



CG7 Series



Agency Approvals

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

Two Electrode GDT Graphical Symbol



Additional Information



Datasheet



Resources



Samples

Description

The Littelfuse CG7 series GDT is a miniature surface mount device with a 1kA 8/20 $\mu$ S surge rating. Its low insertion loss and thus low off-state capacitance makes it compatible with high bandwidth applications up to the GHz RF range. This GDT's crowbar characteristic protects sensitive ICs from surges as defined in ITU K.20/21/45 Basic and Enhanced Recommendations, GR-1089-CORE first level lightning Port Type 1 and 3, and IEC 61000-4-5 2<sup>nd</sup> edition. It is hermetically sealed using non-radioactive materials Classes 1-3 and some Class 4 & 5 cases and is thus environmentally safe. Its 2.8mm diameter size makes it the world's smallest two-electrode single chamber GDT available.

Features

- RoHS compliant and Lead-free
- Excellent Surge Withstanding Capability
- Excellent response to fast rising transients.
- Ultra Low Insertion Loss and low off-state capacitance for GHz bandwidth compatibility
- Ultra small devices offered in SMD package
- 1kA 8/20 $\mu$ S surge capability pulse as defined by IEC 61000-4-5 2<sup>nd</sup> edition
- Ultra Low capacitance (<0.3pF)
- Voltage Range 75V to 470V
- UL recognized

Applications

- Set top box
- Cable Modem
- Embedded Multimedia Terminal Adapter (EMTA)
- RF Connector
- Multimedia over Coax Alliance (MoCA)
- Base Station RF antenna transmitter
- G.Fast 106MHz and 212 MHz bandplans compatible
- CATV/Broadband equipment
- Data lines and Ethernet (up to 10GbE)
- Telecom line protection
- Broadband equipment
- xDSL equipment, including ADSL2, ADSL, VDSL, VDSL2 30a bandplan compatible
- IAD (Integrated Access Device)
- Aerospace and Automotive

**Electrical Characteristics**

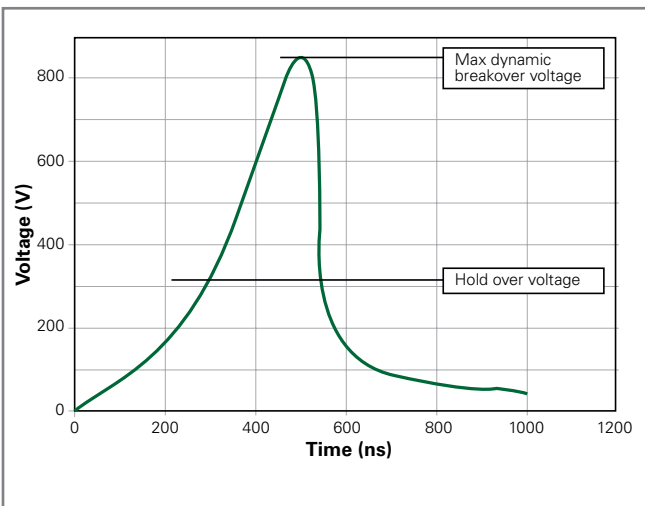
| Part Number | Device Specifications (at 25°C) |     |     |  |                                       |                       | Life Ratings        |   |  |                                      |                              |                              |
|-------------|---------------------------------|-----|-----|--|---------------------------------------|-----------------------|---------------------|---|--|--------------------------------------|------------------------------|------------------------------|
|             | DC Breakdown in Volts (@100V/s) |     |     | Impulse Break-down in Volts (@100V/μs) | Impulse Break-down In Volts (@1kV/μs) | Insulation Resistance | Capacitance (@1MHz) | Max Impulse Discharge Current (8/20μs)        | Max Impulse Discharge Current (10/700μs) | AC Discharge Current (9 cycle @50Hz) | DC Holdover Voltage (<150ms) | Impulse Life (8/20μs) (100A) |
|             | MIN                             | TYP | MAX | MAX                                    |                                       | MIN                   | MAX                 |   |  | MIN                                  |                              | MIN                          |
| CG775       | 60                              | 75  | 90  | 600                                    | 700                                   | 1GΩ@50V               | 0.3pf               | 10 Shots (@1kA) <sup>1</sup><br>1 Shot at 2kA | 10 Shots (@ 100A/4kV) <sup>2</sup>       | 1A                                   | 52V                          | 300 Shots                    |
| CG790       | 72                              | 90  | 108 | 600                                    | 700                                   |                       |                     |   |  |                                      | 52V                          |                              |
| CG7120      | 96                              | 120 | 144 | 600                                    | 700                                   | 80V                   |                     |   |  |                                      |                              |                              |
| CG7150      | 120                             | 150 | 180 | 600                                    | 700                                   | 80V                   |                     |   |  |                                      |                              |                              |
| CG7200      | 160                             | 200 | 240 | 600                                    | 700                                   | 135V                  |                     |   |  |                                      |                              |                              |
| CG7230      | 186                             | 230 | 276 | 600                                    | 700                                   | 135V                  |                     |   |  |                                      |                              |                              |
| CG7250      | 200                             | 250 | 300 | 600                                    | 700                                   | 135V                  |                     |   |  |                                      |                              |                              |
| CG7350      | 280                             | 350 | 420 | 750                                    | 900                                   | 135V                  |                     |   |  |                                      |                              |                              |
| CG7400      | 360                             | 400 | 480 | 850                                    | 1000                                  | 135V                  |                     |   |  |                                      |                              |                              |
| CG7470      | 376                             | 470 | 564 | 900                                    | 1100                                  | 1GΩ@250V              |                     |   |  |                                      | 135V                         |                              |

- Notes:  
UL Pending for CG775 and CG7470.  
1. 5 x (+) and 5 x (-) applications of 1kA 8/20μs sec.  
2. 5 x (+) and 5 x (-) applications of 100A 10/700μs sec.

**Product Characteristics**

|  |  |
|--|--|
| <b>Materials</b>                           | Device Tin Plated 17.5 ± 12.5 Microns<br>Construction: Ceramic Insulator |
| <b>Storage and Operational Temperature</b> | -40 to +90°C   |

**Voltage Vs. Time Characteristic**



Note: Tested per 1kV/μs waveform

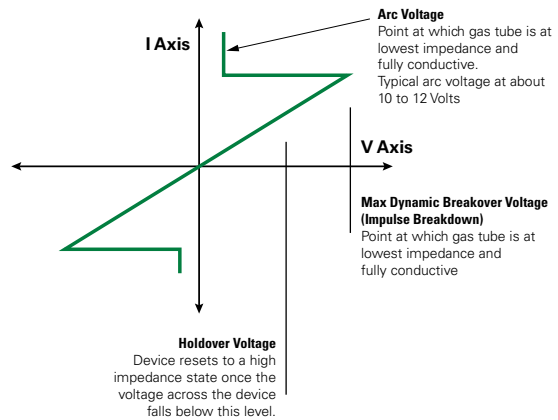
**Typical Insertion Loss**

|                  |
|------------------|
| @1.0GHz = 0.02dB |
| @1.4GHz = 0.03dB |
| @1.8GHz = 0.05dB |
| @2.0GHz = 0.06dB |
| @2.4GHz = 0.07dB |
| @2.8GHz = 0.08dB |
| @3.1GHz = 0.09dB |
| @3.5GHz = 0.10dB |
| @4.0GHz = 0.12dB |

Note: Insertion data for customer reference only, application testing needed for verification.

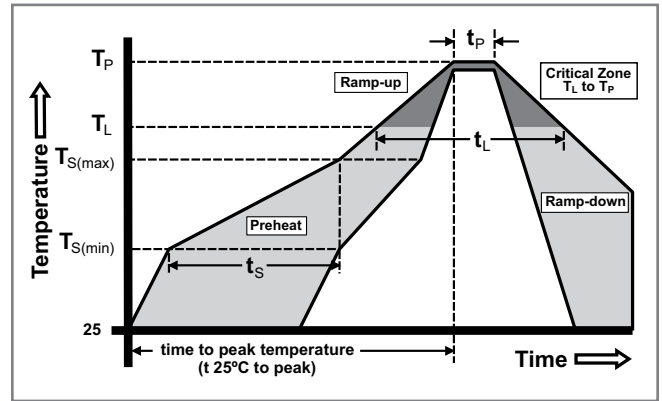
**V-I Characteristic Curve**

Characteristics of Gas Plasma -response to transient condition



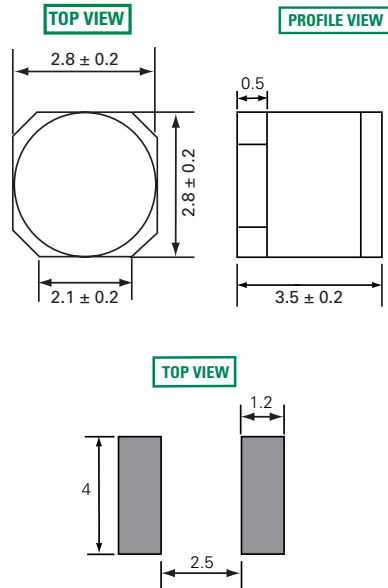
### Soldering Parameters - Reflow Soldering (Surface Mount Devices)

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| 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                   |



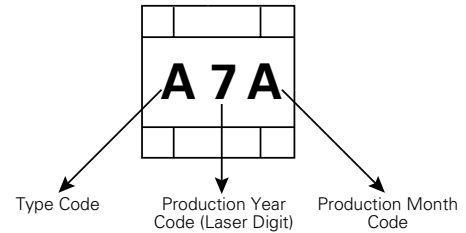
### Device Dimensions

Dimensions in millimeters



Recommended Soldering Pad Layout

### Product Marking



| Type Code |        |
|-----------|--------|
| A         | CG775  |
| B         | CG790  |
| T         | CG7120 |
| C         | CG7150 |
| O         | CG7200 |
| D         | CG7230 |
| R         | CG7250 |
| G         | CG7350 |
| I         | CG7400 |
| P         | CG7470 |

| Month Code |           |
|------------|-----------|
| A          | January   |
| B          | February  |
| C          | March     |
| D          | April     |
| E          | May       |
| F          | June      |
| G          | July      |
| H          | August    |
| I          | September |
| J          | October   |
| K          | November  |
| L          | December  |