4-Channel ESD Array in CSP

Features

- Functionally and pin compatible with CMD's CSPESD304
- Optiguard™ coated for improved reliability
- Four channels of ESD protection
- ±15kV ESD protection on each channel (IEC 61000-4-2 Level 4, contact discharge)
- ±30kV ESD protection on each channel (HBM)
- Chip Scale Package features extremely low lead inductance for optimum ESD protection
- 5-bump, 0.960mm X 1.330mm footprint Chip Scale Package (CSP)
- Lead-free version available

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

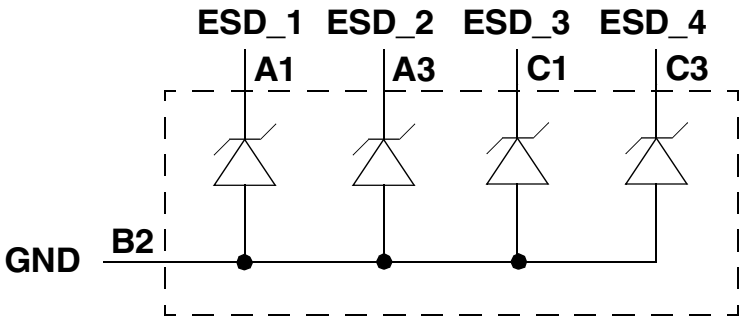
Product Description

The CM1204 is a quad ESD transient voltage supression 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 are designed and characterized to safely dissipate ESD strikes of ±15kV, 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 ±30kV.

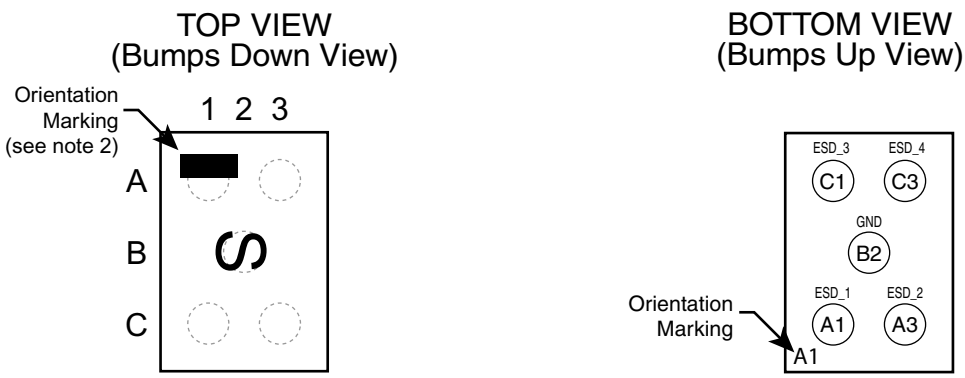
The CM1204 is particularly well suited for portable electronics (e.g., cellular telephones, PDAs, notebook computers) because of its small package format and low weight.

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 optional lead-free finishing.

Electrical Schematic



PACKAGE / PINOUT DIAGRAMS



CM1204
CSP Package with OptiGuard™

Notes:
1) These drawings are not to scale.
2) Lead-free devices are specified by using a "**+**" character for the top side orientation mark.

PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION
A1	ESD1	ESD Channel1
A3	ESD2	ESD Channel 2
B2	GND	Device Ground
C1	ESD3	ESD Channel 3
C3	ESD4	ESD Channel 4

Ordering Information

PART NUMBERING INFORMATION

Pins	Package	Standard Finish		Lead-free Finish[2]	
		Ordering Part Number[1]	Part Marking	Ordering Part Number[1]	Part Marking
5	CSP	CM1204-03CS	S	CM1204-03CP	S

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.
Note 2: Lead-free devices are specified by using a "**+**" character for the top side orientation mark.

Specifications

ABSOLUTE MAXIMUM RATINGS		
PARAMETER	**RATING**	**UNITS**
Storage Temperature Range	-65 to +150	°C
DC Package Power Rating	200	mW

STANDARD OPERATING CONDITIONS		
PARAMETER	**RATING**	**UNITS**
Operating Temperature Range	-40 to +85	°C

ELECTRICAL OPERATING CHARACTERISTICS (SEE NOTE 1)						
SYMBOL	**PARAMETER**	**CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNITS**
V_{DIODE}	Diode Reverse Breakdown Voltage	I_{DIODE} = 10µA	5.5			V
I_{LEAK}	Diode Leakage Current	V_{IN}=3.3V, T_A=25°C			100	nA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{DIODE} = 10mA	 5.6 -0.4	 6.8 -0.8	 9.0 -1.5	 V 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	Notes 2, 3 and 4	 ±30 ±15			 kV kV
V_{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8kV Positive Transients Negative Transients	Notes 2, 3 and 4		 +15 -8		 V V
C_{DIODE}	Diode Capacitance	At 2.5VDC Reverse Bias, 1MHz, 30mVAC	22	27	32	pF

Note 1: T_A=-40 to +85°C unless otherwise specified.
Note 2: ESD applied to input and output pins with respect to GND, one at a time.
Note 3: Unused pins are left open
Note 4: These parameters are guaranteed by design and characterization.

Performance Information

Diode Characteristics (nominal conditions unless specified otherwise)

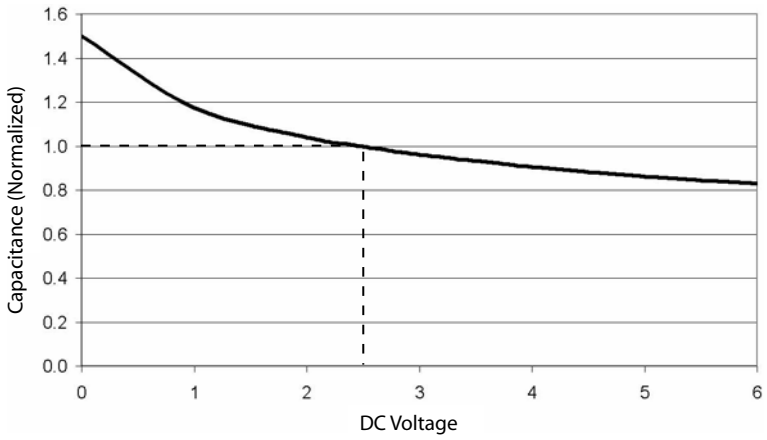


Figure 1. Typical Diode Capacitance VS. Input Voltage (normalized to 2.5VDC)

Application Information

Refer to Application Note AP-217, "The Chip Scale Package", for a detailed description of Chip Scale Packages offered by California Micro Devices.

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	**VALUE**
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask defined pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.125mm - 0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm 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	±50µm
Solder Ball Side Coplanarity	±20µm
Maximum Dwell Time Above Liquidous	60 seconds
Soldering Maximum Temperature	260°C

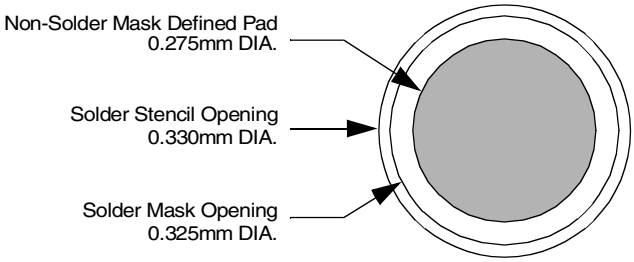


Figure 2. Recommended Non-Solder Mask Defined Pad Illustration

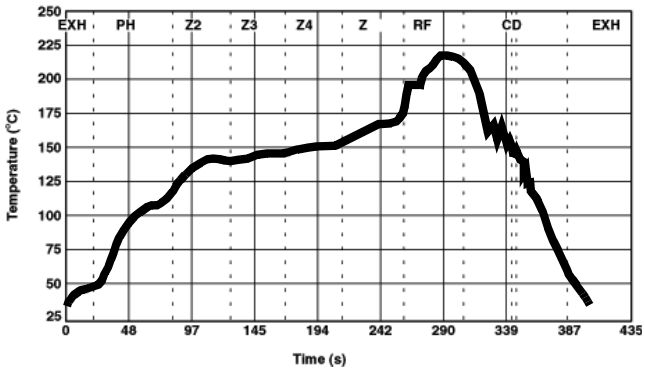


Figure 3. Eutectic (SnPb) Solder Ball Reflow Profile

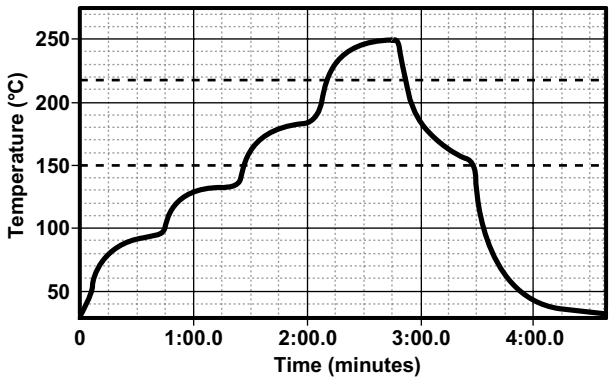


Figure 4. Lead-free (SnAgCu) Solder Ball Reflow Profile

Mechanical Details

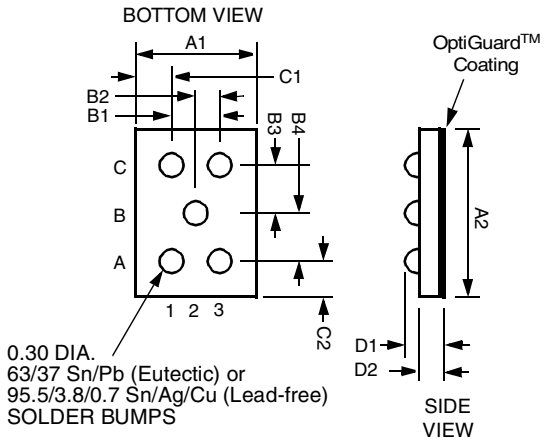
CSP Mechanical Specifications

CM1204 devices are packaged in a custom Chip Scale Package (CSP). Dimensions are presented below. For complete information on CSP packaging, see the California Micro Devices CSP Package Information document.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	5					
Dim	**Millimeters**			**Inches**		
	Min	**Nom**	**Max**	**Min**	**Nom**	**Max**
A1	0.915	0.960	1.005	0.0360	0.0378	0.0396
A2	1.285	1.330	1.375	0.0506	0.0524	0.0541
B1	0.495	0.500	0.505	0.0195	0.0197	0.0199
B2	0.245	0.250	0.255	0.0096	0.0098	0.0100
B3	0.430	0.435	0.440	0.0169	0.0171	0.0173
B4	0.430	0.435	0.440	0.0169	0.0171	0.0173
C1	0.180	0.230	0.280	0.0071	0.0091	0.0110
C2	0.180	0.230	0.280	0.0071	0.0091	0.0110
D1	0.600	0.670	0.739	0.0236	0.0264	0.0291
D2	0.394	0.445	0.495	0.0155	0.0175	0.0195
# per tape and reel	3500 pieces					
Controlling dimension: millimeters						

Mechanical Package Diagrams

OptiGuard™ Coated CSP



DIMENSIONS IN MILLIMETERS

Package Dimensions for CM1204 Chip Scale Packages

CSP Tape and Reel Specifications

PART NUMBER	CHIP SIZE (mm)	POCKET SIZE (mm) B_0 X A_0 X K_0	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
CM1204	1.33 X 0.96 X 0.670	1.42 X 1.07 X 0.740	8mm	178mm (7")	3500	4mm	4mm

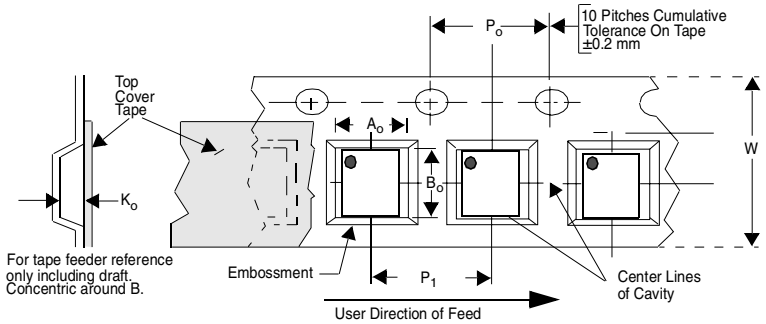


Figure 5. Tape and Reel Mechanical Data