Description

Littelfuse Broadband Optimized™ SL0902A Series offers high surge ratings in a miniature package. Special design features provide high levels of protection against fast rising transients in the 100V/μs to 1kV/μs range usually caused by lightning disturbances. Low insertion loss is perfectly suited to broadband equipment applications. The capacitance does not vary with voltage, and will not cause operational problems with ADSL2+, where capacitance variation across Tip and Ring is undesirable. These devices are extremely robust and are able to divert a 2500A pulse without destruction. For AC Power Cross of long duration, overcurrent protection is recommended.

Littelfuse CG5 MS mini surge arresters are specifically designed for protection of electrical and communication equipment against over voltage transients in surface mount assembly applications. This series offers the most cutting edge protection using non-radioactive elements.

Features

- RoHS compliant and Lead-free
- GHz working frequency
- Excellent stability on multiple pulse duty cycle
- Excellent response to fast rising transients.
- Ultra Low Insertion Loss
- 5KA surge capability tested with 8/20μS pulse as defined by IEC 61000-4-5, 2nd edition
- Ultra small devices offered in a variety of mounting lead forms
- Non-Radioactive
- Low capacitance (<1pF)
- Voltage Ranges 90V to 600V
- UL Recognized
- Conforms to ITU-T K12, IEC 61000-4-5, 2nd edition

Applications

- Communication equipment
- CATV equipment
- Test equipment
- Data lines
- Power supplies
- Telecom SLIC protection
- Broadband equipment
- ADSL equipment, including ADSL2+
- XDSL equipment
- Satellite and CATV equipment
- General telecom equipment

Agency Approvals

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>AGENCY FILE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL</td>
<td>E128662</td>
</tr>
</tbody>
</table>

2 Electrode GDT Graphical Symbol

Additional Information

- Datasheet CG5 Series
- Resources CG5 Series
- Samples CG5 Series
- Datasheet SL0902A
- Resources SL0902A
- Samples SL0902A
## Gas Discharge Tubes
CG5 and SL0902A Series

### Electrical Characteristics

<table>
<thead>
<tr>
<th>Device Specifications (at 25°C)</th>
<th>Life Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part Number</strong></td>
<td><strong>DC Breakdown in Volts (@100V/s)</strong></td>
</tr>
<tr>
<td>SL0902A090</td>
<td>72</td>
</tr>
<tr>
<td>CG590</td>
<td>116</td>
</tr>
<tr>
<td>CG5150</td>
<td>120</td>
</tr>
<tr>
<td>SL0902A230 CG5230</td>
<td>184</td>
</tr>
<tr>
<td>CG5250</td>
<td>200</td>
</tr>
<tr>
<td>CG5270*</td>
<td>216</td>
</tr>
<tr>
<td>SL0902A350 CG5350</td>
<td>280</td>
</tr>
<tr>
<td>CG5400</td>
<td>320</td>
</tr>
<tr>
<td>SL0902A420*</td>
<td>336</td>
</tr>
<tr>
<td>CG5470</td>
<td>376</td>
</tr>
<tr>
<td>SL0902A600 CG5600</td>
<td>480</td>
</tr>
</tbody>
</table>

* - Particular component is not UL Recognized.

### Product Characteristics

#### Materials

**CG5xxxLS (Outline 500), CG5xxxxLTR & CG5350L-03TR (Outline 502), and CG5xxxL-02 (Outline 503):** Device Nickel Plated 2–5 Microns Wire Tin Plated 175±12.5 Microns Construction Ceramic Insulator. **CG5xxx (Outline 501), and CG5xxxMS & SL0902AxxxSM (Outline 505):** Device Tin Plated 175±12.5 Microns Construction Ceramic Insulator.

#### Voltage vs. Time Characteristic

**Product Marking**
LF Logo, Voltage and date code

**Glow to arc transition current**
< 0.5Amps

**Glow Voltage**
140 Volts

**Storage and Operational Temperature**
-40 to +90

### Typical Insertion Loss

- @ 1.0 GHz = 0.01 dB
- @ 1.4 GHz = 0.1 dB
- @ 1.8 GHz = 0.53 dB
- @ 2.1 GHz = 0.81 dB
- @ 2.45 GHz = 1 dB
- @ 2.8 GHz = 1.2 dB
- @ 3.1 GHz = 1.5 dB
- @ 3.5 GHz = 2.1 dB

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Specifications are subject to change without notice.
Revised: 12/14/18
Device Dimensions

Outline 500 - CG5xxxLS

Outline 501 - CG5xxx

Outline 502 - CG5xxxLTR (also CG5350L-02TR, CG5600L-02)

Outline 503 - CG5xxxL-02 (except CG5600L-02, see Outline 502)

Outline 505 - CG5xxxMS and SL0902AxxxSM

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Revised: 12/14/18
Soldering Parameters - Reflow Soldering (Surface Mount Devices)

<table>
<thead>
<tr>
<th>Reflow Condition</th>
<th>Pb – Free assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Heat</td>
<td></td>
</tr>
<tr>
<td>- Temperature Min (T_s(min))</td>
<td>150°C</td>
</tr>
<tr>
<td>- Temperature Max (T_s(max))</td>
<td>200°C</td>
</tr>
<tr>
<td>- Time (Min to Max) (t_s)</td>
<td>60 – 180 secs</td>
</tr>
<tr>
<td>Average ramp up rate</td>
<td>3°C/second max</td>
</tr>
<tr>
<td>T_s(max) to T_L - Ramp-up Rate</td>
<td>5°C/second max</td>
</tr>
<tr>
<td>Reflow</td>
<td></td>
</tr>
<tr>
<td>- Temperature (T_L) (Liquidus)</td>
<td>217°C</td>
</tr>
<tr>
<td>- Temperature (t_L)</td>
<td>60 – 150 seconds</td>
</tr>
<tr>
<td>Peak Temperature (T_P)</td>
<td>260°C</td>
</tr>
<tr>
<td>Time within 5°C of actual peak Temperature (t_P)</td>
<td>10 – 30 seconds</td>
</tr>
<tr>
<td>Ramp-down Rate</td>
<td>6°C/second max</td>
</tr>
<tr>
<td>Time 25°C to peak Temperature (T_P)</td>
<td>8 minutes Max.</td>
</tr>
<tr>
<td>Do not exceed</td>
<td>260°C</td>
</tr>
</tbody>
</table>

Soldering Parameters - Wave Soldering (Thru-Hole Devices)

Recommended Process Parameters:

<table>
<thead>
<tr>
<th>Wave Parameter</th>
<th>Lead-Free Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat:</td>
<td>350°C +/- 5°C</td>
</tr>
<tr>
<td>Temperature Min:</td>
<td>100°C</td>
</tr>
<tr>
<td>Temperature Max:</td>
<td>150°C</td>
</tr>
<tr>
<td>Preheat Time:</td>
<td>60-180 seconds</td>
</tr>
<tr>
<td>Solder Pot Temp:</td>
<td>280°C Maximum</td>
</tr>
<tr>
<td>Solder Dwell Time</td>
<td>2-5 seconds</td>
</tr>
</tbody>
</table>

Note: These devices are not recommended for IR or Convection Reflow process.
Part Numbering System and Ordering Information

CG5xxx L TR
- Series: CG5
- Breakdown Voltage:
  - 90 = 90V
  - 145 = 145V
  - 150 = 150V
  - 230 = 230V
  - 250 = 250V
  - 270 = 270V
  - 350 = 350V
  - 400 = 400V
  - 470 = 470V
  - 600 = 600V

Lead Option Code:
- (Blank) = Core Device (No Leads)
- L = Straight Leads
- LS = Shaped Leads
- MS = Surface Mount

Packaging Option Code:
- (Blank) = Bulk (Applies to Core Devices Only)
- TR = Tape & Reel

SL0902A xxx SM
- Series: SL0902A
- Breakdown Voltage:
  - 090 = 90V
  - 230 = 230V
  - 350 = 350V
  - 420 = 420V
  - 600 = 600V

Lead Option Code:
- SM = Surface Mount

Packaging Option Code (is not applicable for SL0902A)

Packaging

<table>
<thead>
<tr>
<th>Part Number and Device Type</th>
<th>Device Dimensions Reference</th>
<th>Quantity and Packaging Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG5xxx</td>
<td>Core</td>
<td>Outline 501</td>
</tr>
<tr>
<td>CG5xxxLS</td>
<td>Shaped Leads</td>
<td>Outline 500</td>
</tr>
<tr>
<td>CG5xxxLTR</td>
<td>Straight Axial Leads</td>
<td>Outline 502</td>
</tr>
<tr>
<td>CG5xxxL-02**</td>
<td>Bent Radial Leads</td>
<td>Outline 503</td>
</tr>
<tr>
<td>CG5xxxMS</td>
<td>Surface mount</td>
<td>Outline 505</td>
</tr>
<tr>
<td>SL0902A xxx SM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For tape specifications and dimensions, please contact factory.
** Special order items not available for general sale. Please contact Littelfuse for details.

Surface Mount Device Orientation

Note: Surface Mount device orientation on carrier tape as shown below

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