

### CG/CG2 Series



#### Agency Approvals

| AGENCY  | AGENCY FILE NUMBER |
|---|--------------------|
|  | E128662            |
|  | E320116            |

#### 2 Electrode GDT Graphical Symbol



#### 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 (75-110V) 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.

#### Features

- Rugged Ceramic-Metal construction
- Low Capacitance (<1.5pf)
- Meets REA PE-80
- Available in surface mount, and a variety of lead 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                                      |                              |                     |  |                              |  |   |                                      | 80 V                             |  |
| CG90 SN              | 72                              | 90   | 108  | 400                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG110                | 88                              | 110  | 132  | 450                                    | 600                                      | 10 <sup>10</sup> Ω (at 100V) | 1.5 pf              | 15 V                                     | 400 shots                    | 10 shots (@20kA) <sup>3</sup>              | 20 A  | 100 A                                | 135 V                            | 2.5kA  |
| CG2145               | 116                             | 145  | 174  | 500                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2145 SN            | 120                             | 145  | 174  | 500                                    | 600                                      |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2230               | 195                             | 230  | 265  | 600                                    | 700                                      |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2230 SN            | 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               | 400                             | 470  | 540  | 850                                    | 1200                                     |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2470 SN            | 376                             | 470  | 564  | 850                                    | 1200                                     |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2600               | 510                             | 600  | 690  | 1000                                   | 1400                                     |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2600 SN            | 480                             | 600  | 720  | 1000                                   | 1400                                     |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG2800 <sup>1</sup>  | 680                             | 800  | 920  | 1200                                   | 1500                                     |                              |                     |  |                              |  |   |                                      |                                  |  |
| CG21000 <sup>1</sup> | 850                             | 1000 | 1150 | 1500                                   | 1600                                     |                              |                     |  |                              |  |   |                                      |                                  |  |

NOTES:  
 1. Tested to UL1449 Third Edition  
 2. Reference REA PE-80, 0.2A. Tested to ITU-T Rec K.12 and REA PE 80 < 150 mSec.

### 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>Product Marking</b><br>LF Logo, Voltage and date code; Black in positive print  |

|  |   |
|--|---|
| <b>Glow to arc transition current</b>        | < 0.5Amps   |
| <b>Glow Voltage</b>                          | 60-160 Volts  |
| <b>Storage and Operational Temperature</b>   | -40 to +90  |
| <b>Maximum Follow On Current<sup>1</sup></b> | 230 Volts r.m.s, 200 Amps.<br>(800V and 1000V devices tested to UL1449 3rd edition) |

### Device Dimensions

#### Leaded 'L' Type Straight Axial Devices



#### Core Devices



#### Leaded 'LS' Type Shaped Lead 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**

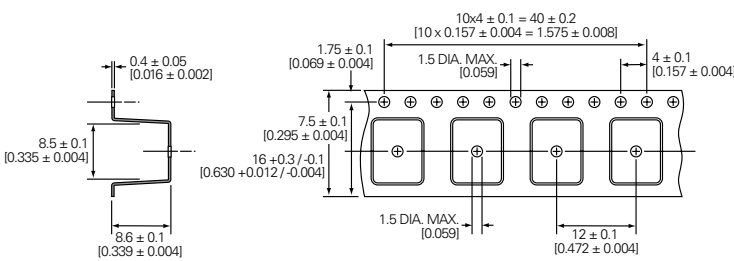
Solder Iron Temperature: 350° C +/- 5°C  
Heating Time: 5 seconds max.

### 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

**CG2 XXX XX \* XX**

**Series**

**CG** – for 75, 90, or 110V  
**CG2** – for 145V to 1000V

**Breakdown Voltage**

|            |             |
|------------|-------------|
| <b>75</b>  | <b>300</b>  |
| <b>90</b>  | <b>350</b>  |
| <b>110</b> | <b>470</b>  |
| <b>145</b> | <b>600</b>  |
| <b>230</b> | <b>800</b>  |
| <b>250</b> | <b>1000</b> |

**Lead Option Code**

(Blank) = No Leads / Core  
**L** = Straight Leads  
**LS** = Shaped Leads  
**MS** = Surface Mount

**Option Code\***

SN = may have different DC Breakover Voltage Limit. Please refer to Electrical Characteristics table for additional information.

**Packaging Option Code**

(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  
**LTE** = Straight Lead, Tape & Reel per IEC 60286-1 - 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.

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