

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
- Lead free

ChipGuard® MLD Series Varistor ESD Clamp Protectors

Description

The Chip Guard® CG0402MLD and CG0603MLD Series have 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 _{DC} (V)	V _B @ 1 mA (V)	V _C @ 1 A 8/20 μs (V)	I _L (μA)	C _{OFF} (pF)
	Max.	Typ.	Max.	Max.	Max.
CG0402MLD-12G	12	50	150	1	5
CG0603MLD-12E	12	50	150	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

These products are RoHS compliant. There is some lead contained within the glass of the ceramic. This is acceptable under exemption no. 5 of the RoHS directive (DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment).

ESD 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	

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WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

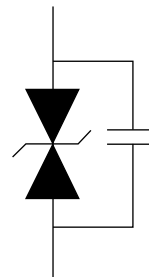
*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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Schematic



How to Order

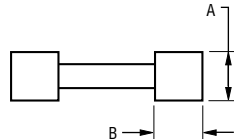
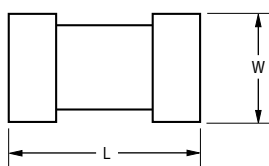
CG 0n0n MLD - 12 x

ChipGuard®
 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
 ChipGuard® part numbers.

ChipGuard® MLD Series Varistor ESD Clamp Protectors

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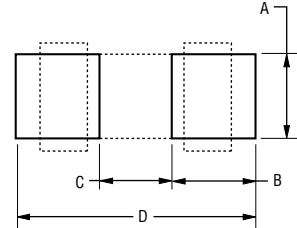
Product Dimensions



DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

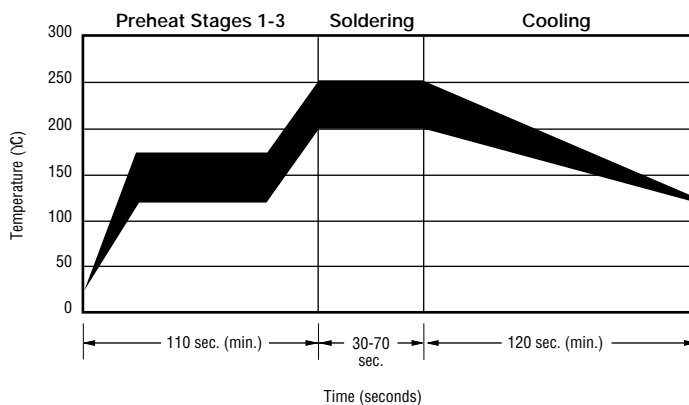
Dimension	CG0402MLD Series	CG0603MLD Series
L	$\frac{1.00 \pm 0.15}{(0.04 \pm 0.006)}$	$\frac{1.60 \pm 0.20}{(0.064 \pm 0.008)}$
W	$\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$	$\frac{0.80 \pm 0.20}{(0.032 \pm 0.008)}$
A	$\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$	$\frac{0.80 \pm 0.20}{(0.032 \pm 0.008)}$
B	$\frac{0.25 \pm 0.15}{(0.01 \pm 0.006)}$	$\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$

Recommended Pad Layout



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 210 °C 220 °C 230 °C 240 °C	60 s to 70 s 55 s to 65 s 50 s to 60 s 40 s to 50 s 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.

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Technical drawing of a circular tape reel, showing side and end views with dimensions in millimeters (mm) and inches (inches).

Side View Dimensions:

- Overall Width: 8.00 ± 0.30 (0.32 \pm 0.012)
- Distance from Center to Edge: 4.00 ± 0.10 (0.16 \pm 0.004)
- Distance from Center to Hole: 1.50 ± 0.10 (0.06 \pm 0.004)
- Distance from Hole to Edge: 3.50 ± 0.05 (0.14 \pm 0.002)
- Distance between Holes: G
- Distance between Holes: D
- Distance from Center to Hole: L
- Distance from Hole to Edge: W
- Top Tape Label: TOP TAPE

End View Dimensions:

- Overall Diameter: 13.0 ± 1.0 (0.52 \pm 0.04)
- Distance from Center to Hole: 2.0 ± 0.50 (0.08 \pm 0.02)
- Distance from Center to Hole: 21.0 ± 0.80 (0.84 \pm 0.032)
- Distance from Center to Hole: 62.0 ± 1.50 (2.48 \pm 0.06)
- Distance from Center to Hole: 13.0 ± 0.50 (0.52 \pm 0.02)
- Distance from Center to Hole: 180.8 ± 2.0 (7.12 \pm 0.08)
- Distance from Center to Hole: 9.0 ± 0.50 (0.36 \pm 0.02)

Notes:

- TAPE MATERIAL IS PAPER.
- TAPE THICKNESS IS 0.48 ± 0.03 (0.019 \pm 0.0012)
- COVER TAPE ADHESION IS 40 \pm 15 GRAMS.

Dimensions: MM (INCHES)

Dimension	CG0402MLD Series	CG0603MLD 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	$\frac{1.19 \pm 0.05}{(0.047 \pm 0.002)}$	$\frac{1.80 \pm 0.20}{(0.072 \pm 0.008)}$
W	$\frac{0.69 \pm 0.05}{(0.027 \pm 0.002)}$	$\frac{0.90 \pm 0.20}{(0.036 \pm 0.008)}$
G	$\frac{2.0 \pm 0.05}{(0.08 \pm 0.002)}$	$\frac{4.0 \pm 0.05}{(0.16 \pm 0.002)}$

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