



# CM1244

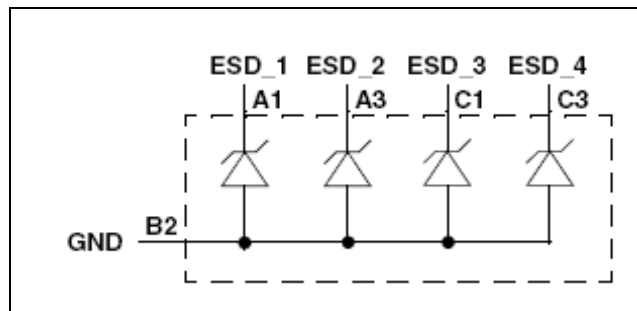
## Features

- Four channels of ESD protection
- $\pm 15\text{kV}$  ESD protection on each channel (IEC 61000-4-2 Level 4, contact discharge)
- $\pm 30\text{kV}$  ESD protection on each channel (HBM)
- Chip Scale Package features extremely low lead inductance for optimum ESD protection
- 5-bump, 0.760mm x 1.053mm footprint, 0.4mm pitch, Chip Scale Package (CSP)
- Lead-free
- *OptiGuard™* coating for improved reliability at assembly

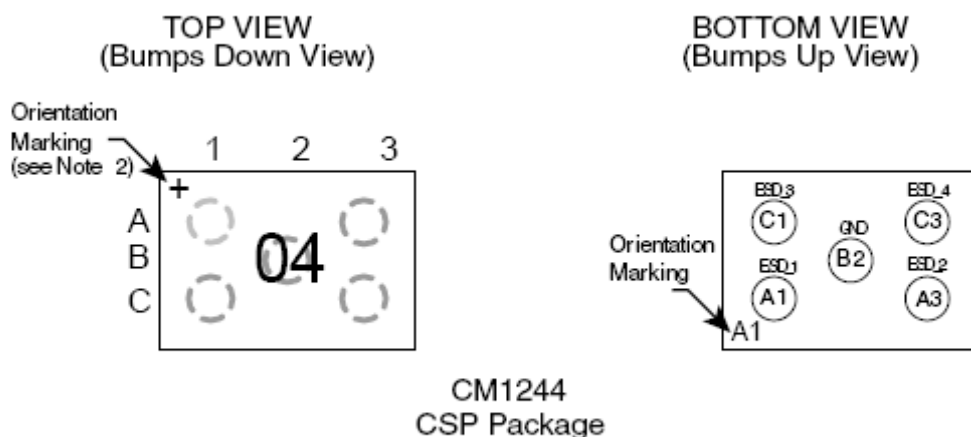
## Applications

- ESD protection for sensitive electronic equipment
- I/O port and keypad and button circuitry protection for portable devices
- Can be used for EMI filtering when combined with external series resistance
- Wireless handsets
- Handheld PCs/PDAs
- MP3 Players
- Digital Camcorders
- Notebooks
- Desktop PCs

## Block Diagram



**PACKAGE / PINOUT DIAGRAMS**



CM1244  
CSP Package

Notes:

- 1) These drawings are not to scale.
- 2) The "+" orientation marking indicates that the package is lead-free.

**PIN DESCRIPTIONS**

| PIN | NAME  | DESCRIPTION   |
|-----|-------|---------------|
| A1  | ESD_1 | ESD Channel1  |
| A3  | ESD_2 | ESD Channel 2 |
| B2  | GND   | Device Ground |
| C1  | ESD_3 | ESD Channel 3 |
| C3  | ESD_4 | ESD Channel 4 |

**Ordering Information**

**PART NUMBERING INFORMATION**

| Bumps | Package | Lead-free Finish                  |              |
|-------|---------|-----------------------------------|--------------|
|       |         | Ordering Part Number <sup>1</sup> | Part Marking |
| 5     | CSP     | CM1244-04CP                       | 04           |

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.

# CM1244

## 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<sup>1</sup>

| SYMBOL      | PARAMETER   | CONDITIONS                              | MIN                  | TYP         | MAX         | UNITS    |
|-------------|---|---|----------------------|-------------|-------------|----------|
| $V_{DIODE}$ | Diode Reverse Breakdown Voltage   | $I_{DIODE} = 10\mu A$                   | 5.5                  |             |             | V        |
| $I_{LEAK}$  | Diode Leakage Current   | $V_{IN} = 3.3V, T_A = 25^\circ C$       |                      |             | 100         | nA       |
| $V_{SIG}$   | Signal Voltage<br>Positive Clamp<br>Negative Clamp  | $I_{DIODE} = 10mA$                      | 5.6<br>-1.5          | 6.8<br>-0.8 | 9.0<br>-0.4 | V<br>V   |
| $V_{ESD}$   | In-system ESD Withstand Voltage<br>a) Human Body Model, MIL-STD-883,<br>Method 3015<br>b) Contact Discharge per IEC 61000-4-2 | Note 2                                  | $\pm 30$<br>$\pm 15$ |             |             | kV<br>kV |
| $V_{CL}$    | Clamping Voltage during ESD Discharge<br>MIL-STD-883 (Method 3015), 8kV<br>Positive Transients<br>Negative Transients         | Note 2                                  |                      | +15<br>-8   |             | V<br>V   |
| $C_{DIODE}$ | Diode Capacitance   | At 2.5VDC Reverse Bias,<br>1MHz, 30mVAC | 22                   | 27          | 32          | pF       |

Note 1:  $T_A = -40$  to  $+85^\circ C$  unless otherwise specified.

Note 2: ESD applied to input and output pins with respect to GND, one at a time.

## 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.

## Performance Information

Diode Characteristics (nominal conditions unless specified otherwise)

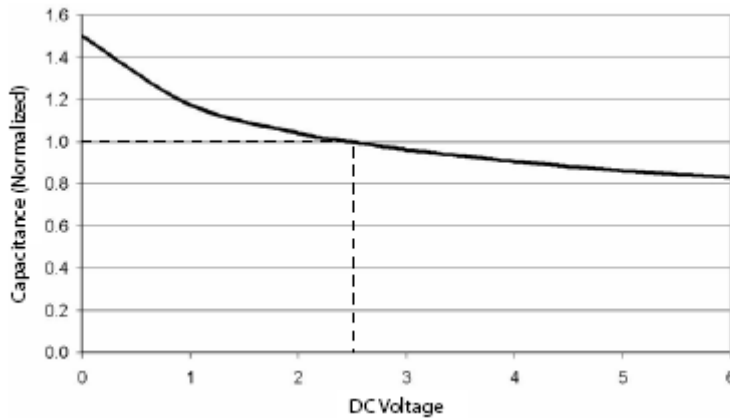


Figure 1. Typical Diode Capacitance VS. Input Voltage (normalized to 2.5VDC)

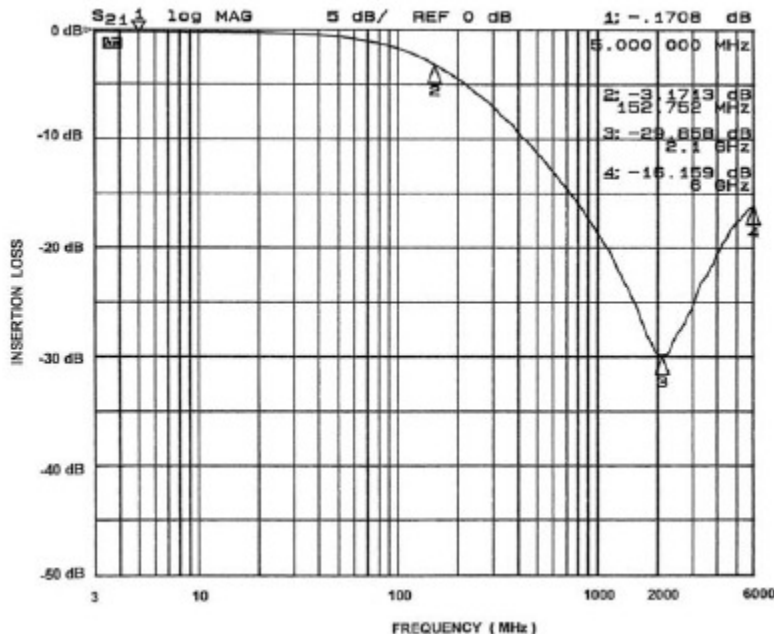


Figure 2. Frequency Response (single channel vs. GND, in 50Ω system)

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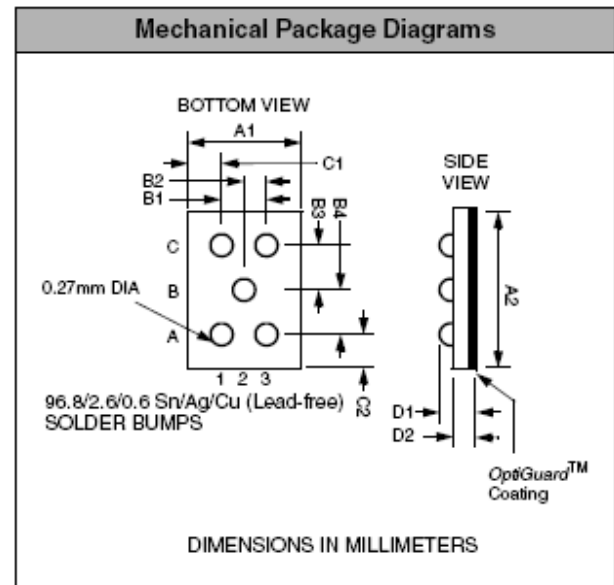
## Mechanical Details

### CSP Mechanical Specifications

The CM1244 is available in a custom Chip Scale Package (CSP). Dimensions are presented below.

| PACKAGE DIMENSIONS  |             |       |       |        |        |        |
|---------------------|-------------|-------|-------|--------|--------|--------|
| Package             | Custom CSP  |       |       |        |        |        |
| Bumps               | 5           |       |       |        |        |        |
| Dim                 | Millimeters |       |       | Inches |        |        |
|                     | Min         | Nom   | Max   | Min    | Nom    | Max    |
| A1                  | 0.715       | 0.760 | 0.805 | 0.0281 | 0.0299 | 0.0317 |
| A2                  | 1.008       | 1.053 | 1.098 | 0.0397 | 0.0415 | 0.0432 |
| B1                  | 0.395       | 0.400 | 0.405 | 0.0156 | 0.0157 | 0.0159 |
| B2                  | 0.195       | 0.200 | 0.205 | 0.0076 | 0.0078 | 0.080  |
| B3                  | 0.342       | 0.347 | 0.352 | 0.0134 | 0.0136 | 0.0138 |
| B4                  | 0.342       | 0.347 | 0.352 | 0.0134 | 0.0136 | 0.0138 |
| C1                  | 0.130       | 0.180 | 0.230 | 0.0051 | 0.0071 | 0.0091 |
| C2                  | 0.130       | 0.180 | 0.230 | 0.0051 | 0.0071 | 0.0091 |
| D1                  | 0.545       | 0.615 | 0.685 | 0.0215 | 0.0242 | 0.0268 |
| D2                  | 0.368       | 0.419 | 0.470 | 0.0145 | 0.0165 | 0.0185 |
| # per tape and reel | 3500 pieces |       |       |        |        |        |

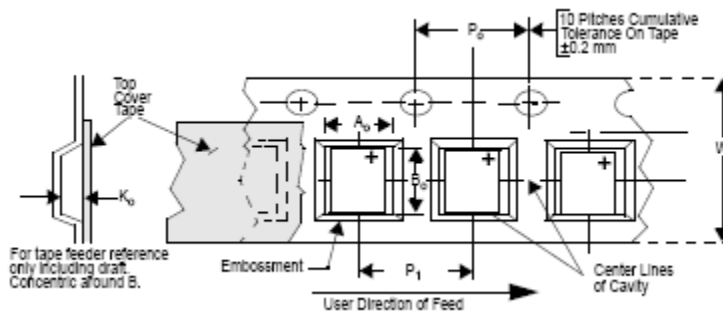
Controlling dimension: millimeters




**Package Dimensions for  
CM1244 Chip Scale Package**

**CSP Tape and Reel Specifications**

| PART NUMBER | CHIP SIZE (mm)         | POCKET SIZE (mm)<br>$B_0 \times A_0 \times K_0$ | TAPE WIDTH<br>W | REEL<br>DIAMETER | QTY PER<br>REEL | $P_0$ | $P_1$ |
|-------------|------------------------|---|-----------------|------------------|-----------------|-------|-------|
| CM1244      | 1.05 X 0.76 X<br>0.615 | 1.42 X 1.07 X 0.74                              | 8mm             | 178mm (7")       | 3500            | 4mm   | 4mm   |



**Figure 3. Tape and Reel Mechanical Data**

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