

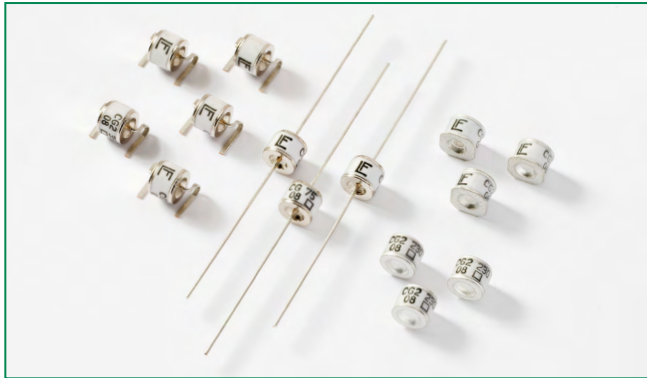
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**CG/CG2 Series**



**Description**

Littelfuse highly reliable CG/CG2 Series GDTs provide a high degree of surge protection in a small size ideal for board level circuit protection.

GDTs function as switches which dissipate a minimum amount of energy and therefore handle currents that far surpass other types of transient voltage protection. Their gas-filled, rugged ceramic metal construction make them well suited to adverse environments.

The CG/CG2 series comes in a variety of forms including surface mount, core, straight and shaped leads, to serve a variety of mounting methods.

The CG Series (75V-110V) is ideal for protection of test and communication equipment and other devices in which low voltage limits and extremely low arc voltages are required.

The CG2 Series (145V-1000V) is ideal for protecting equipment where higher voltage limits and holdover voltages are necessary.

**Agency Approvals**

| AGENCY | AGENCY FILE NUMBER   |
|--------|----------------------|
|        | E128662 <sup>1</sup> |
|        | E320116 <sup>2</sup> |

NOTES:  
1. Certified to UL 497B.  
2. Only CG2300, CG2470, CG2600, CG2800 and CG221000. Certified to UL 1449.

**2 Electrode GDT Graphical Symbol**



**Additional Information**



**Datasheet**  
CG/CG2



**Resources**  
CG/CG2



**Samples**  
CG/CG2

**Features**

- RoHS and Lead-free compliant
- Rugged Ceramic-Metal construction
- Low Capacitance (<1.5pf)
- Meets REA PE-80
- Available in surface mount, and a variety of lead options options

**Applications**

- Communication lines and equipment
- CATV equipment
- Test equipment
- Data lines
- Power supplies
- Instrumentation circuits
- Medical electronics
- ADSL equipment
- Telecom SLIC protection

### Electrical Characteristics

| Part Number            | Device Specifications (at 25°C) |      |      |  |  |                              | Life Ratings        |  |                              |  |   |                                      |                                  |  |       |
|------------------------|---------------------------------|------|------|--|--|------------------------------|---------------------|--|------------------------------|--|---|--------------------------------------|----------------------------------|--|-------|
|                        | DC Breakdown in Volts (@100V/s) |      |      | Impulse Break-down in Volts (@100V/μs) | Impulse Break-down In Volts (@1 Kv/μsec) | Insulation Resistance        | Capacitance (@1MHz) | Arc Voltage (on state Voltage) @1Amp Min | Surge Life (@500A 10/1000μs) | Nominal Impulse Discharge Current (8/20μs) | Nominal AC Discharge Current (10x1sec @50-60Hz) | AC Discharge Current (9 cycle @50Hz) | DC Holdover Voltage <sup>2</sup> | Max Impulse Discharge Current (1 Application @ 10/350μs) |       |
|                        | MIN                             | TYP  | MAX  | MAX                                    |  | MIN                          | MAX                 | TYP                                      |                              |  |   |                                      | TYP                              |  |       |
| CG75                   | 60                              | 75   | 90   | 400                                    | 650                                      | 10 <sup>10</sup> Ω (at 50V)  | 1.5 pf              | 15 V                                     | 400 shots                    | 10 shots (@20kA) <sup>3</sup>              | 20 A  | 100 A                                | 52 V                             | 4kA  |       |
| CG90                   | 72                              | 90   | 108  | 400                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG90 SN                | 72                              | 90   | 108  | 400                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG110                  | 88                              | 110  | 132  | 450                                    | 600                                      | 10 <sup>10</sup> Ω (at 100V) |                     |  |                              |  |   |                                      | 80 V                             |  | 2.5kA |
| CG2145                 | 116                             | 145  | 174  | 500                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2145 SN              | 120                             | 145  | 174  | 500                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2230 <sup>1</sup>    | 195                             | 230  | 265  | 600                                    | 700                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2230 SN <sup>1</sup> | 184                             | 230  | 276  | 600                                    | 700                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2250                 | 213                             | 250  | 288  | 625                                    | 725                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2250 SN              | 200                             | 250  | 300  | 625                                    | 725                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2300                 | 255                             | 300  | 345  | 700                                    | 800                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2300 SN              | 240                             | 300  | 360  | 700                                    | 800                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2350                 | 297                             | 350  | 403  | 750                                    | 900                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2350 SN              | 280                             | 350  | 420  | 750                                    | 900                                      |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2420                 | 357                             | 420  | 483  | 800                                    | 1000                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2470 <sup>1</sup>    | 400                             | 470  | 540  | 850                                    | 1200                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2470 SN <sup>1</sup> | 376                             | 470  | 564  | 850                                    | 1200                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2600 <sup>1</sup>    | 510                             | 600  | 690  | 1000                                   | 1400                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2600 SN <sup>1</sup> | 480                             | 600  | 720  | 1000                                   | 1400                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG2800 <sup>1</sup>    | 680                             | 800  | 920  | 1200                                   | 1500                                     |                              |                     |  |                              |  |   |                                      |                                  |  |       |
| CG21000 <sup>1</sup>   | 850                             | 1000 | 1150 | 1500                                   | 1600                                     |                              |                     |  | 10 shots (@10kA)             | 10 A                                       | 65 A  |                                      |                                  |  |       |

NOTES:

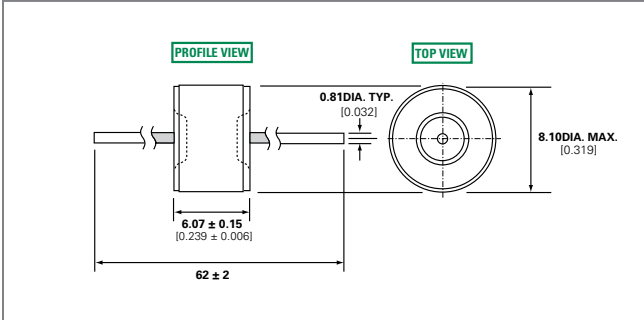
1. Certified to UL 1449.
2. Reference REA PE-80, 0.2A. Tested to ITU-T Rec K.12 and REA PE 80 < 150 mSec.
3. 5 x [5 (+) or 5 (-)] applications 20kA 8/20μSec. (75 to 600 volt devices.)  
 10 x [5 (+) and 5 (-)] applications 10kA 8/20μSec. (800 and 100 volt devices.)

### Product Characteristics

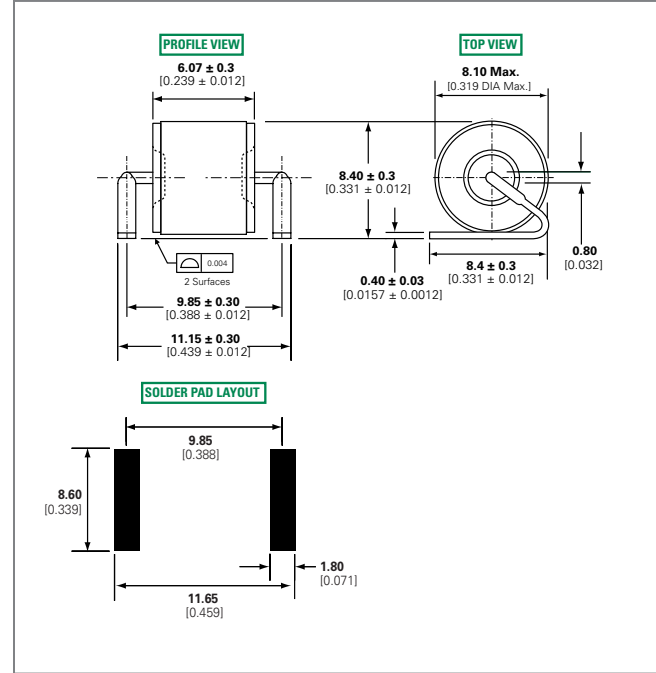
|                  |  |   |
|------------------|--|---|
| <b>Materials</b> | <b>LS, Axial:</b><br>Device: Tin Plated 2–5 Microns<br>Lead Wires: Tin Plated 17.5 ± 12.5 Microns<br>Construction: Ceramic Insulator<br><b>Core:</b><br>Device: Tin Plated 17.5 ± 12.5 Microns.<br>Construction: Ceramic Insulator<br><b>MS:</b><br>Device: Dull Tin Plated 7–9 Microns<br>Construction: Ceramic Insulator | <b>Glow to arc transition current</b> < 0.5Amps<br><b>Glow Voltage</b> 60-160 Volts<br><b>Storage and Operational Temperature</b> -40 to +90<br><b>Maximum Follow On Current<sup>1</sup></b> 230 Volts r.m.s, 200 Amps. (800V and 1000V devices tested to UL1449 3rd edition) |
|                  | <b>Product Marking</b> LF Logo, Voltage and date code; Black in positive print   |   |

**Device Dimensions**

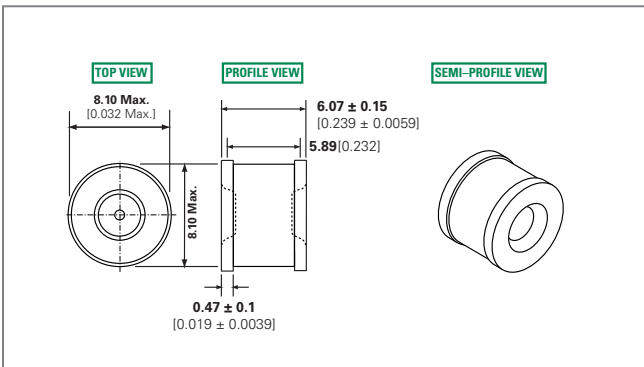
**Leaded 'L' Type Straight Axial Devices**



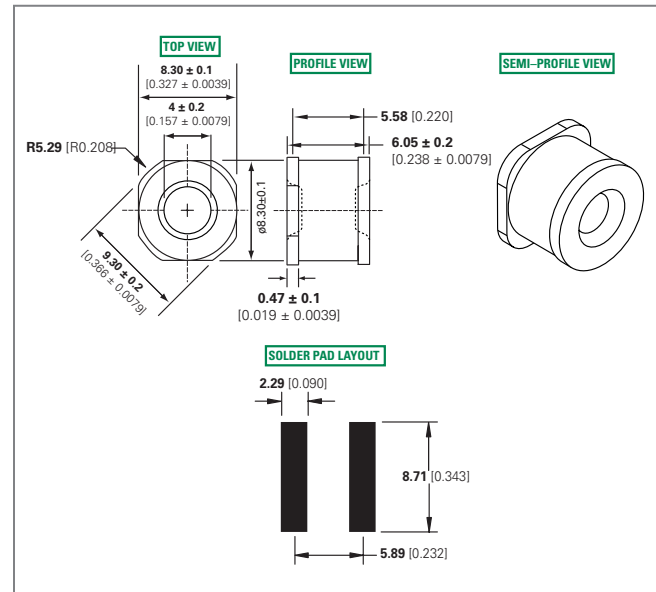
**Leaded 'LS' Type Shaped Lead Devices**



**Core Devices**

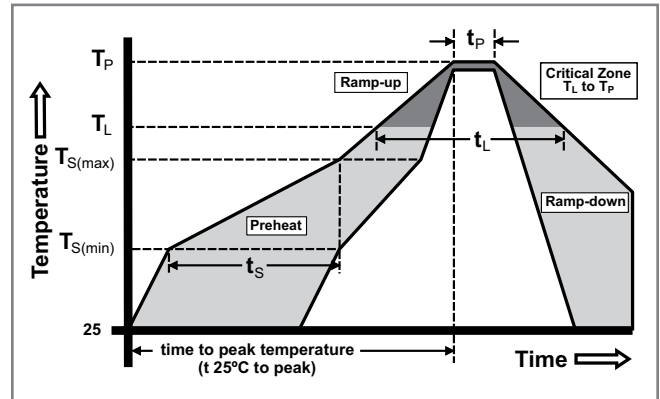


**'MS' Type Devices**

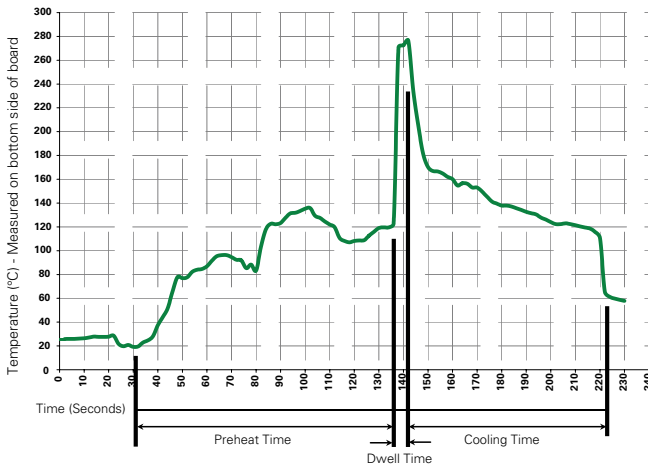


### Soldering Parameters - Reflow Soldering (Surface Mount Devices)

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| Reflow Condition                                       |                                    | Pb – Free assembly      |
| Pre Heat   | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|  | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|  | - Time (Min to Max) ( $t_s$ )      | 60 – 180 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak) |                                    | 3°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                    | 5°C/second max          |
| Reflow   | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|  | - Temperature ( $t_L$ )            | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 10 – 30 seconds         |
| Ramp-down Rate   |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )                |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 260°C                   |



### Soldering Parameters - Wave Soldering (Thru-Hole Devices)



### Recommended Process Parameters:

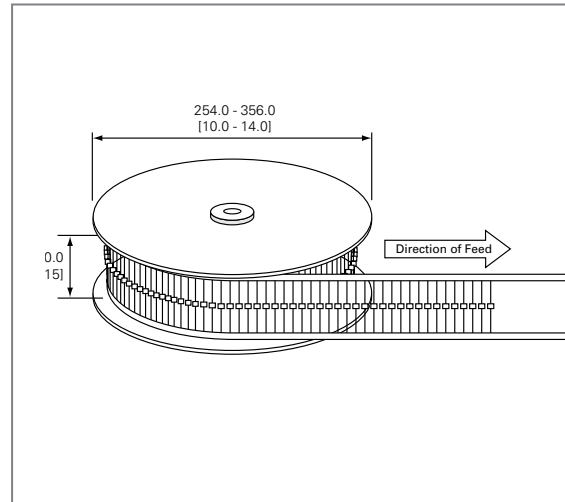
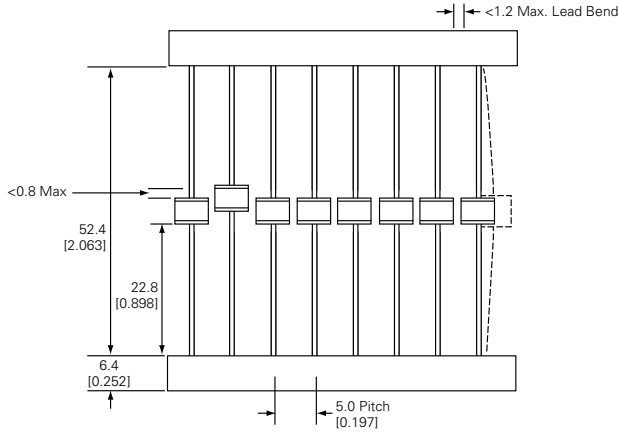
| Wave Parameter  | Lead-Free Recommendation |
|---|--------------------------|
| <b>Preheat:</b><br>(Depends on Flux Activation Temperature) (Typical Industry Recommendation) |                          |
| Temperature Minimum:  | 100° C                   |
| Temperature Maximum:  | 150° C                   |
| Preheat Time:   | 60-180 seconds           |
| <b>Solder Pot Temperature:</b>  | 280° C Maximum           |
| <b>Solder Dwell Time:</b>   | 2-5 seconds              |

### Soldering Parameters - Hand Soldering

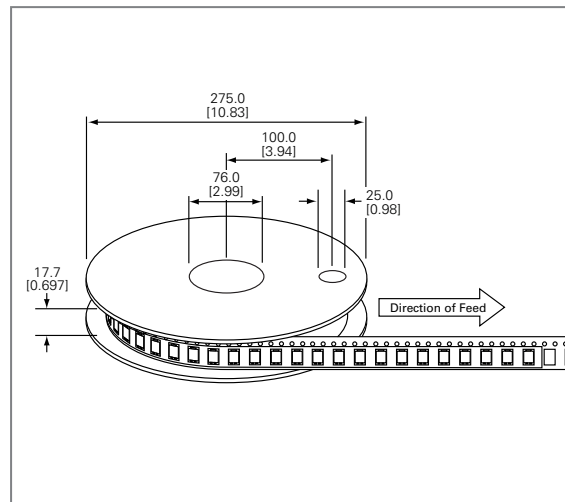
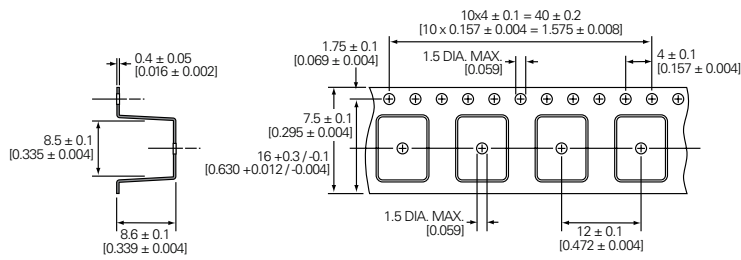
Solder Iron Temperature: 350° C +/- 5°C  
 Heating Time: 5 seconds max.

**Packaging Dimensions**

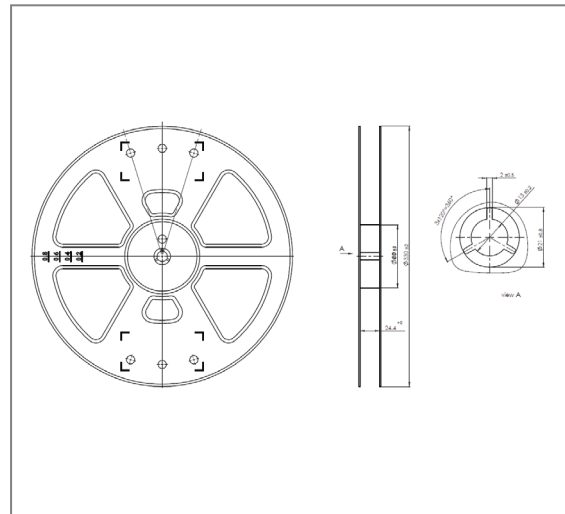
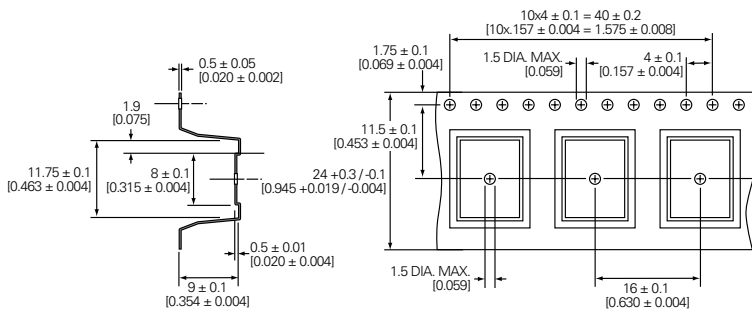
**For 'L' Type Axial Lead Items**



**Core and 'MS' Type Items**



**For 'LS' Type Shaped Lead Items**



### Part Numbering System and Ordering Information

|                              |   |            |           |          |           |
|------------------------------|---|------------|-----------|----------|-----------|
|                              | <b>CG2</b>  | <b>XXX</b> | <b>XX</b> | <b>*</b> | <b>XX</b> |
| <b>Series</b>                |   |            |           |          |           |
| CG                           | – for 75, 90, or 110V   |            |           |          |           |
| CG2                          | – for 145V to 1000V   |            |           |          |           |
| <b>Breakdown Voltage</b>     |   |            |           |          |           |
| 75                           | 300   |            |           |          |           |
| 90                           | 350   |            |           |          |           |
| 110                          | 470   |            |           |          |           |
| 145                          | 600   |            |           |          |           |
| 230                          | 800   |            |           |          |           |
| 250                          | 1000  |            |           |          |           |
| <b>Lead Option Code</b>      |   |            |           |          |           |
| (Blank)                      | = No Leads / Core   |            |           |          |           |
| L                            | = Straight Leads  |            |           |          |           |
| LS                           | = Shaped Leads  |            |           |          |           |
| MS                           | = Surface Mount   |            |           |          |           |
| <b>Option Code*</b>          |   |            |           |          |           |
| SN                           | = may have different DC Breakover Voltage Limit. Please refer to Electrical Characteristics table for additional information. |            |           |          |           |
| <b>Packaging Option Code</b> |   |            |           |          |           |
| (Blank)                      | = No Leads / Core, Bulk Bag - 400 pcs   |            |           |          |           |
| L(Blank)                     | = Straight Lead, Tray - 50 pcs  |            |           |          |           |
| LTR                          | = Straight Lead, Tape & Reel per EIA RS-296-E - 500 per reel  |            |           |          |           |
| LS(Blank)                    | = Shaped Lead (see LS dimensions), Tape & Reel - 500 per reel   |            |           |          |           |

**Examples:**

**CG75** – A non-leaded 75V device

**CG2230L** – A leaded 230V device

**CG2800LTR** – A leaded 800V device, tape-and-reel (per EIA standard RS-296-D)

**Notes:**

CG/CG2 devices with other breakdown voltages in the 75-1000 V range are available upon request.