CM1220

4 and 8-Channel ESD Protection Arrays in CSP

ON Semiconductor®

http://onsemi.com



WLCSP5
CP SUFFIX
CASE 567AY



WLCSP10
CP SUFFIX
CASE 567BL

Description

The CM1220 ESD protection arrays are available in four and eight channel configurations. Each ESD channel features a nominal capacitance of 14 pF making the devices ideal for protecting high speed I/O ports and LCD and camera data lines without significantly affecting signal integrity. The CM1220 integrates avalanche−type ESD diodes on every channel, providing 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 IEC61000−4−2 international standard. Using the MIL−STD−883 (Method 3015) specification for Human Body Model (HBM) ESD, the CM1220 protect against contact discharges at greater than ±30 kV.

These devices are particularly well−suited for portable electronics (e.g. wireless handsets, PDAs, notebook computers) because of their small package and easy−to−use pin assignments. In particular, the CM1220 is ideal for protecting high speed I/O ports and data and control lines for the LCD display and camera interface in mobile handsets.

The CM1220 incorporates ON Semiconductor's *OptiGuard*™ coating for improved reliability at assembly in a space−saving, low−profile Chip Scale Package.

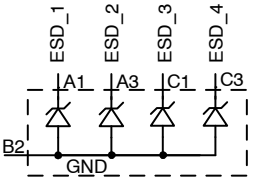
Features

- Four and Eight Channels of ESD Protection
- *OptiGuard*™ Coated for Improved Reliability
- ±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 (CSP) Features Extremely Low Lead Inductance for Optimum ESD Protection
- 5 bump, 0.960 mm X 1.330 mm CSP Footprint for CM1220−04
- 10 bump, 1.960 mm X 1.330 mm CSP Footprint for CM1220−08
- These Devices are Pb−Free and are RoHS Compliant

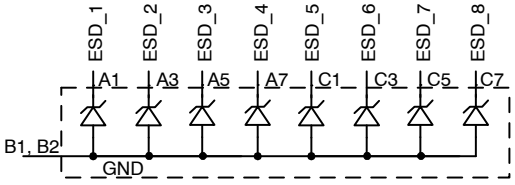
Applications

- LCD and Camera Data Lines in Mobile Handsets
- I/O Port Protection for Mobile Handsets, Notebook Computers, PDAs, etc.
- Keypads and Buttons
- Wireless Handsets
- Handheld PCs/PDAs
- LCD and Camera Modules

BLOCK DIAGRAM

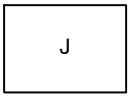


CM1220−04

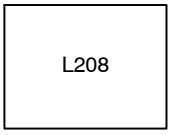


CM1220−08

MARKING DIAGRAM



CM1220−04
5−Bump CSP Package



CM1220−08
10−Bump CSP Package

J = CM1220−04CP
L208 = CM1220−08CP

ORDERING INFORMATION

Device	Package	Shipping†
CM1220−04CP	CSP−5 (Pb−Free)	3500/Tape & Reel
CM1220−08CP	CSP−10 (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.

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PACKAGE / PINOUT DIAGRAMS

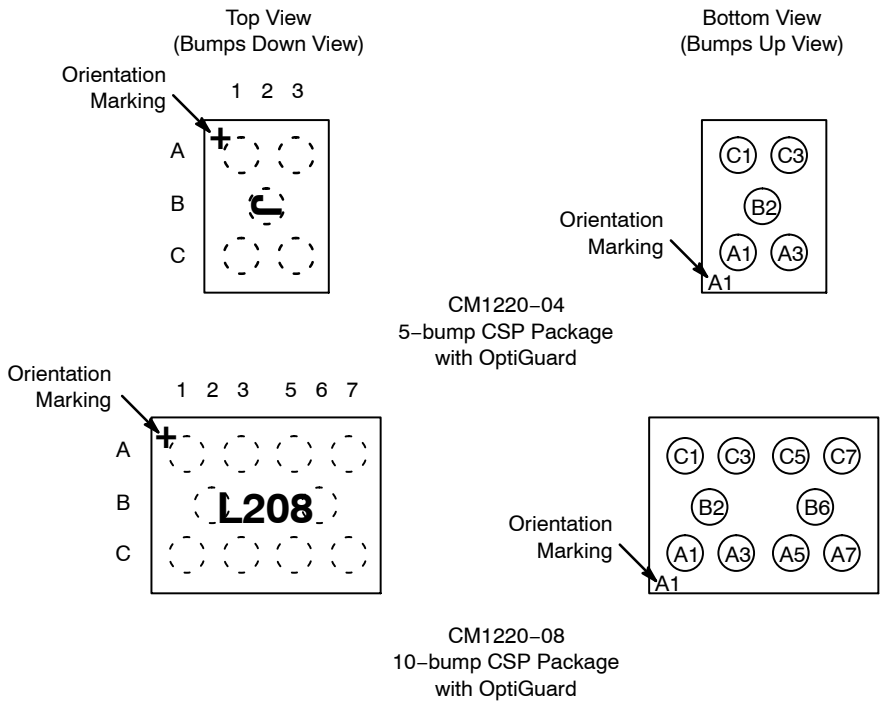


Table 1. PIN DESCRIPTIONS

CM1220−08		CM1220−04			CM1220−08		CM1220−04		
Pins	**Name**	**Pins**	**Name**	**Description**	**Pins**	**Name**	**Pins**	**Name**	**Description**
A1	ESD1	A1	ESD1	ESD Channel	C1	ESD5	C1	ESD3	ESD Channel
A3	ESD2	A3	ESD2	ESD Channel	C3	ESD6	C3	ESD4	ESD Channel
A5	ESD3	–	–	ESD Channel	C5	ESD7	–	–	ESD Channel
A7	ESD4	–	–	ESD Channel	C7	ESD8	–	–	ESD Channel
B2	GND	B2	GND	Device Ground	B6	GND	–	–	Device Ground

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°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. 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
C_{DIODE}	Diode (Channel) Capacitance	At 2.5 VDC Reverse Bias, 1 MHz, 30 mVAC	11	14	17	pF
V_{DIODE}	Diode Standoff Voltage	I_{DIODE} = 10 μA		6.0		V
I_{LEAK}	Diode Leakage Current	V_{IN} = +3.3 V (reverse bias voltage)		0.1	1	μA
V_{SIG}	Signal Clamp 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
R_{DYN}	Dynamic Resistance Positive Negative			 2.3 0.9		Ω

1. T_A = 25 °C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time. Unused pins are left open.

PERFORMANCE INFORMATION

Diode Characteristics (nominal conditions unless specified otherwise)

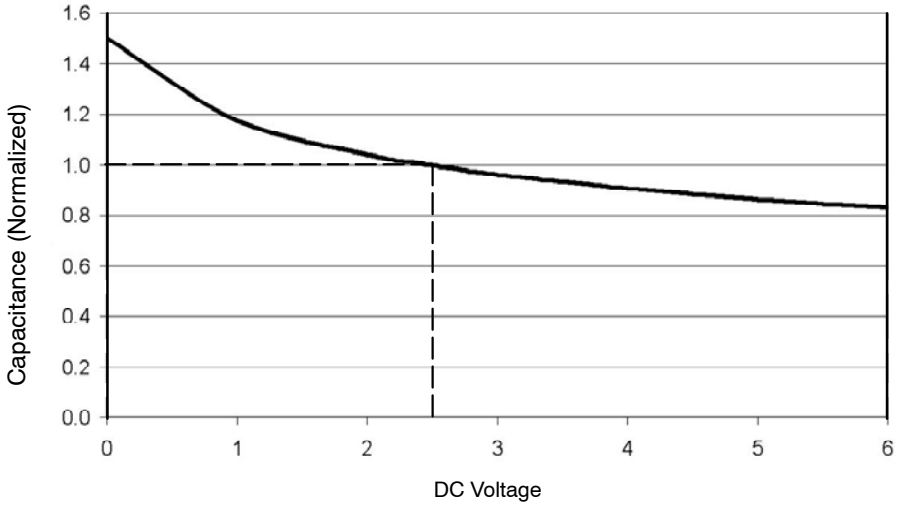


Figure 1. Insertion Loss vs. Frequency (0 V Bias)

APPLICATION INFORMATION

Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

Parameter	Value
Pad Size on PCB	0.240 mm
Pad Shape	Round
Pad Definition	Non−Solder Mask defined pads
Solder Mask Opening	0.290 mm Round
Solder Stencil Thickness	0.125 − 0.150 mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.300 mm Round
Solder Flux Ratio	50/50 by volume
Solder Paste Type	No Clean
Pad Protective Finish	OSP (Entek Cu Plus 106A)
Tolerance − Edge To Corner Ball	±50 μm
Solder Ball Side Coplanarity	±20 μm
Maximum Dwell Time Above Liquidous (183°C)	60 seconds
Maximum Soldering Temperature for Lead−free Devices using a Lead−free Solder Paste	260°C

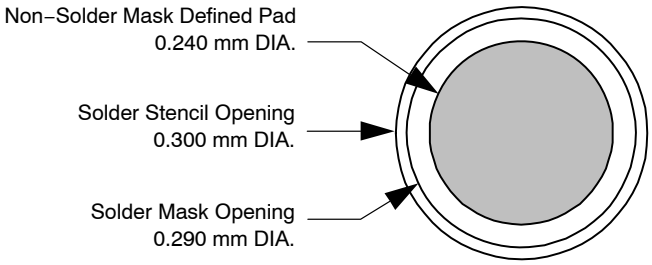


Figure 2. Recommended Non−Solder Mask Defined Pad Illustration

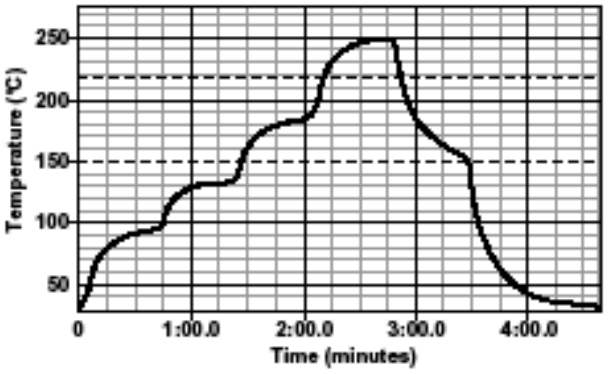
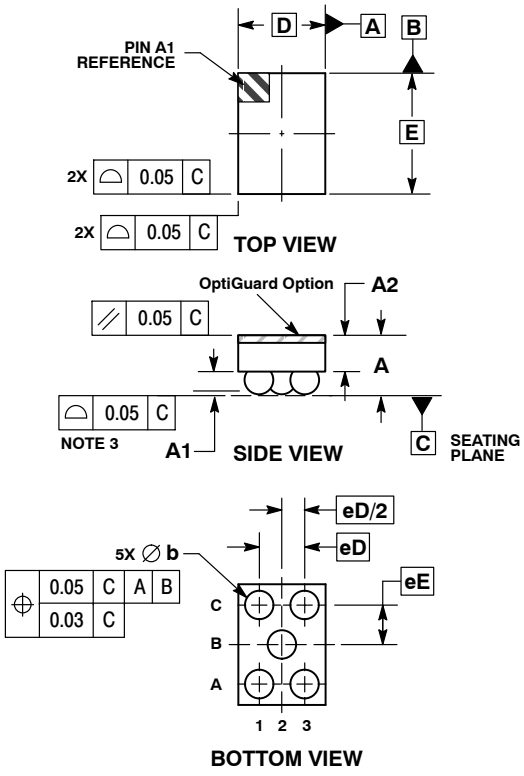


Figure 3. Lead−free (SnAgCu) Solder Ball Reflow Profile

PACKAGE DIMENSIONS

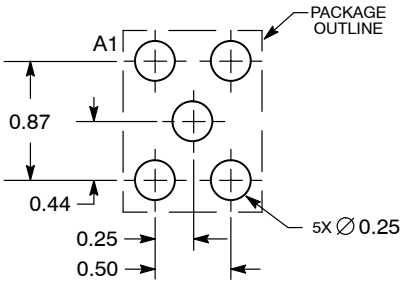
WLCSP5, 0.96x1.33
CASE 567AY−01
ISSUE O



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*

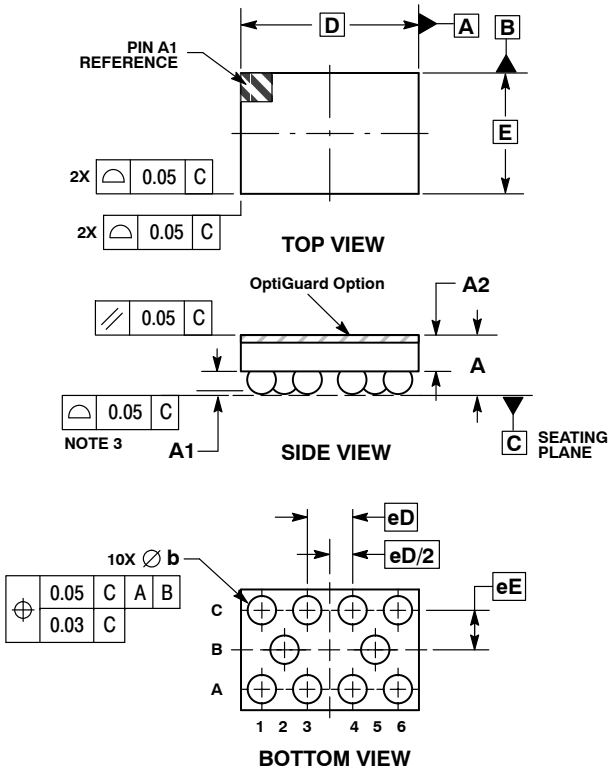


DIMENSIONS: MILLIMETERS

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

PACKAGE DIMENSIONS

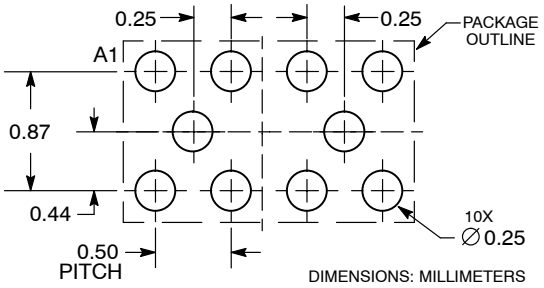
WLCSP10, 1.96x1.33
CASE 567BL−01
ISSUE O



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