

## Features

- AEC-Q200 compliant & automotive grade
- ESD protection to IEC 61000-4-2 Level 4
- <1 ns response time to ESD strike
- Low leakage current
- Extremely low capacitance (0.2 pF typ.)
- Bidirectional device
- Multi-strike capability

## Applications

- Camera links
- Sensors
- Touchscreen interfaces
- GPS
- Antennas
- USB 3.0
- High-speed communications buses

# ChipGuard® MLC Series - ESD Protectors

### General Information

Bourns® ChipGuard® Automotive MLC Series is a sub-1 pF protector designed specifically for use in circuits requiring ESD protection. The CGA-MLC series is available in industry standard 0402 and 0603 packages. In addition to its very low capacitance, these protectors exhibit extremely fast response times to ESD events making them ideal for protecting a wide array of high speed digital electronic applications.



The ChipGuard® MLC Series is fully AEC-Q200 compliant and supported.

### Additional Information

Click these links for more information:



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

Parameter	Symbol	CGA0402MLC-			CGA0603MLC-			Unit
		05G	12G	24G	05E	12E	24E	
DC Working Voltage	$V_W(DC)$	≤5	≤12	≤24	≤5	≤12	≤24	V
Maximum Leakage Current @ Max. $V_W(DC)$	$I_L$	<0.01						μA
Typical Clamping Voltage (Note 1)	$V_C$	30						V
Typical Trigger Voltage (Note 1)	$V_T$	300						V
Typical Peak Voltage (Note 2)	$V_P$	300						V
Typical Capacitance @ 1 MHz, 1 Vrms	$C_O$	0.2						pF
Response Time	$R_T$	<1						ns
ESD Protection: Per IEC 61000-4-2 Level 4 Min. Contact Discharge Min. Air Discharge Typical ESD Withstand		±8 ±15 (Note 3) 1000						kV kV Pulses
Operating Temperature	$T_{OPR}$	-55 to +125						°C
Storage Temperature	$T_{STG}$	-55 to +125						°C

Notes: 1.  $V_T$  and  $V_C$  measured using TLP (Transmission Line Pulse) method.  
 2. Peak voltage measured under ESD Test Conditions: IEC61000-4-2, 8 kV contact discharge.  
 3. IEC 61000-4-2 ESD Performance for CGA0603MLC-05E and CGA0603MLC-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.



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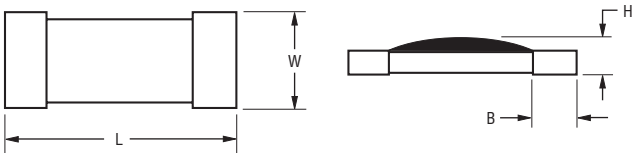
\* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

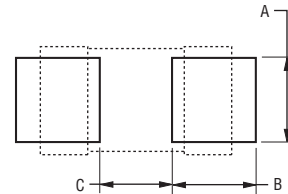
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## Product Dimensions



Dim.	CG0402MLC Series	CG0603MLC Series
L	$\frac{1.00 \pm 0.10}{(0.04 \pm 0.004)}$	$\frac{1.60 \pm 0.10}{(0.064 \pm 0.004)}$
W	$\frac{0.50 \pm 0.10}{(0.02 \pm 0.004)}$	$\frac{0.85 \pm 0.15}{(0.033 \pm 0.006)}$
H	$\frac{0.34 \pm 0.10}{(0.014 \pm 0.004)}$	$\frac{0.51 \pm 0.05}{(0.020 \pm 0.002)}$
B	$\frac{0.20 \pm 0.15}{(0.008 \pm 0.006)}$	$\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$

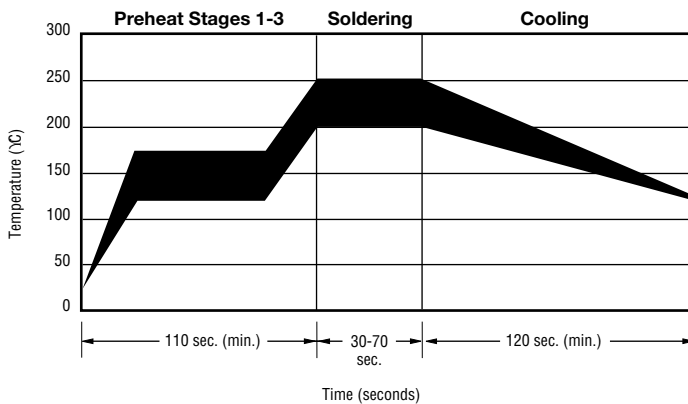
## Recommended Pad Layout



Dim.	CGA0402MLC Series	CGA0603MLC Series
A	$\frac{0.50 \pm 0.1}{(0.02 \pm 0.004)}$	$\frac{0.75 \pm 0.1}{(0.03 \pm 0.004)}$
B	$\frac{0.50 \pm 0.1}{(0.02 \pm 0.004)}$	$\frac{0.75 \pm 0.1}{(0.03 \pm 0.004)}$
C	$\frac{0.50 \pm 0.1}{(0.02 \pm 0.004)}$	$\frac{0.75 \pm 0.1}{(0.03 \pm 0.004)}$

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

## Solder Reflow Recommendations

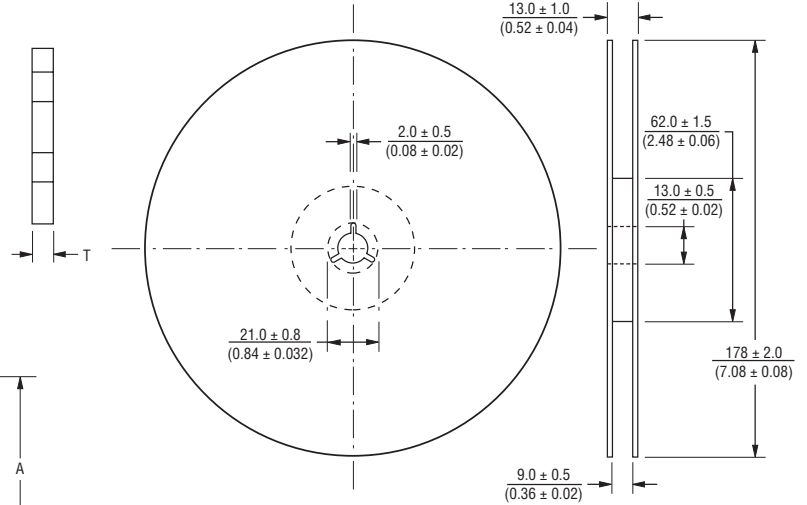
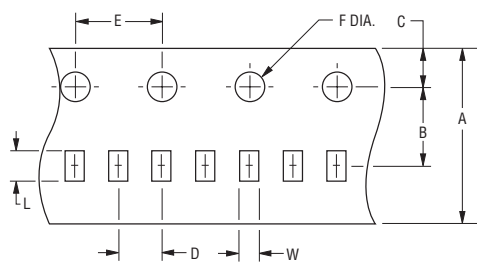


A	Stage 1 Preheat	Ambient to Preheating Temperature	30 s to 60 s
B	Stage 2 Preheat	140 °C to 160 °C	60 s to 120 s
C	Stage 3 Preheat	Preheat to 200 °C	20 s to 40 s
D	Main Heating	200 °C	60 s to 70s
		210 °C	55 s to 65 s
		220 °C	50 s to 60 s
		230 °C	40 s to 50 s
		240 °C	30 s to 40 s
E	Cooling	250 °C to 255 °C	5 s
		200 °C to 100 °C	1 °C/s to 4 °C/s

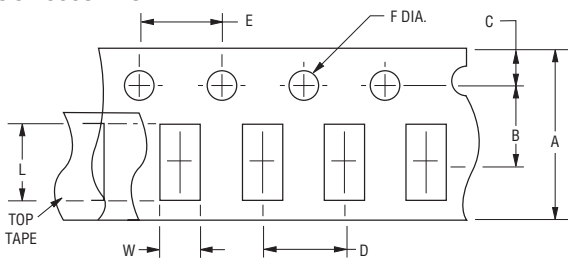
- This product can be damaged by rapid heating, cooling or localized heating.
- Heat shocks should be avoided. Preheating and gradual cooling recommended.
- Excessive solder can damage the device. Print solder thickness of 150 to 200 um recommended.
- Solder gun tip temperature should be kept below 280 °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**

**CGA0402MLC**



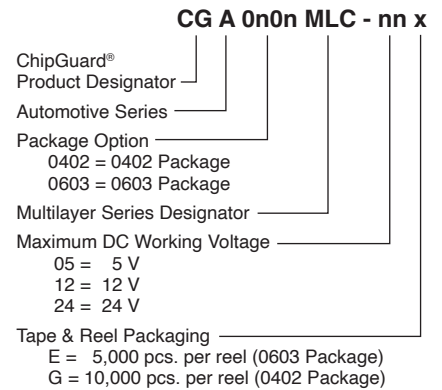
**CGA0603MLC**



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

Dimension	CGA0402MLC Series	CGA0603MLC Series
A	$\frac{8.00 \pm 0.30}{(0.315 \pm 0.012)}$	$\frac{8.00 \pm 0.30}{(0.315 \pm 0.012)}$
B	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$
C	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
D	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$	$\frac{4.00 \pm 0.05}{(0.157 \pm 0.002)}$
E	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
F	$\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$	$\frac{1.50 \pm 0.10}{(0.059 \pm 0.004)}$
L	$\frac{1.13 \pm 0.03}{(0.044 \pm 0.001)}$	$\frac{1.90 \pm 0.20}{(0.075 \pm 0.008)}$
W	$\frac{0.63 \pm 0.03}{(0.025 \pm 0.001)}$	$\frac{1.05 \pm 0.20}{(0.041 \pm 0.008)}$
T	$\frac{0.43 \pm 0.03}{(0.017 \pm 0.001)}$	$\frac{0.60 \pm 0.03}{(0.024 \pm 0.0012)}$

**How to Order**



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