

Features

- RoHS compliant*
- ESD protection >25 kV
- Low capacitance <0.05 pF
- Low leakage current <5 nA

Applications

- HDMI 1.4
- Digital Visual Interface (DVI)
- USB 3.0 / USB OTG
- Memory protection
- SIM card ports
- Automotive

ChipGuard® MLU Series - ESD Protectors

General Information

The ChipGuard® MLU Series has been specifically designed to protect sensitive electronic components from electrostatic discharge damage. The MLU family has been designed to protect equipment to IEC61000-4-2, Level 4 (±8 kV Contact / ±15 kV Air Discharge) ESD specifications targeted for high speed USB 3.0/USB OTG, HDMI 1.4, DVI or IEEE1394 applications.

The ChipGuard® MLU Series has been manufactured to provide low 0.05 pF capacitance and leakage currents less than 5 nA with excellent clamp qualities, making the family almost transparent under normal working conditions.

Device Symbol



Electrical Characteristics @ 25 °C (unless otherwise noted)

Parameter	Symbol	CG0402MLU / CG0603MLU (Note 3)				Unit
		3.3x	05x	12x	24x	
Typical Continuous Operating Voltage	V _{DC}	3.3	5	12	24	V
Typical Clamping Voltage (Note 1)	V _C	25				V
Maximum Capacitance @ 1 VRMS 1 MHz	C _O	0.05				pF
Maximum Leakage Current @ Max. VDC	I _L	5				nA
Typical Trigger Voltage (Note 2)	V _T	250				V
Maximum Response Time	R _T	1				ns
ESD Protection: Per IEC 61000-4-2						
Min. Contact Discharge (>1000 Repts)		±8				kV
Min. Air Discharge (>1000 Repts)		±15				kV
Operating Temperature	T _{OPR}	-40 to +125				°C
Storage Temperature	T _{STG}	-55 to +150				°C

- Notes: 1. Per IEC 61000-4-2, Level 4 8 kV Contact Discharge. Measurement 30 ns after initiation of pulse.
 2. Per IEC 61000-4-2, Level 4 8 kV Contact Discharge. Measurement at maximum pulse voltage.
 3. Part number suffix "x" can be E for 0603 size or G for 0402 size to indicate tape & reel quantity.

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

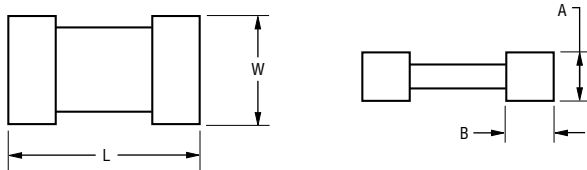
Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

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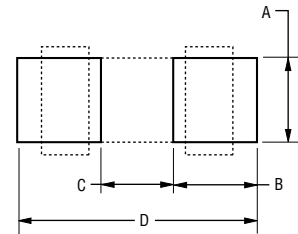
Product Dimensions



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

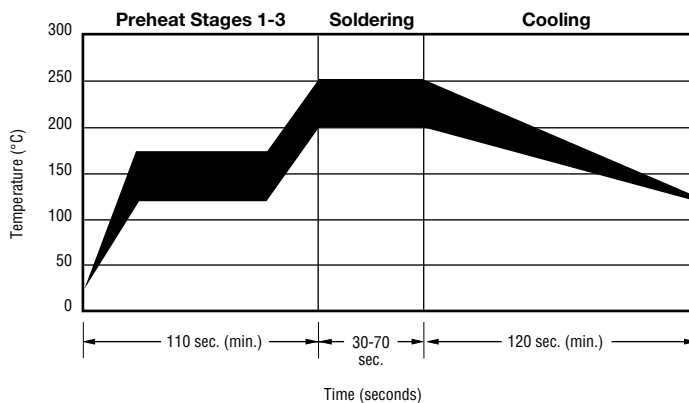
Dimension	CG0402 Series	CG0603 Series
L	$\frac{1.00 \pm 0.15}{(0.04 \pm 0.006)}$	$\frac{1.60 \pm 0.20}{(0.064 \pm 0.008)}$
W	$\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$	$\frac{0.80 \pm 0.20}{(0.032 \pm 0.008)}$
A	$\frac{0.36 \pm 0.05}{(0.014 \pm 0.002)}$	$\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$
B	$\frac{0.25 \pm 0.15}{(0.10 \pm 0.006)}$	$\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$

Recommended Pad Layout



Dim.	CG0402 Series	CG0603 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	$\frac{1.70}{(0.067)}$	$\frac{2.54}{(0.100)}$

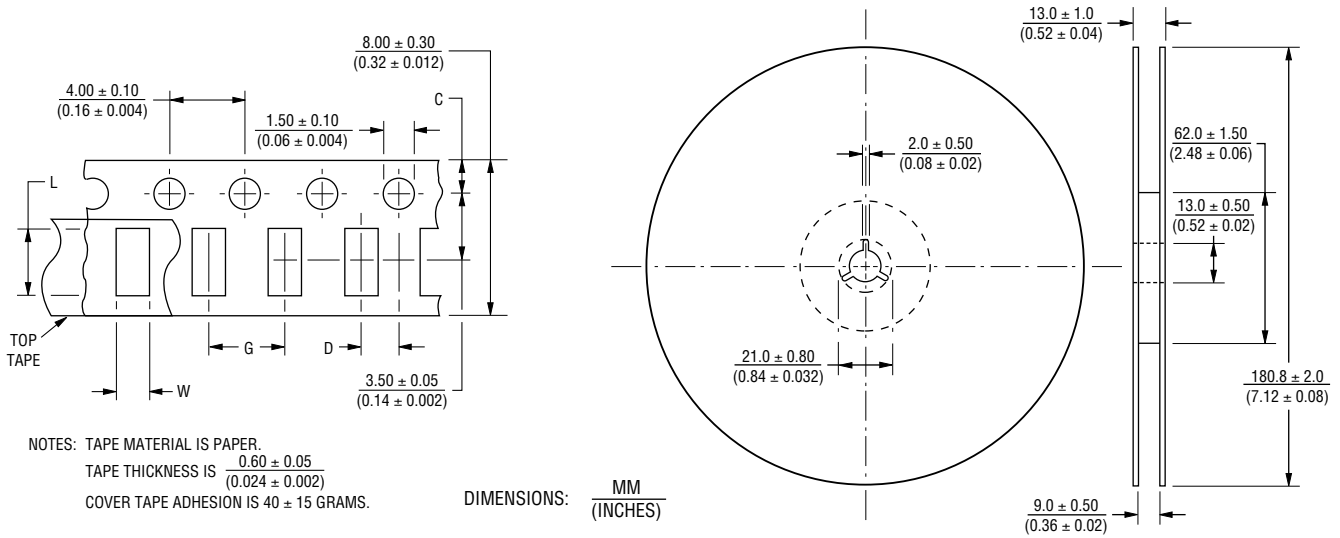
Solder Reflow Recommendations



Stage	Description	Temperature	Time
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	60 s to 70 s
		210 °C	55 s to 65 s
		220 °C	50 s to 60 s
		230 °C	40 s to 50 s
		240 °C	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.

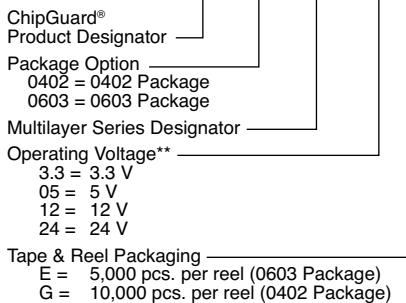
Packaging Dimensions



Dimension	CG0402 Series	CG0603 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	$\frac{2.0 \pm 0.05}{(0.08 \pm 0.002)}$	$\frac{4.0 \pm 0.05}{(0.16 \pm 0.002)}$

How to Order

CG 0n0n MLU - n.n x



** Only models lower than 10 volts require decimal point.

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