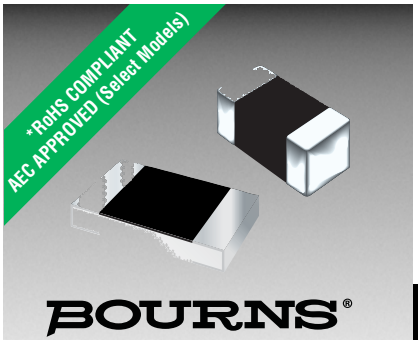


Features

- Select models are compliant with AEC-Q200 Rev-C Stress Test Qualification for Passive Components in Automotive Applications (see chart below)
- RoHS compliant*
- ESD protection >25 kV
- Low capacitance <0.5 pF
- Low leakage current <50 nA

Applications

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

ChipGuard® MLC Series - ESD Protectors

General Information

The ChipGuard® MLC Series has been specifically designed to protect sensitive electronic components from electrostatic discharge damage. The MLC 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® MLC Series has been manufactured to provide low 0.5 pF capacitance and leakage currents less than 50 nA with excellent clamp qualities, making the family almost transparent under normal working conditions.

Device Symbol



AEC Approved Models

Model	AEC-Q200
CG0603MLC-05E	✓ Yes
CG0603MLC-05LE	✓ Yes
CG0603MLC-05LEA	✓ Yes
CG0603MLC-12E	✓ Yes
CG0603MLC12LE	✓ Yes
CG0603MLC-12LEA	✓ Yes

Electrical Characteristics @ 25 °C (unless otherwise noted)

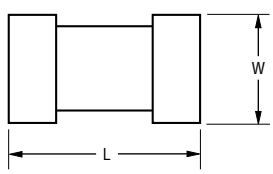
Parameter	Symbol	CG0402MLC-								Unit
		3.3LG	05LG	12LG	24LG	3.3LGA	05LGA	12LGA	24LGA	
Typical Continuous Operating Voltage	V_{DC}	3.3	5	12	24	3.3	5	12	24	V
Typical Clamping Voltage (Note 1)	V_C	25								V
Maximum Capacitance @ 1 VRMS 1 MHz	C_O	0.5								pF
Maximum Leakage Current @ Max. VDC	I_L	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 Level 4 Min. Contact Discharge Min. Air Discharge Min. Air Discharge		 ±8 ±15 (Note 3) ±25								 kV kV kV
Operating Temperature	T_{OPR}	-40 to +85				-40 to +125				˚C
Storage Temperature	T_{STG}	-55 to +150								˚C

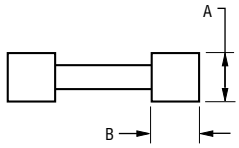
Parameter	Symbol	CG0603MLC-										Unit
		3.3LE	05E	05LE	12E	12LE	24LE	3.3LEA	05LEA	12LEA	24LEA	
Typical Continuous Operating Voltage	V_{DC}	3.3	5	5	12	12	24	3.3	5	12	24	V
Typical Clamping Voltage (Note 1)	V_C	25	20	25	30	25						V
Maximum Capacitance @ 1 VRMS 1 MHz	C_O	0.5										pF
Maximum Leakage Current @ Max. VDC	I_L	5	50	5	50	5						nA
Typical Trigger Voltage (Note 2)	V_T	250	150	250	150	250						V
Maximum Response Time	R_T	1										ns
ESD Protection: Per IEC 61000-4-2 Level 4 Min. Contact Discharge Min. Air Discharge Min. Air Discharge		 ±8 ±15 (Note 3) ±25										 kV kV kV
Operating Temperature	T_{OPR}	-40 to +85						-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. IEC 61000-4-2 ESD Performance for CG0603MLC-05E and CG0603MLC-12E devices will meet minimum 100 reps. Some shifting in characteristics may occur when tested over several hundred ESD pulses. All other part numbers listed will meet IEC 61000-4-2 ESD Performance with minimum 1000 reps without degradation in performance.

*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.
Customers should verify actual device performance in their specific applications.

Product Dimensions

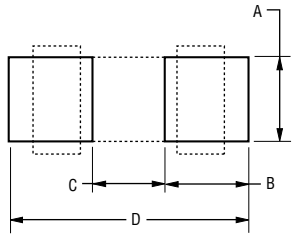




DIMENSIONS: MM / (INCHES)

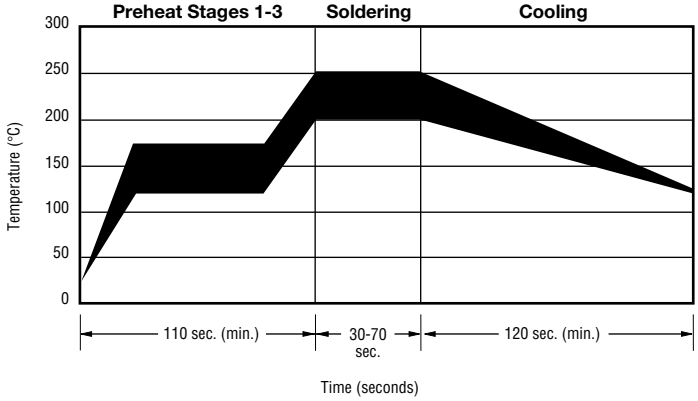
Dimension	CG0402 Series	CG0603 Series
L	1.00 ± 0.15 (0.04 ± 0.006)	1.60 ± 0.20 (0.064 ± 0.008)
W	0.50 ± 0.10 (0.02 ± 0.004)	0.80 ± 0.20 (0.032 ± 0.008)
A	0.36 ± 0.05 (0.014 ± 0.002)	0.45 ± 0.10 (0.018 ± 0.004)
B	0.25 ± 0.15 (0.10 ± 0.006)	0.30 ± 0.20 (0.012 ± 0.008)

Recommended Pad Layout



Dim.	CG0402 Series	CG0603 Series
A	0.51 (0.020)	0.76 (0.030)
B	0.61 (0.024)	1.02 (0.040)
C	0.51 (0.020)	0.50 (0.020)
D	1.70 (0.067)	2.54 (0.100)

Solder Reflow Recommendations

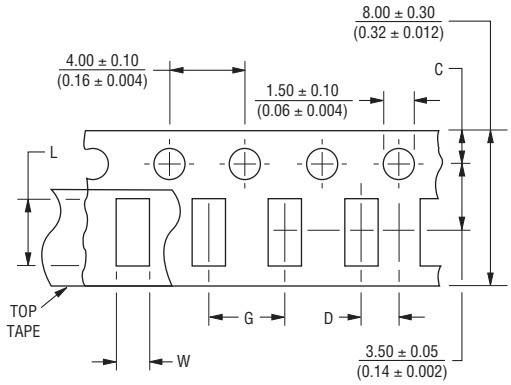


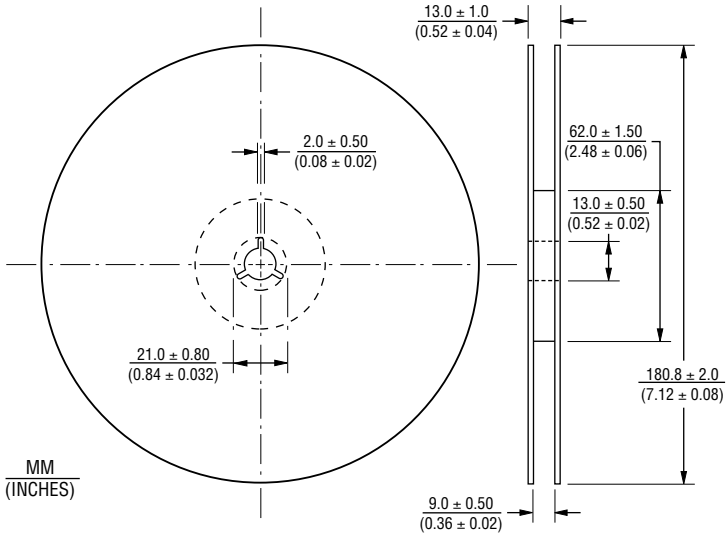
A	Stage 1 Preheat	Ambient to Preheating Temperature	30 s to 60 s
B	Stage 2 Preheat	140 °C to 160 °C	60 s to 120 s
C	Stage 3 Preheat	Preheat to 200 °C	20 s to 40 s
D	Main Heating	200 °C 210 °C 220 °C 230 °C 240 °C 250 °C to 255 °C	60 s to 70 s 55 s to 65 s 50 s to 60 s 40 s to 50 s 30 s to 40 s 5 s
E	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.

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

Packaging Dimensions





NOTES: TAPE MATERIAL IS PAPER.
TAPE THICKNESS IS $\frac{0.48 \pm 0.03}{(0.019 \pm 0.0012)}$
COVER TAPE ADHESION IS 40 ± 15 GRAMS.

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

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 MLC - n.n x x x

ChipGuard® Product Designator

Package Option
- 0402 = 0402 Package
- 0603 = 0603 Package

Multilayer Series Designator

Operating Voltage**
- 3.3 = 3.3 V
- 05 = 5 V
- 12 = 12 V
- 24 = 24 V

Low Leakage Current Option
- L = Low Leakage Current
- Blank = Standard Product

Tape & Reel Packaging
- E = 5,000 pcs. per reel (0603 Package)
- G = 10,000 pcs. per reel (0402 Package)

Operating Temperature Option
- A = Higher +125 °C Operating Temperature
- Blank = Standard Product

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

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http://moschip.ru/get-element

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