

# MC10H125

## Quad MECL-to-TTL Translator

### Description

The MC10H125 is a quad translator for interfacing data and control signals between the MECL section and saturated logic section of digital systems. The 10H part is a functional/pinout duplication of the standard MECL 10K™ family part, with 100% improvement in propagation delay, and no increase in power-supply current.

Outputs of unused translators will go to low state when their inputs are left open.

### Features

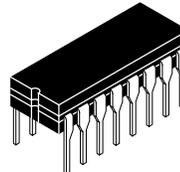
- Propagation Delay, 2.5 ns Typical
- Voltage Compensated
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- MECL 10K Compatible
- Pb-Free Packages are Available\*



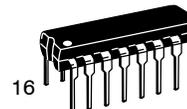
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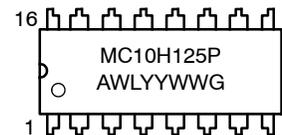
### MARKING DIAGRAMS\*



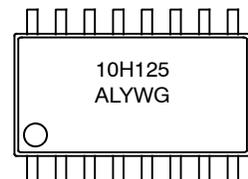
CDIP-16  
L SUFFIX  
CASE 620A



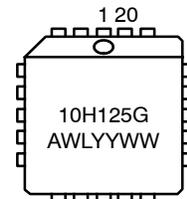
PDIP-16  
P SUFFIX  
CASE 648



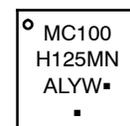
SOEIAJ-16  
CASE 966



PLLC-20  
FN SUFFIX  
CASE 775



QFN-16  
MN SUFFIX  
CASE 485G



A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G or ■ = Pb-Free Package

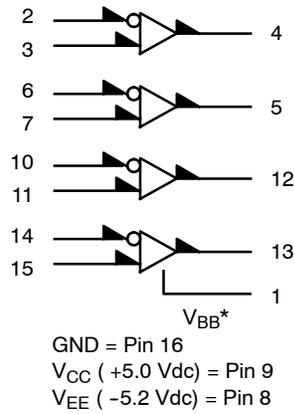
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

\*For additional marking information, refer to Application Note AND8002/D.

### ORDERING INFORMATION

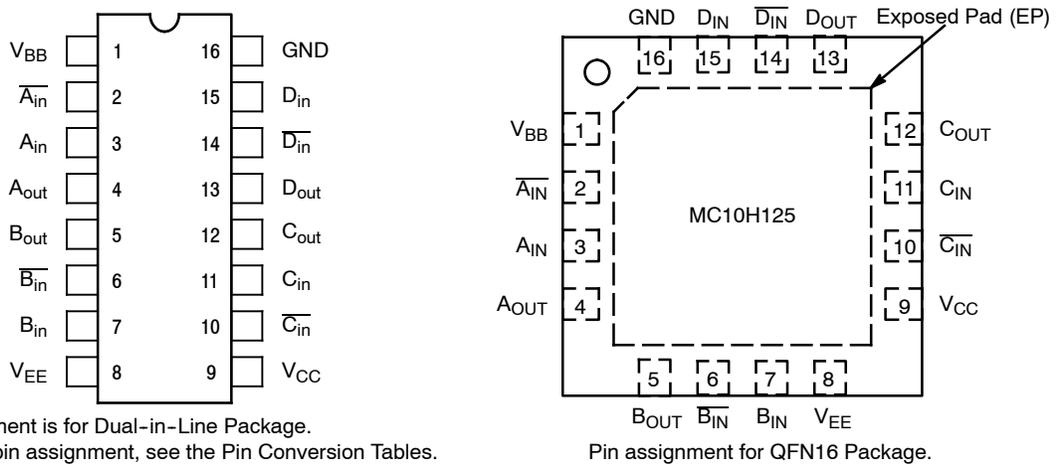
See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

# MC10H125



\* $V_{BB}$  to be used to supply bias to the MC10H125 only and bypassed (when used) with 0.01  $\mu$ F to 0.1  $\mu$ F capacitor to ground (0 V).  $V_{BB}$  can source < 1.0 mA.

**Figure 1. Logic Diagram**



**Figure 2. Pin Assignment**

## Table 1. DIP CONVERSION TABLES

### 16-Pin DIL to 20-Pin PLCC

16 PIN DIL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
20 PIN PLCC	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20				

### 20-Pin DIL to 20-Pin PLCC

20 PIN DIL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
20 PIN PLCC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

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**Table 2. MAXIMUM RATINGS**

Symbol	Characteristic	Rating	Unit	
V <sub>EE</sub>	Power Supply (V <sub>CC</sub> = 5.0 V)	-8.0 to 0	Vdc	
V <sub>CC</sub>	Power Supply (V <sub>EE</sub> = -5.2 V)	0 to +7.0	Vdc	
V <sub>I</sub>	Input Voltage (V <sub>CC</sub> = 5.0 V)	0 to V <sub>EE</sub>	Vdc	
T <sub>A</sub>	Operating Temperature Range	0 to +75	°C	
T <sub>stg</sub>	Storage Temperature Range	- Plastic - Ceramic	-55 to +150 -55 to +165	°C °C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

**Table 3. ELECTRICAL CHARACTERISTICS** (V<sub>EE</sub> = -5.2 V +5%; V<sub>CC</sub> = 5.0 V + 5.0 %) (Note 2)

Symbol	Characteristic	0°		25°		75°		Unit
		Min	Max	Min	Max	Min	Max	
I <sub>E</sub>	Negative Power Supply Drain Current	-	44	-	40	-	44	mA
I <sub>CCH</sub>	Positive Power Supply Drain Current	-	63	-	63	-	63	mA
I <sub>CCL</sub>		-	40	-	40	-	40	mA
I <sub>inH</sub>	Input Current	-	225	-	145	-	145	μA
I <sub>CBO</sub>	Input Leakage Current	-	1.5	-	1.0	-	1.0	μA
V <sub>OH</sub>	High Output Voltage I <sub>OH</sub> = -1.0 mA	2.5	-	2.5	-	2.5	-	Vdc
V <sub>OL</sub>	Low Output Voltage I <sub>OL</sub> = +20 mA	-	0.5	-	0.5	-	0.5	Vdc
V <sub>IH</sub>	High Input Voltage (Note 1)	-1.17	-0.84	-1.13	-0.81	-1.07	-0.735	Vdc
V <sub>IL</sub>	Low Input Voltage (Note 1)	-1.95	-1.48	-1.95	-1.48	-1.95	-1.45	Vdc
I <sub>OS</sub>	Short Circuit Current	60	150	60	150	50	150	mA
V <sub>BB</sub>	Reference Voltage	-1.38	-1.27	-1.35	-1.25	-1.31	-1.19	Vdc
V <sub>CMR</sub>	Common Mode Range (Note 3)	-	-	-2.85 to +0.3				V
		<b>Typical</b>						
V <sub>PP</sub>	Input Sensitivity (Note 4)	150						mV

1. When V<sub>BB</sub> is used as the reference voltage.
2. Each MECL 10H™ series circuit has been designed to meet the specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained.
3. Differential input not to exceed 1.0 Vdc.
4. 150 mV<sub>p-p</sub> differential input required to obtain full logic swing on output.

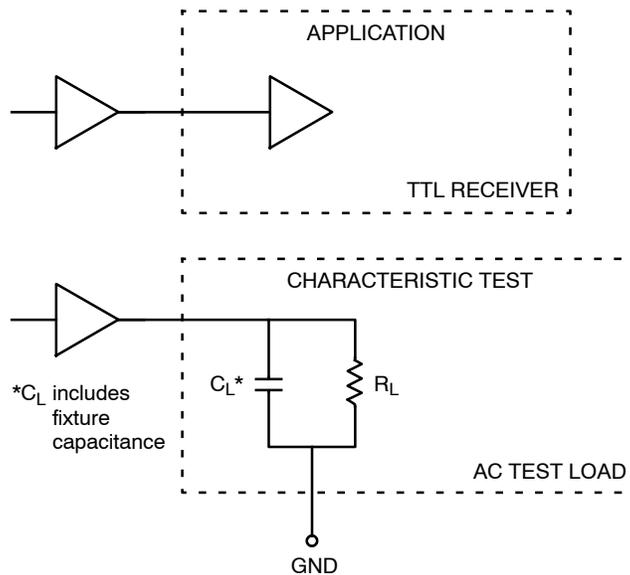
# MC10H125

**Table 4. AC CHARACTERISTICS**

Symbol	Characteristic	0°		25°		75°		Unit
		Min	Max	Min	Max	Min	Max	
$t_{pd}$	Propagation Delay	0.8	3.3	0.85	3.35	0.9	3.4	ns
$t_r$	Rise Time (Note 5)	0.3	1.2	0.3	1.2	0.3	1.2	ns
$t_f$	Fall Time (Note 5)	0.3	1.2	0.3	1.2	0.3	1.2	ns

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

5. Output Voltage = 1.0 V to 2.0 V.  $R_L = 500 \Omega$  to GND and  $C_L = 25$  pF to GND. Refer to Figure 1.



**Figure 1. TTL Output Loading Used for Device Evaluation**

## APPLICATION INFORMATION

The MC10H125 incorporates differential inputs and Schottky TTL “totem pole” outputs. Differential inputs allow for use as an inverting/non-inverting translator or as a differential line receiver. The  $V_{BB}$  reference voltage is available on Pin 1 for use in single-ended input biasing. The outputs of the MC10H125 go to a low-logic level whenever the inputs are left floating, and a high-logic output level is achieved with a minimum input level of  $150 \text{ mV}_{p-p}$ .

An advantage of this device is that MECL-level information can be received, via balanced twisted pair lines, in the TTL equipment. This isolates the MECL-logic from the noisy TTL environment. Power supply requirements are ground, +5.0 V and -5.2 V.

## MC10H125

### ORDERING INFORMATION

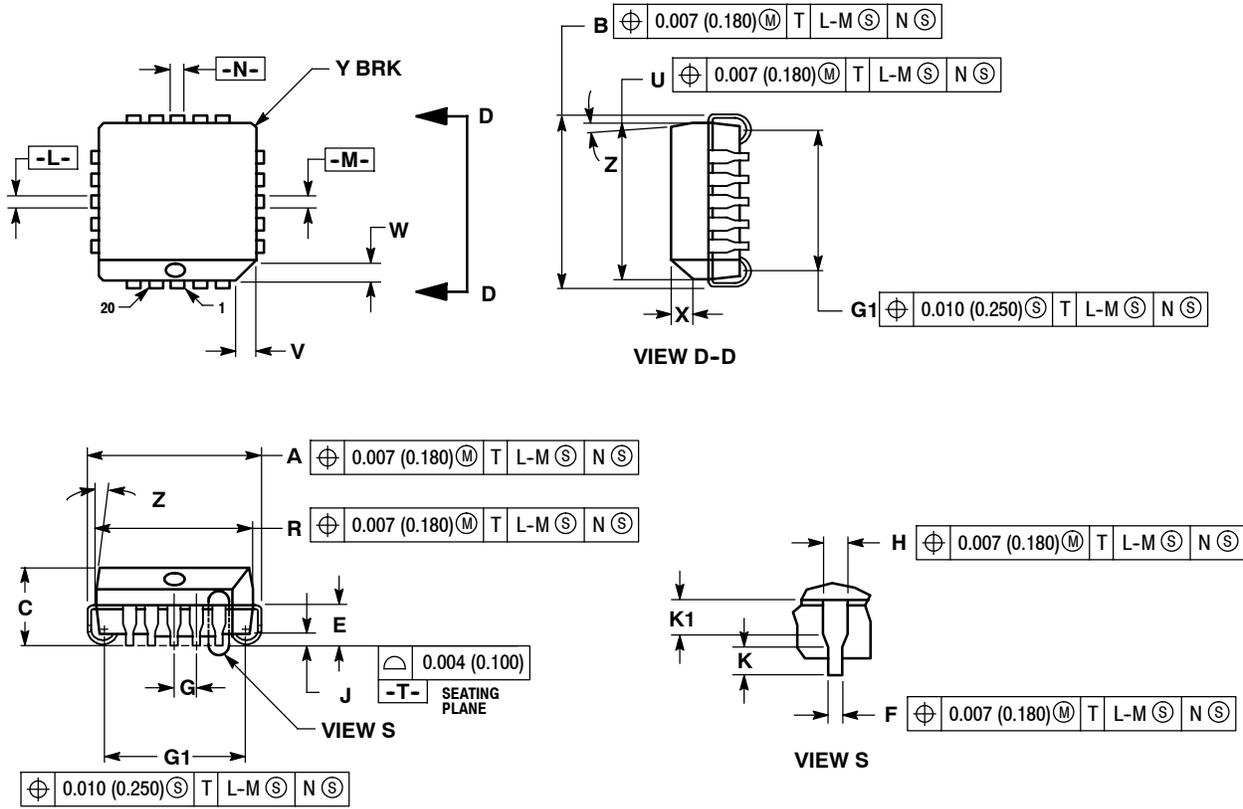
Device	Package	Shipping†
MC10H125FN	PLLC-20	46 Units / Rail
MC10H125FNG	PLLC-20 (Pb-Free)	46 Units / Rail
MC10H125FNR2	PLLC-20	500 / Tape & Reel
MC10H125FNR2G	PLLC-20 (Pb-Free)	500 / Tape & Reel
MC10H125L	CDIP-16	25 Unit / Rail
MC10H125M	SOEIAJ-16	50 Unit / Rail
MC10H125MG	SOEIAJ-16 (Pb-Free)	50 Unit / Rail
MC10H125MEL	SOEIAJ-16	2000 / Tape & Reel
MC10H125MELG	SOEIAJ-16 (Pb-Free)	2000 / Tape & Reel
MC10H125P	PDIP-16	25 Unit / Rail
MC10H125PG	PDIP-16 (Pb-Free)	25 Unit / Rail
MC10H125MNG	QFN-16, 3 x 3 mm (Pb-Free)	123 Units / Rail
MC10H125MNTXG	QFN-16, 3 x 3 mm (Pb-Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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## PACKAGE DIMENSIONS

20 LEAD PLLC  
CASE 775-02  
ISSUE F



**NOTES:**

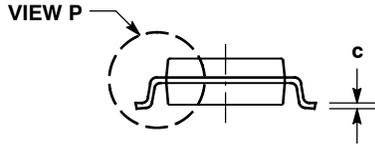
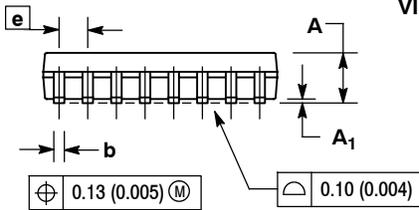
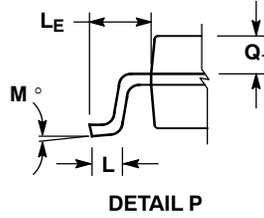
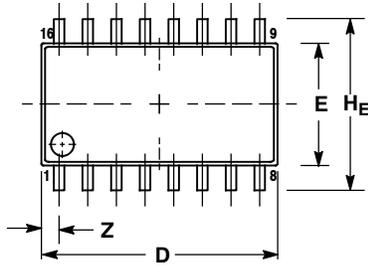
- DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
- DIMENSIONS IN INCHES.
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONS IN THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.385	0.395	9.78	10.03
B	0.385	0.395	9.78	10.03
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.021	0.33	0.53
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	---	0.51	---
K	0.025	---	0.64	---
R	0.350	0.356	8.89	9.04
U	0.350	0.356	8.89	9.04
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	---	0.020	---	0.50
Z	2°	10°	2°	10°
G1	0.310	0.330	7.88	8.38
K1	0.040	---	1.02	---

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## PACKAGE DIMENSIONS

### SOEIAJ-16 CASE 966-01 ISSUE A

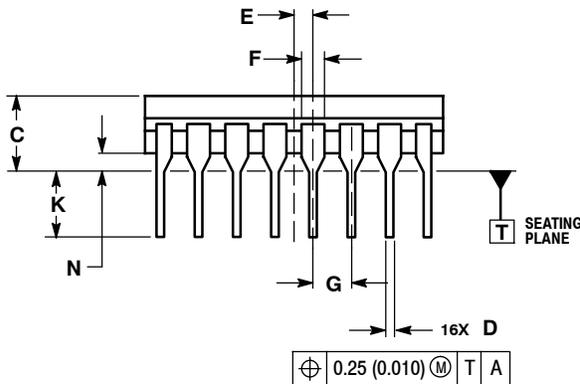
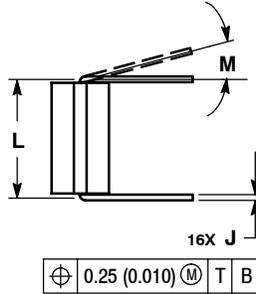
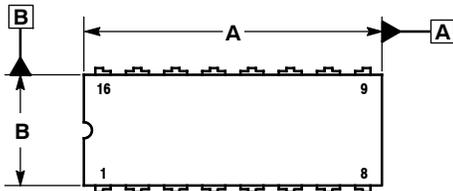


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A <sub>1</sub>	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.10	0.20	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
HE	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
LE	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q <sub>1</sub>	0.70	0.90	0.028	0.035
Z	---	0.78	---	0.031

### CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620A-01 ISSUE O



NOTES:

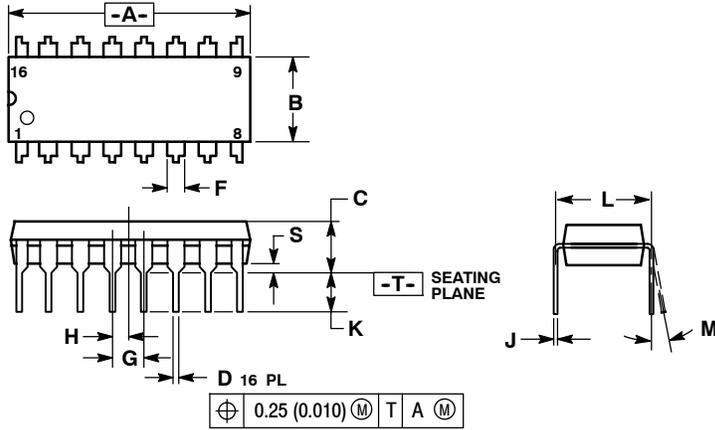
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
5. THIS DRAWING REPLACES OBSOLETE CASE OUTLINE 620-10.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.750	0.785	19.05	19.93
B	0.240	0.295	6.10	7.49
C	---	0.200	---	5.08
D	0.015	0.020	0.39	0.50
E	0.050 BSC		1.27 BSC	
F	0.055	0.065	1.40	1.65
G	0.100 BSC		2.54 BSC	
H	0.008	0.015	0.21	0.38
K	0.125	0.170	3.18	4.31
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

# MC10H125

## PACKAGE DIMENSIONS

PDIP-16  
CASE 648-08  
ISSUE T



NOTES:

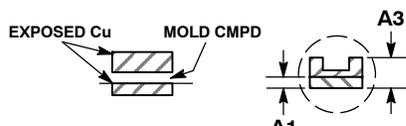
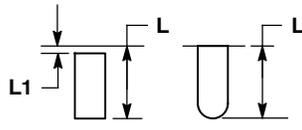
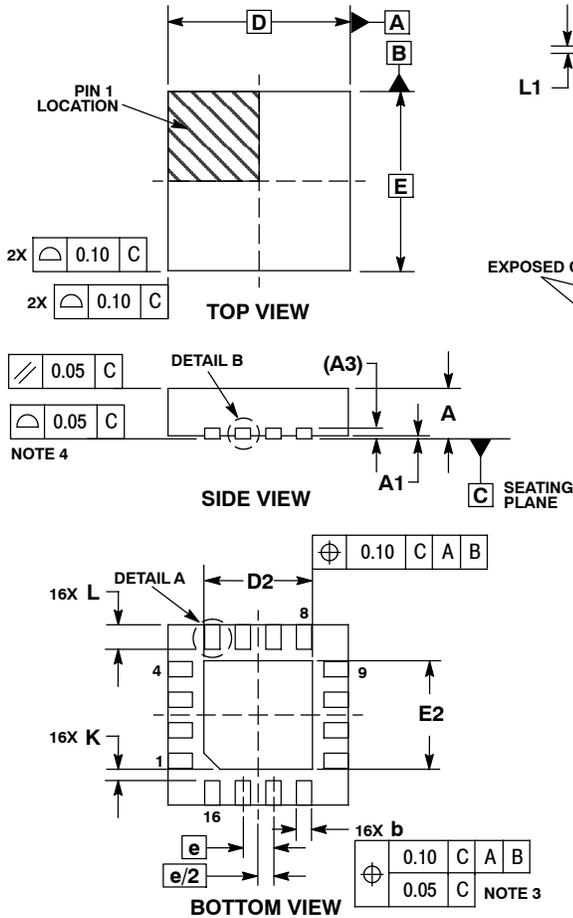
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0° 10°		0° 10°	
S	0.020	0.040	0.51	1.01

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## PACKAGE DIMENSIONS

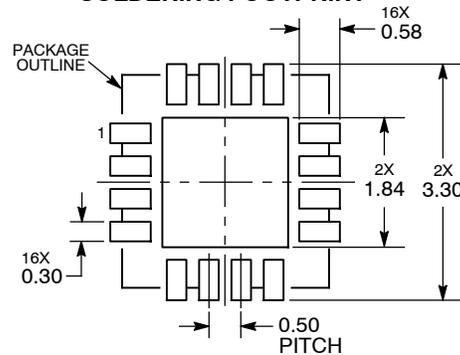
QFN16 3x3, 0.5P  
CASE 485G-01  
ISSUE E



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
  4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.20 REF	
b	0.18	0.30
D	3.00 BSC	
D2	1.65	1.85
E	3.00 BSC	
E2	1.65	1.85
e	0.50 BSC	
K	0.18 TYP	
L	0.30	0.50
L1	0.00	0.15

### RECOMMENDED SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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