

**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

## ChipGuard® MLA Series Varistor ESD Clamp Protectors

### Description

The ChipGuard® CG0402MLA and CG0603MLA Series is based on a multilayer metal oxide technology. The MLA family is designed to protect sensitive electronic circuits from the threat of electrostatic discharge ESD. The MLA series is available from 5.5 V to 26 V DC working voltages.

The wide operating voltage and temperature range makes this family ideally suited to IC power supplies, signal and control line protection.

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

| Model           | V <sub>rms</sub><br>(V) | V <sub>DC</sub><br>(V) | V <sub>N</sub> Min.<br>(V) | V <sub>N</sub> Max.<br>(V) | V <sub>C</sub><br>(V) | I <sub>TM</sub> (Max.)<br>(A) | W <sub>TM</sub> (Max.)<br>(J) | C <sub>p</sub><br>(pF) Typ.   |
|-----------------|-------------------------|------------------------|----------------------------|----------------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|
|                 | <50 µA                  |                        | 1 mA DC                    |                            | 1 A @ 8/20 µs         | @ 8/20 µs                     | 10/1000 µs                    | 1 V <sub>rms</sub><br>@ 1 MHz |
| CG0402MLA-5.5MG | 4                       | 5.5                    | 6.4                        | 9.6                        | 19                    | 20                            | 0.05                          | 300                           |
| CG0402MLA-14KG  | 11                      | 14                     | 16.2                       | 19.8                       | 38                    | 20                            | 0.05                          | 100                           |
| CG0402MLA-18KG  | 14                      | 18                     | 19.8                       | 24.2                       | 45                    | 20                            | 0.05                          | 95                            |
| CG0603MLA-5.5ME | 4                       | 5.5                    | 6.4                        | 9.6                        | 19                    | 30                            | 0.1                           | 300                           |
| CG0603MLA-14KE  | 11                      | 14                     | 16.2                       | 19.8                       | 35                    | 30                            | 0.1                           | 160                           |
| CG0603MLA-18KE  | 14                      | 18                     | 19.8                       | 24.2                       | 40                    | 30                            | 0.1                           | 140                           |
| CG0603MLA-26KE  | 20                      | 26                     | 27.9                       | 34.1                       | 58                    | 30                            | 0.1                           | 120                           |

### Environmental Characteristics

Operating Temperature.....-55 °C to +125 °C  
 Storage Temperature .....-55 °C to +125 °C  
 Response Time.....<1 ns  
 Standard .....IEC 61000-4-2 Level 4

### Device Symbol



### How to Order

**CG 0402 MLA - 5.5 M G**

ChipGuard®  
 Product Designator

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

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

Operating Voltage \_\_\_\_\_  
 5.5 = 5.5 V  
 14 = 14 V  
 18 = 18 V  
 26 = 26 V

Tolerance \_\_\_\_\_  
 K = 10 %  
 M = 20 %

Tape & Reel Packaging \_\_\_\_\_  
 E = 4,000 pcs. per reel (CG0603MLA Series)  
 G = 10,000 pcs. per reel (CG0402MLA Series)

Ni barrier terminations are standard on all ChipGuard® part numbers.



*Reliable Electronic Solutions*

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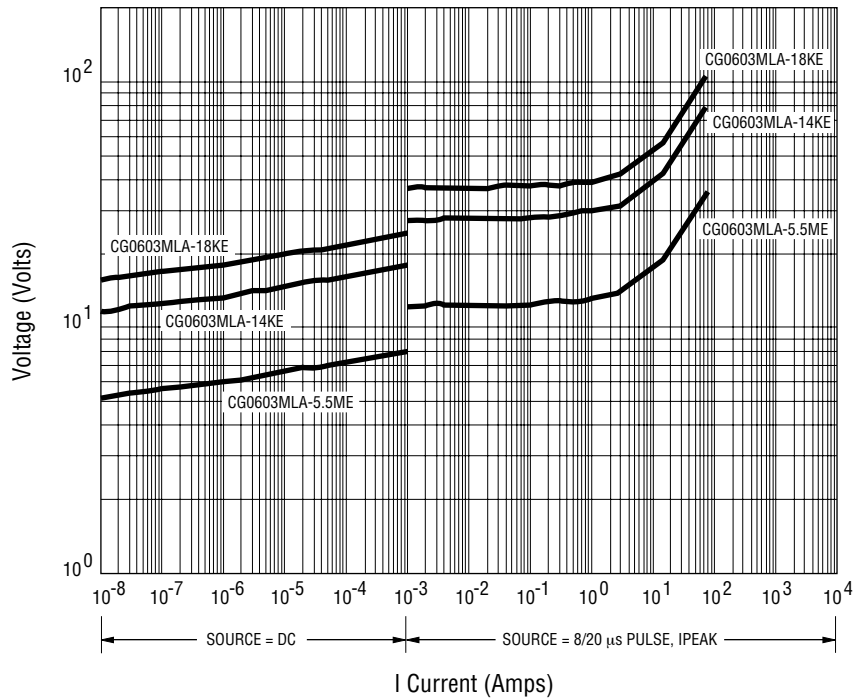
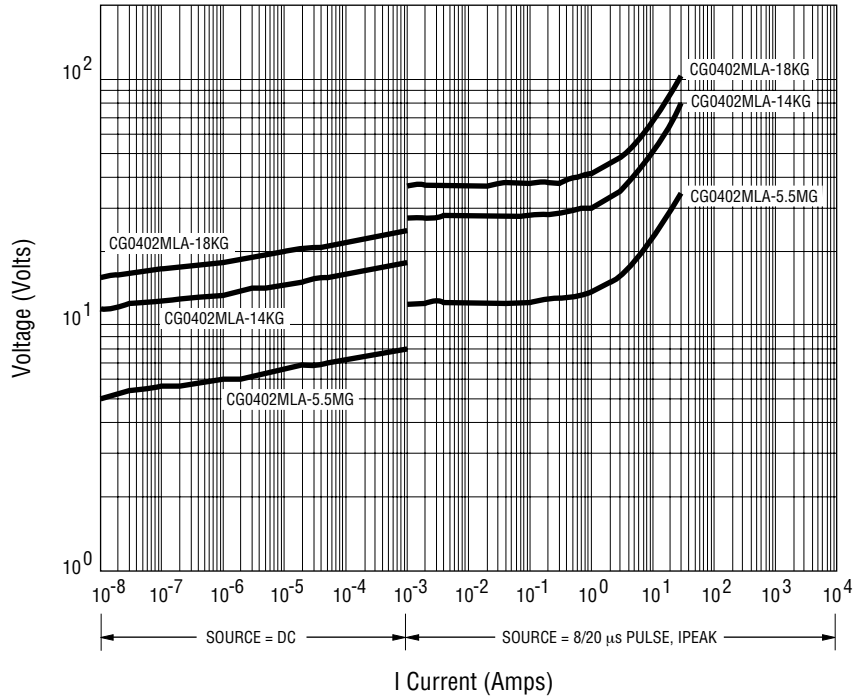
#### North America:

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

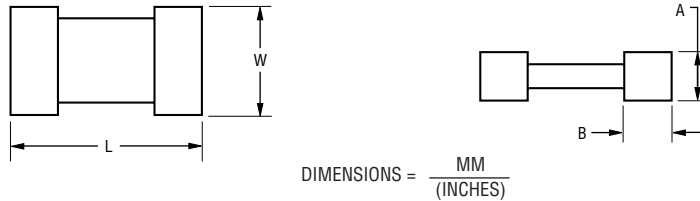
TEL +1-951 781-5500 • FAX +1-951 781-5700 (after 7/17/04)

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

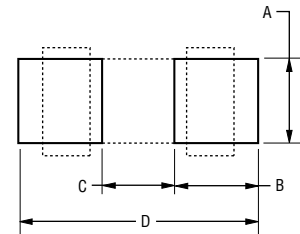
Voltage-Current Characteristics



## Product Dimensions



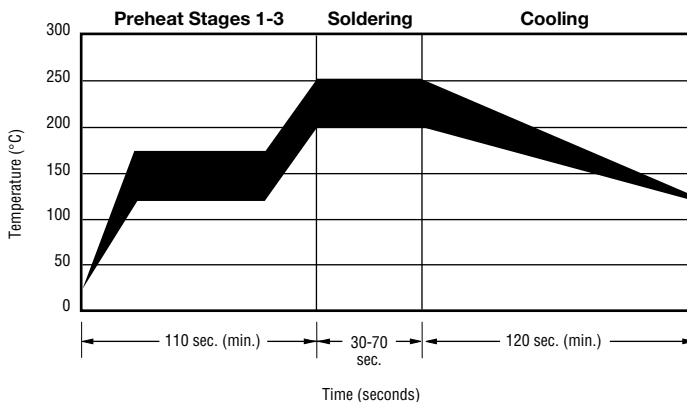
## Recommended Pad Layout



| Dimension | CG0402MLA Series                          | CG0603MLA 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. | CG0402MLA Series       | CG0603MLA 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    | $\frac{1.70}{(0.067)}$ | $\frac{2.54}{(0.100)}$ |

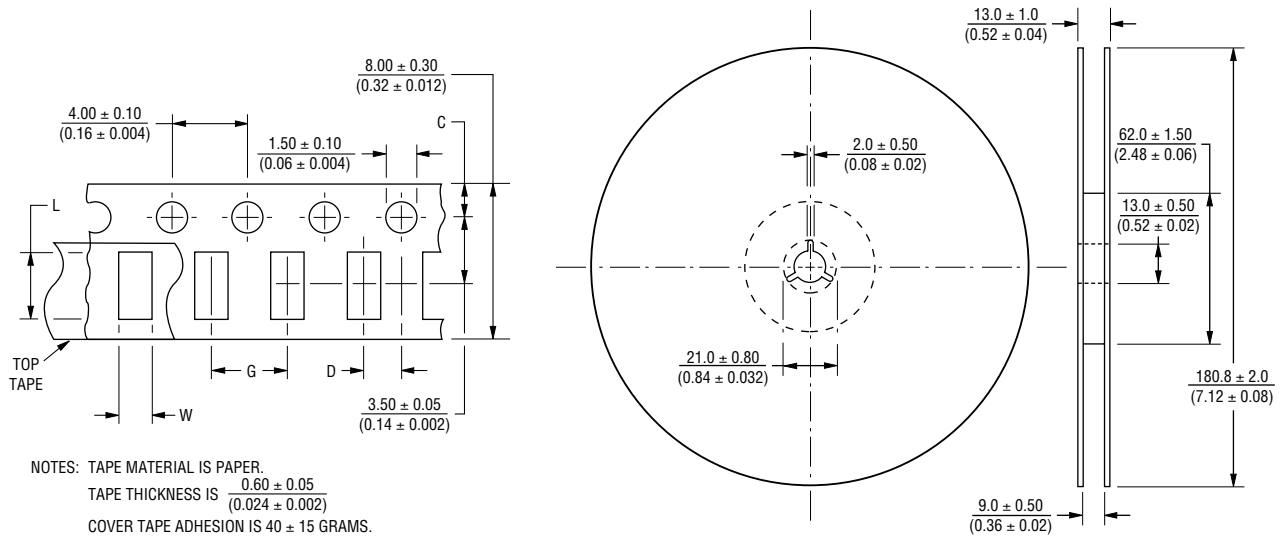
## Solder Reflow Recommendations



|   |                 |  |  |
|---|-----------------|--|--|
| 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.

## Packaging Dimensions



NOTES: TAPE MATERIAL IS PAPER.  
 TAPE THICKNESS IS  $\frac{0.60 \pm 0.05}{(0.024 \pm 0.002)}$   
 COVER TAPE ADHESION IS 40 ± 15 GRAMS.

| Dimension | CG0402MLA Series                           | CG0603MLA Series                          |
|-----------|--|---|
| C         | $\frac{1.75 \pm 0.05}{(0.04 \pm 0.002)}$   | $\frac{1.75 \pm 0.10}{(0.04 \pm 0.004)}$  |
| D         | $\frac{2.00 \pm 0.02}{(0.08 \pm 0.0008)}$  | $\frac{2.00 \pm 0.05}{(0.08 \pm 0.002)}$  |
| L         | $\frac{1.12 \pm 0.03}{(0.045 \pm 0.0012)}$ | $\frac{1.80 \pm 0.20}{(0.072 \pm 0.008)}$ |
| W         | $\frac{0.62 \pm 0.03}{(0.025 \pm 0.0012)}$ | $\frac{0.90 \pm 0.20}{(0.036 \pm 0.008)}$ |
| G         | $\frac{2.0 \pm 0.05}{(0.08 \pm 0.002)}$    |   |