CM1204

4-Channel ESD Array in CSP

Product Description

The CM1204 is a quad ESD transient voltage suppression diode array. Each diode provides a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). These diodes safely dissipate ESD strikes of ±15 kV, exceeding the maximum requirement of the IEC 61000-4-2 international standard. Using the MIL-STD-883 (Method 3015) specification for Human Body Model (HBM) ESD, the device provides protection for contact discharges to greater than ±30 kV.

The CM1204 is particularly well suited for portable electronics (e.g., cellular telephones, PDAs, notebook computers) because of its small package format and low weight.

The CM1204 features *Optiguard™* coating which results in improved reliability at assembly. It is available in a space-saving, low-profile chip scale package with RoHS-compliant lead-free finishing.

Features

- Functionally and Pin Compatible with ON Semiconductor's CSPESD304
- Optiguard™ Coated for Improved Reliability
- Four Channels of ESD Protection
- ±15 kV ESD Protection on Each Channel (IEC 61000-4-2 Level 4, Contact Discharge)
- ±30 kV ESD Protection on Each Channel (HBM)
- Chip Scale Package Features Extremely Low Lead Inductance for Optimum ESD Protection
- 5-bump, 0.960 mm X 1.330 mm Footprint Chip Scale Package (CSP)
- These Devices are Pb−Free and are RoHS Compliant

Applications

- ESD Protection for Sensitive Electronic Equipment
- I/O Port and Keypad and Button Circuitry Protection for Portable Devices
- Wireless Handsets
- Handheld PCs / PDAs
- MP3 Players
- Digital Camcorders
- Notebooks
- Desktop PCs

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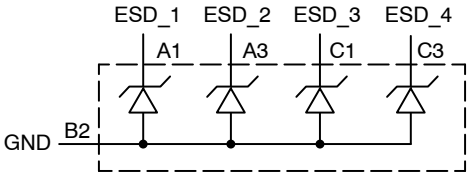
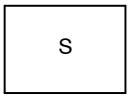
http://onsemi.com

CSP−5
CP SUFFIX
CASE 567AY

BLOCK DIAGRAM



MARKING DIAGRAM



S = Specific Device Code

ORDERING INFORMATION

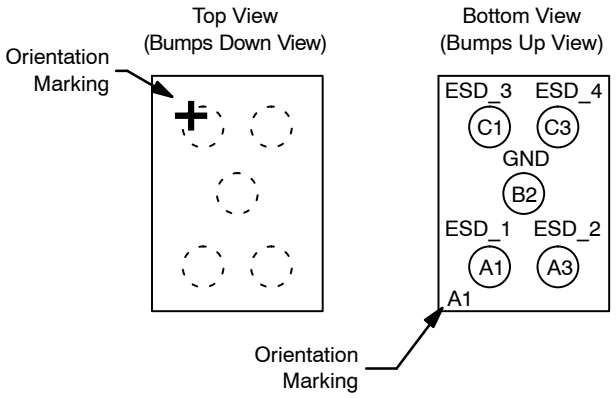
Device	Package	Shipping†
CM1204−03CP	CSP (Pb−Free)	3500/Tape & Reel

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

Table 1. PIN DESCRIPTIONS

Pin	Name	Description
A1	ESD_1	ESD Channel 1
A3	ESD_2	ESD Channel 2
B2	GND	Device Ground
C1	ESD_3	ESD Channel 3
C3	ESD_4	ESD Channel 4

PACKAGE / PINOUT DIAGRAMS



CM1204
CSP Package with OptiGuard™

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC Package Power Rating	200	mW

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. STANDARD OPERATING CONDITIONS

Parameter	Rating	Units
Operating Temperature Range	−40 to +85	°C

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{DIODE}	Diode Reverse Breakdown Voltage	I_{DIODE} = 10 μA		6.0		V
I_{LEAK}	Diode Leakage Current	V_{IN} = 3.3 V, T_A = 25°C			100	nA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{DIODE} = 10 mA	 5.6 −1.5	 6.8 −0.8	 9.0 −0.4	V
V_{ESD}	In-system ESD Withstand Voltage a) Human Body Model, MIL-STD-883, Method 3015 b) Contact Discharge per IEC 61000-4-2	(Note 2)	 ±30 ±15			kV
V_{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8 kV Positive Transients Negative Transients	(Note 2)		 +15 −8		V
C_{DIODE}	Diode Capacitance	At 2.5 VDC Reverse Bias, 1 MHz, 30 mVAC	22	27	32	pF

1. T_A = −40 to +85°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.

PERFORMANCE INFORMATION

Diode Characteristics (nominal conditions unless specified otherwise)

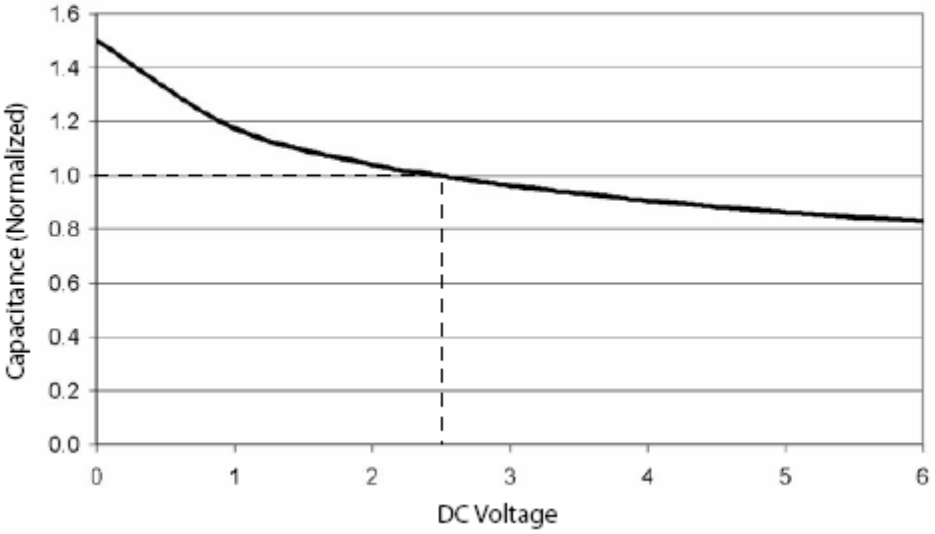


Figure 1. Typical Diode Capacitance vs. Input Voltage (Normalized to 2.5 VDC)

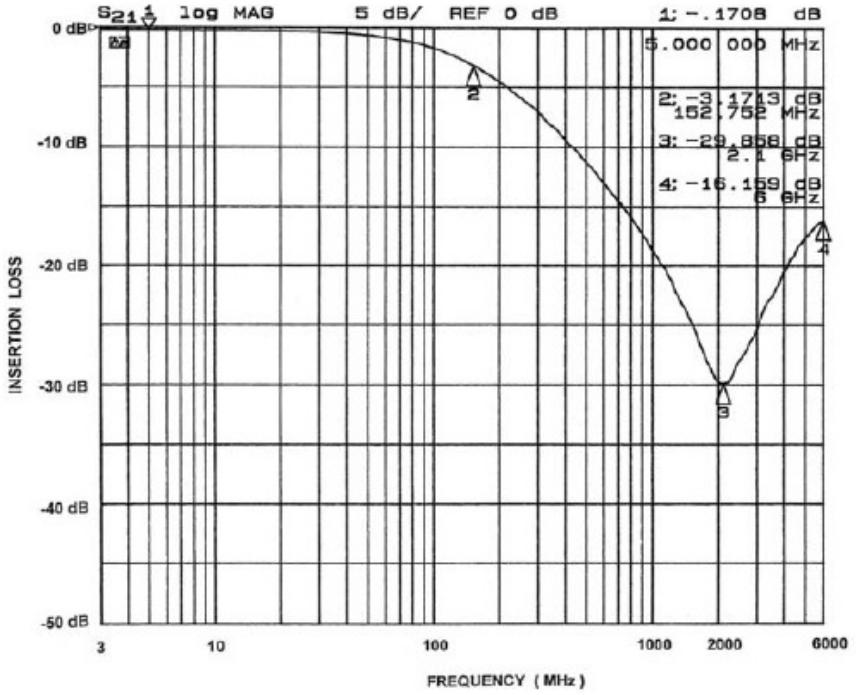


Figure 2. Frequency Response (Single Channel vs. GND, in 50 Ω System)

APPLICATION INFORMATION

Refer to Application Note “The Chip Scale Package”, for a detailed description of Chip Scale Packages offered by ON Semiconductor.

Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

Parameter	Value
Pad Size on PCB	0.275 mm
Pad Shape	Round
Pad Definition	Non−Solder Mask defined pads
Solder Mask Opening	0.325 mm Round
Solder Stencil Thickness	0.125 mm − 0.150 mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330 mm Round
Solder Flux Ratio	50/50 by volume
Solder Paste Type	No Clean
Pad Protective Finish	OSP (Entek Cu Plus 106 A)
Tolerance — Edge To Corner Ball	±50 μm
Solder Ball Side Coplanarity	±20 μm
Maximum Dwell Time Above Liquidous	60 seconds
Maximum Soldering Temperature	260°C

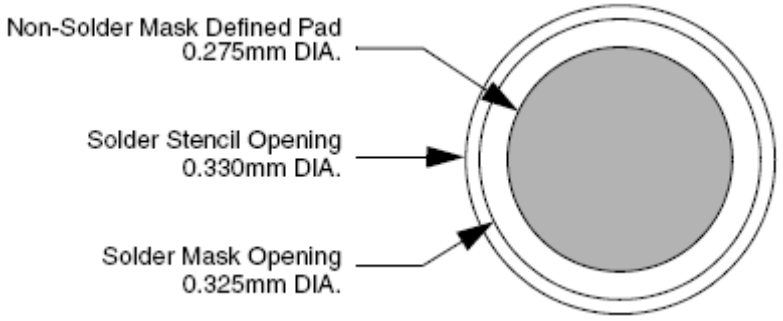


Figure 3. Recommended Non−Solder Mask Defined Pad Illustration

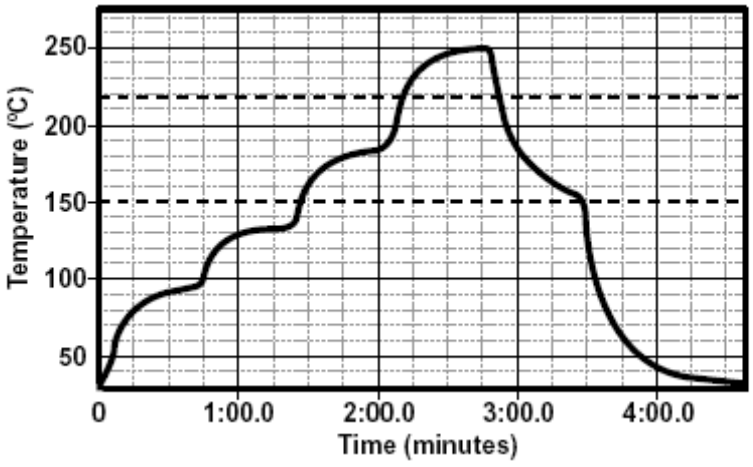
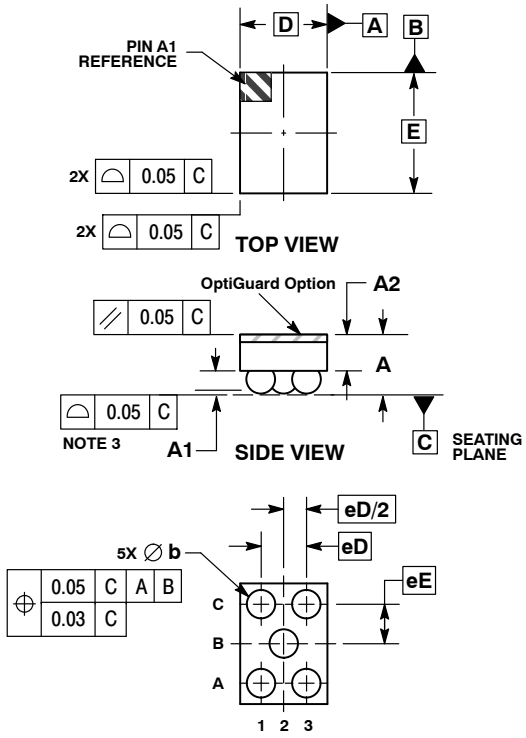


Figure 4. Lead−free (SnAgCu) Solder Ball Reflow Profile

WLCSP5, 0.96x1.33
CASE 567AY−01
ISSUE O

SCALE 4:1

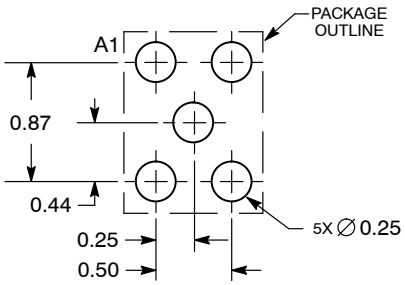
DATE 26 JUL 2010



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.56	0.72
A1	0.21	0.27
A2	0.40 REF	
b	0.29	0.35
D	0.96 BSC	
E	1.33 BSC	
eD	0.50 BSC	
eE	0.435 BSC	

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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DESCRIPTION:	**WLCSP5, 0.96X1.33**		**PAGE 1 OF 1**

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