

# CM1250-04QG

## ESD Protection Diode

### Low Capacitance

#### Features

- Low I/O Capacitance at 5 pF at 0 V
- In-System ESD Protection to  $\pm 8$  kV Contact Discharge, per the IEC 61000-4-2 International Standard
- Compact SMT Package Saves Board Space and Facilitates Layout in Space-Critical Applications
- Each I/O Pin Can Withstand over 1000 ESD Strikes\*
- These Devices are Pb-Free and are RoHS Compliant



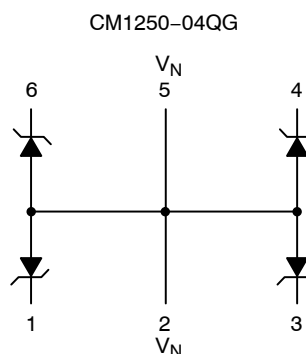
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UDFN-6  
QG SUFFIX  
CASE 517BM

#### BLOCK DIAGRAM



#### MARKING DIAGRAM



LS = CM1250-04QG

#### ORDERING INFORMATION

| Device      | Package            | Shipping†        |
|-------------|--------------------|------------------|
| CM1250-04QG | UDFN6<br>(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 Specification Brochure, BRD8011/D.

\*Standard test condition is IEC61000-4-2 level 4 test circuit with each pin subjected to  $\pm 8$  kV contact discharge for 1000 pulses. Discharges are timed at 1 second intervals and all 1000 strikes are completed in one continuous test run. The part is then subjected to standard production test to verify that all of the tested parameters are within spec after the 1000 strikes.

# CM1250-04QG

## PACKAGE / PINOUT DIAGRAM

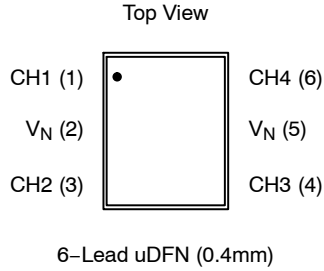


Table 1. PIN DESCRIPTIONS

| Pins                                | Name           | Description                                                                                                                         |
|-------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| (Refer to package / pinout diagram) | CHx            | The cathode of the respective surge protection diode, which should be connected to the node requiring transient voltage protection. |
| (Refer to package / pinout diagram) | V <sub>N</sub> | The anode of the surge protection diodes.                                                                                           |

## SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

| Parameter                 | Rating      | Units |
|---------------------------|-------------|-------|
| Storage Temperature Range | -65 to +150 | °C    |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 3. STANDARD OPERATING CONDITIONS

| Parameter             | Rating     | Units |
|-----------------------|------------|-------|
| Operating Temperature | -40 to +85 | °C    |

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

| Symbol            | Parameter                                                                                                           | Conditions                                                                             | Min         | Typ        | Max         | Units |
|-------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|------------|-------------|-------|
| C <sub>IN</sub>   | Channel Input Capacitance                                                                                           | T <sub>A</sub> = 25°C, 0 VDC, 1 MHz; (Note 2)                                          |             | 5          | 7           | pF    |
|                   |                                                                                                                     | T <sub>A</sub> = 25°C, 2.5 VDC, 1 MHz; (Note 2)                                        |             | 3          |             | pF    |
| ΔC <sub>IN</sub>  | Differential Channel I/O to GND Capacitance                                                                         | T <sub>A</sub> = 25°C, 2.5 VDC, 1 MHz; (Note 2)                                        |             | 0.14       |             | pF    |
| I <sub>LEAK</sub> | Leakage Current                                                                                                     | V <sub>IN</sub> = 3.5 VDC, T <sub>A</sub> = 25°C                                       |             |            | 0.10        | μA    |
| V <sub>SIG</sub>  | Small Signal Clamp Voltage<br>Positive Clamp<br>Negative Clamp                                                      | I = 5 mA, T <sub>A</sub> = 25°C<br>I = -5 mA, T <sub>A</sub> = 25°C                    | 6.1<br>-1.5 |            | 8.5<br>-0.4 | V     |
| V <sub>ESD</sub>  | ESD Withstand Voltage<br>Contact Discharge per IEC 61000-4-2 standard<br>Human Body Model, MIL-STD-883, Method 3015 | T <sub>A</sub> = 25°C; (Notes 2, 4 and 5)<br>T <sub>A</sub> = 25°C; (Notes 2, 3 and 5) | ±8<br>±15   |            |             | kV    |
| R <sub>D</sub>    | Diode Dynamic Resistance<br>Forward Conduction<br>Reverse Conduction                                                | T <sub>A</sub> = 25°C<br>(Note 2)                                                      |             | 0.7<br>2.1 |             | Ω     |

1. All parameters specified at T<sub>A</sub> = -40°C to +85°C unless otherwise noted.
2. These parameters guaranteed by design and characterization.
3. Human Body Model per MIL-STD-883, Method 3015, C<sub>Discharge</sub> = 100 pF, R<sub>Discharge</sub> = 1.5 KΩ, V<sub>N</sub> grounded.
4. Standard IEC 61000-4-2 with C<sub>Discharge</sub> = 150 pF, R<sub>Discharge</sub> = 330 Ω, V<sub>N</sub> grounded.
5. These measurements performed with no external capacitor on CH<sub>x</sub>.

## PERFORMANCE INFORMATION

### Diode Capacitance

Typical diode capacitance with respect to positive cathode voltage (reverse voltage across the diode) is given in Diode Capacitance vs. Reverse Voltage.

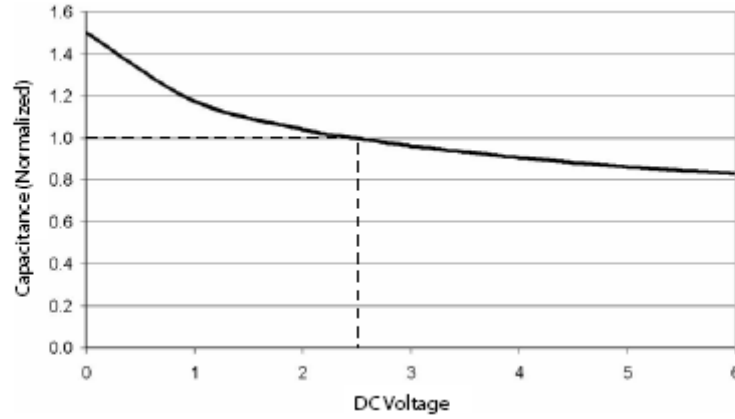


Figure 1. Diode Capacitance vs. Reverse Voltage

### Typical High Current Diode Characteristics

Measurements are made in pulsed mode with a nominal pulse width of 0.7 ms.

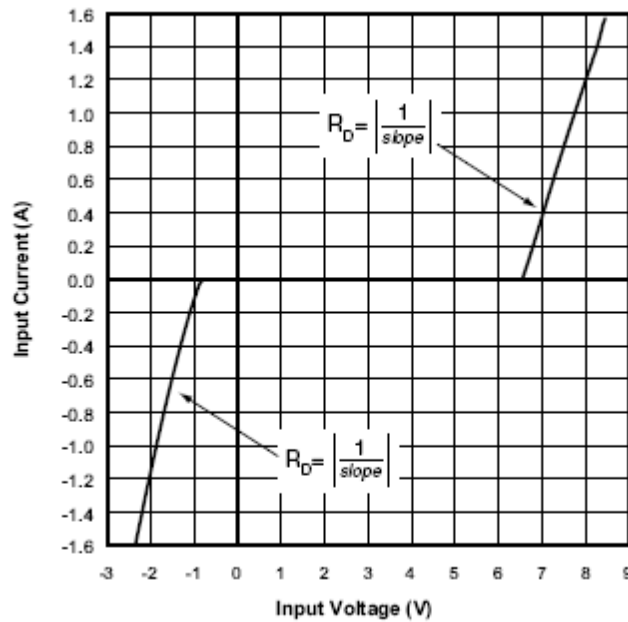
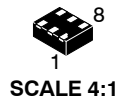


Figure 2. Typical Input VI Characteristics  
(Pulse-mode Measurements, Pulse Width = 0.7 ms nominal)

# MECHANICAL CASE OUTLINE

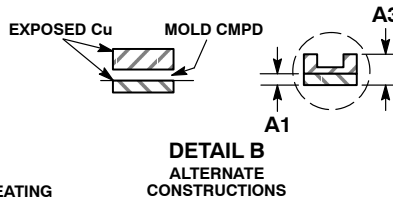
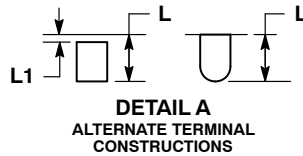
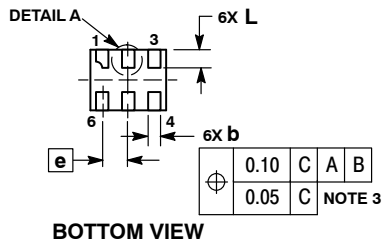
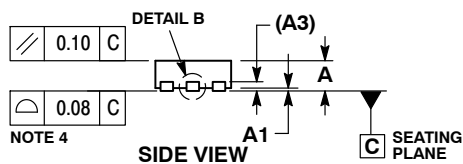
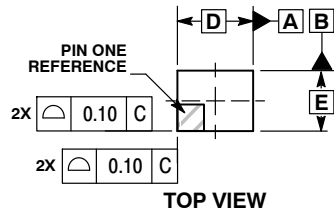
## PACKAGE DIMENSIONS

ON Semiconductor®



UDFN6, 1.25x1, 0.4P  
CASE 517BM-01  
ISSUE O

DATE 20 JUL 2010

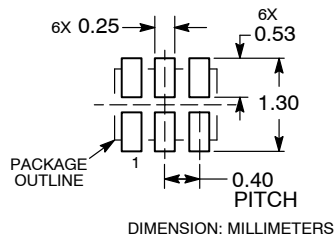


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| MILLIMETERS |      |      |
|-------------|------|------|
| DIM         | MIN  | MAX  |
| A           | 0.45 | 0.55 |
| A1          | 0.00 | 0.05 |
| A3          | 0.15 | REF  |
| b           | 0.15 | 0.25 |
| D           | 1.25 | BSC  |
| E           | 1.00 | BSC  |
| e           | 0.40 | BSC  |
| L           | 0.20 | 0.40 |
| L1          | ---  | 0.15 |

### RECOMMENDED SOLDERING FOOTPRINT\*



\*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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