

**BOURNS®**

## Features

- 0402 and 0603 package options
- Rated for IEC 61000-4-2, level 4
- Withstands multiple ESD strikes
- Low capacitance and leakage currents for invisible load protection
- Tape and reel packaging

## Chip Guard® MLD Series Varistor ESD Clamp Protectors

### Description

The Chip Guard® CG0402MLD and CG0603MLD Series has been specifically designed to protect sensitive electronic components from electrostatic discharge damage. The MLD family has been designed to protect equipment to IEC61000-4-2, level 4 ESD specifications targeted for high speed data applications. The Chip Guard® MLD Series has been manufactured to provide very low capacitance with excellent clamp qualities, making the family almost transparent under normal working conditions.

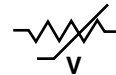
### Electrical Characteristics @ 25 °C (unless otherwise noted)

| Model         | Continuous Operating Voltage | Breakdown Voltage         | Clamping Voltage                 | Off-state Current   | Capacitance           |
|---------------|------------------------------|---------------------------|----------------------------------|---------------------|-----------------------|
|               | V <sub>DC</sub> (V)          | V <sub>B</sub> @ 1 mA (V) | V <sub>C</sub> @ 1 A 8/20 μs (V) | I <sub>L</sub> (μA) | C <sub>OFF</sub> (pF) |
|               | Max.                         | Typ.                      | Max.                             | Max.                | Max.                  |
| CG0402MLD-12G | 12                           | 50 ~ 60                   | 140                              | 1                   | 5                     |
| CG0603MLD-12E | 12                           | 50 ~ 60                   | 140                              | 1                   | 5                     |

### Environmental Characteristics

Operating Temperature.....-30 °C to +85 °C  
 Storage Temperature .....-30 °C to +85 °C  
 Standard .....IEC 61000-4-2 Level 4

### Device Symbol



### Surge Withstand Ratings

| Parameter                                 | Peak Voltage         | Repetitions (Min.) |
|---|----------------------|--------------------|
| ESD Voltage Capability, Contact Discharge | 8 kV                 | 100 at 8 kV        |
| ESD Voltage Capability, Air Discharge     | 15 kV                | 100 at 15 kV       |
| Standard                                  | IEC61000-4-2 Level 4 |                    |

### How to Order

**CG 0603 MLD - 12 E**

Chip Guard®  
 Product Designator \_\_\_\_\_

Package Option \_\_\_\_\_  
 0402 = 0402 Package  
 0603 = 0603 Package

Multilayer Series Designator \_\_\_\_\_

Operating Voltage \_\_\_\_\_  
 12 = 12 V

Tape & Reel Packaging \_\_\_\_\_  
 E = 4,000 pcs. per reel (CG0603MLD Series)  
 G = 10,000 pcs. per reel (CG0402MLD Series)

Ni barrier terminations are standard on all Chip Guard® part numbers.



*Reliable Electronic Solutions*

#### Asia-Pacific:

TEL +886-2 25624117 • FAX +886-2 25624116

#### Europe:

TEL +41-41 7685555 • FAX +41-41 7685510

#### North America:

TEL +1-909 781-5500 • FAX +1-909 781-5700

TEL +1-951 781-5500 • FAX +1-951 781-5700 (after 7/17/04)

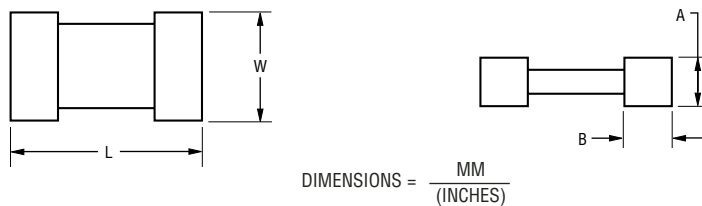
[www.bourns.com](http://www.bourns.com)

Specifications are subject to change without notice.  
 Customers should verify actual device performance in their specific applications.

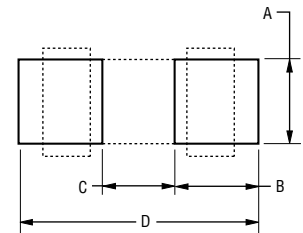
# Chip Guard® MLD Series Varistor ESD Clamp Protectors



## Product Dimensions



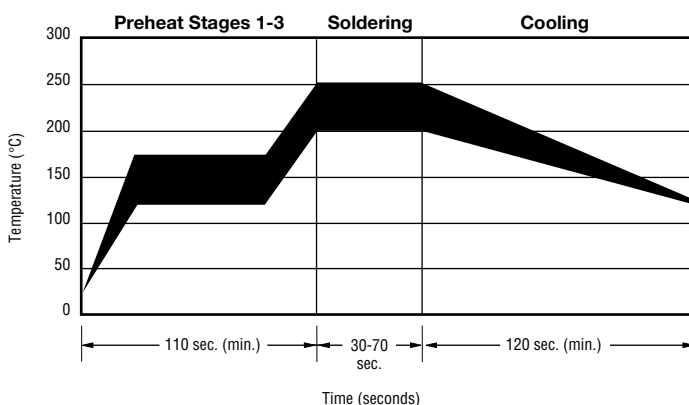
## Recommended Pad Layout



| Dimension | CG0402MLD Series                          | CG0603MLD Series                          |
|-----------|---|---|
| L         | $\frac{1.00 \pm 0.15}{(0.04 \pm 0.006)}$  | $\frac{1.60 \pm 0.20}{(0.064 \pm 0.008)}$ |
| W         | $\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$  | $\frac{0.80 \pm 0.20}{(0.032 \pm 0.008)}$ |
| A         | $\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$  | $\frac{0.80 \pm 0.20}{(0.032 \pm 0.008)}$ |
| B         | $\frac{0.25 \pm 0.15}{(0.010 \pm 0.006)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ |

| Dim. | CG0402MLD Series       | CG0603MLD Series       |
|------|------------------------|------------------------|
| A    | $\frac{0.51}{(0.020)}$ | $\frac{0.76}{(0.030)}$ |
| B    | $\frac{0.61}{(0.024)}$ | $\frac{1.02}{(0.040)}$ |
| C    | $\frac{0.51}{(0.020)}$ | $\frac{0.50}{(0.020)}$ |
| D    | $\frac{1.70}{(0.067)}$ | $\frac{2.54}{(0.100)}$ |

## Solder Reflow Recommendations



|   |                 |  |  |
|---|-----------------|--|--|
| A | Stage 1 Preheat | Ambient to Preheating Temperature              | 30 s to 60 s   |
| B | Stage 2 Preheat | 140 °C to 160 °C                               | 60 s to 120 s  |
| C | Stage 3 Preheat | Preheat to 200 °C                              | 20 s to 40 s   |
| D | Main Heating    | 200 °C<br>210 °C<br>220 °C<br>230 °C<br>240 °C | 60 s to 70 s<br>55 s to 65 s<br>50 s to 60 s<br>40 s to 50 s<br>30 s to 40 s |
| E | Cooling         | 200 °C to 100 °C                               | 1 °C/s to 4 °C/s   |

- This product can be damaged by rapid heating, cooling or localized heating.
- Heat shocks should be avoided. Preheating and gradual cooling recommended.
- Excessive solder can damage the device. Print solder thickness of 150 to 200 um recommended.
- Solder gun tip temperature should be kept below 280 °C and should not touch the device directly. Contact should be less than 3 seconds. A solder gun under 30 watts is recommended.

