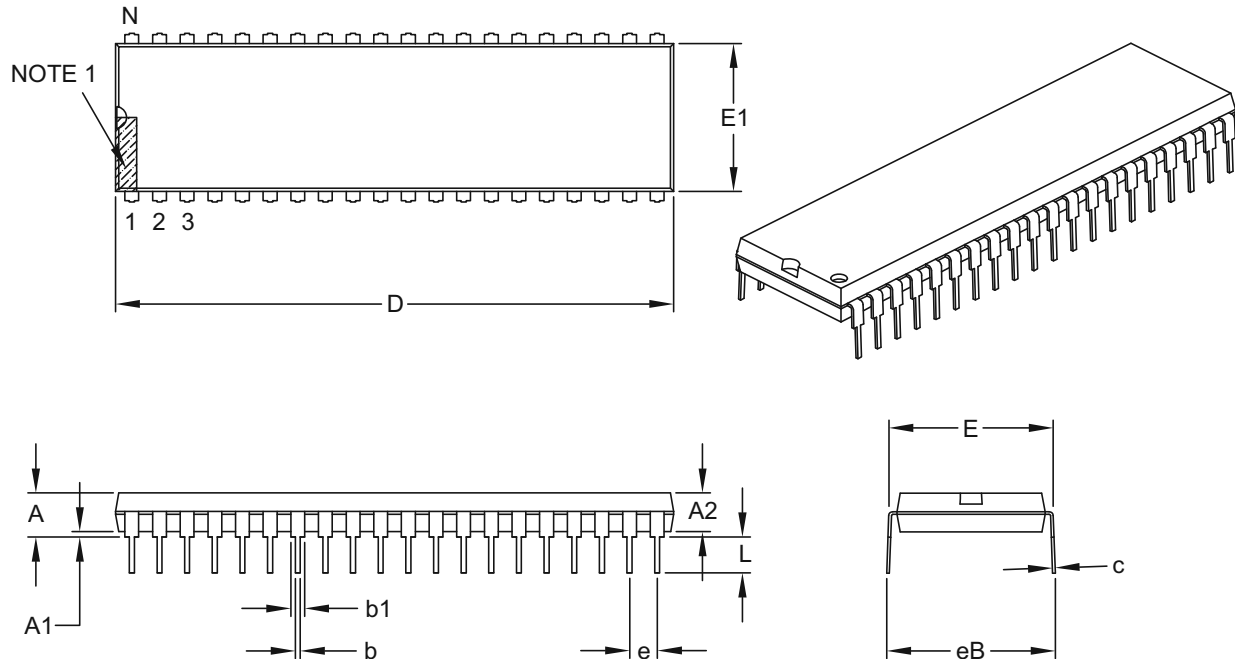
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.980	–	2.095
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.023
Overall Row Spacing §	eB	–	–	.700

Notes:

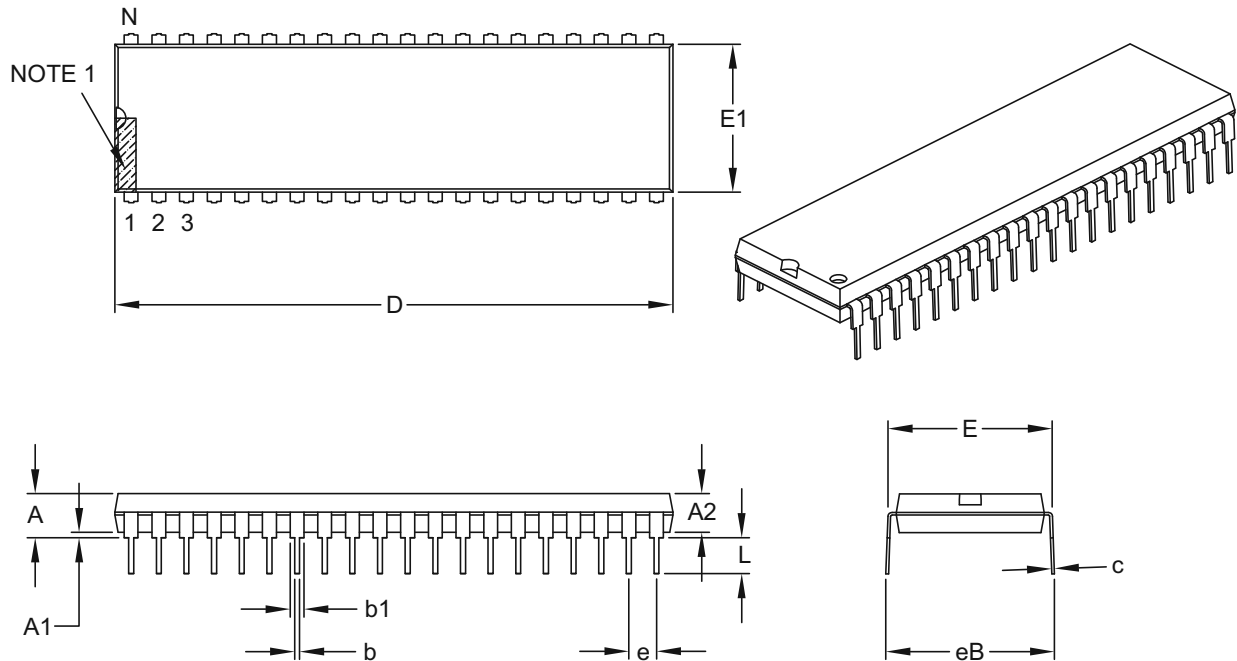
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Plastic Dual In-Line (PL) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1,980	–	2,095
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.023
Overall Row Spacing §	eB	–	–	.700

Notes:

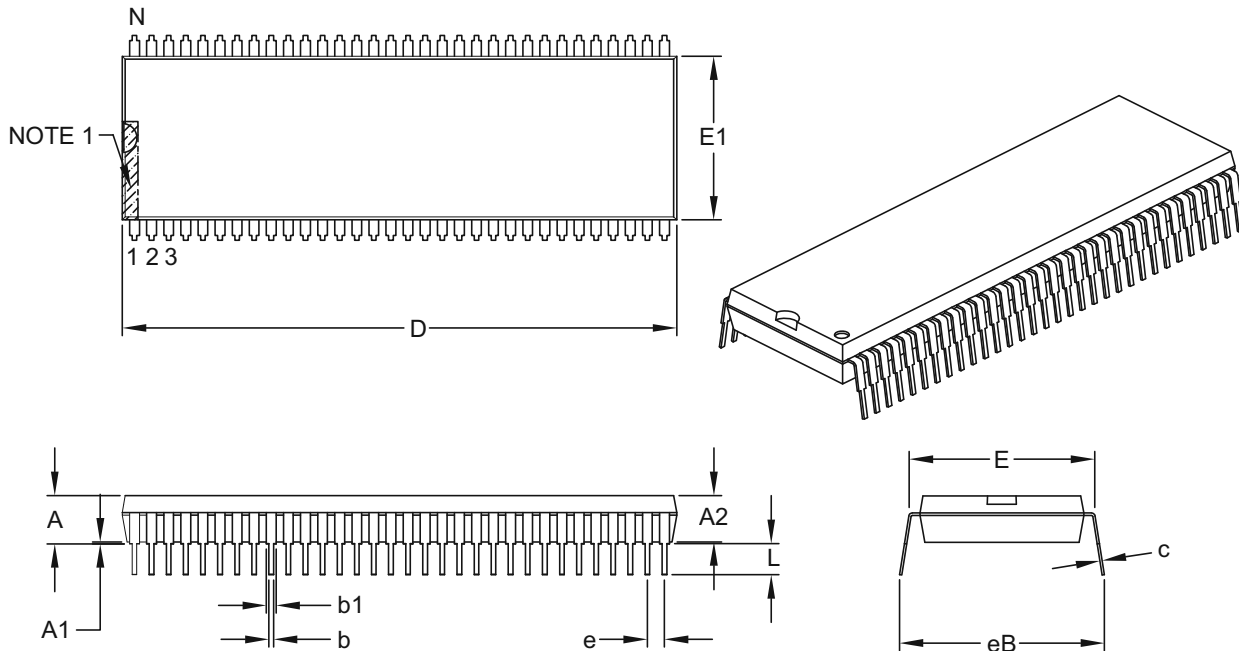
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

64-Lead Shrink Plastic Dual In-Line (SP) – 750 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	INCHES		
		Dimension Limits		
		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	.070 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.150	.180
Base to Seating Plane	A1	.020	–	–
Shoulder to Shoulder Width	E	.750	–	.785
Molded Package Width	E1	.650	.670	.690
Overall Length	D	2.260	2.270	2.280
Tip to Seating Plane	L	.100	.130	.150
Lead Thickness	c	.009	.010	.015
Upper Lead Width	b1	.035	.040	.045
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.880

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

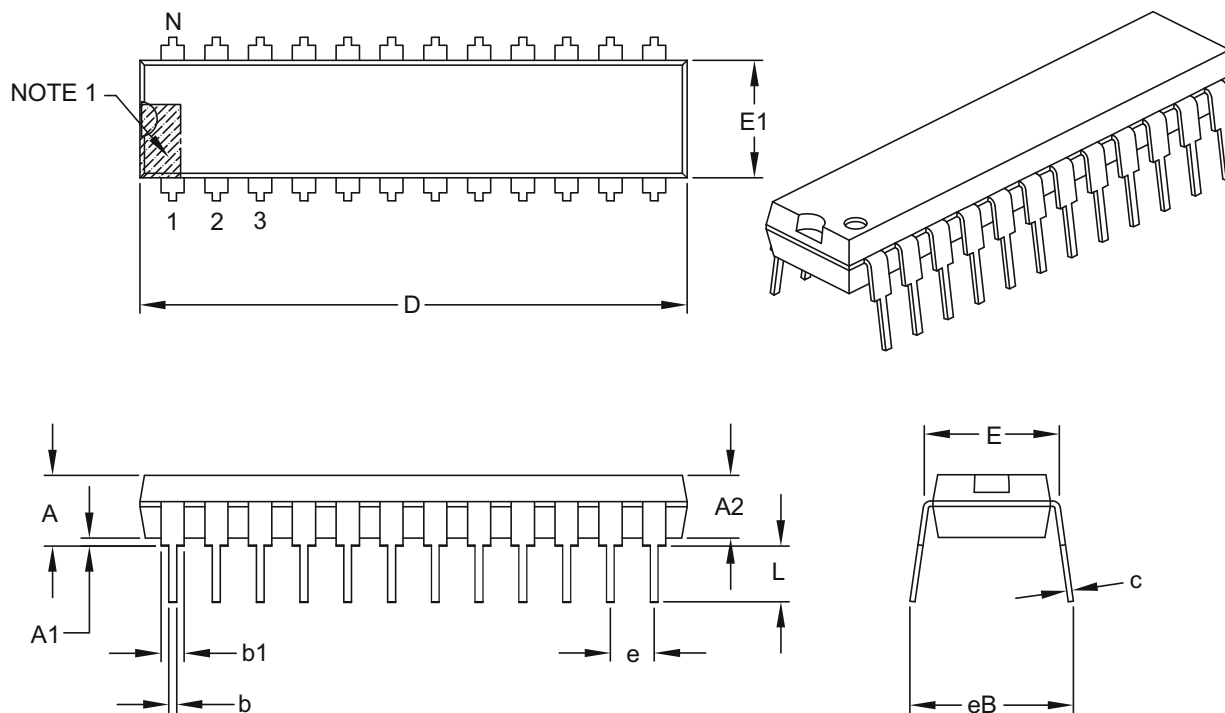
SPDIP Family

Skinny Plastic Dual In-Line Packages

Packaging Diagrams and Parameters

24-Lead Skinny Plastic Dual In-Line (PF) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		24		
Pitch	e		.100 BSC		
Top to Seating Plane	A	–	–	–	.210
Molded Package Thickness	A2	.115	.130	.195	
Base to Seating Plane	A1	.015	–	–	
Shoulder to Shoulder Width	E	.280	.310	.325	
Molded Package Width	E1	.240	.250	.280	
Overall Length	D	1.155	1.250	1.280	
Tip to Seating Plane	L	.115	.130	.160	
Lead Thickness	c	.008	.010	.015	
Upper Lead Width	b1	.045	.060	.070	
Lower Lead Width	b	.014	.018	.023	
Overall Row Spacing §	eB	–	–	–	.430

Notes:

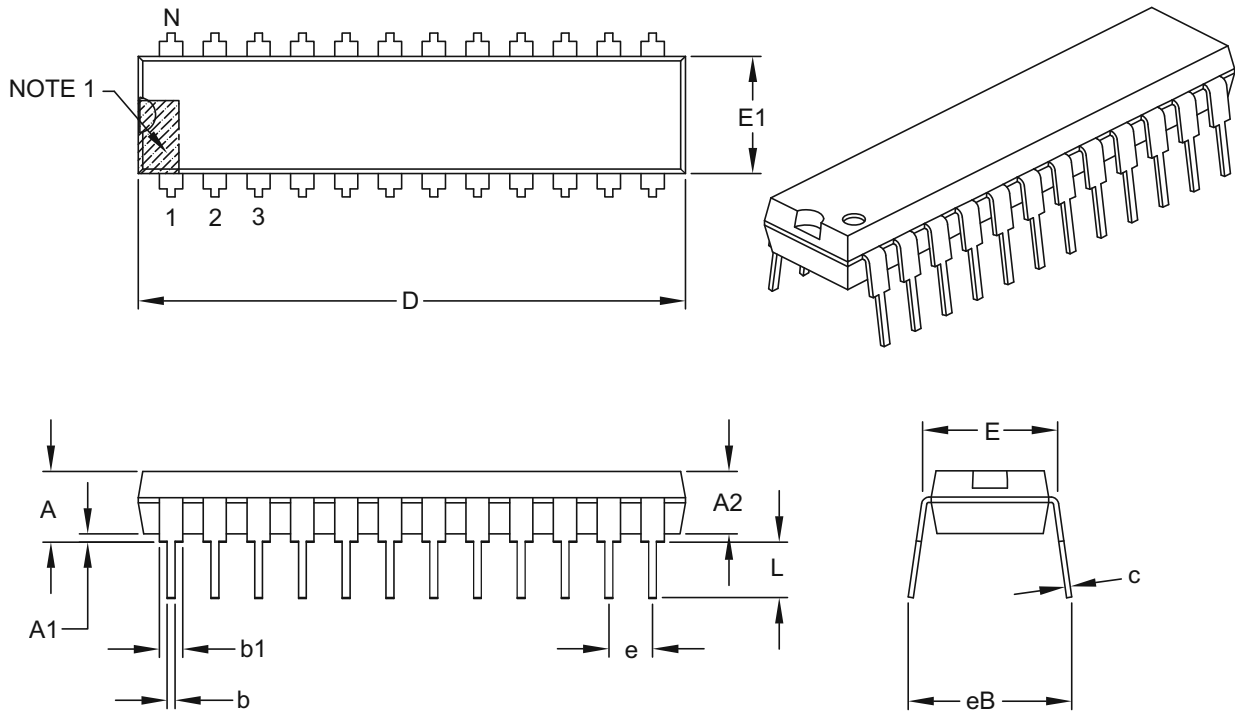
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

24-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.280	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	1.155	1.250	1.280
Tip to Seating Plane	L	.115	.130	.160
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.023
Overall Row Spacing §	eB	–	–	.430

Notes:

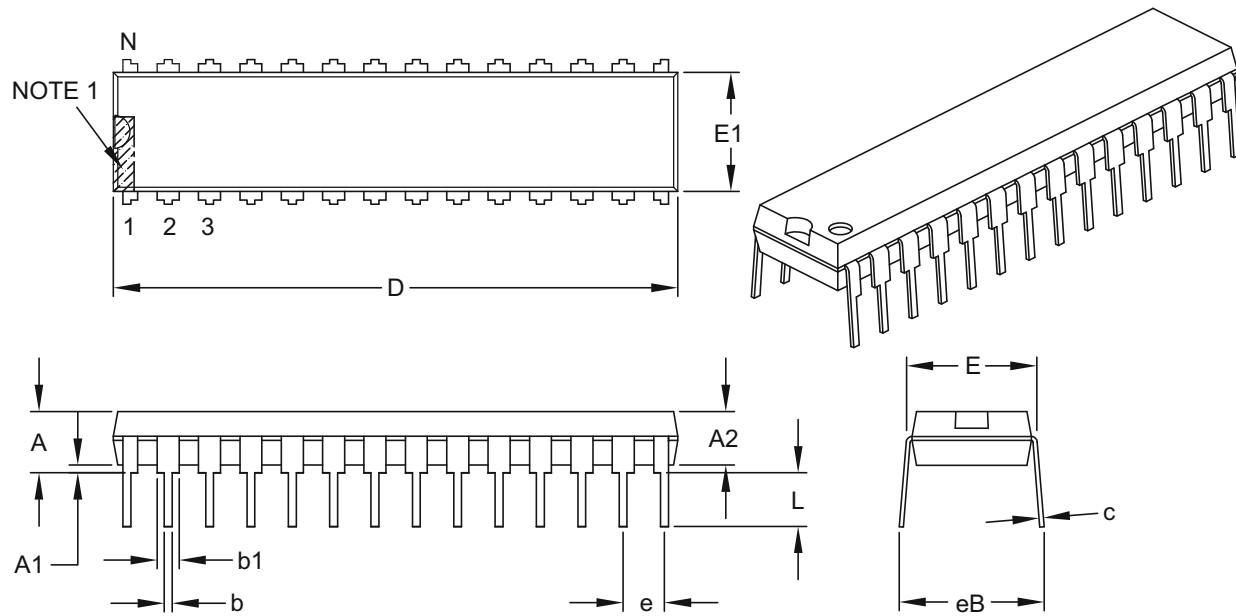
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension, Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Skinny Plastic Dual In-Line (PJ) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.135	.150
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.335
Molded Package Width	E1	.240	.285	.295
Overall Length	D	1.345	1.365	1.400
Tip to Seating Plane	L	.110	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.050	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

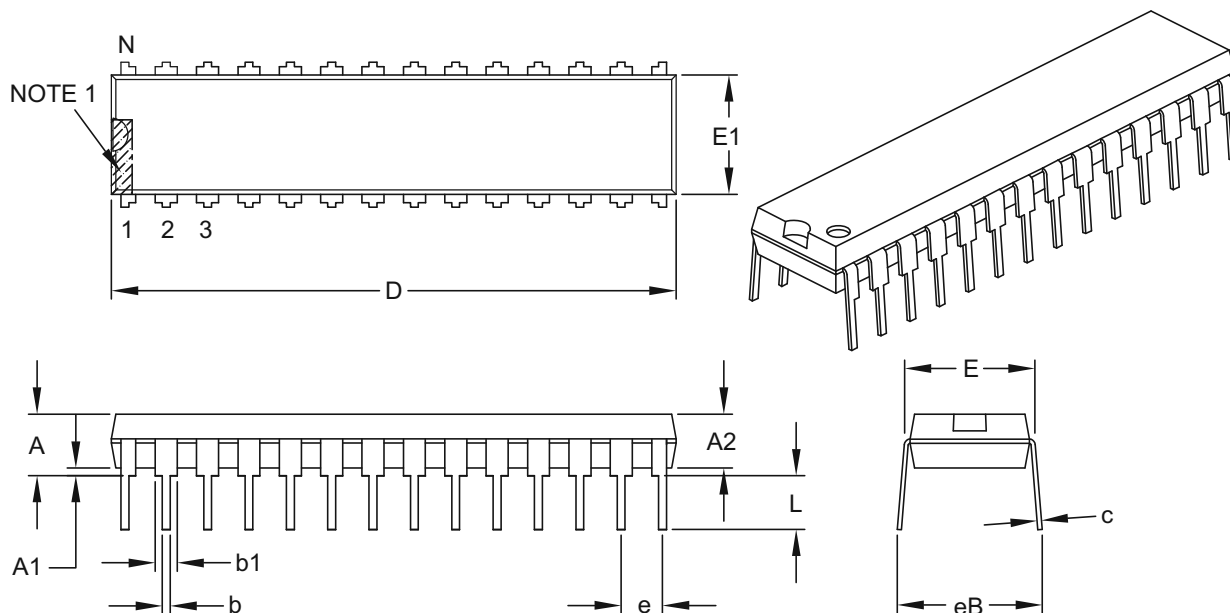
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.135	.150
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.335
Molded Package Width	E1	.240	.285	.295
Overall Length	D	1.345	1.365	1.400
Tip to Seating Plane	L	.110	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.050	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.



MICROCHIP

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

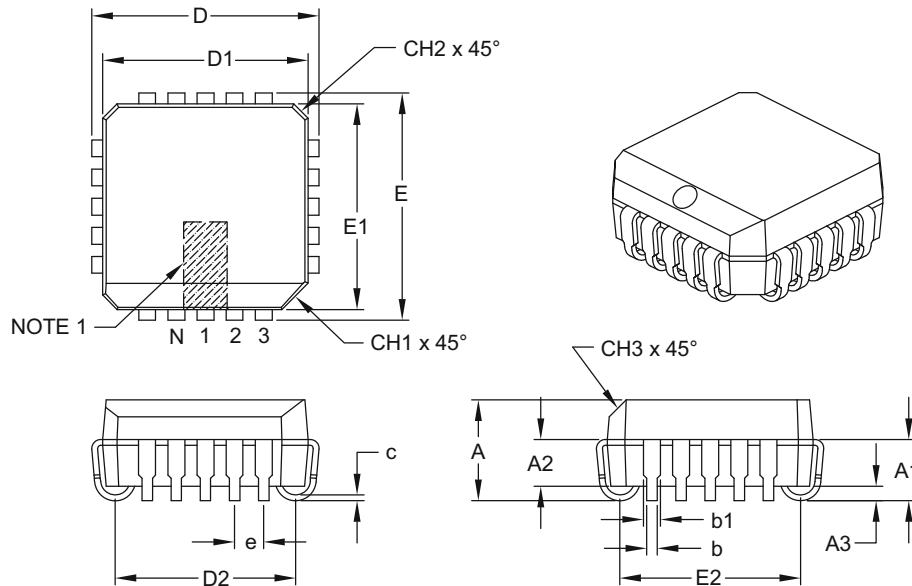
PLCC Family

Plastic Leaded Chip Carrier Packages

Packaging Diagrams and Parameters

20-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		20		
Pitch	e		.050		
Overall Height	A		.165	.172	.180
Contact Height	A1		.090	.105	.120
Molded Package to Contact	A2		.062	–	.083
Standoff §	A3		.020	–	–
Corner Chamfer	CH1		.042	–	.048
Chamfers	CH2		–	–	.020
Side Chamfer	CH3		.042	–	.056
Overall Width	E		.385	.390	.395
Overall Length	D		.385	.390	.395
Molded Package Width	E1		.350	.353	.356
Molded Package Length	D1		.350	.353	.356
Footprint Width	E2		.282	.310	.338
Footprint Length	D2		.282	.310	.338
Lead Thickness	c		.0075	–	.0125
Upper Lead Width	b1		.026	–	.032
Lower Lead Width	b		.013	–	.021

Notes:

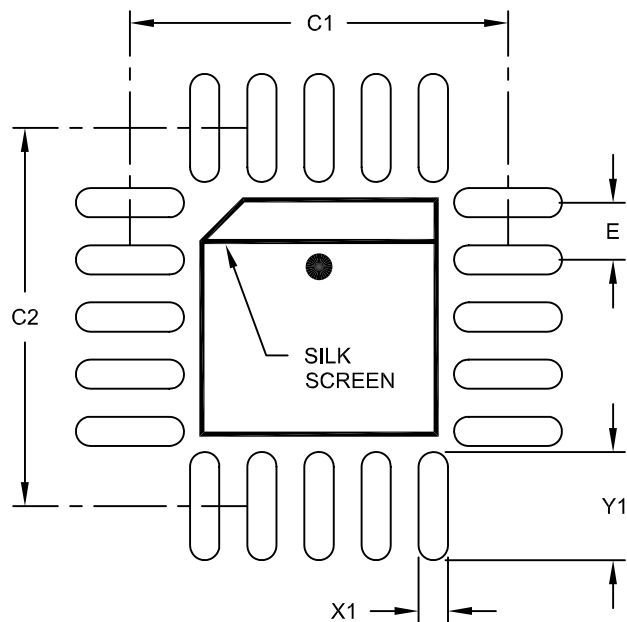
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-064B

Land Pattern (Footprint)

20-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.331	
Contact Pad Spacing	C2		.331	
Contact Pad Width (X20)	X1			.026
Contact Pad Length (X20)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

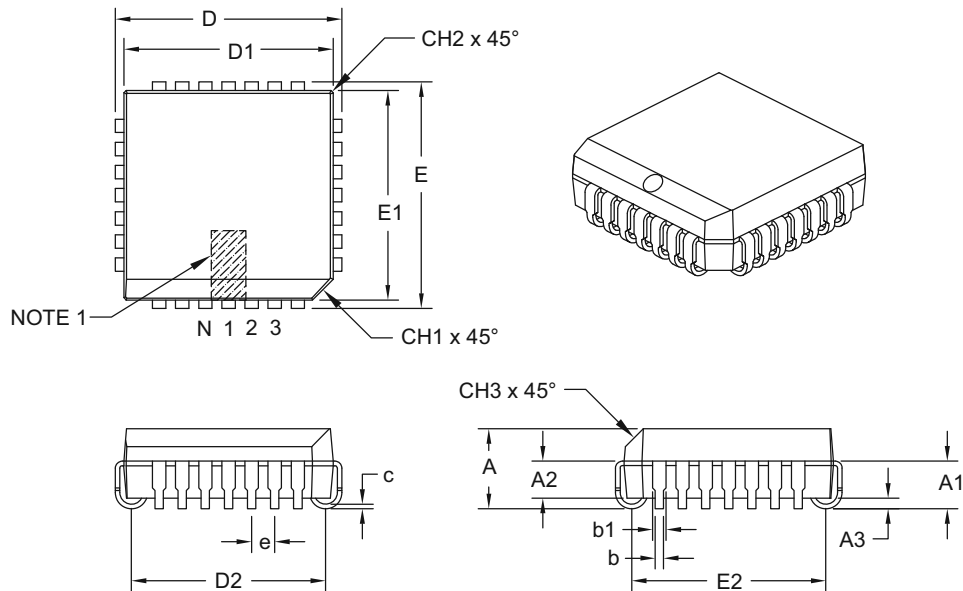
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2064A

Packaging Diagrams and Parameters

28-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	INCHES		
		MIN	NOM	MAX
Dimension Limits				
Number of Pins	N	28		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.485	.490	.495
Overall Length	D	.485	.490	.495
Molded Package Width	E1	.450	.453	.456
Molded Package Length	D1	.450	.453	.456
Footprint Width	E2	.382	.410	.438
Footprint Length	D2	.382	.410	.438
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

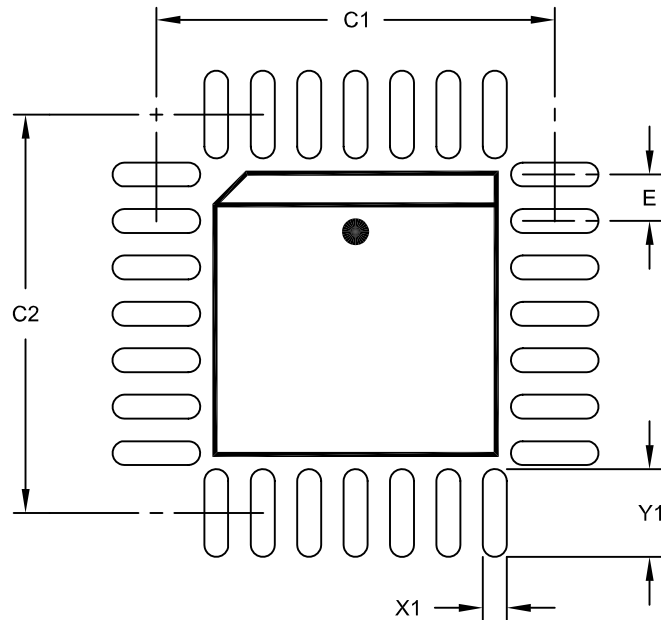
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

28-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	INCHES		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E			.050 BSC	
Contact Pad Spacing	C1			.429	
Contact Pad Spacing	C2			.429	
Contact Pad Width (X28)	X1				.026
Contact Pad Length (X28)	Y1				.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

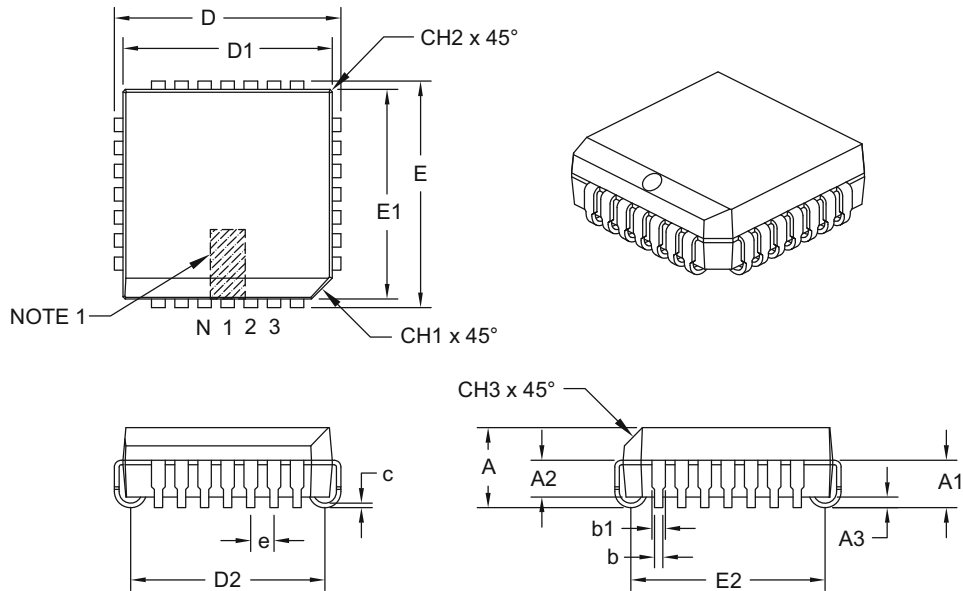
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

Packaging Diagrams and Parameters

28-Lead Plastic Leaded Chip Carrier (LI) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		.050		
Overall Height	A		.165	.172	.180
Contact Height	A1		.090	.105	.120
Molded Package to Contact	A2		.062	–	.083
Standoff §	A3		.020	–	–
Corner Chamfer	CH1		.042	–	.048
Chamfers	CH2		–	–	.020
Side Chamfer	CH3		.042	–	.056
Overall Width	E		.485	.490	.495
Overall Length	D		.485	.490	.495
Molded Package Width	E1		.450	.453	.456
Molded Package Length	D1		.450	.453	.456
Footprint Width	E2		.382	.410	.438
Footprint Length	D2		.382	.410	.438
Lead Thickness	c		.0075	–	.0125
Upper Lead Width	b1		.026	–	.032
Lower Lead Width	b		.013	–	.021

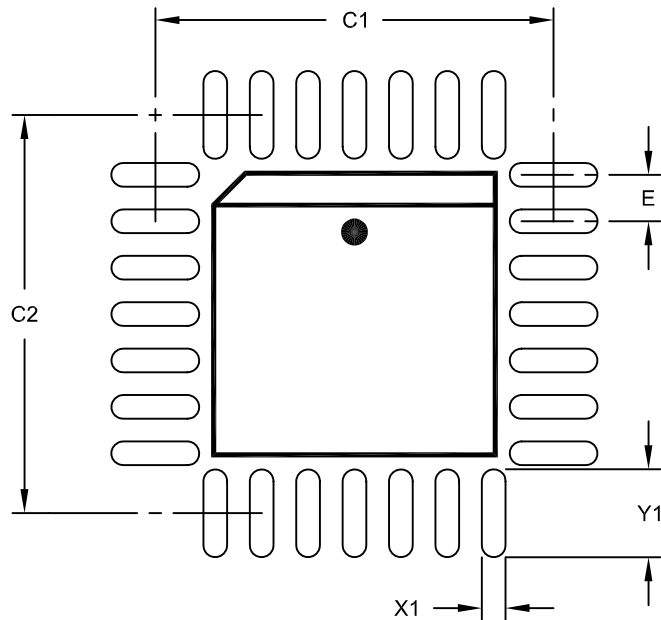
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

28-Lead Plastic Leaded Chip Carrier (LI) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.429	
Contact Pad Spacing	C2		.429	
Contact Pad Width (X28)	X1			.026
Contact Pad Length (X28)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

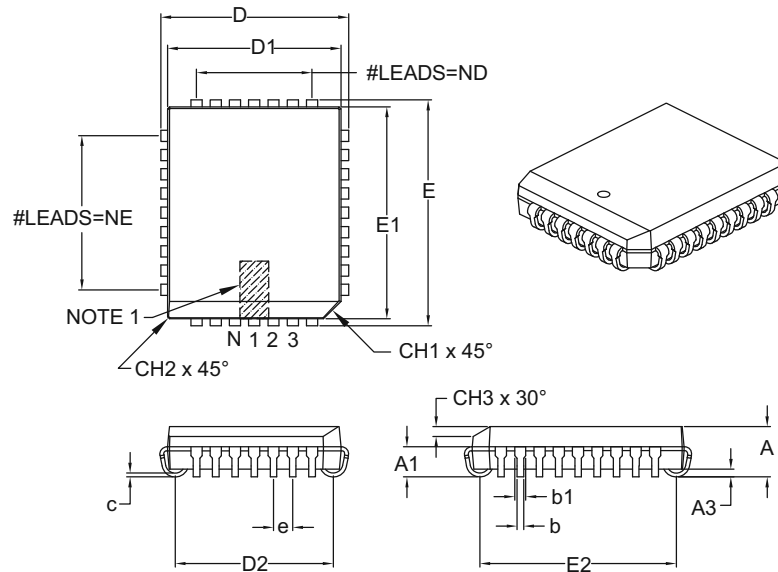
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

Packaging Diagrams and Parameters

32-Lead Plastic Leaded Chip Carrier (L) – Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	32		
Pitch	e	.050		
Pins along Length	ND	7		
Pins along Width	NE	9		
Overall Height	A	.125	–	.140
Contact Height	A1	.060	–	.095
Standoff §	A3	.015	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer Height	CH3	.023	–	.029
Overall Length	D	.485	–	.495
Overall Width	E	.585	–	.595
Molded Package Length	D1	.447	–	.453
Molded Package Width	E1	.547	–	.553
Footprint Length	D2	.376	–	.446
Footprint Width	E2	.476	–	.546
Lead Thickness	c	.008	–	.013
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

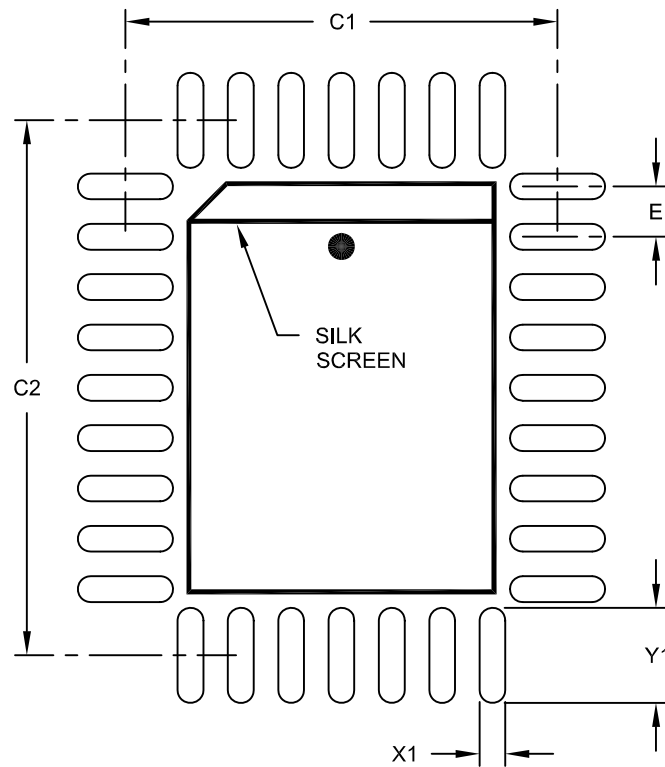
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

32-Lead Plastic Leaded Chip Carrier (L) - Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.429	
Contact Pad Spacing	C2		.531	
Contact Pad Width (X32)	X1			.026
Contact Pad Length (X32)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

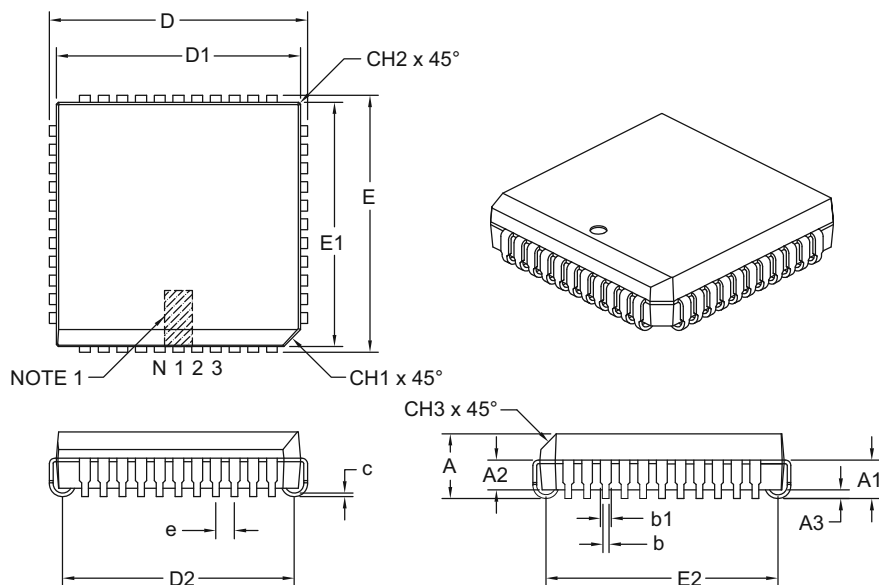
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2023A

Packaging Diagrams and Parameters

44-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	44		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.685	.690	.695
Overall Length	D	.685	.690	.695
Molded Package Width	E1	.650	.653	.656
Molded Package Length	D1	.650	.653	.656
Footprint Width	E2	.582	.610	.638
Footprint Length	D2	.582	.610	.638
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

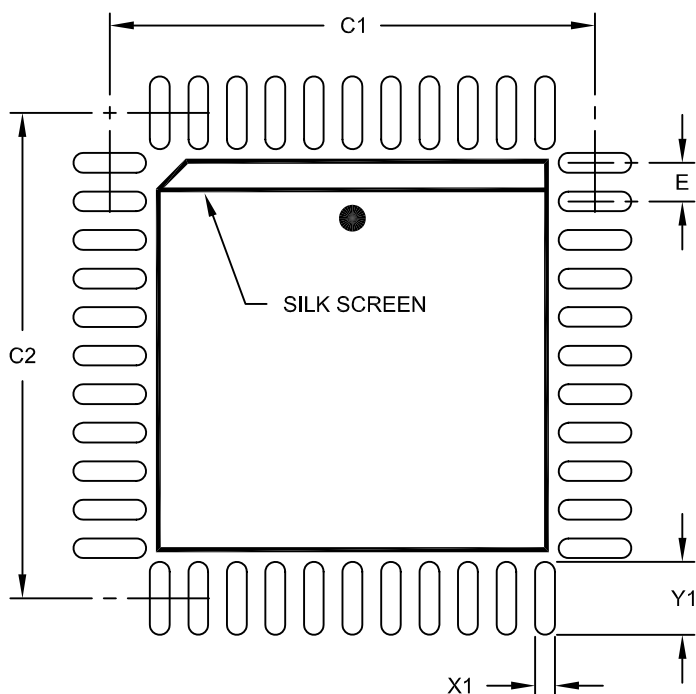
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

44-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	INCHES		
	Limits	MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

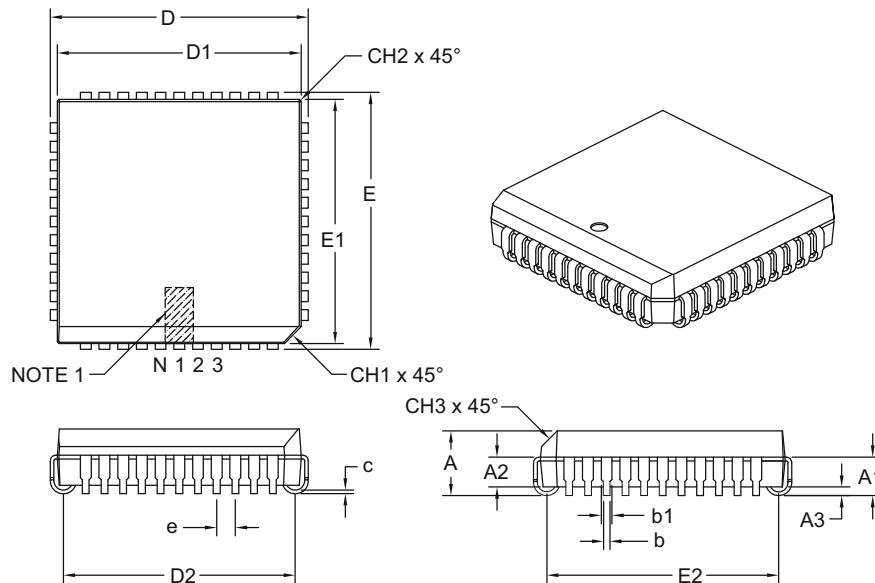
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

Packaging Diagrams and Parameters

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	44		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.685	.690	.695
Overall Length	D	.685	.690	.695
Molded Package Width	E1	.650	.653	.656
Molded Package Length	D1	.650	.653	.656
Footprint Width	E2	.582	.610	.638
Footprint Length	D2	.582	.610	.638
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

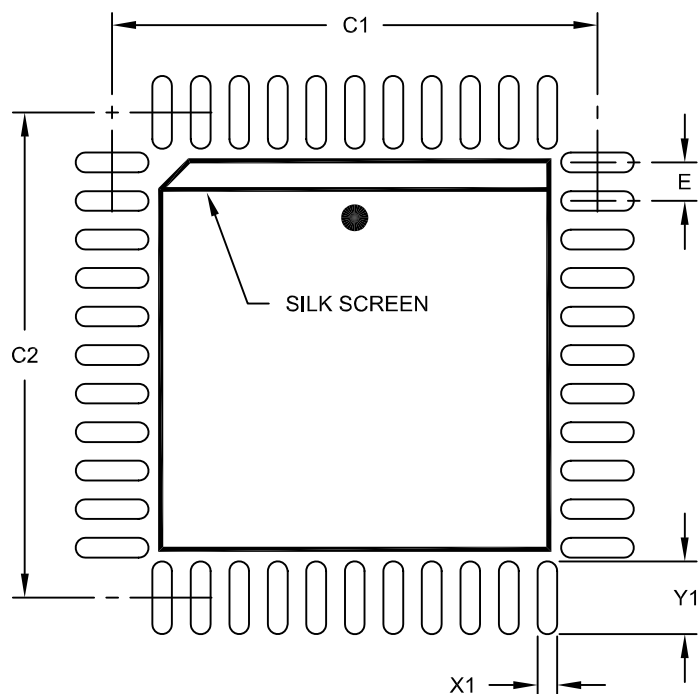
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	INCHES		
	Limits	MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

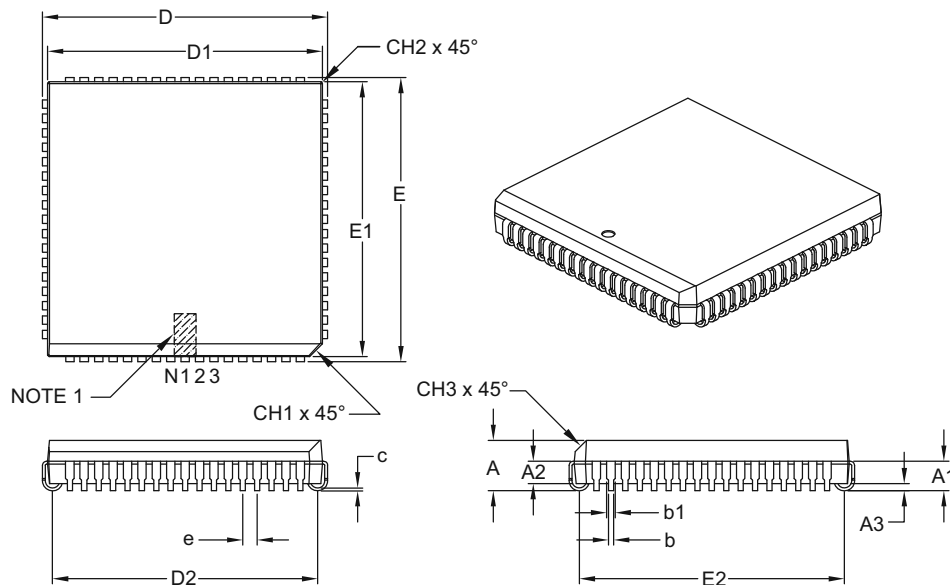
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

Packaging Diagrams and Parameters

68-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		68		
Pitch	e		.050		
Overall Height	A		.165	.172	.180
Contact Height	A1		.090	.105	.120
Molded Package to Contact	A2		.062	–	.083
Standoff §	A3		.020	–	–
Corner Chamfer	CH1		.042	–	.048
Chamfers	CH2		–	–	.020
Side Chamfer	CH3		.042	–	.056
Overall Width	E		.985	.990	.995
Overall Length	D		.985	.990	.995
Molded Package Width	E1		.950	.954	.958
Molded Package Length	D1		.950	.954	.958
Footprint Width	E2		.882	.910	.938
Footprint Length	D2		.882	.910	.938
Lead Thickness	c		.0075	–	.0125
Upper Lead Width	b1		.026	–	.032
Lower Lead Width	b		.013	–	.021

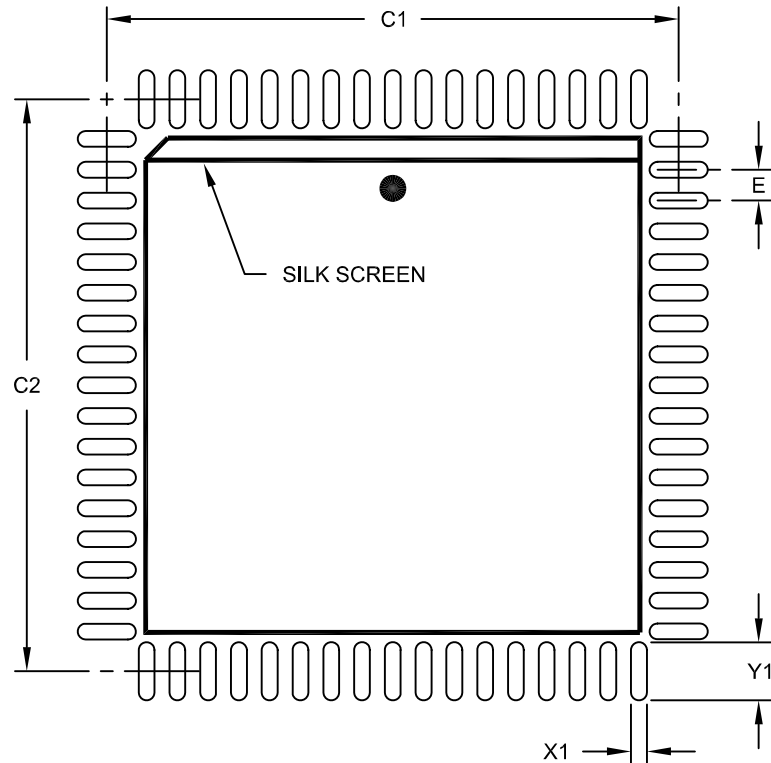
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

68-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

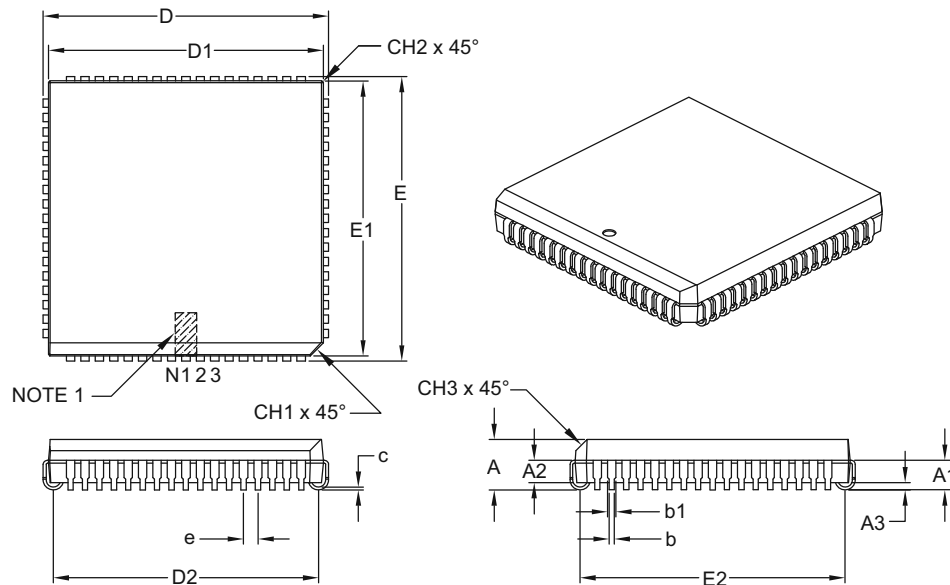
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

Packaging Diagrams and Parameters

68-Lead Plastic Leaded Chip Carrier (LS) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		68		
Pitch	e		.050		
Overall Height	A		.165	.172	.180
Contact Height	A1		.090	.105	.120
Molded Package to Contact	A2		.062	–	.083
Standoff §	A3		.020	–	–
Corner Chamfer	CH1		.042	–	.048
Chamfers	CH2		–	–	.020
Side Chamfer	CH3		.042	–	.056
Overall Width	E		.985	.990	.995
Overall Length	D		.985	.990	.995
Molded Package Width	E1		.950	.954	.958
Molded Package Length	D1		.950	.954	.958
Footprint Width	E2		.882	.910	.938
Footprint Length	D2		.882	.910	.938
Lead Thickness	c		.0075	–	.0125
Upper Lead Width	b1		.026	–	.032
Lower Lead Width	b		.013	–	.021

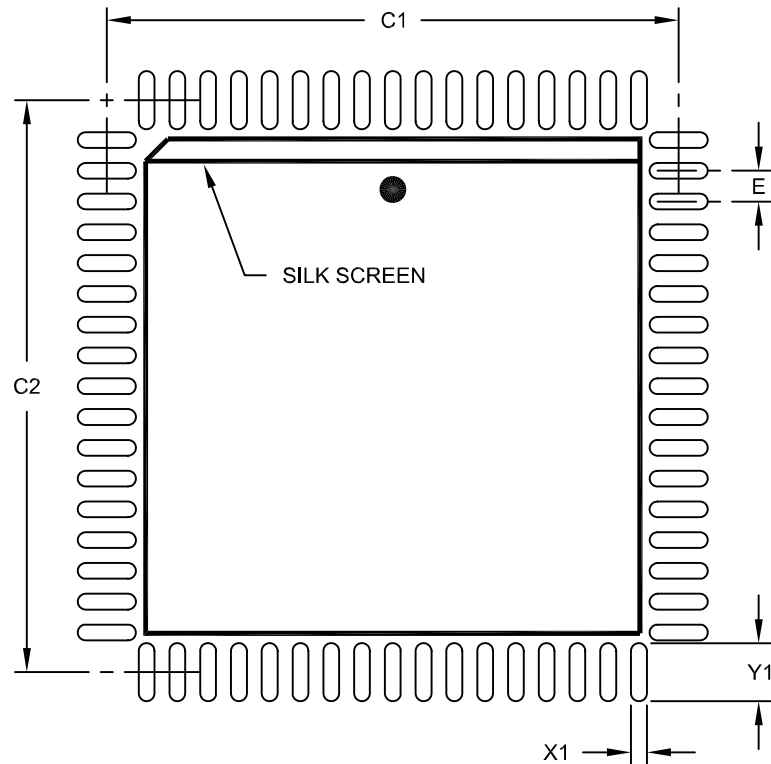
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

68-Lead Plastic Leaded Chip Carrier (LS) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	INCHES		
		MIN	NOM	MAX
	Dimension Limits			
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

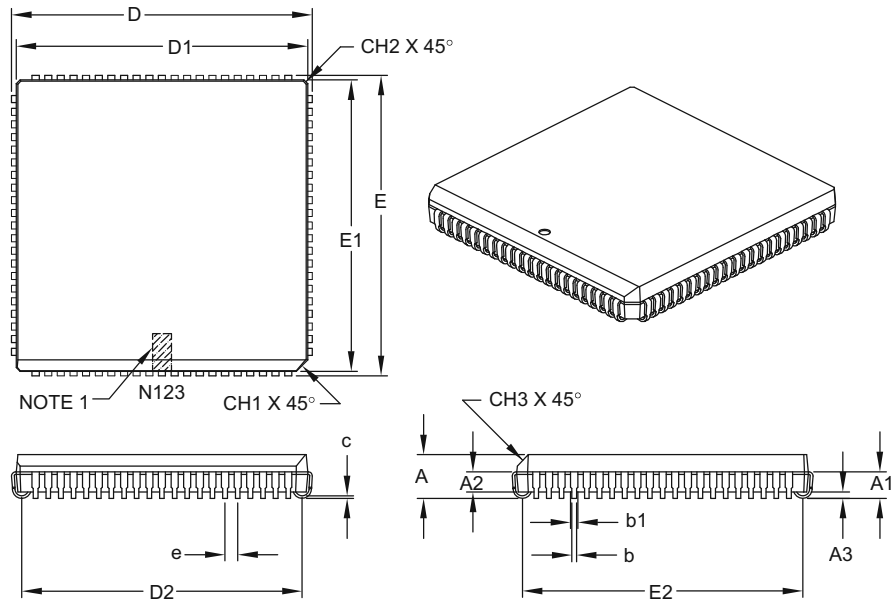
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

Packaging Diagrams and Parameters

84-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		84		
Pitch	e		.050		
Overall Height	A		.165	.172	.200
Contact Height	A1		.090	.105	.130
Molded Package to Contact	A2		.059	—	.080
Standoff §	A3		.020	—	—
Corner Chamfer	CH1		.042	—	.048
Chamfers	CH2		—	—	.020
Side Chamfer	CH3		.042	—	.056
Overall Width	E		1.185	1.190	1.195
Overall Length	D		1.185	1.190	1.195
Molded Package Width	E1		1.150	1.154	1.158
Molded Package Length	D1		1.150	1.154	1.158
Footprint Width	E2		1.082	1.110	1.138
Footprint Length	D2		1.082	1.110	1.138
Lead Thickness	c		.0075	—	.0125
Upper Lead Width	b1		.026	—	.032
Lower Lead Width	b		.013	—	.021

Notes:

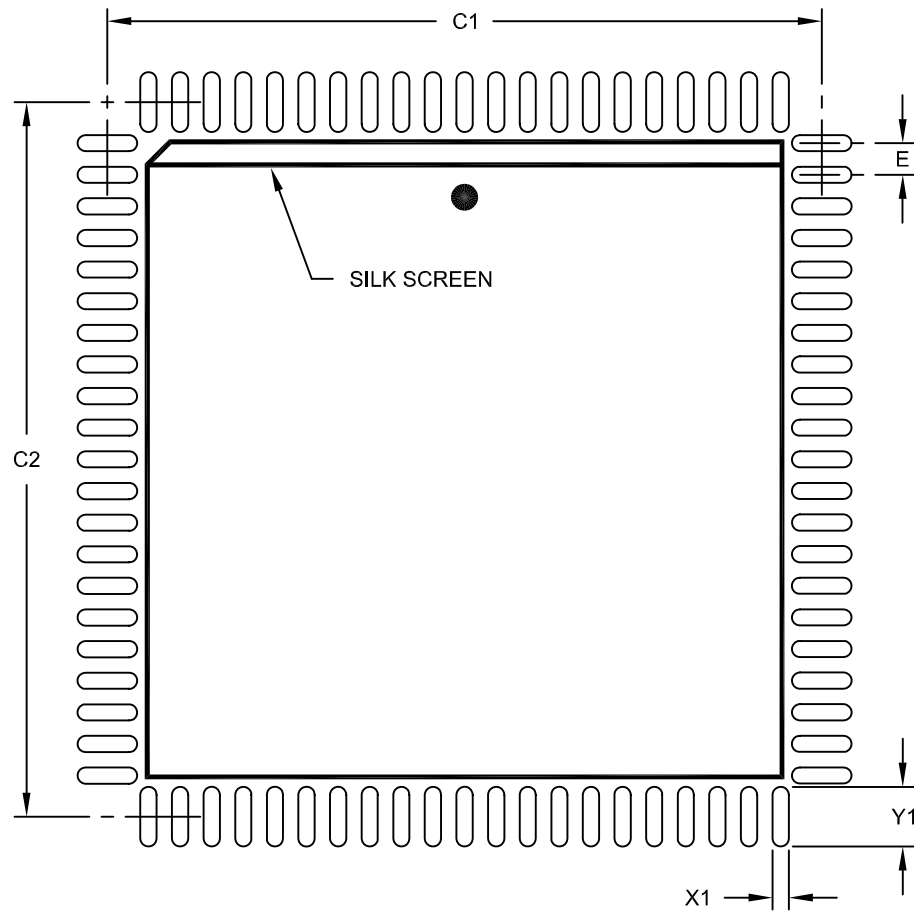
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-093B

Land Pattern (Footprint)

84-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		1.130	
Contact Pad Spacing	C2		1.130	
Contact Pad Width (X84)	X1			.026
Contact Pad Length (X84)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2093A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

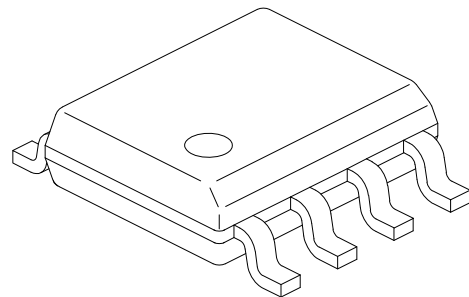
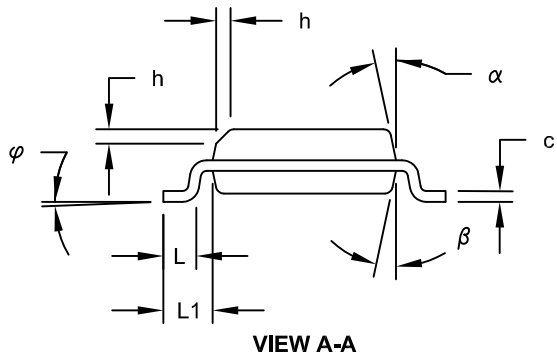
SOP Family

Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		1.27		
Overall Height	A	-	-	-	1.75
Molded Package Thickness	A2	1.25	-	-	-
Standoff §	A1	0.00	-	-	0.15
Overall Width	E	5.80	6.00	-	6.20
Molded Package Width	E1	3.80	3.90	-	4.00
Overall Length	D	4.70	4.90	-	5.10
Exposed Pad Width	E2	2.19	2.29	-	2.39
Exposed Pad Length	D2	2.19	2.29	-	2.39
Chamfer (Optional)	h	0.25	-	-	0.50
Foot Length	L	0.40	-	-	1.27
Footprint	L1	1.04	1.04	-	1.04
Foot Angle	φ	0°	-	-	8°
Lead Thickness	c	0.17	-	-	0.25
Lead Width	b	0.31	-	-	0.51
Mold Draft Angle Top	α	5°	-	-	15°
Mold Draft Angle Bottom	β	5°	-	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

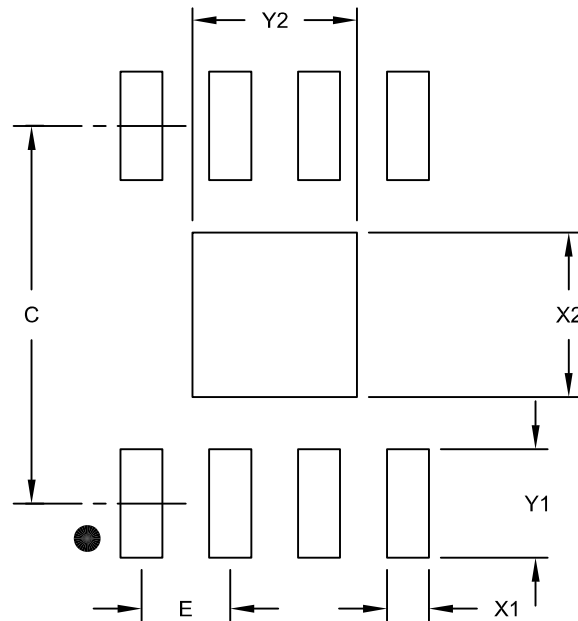
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.27 BSC		
Contact Pad Spacing	C			5.40	
Contact Pad Width (X8)	X1				0.60
Contact Pad Length (X8)	Y1				1.55
Exposed Pad Width	X2				2.35
Exposed Pad Length	Y2				2.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2121A

Packaging Diagrams and Parameters

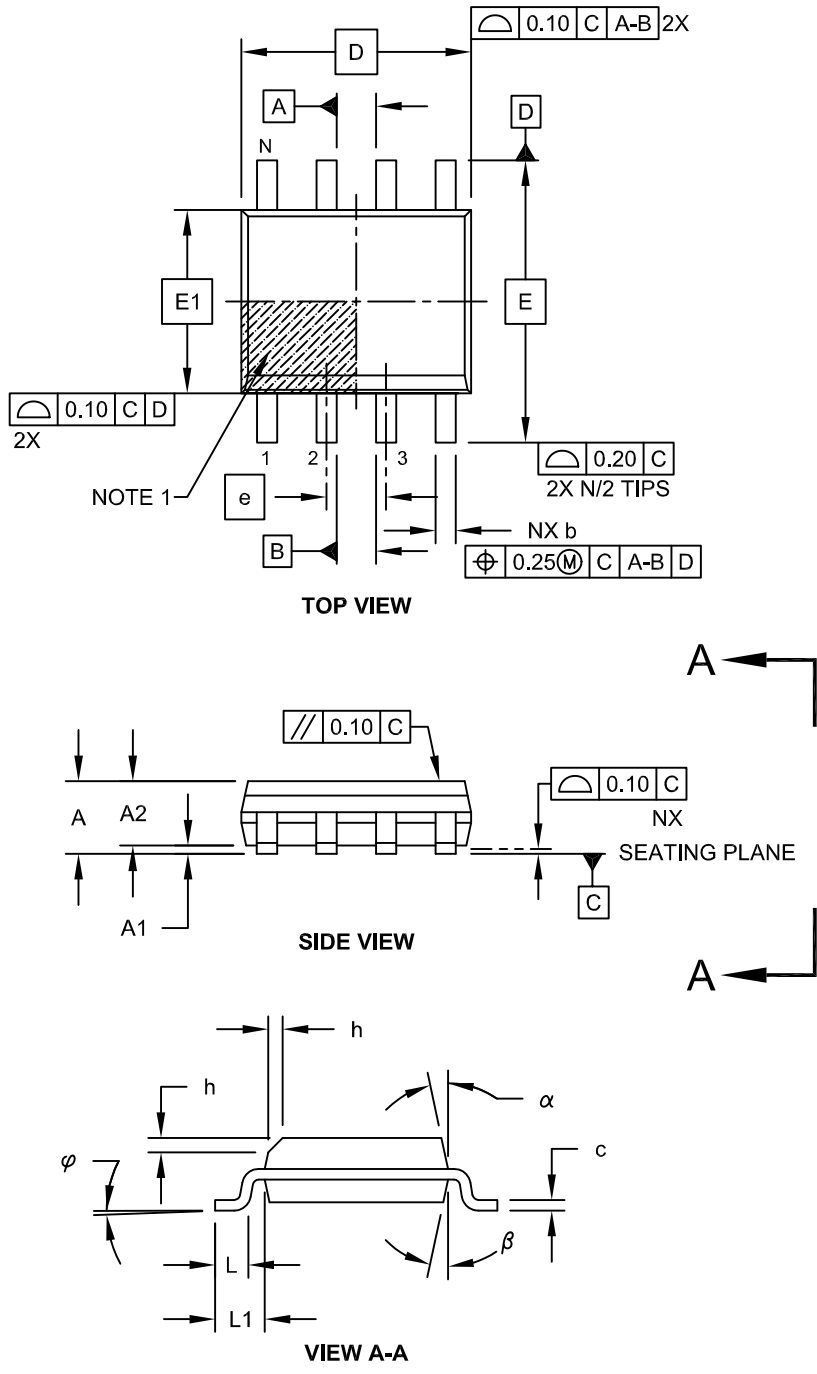
SOIC Family

Small Outline Plastic Packages

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

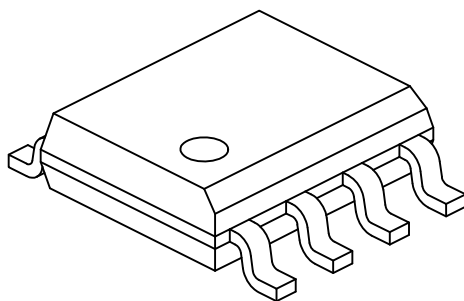
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

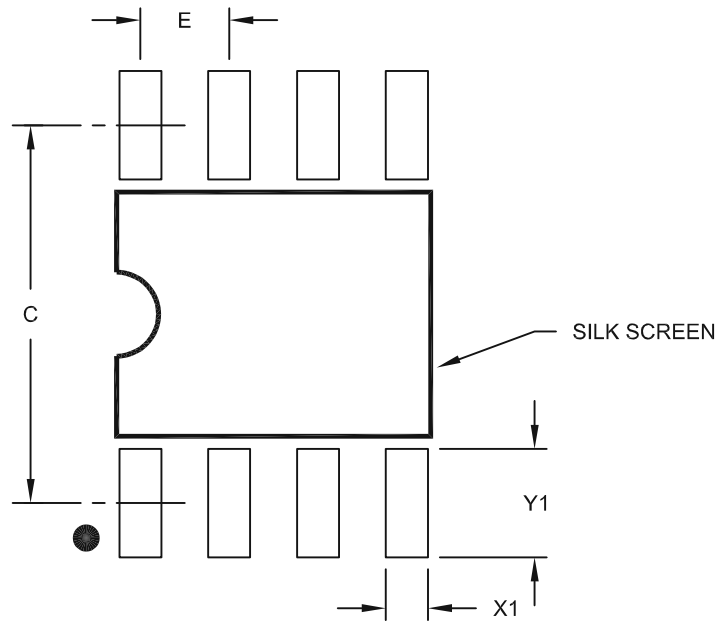
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.27 BSC		
Contact Pad Spacing	C			5.40	
Contact Pad Width (X8)	X1				0.60
Contact Pad Length (X8)	Y1				1.55

Notes:

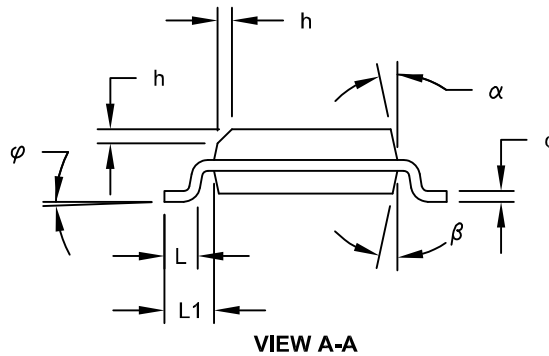
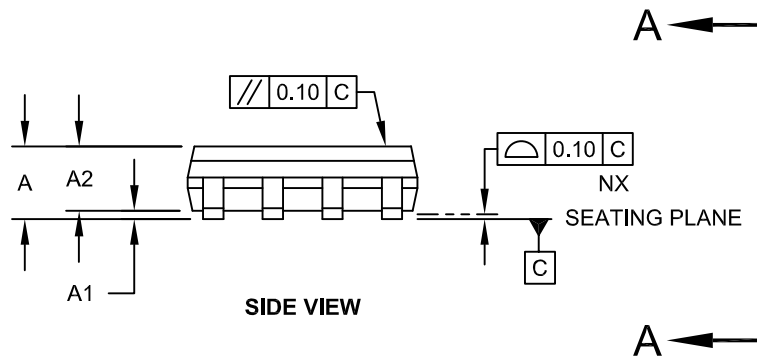
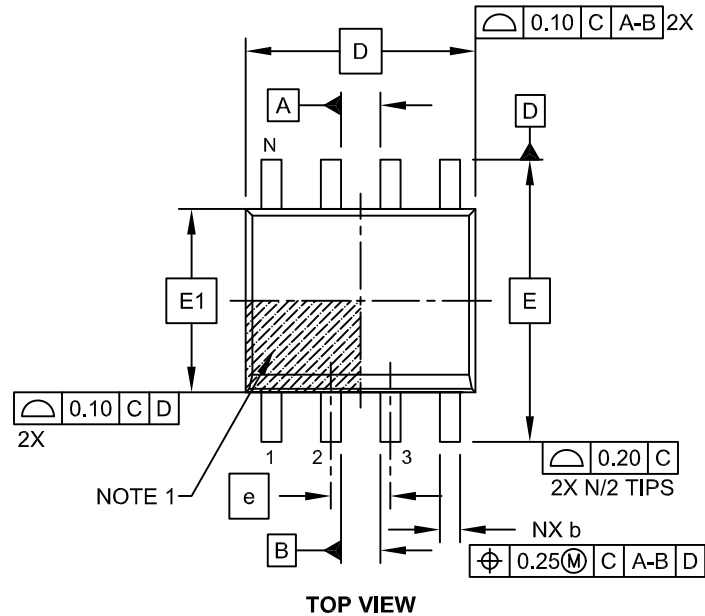
1. Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

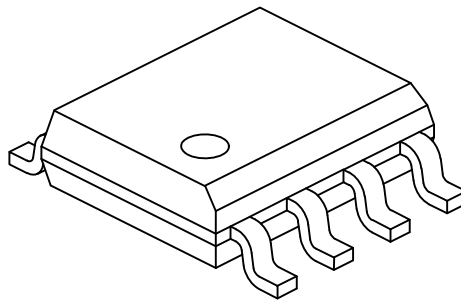
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		1.27 BSC		
Overall Height	A	-	-	-	1.75
Molded Package Thickness	A2		1.25	-	-
Standoff §	A1		0.10	-	0.25
Overall Width	E		6.00 BSC		
Molded Package Width	E1		3.90 BSC		
Overall Length	D		4.90 BSC		
Chamfer (Optional)	h		0.25	-	0.50
Foot Length	L		0.40	-	1.27
Footprint	L1		1.04 REF		
Foot Angle	φ		0°	-	8°
Lead Thickness	c		0.17	-	0.25
Lead Width	b		0.31	-	0.51
Mold Draft Angle Top	α		5°	-	15°
Mold Draft Angle Bottom	β		5°	-	15°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M

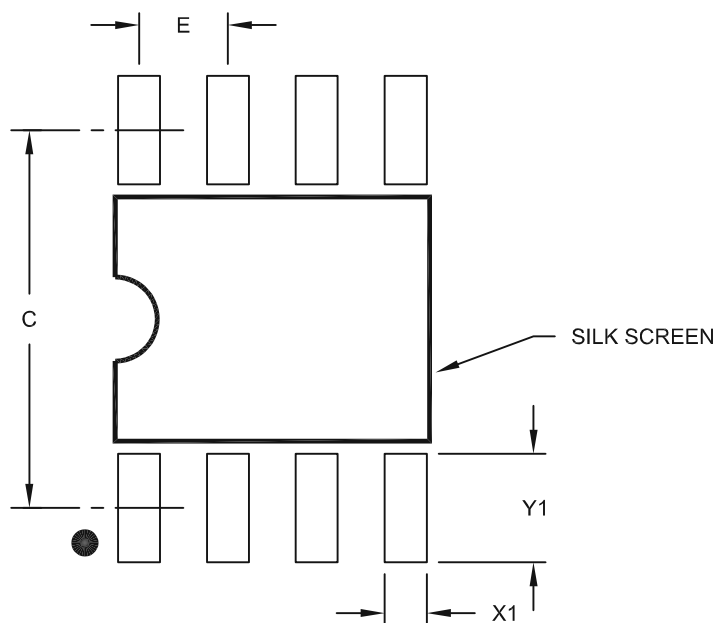
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Small Outline (OA) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
		MIN	NOM	MAX
Dimension Limits				
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

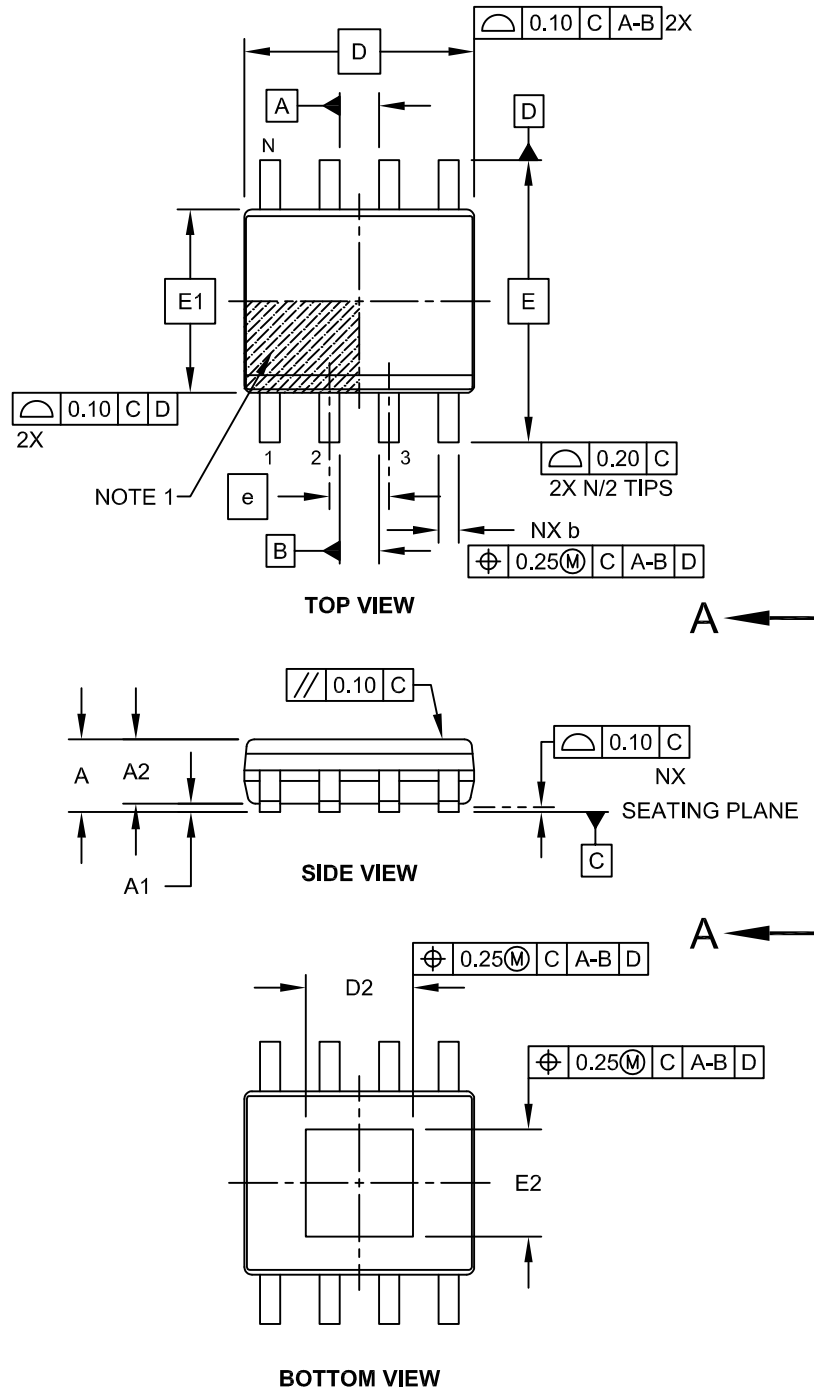
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

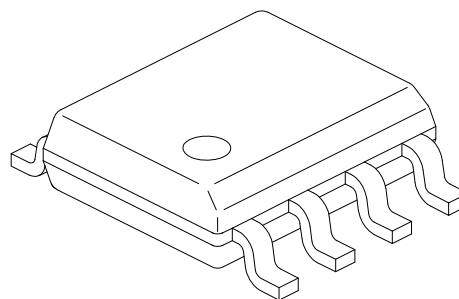
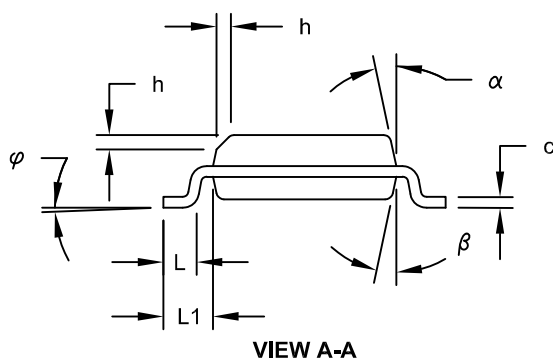
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.15
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Exposed Pad Width	E2	2.19	2.29	2.39
Exposed Pad Length	D2	2.19	2.29	2.39
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

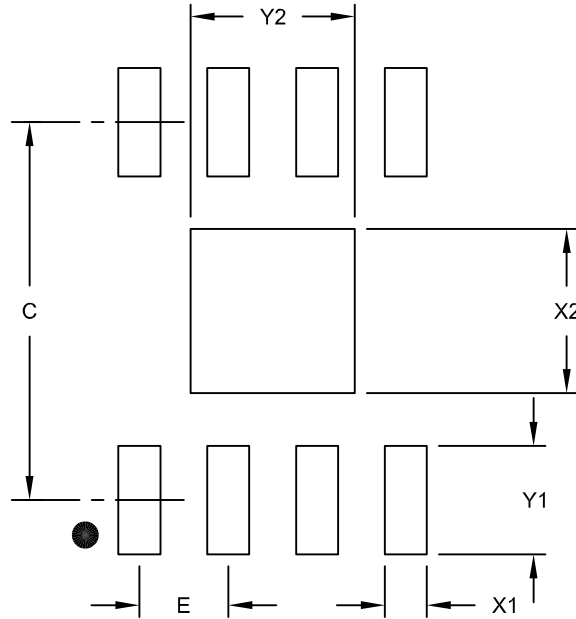
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-162B Sheet 2 of 2

Land Pattern (Footprint)

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55
Exposed Pad Width	X2			2.35
Exposed Pad Length	Y2			2.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

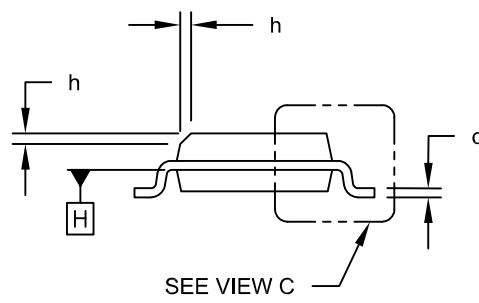
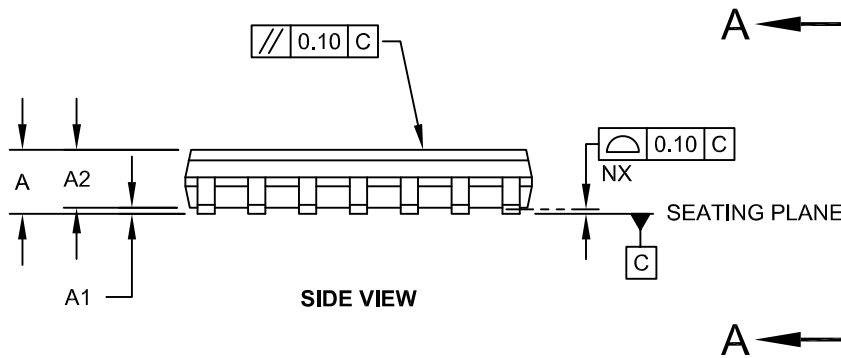
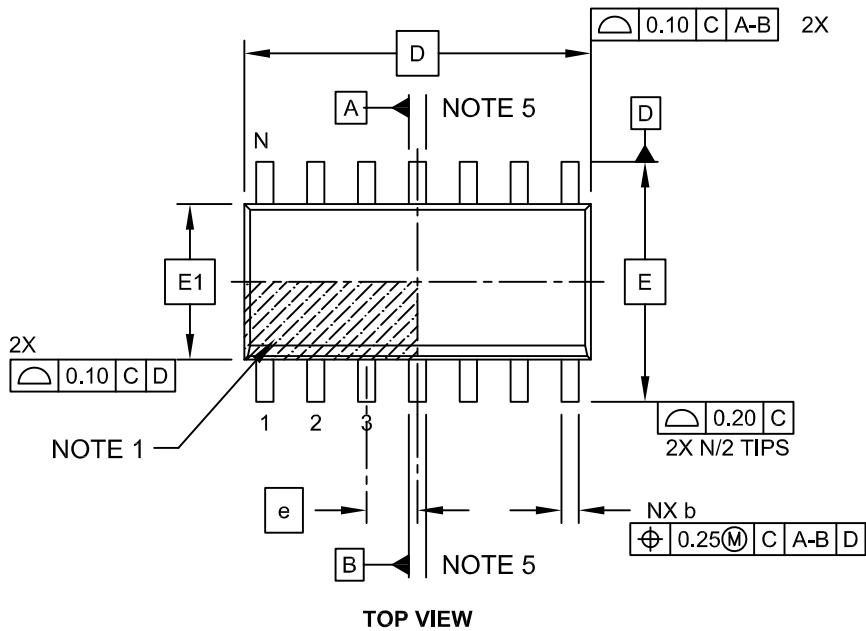
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2162A

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

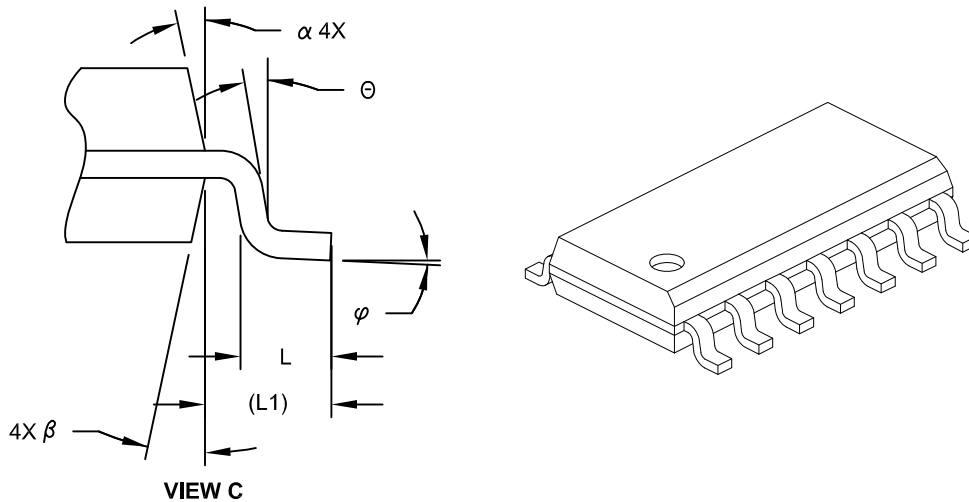


Microchip Technology Drawing No. C04-065C Sheet 1 of 2

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	8.65 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

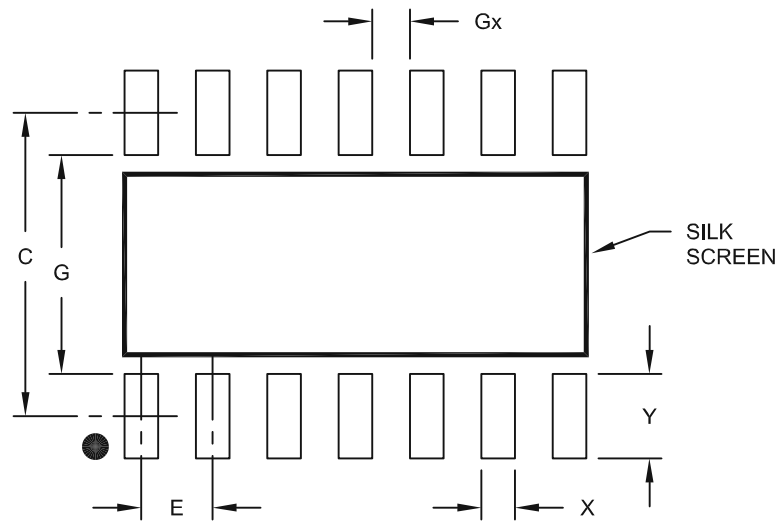
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-065C Sheet 2 of 2

Land Pattern (Footprint)

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

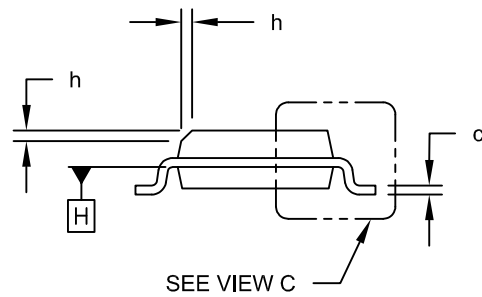
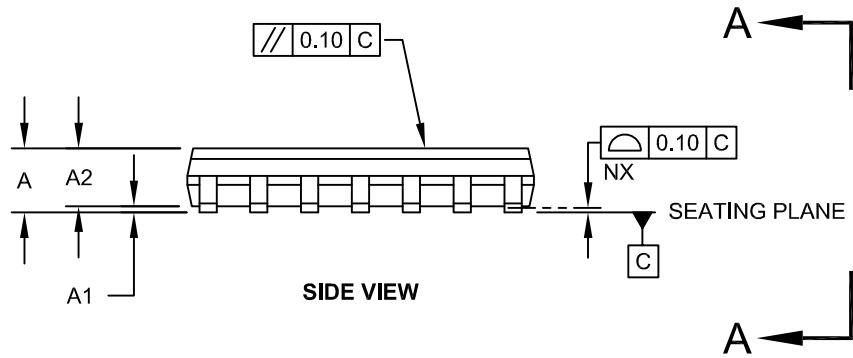
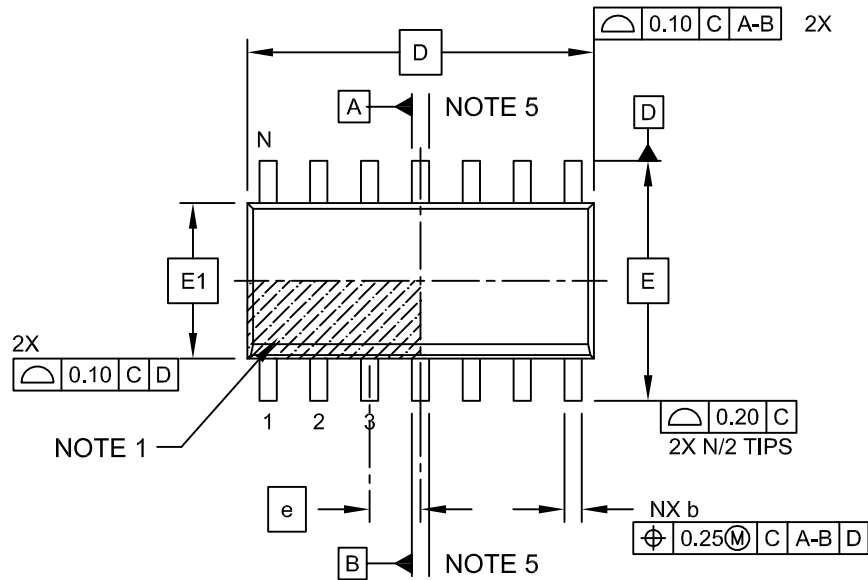
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

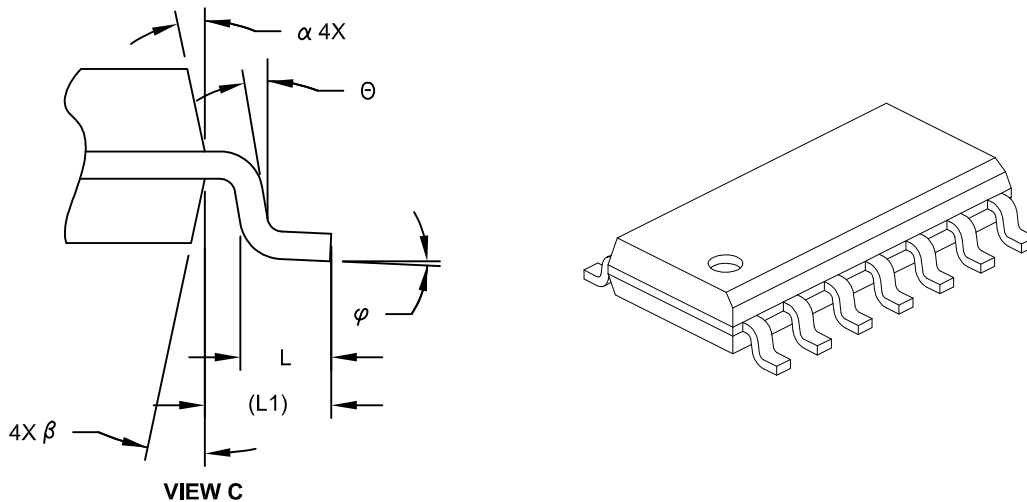


Microchip Technology Drawing No. C04-065C Sheet 1 of 2

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	8.65 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

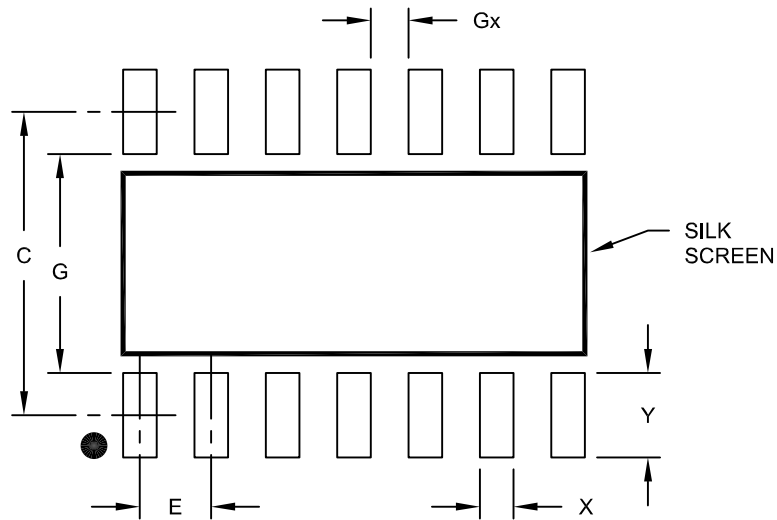
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-065C Sheet 2 of 2

Land Pattern (Footprint)

14-Lead Plastic Small Outline (OD) – Narrow, 3.90 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		1.27 BSC		
Contact Pad Spacing	C			5.40	
Contact Pad Width	X				0.60
Contact Pad Length	Y				1.50
Distance Between Pads	Gx		0.67		
Distance Between Pads	G		3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

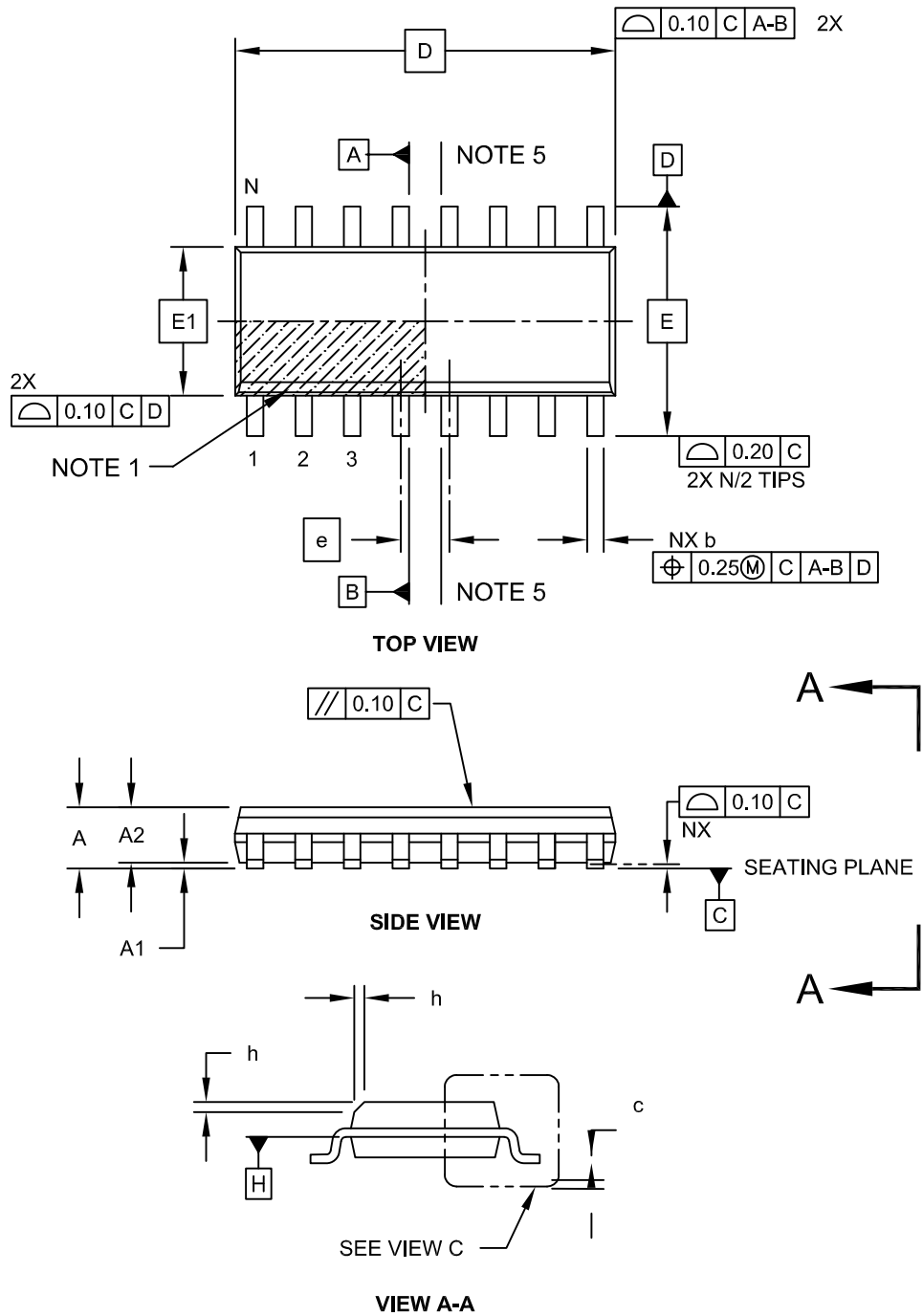
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

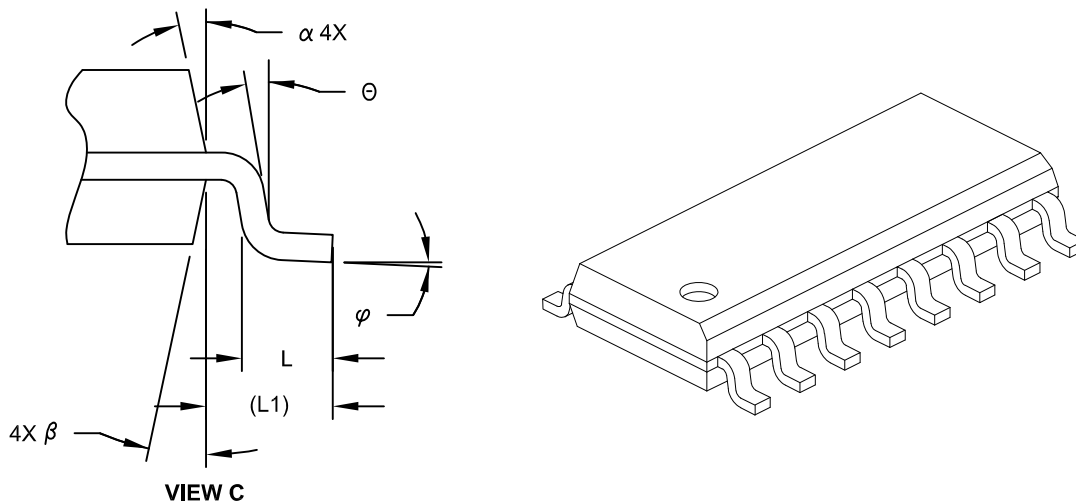
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	9.90 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

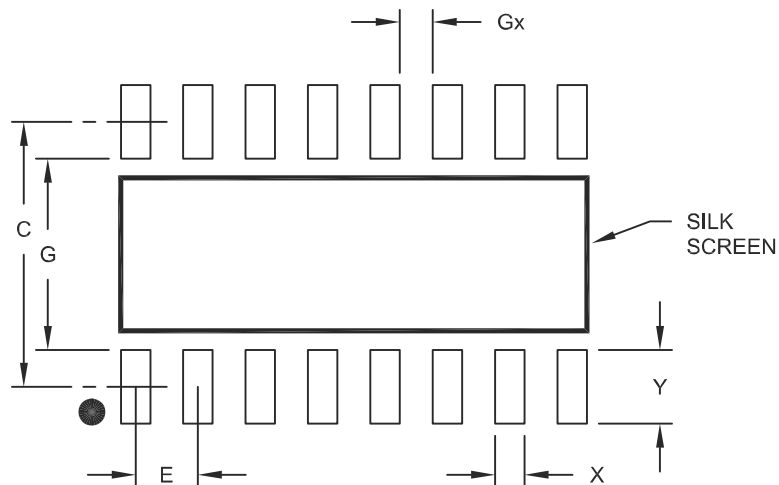
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C	5.40		
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

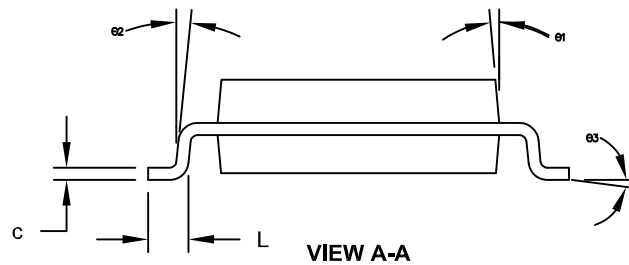
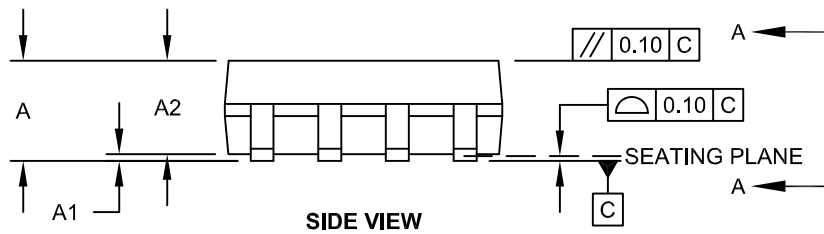
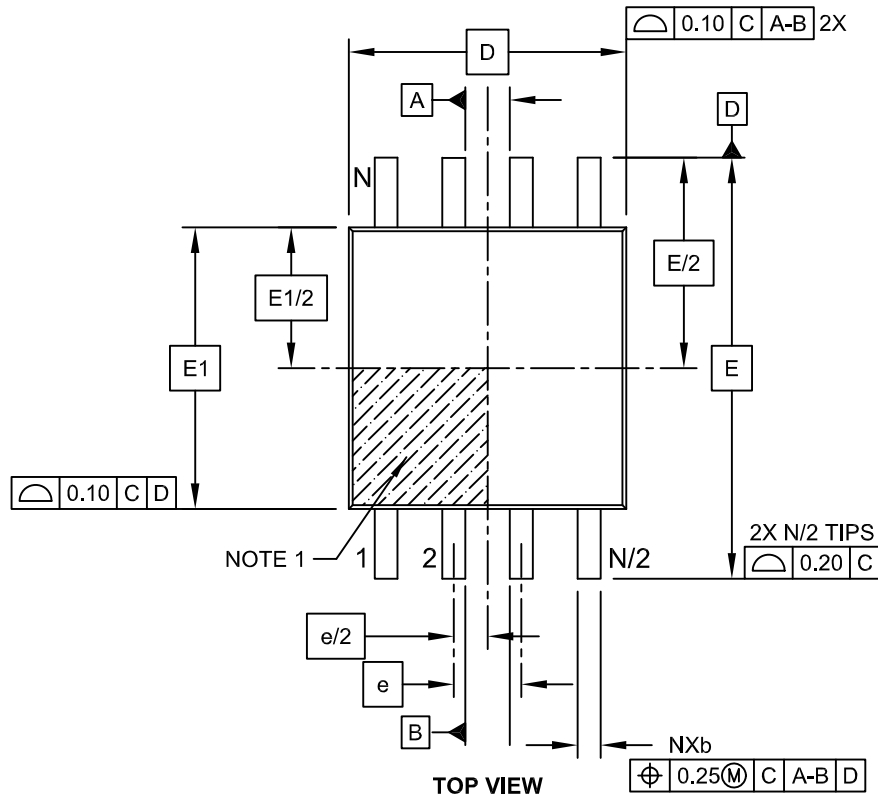
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2108A

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

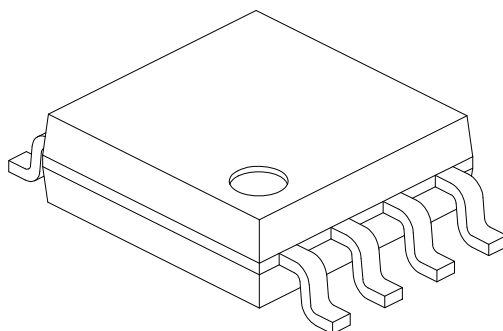
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		1.27 BSC		
Overall Height	A		1.77	-	2.03
Standoff §	A1		0.05		0.25
Molded Package Thickness	A2		1.75	-	1.98
Overall Width	E		7.94 BSC		
Molded Package Width	E1		5.25 BSC		
Overall Length	D		5.26 BSC		
Foot Length	L		0.51	-	0.76
Lead Thickness	c		0.15	-	0.25
Lead Width	b		0.36	-	0.51
Mold Draft Angle	Ø1		-	-	15°
Lead Angle	Ø2		0°	-	8°
Foot Angle	Ø3		0°	-	8°

Notes:

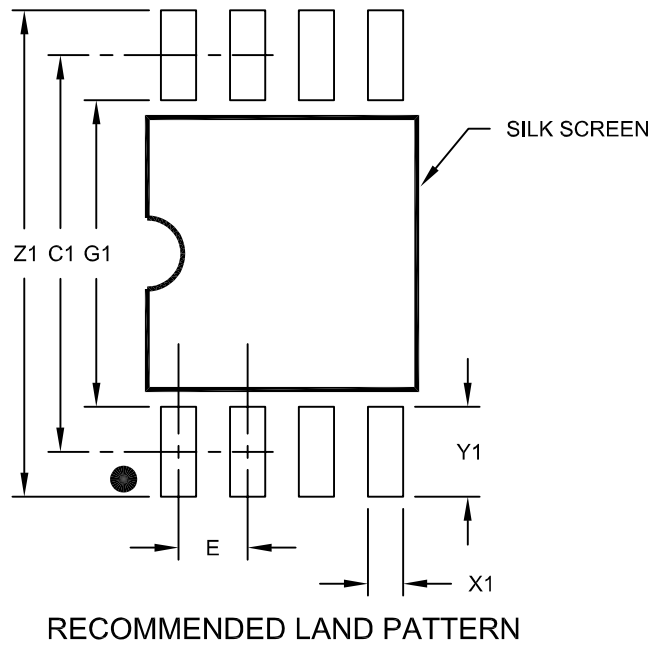
1. SOIJ, JEITA/EIAJ Standard, Formerly called SOIC
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.

Microchip Technology Drawing No. C04-056C Sheet 2 of 2

Land Pattern (Footprint)

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Overall Width	Z1			9.00
Contact Pad Spacing	C1		7.30	
Contact Pad Width (X8)	X1			0.65
Contact Pad Length (X8)	Y1			1.70
Distance Between Pads	G1	5.60		
Distance Between Pads	G	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

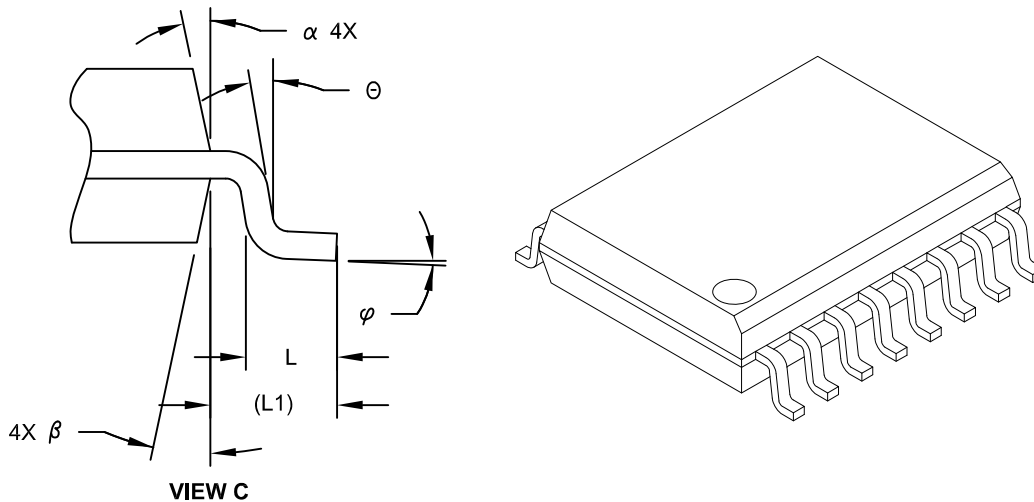
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2056C

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		1.27 BSC		
Overall Height	A	-	-	-	2.65
Molded Package Thickness	A2	2.05	-	-	-
Standoff §	A1	0.10	-	-	0.30
Overall Width	E		10.30 BSC		
Molded Package Width	E1		7.50 BSC		
Overall Length	D		10.30 BSC		
Chamfer (Optional)	h	0.25	-	-	0.75
Foot Length	L	0.40	-	-	1.27
Footprint	L1		1.40 REF		
Lead Angle	θ	0°	-	-	-
Foot Angle	φ	0°	-	-	8°
Lead Thickness	c	0.20	-	-	0.33
Lead Width	b	0.31	-	-	0.51
Mold Draft Angle Top	α	5°	-	-	15°
Mold Draft Angle Bottom	β	5°	-	-	15°

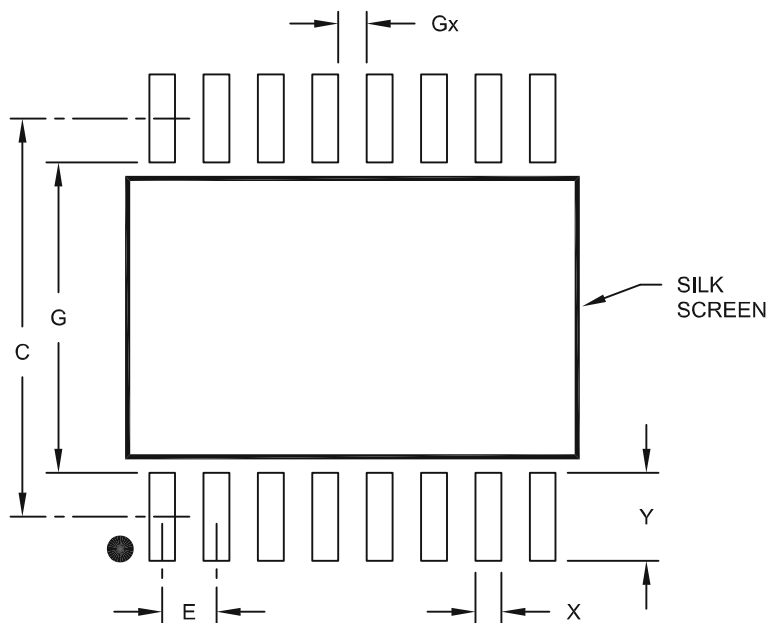
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

16-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C	9.30		
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

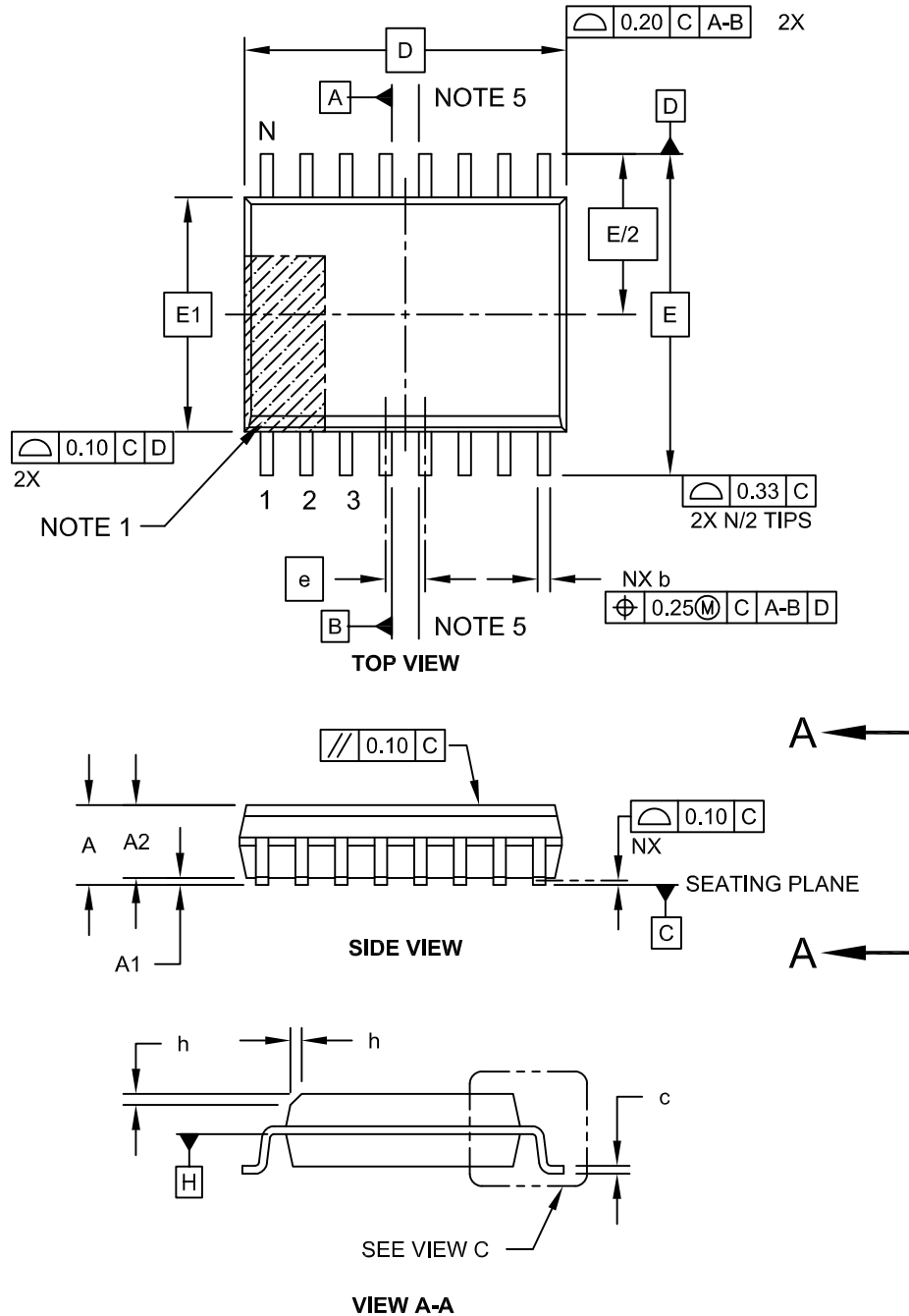
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

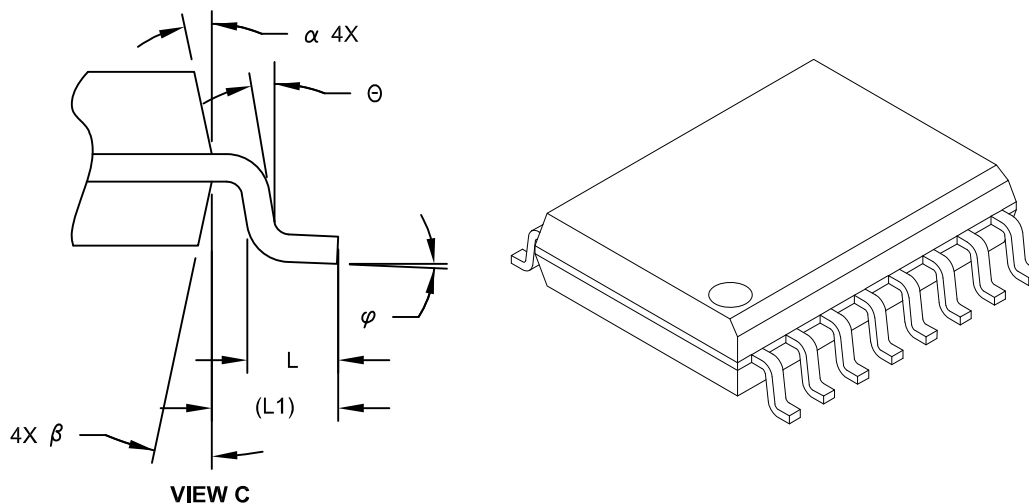
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	10.30 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

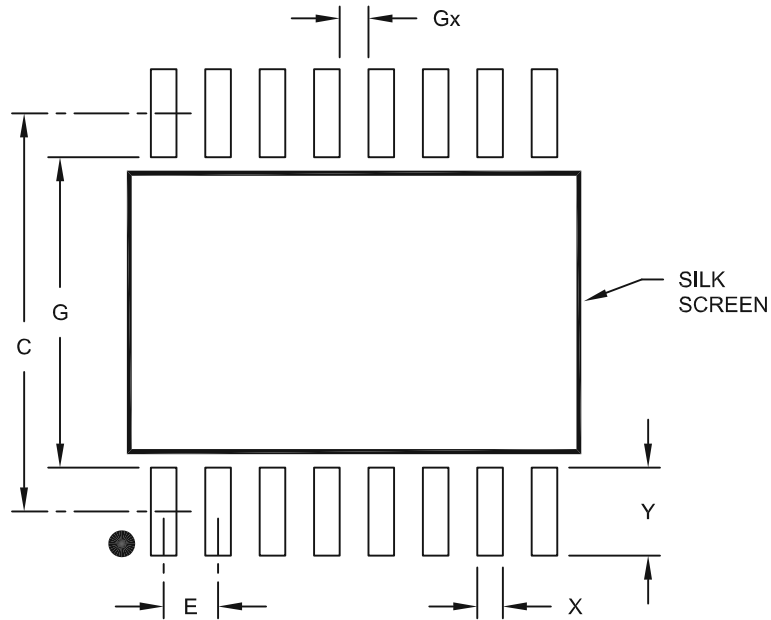
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

16-Lead Plastic Small Outline (OE) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.30	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

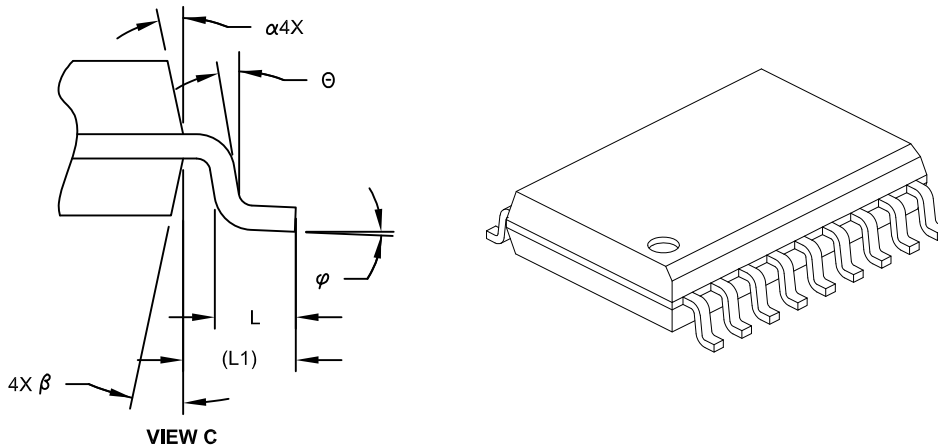
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

Packaging Diagrams and Parameters

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	11.55 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

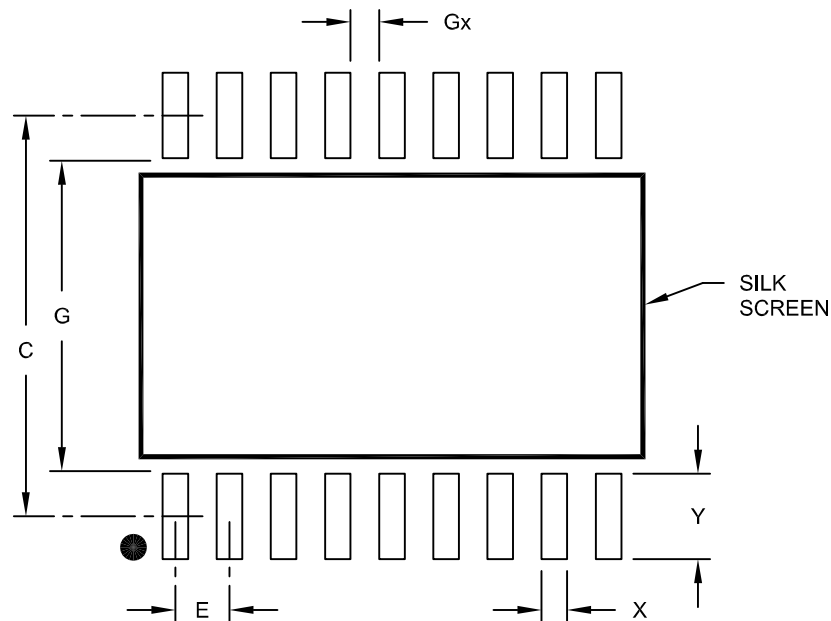
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

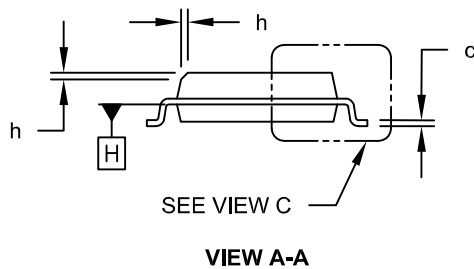
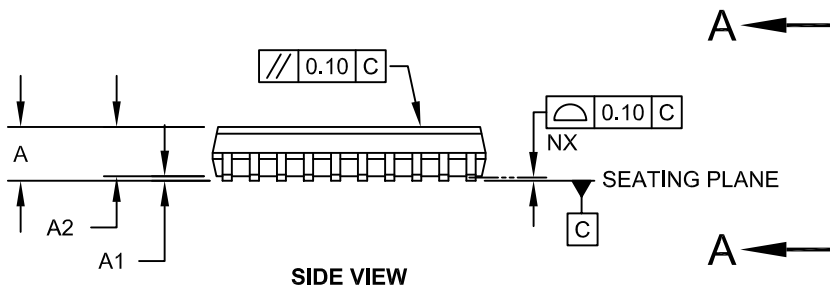
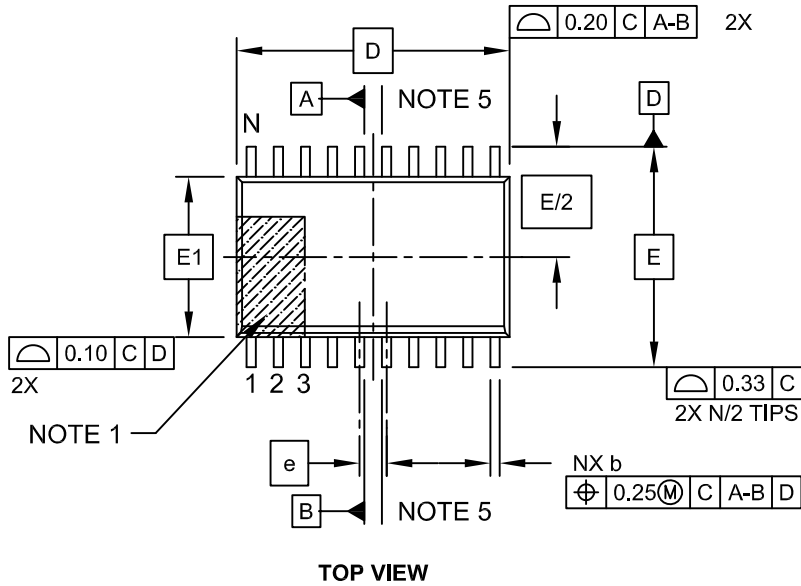
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2051A

Packaging Diagrams and Parameters

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

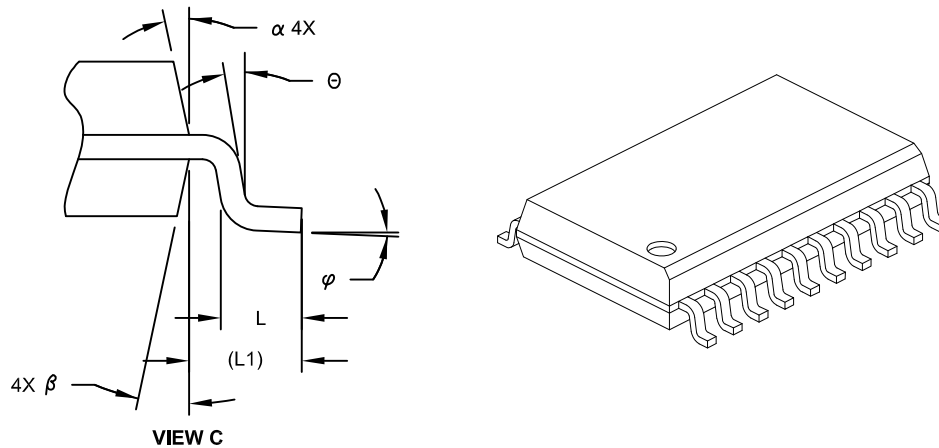
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	12.80 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

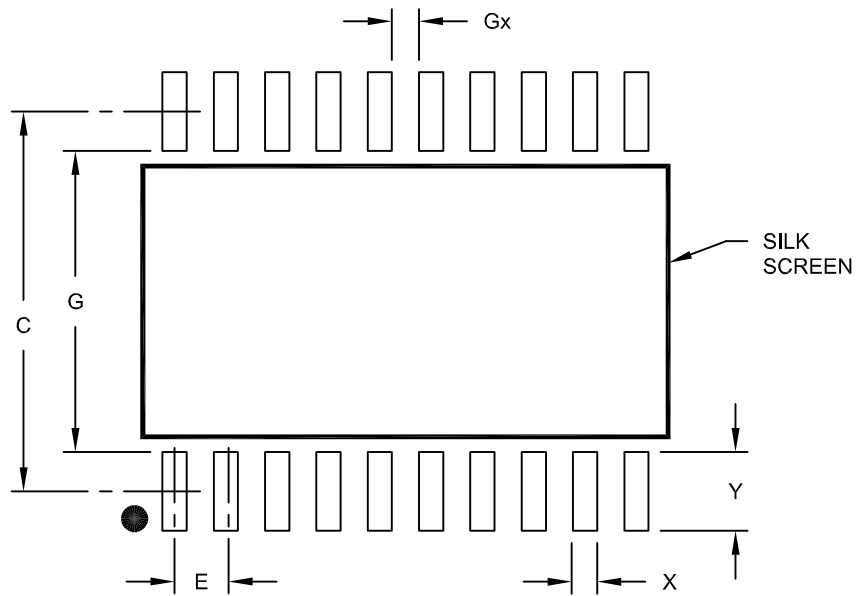
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C	9.40		
Contact Pad Width (X20)	X			0.60
Contact Pad Length (X20)	Y			1.95
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

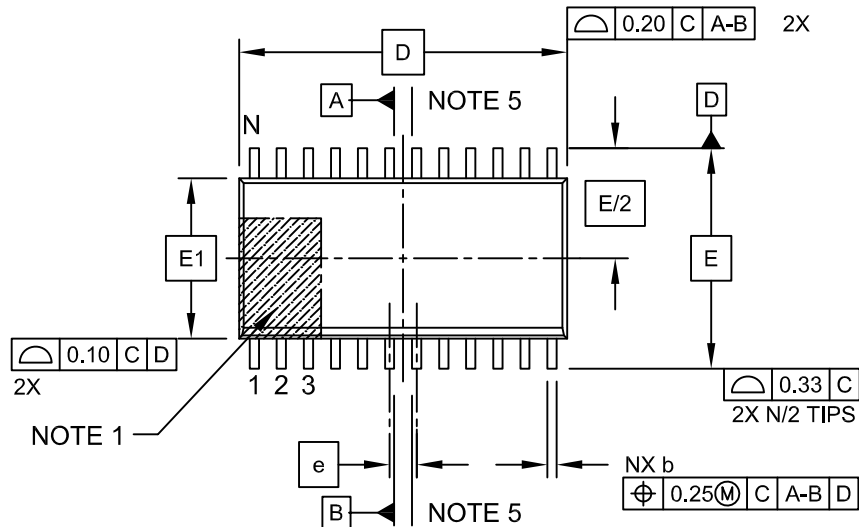
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2094A

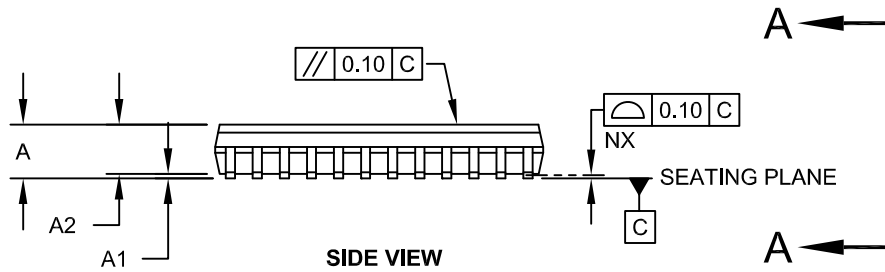
Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

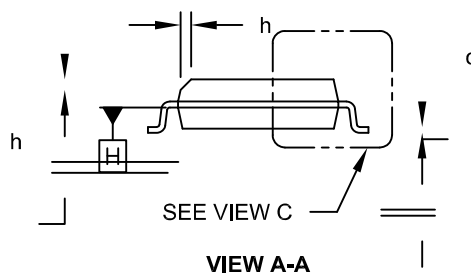
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW



SIDE VIEW



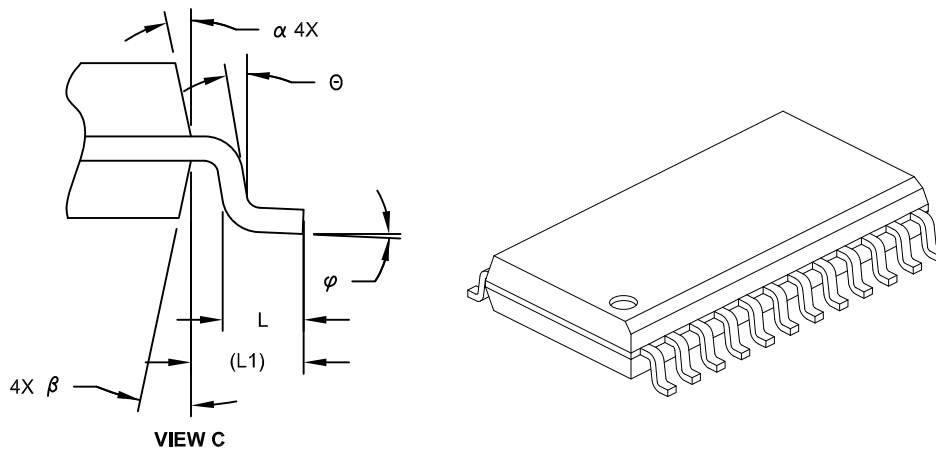
VIEW A-A

Microchip Technology Drawing C04-025C Sheet 1 of 2

Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	15.40 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

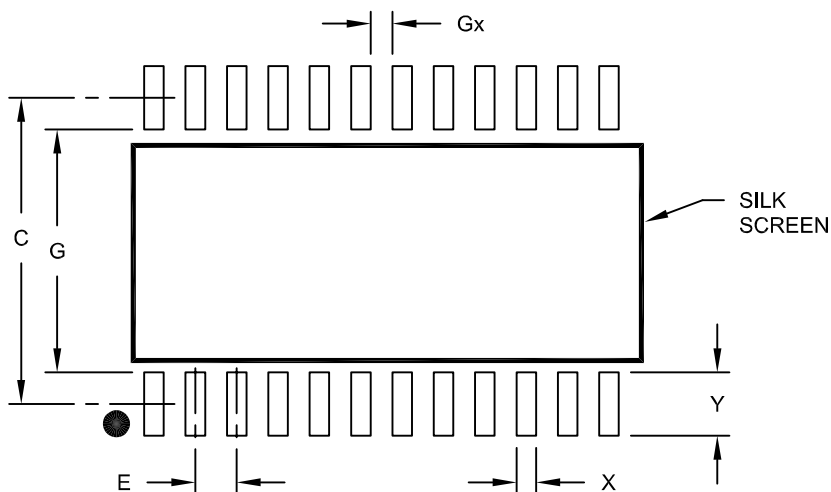
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-025C Sheet 2 of 2

Land Pattern (Footprint)

24-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

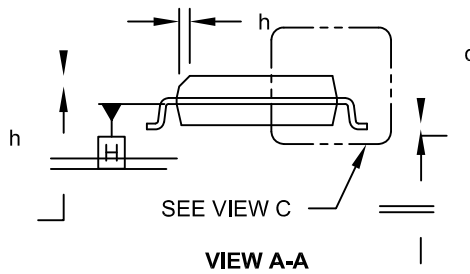
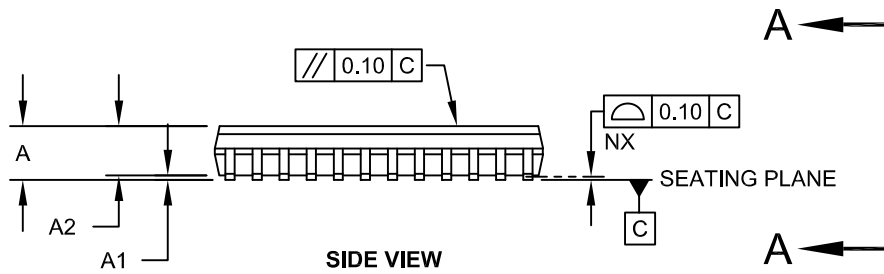
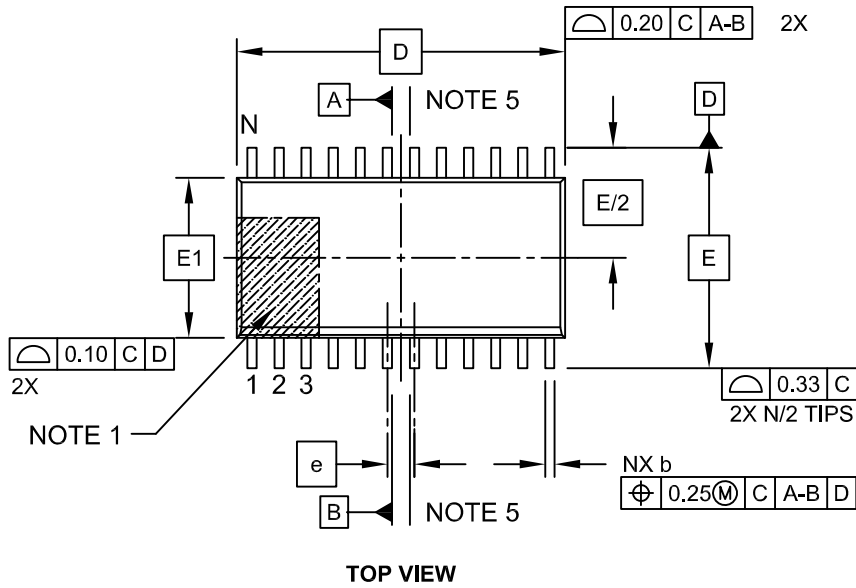
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

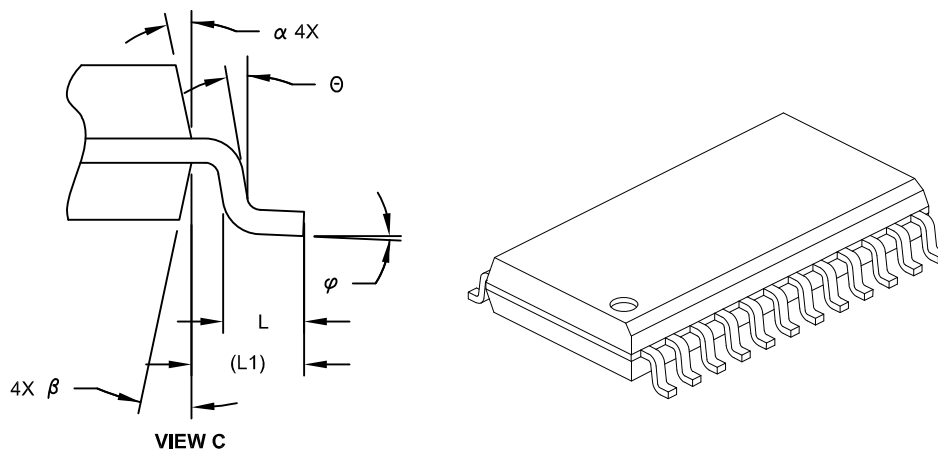


Microchip Technology Drawing C04-025C Sheet 1 of 2

Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	15.40 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

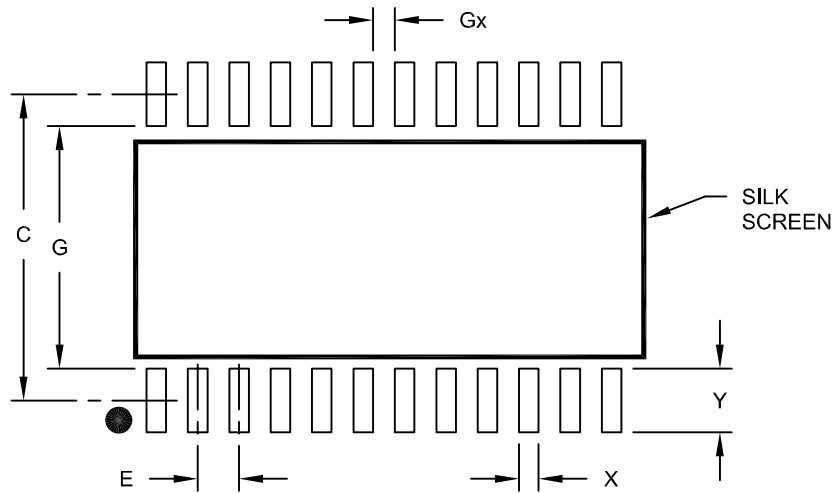
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

24-Lead Plastic Small Outline (OG) – Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
		MIN	NOM	MAX
Dimension Limits				
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

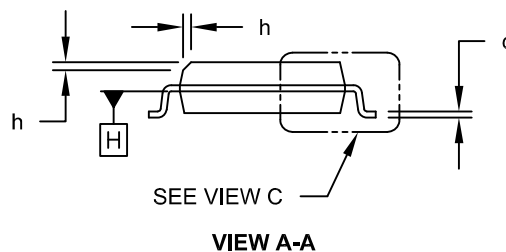
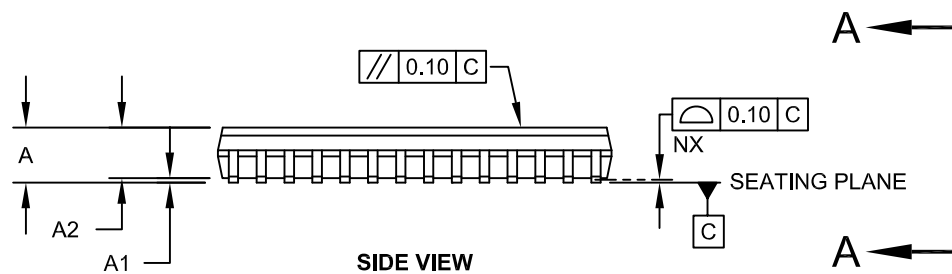
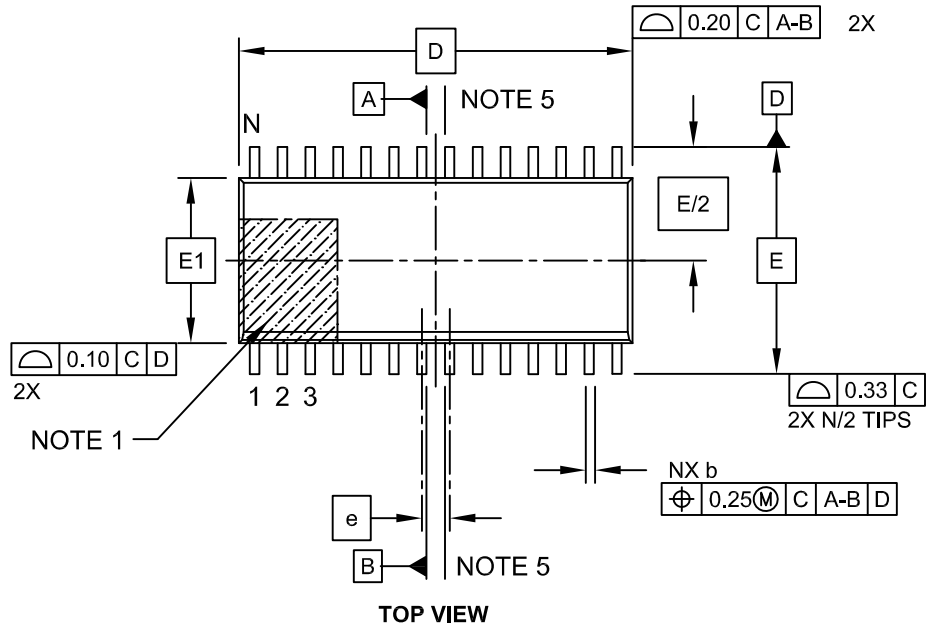
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

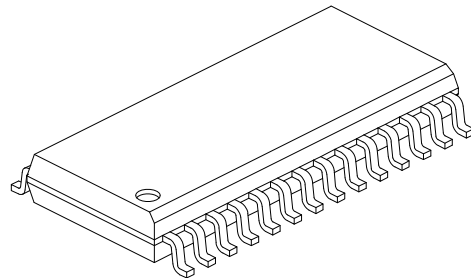
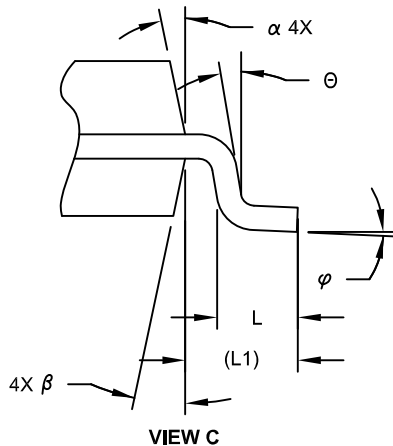
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	17.90 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.18	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

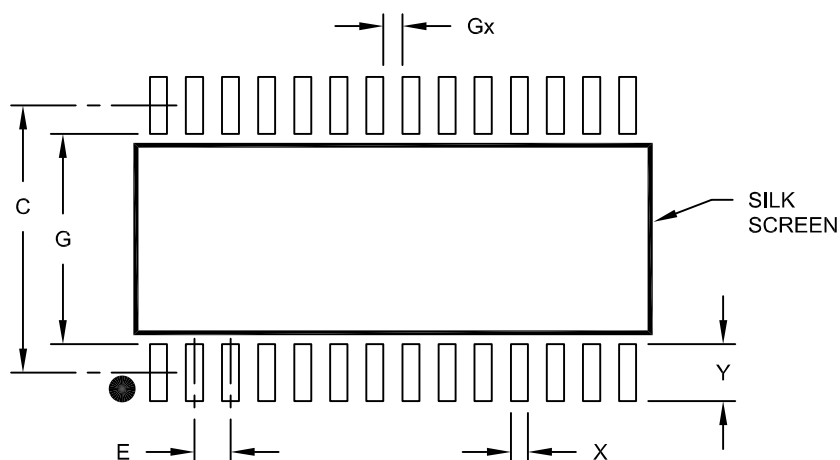
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC			
Contact Pad Spacing	C			9.40	
Contact Pad Width (X28)	X				0.60
Contact Pad Length (X28)	Y				2.00
Distance Between Pads	Gx	0.67			
Distance Between Pads	G	7.40			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

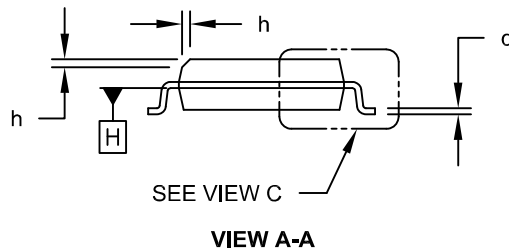
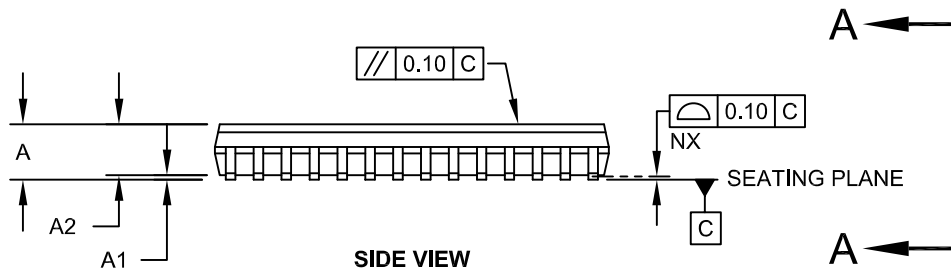
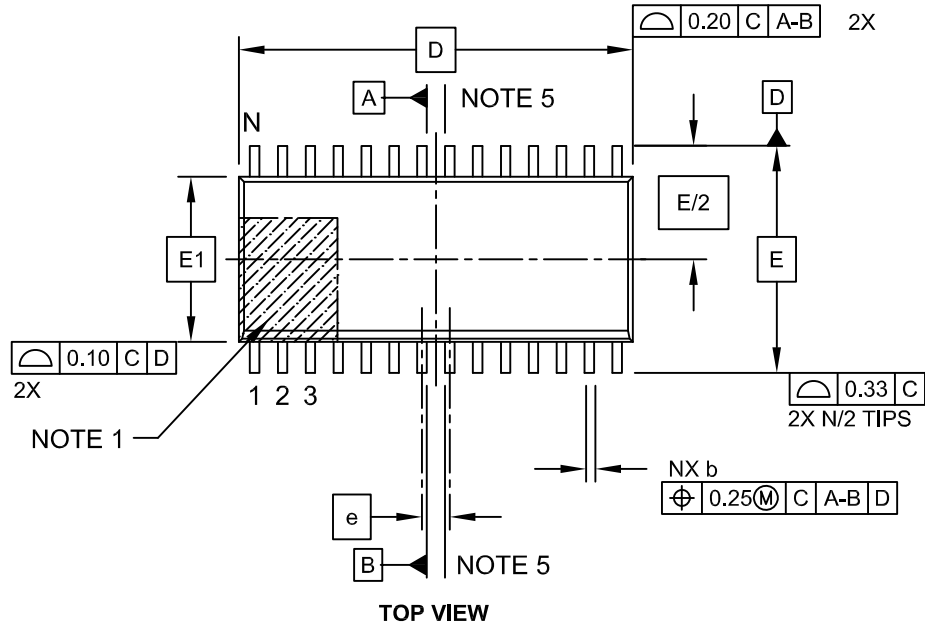
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

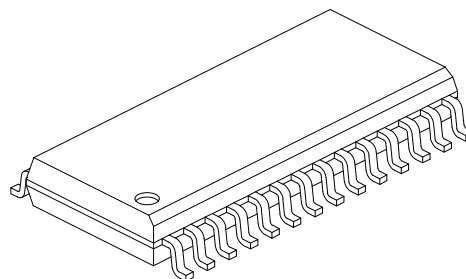
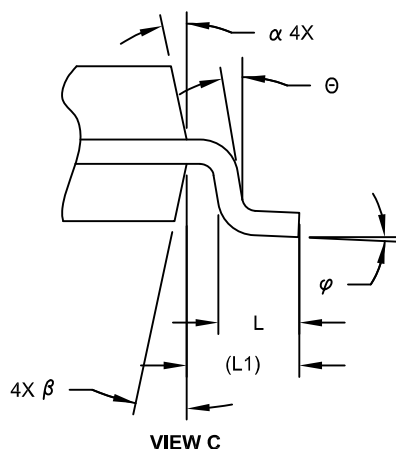
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	17.90 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.18	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

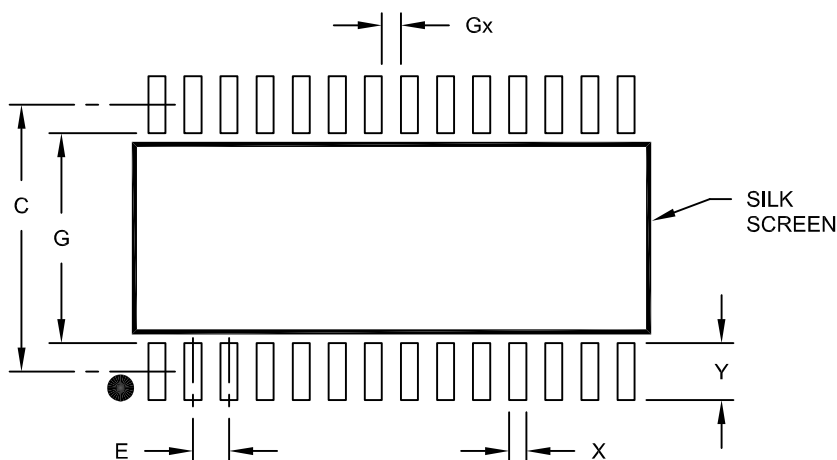
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

28-Lead Plastic Small Outline (O) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC			
Contact Pad Spacing	C			9.40	
Contact Pad Width (X28)	X				0.60
Contact Pad Length (X28)	Y				2.00
Distance Between Pads	Gx	0.67			
Distance Between Pads	G	7.40			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

Packaging Diagrams and Parameters

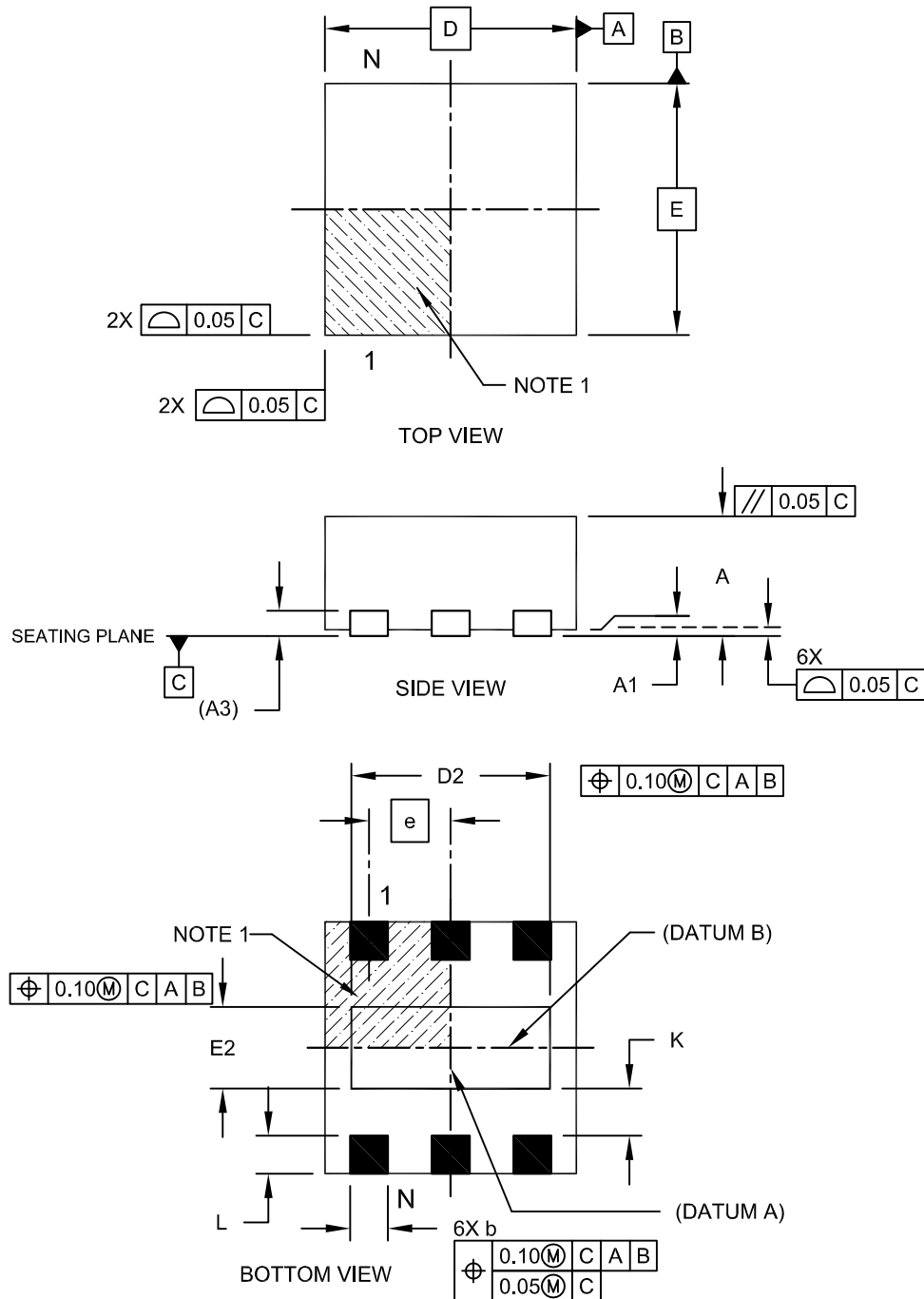
DFN Family

Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

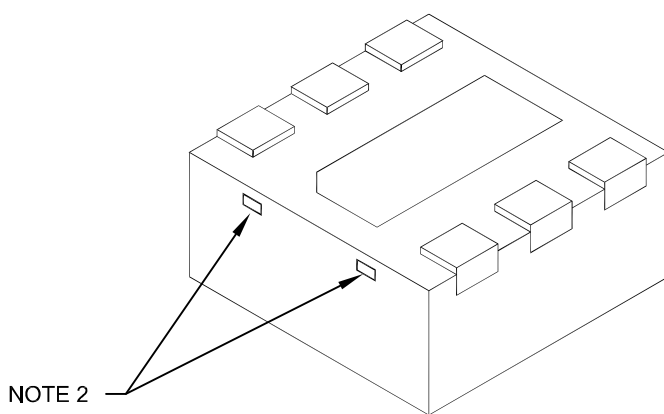
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	2.00 BSC		
Overall Width	E	2.00 BSC		
Exposed Pad Length	D2	1.50	1.60	1.70
Exposed Pad Width	E2	0.90	1.00	1.10
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

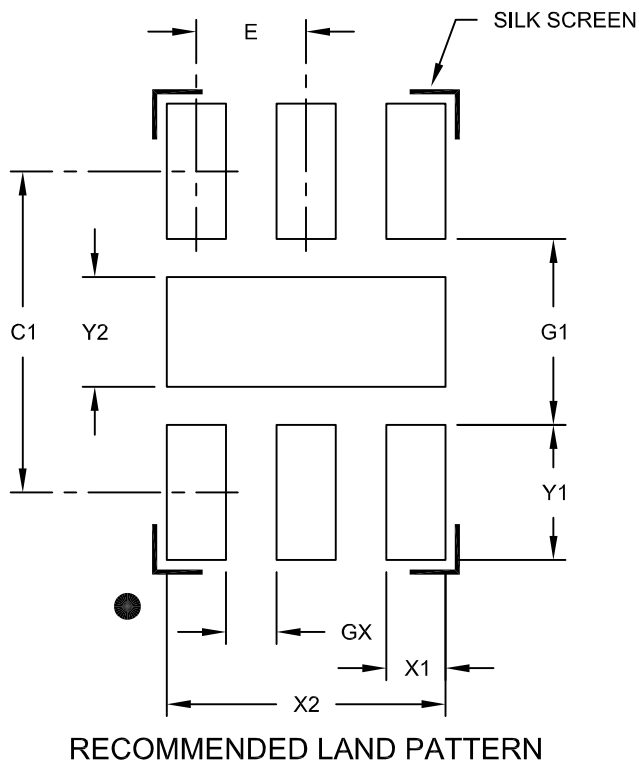
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

6-Lead Plastic Dual Flat, No Lead Package (MA) - 2x2x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC		
Optional Center Pad Width	Y2				1.00
Optional Center Pad Length	X2				1.70
Contact Pad Spacing	C1			2.10	
Contact Pad Width (X6)	X1				0.35
Contact Pad Length (X6)	Y1				0.65
Distance Between Pads	GX	0.20			
Distance Between Pads	G1	1.10			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

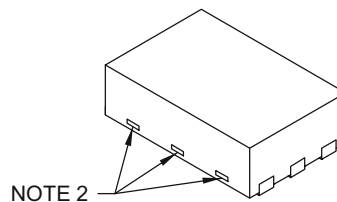
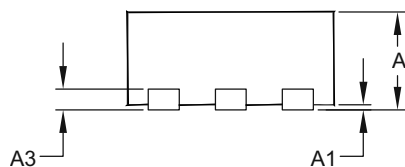
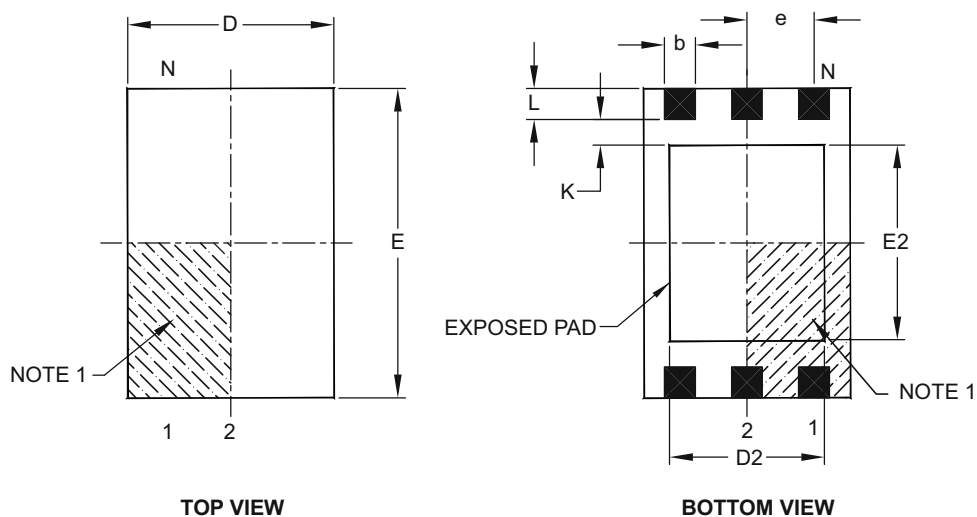
BSC: Basic Dimension, Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2120A

Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (ME) – 2x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.65 BSC		
Overall Height	A		0.80	0.90	1.00
Standoff	A1		0.00	0.02	0.05
Contact Thickness	A3		0.20 REF		
Overall Length	D		2.00 BSC		
Overall Width	E		3.00 BSC		
Exposed Pad Length	D2		1.40	–	1.60
Exposed Pad Width	E2		1.80	–	2.00
Contact Width	b		0.25	0.30	0.35
Contact Length	L		0.20	0.30	0.40
Contact-to-Exposed Pad	K		0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

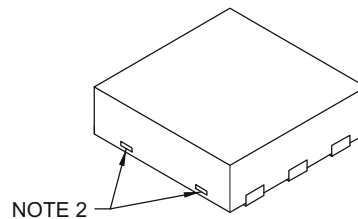
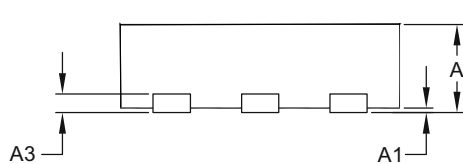
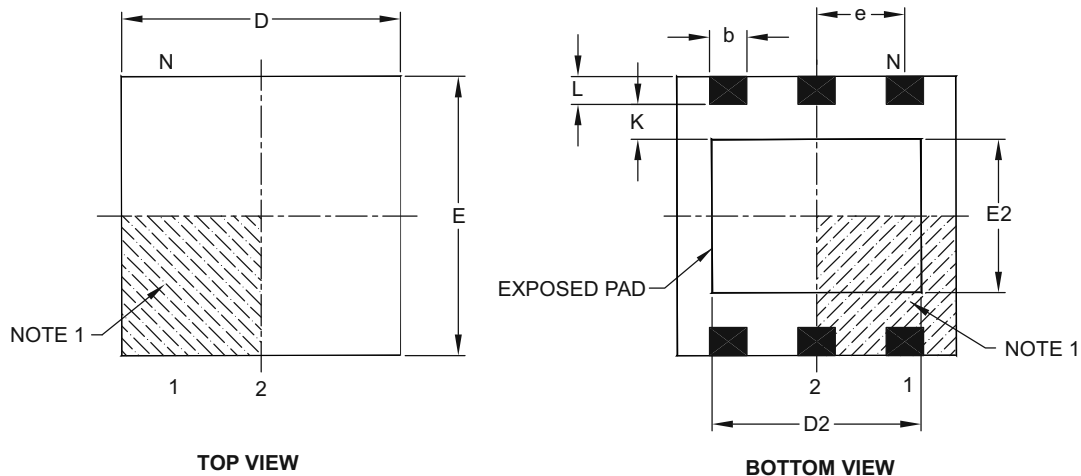
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-134A

Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MH) – 3x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	0.00	–	2.25
Exposed Pad Width	E2	0.00	–	1.65
Contact Width	b	0.30	0.40	0.45
Contact Length	L	0.20	0.30	0.45
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

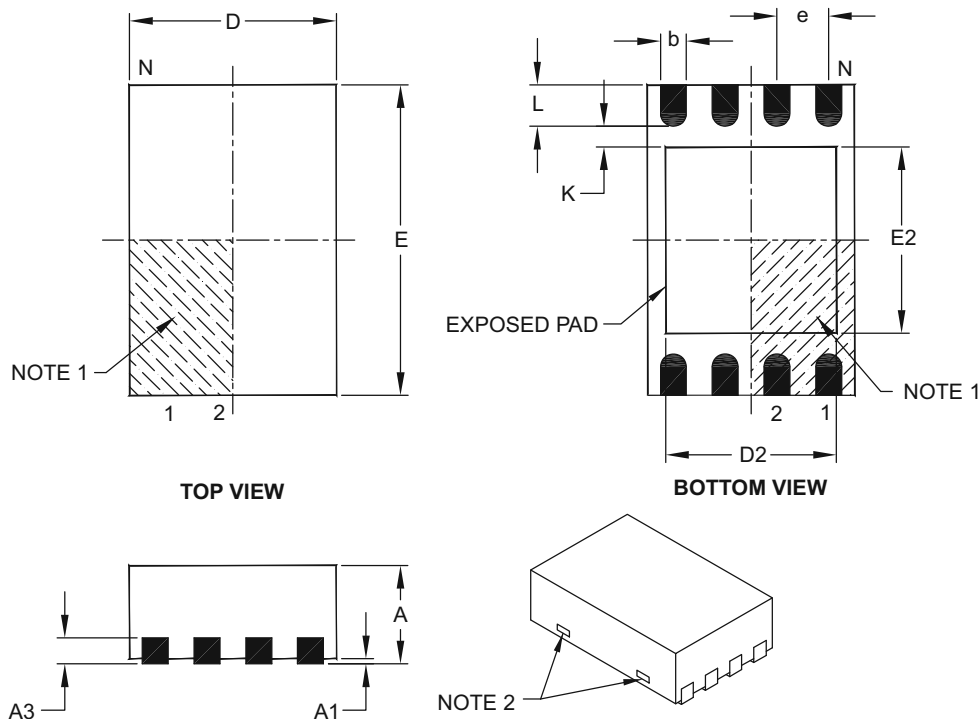
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-135A

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MC) – 2x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	2.00 BSC		
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	1.30	–	1.55
Exposed Pad Width	E2	1.50	–	1.75
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

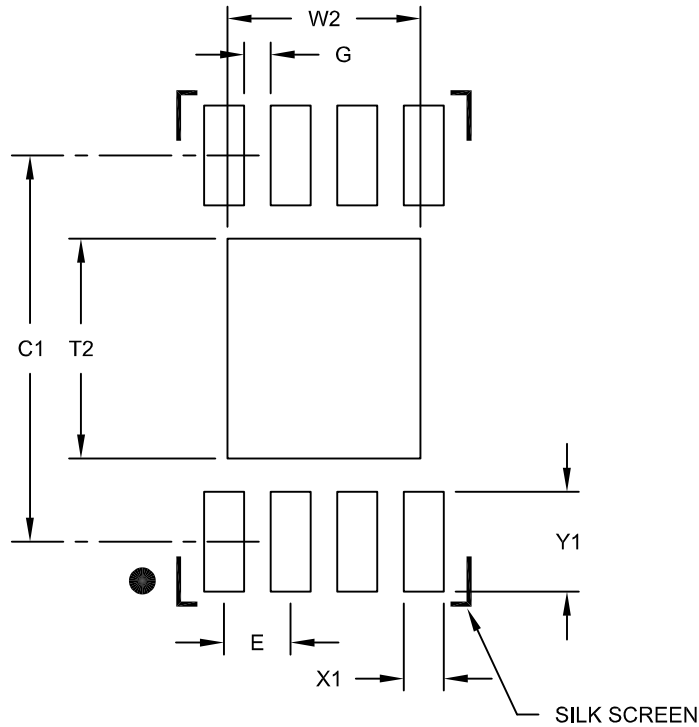
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-123C

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MC) - 2x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.45
Optional Center Pad Length	T2			1.75
Contact Pad Spacing	C1		2.90	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

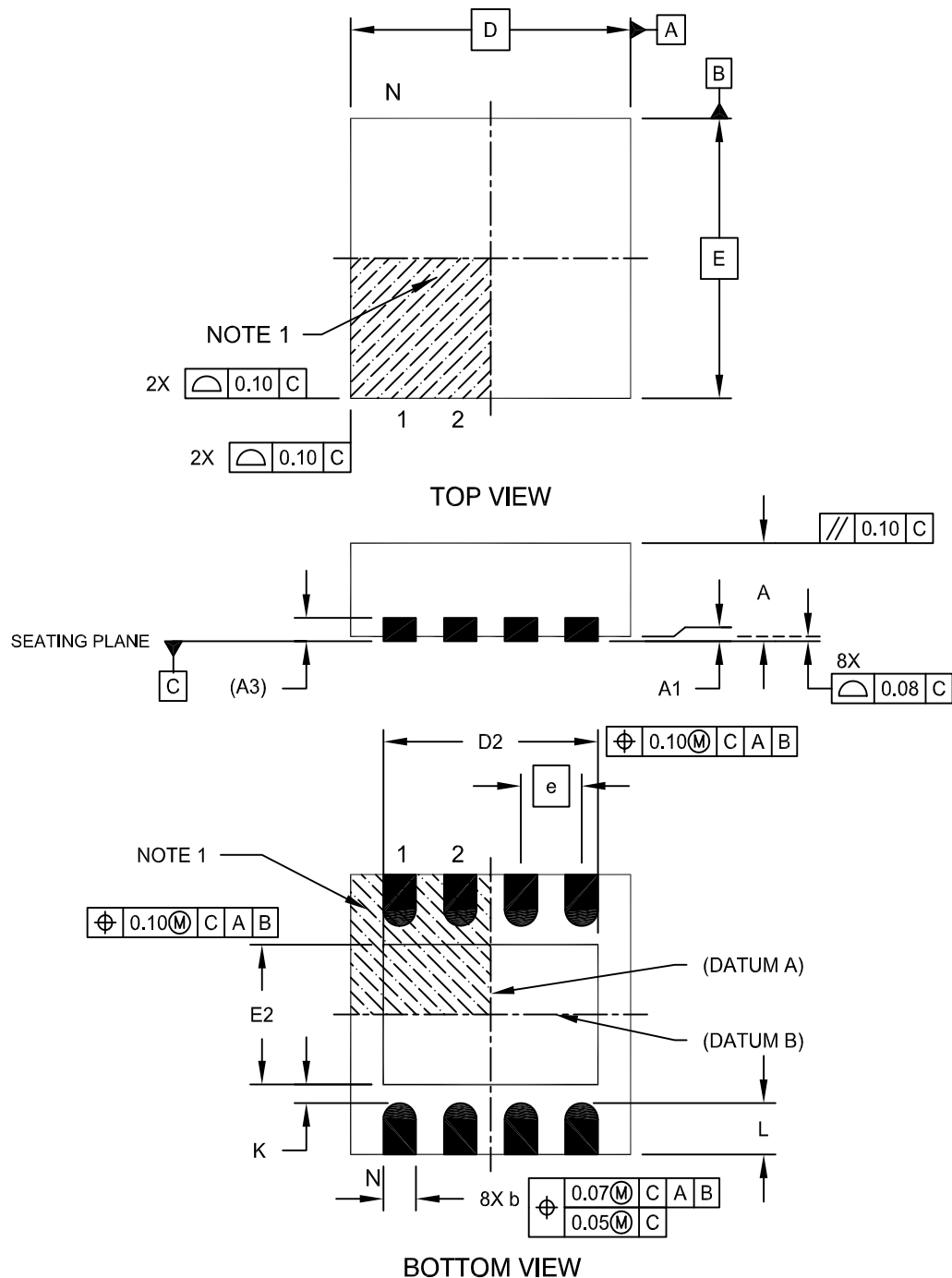
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2123B

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

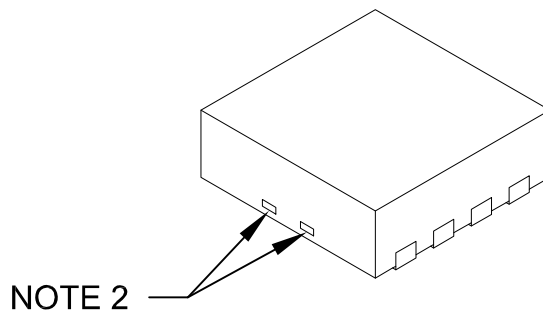
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Exposed Pad Width	E2	1.34	-	1.60
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	1.60	-	2.40
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.30	0.55
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M

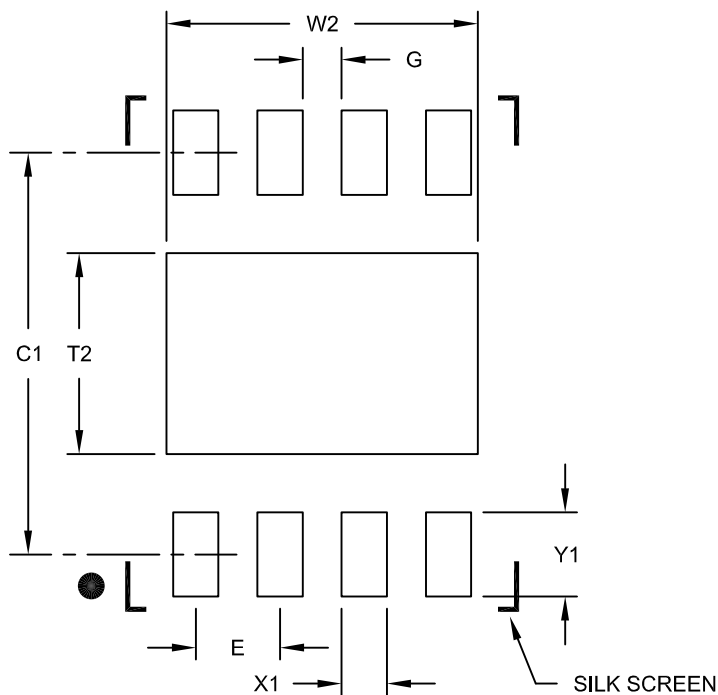
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.65
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

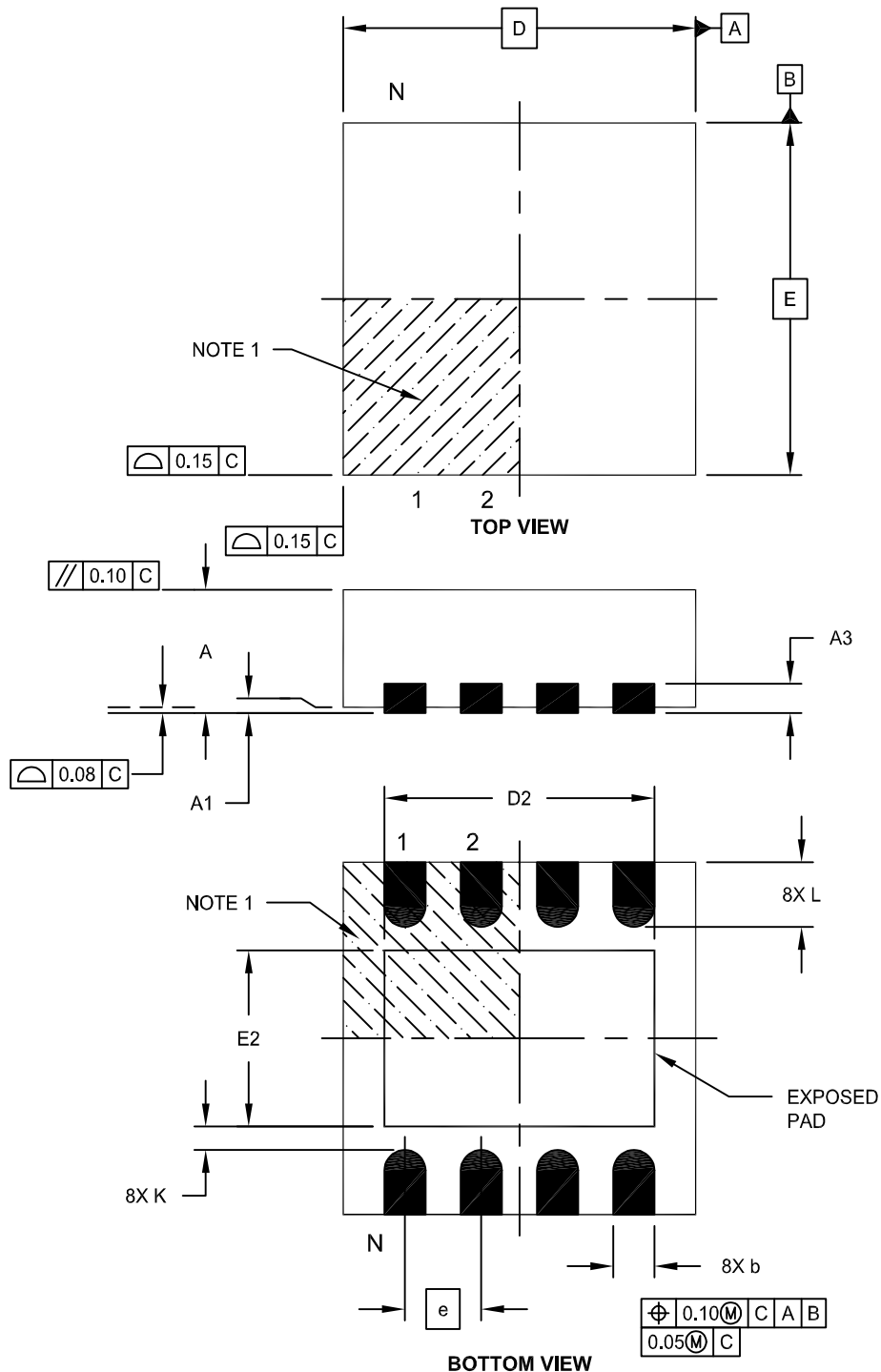
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2062B

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

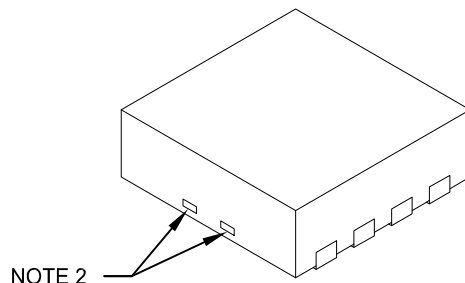
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		0.80 BSC		
Overall Height	A		0.80	0.90	1.00
Standoff	A1		0.00	0.02	0.05
Contact Thickness	A3		0.20 REF		
Overall Length	D		4.00 BSC		
Exposed Pad Width	E2		2.60	2.70	2.80
Overall Width	E		4.00 BSC		
Exposed Pad Length	D2		3.40	3.50	3.60
Contact Width	b		0.25	0.30	0.35
Contact Length	L		0.30	0.40	0.50
Contact-to-Exposed Pad	K		0.20	-	-

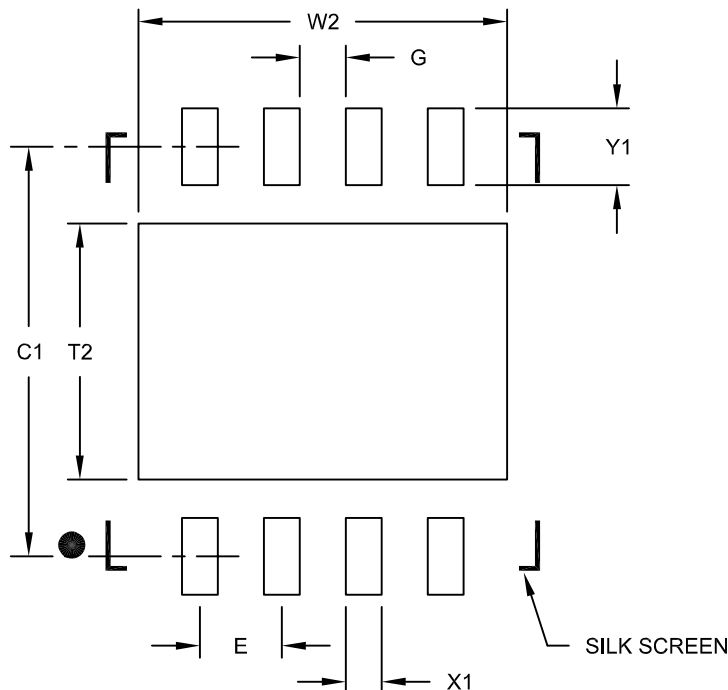
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MD) - 4x4x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Optional Center Pad Width	W2			3.60
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

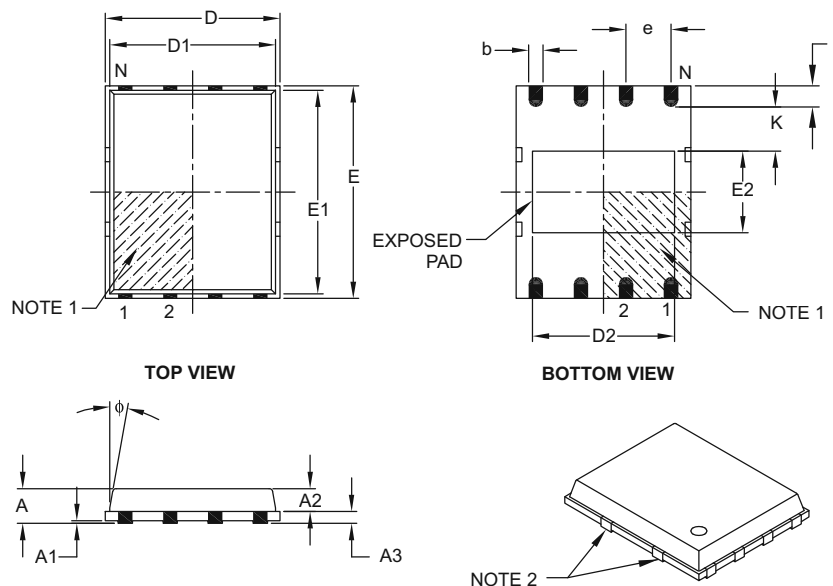
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2131C

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S] PUNCH SINGULATED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1,27 BSC		
Overall Height	A	–	0.85	1.00
Molded Package Thickness	A2	–	0.65	0.80
Standoff	A1	0.00	0.01	0.05
Base Thickness	A3	0.20 REF		
Overall Length	D	4.92 BSC		
Molded Package Length	D1	4.67 BSC		
Exposed Pad Length	D2	3.85	4.00	4.15
Overall Width	E	5.99 BSC		
Molded Package Width	E1	5.74 BSC		
Exposed Pad Width	E2	2.16	2.31	2.46
Contact Width	b	0.35	0.40	0.47
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	–	–
Model Draft Angle Top	ϕ	–	–	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

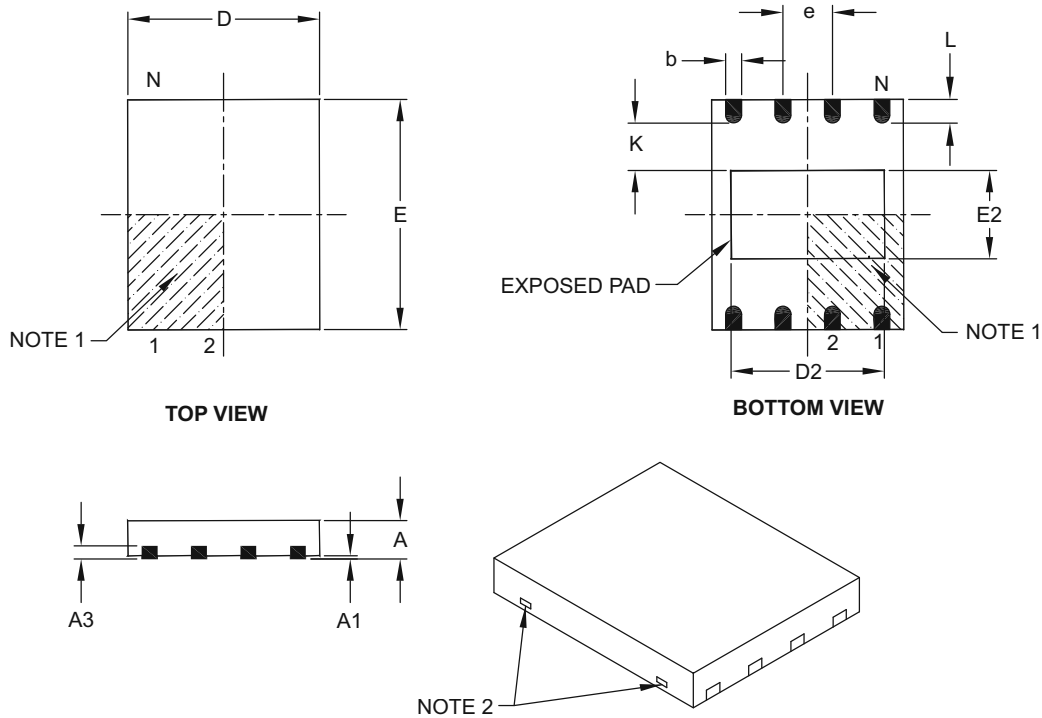
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-113B

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	0.80	0.85	1.00
Standoff	A1	0.00	0.01	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	5.00 BSC		
Overall Width	E	6.00 BSC		
Exposed Pad Length	D2	3.90	4.00	4.10
Exposed Pad Width	E2	2.20	2.30	2.40
Contact Width	b	0.35	0.40	0.48
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

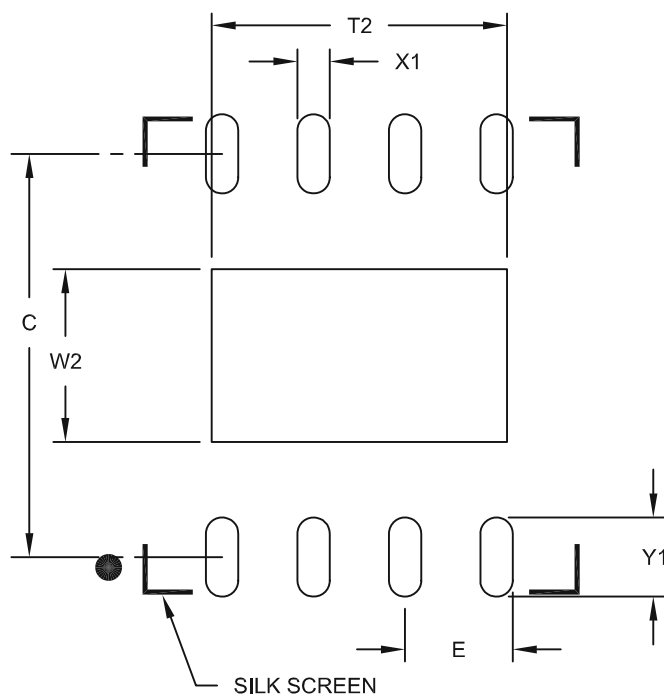
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-122B

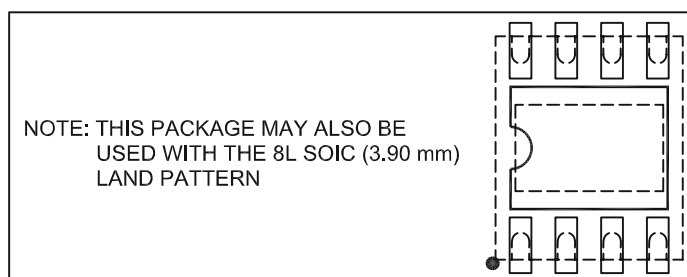
Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body [DFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			4.10
Contact Pad Spacing	C	5.60		
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

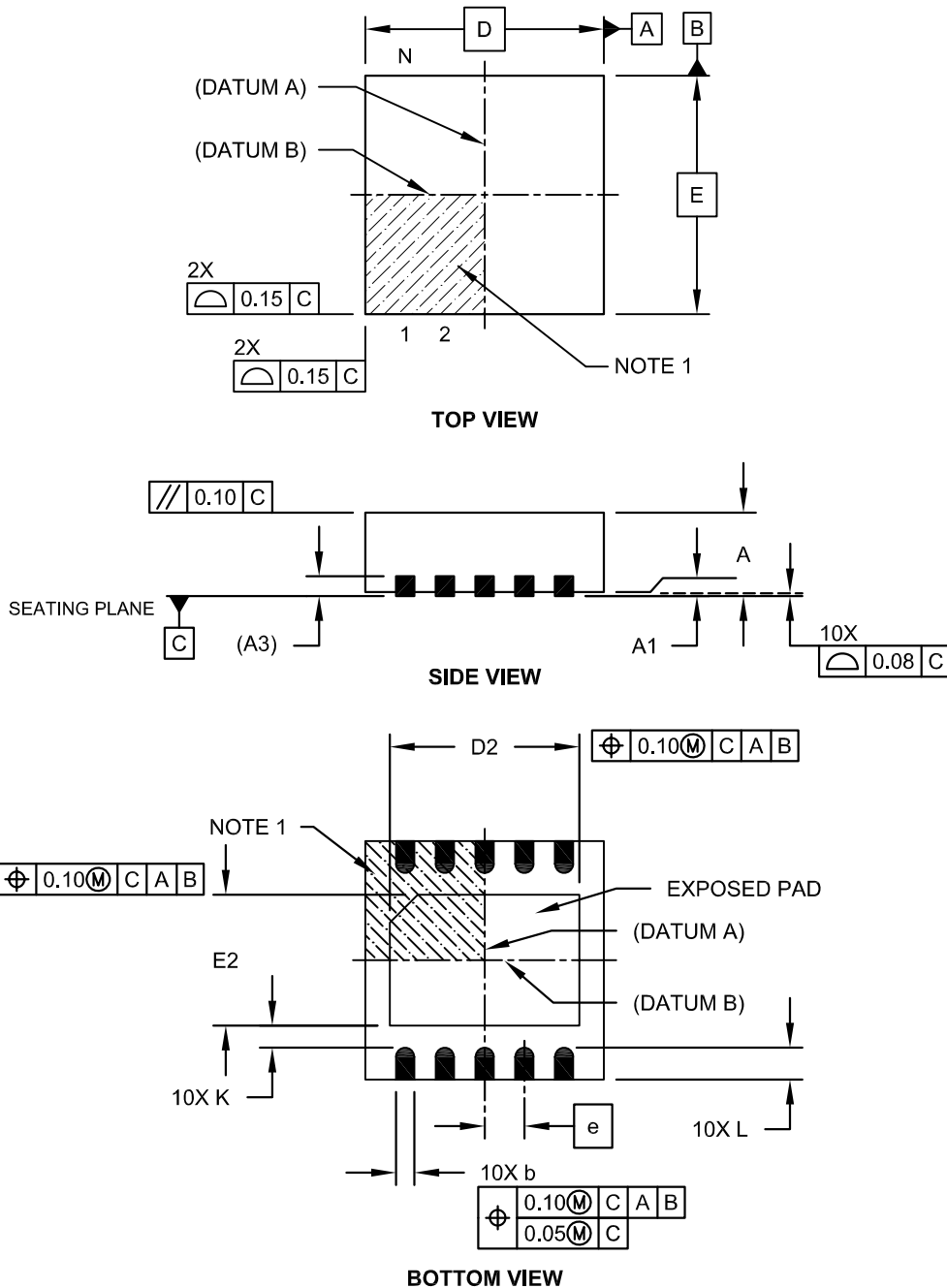
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2122A

Packaging Diagrams and Parameters

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

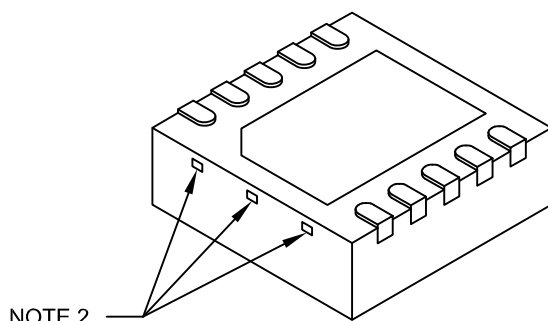
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Exposed Pad Length	D2	2.15	2.35	2.45
Overall Width	E	3.00 BSC		
Exposed Pad Width	E2	1.40	1.50	1.75
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

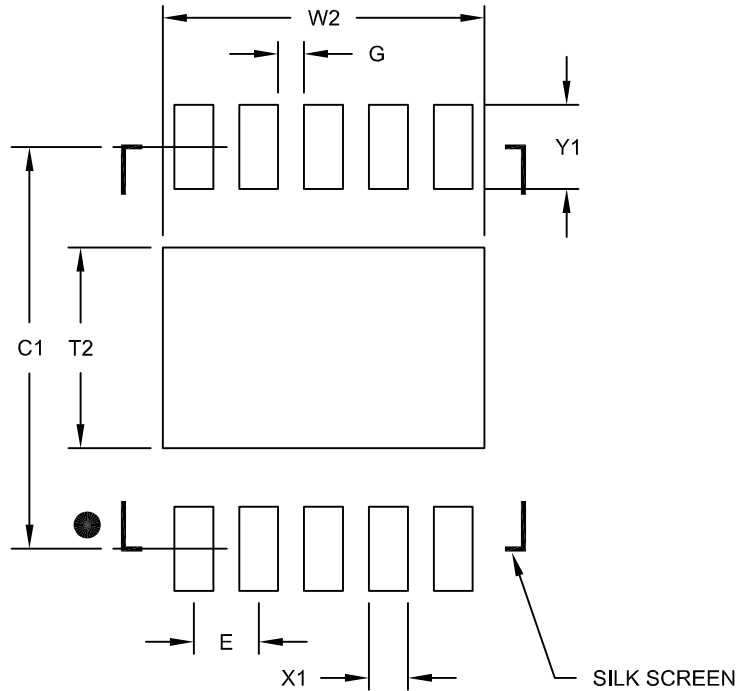
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.48
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			0.65
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2063B

Packaging Diagrams and Parameters

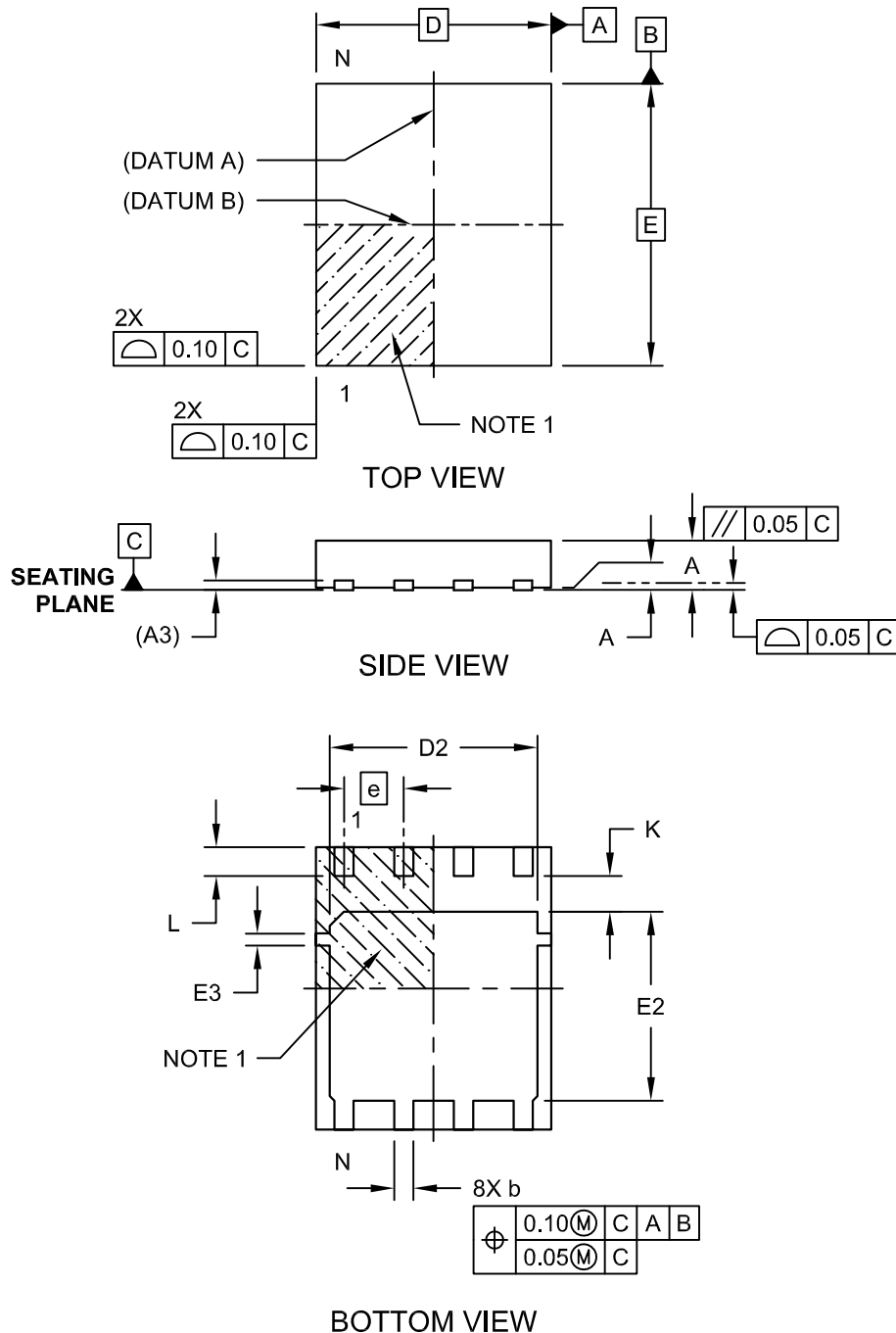
PDFN Family

High Power Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

8-Lead High Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

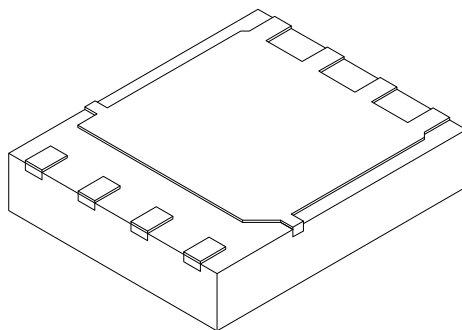
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead High Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
	Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	0.95	1.00	1.05
Standoff	A1	0.00	-	0.05
Terminal Thickness	(A3)	0.20 REF		
Overall Length	D	5.00 BSC		
Overall Width	E	6.00 BSC		
Exposed Pad length	D2	4.37	4.42	4.47
Exposed Pad Width	E2	3.97	4.02	4.07
Tab Width	E3	0.20	0.25	0.30
Terminal Width	b	0.36	0.41	0.46
Terminal Length	L	0.56	0.61	0.66
Terminal to Exposed Pad	K	0.71	0.76	0.81

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Package dimension does not include mold flash, protrusions, burrs or metal smearing.
4. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

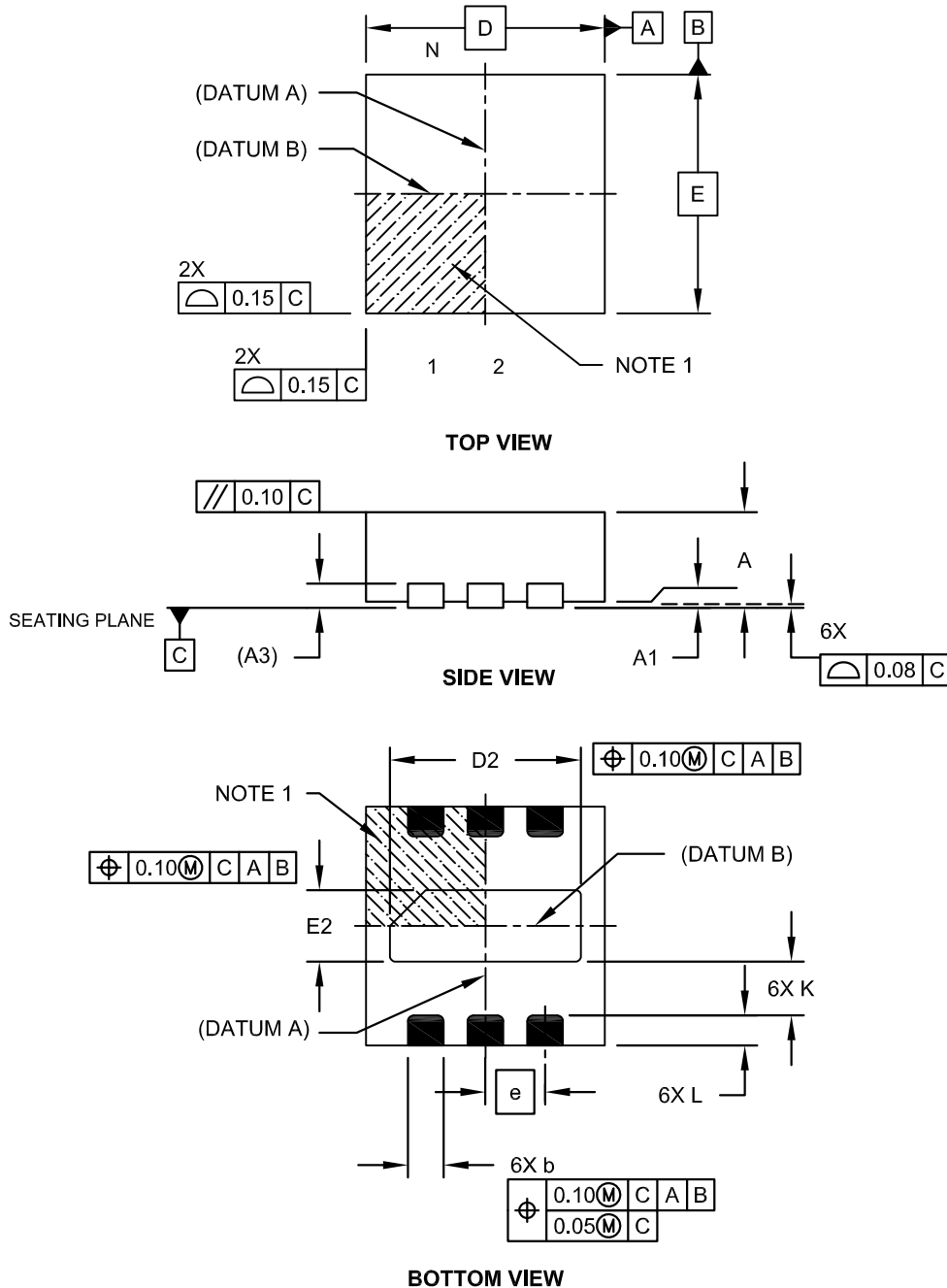
TDFN Family

Thin Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

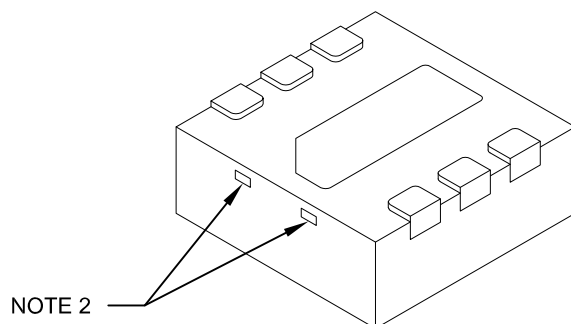
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.50 BSC		
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	2.00 BSC		
Exposed Pad Width	E2	0.55	0.60	0.65
Overall Length	D	2.00 BSC		
Exposed Pad Length	D2	1.55	1.60	1.65
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

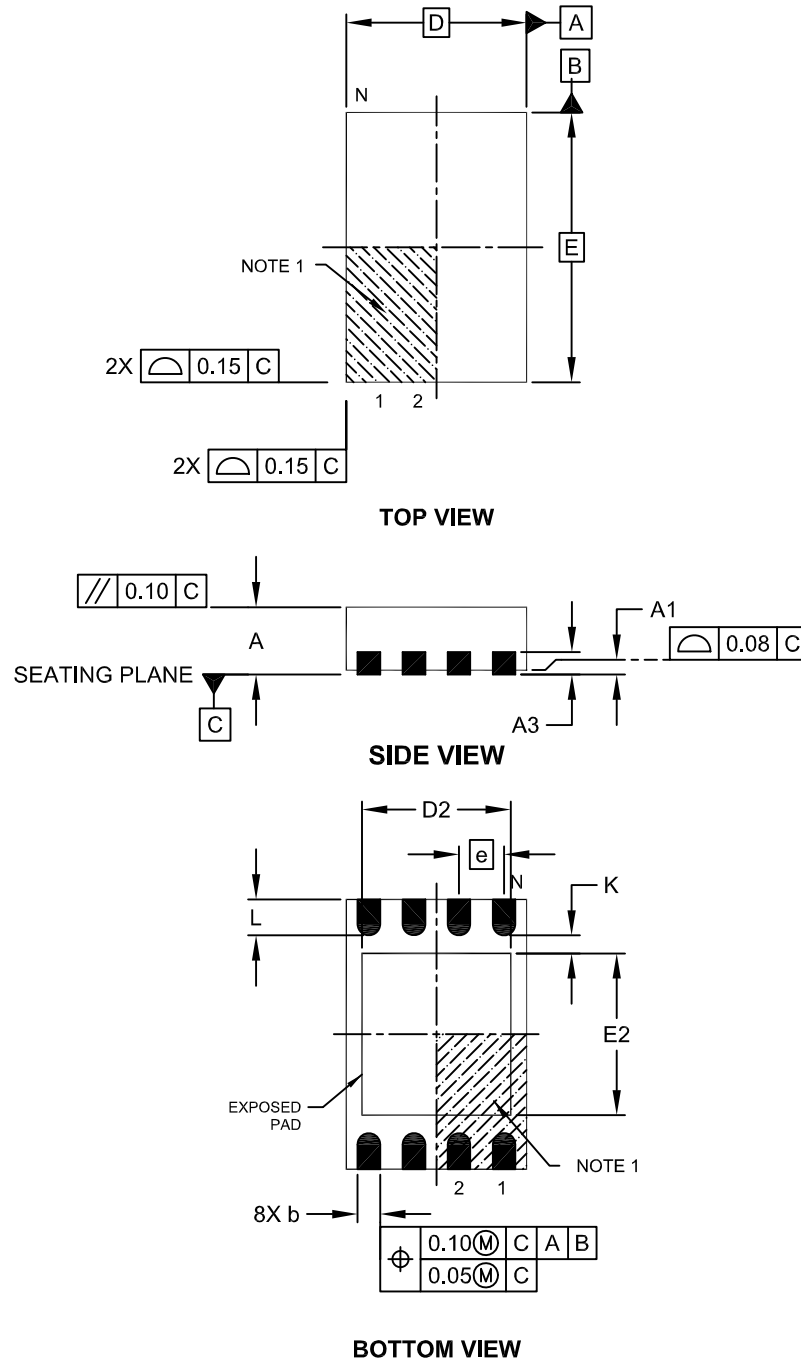
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-078A Sheet 2 of 2

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

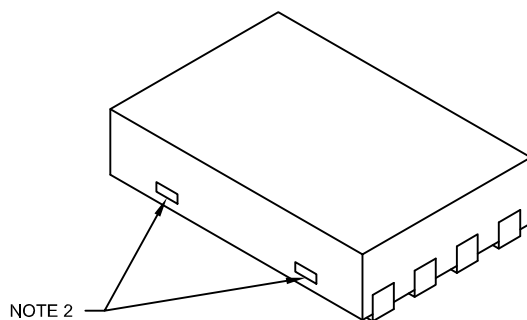


Microchip Technology Drawing No. C04-129C Sheet 1 of 2

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.50 BSC		
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	2.00 BSC		
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	1.20	-	1.60
Exposed Pad Width	E2	1.20	-	1.60
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

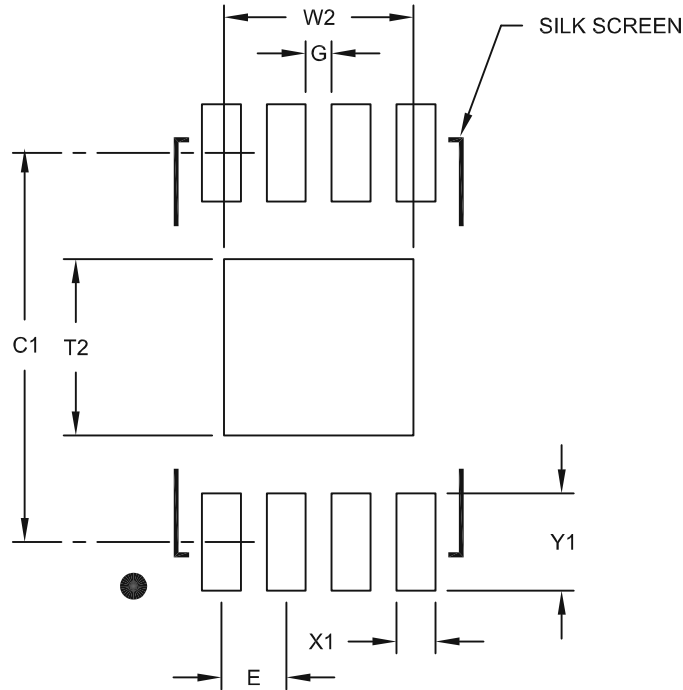
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-129C Sheet 2 of 2

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.46
Optional Center Pad Length	T2			1.36
Contact Pad Spacing	C1		3.00	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

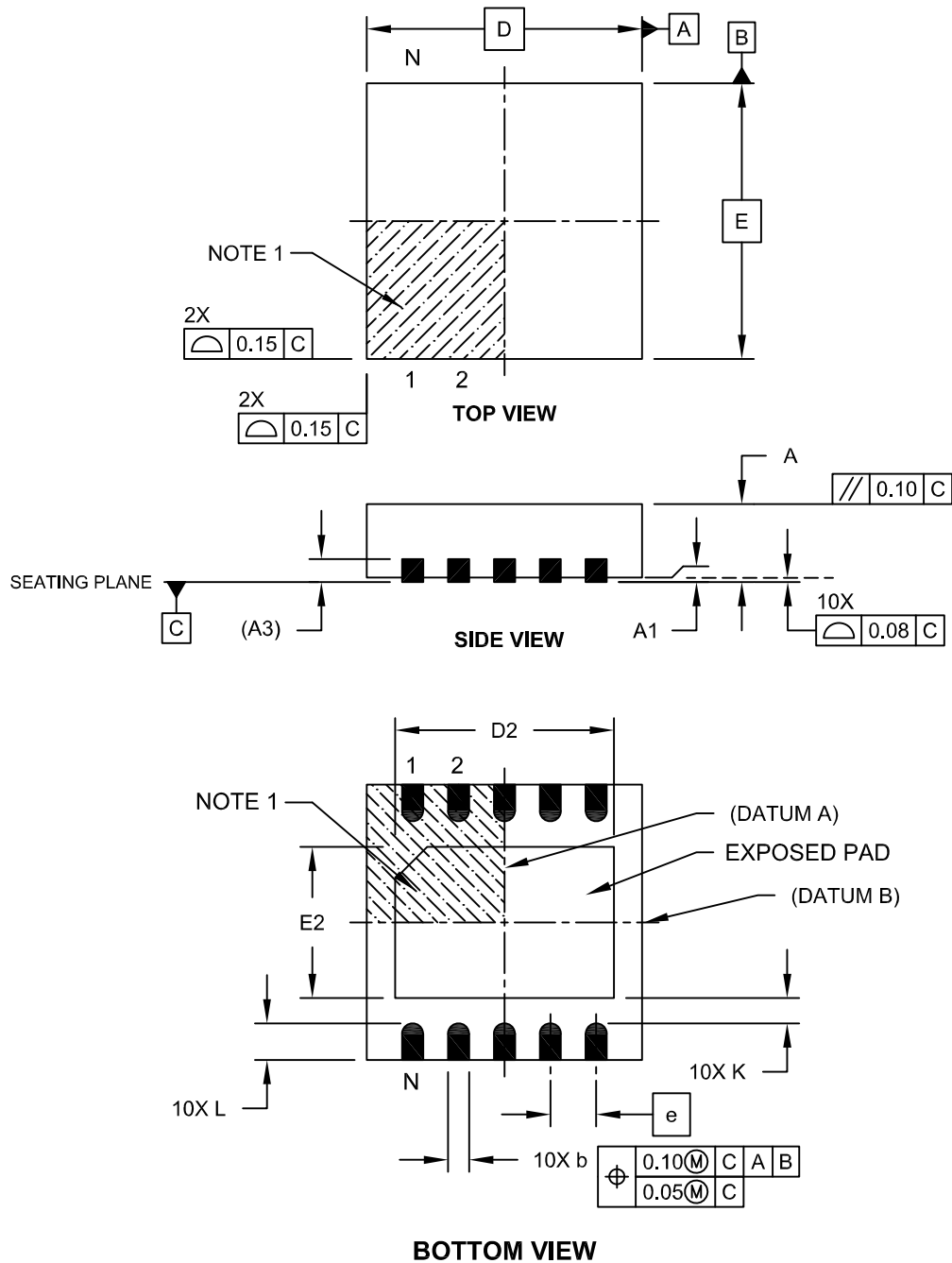
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2129A

Packaging Diagrams and Parameters

10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

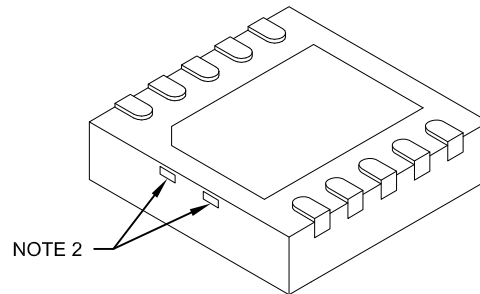
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Exposed Pad Length	D2	2.20	2.30	2.35
Overall Width	E	3.00 BSC		
Exposed Pad Width	E2	1.55	1.65	1.70
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-0185A Sheet 2 of 2

Packaging Diagrams and Parameters

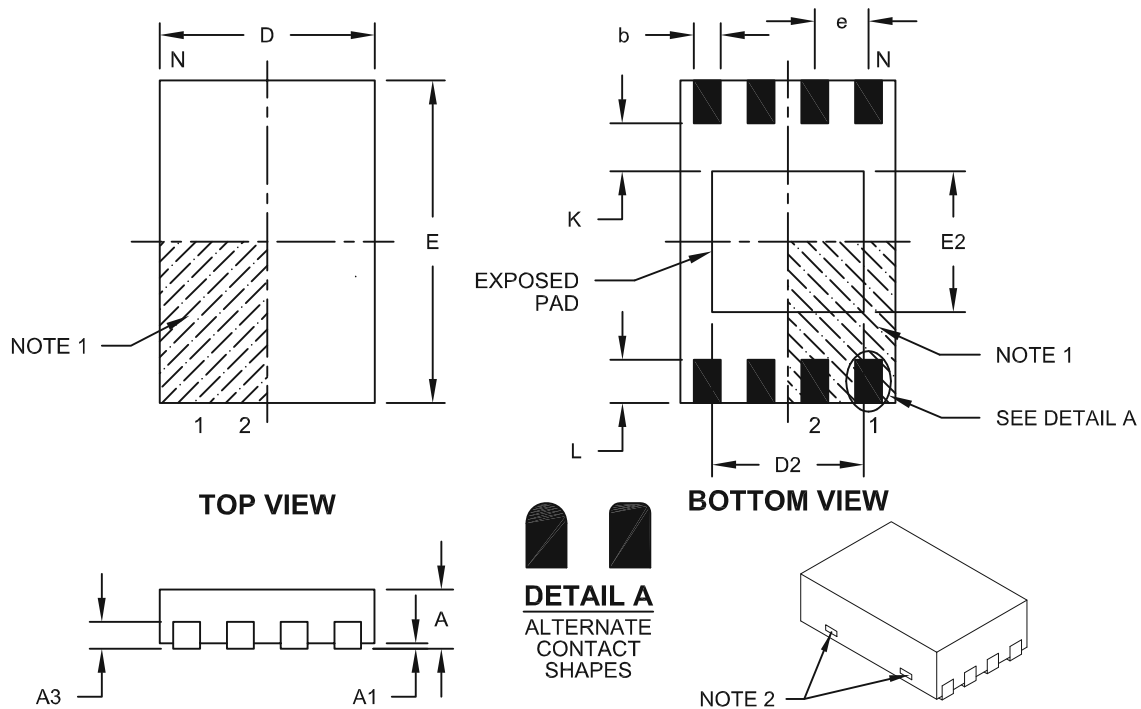
UDFN Family

Ultra Thin Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.50 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1			0.07
Contact Thickness	A3	0.127 REF		
Overall Length	D	1.95	2.00	2.05
Overall Width	E	2.95	3.00	3.05
Exposed Pad Length	D2	1.30	1.40	1.50
Exposed Pad Width	E2	1.20	1.30	1.40
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.35
Contact-to-Exposed Pad	K	0.55 REF		

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

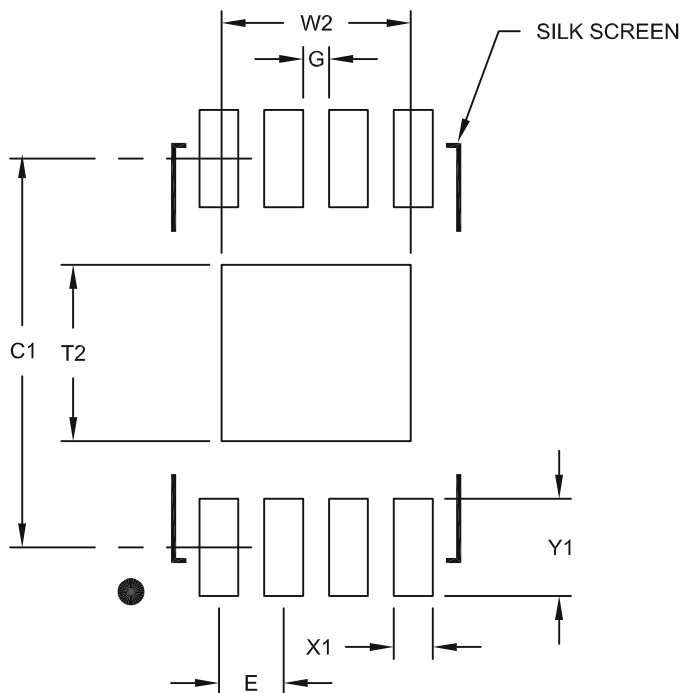
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-136B

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.46
Optional Center Pad Length	T2			1.36
Contact Pad Spacing	C1	3.00		
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

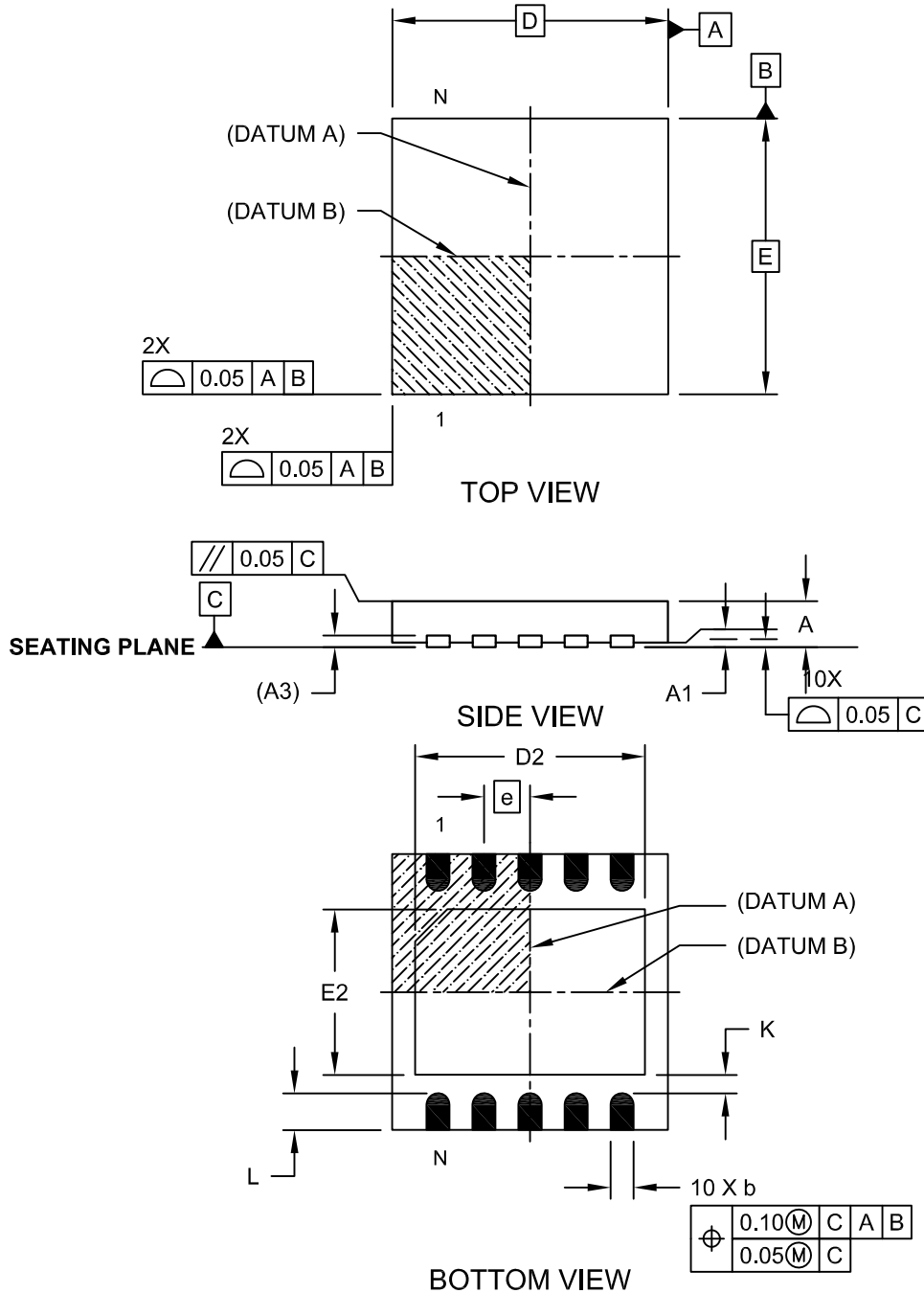
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2136A

Packaging Diagrams and Parameters

10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

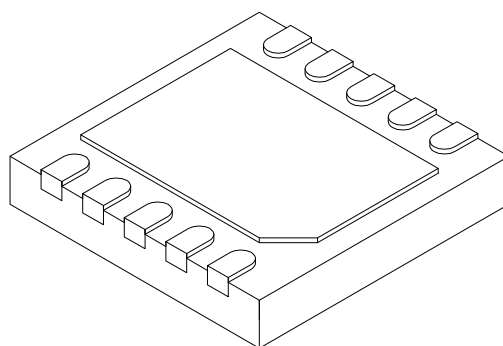
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
	Limits	MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	-	0.05
Overall Length	D	3.00 BSC		
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	2.40	2.50	2.60
Exposed Pad Width	E2	1.70	1.80	1.90
Terminal Thickness	(A3)	0.127 REF		
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
2. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.



MICROCHIP

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

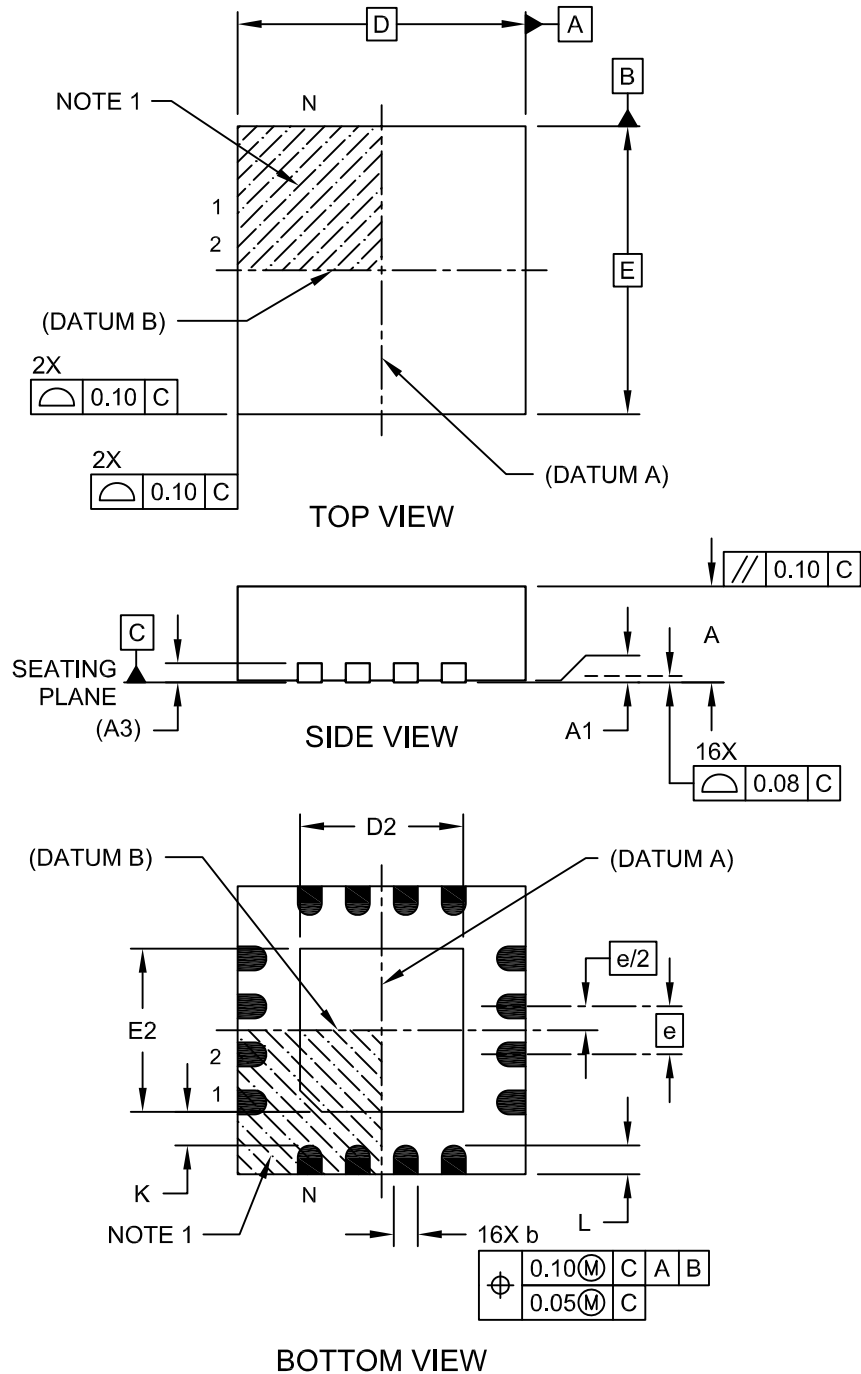
QFN Family

Quad Flat, No Lead Package

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

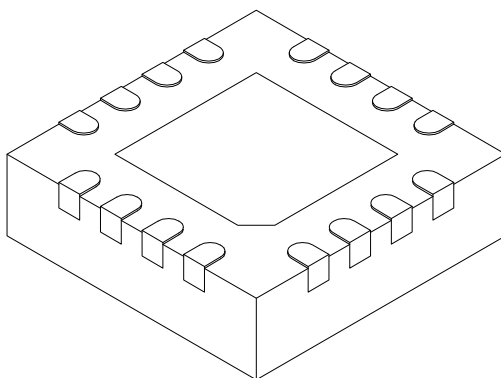
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		0.50 BSC		
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Terminal Thickness	A3	0.20 REF			
Overall Width	E	3.00 BSC			
Exposed Pad Width	E2	1.55	1.70	1.80	
Overall Length	D	3.00 BSC			
Exposed Pad Length	D2	1.55	1.70	1.80	
Terminal Width	b	0.18	0.25	0.30	
Terminal Length	L	0.20	0.30	0.40	
Terminal-to-Exposed Pad	K	0.20	-	-	

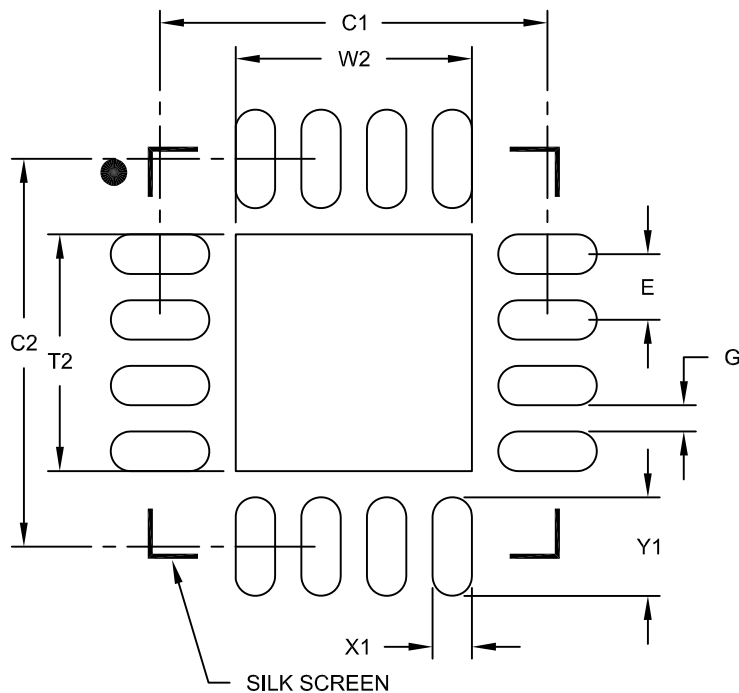
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (NG) – 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.50 BSC		
Optional Center Pad Width	W2				1.80
Optional Center Pad Length	T2				1.80
Contact Pad Spacing	C1			2.95	
Contact Pad Spacing	C2			2.95	
Contact Pad Width (X16)	X1				0.30
Contact Pad Length (X16)	Y1				0.75
Distance Between Pads	G		0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

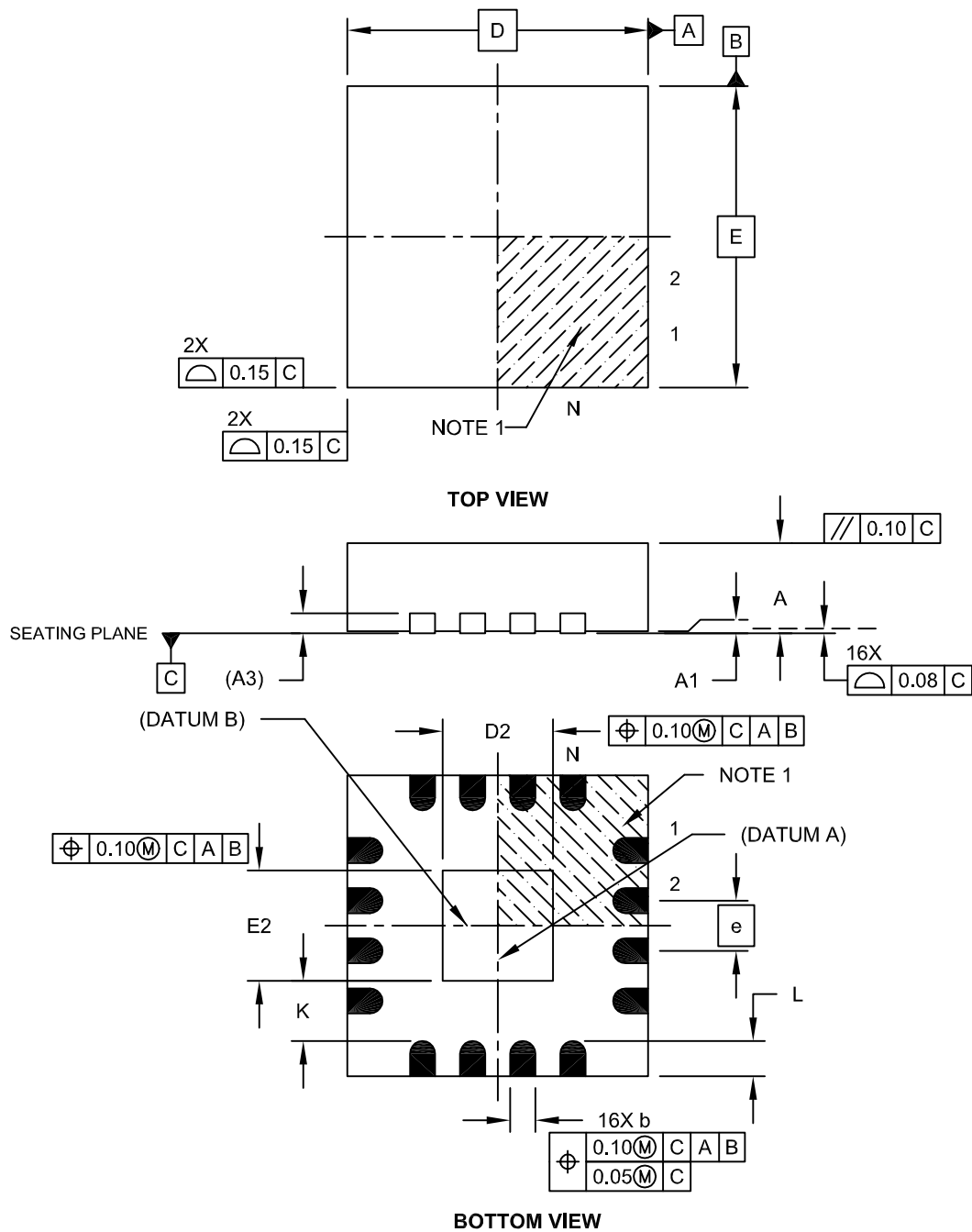
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2197A

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

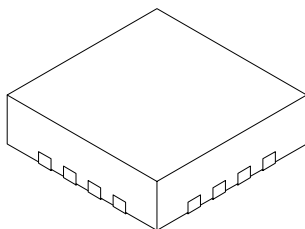
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		0.50 BSC		
Overall Height	A		0.80	0.85	0.90
Standoff	A1		0.00	0.02	0.05
Contact Thickness	A3		0.20 REF		
Overall Width	E		3.00 BSC		
Exposed Pad Width	E2	1.00	1.10	1.50	
Overall Length	D		3.00 BSC		
Exposed Pad Length	D2	1.00	1.10	1.50	
Contact Width	b	0.18	0.25	0.30	
Contact Length	L	0.25	0.35	0.45	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

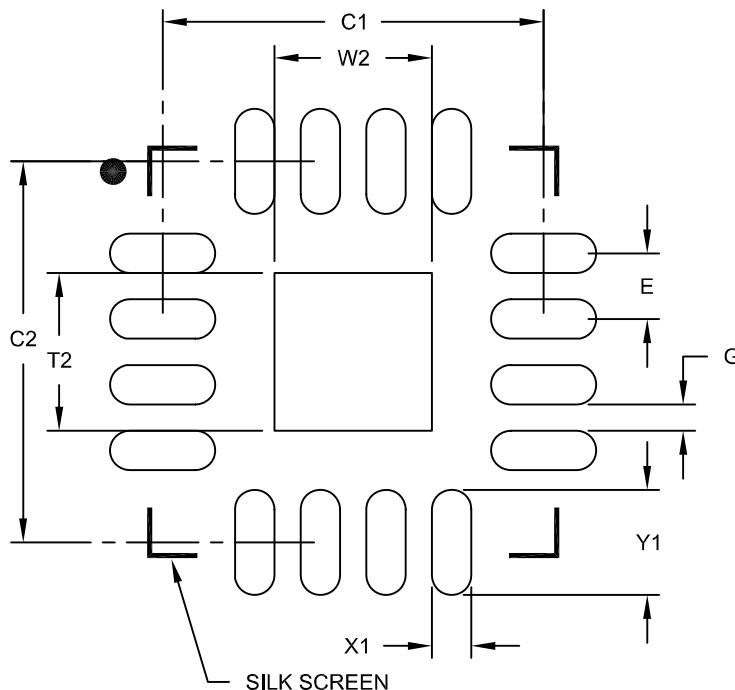
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (MG) – 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.20
Optional Center Pad Length	T2			1.20
Contact Pad Spacing	C1		2.90	
Contact Pad Spacing	C2		2.90	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

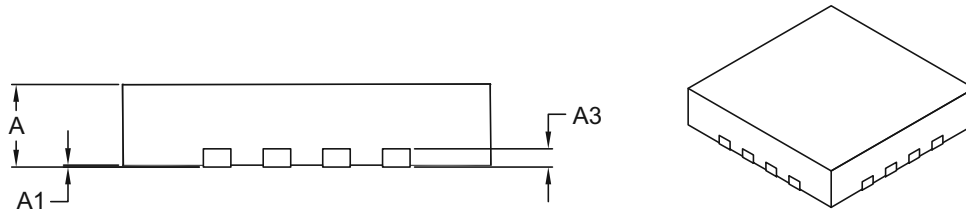
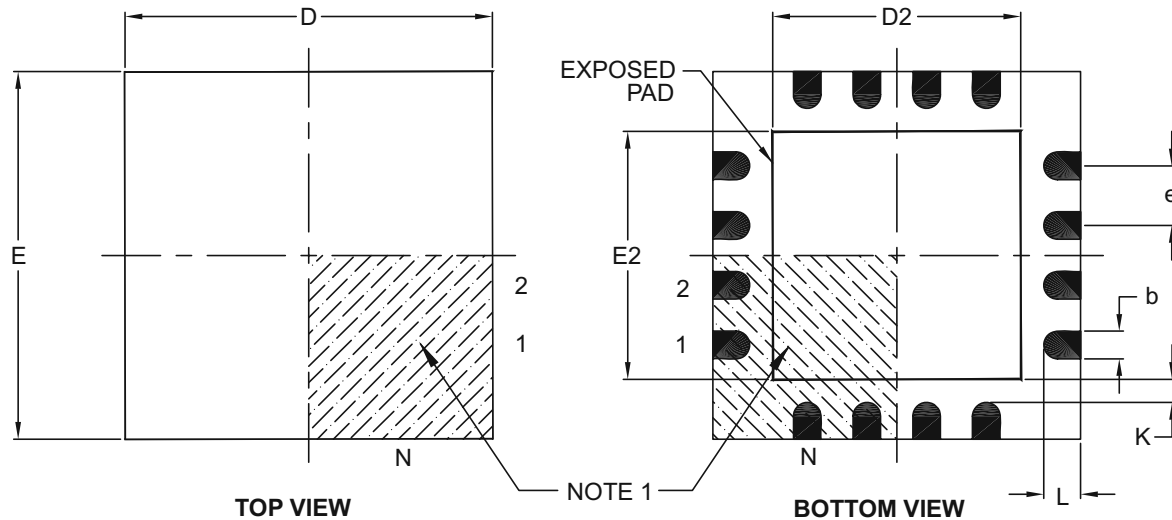
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2142A

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	MILLIMETERS		
		MIN	NOM	MAX
Dimension Limits				
Number of Pins	N	16		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.50	2.65	2.80
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.50	2.65	2.80
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension, Theoretically exact value shown without tolerances.

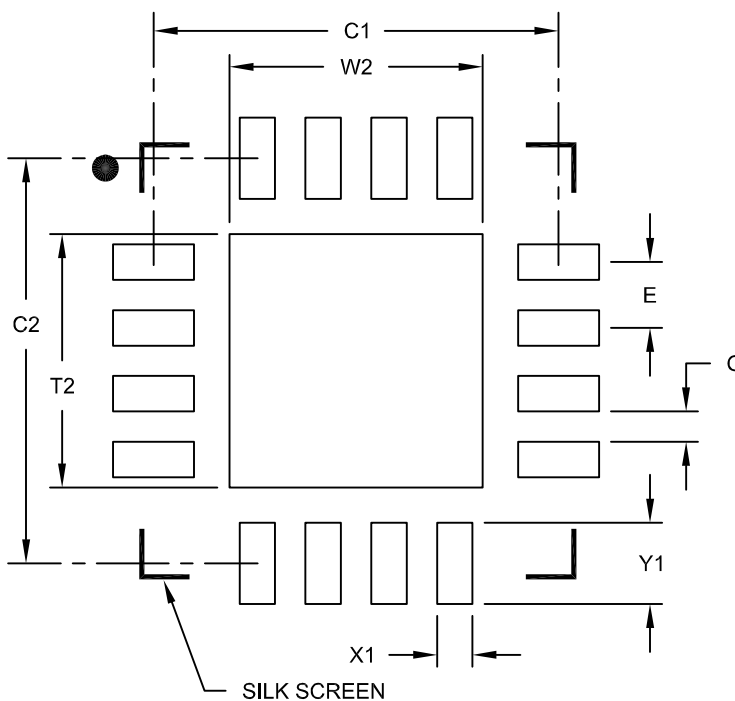
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-127B

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X16)	X1			0.35
Contact Pad Length (X16)	Y1			0.80
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

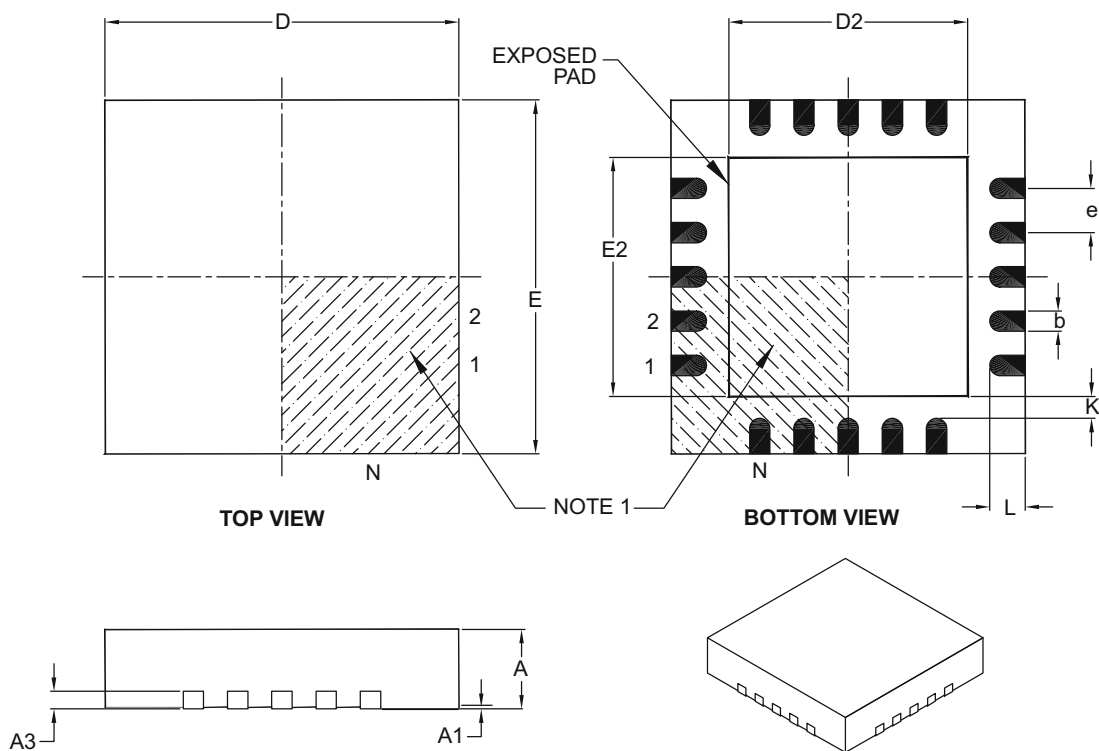
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2127A

Packaging Diagrams and Parameters

20-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Units	MILLIMETERS		
		MIN	NOM	MAX
Dimension Limits				
Number of Pins	N	20		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.60	2.70	2.80
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

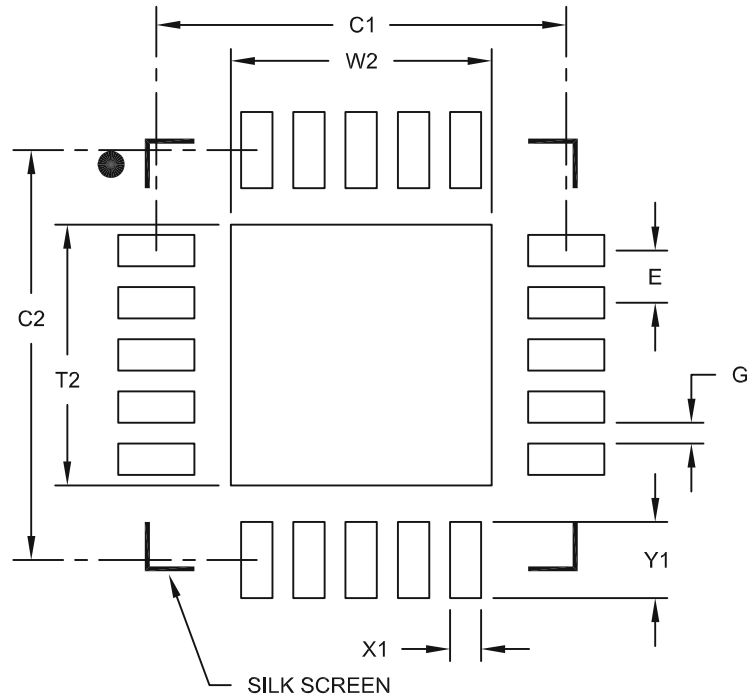
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-126B

Land Pattern (Footprint)

20-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4 mm Body [QFN]
 With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		3.93	
Contact Pad Spacing	C2		3.93	
Contact Pad Width	X1			0.30
Contact Pad Length	Y1			0.73
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

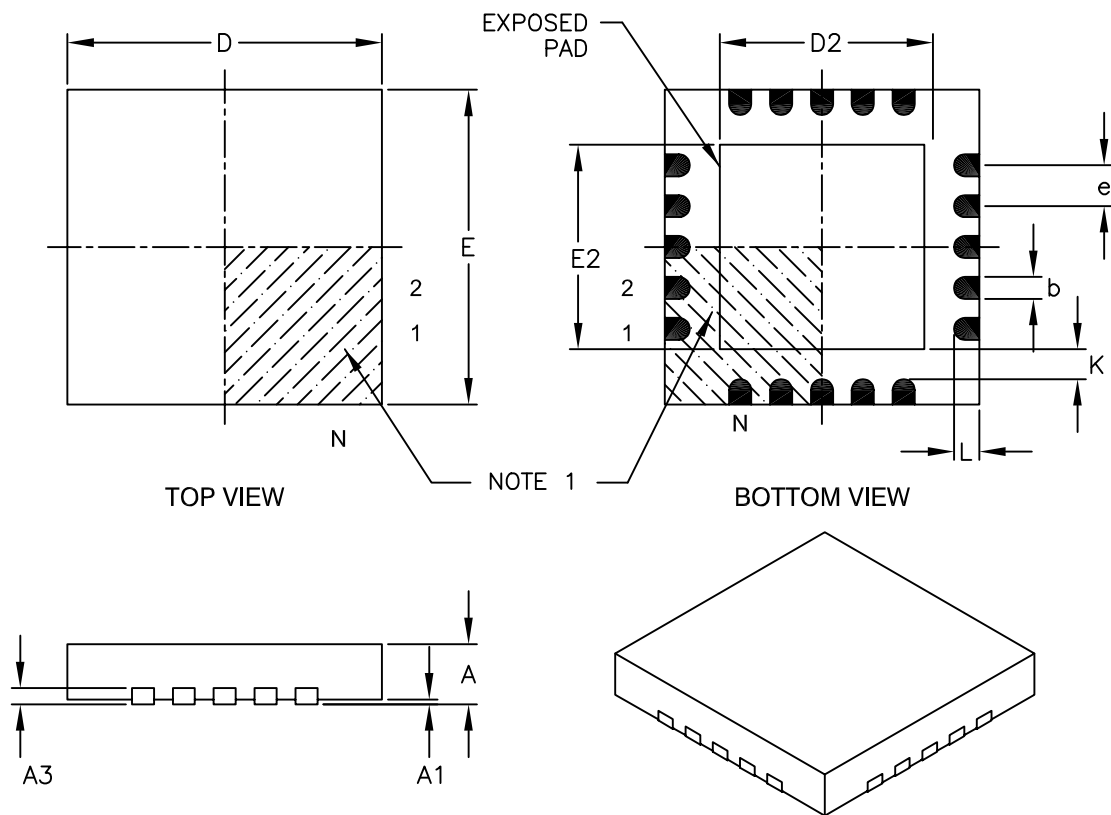
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2126A

Packaging Diagrams and Parameters

20-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	5.00 BSC		
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D	5.00 BSC		
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

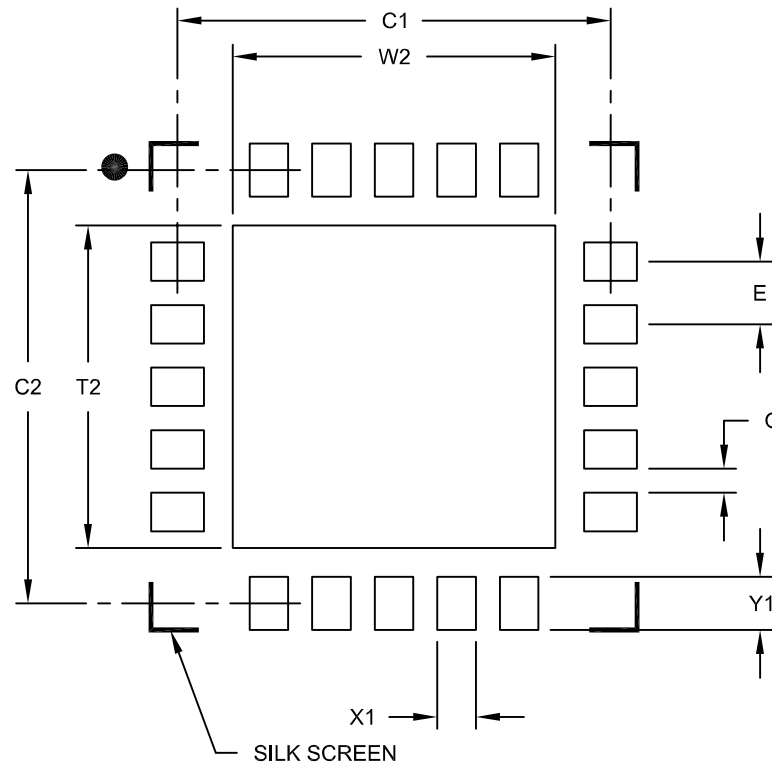
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

20-Lead Plastic Quad Flat, No Lead Package (MQ) - 5x5 mm Body [QFN]
 With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.50	
Contact Pad Spacing	C2		4.50	
Contact Pad Width (X20)	X1			0.40
Contact Pad Length (X20)	Y1			0.55
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

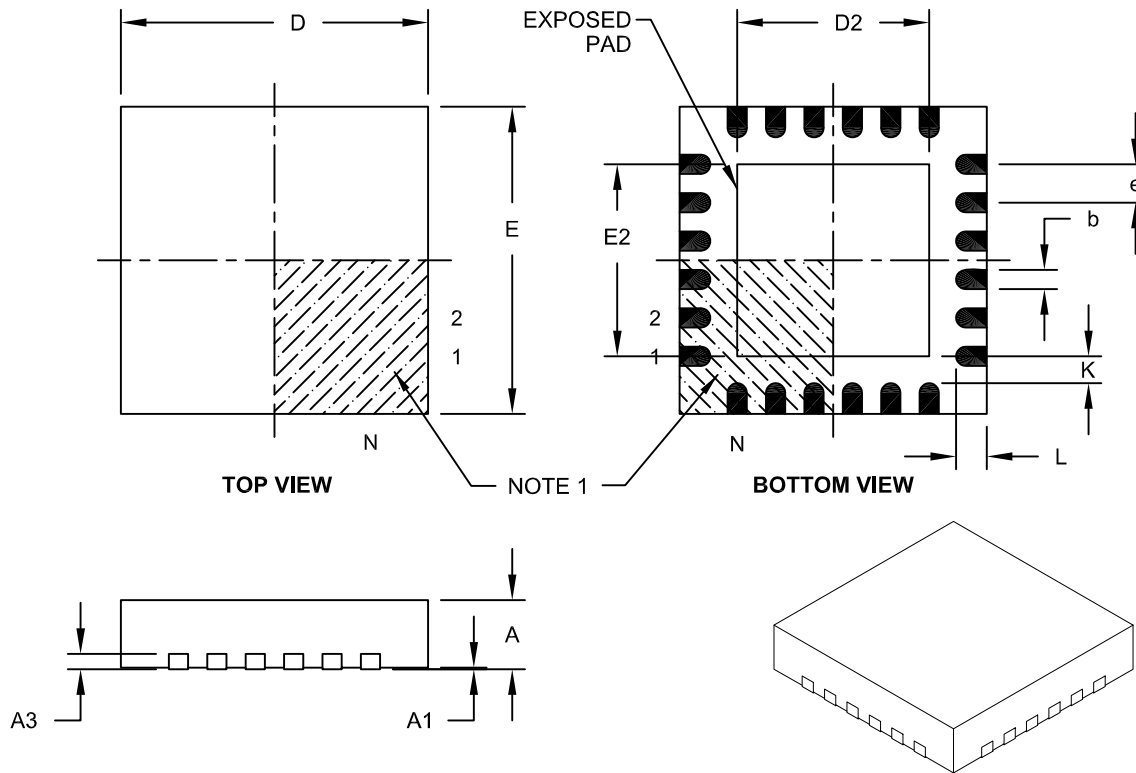
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2139A

Packaging Diagrams and Parameters

24-Lead Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.40	2.50	2.60
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.40	2.50	2.60
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

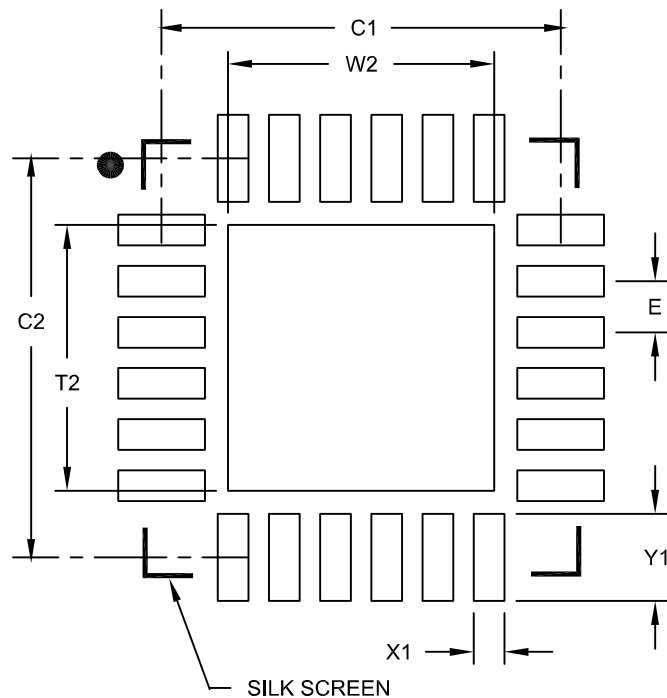
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-143A

Land Pattern (Footprint)

24-Lead Plastic Quad Flat, No Lead Package (MJ) - 4x4 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		MILLIMETERS		
		MIN	NOM	MAX
	Units			
	Dimension Limits			
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.60
Optional Center Pad Length	T2			2.60
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width	X1			0.30
Contact Pad Length	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

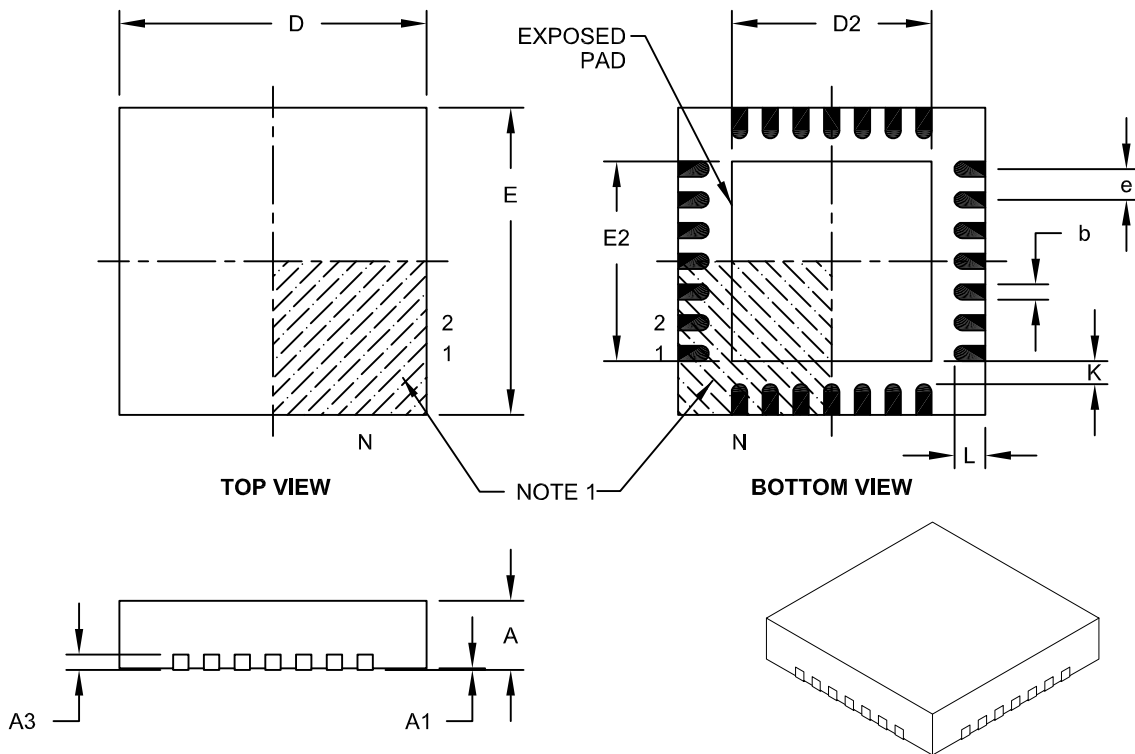
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2143B

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.40 BSC		
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.50	2.60	2.70
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.50	2.60	2.70
Contact Width	b	0.17	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

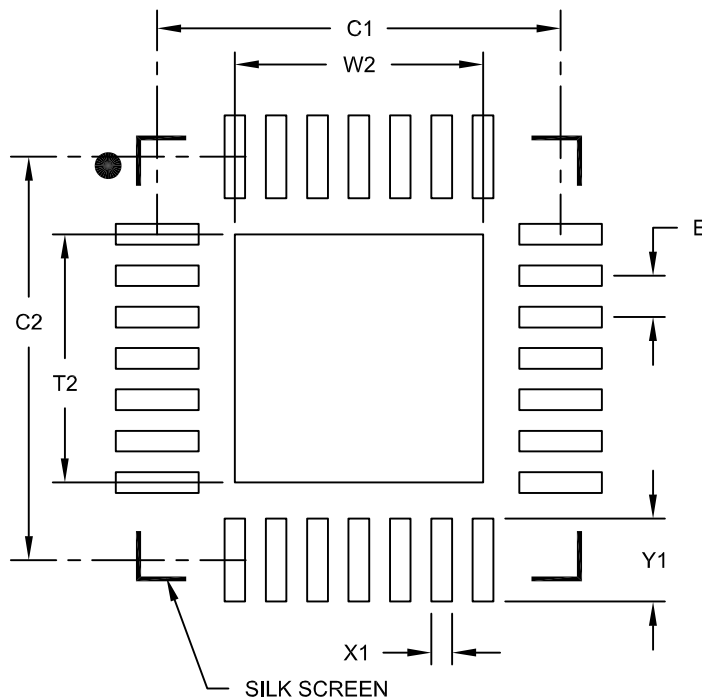
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-144A

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits		MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			2.40
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width	X1			0.20
Contact Pad Length	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

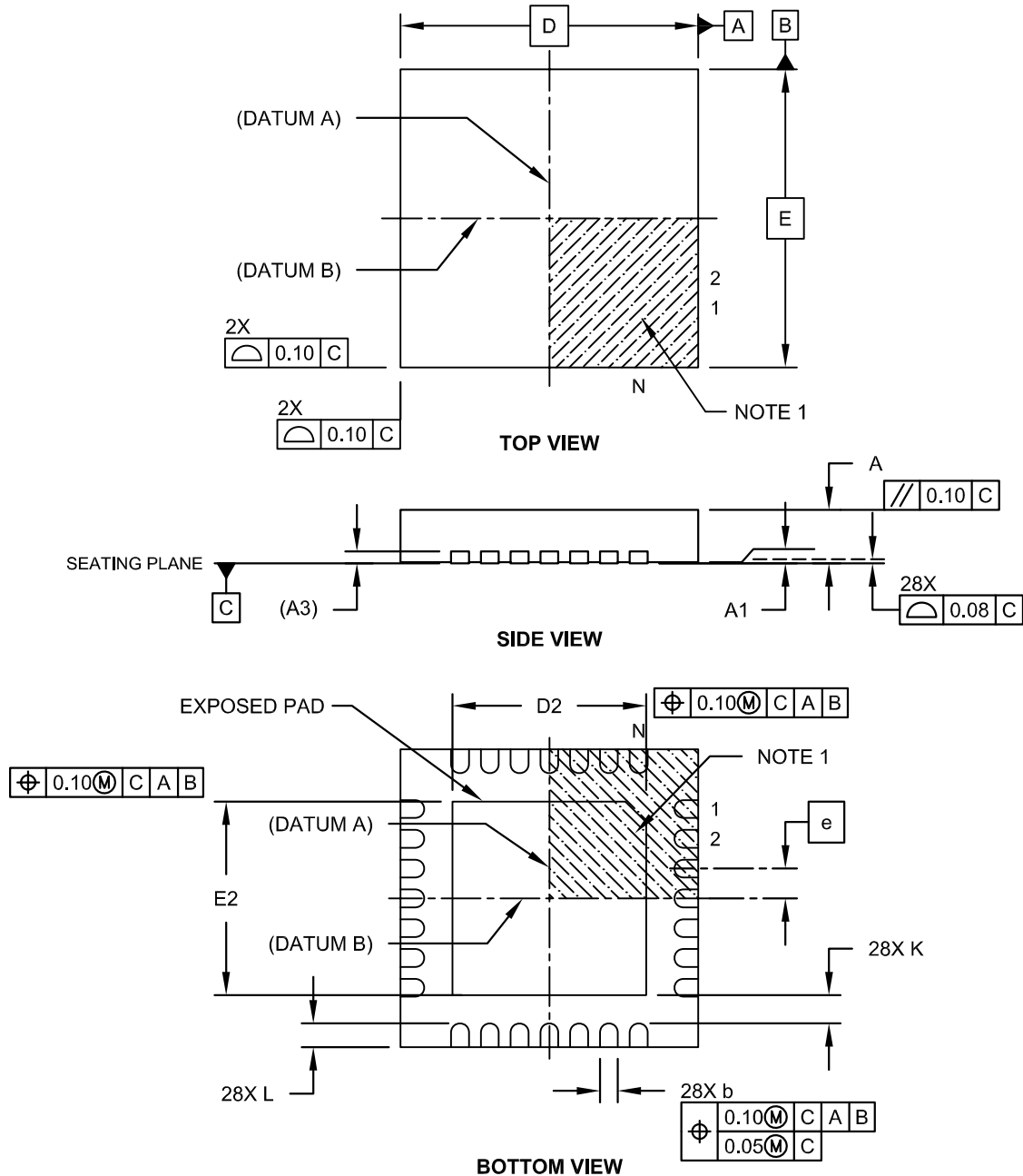
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2144A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

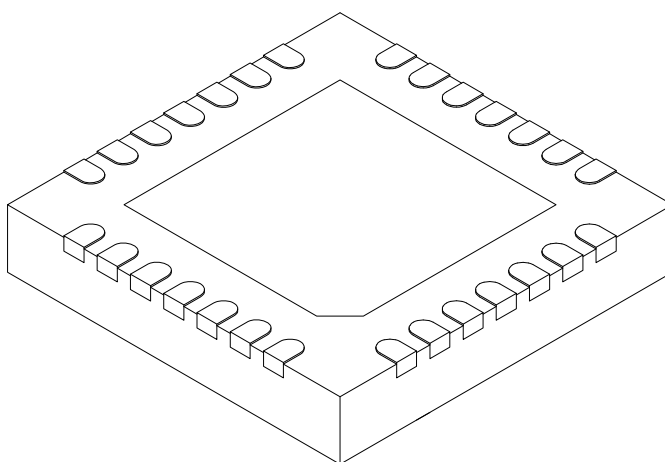
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	5.00 BSC		
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D	5.00 BSC		
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

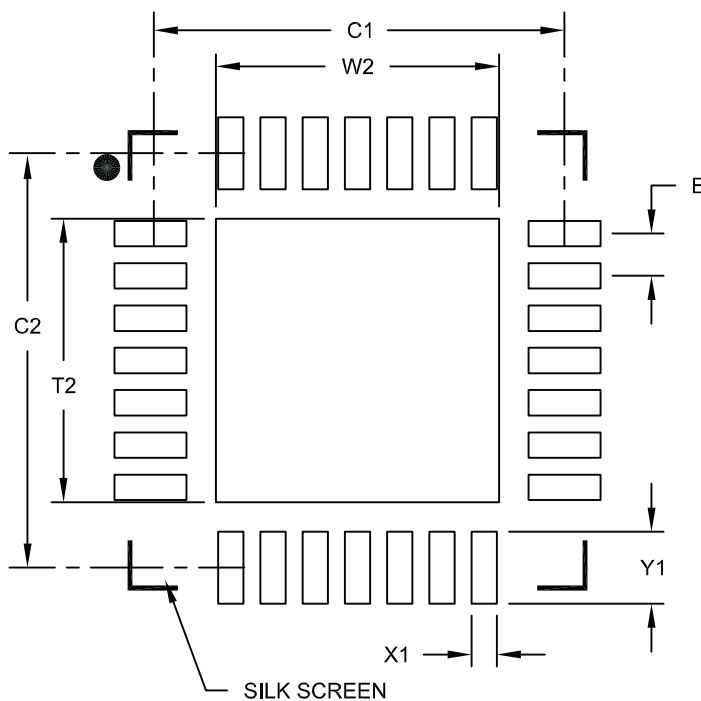
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5 mm Body [QFN] Land Pattern With 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

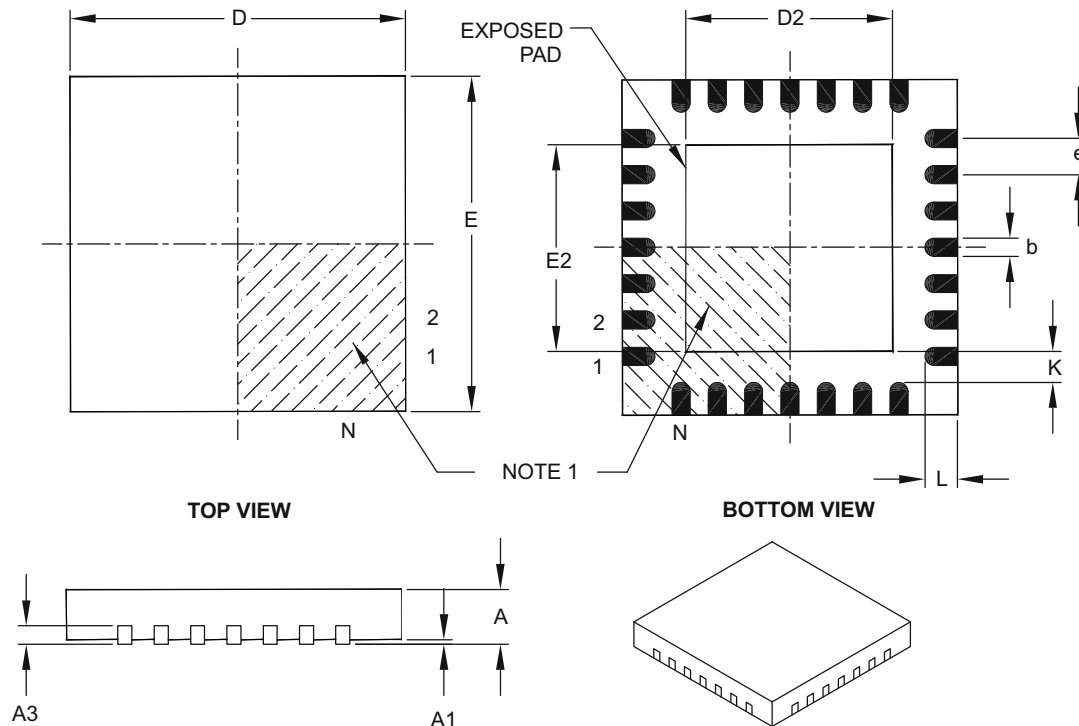
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2140A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	3.65	3.70	4.20
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	3.65	3.70	4.20
Contact Width	b	0.23	0.30	0.35
Contact Length	L	0.50	0.55	0.70
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

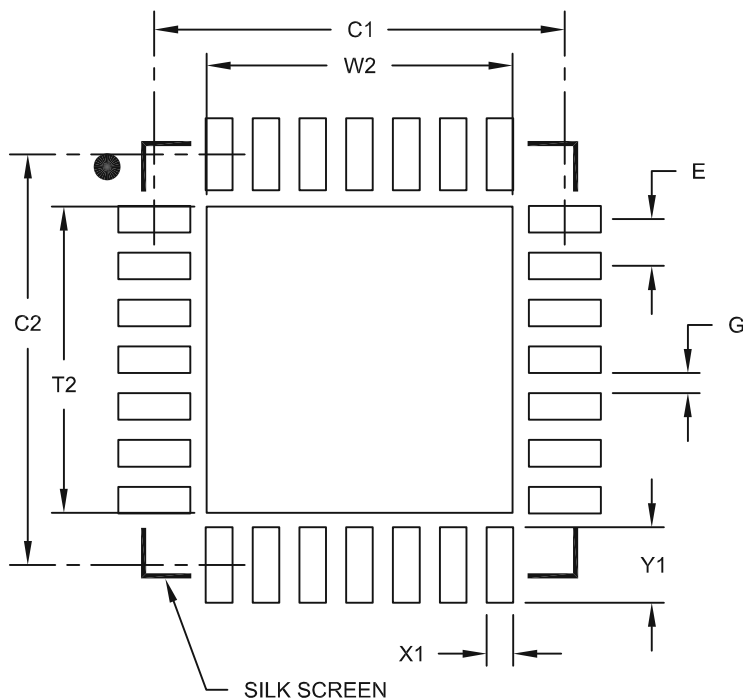
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-105B

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			4.25
Optional Center Pad Length	T2			4.25
Contact Pad Spacing	C1		5.70	
Contact Pad Spacing	C2		5.70	
Contact Pad Width (X28)	X1			0.37
Contact Pad Length (X28)	Y1			1.00
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

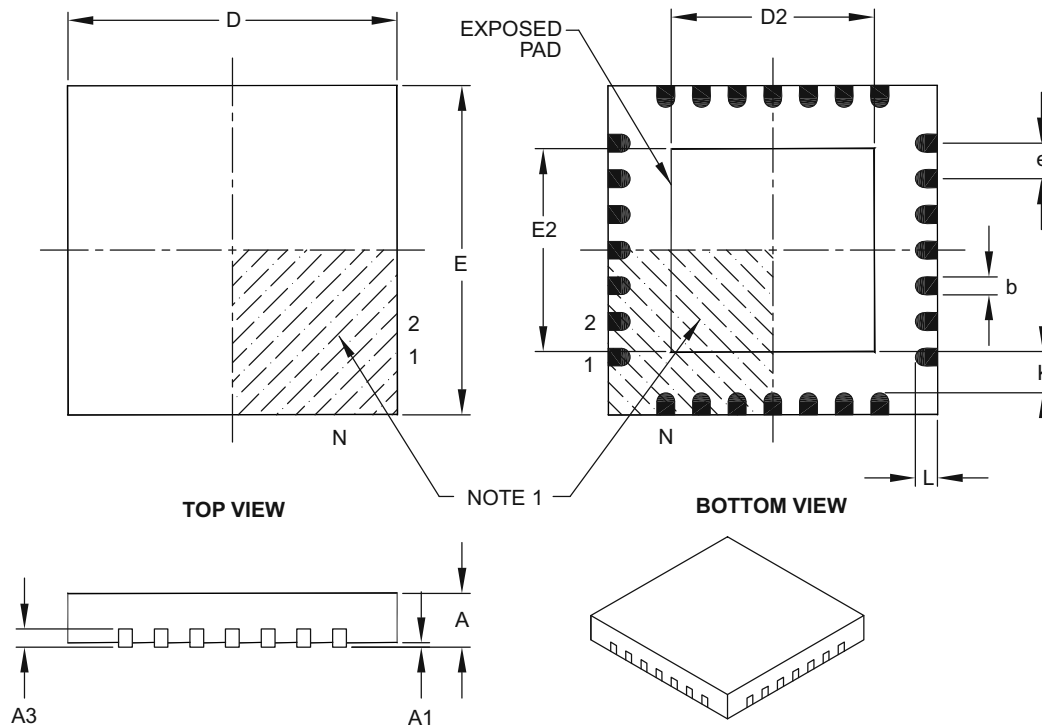
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2105A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	3.65	3.70	4.70
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	3.65	3.70	4.70
Contact Width	b	0.23	0.38	0.43
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

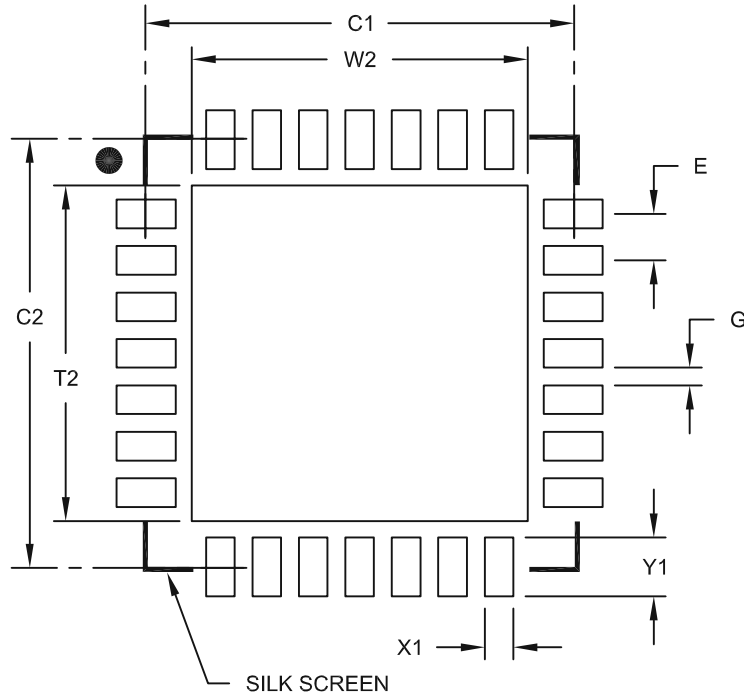
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-124B

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65 BSC		
Optional Center Pad Width	W2				4.70
Optional Center Pad Length	T2				4.70
Contact Pad Spacing	C1			6.00	
Contact Pad Spacing	C2			6.00	
Contact Pad Width (X28)	X1				0.40
Contact Pad Length (X28)	Y1				0.85
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

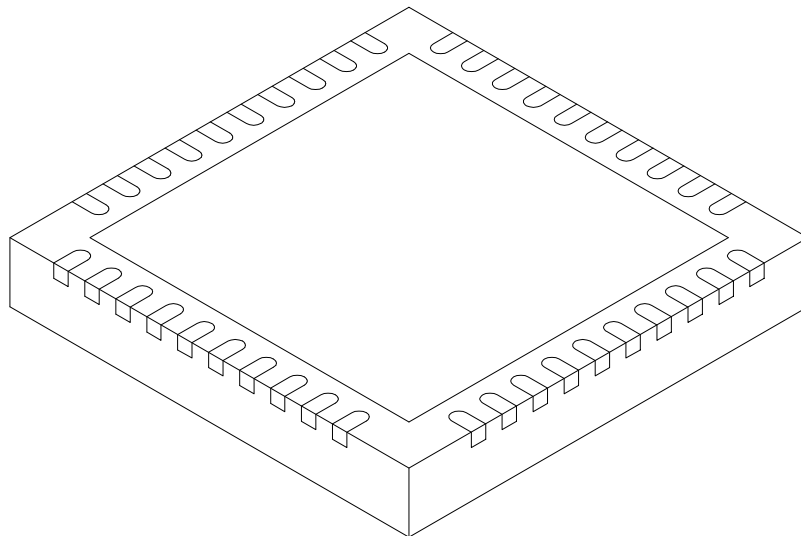
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2124A

Packaging Diagrams and Parameters

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN] With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	4.50	4.65	4.80
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	4.50	4.65	4.80
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

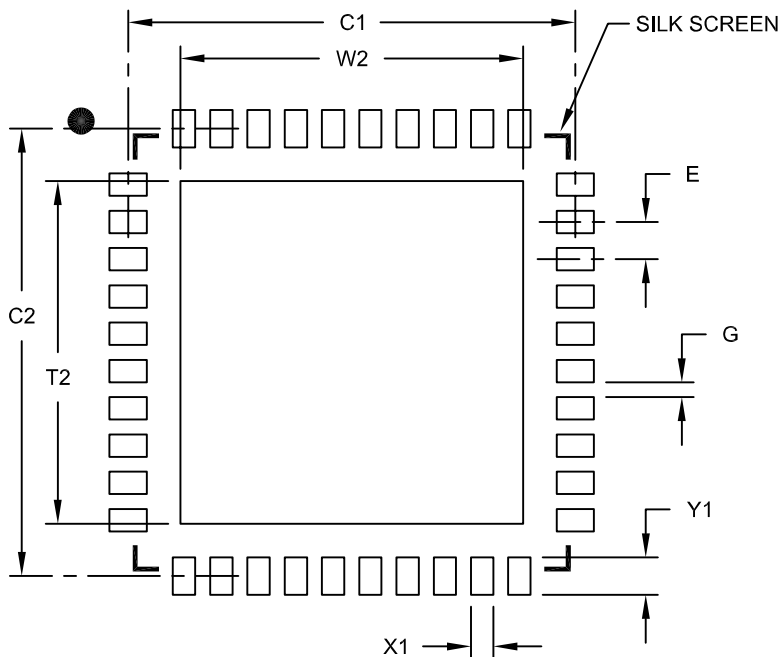
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-118D Sheet 2 of 2

Land Pattern (Footprint)

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN]
 With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			4.60
Optional Center Pad Length	T2			4.60
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X40)	X1			0.30
Contact Pad Length (X40)	Y1			0.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

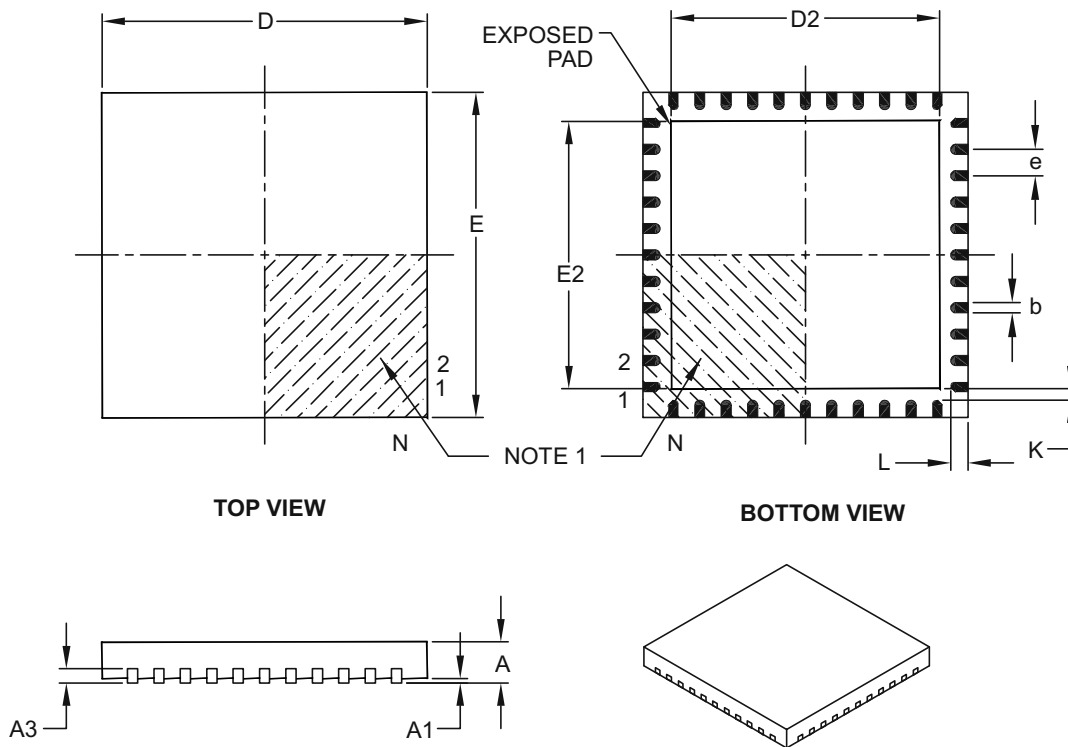
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2118A

Packaging Diagrams and Parameters

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	44		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	8.00 BSC		
Exposed Pad Width	E2	6.30	6.45	6.80
Overall Length	D	8.00 BSC		
Exposed Pad Length	D2	6.30	6.45	6.80
Contact Width	b	0.25	0.30	0.38
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.

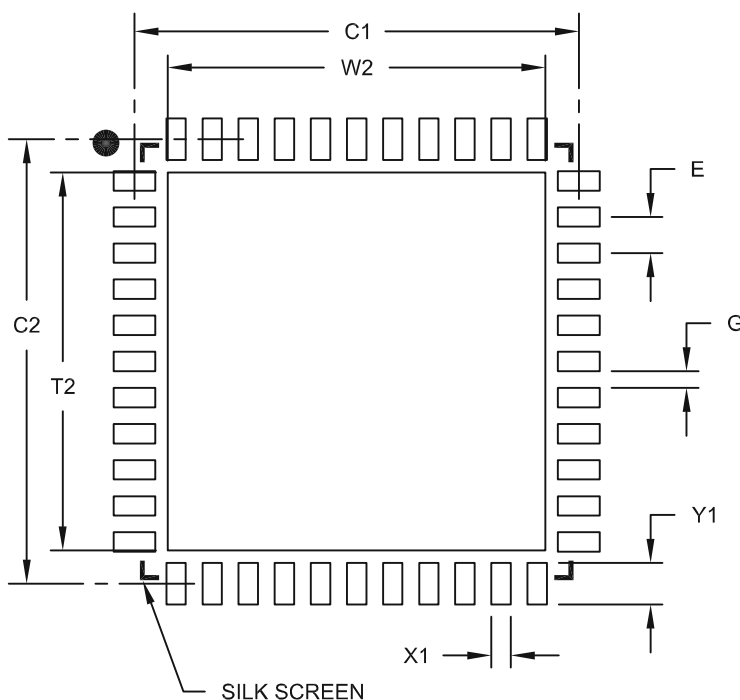
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC		
Optional Center Pad Width	W2				6.80
Optional Center Pad Length	T2				6.80
Contact Pad Spacing	C1			8.00	
Contact Pad Spacing	C2			8.00	
Contact Pad Width (X44)	X1				0.35
Contact Pad Length (X44)	Y1				0.80
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

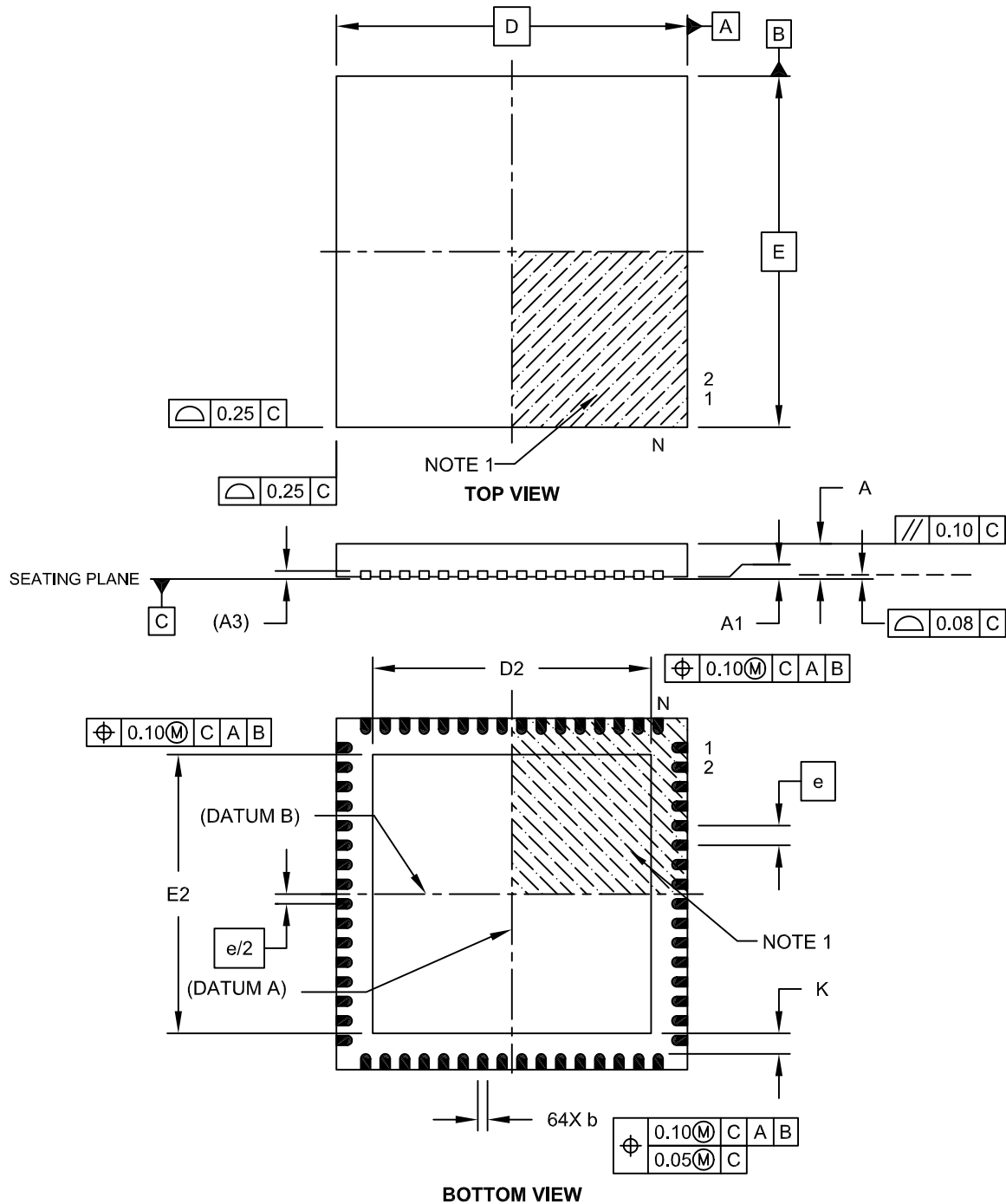
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2103A

Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN] With 7.15 x 7.15 Exposed Pad [QFN]

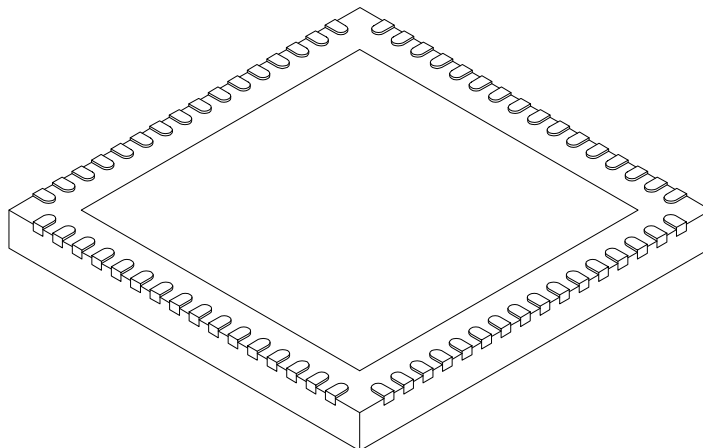
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN] With 7.15 x 7.15 Exposed Pad [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	9.00 BSC		
Exposed Pad Width	E2	7.05	7.15	7.50
Overall Length	D	9.00 BSC		
Exposed Pad Length	D2	7.05	7.15	7.50
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

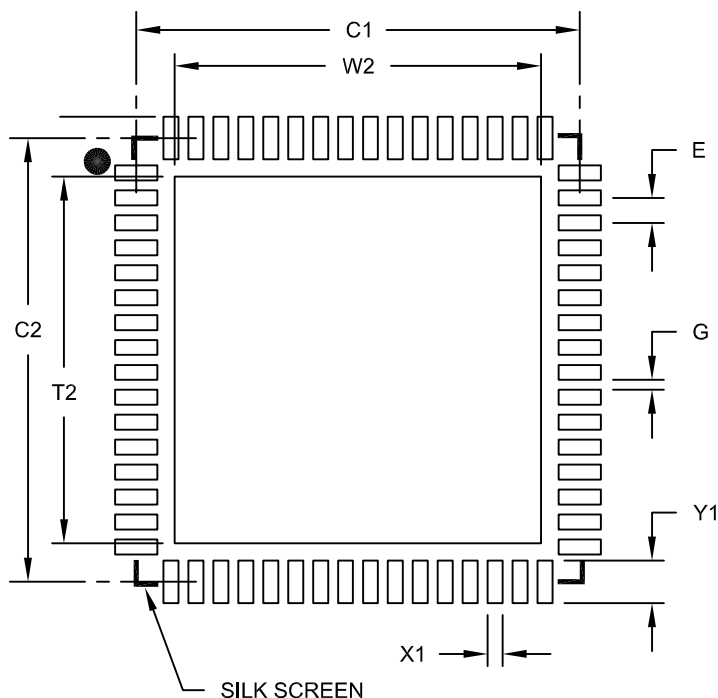
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-149C Sheet 2 of 2

Land Pattern (Footprint)

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
 With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			7.35
Optional Center Pad Length	T2			7.35
Contact Pad Spacing	C1		8.90	
Contact Pad Spacing	C2		8.90	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.85
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

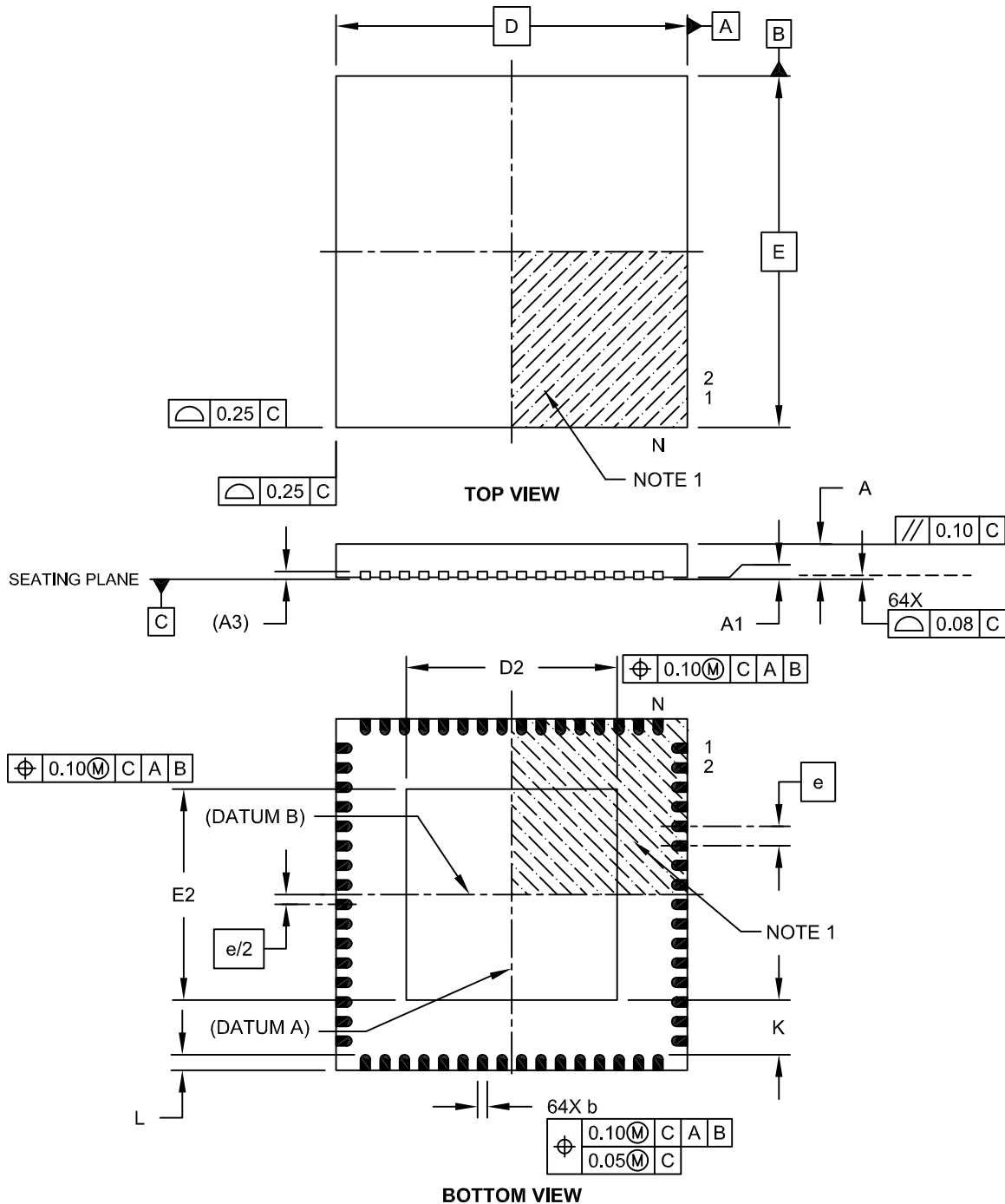
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2149A

Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body with 5.40 x 5.40 Exposed Pad [QFN]

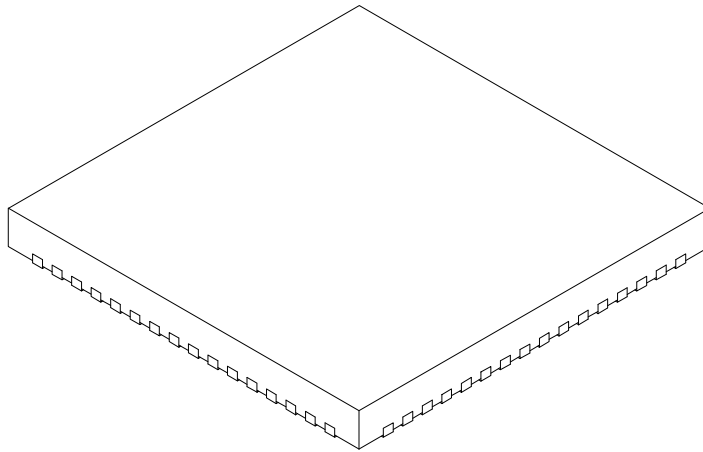
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body with 5.40 x 5.40 Exposed Pad [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	9.00 BSC		
Exposed Pad Width	E2	5.30	5.40	5.50
Overall Length	D	9.00 BSC		
Exposed Pad Length	D2	5.30	5.40	5.50
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-154A Sheet 2 of 2

Packaging Diagrams and Parameters

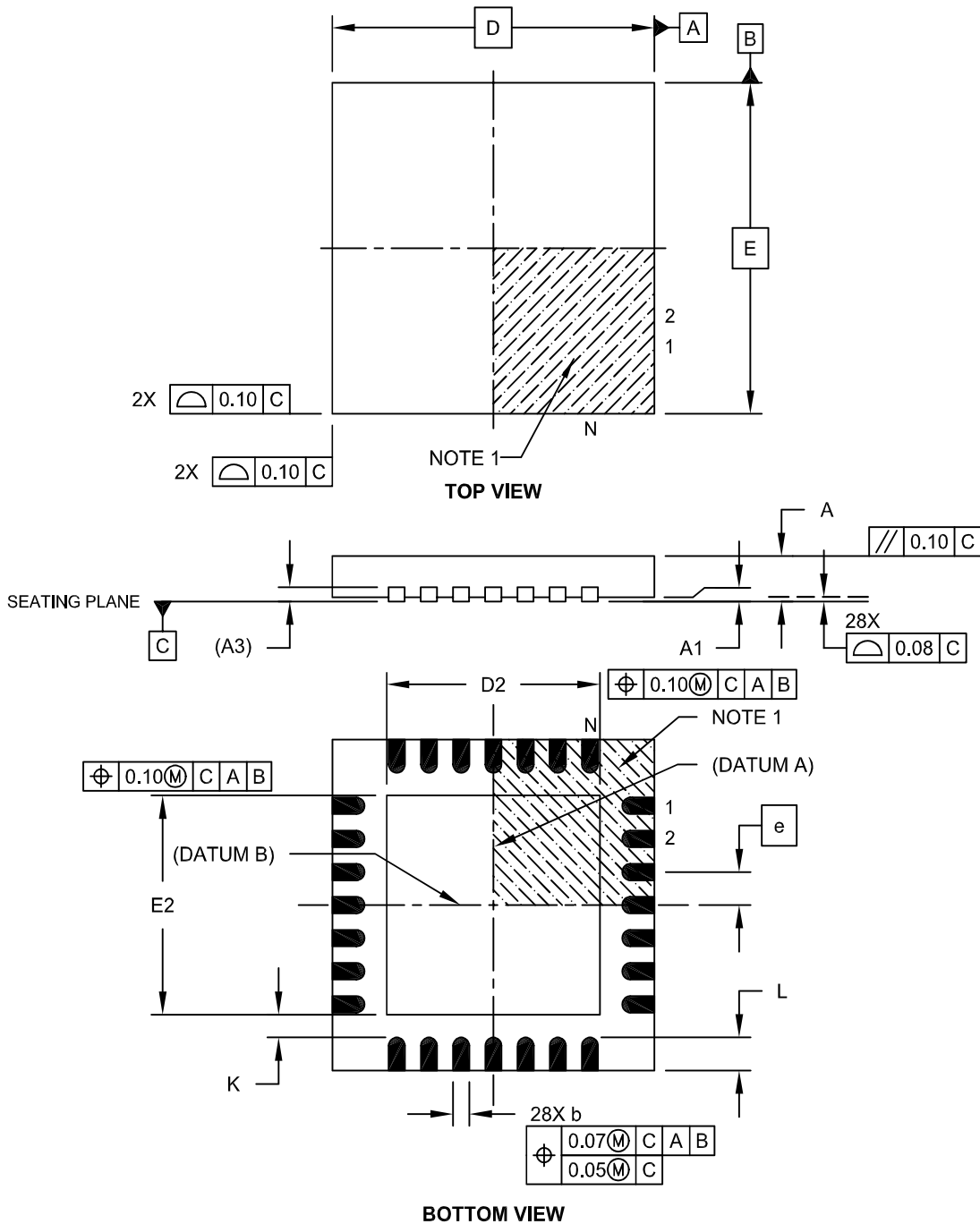
UQFN Family

Ultra Thin Quad Flat, No Lead Packages

Packaging Diagrams and Parameters

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

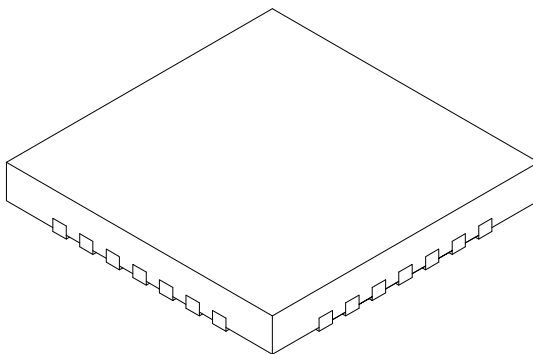
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.40 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.127 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.55	2.65	2.75
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.55	2.65	2.75
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

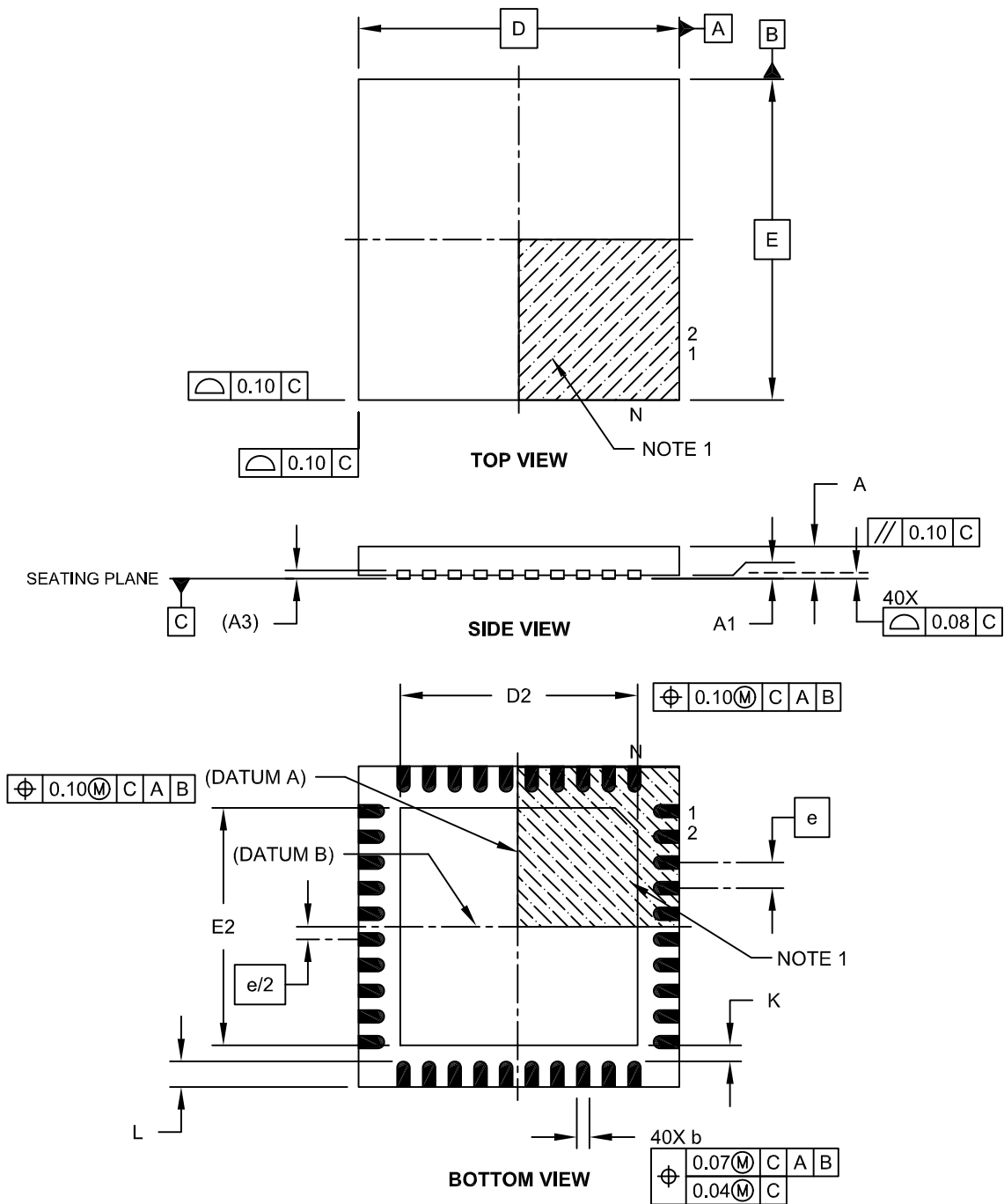
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-152A Sheet 2 of 2

Packaging Diagrams and Parameters

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

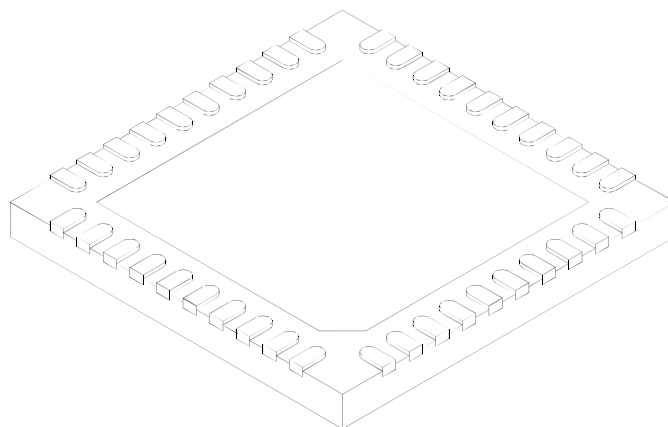


Microchip Technology Drawing C04-156A Sheet 1 of 2

Packaging Diagrams and Parameters

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	0.40 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.127 REF		
Overall Width	E	5.00 BSC		
Exposed Pad Width	E2	3.60	3.70	3.80
Overall Length	D	5.00 BSC		
Exposed Pad Length	D2	3.60	3.70	3.80
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

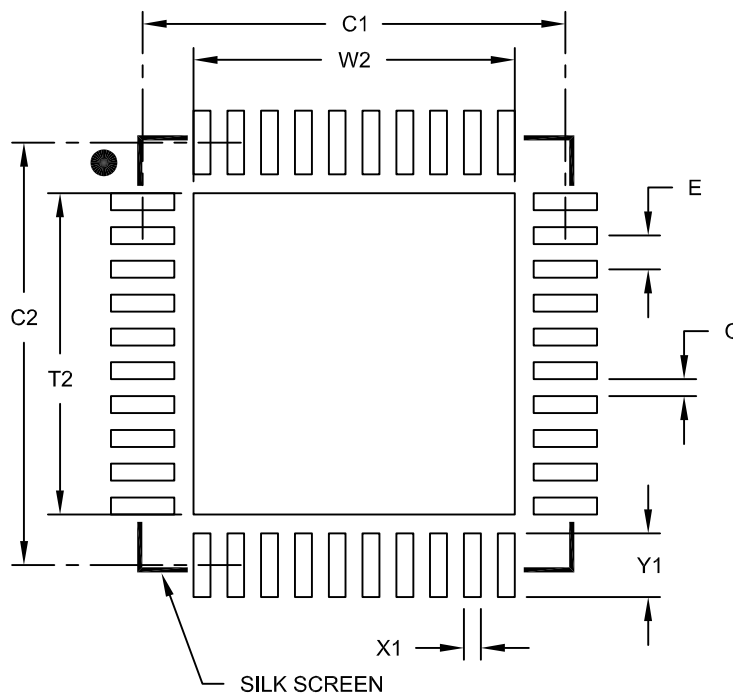
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-156A Sheet 2 of 2

Land Pattern (Footprint)

40-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 5x5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.40 BSC		
Optional Center Pad Width	W2				3.80
Optional Center Pad Length	T2				3.80
Contact Pad Spacing	C1			5.00	
Contact Pad Spacing	C2			5.00	
Contact Pad Width (X40)	X1				0.20
Contact Pad Length (X40)	Y1				0.75
Distance Between Pads	G	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

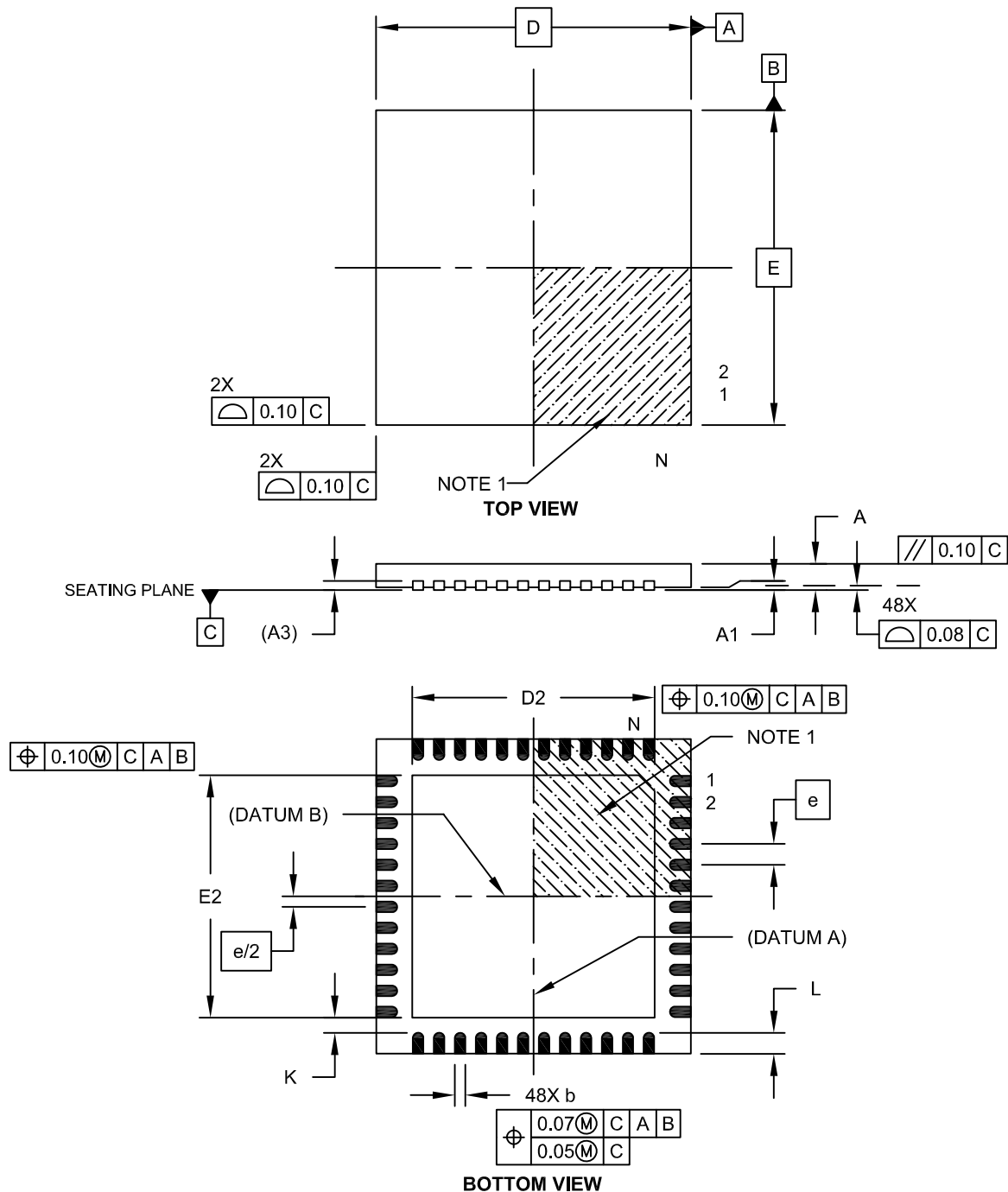
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2156B

Packaging Diagrams and Parameters

48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

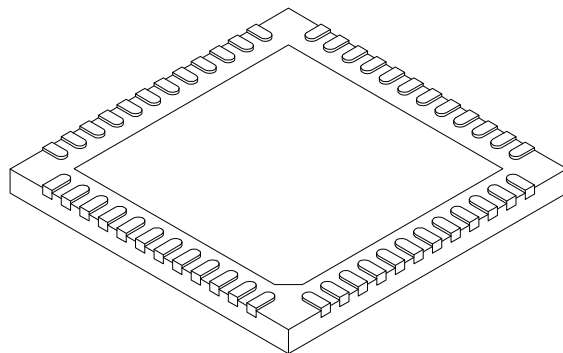


Microchip Technology Drawing C04-153A Sheet 1 of 2

Packaging Diagrams and Parameters

48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	48		
Pitch	e	0.40 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.127 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	4.45	4.60	4.75
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	4.45	4.60	4.75
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-153A Sheet 2 of 2

Packaging Diagrams and Parameters

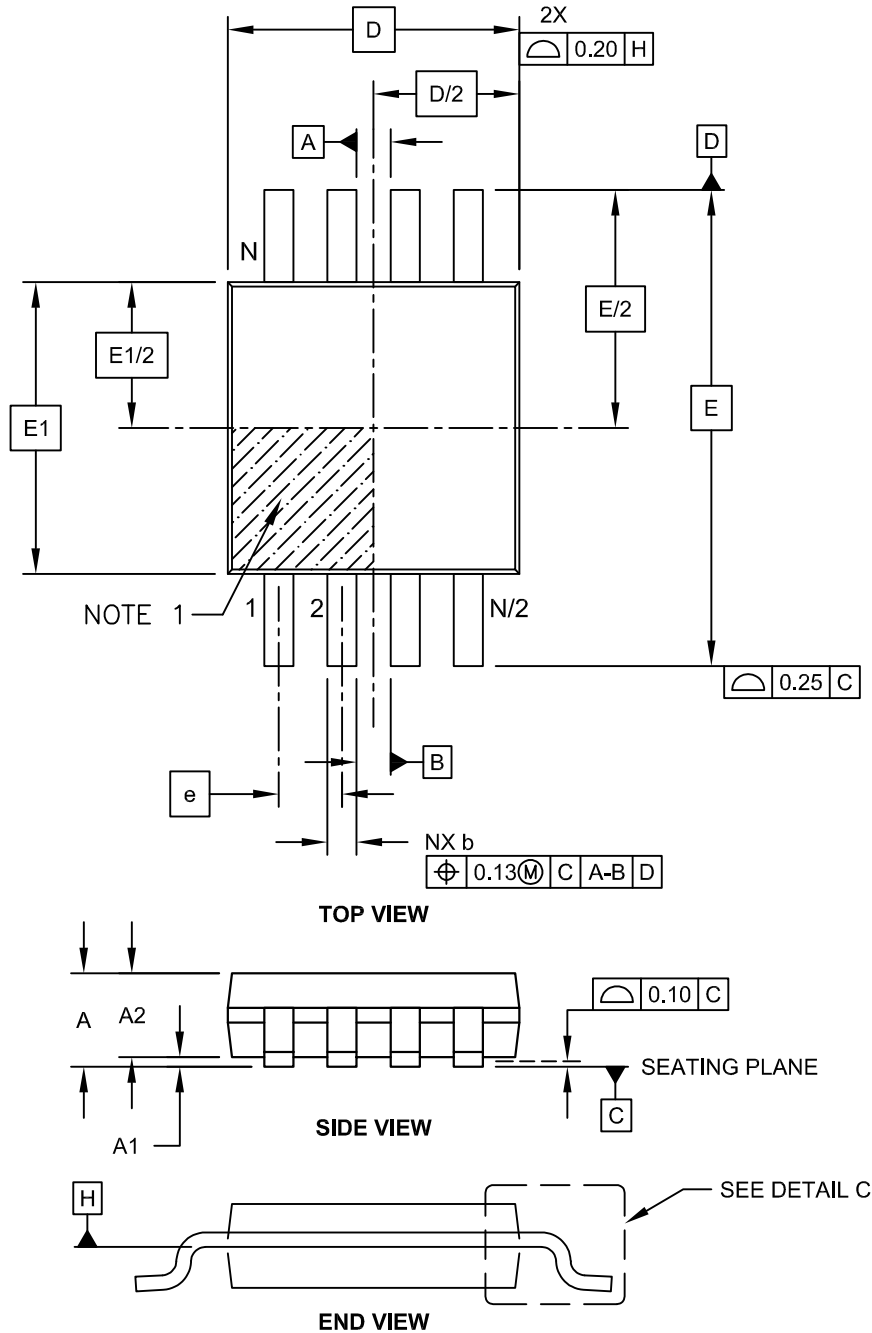
MSOP Family

Micro Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

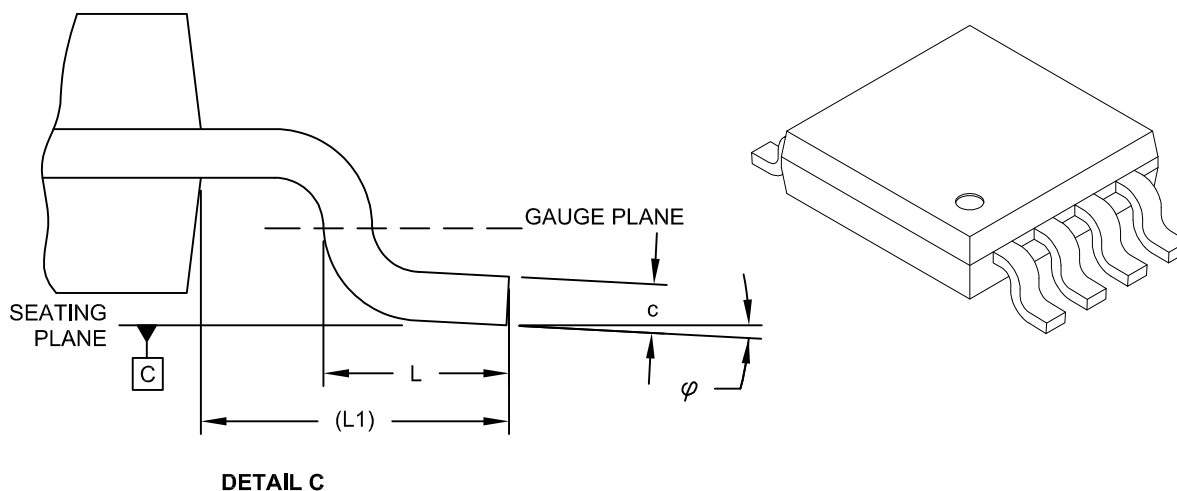
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	ϕ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.22	-	0.40

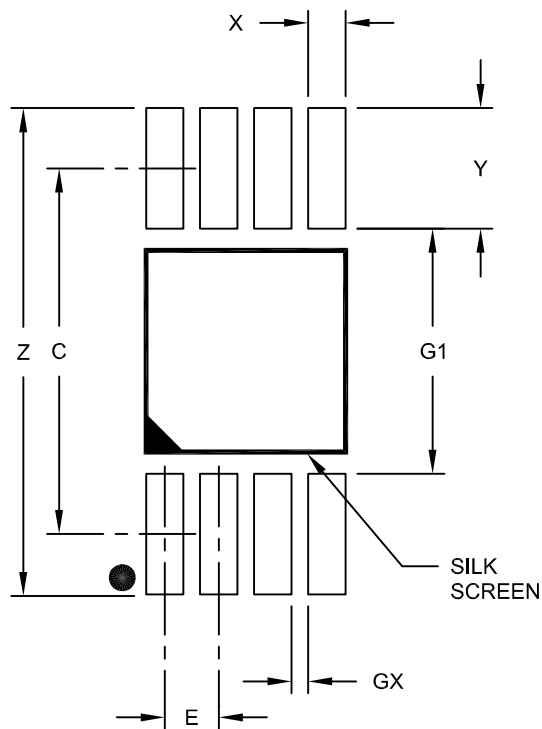
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.85
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G1	2.95		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

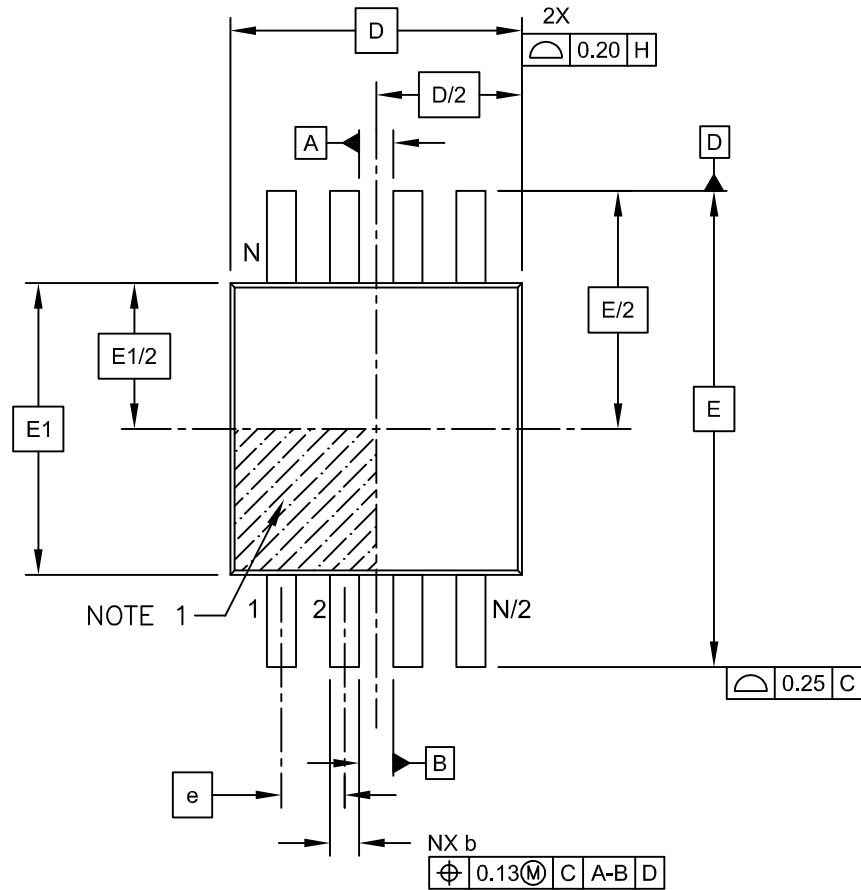
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2111A

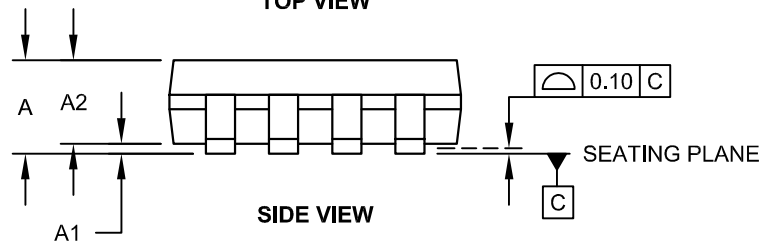
Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

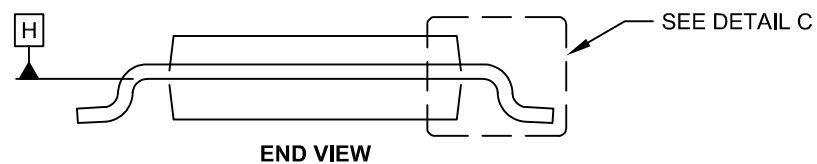
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW



SIDE VIEW

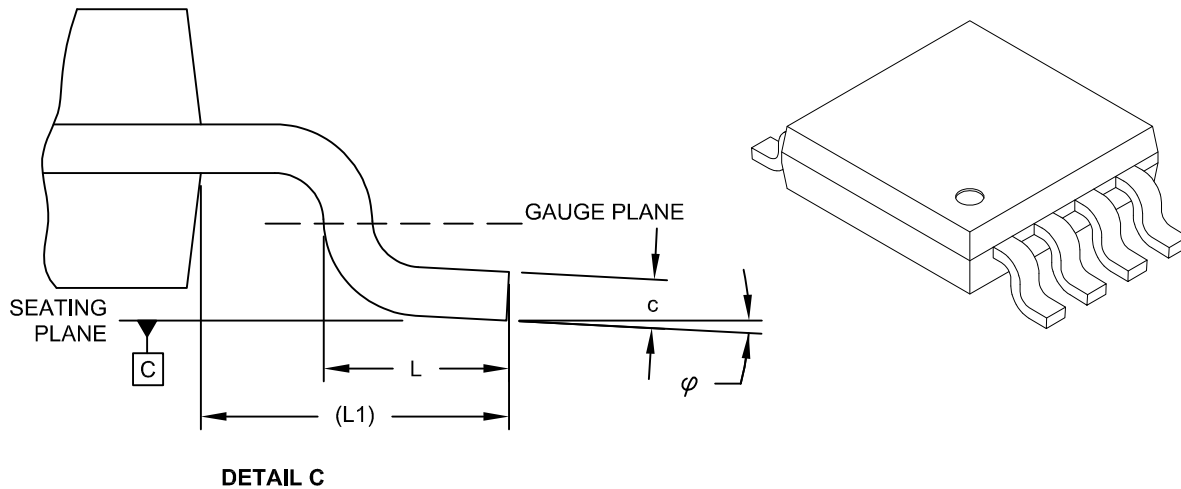


END VIEW

Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	ϕ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.22	-	0.40

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

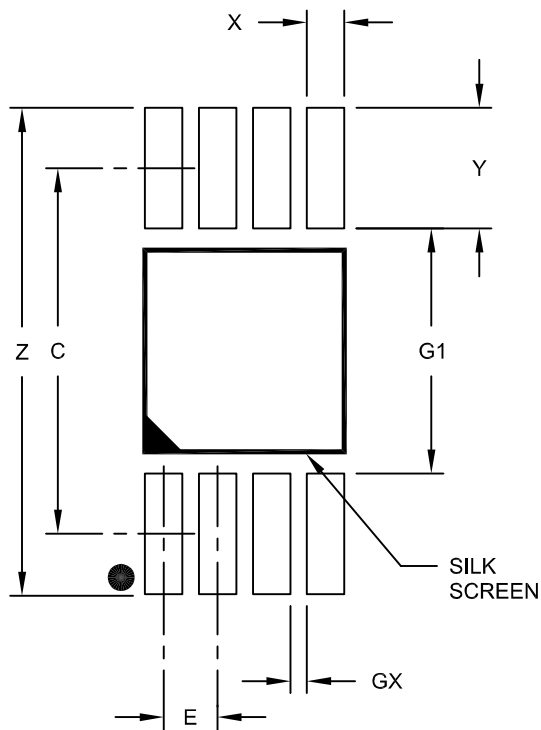
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.85
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G1	2.95		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

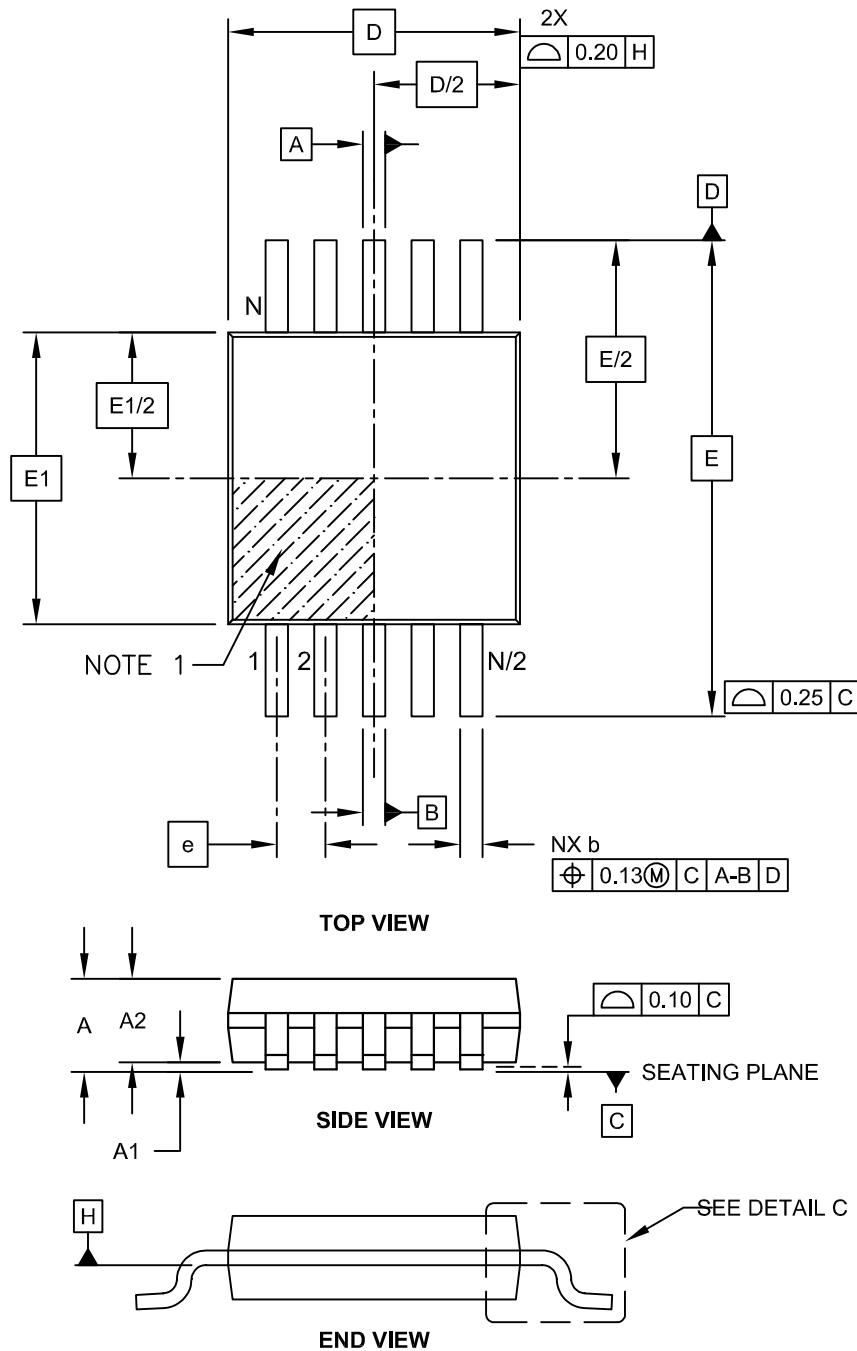
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2111A

Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

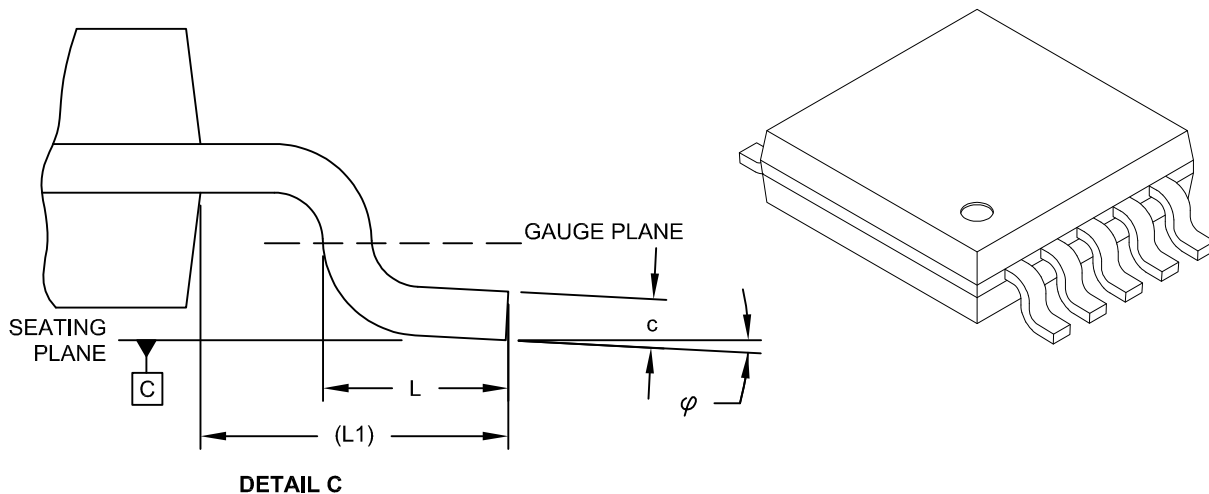


Microchip Technology Drawing C04-021C Sheet 1 of 2

Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.15	-	0.33

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

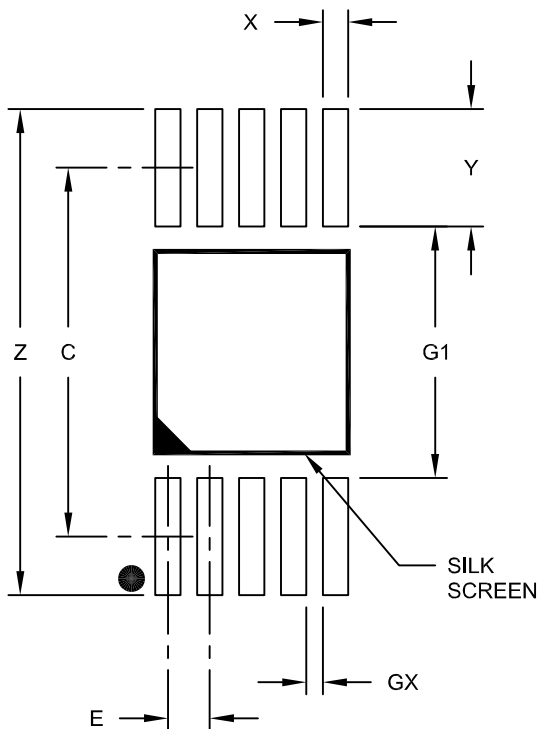
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021C Sheet 2 of 2

Land Pattern (Footprint)

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.80
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			1.40
Distance Between Pads	G1	3.00		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

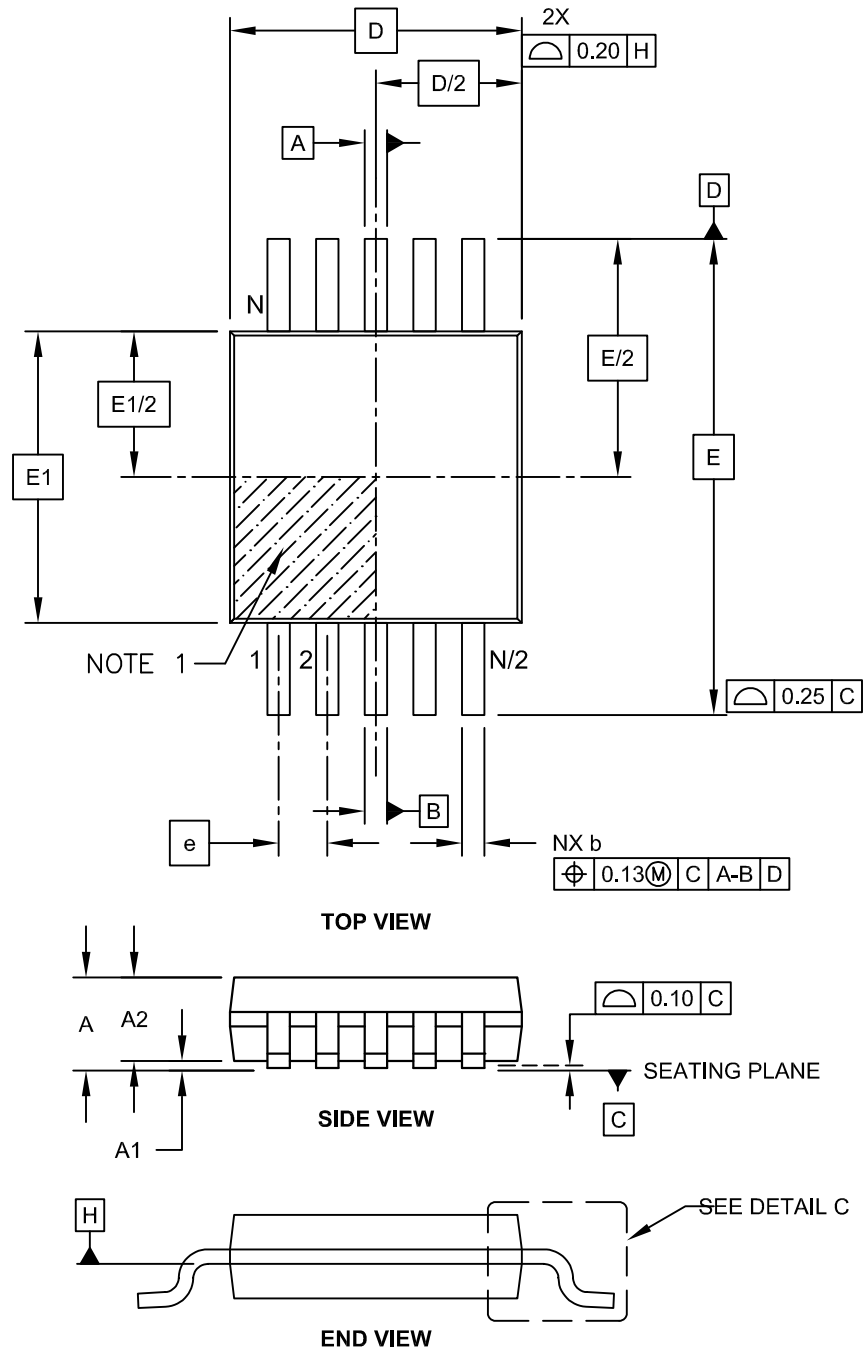
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021A

Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

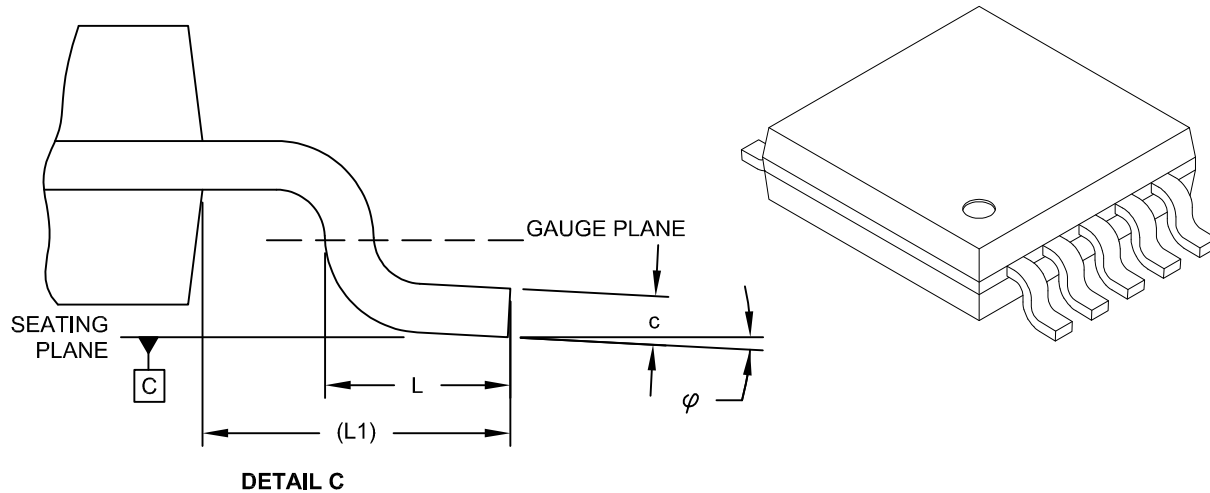
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	ϕ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.15	-	0.33

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

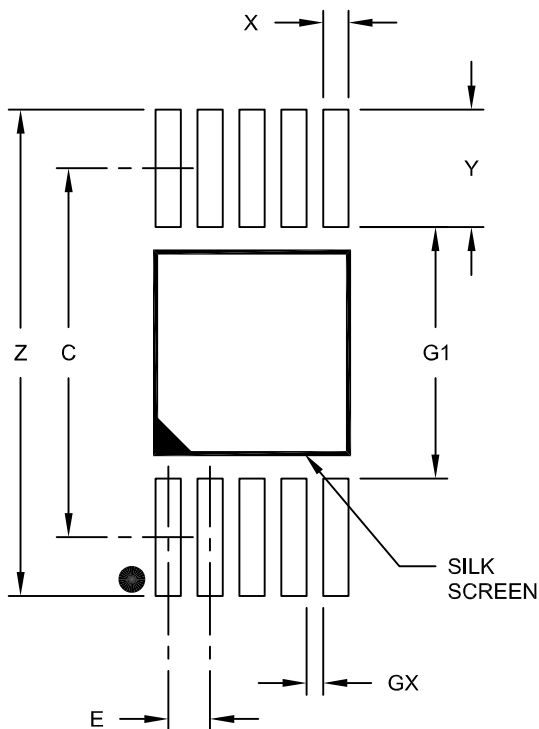
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021C Sheet 2 of 2

Land Pattern (Footprint)

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.50 BSC		
Contact Pad Spacing	C			4.40	
Overall Width	Z				5.80
Contact Pad Width (X10)	X1				0.30
Contact Pad Length (X10)	Y1				1.40
Distance Between Pads	G1		3.00		
Distance Between Pads	GX		0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

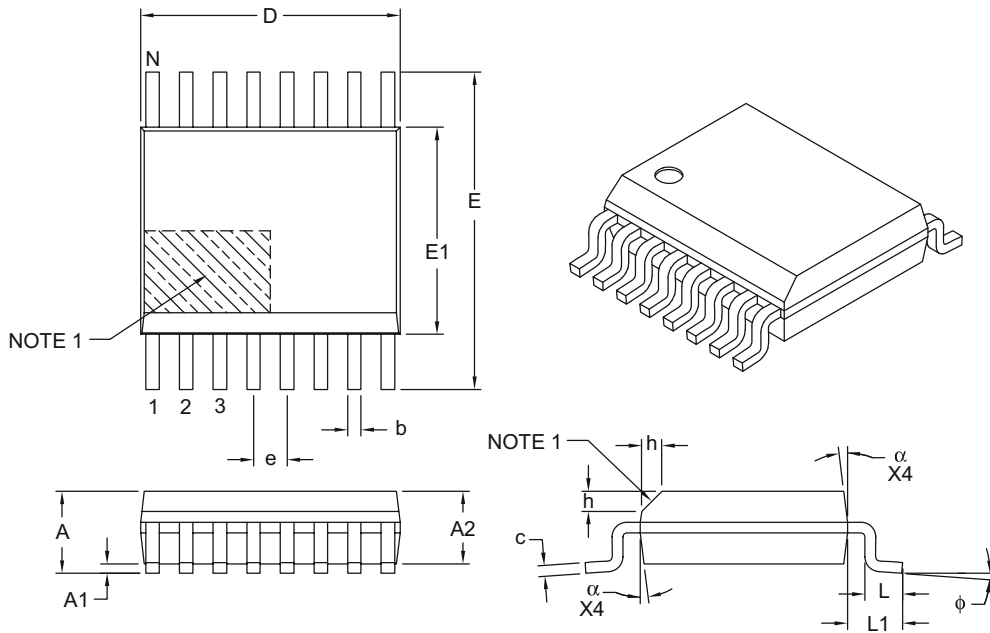
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021A

Packaging Diagrams and Parameters

16-Lead Plastic Shrink Small Outline Narrow Body (QR) – .150" Body [QSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.025 BSC		
Overall Height	A	–	–	.069
Standoff §	A1	.004	–	.010
Molded Package Height	A2	.049	–	–
Overall Width	E	.236 BSC		
Molded Package Width	E1	.154 BSC		
Overall Length	D	.193 BSC		
Chamfer Distance	h	.010	–	.020
Lead Thickness	c	.006	–	.010
Lead Width	b	.008	–	.012
Footprint	L1	.041 REF		
Foot Length	L	.016	–	.050
Foot Angle	φ	0°	–	8°
Molded Draft Angle	α	5°	–	15°

Notes:

1. Chamfer feature is optional. If it is not present, then a Pin 1 visual index feature must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .006" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

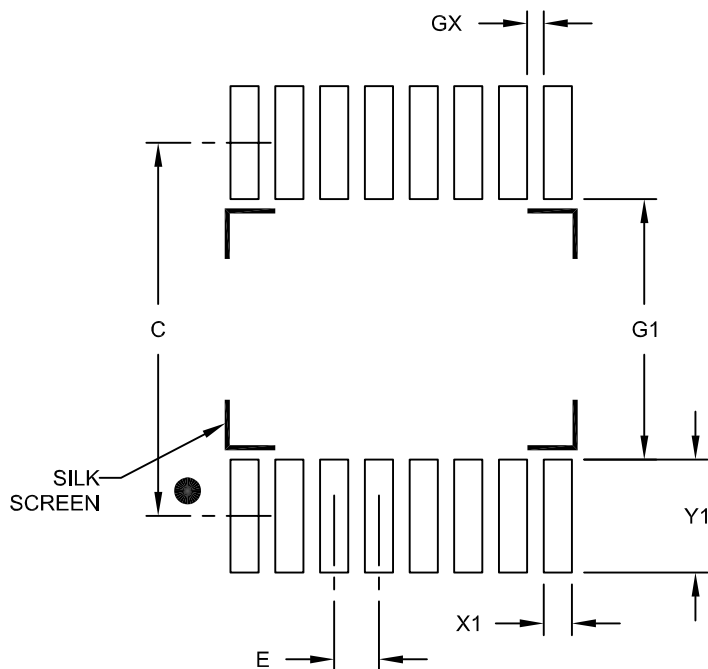
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-024C

Land Pattern (Footprint)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E	.025 BSC		
Contact Pad Spacing	C		.209	
Contact Pad Width (X16)	X1			.016
Contact Pad Length (X16)	Y1			.063
Distance Between Pads	GX	.009		
Distance Between Pads	G1	.146		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2024A



MICROCHIP

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

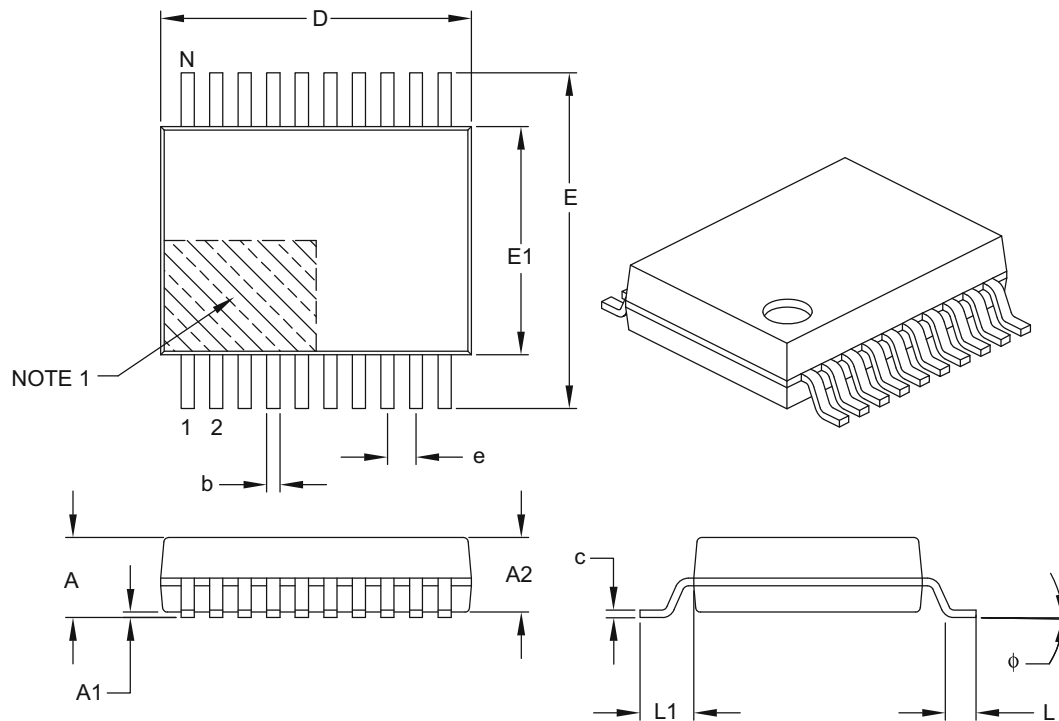
SSOP Family

Shrink Small Outline Packages

Packaging Diagrams and Parameters

20-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		20		
Pitch	e		0.65 BSC		
Overall Height	A		–	–	2.00
Molded Package Thickness	A2		1.65	1.75	1.85
Standoff	A1		0.05	–	–
Overall Width	E		7.40	7.80	8.20
Molded Package Width	E1		5.00	5.30	5.60
Overall Length	D		6.90	7.20	7.50
Foot Length	L		0.55	0.75	0.95
Footprint	L1		1.25 REF		
Lead Thickness	c		0.09	–	0.25
Foot Angle	φ		0°	4°	8°
Lead Width	b		0.22	–	0.38

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

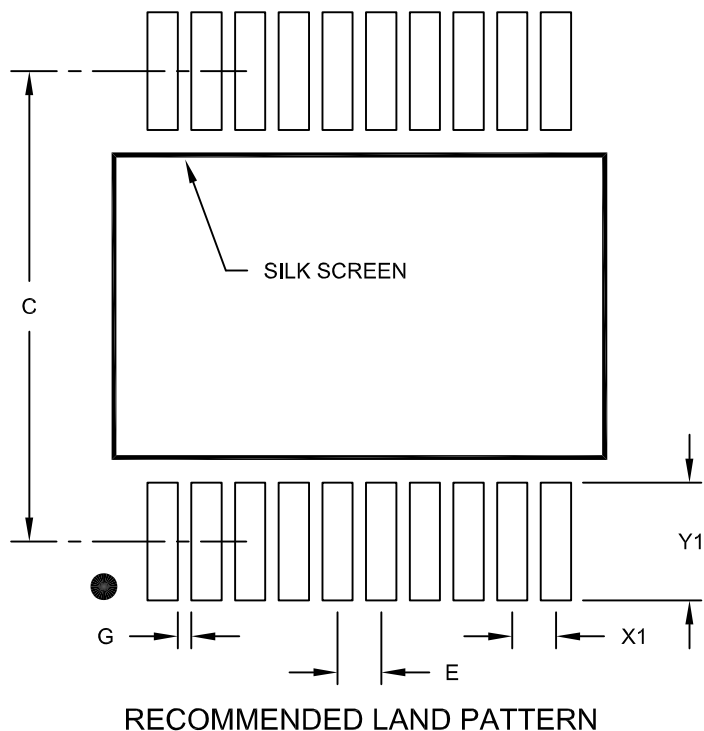
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-072B

Land Pattern (Footprint)

20-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		7.20	
Contact Pad Width (X20)	X1			0.45
Contact Pad Length (X20)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

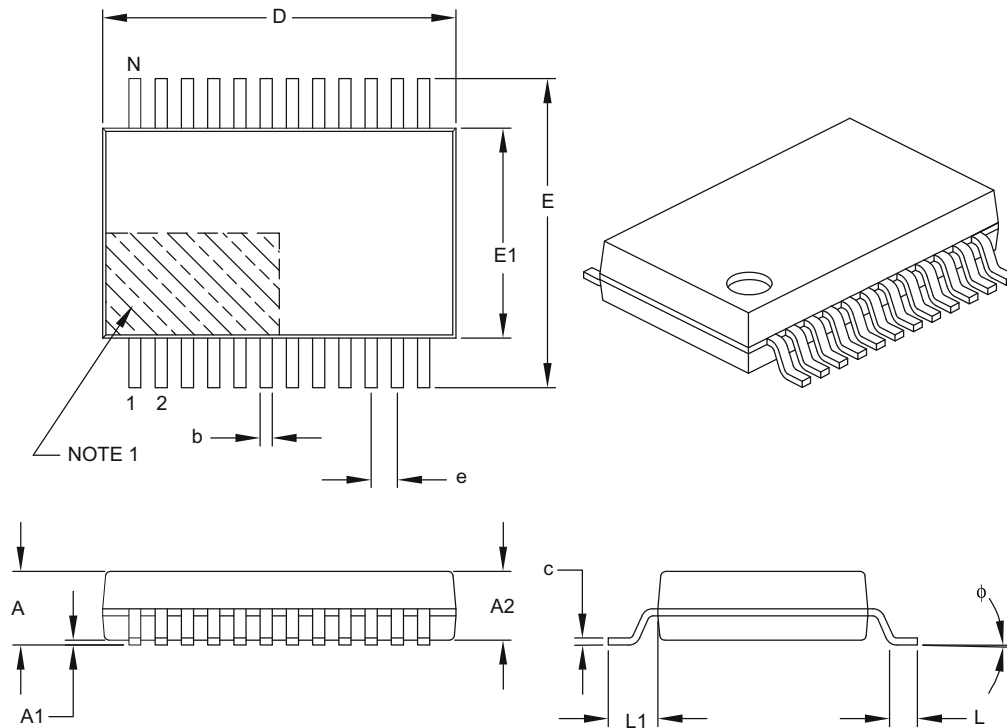
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2072A

Packaging Diagrams and Parameters

24-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		24		
Pitch	e		0.65 BSC		
Overall Height	A	–	–	–	2.00
Molded Package Thickness	A2		1.65	1.75	1.85
Standoff	A1		0.05	–	–
Overall Width	E		7.40	7.80	8.20
Molded Package Width	E1		5.00	5.30	5.60
Overall Length	D		7.90	8.20	8.50
Foot Length	L		0.55	0.75	0.95
Footprint	L1		1.25 REF		
Lead Thickness	c		0.09	–	0.25
Foot Angle	φ		0°	4°	8°
Lead Width	b		0.22	–	0.38

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

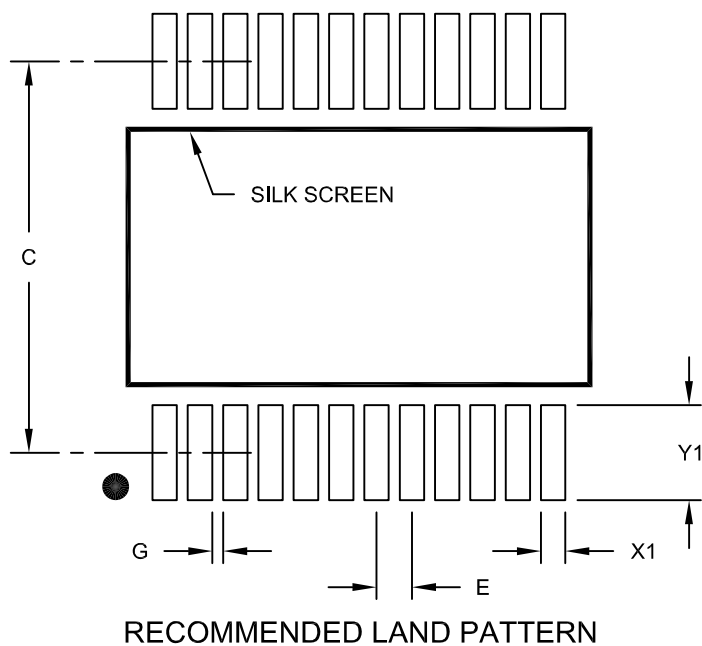
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

24 Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C		7.20	
Contact Pad Width (X24)	X1			0.45
Contact Pad Length (X24)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

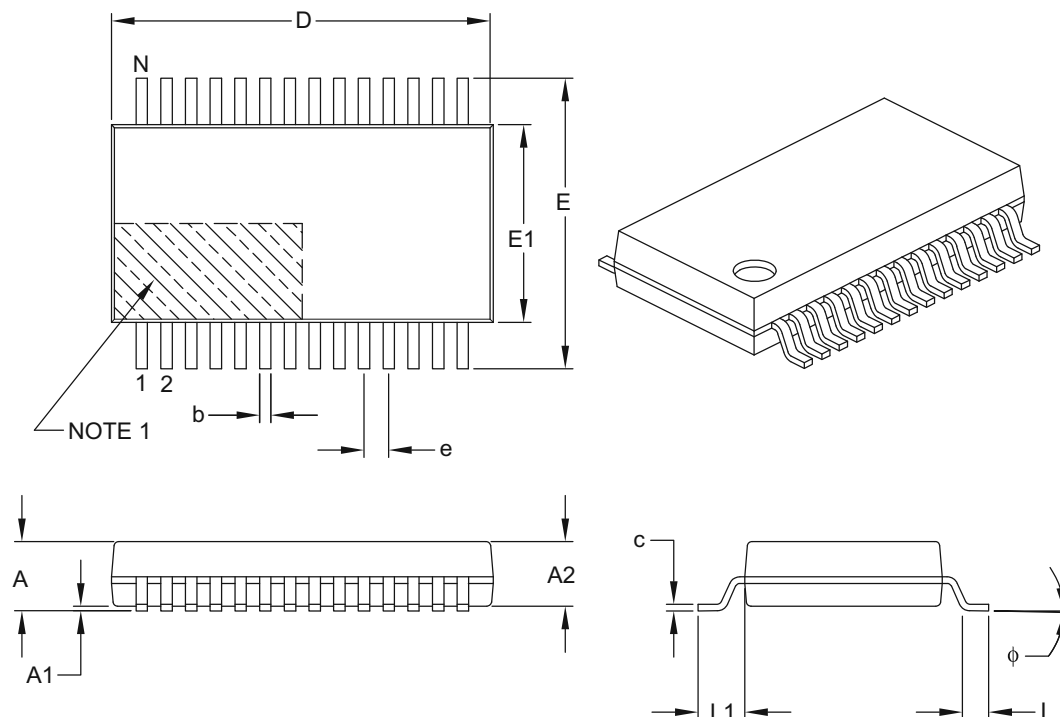
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2132A

Packaging Diagrams and Parameters

28-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		0.65 BSC		
Overall Height	A	–	–		2.00
Molded Package Thickness	A2	1.65	1.75		1.85
Standoff	A1	0.05	–		–
Overall Width	E	7.40	7.80		8.20
Molded Package Width	E1	5.00	5.30		5.60
Overall Length	D	9.90	10.20		10.50
Foot Length	L	0.55	0.75		0.95
Footprint	L1		1.25 REF		
Lead Thickness	c	0.09	–		0.25
Foot Angle	ϕ	0°	4°		8°
Lead Width	b	0.22	–		0.38

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

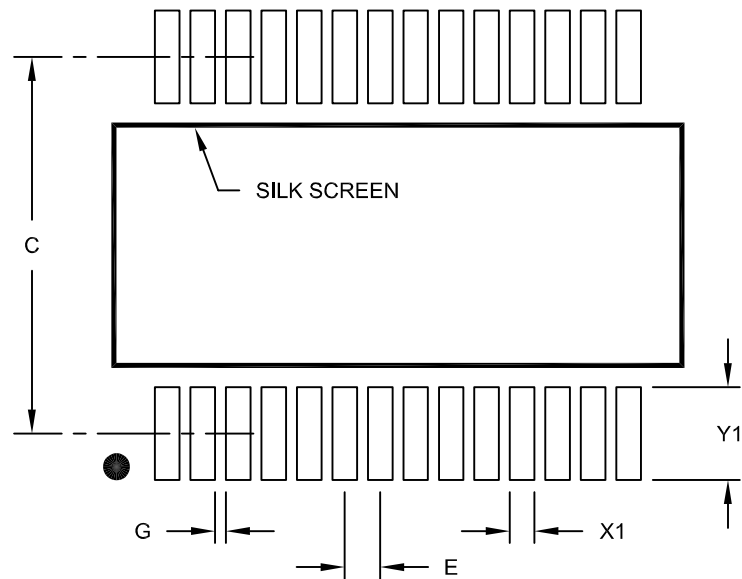
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-073B

Land Pattern (Footprint)

28-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		7.20	
Contact Pad Width (X28)	X1			0.45
Contact Pad Length (X28)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2073A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

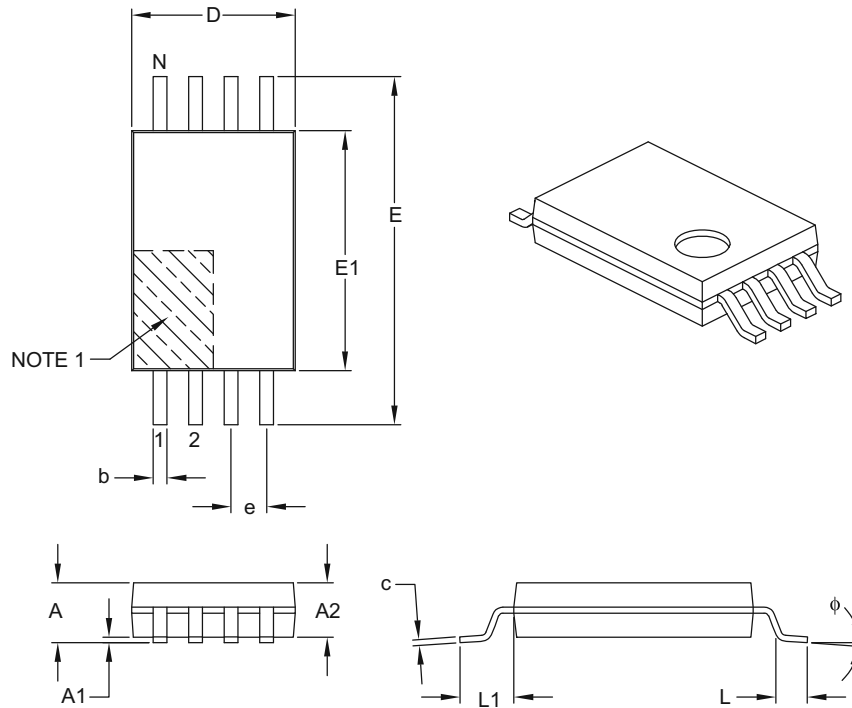
TSSOP Family

Thin Shrink Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.65 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	–	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	2.90	3.00	3.10
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	–	8°
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.19	–	0.30

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

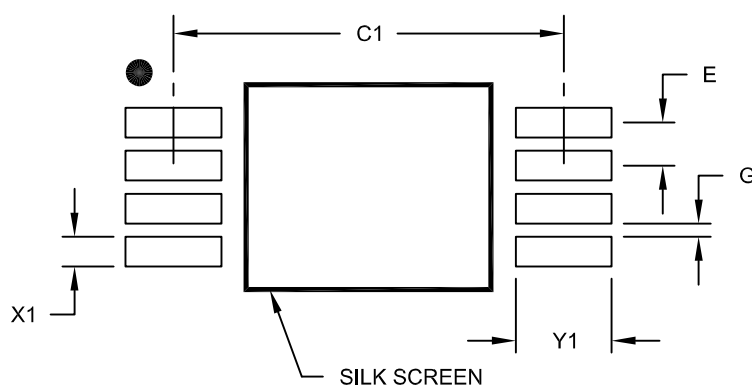
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-086B

Land Pattern (Footprint)

8-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

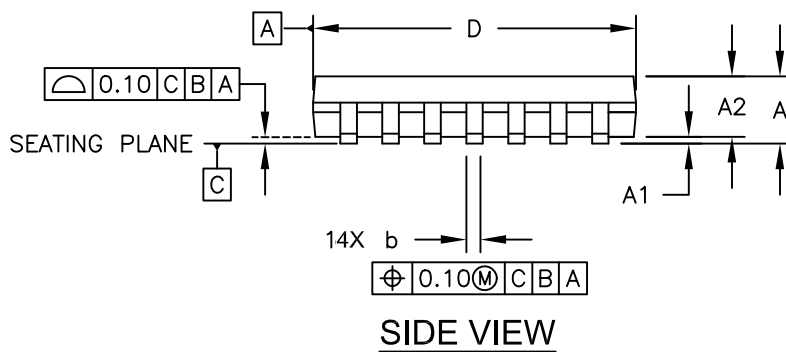
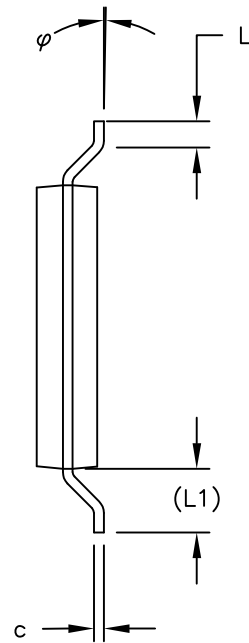
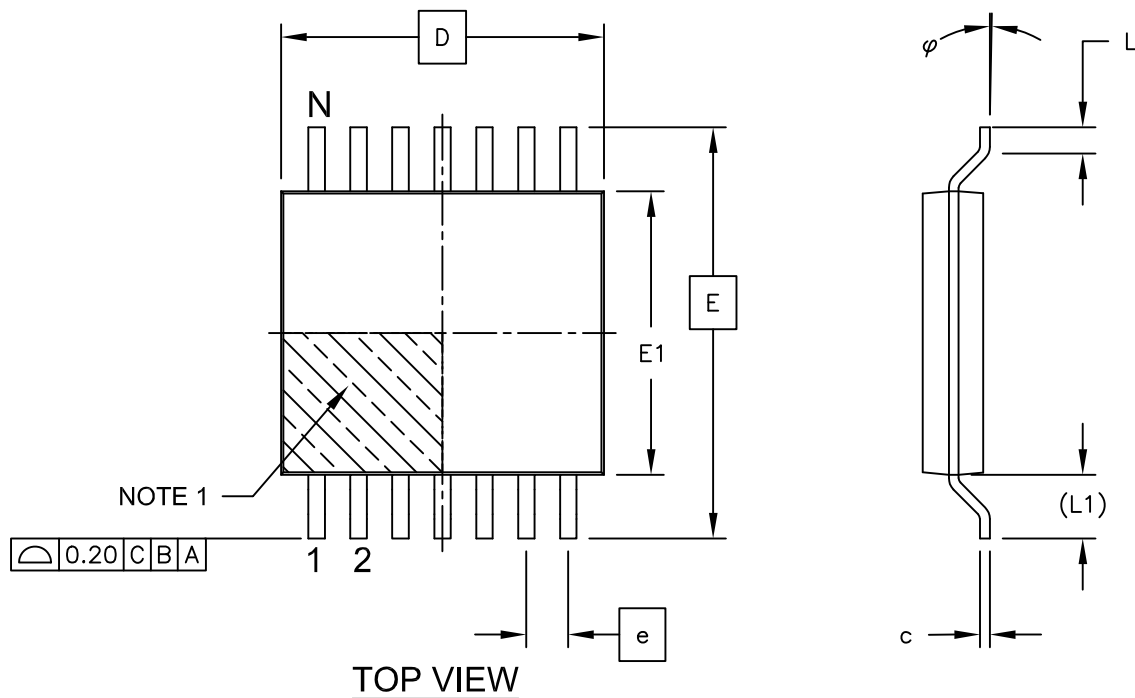
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2086A

Packaging Diagrams and Parameters

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

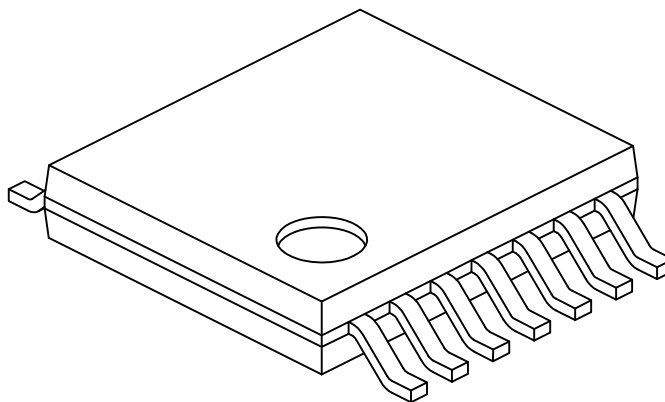
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	-	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	4.90	5.00	5.10
Foot Length	L	0.45	0.60	0.75
Footprint	(L1)	1.00 REF		
Foot Angle	ϕ	0°	-	8°
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.19	-	0.30

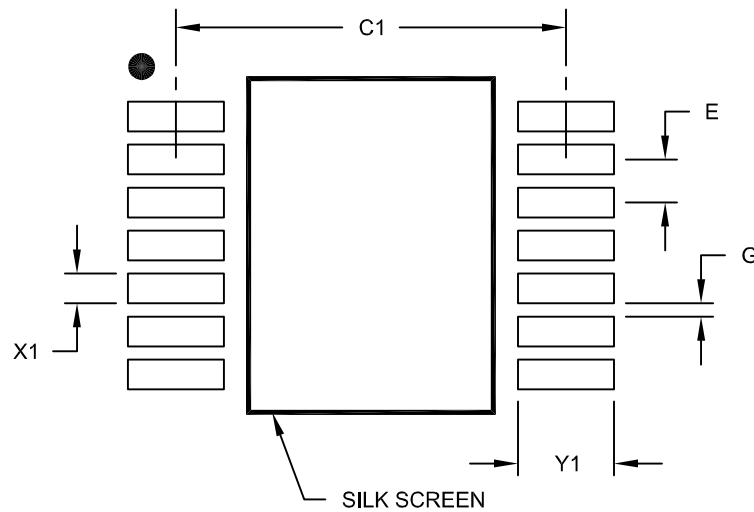
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X14)	X1			0.45
Contact Pad Length (X14)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

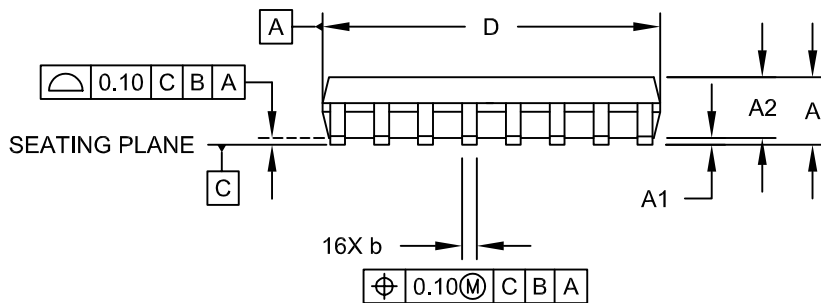
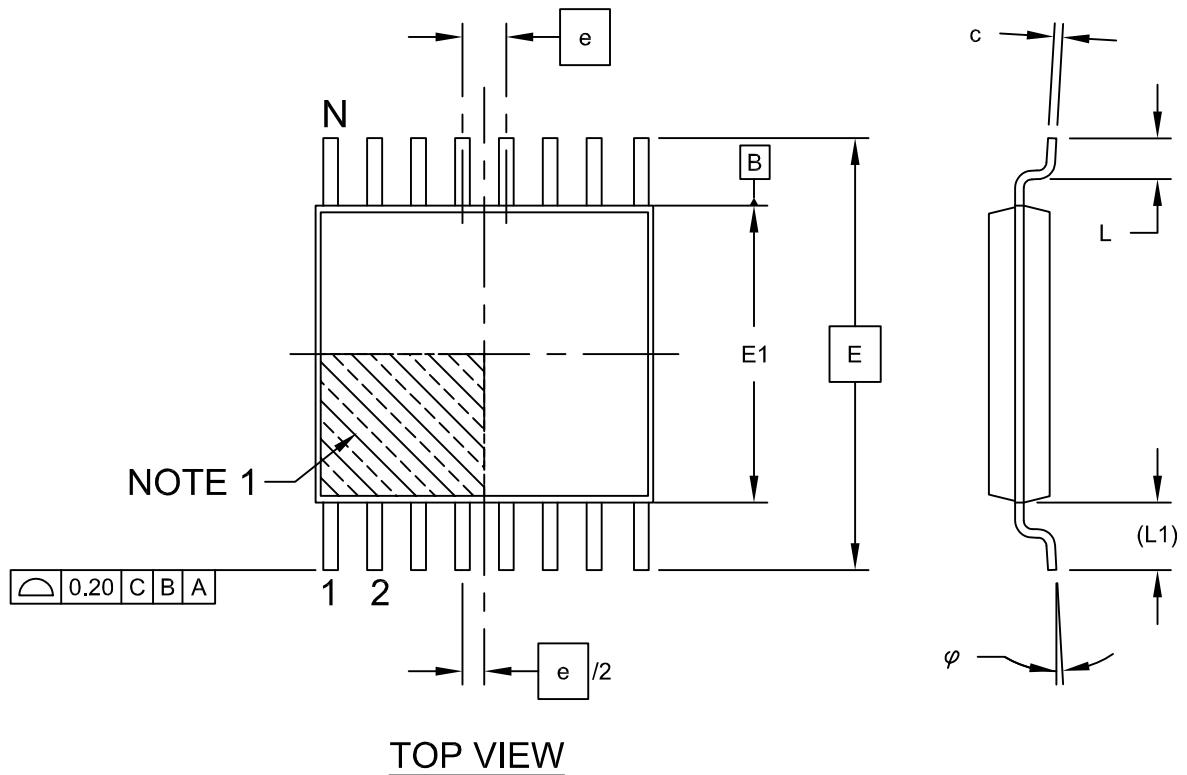
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2087A

Packaging Diagrams and Parameters

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

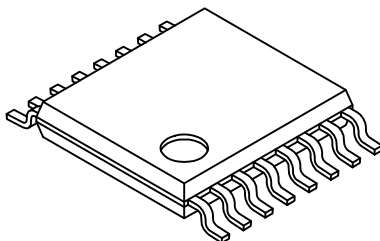
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	-	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	4.90	5.00	5.10
Foot Length	L	0.45	0.60	0.75
Footprint	(L1)	1.00 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.19	-	0.30

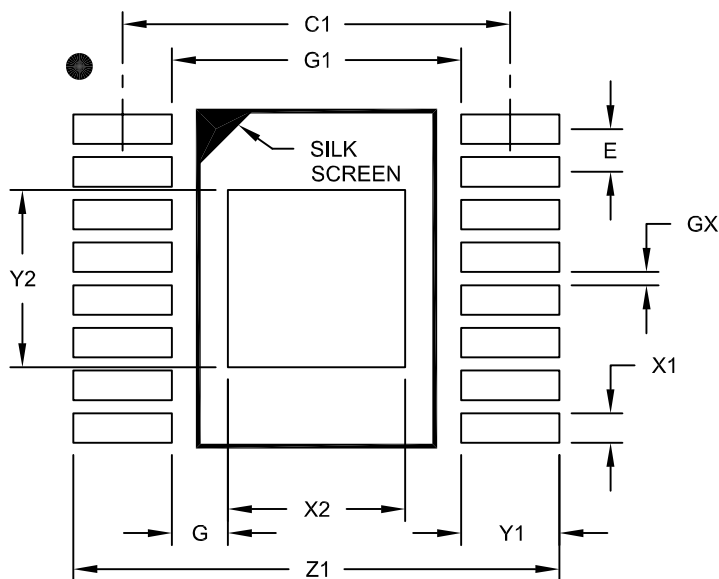
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Length	Y2			2.70
Optional Center Pad Width	X2			2.70
Clearance Between Contact Pads	G1	4.40		
Contact Pad To Center Pad	G	0.73		
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X16)	X1			0.45
Contact Pad Length (X16)	Y1			1.50
Distance Between Pads	GX	0.20		
Overall Width	Z1			7.40

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

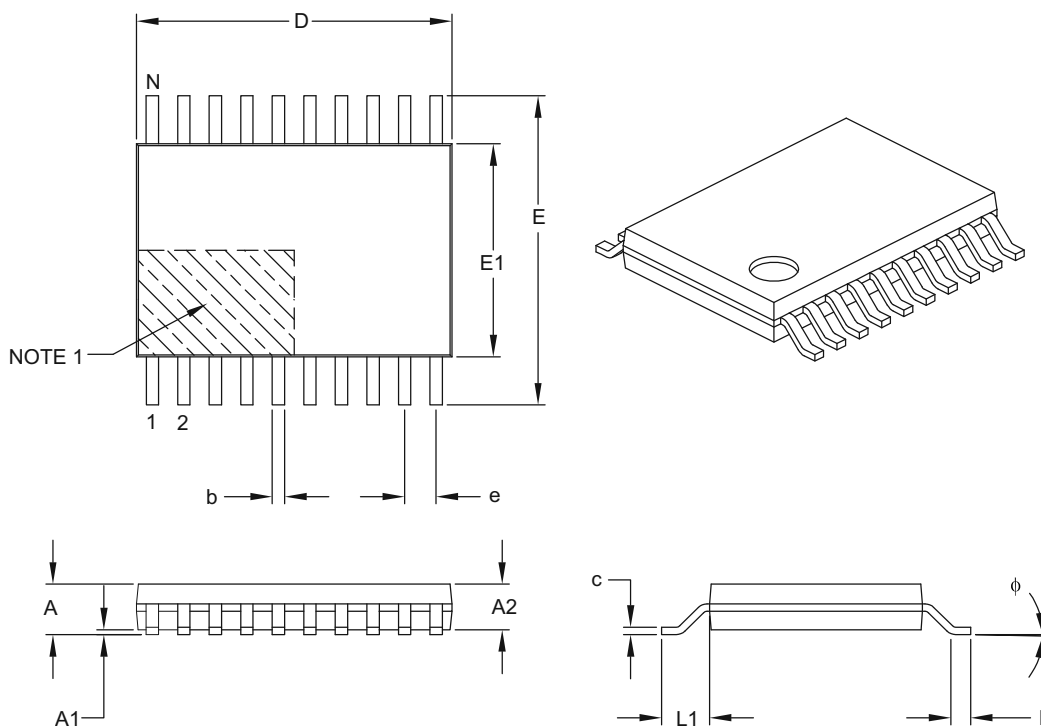
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2068A

Packaging Diagrams and Parameters

20-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.65 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	–	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	6.40	6.50	6.60
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	–	8°
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.19	–	0.30

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

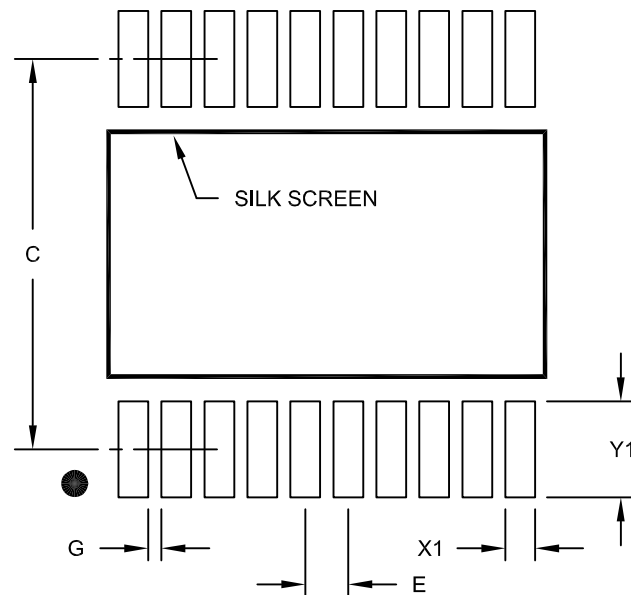
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

20-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		5.90	
Contact Pad Width (X20)	X1			0.45
Contact Pad Length (X20)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2088A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

TSOP Family

Thin Small Outline Package

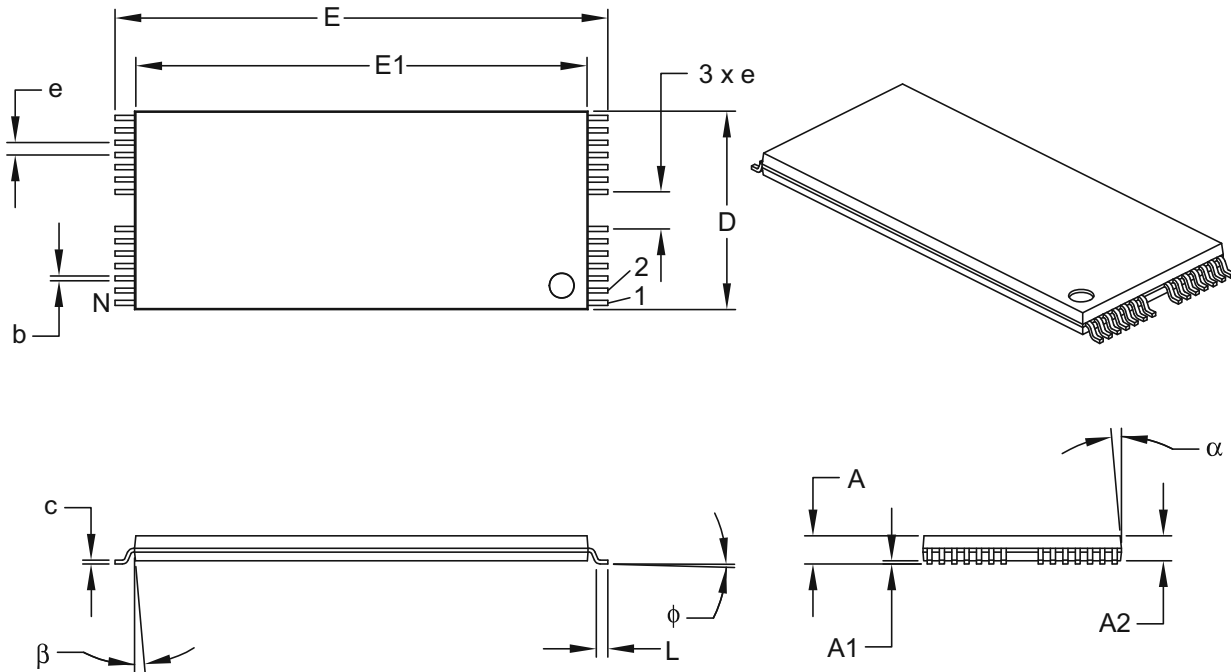
VSOP Family

Very Small Outline Package

Packaging Diagrams and Parameters

28-Lead Plastic Thin Small Outline (TS) – 8x20 mm [TSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.50		
Overall Height	A	0.99	1.14	1.30
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff §	A1	0.05	0.15	0.25
Overall Width	E	19.80	20.00	20.20
Molded Package Width	E1	18.30	18.40	18.50
Molded Package Length	D	7.80	8.00	8.20
Foot Length	L	0.50	0.60	0.70
Foot Angle	φ	0°	4°	8°
Lead Thickness	c	0.10	0.15	0.20
Lead Width	b	0.15	0.20	0.25
Mold Draft Angle Top	α	0°	5°	10°
Mold Draft Angle Bottom	β	0°	5°	10°

Notes:

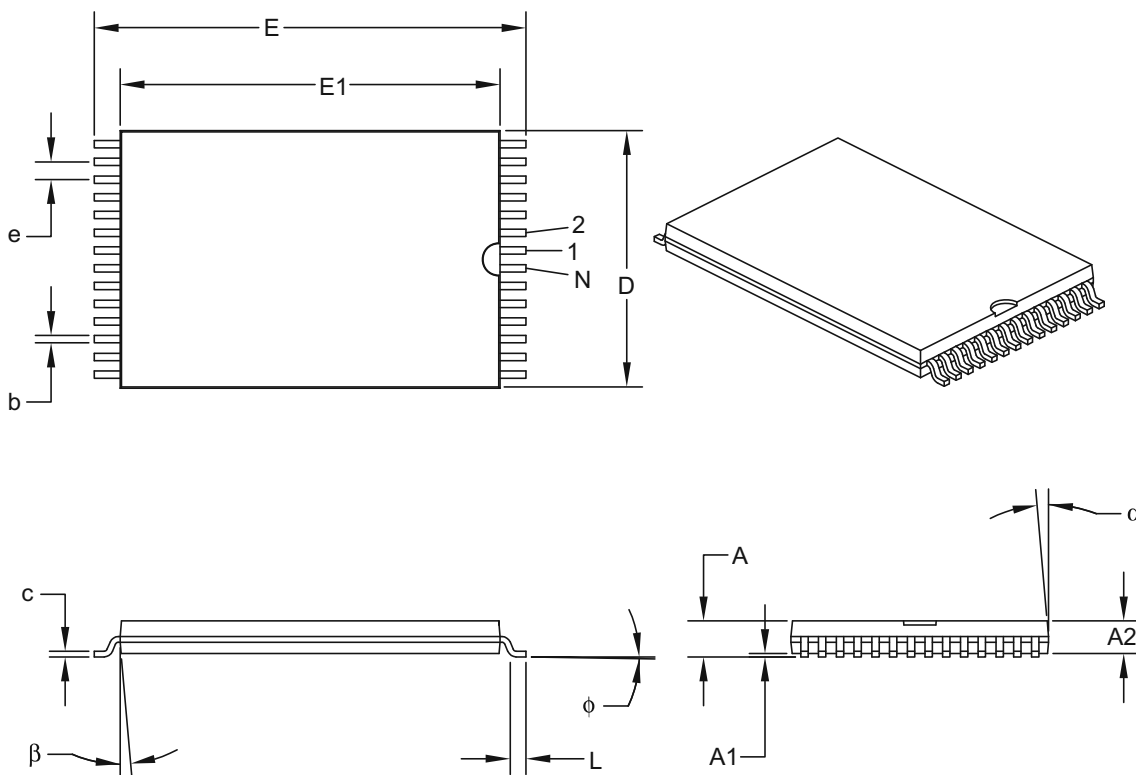
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- § Significant Characteristic.

Microchip Technology Drawing C04-067B

Packaging Diagrams and Parameters

28-Lead Plastic Very Small Outline (VS) – 8x13.4 mm Body [VSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.55		
Overall Height	A	0.99	1.14	1.29
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff §	A1	0.05	0.13	0.25
Overall Width	E	13.20	13.40	13.60
Molded Package Width	E1	11.70	11.80	11.90
Molded Package Length	D	7.90	8.00	8.10
Foot Length	L	0.30	0.50	0.70
Foot Angle	φ	0°	3°	5°
Lead Thickness	c	0.14	0.15	0.16
Lead Width	b	0.17	0.20	0.23
Mold Draft Angle Top	α	0°	5°	10°
Mold Draft Angle Bottom	β	0°	5°	10°

Notes:

1. § Significant Characteristic.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.

Microchip Technology Drawing C04-075B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

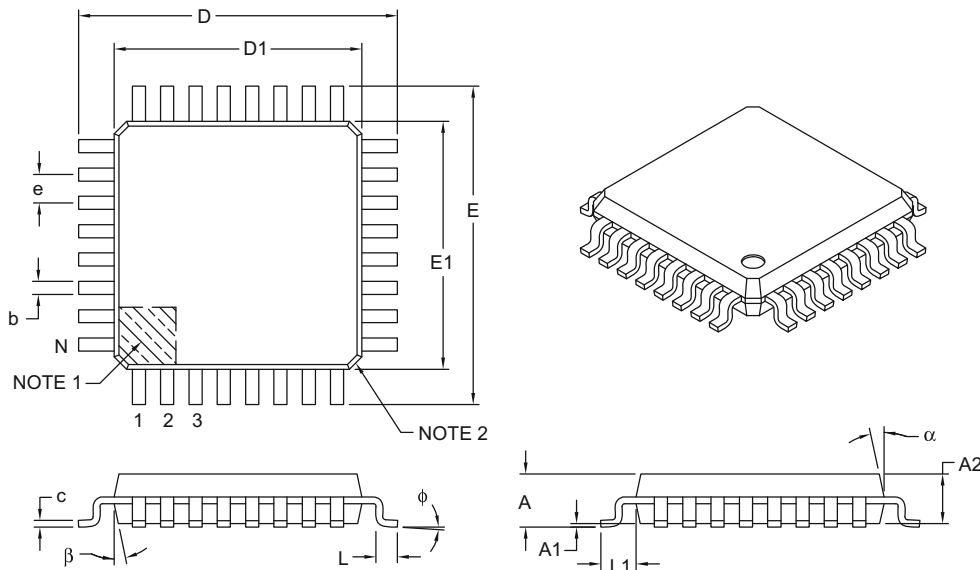
LQFP Family

Low Profile Quad Flat Packages

Packaging Diagrams and Parameters

32-Lead Plastic Low-Profile Quad Flatpack (PL) – 7x7x1.4 mm Body, 2.0 mm [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	32		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.60
Molded Package Thickness	A2	1.35	1.40	1.45
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	9.00 BSC		
Overall Length	D	9.00 BSC		
Molded Package Width	E1	7.00 BSC		
Molded Package Length	D1	7.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

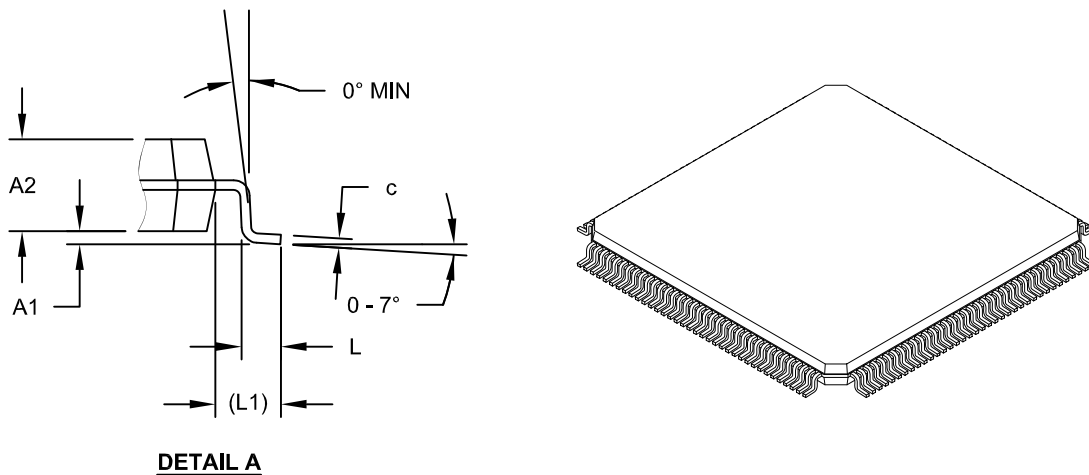
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

144-Lead Plastic Low Profile Quad Flatpack (PL) – 20x20x1.40 mm Body, with 2.00 mm Footprint [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N		144	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.60
Molded Package Height	A2	1.35	1.40	1.45
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 (REF)		
Overall Width	E	22.00 BSC		
Overall Length	D	22.00 BSC		
Molded Body Width	E1	20.00 BSC		
Molded Body Length	D1	20.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.17	0.22	0.27

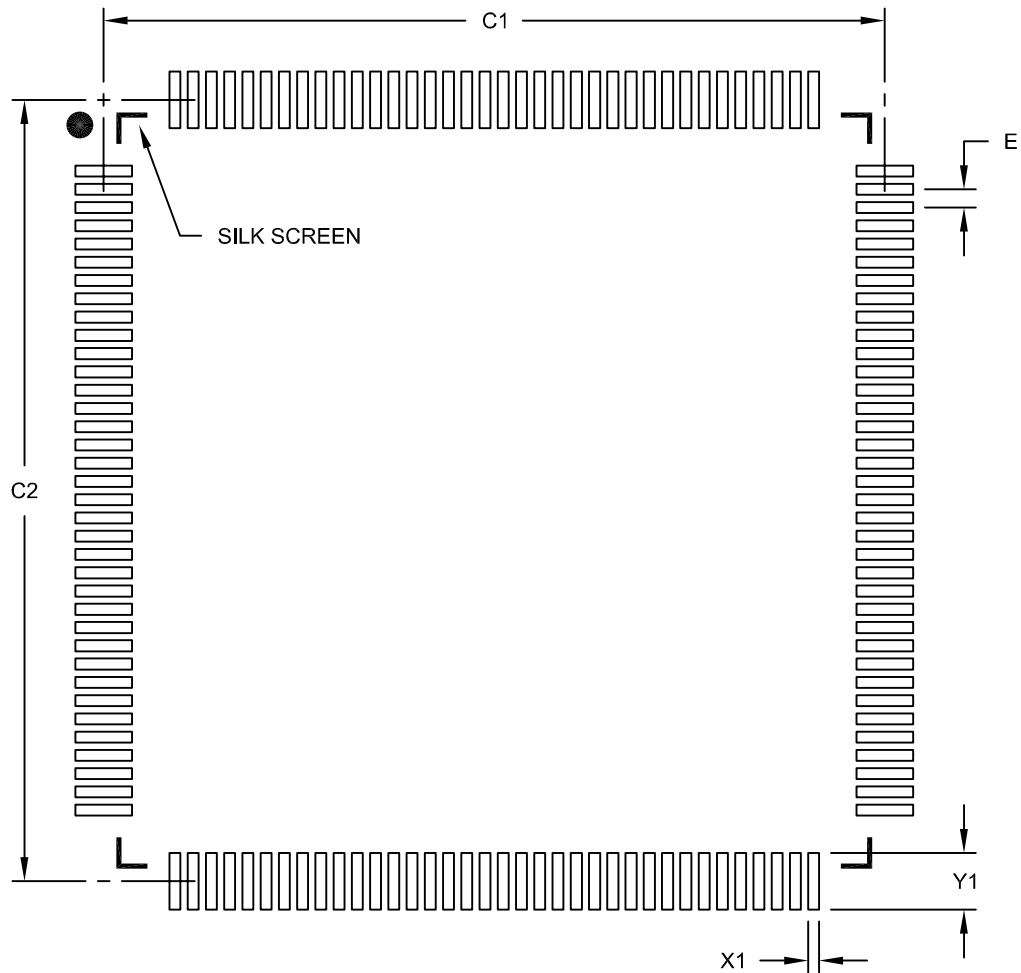
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

144-Lead Plastic Low Profile Quad Flatpack (PL) - 20x20x1.40 mm Body [LQFP]
 2.00 mm Footprint

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
		MIN	NOM	MAX
Dimension Limits				
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		21.40	
Contact Pad Spacing	C2		21.40	
Contact Pad Width (X144)	X1			0.30
Contact Pad Length (X144)	Y1			1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2044B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

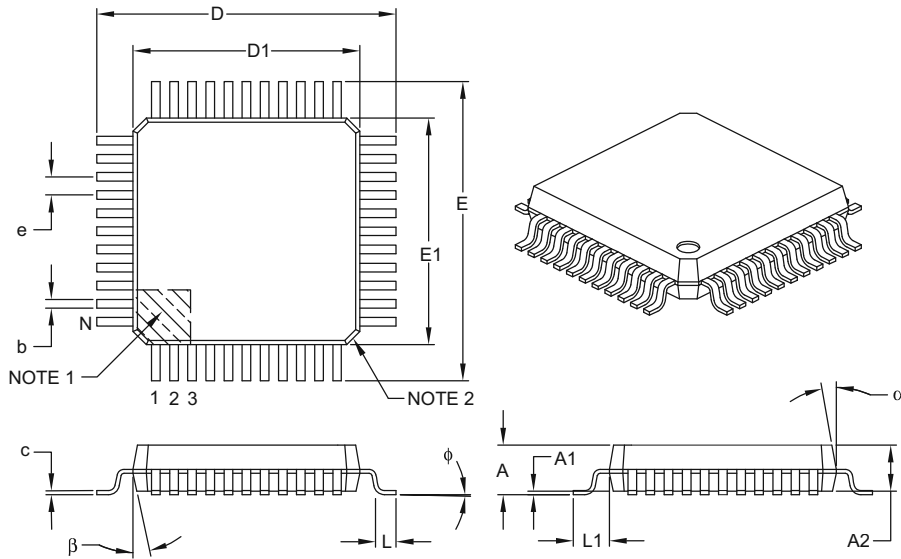
MQFP Family

Metric Quad Flat Packages

Packaging Diagrams and Parameters

44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	44		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	2.45
Molded Package Thickness	A2	1.80	2.00	2.20
Standoff §	A1	0.00	–	0.25
Foot Length	L	0.73	0.88	1.03
Footprint	L1	1.60 REF		
Foot Angle	φ	0°	–	7°
Overall Width	E	13.20 BSC		
Overall Length	D	13.20 BSC		
Molded Package Width	E1	10.00 BSC		
Molded Package Length	D1	10.00 BSC		
Lead Thickness	c	0.11	–	0.23
Lead Width	b	0.29	–	0.45
Mold Draft Angle Top	α	5°	–	16°
Mold Draft Angle Bottom	β	5°	–	16°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

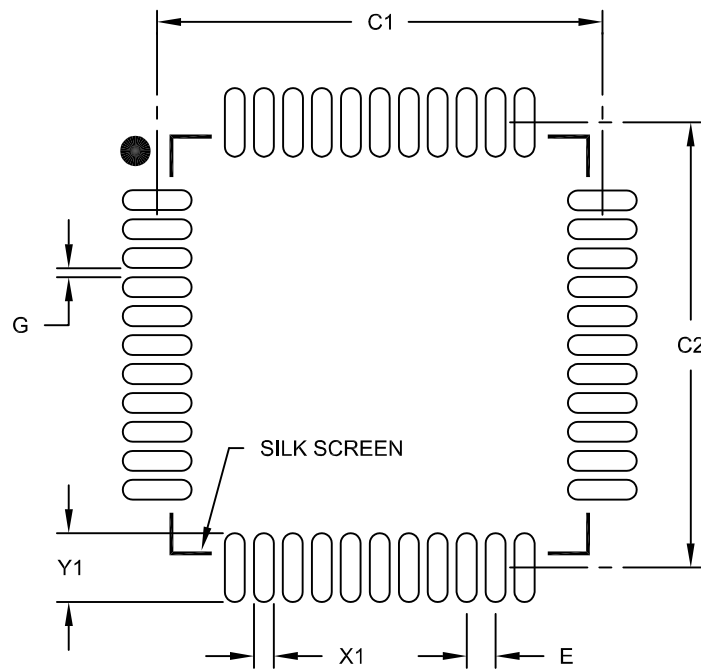
REF: Reference Dimension, usually without tolerance, for information purposes only.

- § Significant Characteristic.

Land Pattern (Footprint)

44-Lead Plastic Metric Quad Flatpack (KW) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.80 BSC		
Contact Pad Spacing	C1			12.30	
Contact Pad Spacing	C2			12.30	
Contact Pad Width (X44)	X1				0.55
Contact Pad Length (X44)	Y1				1.90
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

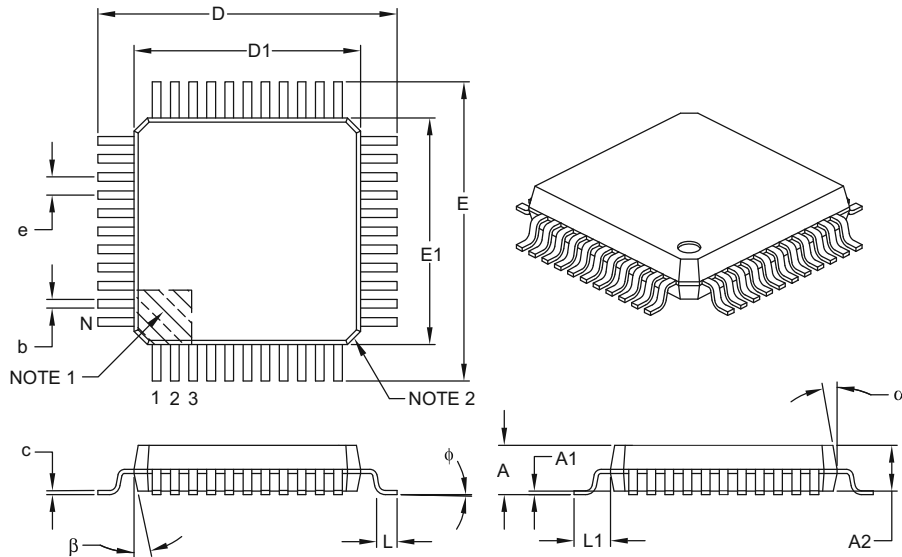
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

Packaging Diagrams and Parameters

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		44		
Lead Pitch	e		0.80 BSC		
Overall Height	A	–	–	–	2.45
Molded Package Thickness	A2		1.80	2.00	2.20
Standoff §	A1		0.00	–	0.25
Foot Length	L		0.73	0.88	1.03
Footprint	L1		1.60 REF		
Foot Angle	φ		0°	–	7°
Overall Width	E		13.20 BSC		
Overall Length	D		13.20 BSC		
Molded Package Width	E1		10.00 BSC		
Molded Package Length	D1		10.00 BSC		
Lead Thickness	c		0.11	–	0.23
Lead Width	b		0.29	–	0.45
Mold Draft Angle Top	α		5°	–	16°
Mold Draft Angle Bottom	β		5°	–	16°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

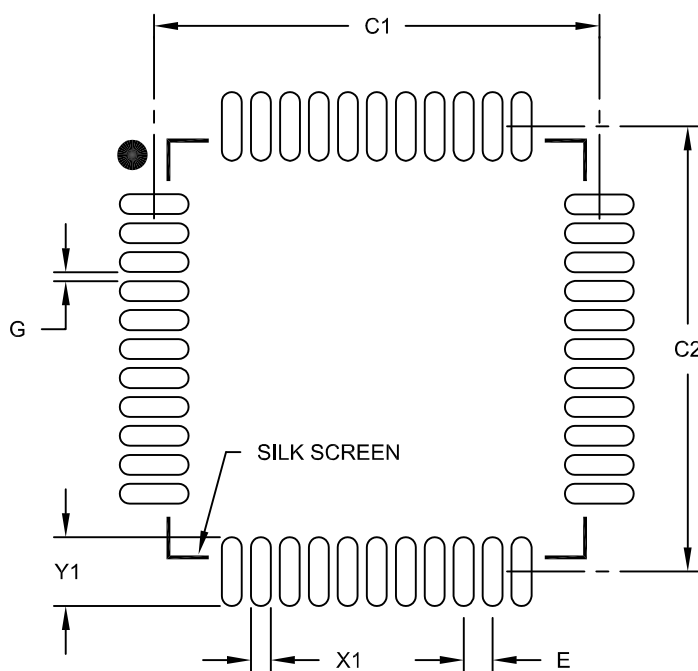
REF: Reference Dimension, usually without tolerance, for information purposes only.

- § Significant Characteristic.

Land Pattern (Footprint)

44-Lead Plastic Metric Quad Flatpack (PQ) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.80 BSC		
Contact Pad Spacing	C1			12.30	
Contact Pad Spacing	C2			12.30	
Contact Pad Width (X44)	X1				0.55
Contact Pad Length (X44)	Y1				1.90
Distance Between Pads	G		0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

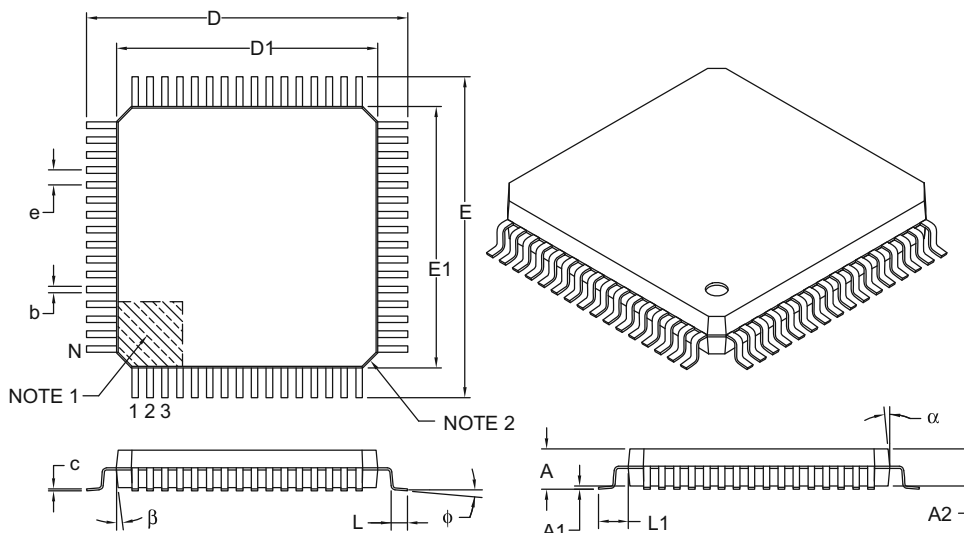
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

Packaging Diagrams and Parameters

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	64		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	3.15
Molded Package Thickness	A2	2.50	2.70	2.90
Standoff §	A1	0.00	–	0.25
Overall Width	E	17.20 BSC		
Molded Package Width	E1	14.00 BSC		
Overall Length	D	17.20 BSC		
Molded Package Length	D1	14.00 BSC		
Foot Length	L	0.73	0.88	1.03
Footprint	L1	1.60 REF		
Foot Angle	ϕ	0°	–	7°
Lead Thickness	c	0.11	–	0.23
Lead Width	b	0.29	–	0.45
Mold Draft Angle Top	α	5°	–	16°
Mold Draft Angle Bottom	β	5°	–	16°

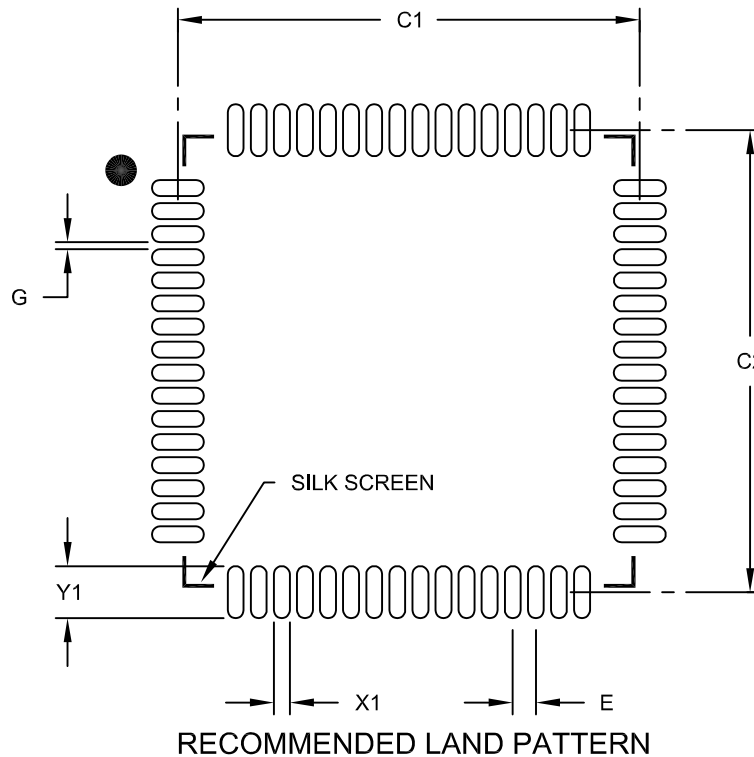
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.
- § Significant Characteristic.
- Formerly TelCom PQFP package.

Land Pattern (Footprint)

64-Lead Plastic Metric Quad FlatPack (BU) - 14x14x2.7 mm Body 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		16.10	
Contact Pad Spacing	C2		16.10	
Contact Pad Width (X64)	X1			0.55
Contact Pad Length (X64)	Y1			1.80
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2022B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

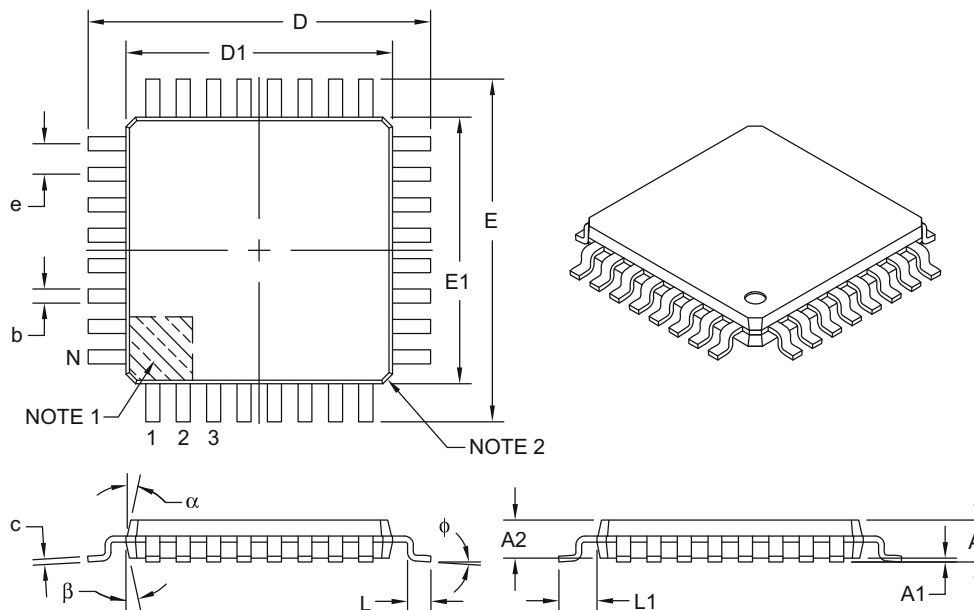
TQFP Family

Thin Quad Flat Packages

Packaging Diagrams and Parameters

32-Lead Plastic Thin Quad Flatpack (PT) – 7x7x1.0 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		32		
Lead Pitch	e		0.80 BSC		
Overall Height	A		–	–	1.20
Standoff	A1		0.05	–	0.15
Molded Package Thickness	A2		0.95	1.00	1.05
Foot Length	L		0.45	0.60	0.75
Footprint	L1		1.00 REF		
Foot Angle	ϕ		0°	3.5°	7°
Overall Width	E		9.00 BSC		
Overall Length	D		9.00 BSC		
Molded Package Width	E1		7.00 BSC		
Molded Package Length	D1		7.00 BSC		
Lead Thickness	c		0.09	–	0.20
Lead Width	b		0.30	0.37	0.45
Mold Draft Angle Top	α		11°	12°	13°
Mold Draft Angle Bottom	β		11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension, Theoretically exact value shown without tolerances.

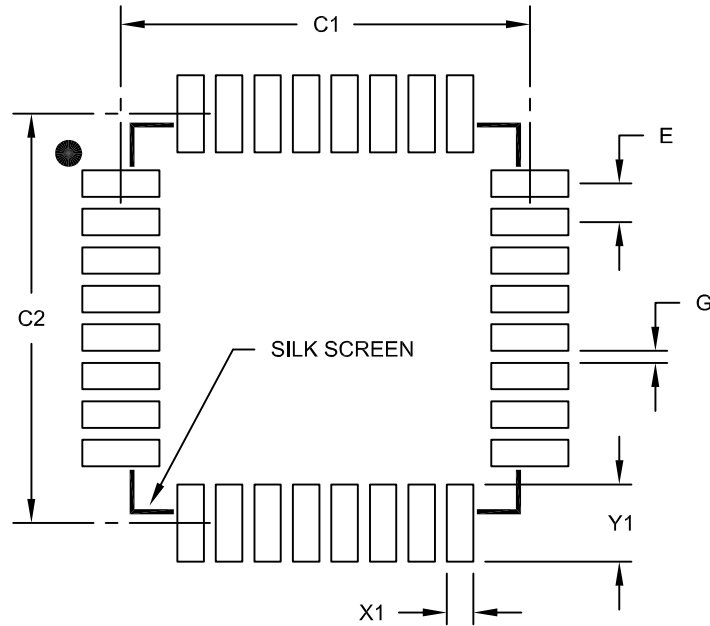
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-074B

Land Pattern (Footprint)

32-Lead Plastic Thin Quad Flatpack (PT) - 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Contact Pad Spacing	C1		8.50	
Contact Pad Spacing	C2		8.50	
Contact Pad Width (X28)	X1			0.55
Contact Pad Length (X28)	Y1			1.60
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

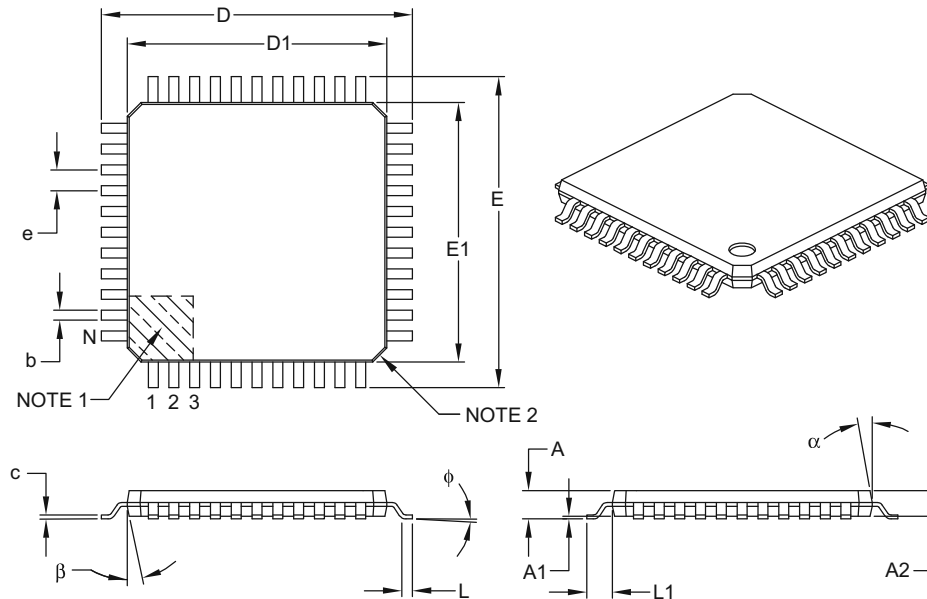
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2074B

Packaging Diagrams and Parameters

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	44		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	12.00 BSC		
Overall Length	D	12.00 BSC		
Molded Package Width	E1	10.00 BSC		
Molded Package Length	D1	10.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

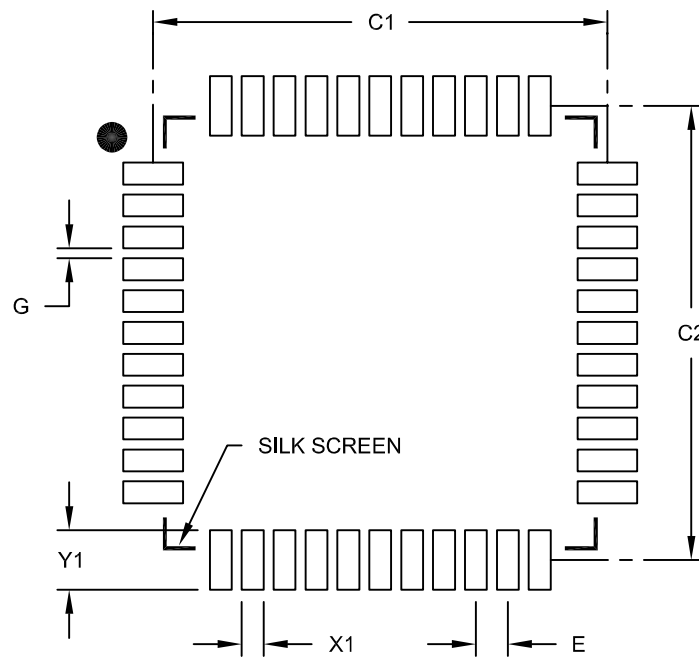
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-076B

Land Pattern (Footprint)

44-Lead Plastic Thin Quad Flatpack (PT) 10X10X1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		11.40	
Contact Pad Spacing	C2		11.40	
Contact Pad Width (X44)	X1			0.55
Contact Pad Length (X44)	Y1			1.50
Distance Between Pads	G	0.25		

Notes:

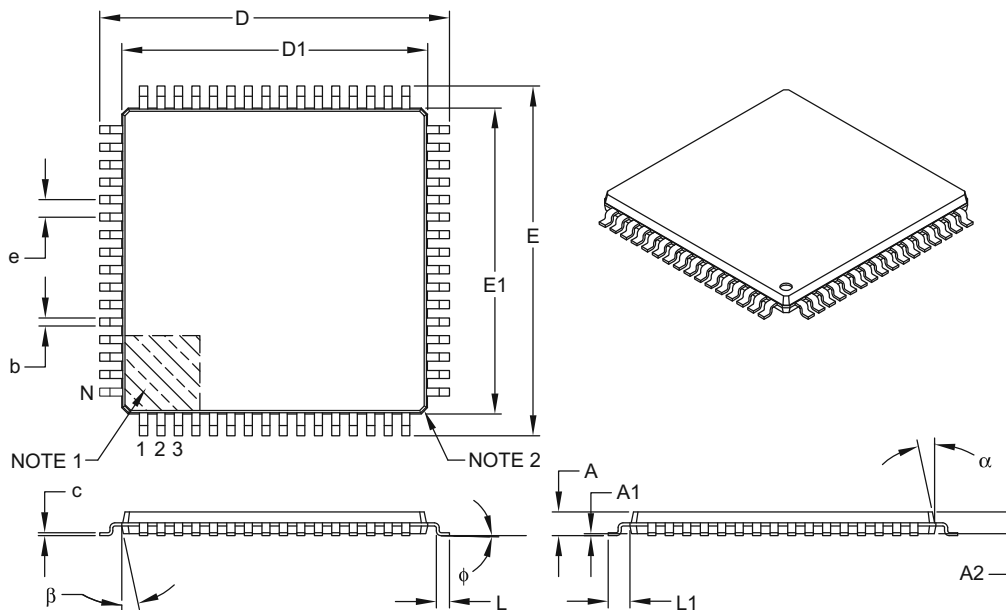
1. Dimensioning and tolerancing per ASME Y14.5M
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2076B

Packaging Diagrams and Parameters

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	64		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	16.00 BSC		
Overall Length	D	16.00 BSC		
Molded Package Width	E1	14.00 BSC		
Molded Package Length	D1	14.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

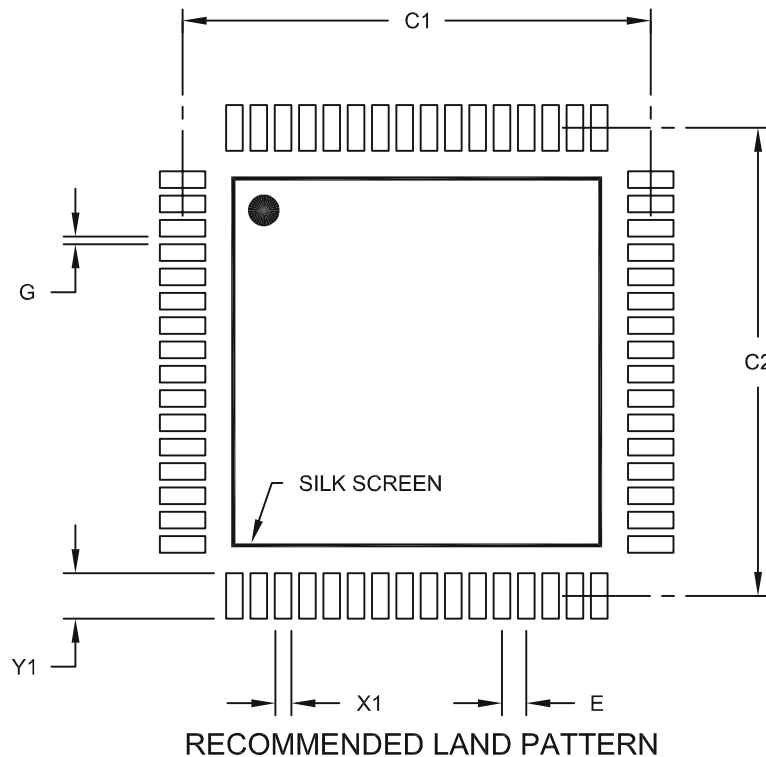
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-066B

Land Pattern (Footprint)

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X64)	X1			0.55
Contact Pad Length (X64)	Y1			1.50
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

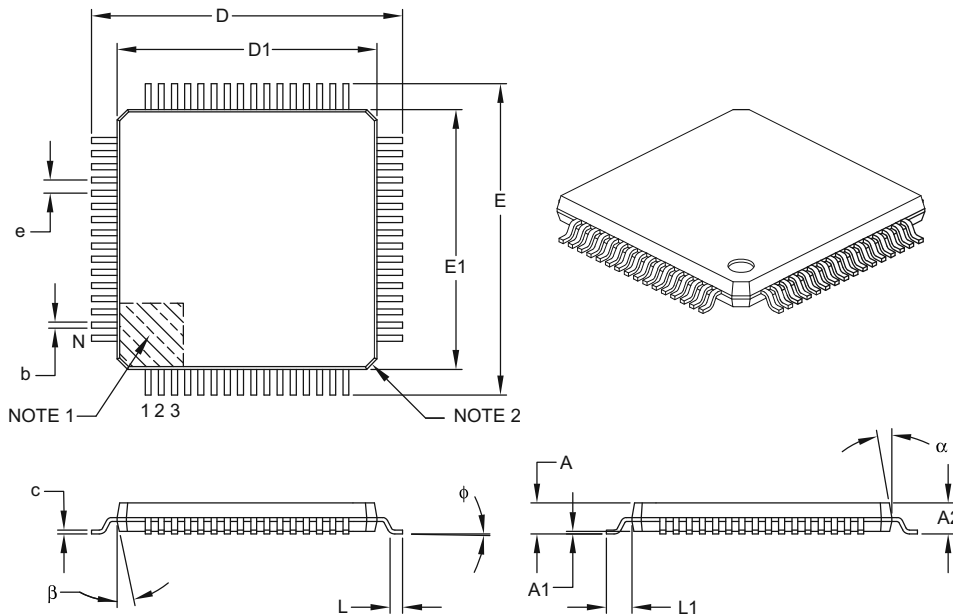
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2066A

Packaging Diagrams and Parameters

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		64		
Lead Pitch	e		0.50 BSC		
Overall Height	A	–	–	–	1.20
Molded Package Thickness	A2		0.95	1.00	1.05
Standoff	A1		0.05	–	0.15
Foot Length	L		0.45	0.60	0.75
Footprint	L1		1.00 REF		
Foot Angle	ϕ		0°	3.5°	7°
Overall Width	E		12.00 BSC		
Overall Length	D		12.00 BSC		
Molded Package Width	E1		10.00 BSC		
Molded Package Length	D1		10.00 BSC		
Lead Thickness	c		0.09	–	0.20
Lead Width	b		0.17	0.22	0.27
Mold Draft Angle Top	α		11°	12°	13°
Mold Draft Angle Bottom	β		11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

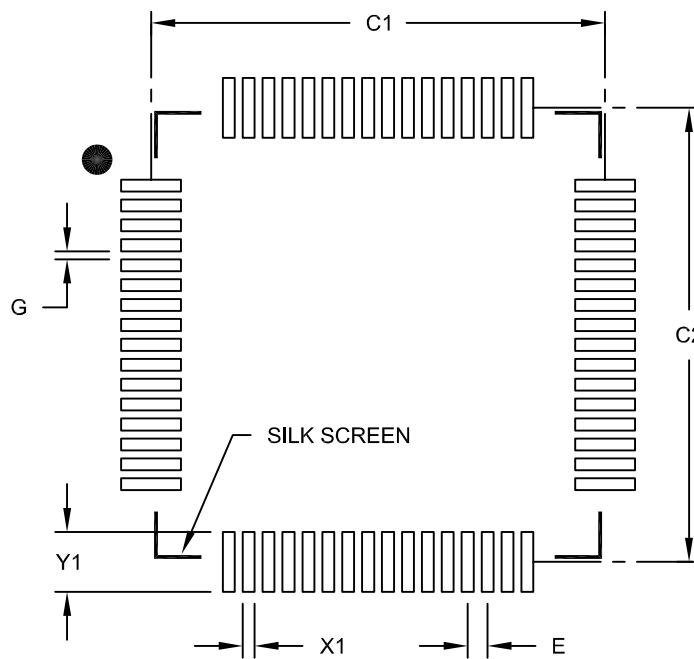
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-085B

Land Pattern (Footprint)

64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC		
Contact Pad Spacing	C1			11.40	
Contact Pad Spacing	C2			11.40	
Contact Pad Width (X64)	X1				0.30
Contact Pad Length (X64)	Y1				1.50
Distance Between Pads	G	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

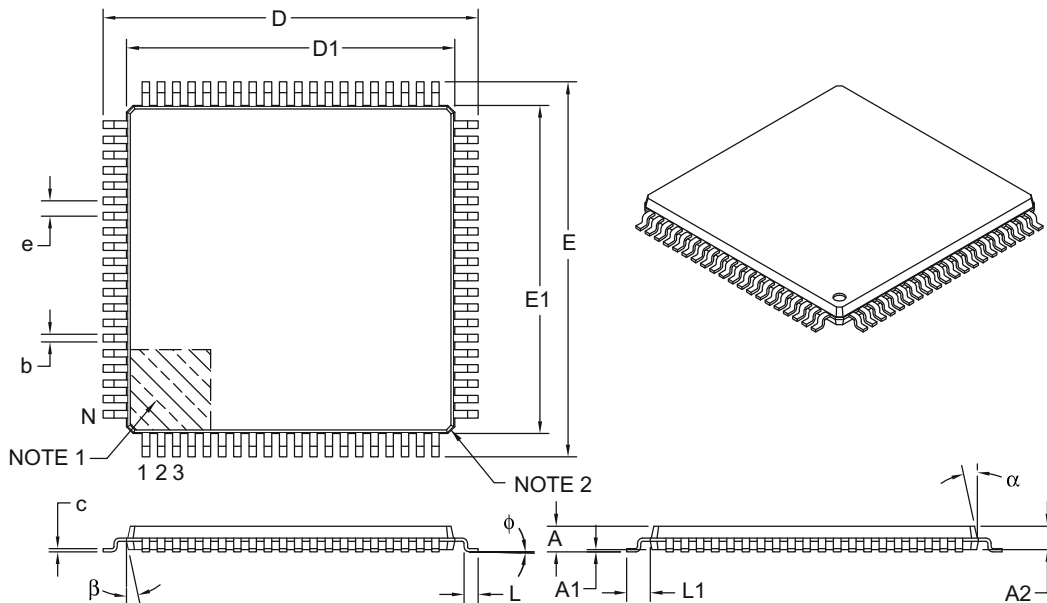
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2085B

Packaging Diagrams and Parameters

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		80		
Lead Pitch	e		0.65 BSC		
Overall Height	A	–	–		1.20
Molded Package Thickness	A2		0.95	1.00	1.05
Standoff	A1		0.05	–	0.15
Foot Length	L		0.45	0.60	0.75
Footprint	L1		1.00 REF		
Foot Angle	φ		0°	3.5°	7°
Overall Width	E		16.00 BSC		
Overall Length	D		16.00 BSC		
Molded Package Width	E1		14.00 BSC		
Molded Package Length	D1		14.00 BSC		
Lead Thickness	c		0.09	–	0.20
Lead Width	b		0.22	0.32	0.38
Mold Draft Angle Top	α		11°	12°	13°
Mold Draft Angle Bottom	β		11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

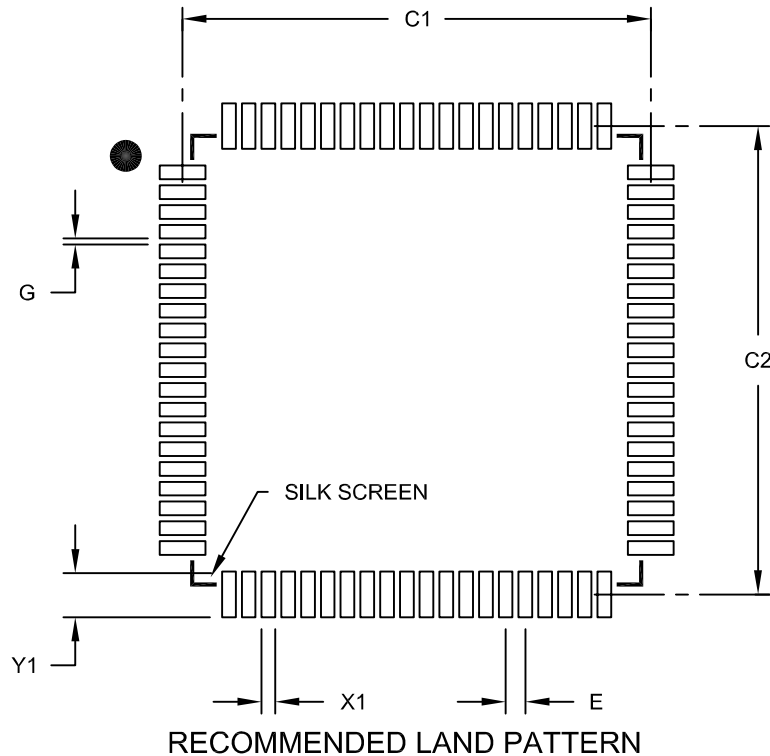
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-116B

Land Pattern (Footprint)

80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		MILLIMETERS		
		MIN	NOM	MAX
	Units			
	Dimension Limits			
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X80)	X1			0.45
Contact Pad Length (X80)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

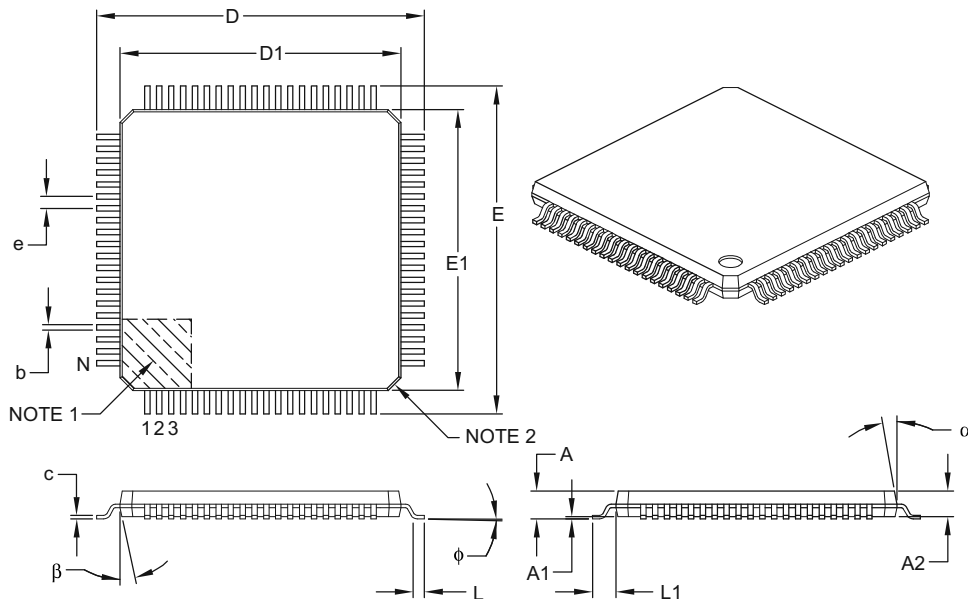
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2116C

Packaging Diagrams and Parameters

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		80		
Lead Pitch	e		0.50 BSC		
Overall Height	A	–	–	–	1.20
Molded Package Thickness	A2		0.95	1.00	1.05
Standoff	A1		0.05	–	0.15
Foot Length	L		0.45	0.60	0.75
Footprint	L1		1.00 REF		
Foot Angle	ϕ		0°	3.5°	7°
Overall Width	E		14.00 BSC		
Overall Length	D		14.00 BSC		
Molded Package Width	E1		12.00 BSC		
Molded Package Length	D1		12.00 BSC		
Lead Thickness	c		0.09	–	0.20
Lead Width	b		0.17	0.22	0.27
Mold Draft Angle Top	α		11°	12°	13°
Mold Draft Angle Bottom	β		11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

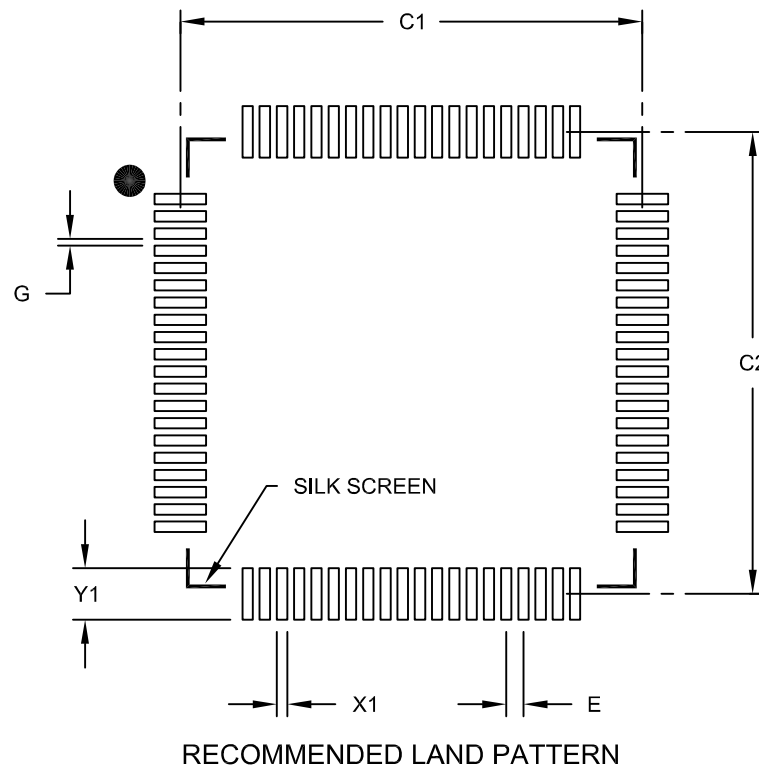
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-092B

Land Pattern (Footprint)

80-Lead Plastic Thin Quad Flatpack (PT) - 12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X80)	X1			0.30
Contact Pad Length (X80)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

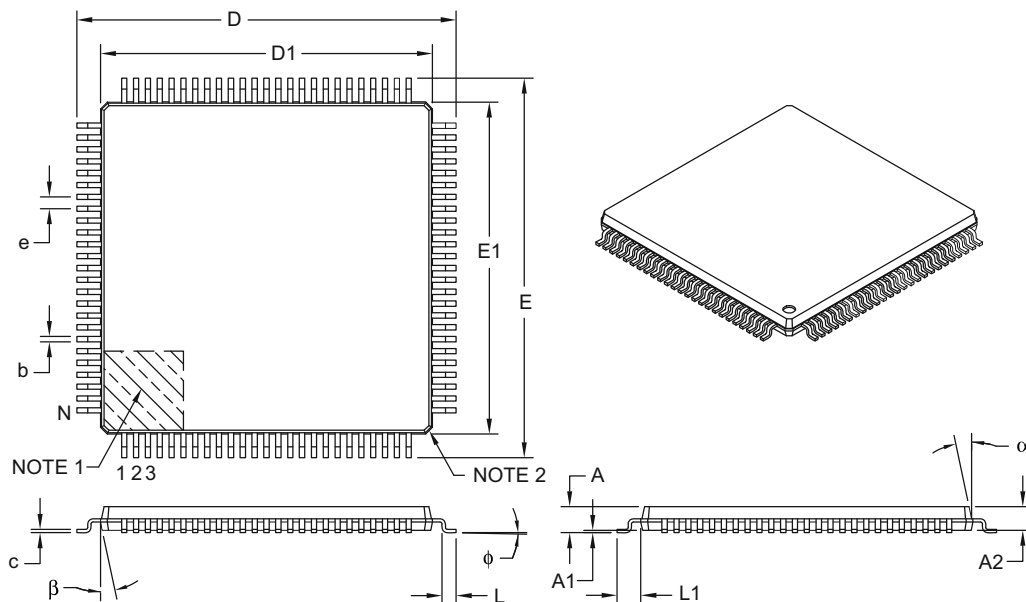
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2092B

Packaging Diagrams and Parameters

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	100		
Lead Pitch	e	0.50 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	16.00 BSC		
Overall Length	D	16.00 BSC		
Molded Package Width	E1	14.00 BSC		
Molded Package Length	D1	14.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

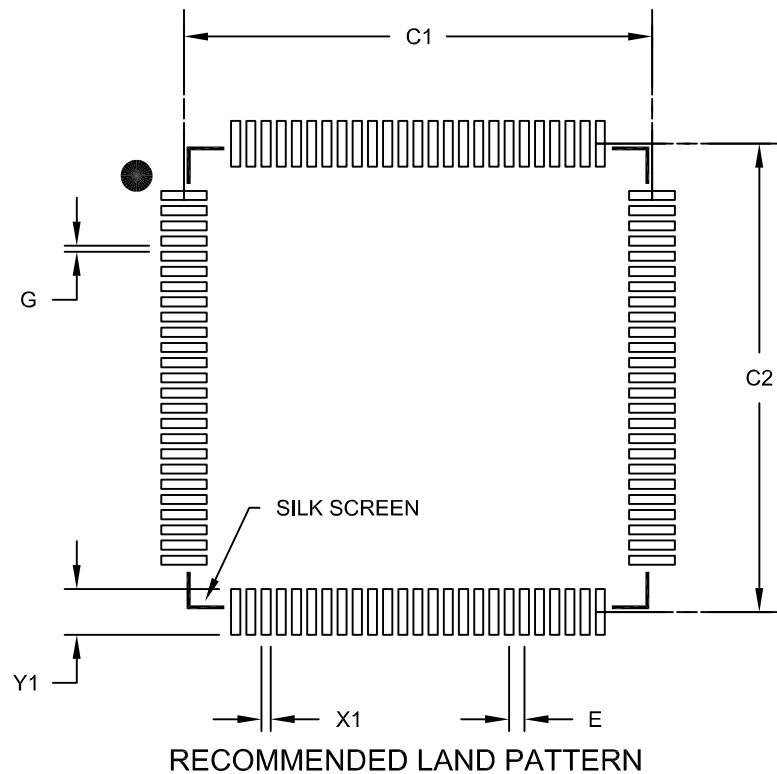
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-110B

Land Pattern (Footprint)

100-Lead Plastic Thin Quad Flatpack (PF) - 14x14x1 mm Body 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		MILLIMETERS		
		MIN	NOM	MAX
	Units			
	Dimension Limits			
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X100)	X1			0.30
Contact Pad Length (X100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

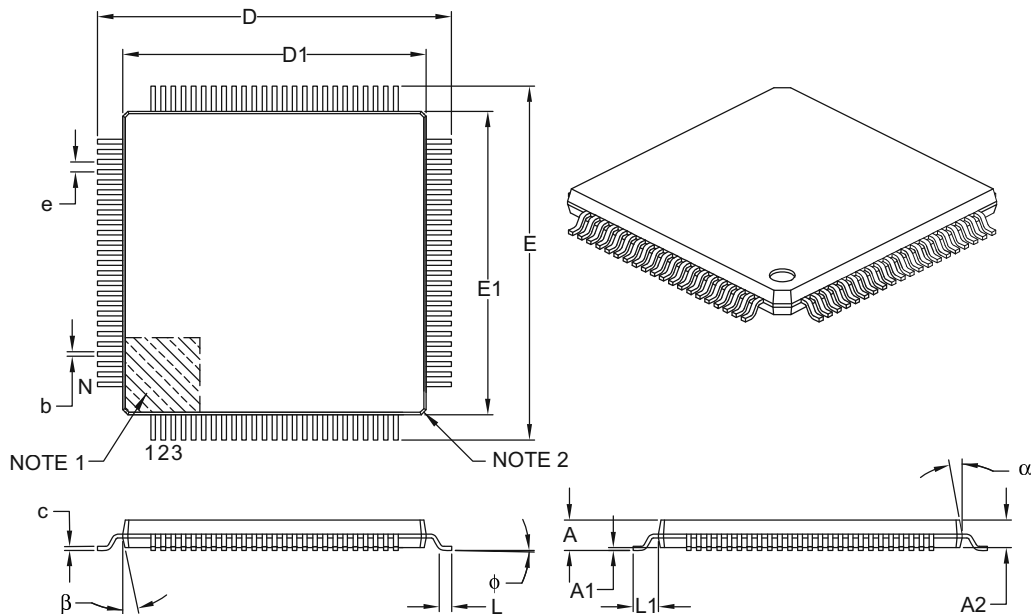
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2110B

Packaging Diagrams and Parameters

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		100		
Lead Pitch	e		0.40 BSC		
Overall Height	A	–	–	–	1.20
Molded Package Thickness	A2		0.95	1.00	1.05
Standoff	A1		0.05	–	0.15
Foot Length	L		0.45	0.60	0.75
Footprint	L1		1.00 REF		
Foot Angle	φ		0°	3.5°	7°
Overall Width	E		14.00 BSC		
Overall Length	D		14.00 BSC		
Molded Package Width	E1		12.00 BSC		
Molded Package Length	D1		12.00 BSC		
Lead Thickness	c		0.09	–	0.20
Lead Width	b		0.13	0.18	0.23
Mold Draft Angle Top	α		11°	12°	13°
Mold Draft Angle Bottom	β		11°	12°	13°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Chamfers at corners are optional; size may vary.
- Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

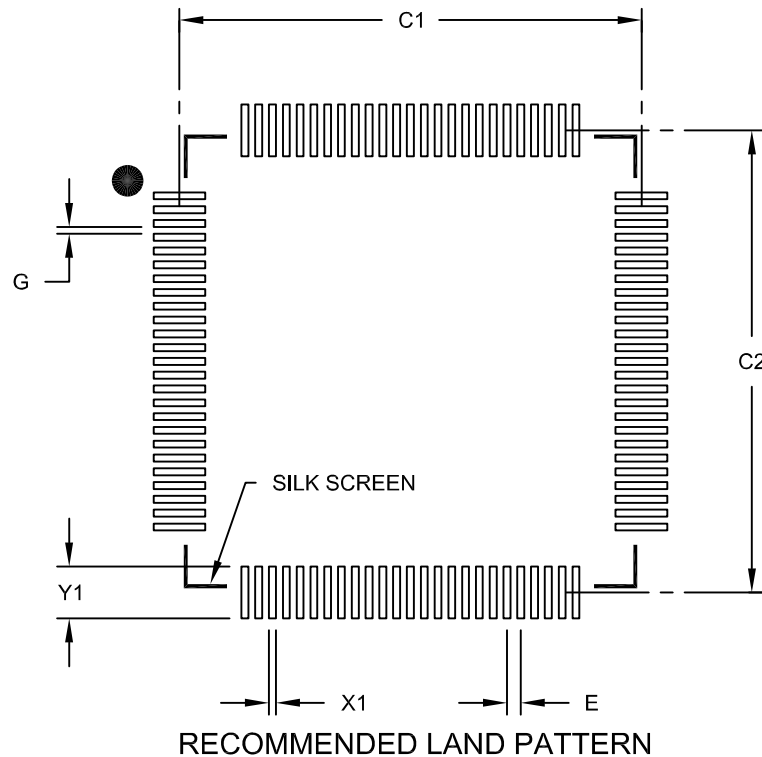
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-100B

Land Pattern (Footprint)

100-Lead Plastic Thin Quad Flatpack (PT)-12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X100)	X1			0.20
Contact Pad Length (X100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

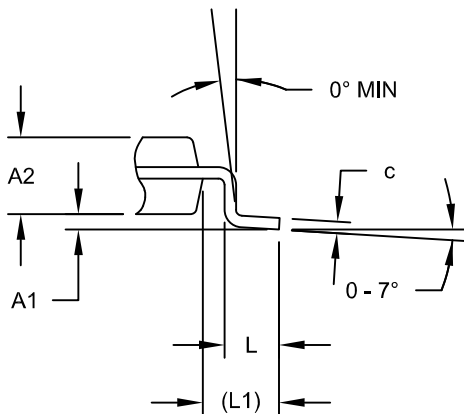
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2100B

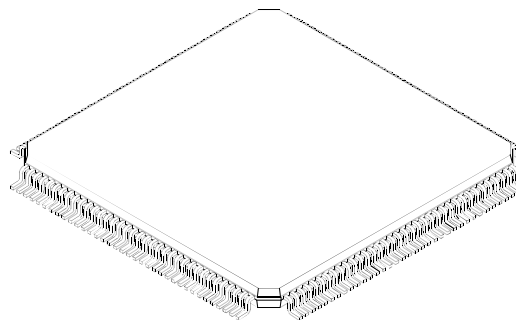
Packaging Diagrams and Parameters

144-Lead Plastic Thin Quad Flatpack (PH)-16x16x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	144		
Lead Pitch	e	0.40 BSC		
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Overall Width	D	18.00 BSC		
Overall Length	E	18.00 BSC		
Molded Body Width	D1	16.00 BSC		
Molded Body Length	E1	16.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.13	-	0.23

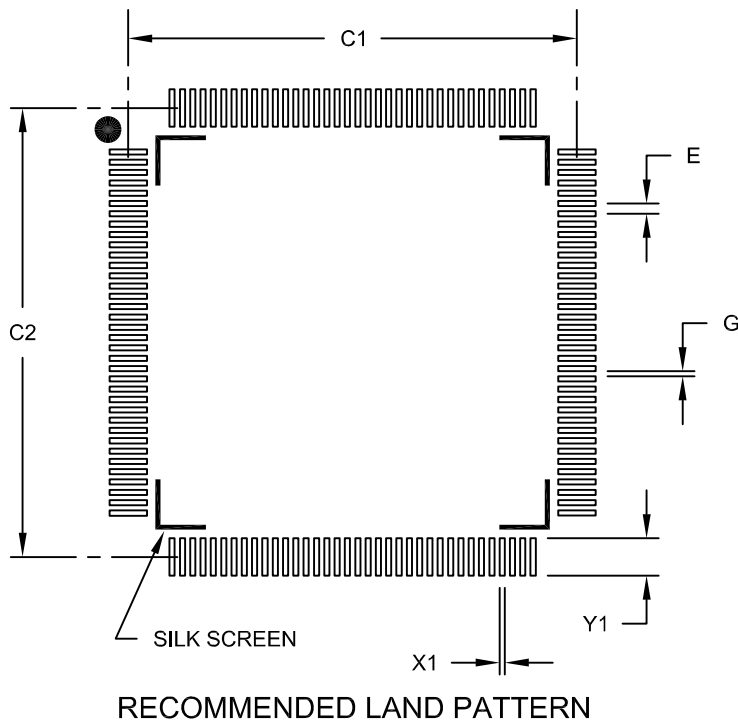
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

144-Lead Plastic Thin Quad Flat Pack (PH) - 16x16 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		17.40	
Contact Pad Spacing	C2		17.40	
Contact Pad Width (X144)	X1			0.20
Contact Pad Length (X144)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2155B

Packaging Diagrams and Parameters

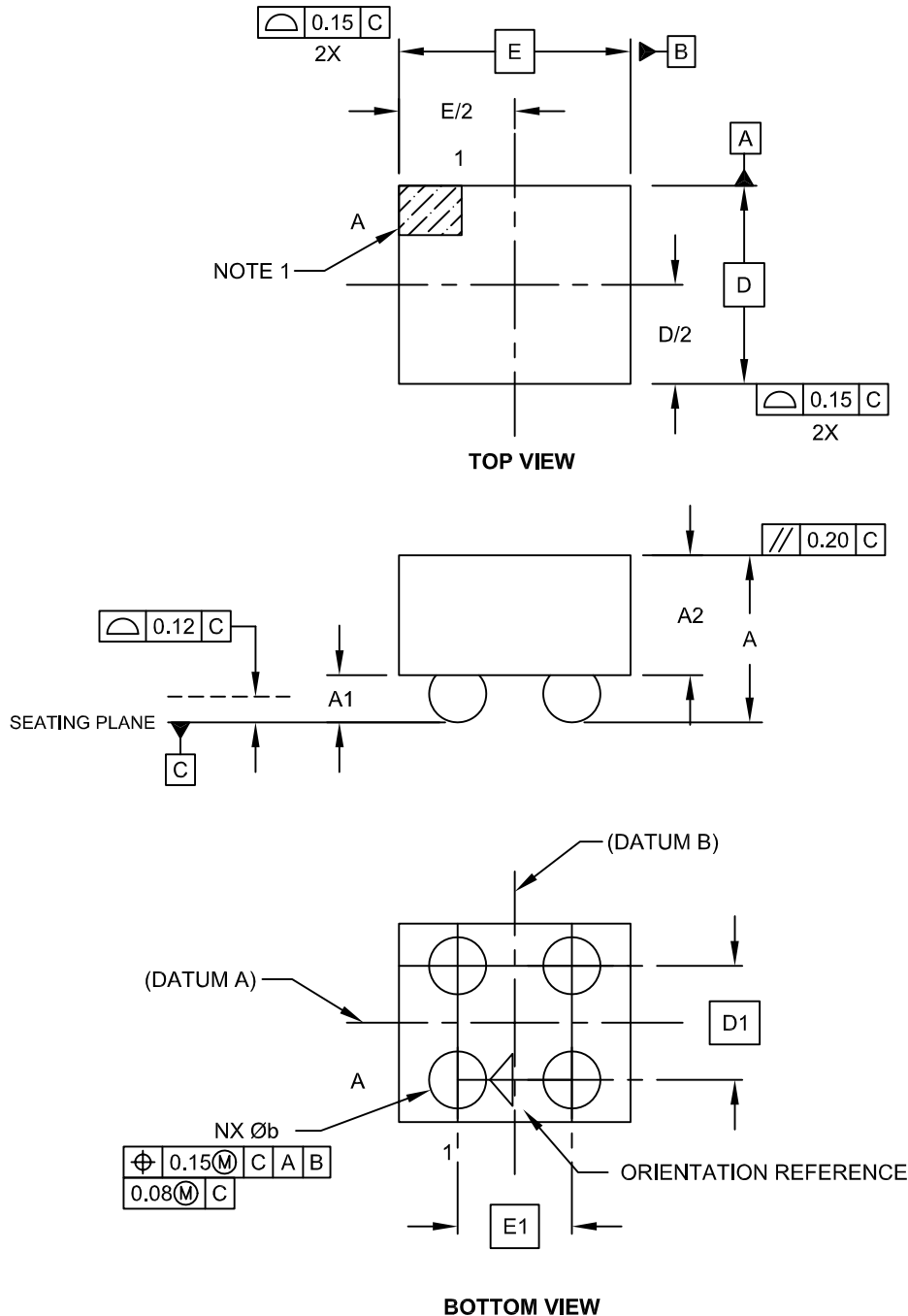
CSP Family

Chip Scale Packages

Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

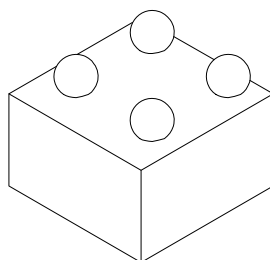
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N		4	
Adjacent Column X-Pitch	E1	0.400 BSC		
Adjacent Row Y-Pitch	D1	0.400 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Length	E	NOTE 4		
Overall Width	D	NOTE 4		
Ball Diameter	b	0.18	0.200	0.22

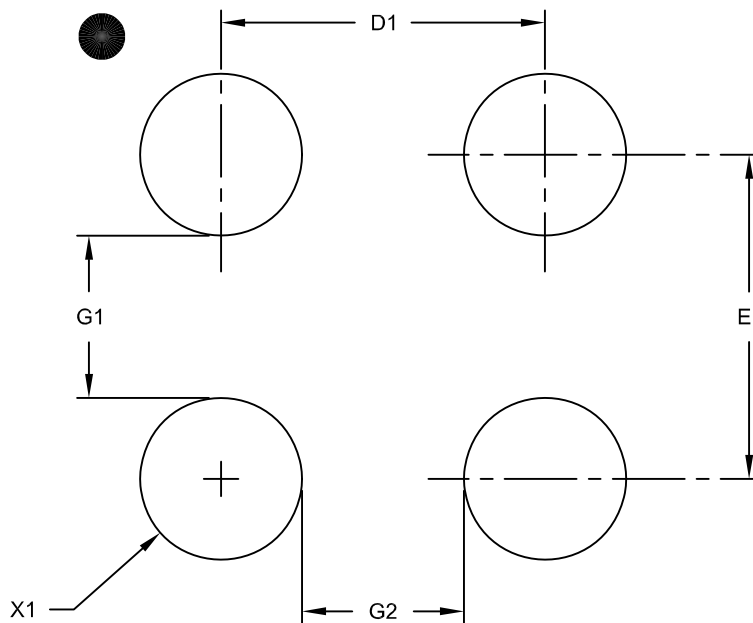
Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please contact our local Microchip representative for specific details.

Land Pattern (Footprint)

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N	4		
Contact Pad Spacing	E1		0.40	
Contact Pad Spacing	D1		0.40	
Contact Pad Diameter (X4)	X1			0.20
Distance Between Pads	G1	0.24		
Distance Between Pads	G2	0.24		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

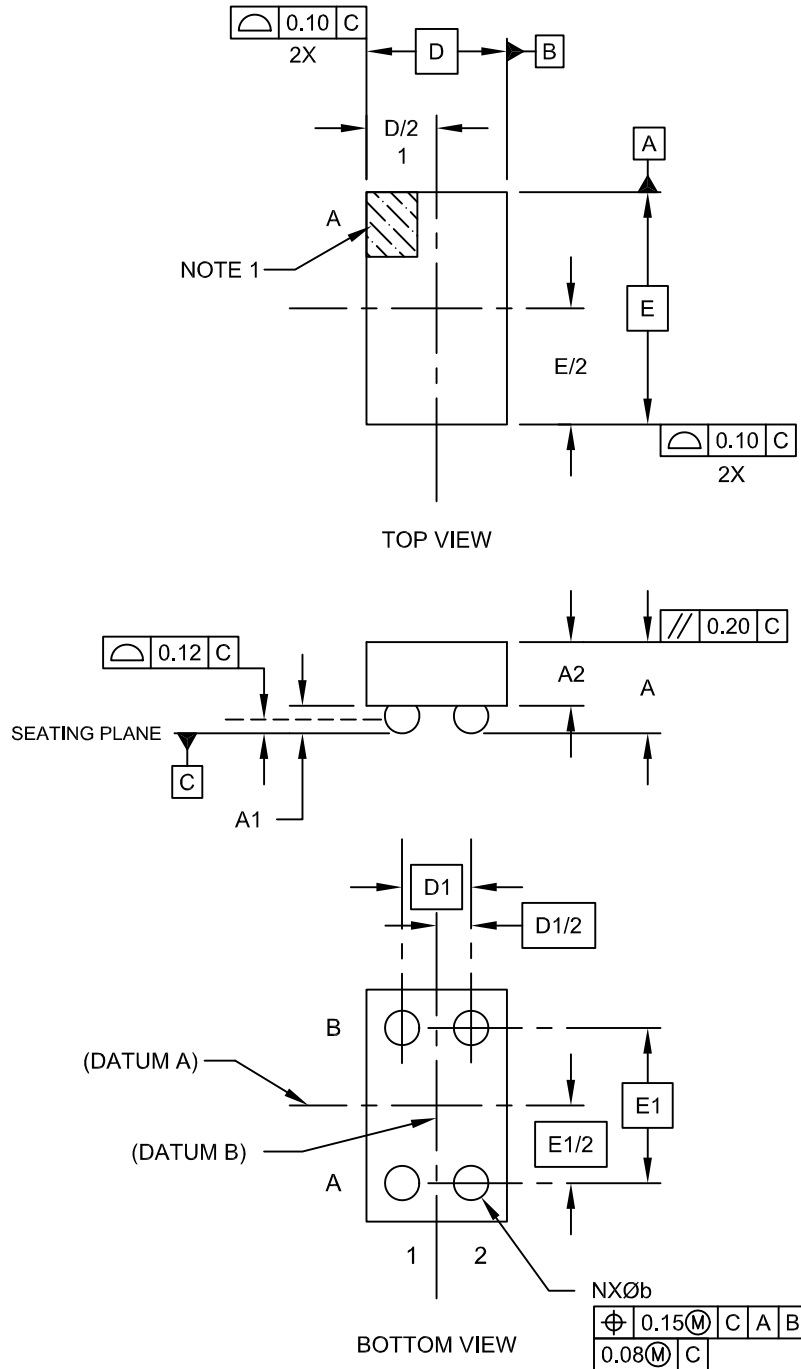
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8005A

Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

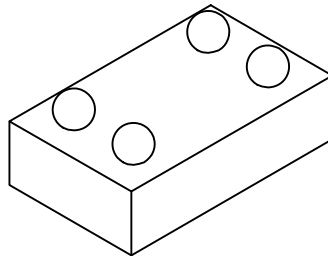
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N		4	
Adjacent Column X-Pitch	D1	0.400 BSC		
Adjacent Row Y-Pitch	E1	0.900 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Width	D	NOTE 4		
Overall Length	E	NOTE 4		
Ball Diameter	b	0.18	0.20	0.22

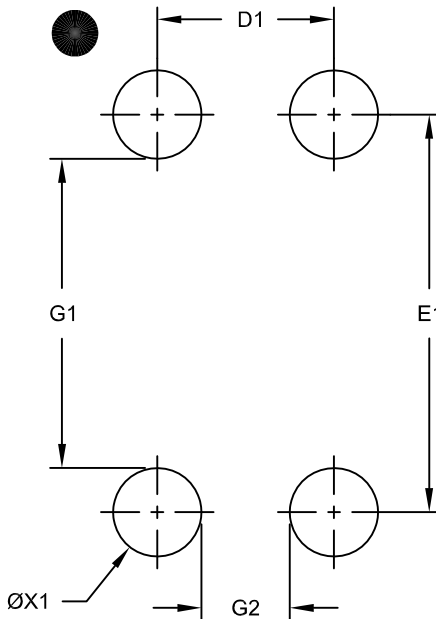
Notes:

- Orientation reference feature may vary, but must be located within the hatched area.
- Package is saw singulated.
- Dimensioning and tolerancing per ASME Y14.5M.
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Package size varies with specific devices. Please see the specific Product Data Sheet.

Land Pattern (Footprint)

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N	4		
Contact Pad Spacing	D1		0.40	
Contact Pad Spacing	E1		0.90	
Contact Pad Diameter (X4)	ØX1		0.20	
Distance Between Pads	G1		0.70	
Distance Between Pads	G2		0.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

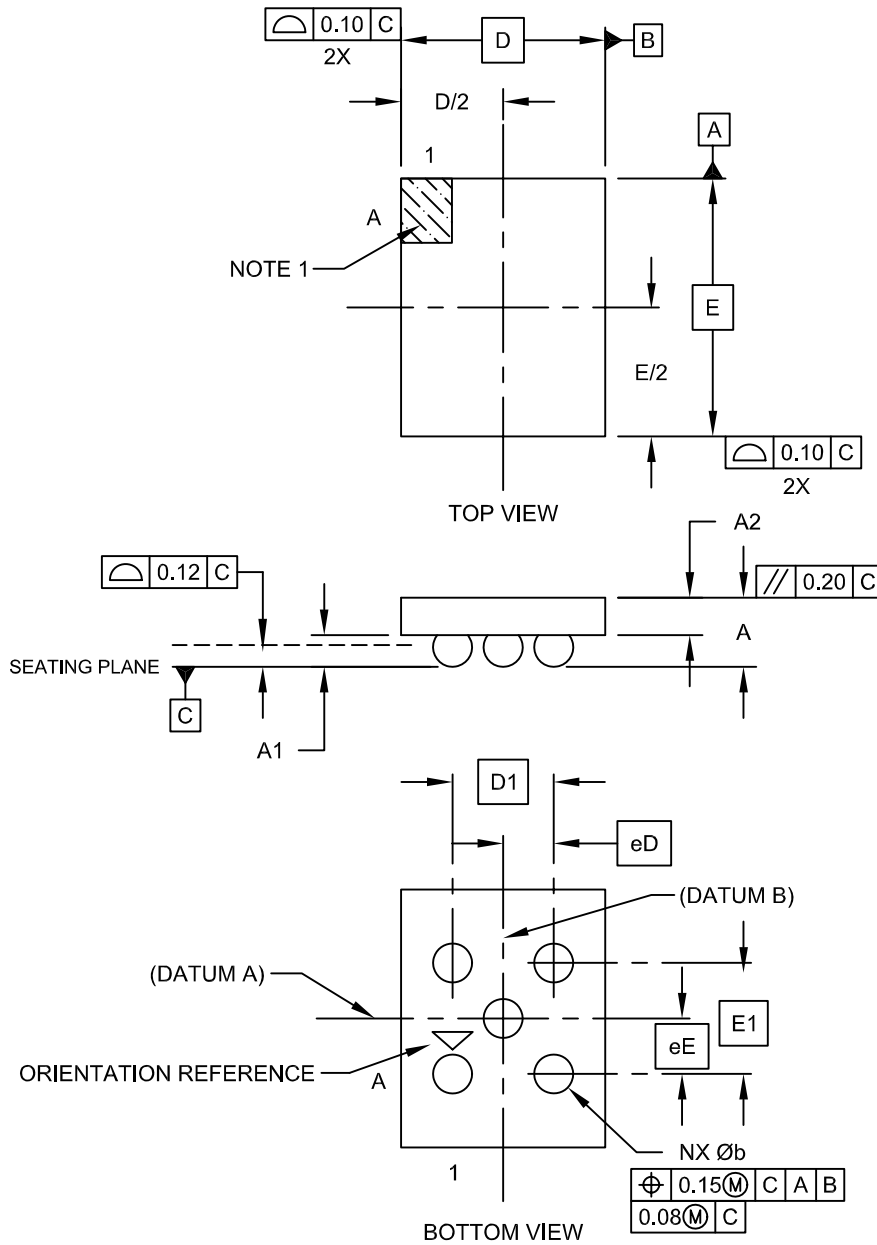
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8008A

Packaging Diagrams and Parameters

5-Lead Chip Scale Package (CS) - [CSP]

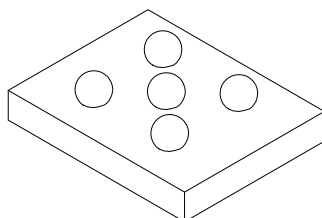
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

5-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Contacts	N			5	
Adjacent Column X-Pitch	E1		0.570 BSC		
Adjacent Row Y-Pitch	D1		0.520 BSC		
Adjacent Column X-Pitch	eE		0.285 BSC		
Adjacent Row Y-Pitch	eD		0.260 BSC		
Overall Height	A	0.47	0.51	0.55	
Die Height	A2	0.33	0.35	0.37	
Bump Height	A1	0.14	0.16	0.18	
Overall Length	E	NOTE 4			
Overall Width	D	NOTE 4			
Ball Diameter	b	0.18	0.20	0.22	

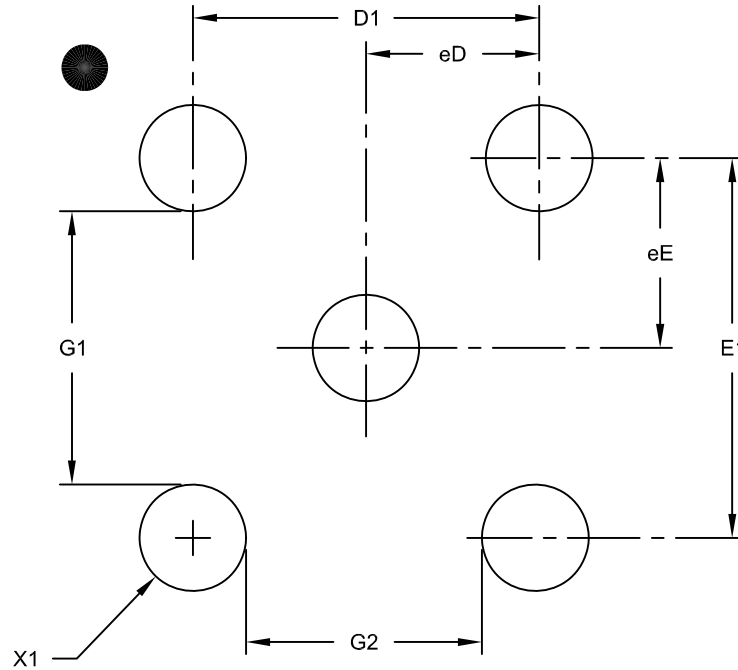
Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Land Pattern (Footprint)

5-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N	5		
Contact Pitch Y	eE		0.285	
Contact Pitch X	eD		0.260	
Contact Pad Spacing	E1		0.570	
Contact Pad Spacing	D1		0.520	
Contact Pad Diameter (X5)	X1			0.20
Distance Between Pads	G1	0.41		
Distance Between Pads	G2	0.36		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

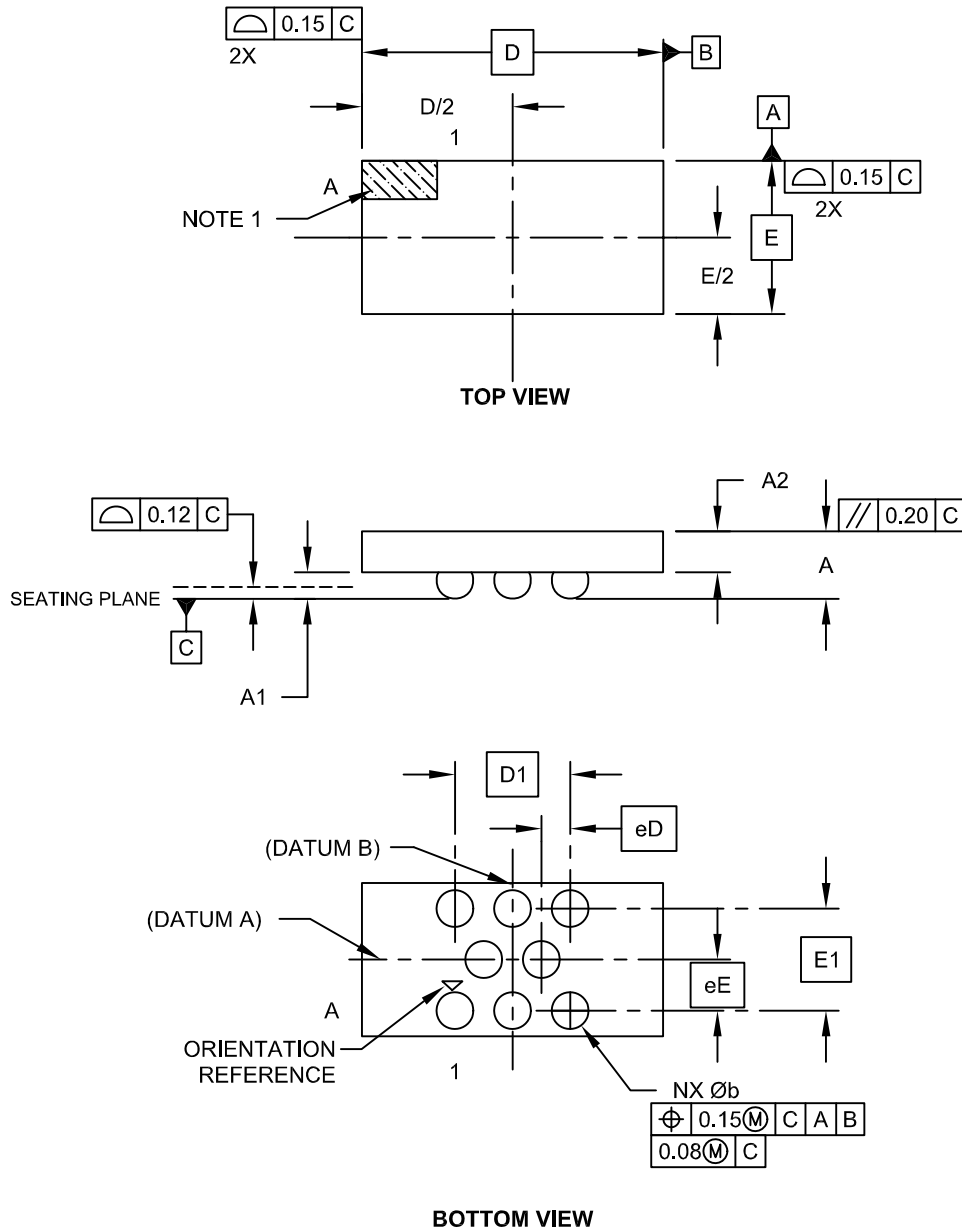
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8004A

Packaging Diagrams and Parameters

8-Lead Chip Scale Package (CS) - [CSP]

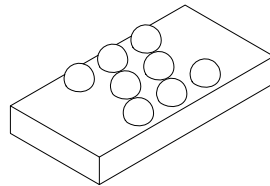
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
	Limits	MIN	NOM	MAX
Number of Contacts	N		8	
Overall Grid X-Pitch	E1	0.886 BSC		
Overall Grid Y-Pitch	D1	1.00 BSC		
Adjacent Column X-Pitch	eE	0.443 BSC		
Adjacent Row Y-Pitch	eD	0.25 BSC		
Overall Height	A	0.53	0.59	0.64
Die Height	A2	0.33	0.36	0.38
Bump Height	A1	0.20	0.23	0.26
Overall Width	E	NOTE 4		
Overall Length	D	NOTE 4		
Ball Diameter	b	0.30	0.32	0.34

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension, Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

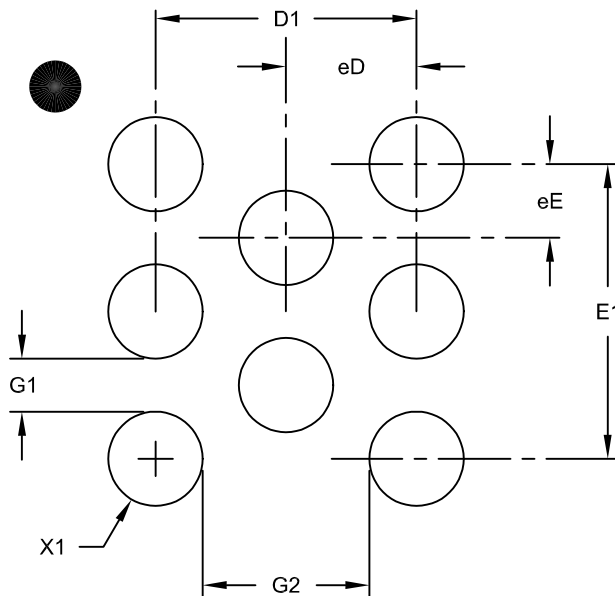
4. Package size varies with specific devices. Please contact your local Microchip representative for specific details

Microchip Technology Drawing C04-6001C Sheet 2 of 2

Land Pattern (Footprint)

8-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N	8		
Contact Pitch Y	eE		0.25	
Contact Pitch X	eD		0.443	
Contact Pad Spacing	E1		1.00	
Contact Pad Spacing	D1		0.886	
Contact Pad Diameter (X8)	X1			0.32
Distance Between Pads	G1	0.18		
Distance Between Pads	G2	0.56		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8001A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

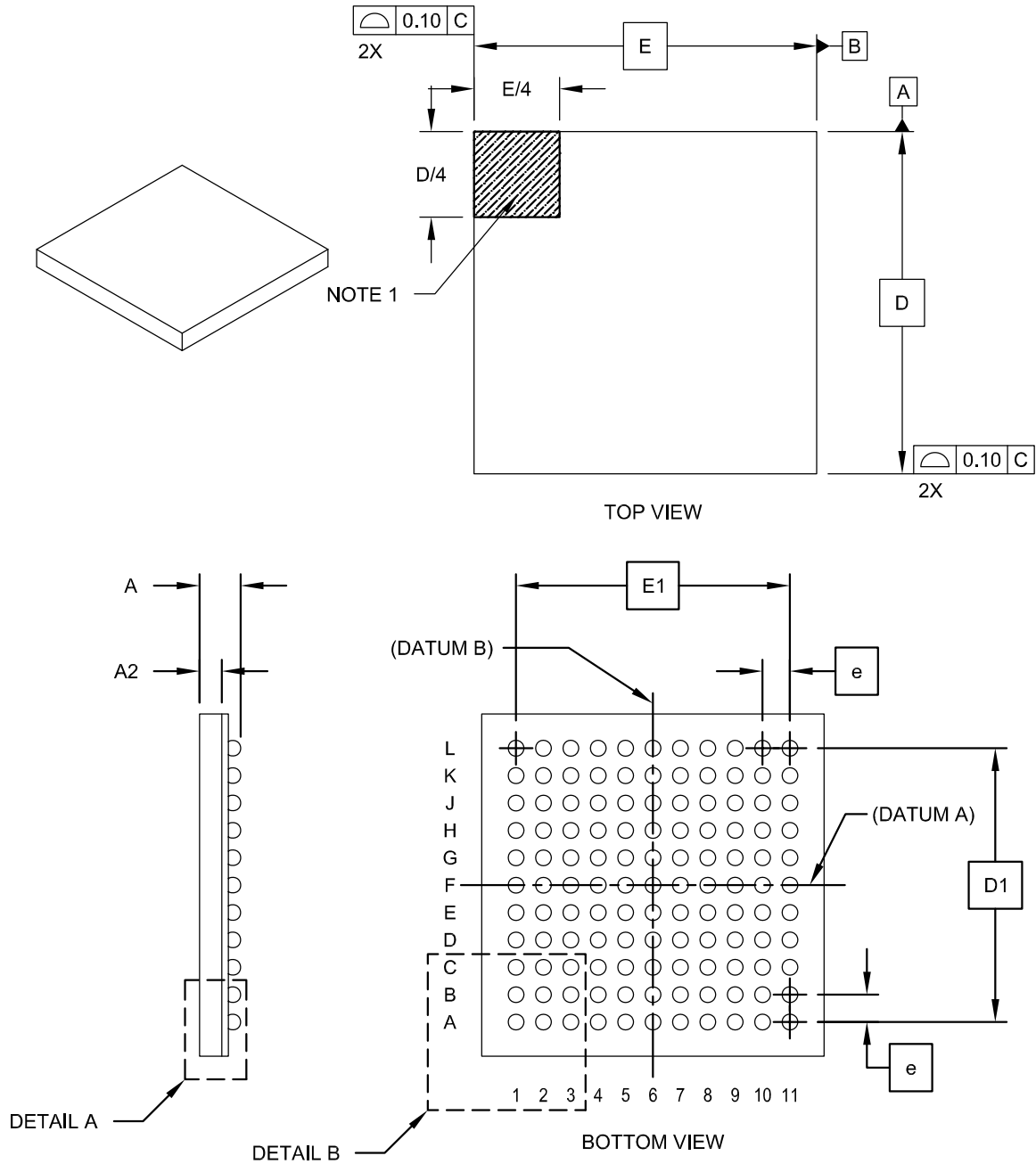
**TFBGA Family
(Formerly XBGA Family)**

Plastic Thin Profile Ball Grid Array Package

Packaging Diagrams and Parameters

121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA--Formerly XBGA]

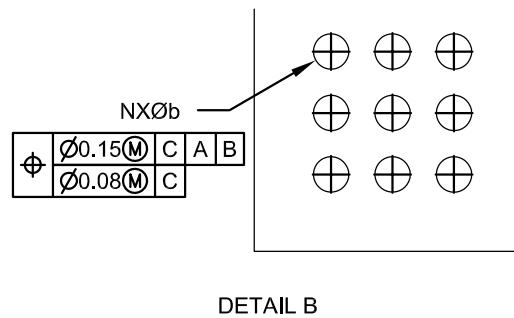
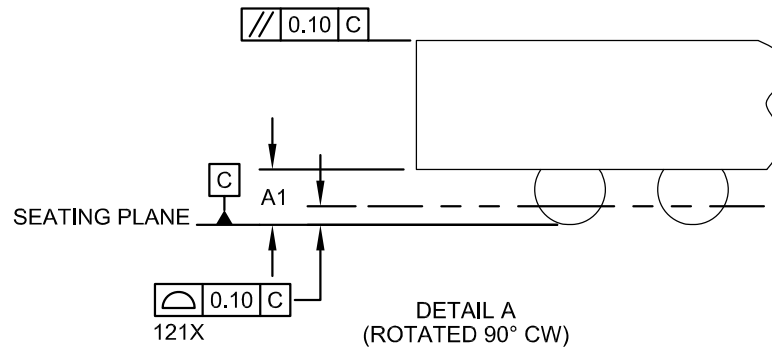
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA--Formerly XBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N	121		
Contact Pitch	e	0.80 BSC		
Overall Height	A	1.00	1.10	1.20
Standoff	A1	0.25	0.30	0.35
Molded Package Thickness	A2	0.55	0.60	0.65
Overall Width	E	10.00 BSC		
Array Width	E1	8.00 BSC		
Overall Length	D	10.00 BSC		
Array Length	D1	8.00 BSC		
Contact Diameter	b	0.40 TYP		

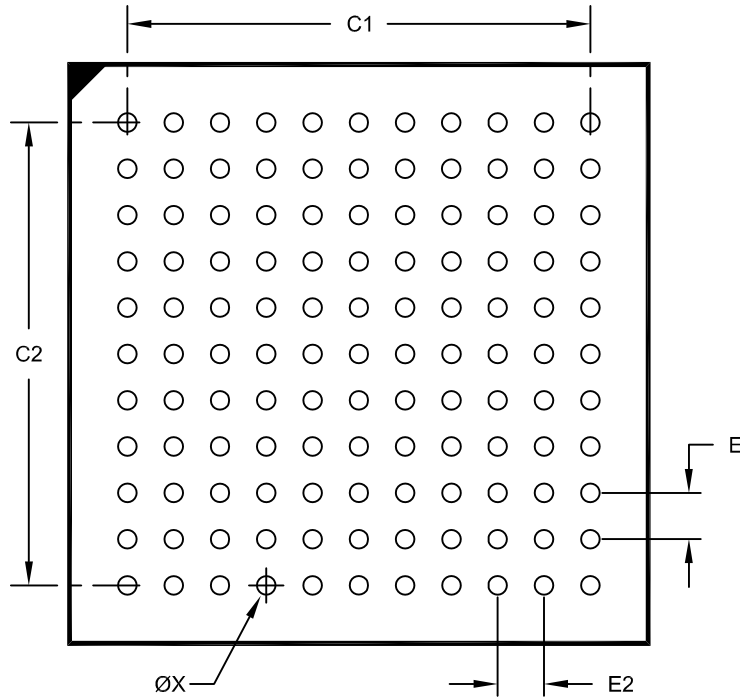
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensioning and tolerancing per ASME Y14.5M.
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- The outer rows and columns of balls are located with respect to datums A and B.

Land Pattern (Footprint)

121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA--Formerly XBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E1	0.80 BSC		
Contact Pitch	E2	0.80 BSC		
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Diameter (X121)	X			0.32

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2148 Rev D

Packaging Diagrams and Parameters

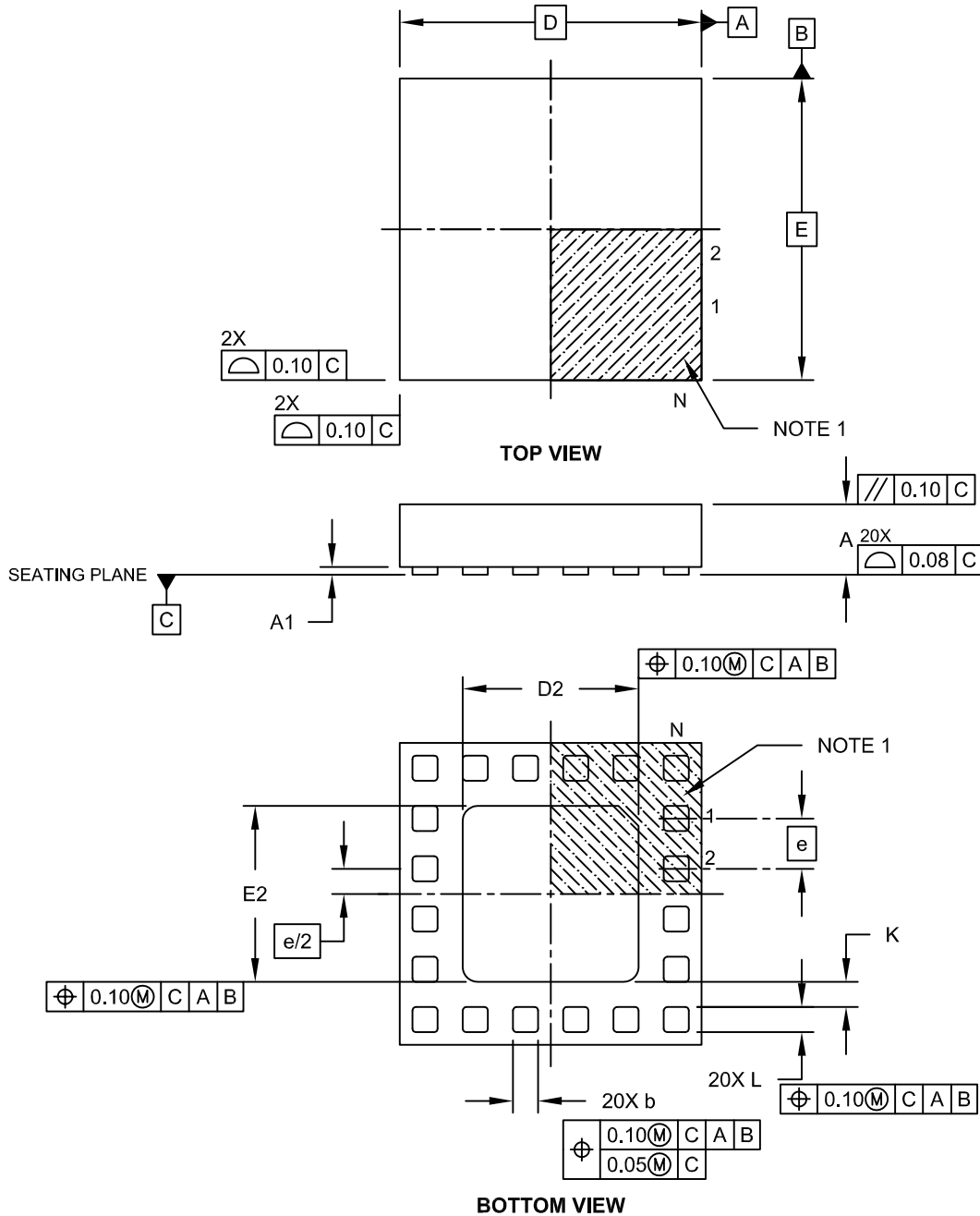
TLA Family

Thermal Leadless Array Packages

Packaging Diagrams and Parameters

20-Lead Thermal Leadless Array Package (TL) – 3x3x0.7 mm Body with Exposed Pad [TLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

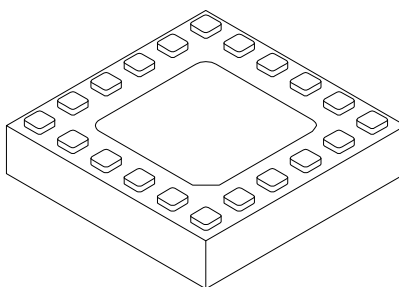


Microchip Technology Drawing C04-184A Sheet 1 of 2

Packaging Diagrams and Parameters

20-Lead Thermal Leadless Array Package (TL) – 3x3x0.7 mm Body with Exposed Pad [TLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
	Limits	MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.50 BSC		
Overall Height	A	0.60	-	0.70
Standoff	A1	0.025	-	0.075
Overall Width	E	3.00 BSC		
Exposed Pad Width	E2	1.60	1.75	1.90
Overall Length	D	3.00 BSC		
Exposed Pad Length	D2	1.60	1.75	1.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

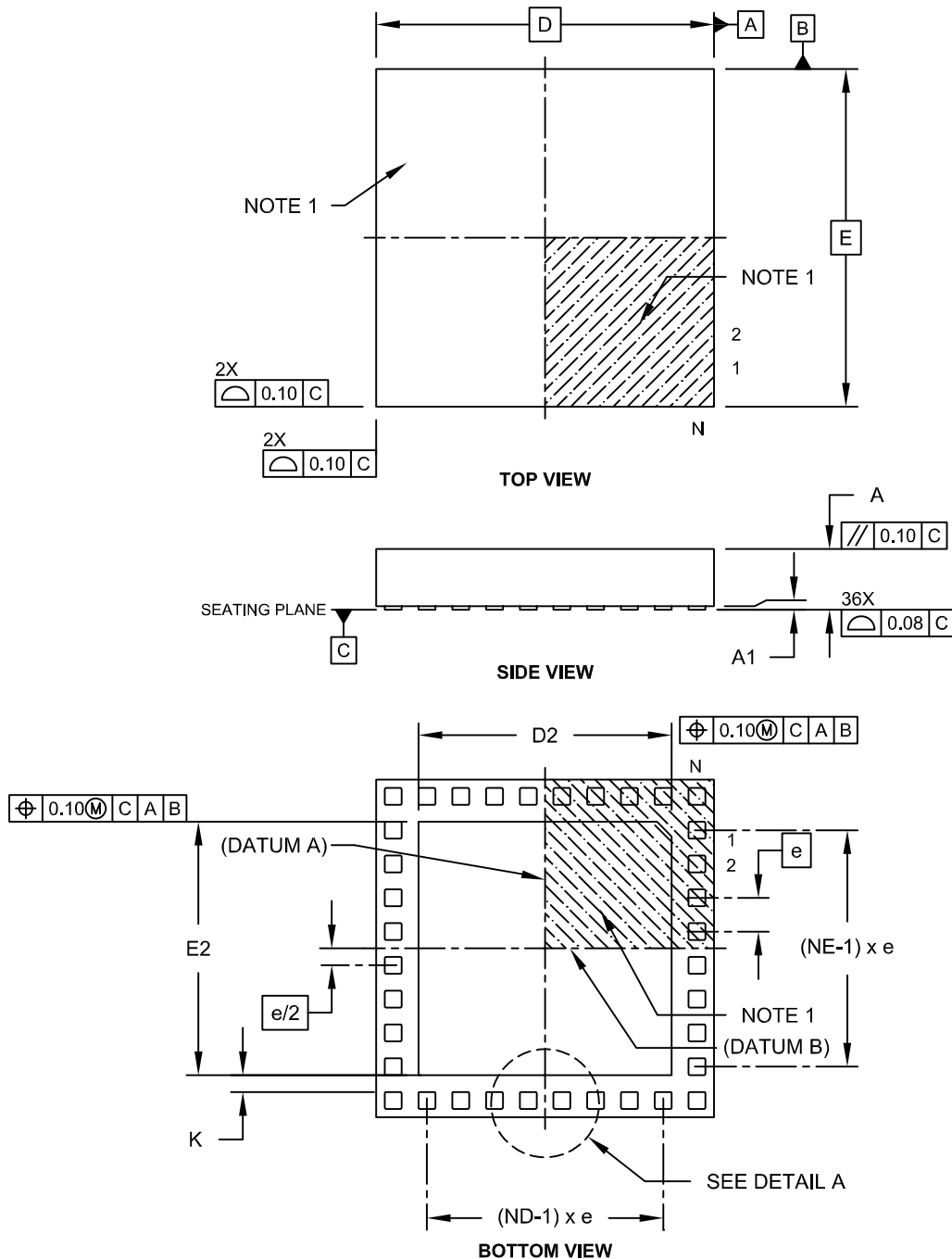
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-184A Sheet 2 of 2

Packaging Diagrams and Parameters

36-Lead Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [TLA]

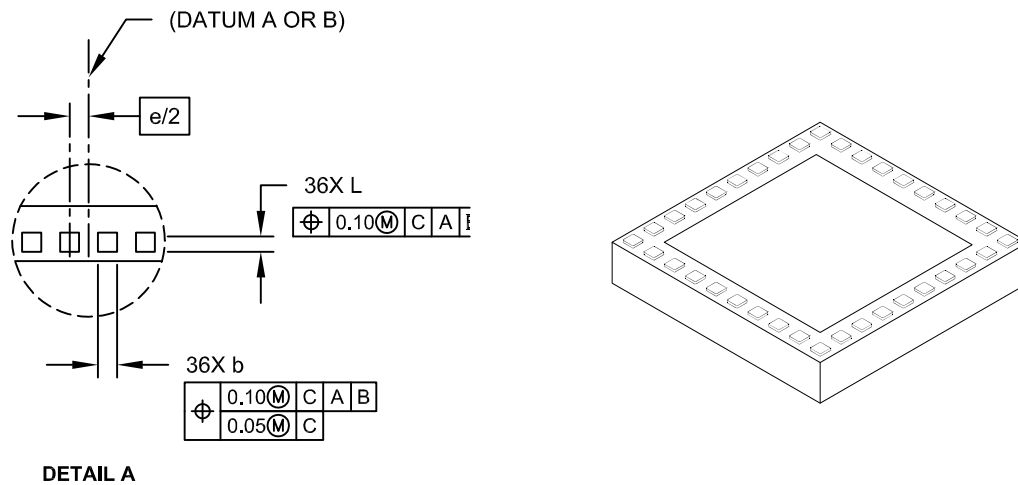
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

36-Lead Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [TLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
	Limits	MIN	NOM	MAX
Number of Pins	N	36		
Number of Pins per Side	ND	10		
Number of Pins per Side	NE	8		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E	5.00 BSC		
Exposed Pad Width	E2	3.60	3.75	3.90
Overall Length	D	5.00 BSC		
Exposed Pad Length	D2	3.60	3.75	3.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

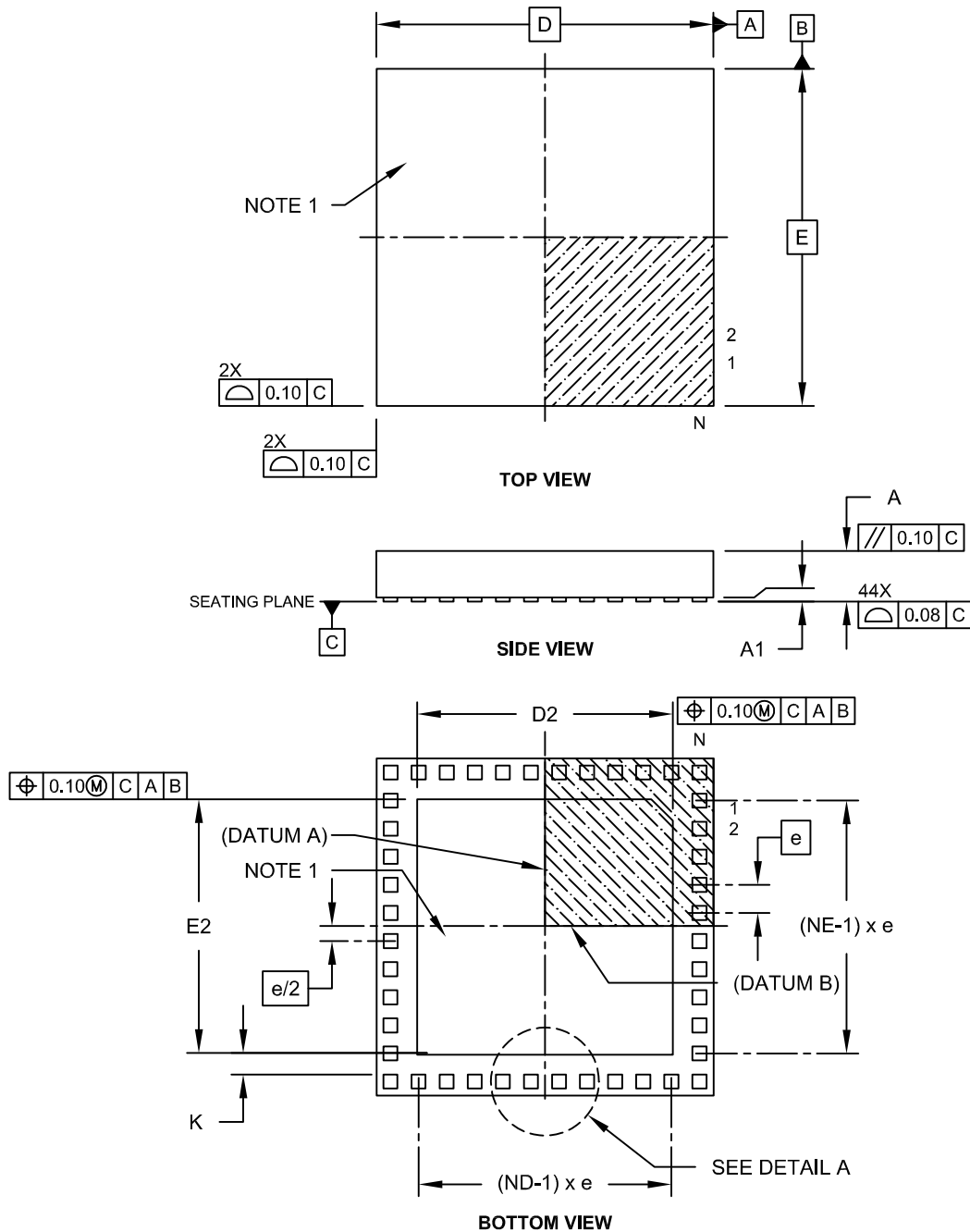
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-187B Sheet 2 of 2

Packaging Diagrams and Parameters

44-Lead Thermal Leadless Array Package (TL) – 6x6x0.9 mm Body with Exposed Pad [TLA]

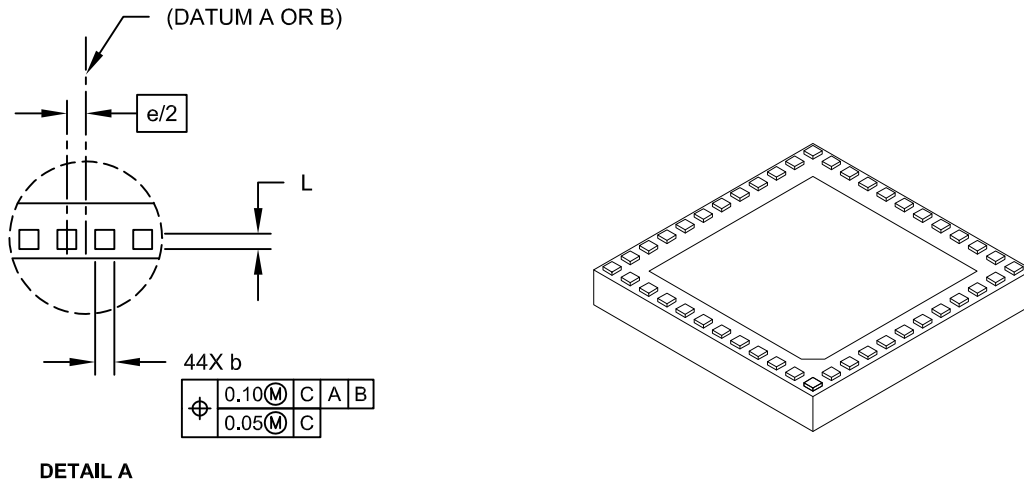
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

44-Lead Thermal Leadless Array Package (TL) – 6x6x0.9 mm Body with Exposed Pad [TLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		Limits	MIN	NOM
Number of Pins	N		44	
Number of Pins per Side	ND		12	
Number of Pins per Side	NE		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.40	4.55	4.70
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.40	4.55	4.70
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

APPENDIX A: REVISION HISTORY

Revision AE (September 2005)

The following is the list of modifications:

1. Added **Appendix A: Revision History**.
2. Revised dimensions D2 and E2 in the 8-Lead Plastic, No Lead (MC) 2x3x0.9 mm body (DFN) – Saw Singulated package diagram
3. Corrected graphic format in all packaging diagrams.
4. Added the following Packages:
 - 16-Lead Plastic Small Outline Narrow Body (QSOP)
 - 4-Lead Plastic Small Outline Transistor (SOT-143)
 - 3-Lead Plastic Small Outline Transistor (SOT-223)
 - 32-Lead Thin Quad Flatpack 7x7x1mm Body 1.0/0.10 Lead Form (TQFP)
 - 3-Lead SC-70 package diagram corrected.
5. The following package diagrams were replaced:
 - Drawing C04-142 replaced by C04-128 (5-Lead Small Outline Transistor) (TSOT)
 - Drawing C04-300 replaced by C04-132 (24-Lead Plastic Shrink Small Outline) (SSOP)
6. Added Part Number Designators DB, RC and QR to Part Number Suffix Designations table.

Revision AF (January 2006)

The following is the list of modifications:

1. Revised 28-Lead Plastic Shrink Small Outline (SS) – 209 mil body, 5.30 mm (SSOP)
2. Revised 28-Lead Plastic Quad Flat No Lead (MM) 6x6x0.9 mm body (QFN-S) with 0.40 mm Contact Length (Saw Singulated)

Revision AG (July 2006)

The following is the list of modifications:

1. Revised 8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm (TSSOP)
2. Added 40-Lead Plastic Quad Flat, No Lead (MM) 6x6x0.9 mm Body (QFN) with 0.40 mm Contact Length (Saw Singulated)
3. Added 3-Lead Plastic Transistor Outline (AB) (TO-220)
4. Removed Drawing No. C04-300 as it does not exist.
5. Revised 28-Lead Plastic Shrink Small Outline (SS) – 209 mil Body, 5.30 mm (SSOP)
6. Revised 20-Lead Plastic Shrink Small Outline (SS) – 209 mil Body, 5.30 mm (SSOP)

7. Revised 14-Lead Plastic Small Outline (SL) – Narrow, 150 mil (SOIC)
8. Revised 64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 1.0/0.10 mm Lead Form (TQFP)
9. Revised 80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 1.0/0.10 mm Lead Form (TQFP)
10. Revised Part Number Suffix Designations

Revision AH (August 2006)

The following is the list of modifications:

1. Revised 28-Lead Plastic Quad Flat No Lead (ML) 6x6 mm Body (QFN) with 0.55 mm Contact Length (Saw Singulated)

Revision AJ (September 2006)

The following is the list of modifications:

1. Revised 8-Lead Plastic Dual Flat, No Lead Package (MC) - 2x3x0.9 mm Body [DFN]
2. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body (DFN-S) – Punch Singulated
3. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body [DFN]
4. Revised 8-Lead Plastic Dual Flat, No Lead Package (MD) - 4x4x0.9 mm Body [DFN]
5. Revised 8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body [DFN-S]
6. Revised 10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body [DFN]
7. Revised 16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9 mm Body [QFN]
8. Revised 20-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9 mm Body [QFN]
9. Revised 28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Contact Length
10. Revised 28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9 mm Body [QFN-S] With 0.40 mm Contact Length
11. Revised 40-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN] With 0.40 mm Contact Length
12. Revised 44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN]
13. Revised 8-Lead Plastic Micro Small Outline Package (MS) [MSOP]
14. Revised 10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Revision AK (January 2007)

The entire Packaging Specification has been updated.

Packaging

Revision AL (February 2007)

Packages were revised. Telcom package designators were added where the designators vary from Microchip designators.

1. Revised 3-Lead Plastic Transistor Outline (TO or ZB) [TO-92]
2. Revised 3-Lead Plastic Small Outline Transistor (TT or NB) [SOT-23]
3. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A]
4. Revised 3-Lead Plastic Small Outline Transistor (DB) [SOT-223]
5. Revised 5-Lead Plastic Small Outline Transistor (DB) [SOT-223]
6. Revised 4-Lead Plastic Small Outline Transistor (RC) [SOT-143]
7. Revised 5-Lead Plastic Small Outline Transistor (OT or CT) [SOT-23]
8. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23]
9. Revised 8-Lead Plastic Dual In-Line (P or PA) 300 mil Body [PDIP]
10. Revised 14-Lead Plastic Dual In-Line (P or PD) 300 mil Body [PDIP]
11. Revised 16-Lead Plastic Dual In-Line (P or PE) 300 mil Body [PDIP]
12. Revised 24-Lead Plastic Dual In-Line (P or PG) 600 mil Body [PDIP]
13. Revised 24-Lead Skinny Plastic Dual In-Line (SP or PF) 300 mil Body [SPDIP]
14. Revised 28-Lead Skinny Plastic Dual In-Line (SP or PJ) 300 mil Body [SPDIP]
15. Revised 28-Lead Plastic Dual In-Line (P or PI) 600 mil Body [PDIP]
16. Revised 40-Lead Plastic Dual In-Line (P or PL) 600 mil Body [PDIP]
17. Revised 20-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
18. Revised 28-Lead Plastic Leaded Chip Carrier (L or LI) Square [PLCC]
19. Revised 32-Lead Plastic Leaded Chip Carrier (L) Rectangle [PLCC]
20. Revised 44-Lead Plastic Leaded Chip Carrier (L or LW) Square [PLCC]
21. Revised 68-Lead Plastic Leaded Chip Carrier (L or LS) Square [PLCC]
22. Revised 84-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
23. Revised 8-Lead Plastic Small Outline (SN or OA) Narrow, 3.90 mm Body [SOIC]
24. Revised 14-Lead Plastic Small Outline (SL or OD) Narrow, 3.90 mm Body [SOIC]
25. Revised 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC]
26. Revised 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ]
27. Revised 16-Lead Plastic Small Outline (SO or OE) Wide, 7.50 mm Body [SOIC]
28. Revised 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
29. Revised 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
30. Revised 24-Lead Plastic Small Outline (SO or PF) Wide, 7.50 mm Body [SOIC]
31. Revised 28-Lead Plastic Small Outline (SO or OI) Wide, 7.50 mm Body [SOIC]
32. Revised 8-Lead Plastic Micro Small Outline Package (MS or UA) [MSOP]
33. Revised 10-Lead Plastic Micro Small Outline Package (MS or UN) [MSOP]
34. Revised 16-Lead Plastic Shrink Small Outline Narrow Body (QR).150" Body [QSOP]
35. Revised 64-Lead Plastic Metric Quad Flatpack (KU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP]
36. Revised 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

Revision AM (March 2007)

Four Microchip and Telcom package designators were corrected and one package was removed.

1. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23] to (CH or OT)
2. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A] to (CB)
3. Revised 44-Lead Plastic Metric Quad Flatpack (PQ) [MQFP] to (PQ or KW)
4. Revised 64-Lead Plastic Metric Quad Flatpack (KU) [MQFP] to (BU)
5. Deleted 44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

Revision AN (March 2007)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body [QSOP]: the nominal pitch value for the package is corrected to ".025." This correction revises MCHP Drawing C04-024B to C04-024C.

Packages with a Microchip and a Telcom designator are represented on separate pages, rather than having both designators on a single page.

Revision AP (April 2007)

Revised 40-Lead Ceramic Dual In-Line with Window (JW) .600" Body [CERDIP]. The E-1 MAX dimension has changed from ".540" to ".583". This correction revises MCHP Drawing C04-014B to C04-014C.

Revision AQ (July 2007)

Revised 5-Lead Plastic Small Outline Transistor [SOT-223] package designator from (DB) to (DC). This correction revises MCHP Drawing C04-137A to C04-137B.

Revision AR (September 2007)

Land patterns have been added for the following 13 packages:

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Please refer to the Packaging Index for page numbers.

Notes: Packaging outline drawings and land pattern drawings appear on facing pages.

The last three digits of a package outline drawing number will always correspond to the last three digits of the land pattern drawing number.

The Microchip drawing number for any land pattern begins with the following characters: C04-2xxx.

Revision AS (January 2008)

The following packages are new:

- Drawing 0129B, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 156.
- Drawing 136B, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body [UDFN] on page 158.

Land patterns have been added for the following packages:

- Drawing 2032A, 3-Lead Plastic Small Outline Transistor (DB) Footprint [SOT-223] on page 33.
- Drawing 2137A, 5-Lead Plastic Small Outline Transistor (DC) Footprint [SOT-223] on page 35.
- Drawing 2031A, 4-Lead Plastic Small Outline Transistor (RC) Footprint [SOT-143] on page 37.
- Drawing 2057A, 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body Footprint [SOIC] on page 79.
- Drawing 2057A, 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body Footprint [SOIC] on page 81.
- Drawing 2056A, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body Footprint [SOIJ] on page 86.
- Drawing 2123A, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 99.
- Drawing 2062A, 8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body Footprint [DFN] on page 103.
- Drawing 2131A, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 105.
- Drawing 2063A, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 109.
- Drawing 2129A, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body Footprint [TDFN] on page 157.
- Drawing 2136A, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body Footprint [UDFN] on page 159.

Corrections have been made to the following packages:

- Drawing 123C, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body [DFN] on page 98.
- Drawing 131D, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] on page 104.
- Drawing 2116A, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 151.

Packaging

Revision AT (June 2008)

Revised 24-Lead Plastic Small Outline [SOIC], Wide, 7.50 mm Body package designator from (PF) to (OG) on page 104.

The following packages are new:

- Drawing 0143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body [QFN] on page 130.
- Drawing 0144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body [QFN] on page 132.
- Drawing 0140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body [QFN] on page 134.
- Drawing 0145A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 182.

Land patterns have been added for the following packages:

- Drawing 2060A, 3-Lead Plastic Small Outline Transistor (LB) Footprint [SC70] on page 43.
- Drawing 2061A, 5-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 45.
- Drawing 2015A, 7-Lead Plastic (EK) Footprint [DDPAK] on page 51.
- Drawing 2065A, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 89.
- Drawing 2065A, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body Footprint [SOIC] on page 91.
- Drawing 2108A, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 93.
- Drawing 2102A, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 97.
- Drawing 2102A, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body Footprint [SOIC] on page 99.
- Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 101.
- Drawing 2122A, 8-Lead Plastic Dual Flat, No Lead Package (MF) 6x5 mm Body Footprint [DFN-S] on page 119.
- Drawing 2127A, 16-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 127.
- Drawing 2126A, 20-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 129.
- Drawing 2143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 131.

- Drawing 2144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body Footprint [QFN] on page 133.
- Drawing 2140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body Footprint [QFN] on page 135.

Revision AU (June 2008)

Updated 8-Lead Plastic Small Outline (SM) Medium 5.28 mm Body Footprint [SOIJ] on page 95.

Revision AV (September 2008)

Added Drawing 0139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 124.

Revision AW (October 2008)

Revised 40-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN] on page 136, correcting the package designator from (MM) to (ML).

Revision AX (January 2009)

Added Drawing 149A, 64-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on page 140. This package is presented on 2 pages to facilitate a more explicit specification through the addition of geometric dimensioning and tolerancing (GD&T) information. GD&T symbols and rules are described and defined in the ASME Y14.5M-1994 standard (www.asme.org).

Revision AY (March 2009)

Revised Drawing 0131E, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] to the new two-page format. It is shown on pages 115-116.

Also revised Drawing 149B, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body [QFN] on pages 147-148. A corresponding land pattern (2149A), in the list below, was added.

The following packages are new:

- Drawing 151A, 6-Lead Plastic Small Outline Transistor (LT) [SC70] on pages 45-46.
- Drawing 2151A, 6-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 47.
- Drawing 2149A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body Footprint [QFN] on page 149.
- Drawing 068A, 16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 161-162.
- Drawing 2068A, 16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 163.

- Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 191-192.
- Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 193.
- Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 195-196.
- Drawing 8004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern Footprint [CSP] on page 197.
- Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on pages 199-200. This package was designated Drawing 145A in the last version of the packaging specification (00049AX).
- Drawing 8001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern Footprint [CSP] on page 201.
- Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.
- Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.
- Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.
- Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.
- Appendix B: Control Dimensions (inspection information) on page 217.

Revision AZ (April 2009)

The following drawings were removed:

- Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.
- Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.
- Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.
- Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.

Appendix B: “Control Dimensions” was modified to include the item “Foot Angle” under **B.1 “On Surface Mount Devices (SMD)”** on page 369.

Revision BA (April 2009)

The following drawing is new:

- Drawing 142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body [QFN] on pages 126-127.

The following drawing was corrected:

- Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 99. The second page of this drawing was incorrectly labeled as Drawing 2015A.

Note 4 on the following drawings has been modified to refer interested parties to a Microchip representative, instead of a data sheet, for details about the package:

- Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on page 194.
- Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on page 198.
- Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 202.

Revision BB (August 2009)

The following drawings are new:

- Drawing 0154A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body with 5.40x5.40 Exposed Pad [QFN] on pages 152-153.
- Drawing 0152A, 28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) 4x4x0.5 mm Body [UQFN] on pages 154-155.
- Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 157.
- Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 161.
- Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 169.
- Drawing 2087A, 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 171.
- Drawing 2088A, 20-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 177.
- Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 216-217.

Revision BC (January 2010)

The following drawings are new or corrected:

- Drawing 2097A, 68-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CER-QUAD] on page 31.
- Drawing 2112A, 84-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CER-QUAD] on page 33.
- Drawing 2104A, 3-Lead Plastic Small Outline Transistor (NB) Footprint [SOT-23] on page 44.
- Drawing 2104A, 3-Lead Plastic Small Outline Transistor (TT) Footprint [SOT-23] on page 46.
- Drawing 2091A, 5-Lead Plastic Small Outline Transistor (CT) Footprint [SOT-23] on page 48.
- Drawing 2091A, 5-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 50.
- Drawing 2028A, 6-Lead Plastic Small Outline Transistor (CH) Footprint [SOT-23] on page 52.

Packaging

- Drawing 2028A, 6-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 54.
- Drawing 2130A, 3-Lead Plastic Small Outline Transistor (CB) Footprint [SOT-23A] on page 56.
- Drawing 2029A, 3-Lead Plastic Small Outline Transistor Header (MB) Footprint [SOT-89] on page 58.
- Drawing 2030A, 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.
- Drawing 2128A, 5-Lead Plastic Thin Small Outline Transistor (OS) Footprint [TSOT] on page 73.
- Drawing 2011A, 3-Lead Plastic (EB) Footprint [DDPAK] on page 77.
- Drawing 2012A, 5-Lead Plastic (ET) Footprint [DDPAK] on page 79.
- Drawing 2064A, 20-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 105.
- Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 107.
- Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (LI) Square Footprint [PLCC] on page 109.
- Drawing 2023A, 32-Lead Plastic Leaded Chip Carrier (L) Rectangle Footprint [PLCC] on page 111.
- Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 113.
- Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (LW) Square Footprint [PLCC] on page 115.
- Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 117.
- Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (LS) Square Footprint [PLCC] on page 119.
- Drawing 2093A, 84-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 121.
- Drawing 056C, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ] on pages 134-135.
- Drawing 2094A, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 144.
- Drawing 2025A, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body Footprint [SOIC] on page 146.
- Drawing 2025A, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 148.
- Drawing 2052A, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body Footprint [SOIC] on page 150.
- Drawing 2052A, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 152.
- Drawing 062C, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on pages 159-160.
- Drawing 2131C, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 164.
- Drawing 0129C, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on pages 168-169.
- Drawing 2142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body Footprint [QFN] on page 177.
- Drawing 2139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body Footprint [QFN] on page 183.
- Drawing 118D, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on pages 194-195.
- Drawing 2118A, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body Footprint [QFN] on page 196.
- Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (UA) Footprint [MSOP] on page 211.
- Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (UN) Footprint [MSOP] on page 215.
- Drawing 2024A, 16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body Footprint [QSOP] on page 217.
- Drawing 2072A, 20-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 221.
- Drawing 2132A, 24-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 223.
- Drawing 2073A, 28-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 225.
- Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 229.
- Drawing 044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on pages 243-244.
- Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 245.
- Drawing 2071A, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 249.
- Drawing 2074A, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 257.
- Drawing 155A, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on pages 272-273.

- Drawing 2155A, 144-Lead Plastic Thin Quad Flat-pack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 274.
- Drawing 6005D, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 276-277.
- Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 276.
- Drawing 6004D, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 279-280.
- Drawing 6001C, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on pages 282-283.
- Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 286-287.
- Drawing 2148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 288.

Revision BD (February 2010)

The following drawings are new:

Drawings 6008A (2) and 8008A, 4-Lead Chip Scale Package (CS) Package Code AL [CSP] on pages 279-282.

Revision BE (June 2010)

The following drawings are new:

- Drawing 162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body w/exposed heat slug [SOIC] on pages 130-131.
- Drawing 2162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body Footprint [SOIC] on page 132.
- Drawing 120B (Sheet 2), 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 161.
- Drawing 2120A, 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body Footprint [DFN] on page 162.
- Drawing 2143B, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 193.
- Drawing 156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body [UQFN] on pages 214-215.
- Drawing 2156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 216.
- Drawing 087C (Sheet 2), 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 241.
- Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 257.

The following drawings have been revised:

- Drawing 2030C 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.
- Drawing 057C 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body [SOIC] on pages 124-125.
- Drawing 057C 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body [SOIC] on pages 124-125.
- Drawing 120B 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 160.
- Drawing 0129C 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 176-177.
- Drawing 087C 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 240.
- Drawing 044B 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on page 255-256.
- Drawing 008A 4-Lead Chip Scale (CS) [CSP] on page 291.
- Drawing 6008A 4-Lead Chip Scale Package PkgCode_AL (continued) (CS) 2x2 Ball Pattern [CSP] on page 292.
- Drawing 148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 302-303.
- Drawing 2148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 304.

Revision BF (July 2010)

Drawings C04-028A and C04-2028A with CHY package designators have been added for the 6-Lead Plastic Small Outline Transistor (CHY) [SOT-23] package and associated land pattern. The drawings appear on pages 53 and 54.

Revision BG (March 2011)

The following drawings are new:

- Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 136.
- Drawing 065C, 14-Lead Plastic Small Outline (sheet 2) (OD) Narrow, 3.90 mm Body [SOIC] on page 139.
- Drawing 108C, 16-Lead Plastic Small Outline (sheet 2) (SL) Narrow, 3.90 mm Body [SOIC] on page 142.
- Drawing 102C, 16-Lead Plastic Small Outline (sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 148.

Packaging

- Drawing 102C, 16-Lead Plastic Small Outline (sheet 2) (OE) Wide, 7.50 mm Body [SOIC] on page 151.
 - Drawing 051C, 18-Lead Plastic Small Outline (sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 154.
 - Drawing 094C, 20-Lead Plastic Small Outline (sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 157.
 - Drawing 025C, 24-Lead Plastic Small Outline (sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 160.
 - Drawing 025C, 24-Lead Plastic Small Outline (sheet 2) (OG) Wide, 7.50 mm Body [SOIC] on page 163.
 - Drawing 052C, 28-Lead Plastic Small Outline (sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 166.
 - Drawing 052C, 28-Lead Plastic Small Outline (sheet 2) (OI) Wide, 7.50 mm Body [SOIC] on page 169.
 - Drawing 078A, 6-Lead Plastic Dual Flat, No Lead Package (MY) 2x2x0.8 mm Body [TDFN] on pages 188-189.
 - Drawing 185A, 10-Lead Plastic Dual Flat, No Lead Package (MN) 3x3x0.8 mm Body [TDFN] on pages 193-194.
 - Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (sheet 2) (MF) 3x3x0.9 mm Body [DFN] on page 198.
 - Drawing 2063B, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 199.
 - Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (sheet 2) (MQ) 5x5x0.9 mm Body [QFN] on page 214.
 - Drawing 153A, 48-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 6x6x0.5 mm Body [UQFN] on pages 235-236.
 - Drawing 184A, 20-Lead Thermal Leadless Array Package (TL) 3x3x0.7 Exposed Pad [UQFN] on pages 326-237.
 - Drawing 187B, 36-Lead Thermal Leadless Array Package (TL) 5x5x0.9 Exposed Pad [TLA] on pages 328-329.
 - Drawing 157B, 44-Lead Thermal Leadless Array Package (TL) 6x6x0.9 Exposed Pad [TLA] on pages 330-331.
- The following drawings have been revised:
- Drawing 001C, 8-Lead Ceramic Dual In-Line w/Window (JA) .300" Body [CERDIP] on page 16.
 - Drawing 027C, 8-Lead Ceramic Dual In-Line (JW) .300" Body [CERDIP] on page 17.
 - Drawing 002C, 14-Lead Ceramic Dual In-Line (JD) .300" Body [CERDIP] on page 18.
 - Drawing 099C, 14-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 19.
 - Drawing 003C, 16-Lead Ceramic Dual In-Line w/Window (JE) .300" Body [CERDIP] on page 20.
 - Drawing 010C, 18-Lead Ceramic Dual In-Line (JW) .300" Body [CERDIP] on page 21.
 - Drawing 115C, 20-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 22.
 - Drawing 004C, 24-Lead Ceramic Dual In-Line (JG) .600" Body [CERDIP] on page 23.
 - Drawing 006C, 28-Lead Ceramic Dual In-Line (JN) .600" Body [CERDIP] on page 24.
 - Drawing 080C, 28-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 25.
 - Drawing 013C, 28-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [CERDIP] on page 26.
 - Drawing 008C, 40-Lead Ceramic Dual In-Line (JK) .600" Body [CERDIP] on page 27.
 - Drawing 014C, 40-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [CERDIP] on page 28.
 - Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body [SOIC] on page 132.
 - Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline w/exposed heat slug (sheet 2) (SE) Narrow, 3.90 mm Body [SOIC] on page 133.
 - Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 135.
 - Drawing 065C, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body [SOIC] on page 138.
 - Drawing 108C, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 141.
 - Drawing 102C, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 147.
 - Drawing 102C, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body [SOIC] on page 150.
 - Drawing 051C, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 153.
 - Drawing 094C, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 156.
 - Drawing 025C, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 159.
 - Drawing 025C, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body [SOIC] on page 162.
 - Drawing 052C, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 165.
 - Drawing 052C, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body [SOIC] on page 168.

- Drawing 2123B, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 178.
- Drawing 2062B, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 181.
- Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on page 197.
- Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 213.
- Drawing 149C, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body w/7.15x7.15 exposed pad [QFN] on page 225-226.
- Drawing 2156B, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 234.
- Drawing 2044B, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 277.
- Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 281.
- Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (PQ) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 283.
- Drawing 2022B, 64-Lead Plastic Metric Quad Flatpack (BU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP] on page 285.
- Drawing 2074B, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 289.
- Drawing 2076B, 44-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 291.
- Drawing 2085B, 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 293.
- Drawing 2116C, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 297.
- Drawing 2092B, 80-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 299.
- Drawing 2110B, 100-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 301.
- Drawing 2100B, 100-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 303.
- Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 304.

- Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (sheet 2) (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 305.
- Drawing 2155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 306.

Revision BH (November 2011)

The following drawings are new:

- Drawing 121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body on pages 130-131.
- Drawing 2121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body Footprint on page 132.
- Drawing 194A, 10-Lead Plastic Ultra Thin Dual Flat No Lead (NA[Y]) 3x3x0.5 mm Body [UDFN] on pages 342-343.
- Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

The following drawings have been revised:

- Drawing 111C, 8-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 254-255.
- Drawing 111C, 8-Lead Plastic Micro Small Outline Package (UA) [MSOP] on pages 257-258.
- Drawing 021C, 10-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 260-261.
- Drawing 021C, 10-Lead Plastic Micro Small Outline Package (UN) [MSOP] on pages 263-264.
- Drawing 148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [TFBGA] on pages 342-343.
- Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

Revision BJ (December 2011)

The following drawings are new:

- Drawing 188A, 8-Lead High Power Dual Flat, No Lead Package (MF) 5x6x1.0 mm Body [PDFN] on pages 200-201.
- Drawing 197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body [QFN] on pages 216-217.
- Drawing 2197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body Footprint [QFN] on page 220.

The following drawing has been revised:

- Drawing 120C, 6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) 2x2x0.9 mm Body [DFN] on pages 180-181.

Packaging

NOTES:

APPENDIX B: CONTROL DIMENSIONS

Microchip inspects the first lot of every new package. Thereafter, one lot of each package, from each assembly site, shall be inspected yearly.

The following dimensions shall be inspected on all types of packages:

- Package Length
- Package Width
- Package Height
- Lead or Contact Width
- Lead or Contact Pitch

The following packages contain dimensions that shall be added to the inspection described above.

B.1 On Surface Mount Devices (SMD)

- § Lead Coplanarity¹
- § Standoff*
- Molded Package Length (if different from overall package length)
- Side Flash
- Foot Angle

B.2 Through-Hole

- § Lead Span*

B.3 Surface Mount Devices And Through-Hole

- Molded Package Width
- Molded Package Thickness

B.4 DFN and QFN Only

- Contact Length
- Contact to Exposed Pad
- Exposed Pad Length
- Exposed Pad Width

¹ The § symbol denotes a significant characteristic specified in the control plan.

Packaging

NOTES:



Overview of Microchip Die/Wafer Support

INTRODUCTION

In addition to packaged devices, Microchip Technology Inc. devices are available in wafer and die form. All products sold in die or wafers have been characterized and qualified according to the requirements of Microchip Technology Inc. Specifications SPI-41014, "Characterization and Qualification of Integrated Circuits" and QCI-39000, "Worldwide Quality Conformance Requirements".

PRODUCT INTEGRITY

Product supplied in die or wafer form is fully tested and characterized. Die and wafers are inspected to Microchip Technology Inc. Specification, QCI-30014.

CAUTION

Some EEPROM devices use EPROM cells for device configuration. Exposure to ultraviolet light must be avoided. Exposure to ultraviolet light may cause the device to operate improperly.

Extreme care is urged in the handling and assembly of these products since they are susceptible to damage from electro-static discharge.

PACKAGING OPTIONS

Die/wafer products are available as individual Die in Waffle Pack, Whole Wafers or as Sawn Wafer on Frame. As a standard, all die on a wafer are tested and Ink Dots are used to indicate the bad die on a wafer. Inkless wafers with electronic wafer maps are also available upon request. To acquire individual electronic wafer maps, customers can request a password-protected account on a Microchip FTP site where their wafer maps are stored and easily downloaded.

Various wafer thicknesses are available, which include 8, 11, 15 and 29 mils for unground wafers. Standard wafer thickness varies from product to product, so contact your Microchip Sales Office for details.

ORDERING INFORMATION

Die sales must be initiated by contacting your Microchip Sales Office. To order or to obtain information (on pricing or delivery) for a specific device, use one of the following part numbers.

Standard Thickness Die/Wafer

DEVICE_NUMBER/S	Die in Waffle Pack
DEVICE_NUMBER/W	Whole Wafers
DEVICE_NUMBER/WF	Sawn Wafer on Frame

EEPROM Examples

24LC01B-I/S
24LC01B-I/W
24LC01B-I/WF

No Backgrind Wafers

DEVICE_NUMBER/WN BG	Whole Wafers with Ink
DEVICE_NUMBER/WN BI	Whole Wafers without Ink

24LC01B-I/WN BG
24LC01B-I/WN BI

Standard Die/Wafers with Manufacturing Process Included in Part Number

DEVICE_NUMBER/SXXX	Die in Waffle Pack	24LC01B-I/S15K
DEVICE_NUMBER/WXXX	Whole Wafers	24LC01B-I/W15K
DEVICE_NUMBER/WFXXX	Sawn Wafer on Frame	24LC01B-I/WF15K

DEVICE_NUMBER is the base part number of the device that you require, the S specifies Die in Waffle Pack, a W specifies a Whole Wafer and WF specifies Sawn Wafer on Frame. Whole wafers specified as N BG are shipped as inked wafers with no backgrind (29 mils) and those specified as N BI are shipped with no backgrind and without Ink.

As further clarification, the manufacturing process is sometimes indicated with a three digit suffix added at the end of the part number. For example, a wafer from the 160K process will use the suffix 16K, one from the 150K process will use 15K and one from the 121K process will use 12K.

Overview of Microchip Die/Wafer Support

ELECTRICAL SPECIFICATIONS

The functional and electrical specifications of Microchip devices in die form are identical to those of a packaged version. Please refer to individual data sheets for complete details.

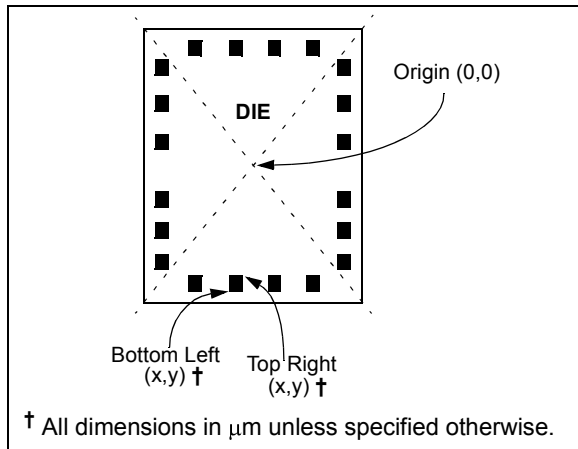
DIE MECHANICAL SPECIFICATIONS

Refer to the individual data sheet for these specifications.

BOND PAD COORDINATES

The die figures have associated bond pad coordinates. These coordinates assist in the attaching of the bond wire to the die. All the dimensions of these coordinates are in micrometers (μm) unless otherwise specified. The origin for the coordinates is the center of the die, as shown in Figure 1. Refer to the specific die data sheet for each device for openings and pitch.

FIGURE 1: DIE COORDINATE ORIGIN



The die is capable of thermosonic gold or ultrasonic wire bonding. Die meet the minimum conditions of MIL-STD 883, Method 2011 on "Bond Strength (Destructive Bond Pull Test)". The Bond Pad metallization is silicon doped aluminum.

SUBSTRATE BONDING

Substrate bonding may be required on certain product families. For more information, refer to the specific die data sheet for that product.

SHIPPING OPTIONS

Die Form (/S)

Microchip product in die form can be shipped in waffle pack. The waffle pack has sufficient cavity area to restrain the die, while maintaining their orientation. Lint free paper inserts are placed over the waffle packs, and each pack is secured with a plastic locking clip. Groups of waffle packs are assembled into sets for shipment. A label with lot number, quantity and part number is attached.

These waffle packs are hermetically sealed in bags.

Wafer Form (/W)

Products may also be shipped in wafer form (see ordering information). Wafers are uncut and shipped in a wafer tub. The tub is padded with non-conductive foam. Lint free paper inserts are placed around each wafer. A label with lot number, quantity and part number is attached.

Sawn Wafer on Frames (/WF)

Products may also be shipped on wafer frames. Wafers are mounted on plastic frames and 100% sawn through. Sawn wafer on frames may be shipped in bulk (25 wafers per carrier) or as a single wafer in a carrier. A label with lot number, quantity and part number is attached with each shipment.

Storage Procedures

Temperature and humidity greatly affect the storage life of die. It is recommended that the die be used as soon as possible after receipt.

Upon receipt, the sealed bags should be stored in a cool and dry environment (25°C and 25% relative humidity). In these conditions, sealed bags have a shelf life of 12 months. Temperatures or humidities greater than these will reduce the storage life.

Once a bag containing waffle packs has been opened, the devices should be assembled and encapsulated within 48 hours (assuming 25°C and 25% humidity).

Overview of Microchip Die/Wafer Support

NOTES:



MICROCHIP

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland
Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Farmington Hills, MI
Tel: 248-538-2250
Fax: 248-538-2260

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

Santa Clara
Santa Clara, CA
Tel: 408-961-6444
Fax: 408-961-6445

Toronto
Mississauga, Ontario,
Canada
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon
Hong Kong
Tel: 852-2401-1200
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing
Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Hangzhou
Tel: 86-571-2819-3187
Fax: 86-571-2819-3189

China - Hong Kong SAR
Tel: 852-2401-1200
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8203-2660
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-2566-1512
Fax: 91-20-2566-1513

Japan - Osaka
Tel: 81-66-152-7160
Fax: 81-66-152-9310

Japan - Yokohama
Tel: 81-45-471-6166
Fax: 81-45-471-6122

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung
Tel: 886-7-536-4818
Fax: 886-7-330-9305

Taiwan - Taipei
Tel: 886-2-2500-6610
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

UK - Wokingham
Tel: 44-118-921-5869
Fax: 44-118-921-5820

11/29/11