Littelfuse
Expertise Applied | Answers Delivered

# CG6 Series

## Agency Approvals

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

## Two Electrode GDT Graphical Symbol

## Additional Information

Datasheet | Resources | Samples

## Description

The Littelfuse CG6 series GDT is a miniature surface-mount device with a 3kA 8/20 surge rating. This ITU-T K.12 Class 1, Type 1 GDT provides protection against fast rising transients typically caused by nearby lightning events. 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 crowbarring 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 1,3, and 5, and IEC 61000-4-5, 2nd edition Level 5 and below. It is hermetically sealed using non-radioactive materials and is thus environmentally safe.

## 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
- 3kA 8/20µs surge capability
- Compact SMD package offered in two squared terminals
- Non-Radioactive
- Ultra Low capacitance (<0.3pF)
- Voltage Range 75V to 600V
- UL recognized
- Characterized according to ITU-T K.12 as a Class X, Type 1 GDT

## Applications

- Broadband equipment
- CATV/Broadband equipment
- Data lines and Ethernet (up to 10GbE)
- xDSL equipment, including ADSL2, ADSL, VDSL, VDSL2 30a bandplan compatible
- IAD (Integrated Access Device)
- Set Top Box (STB)
- General telecom equipment
- 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
- Aerospace and Automotive


Revised: 12/12/17

# Gas Discharge Tubes
## CG6 Series

## Electrical Characteristics

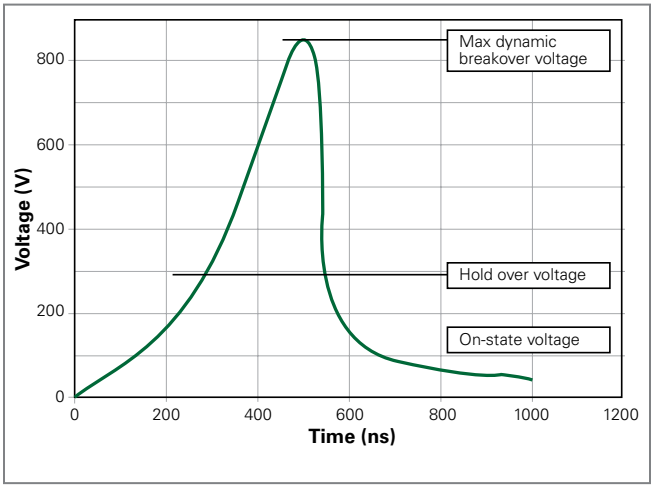
| Part Number | Device Specifications (at 25°C) | | | | | | | | Life Ratings | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DC Breakdown in Volts (@100V/s) | | | Impulse Break-down in Volts (@100V/µs) | Impulse Break-down In Volts (@1 kV/µs) | Insulation Resistance | Capaci-tance (@1MHz) | Max Impulse Discharge Current (8/20µs) | Max Impulse Discharge Current (10/700µs) | AC Dischage Current (50Hz, 1sec) | AC Dischage Current (Single, 9 Cycles) | DC Holdover Voltage (<150ms) | Impulse Life (10/1000µs) (50A) |
| | MIN | TYP | MAX | MAX | | MIN | MAX | | | MIN | MIN | | MIN |
| CG675 | 60 | 75 | 90 | 600 | 700 | 1GΩ @50V | 0.3pf | 10 Shots @ (3kA) [1] 1 Shot at 5kA | 10 Shots @ (150A/6kV) [2] | 3A | 6A | 52V | 300 Shots |
| CG690 | 72 | 90 | 108 | 600 | 700 | | | | | | | 52V | |
| CG6145 | 116 | 145 | 174 | 600 | 700 | 1GΩ @100V | | | | | | 52V | |
| CG6230 | 186 | 230 | 276 | 600 | 700 | | | | | | | 80V | |
| CG6250 | 200 | 250 | 300 | 600 | 700 | | | | | | | 80V | |
| CG6300 | 240 | 300 | 360 | 650 | 800 | | | | | | | 135V | |
| CG6350 | 280 | 350 | 420 | 750 | 900 | | | | | | | 135V | |
| CG6400 | 360 | 400 | 480 | 850 | 1000 | | | | | | | 135V | |
| CG6470 | 376 | 470 | 564 | 900 | 1100 | | | | | | | 135V | |
| CG6600 | 480 | 600 | 720 | 1000 | 1200 | 1GΩ@250V | | | | | | 135V | |

Note:
1. 5 x (+) and 5 x (-) applications of 3kA 8/20µs sec.
2. 5 x (+) and 5 x (-) applications of 150A 10/700µs sec.

## Product Characteristics

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

## Voltage Vs. Time Characteristic




Note: Tested per 1kV/µs waveform

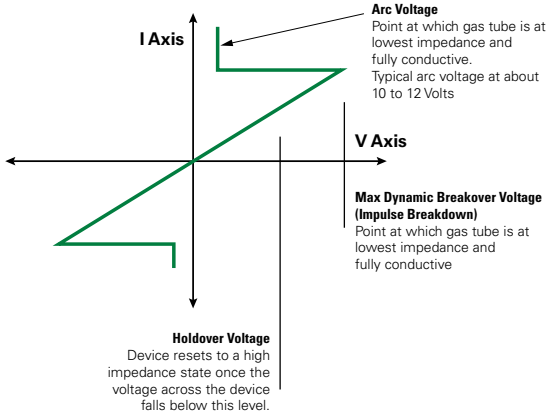
## Typical Insertion Loss

| |
|---|
| @1.0GHz = 0.03dB |
| @1.4GHz = 0.06dB |
| @1.8GHz = 0.09dB |
| @2.0GHz = 0.11dB |
| @2.4GHz = 0.13dB |
| @2.8GHz = 0.15dB |
| @3.1GHz = 0.17dB |
| @3.5GHz = 0.19dB |
| @4.0GHz = 0.22dB |

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

## V-I Characteristic Curve

Characteristics of Gas Plasma -response to transient condition

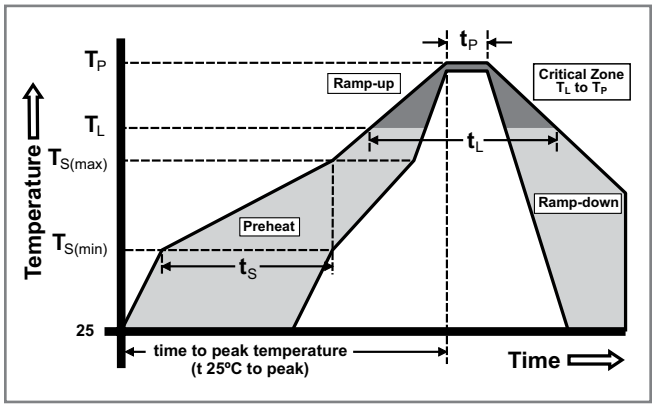




Revised: 12/12/17

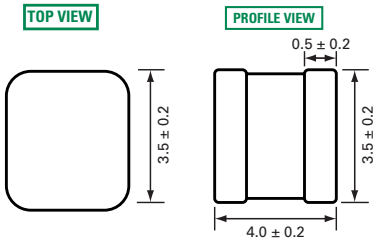
## Soldering Parameters - Reflow Soldering (Surface Mount Devices)

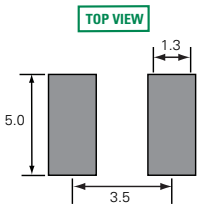
| Reflow Condition | | Pb – Free assembly |
|---|---|---|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | 150°C |
| | -Temperature Max ($T_{s(max)}$) | 200°C |
| | -Time (Min to Max) ($t_s$) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp ($T_L$) to peak | | 3°C/second max |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate | | 5°C/second max |
| Reflow | -Temperature ($T_L$) (Liquidus) | 217°C |
| | -Temperature ($t_L$) | 60 – 150 seconds |
| Peak Temperature ($T_P$) | | $260^{+0/-5}$ °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

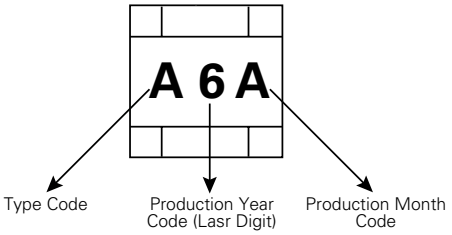
Dimensions in millimeters




Recommended Soldering Pad Layout

## Product Marking




| Type Code | |
|---|---|
| A | CG675 |
| B | CG690 |
| S | CG6145 |
| D | CG6230 |
| R | CG6250 |
| E | CG6300 |
| G | CG6350 |
| I | CG6400 |
| P | CG6470 |
| V | CG6600 |

| 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 |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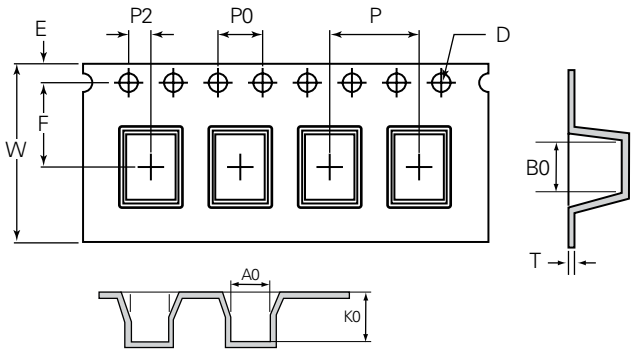
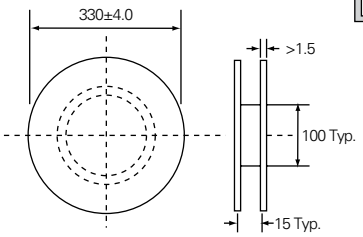
## Taping and Reel Specifications

Unit = mm

| Item | Spec | Item | Spec |
|---|---|---|---|
| P | 8.0 ± 0.1 | E | 1.75 ± 0.1 |
| P0 | 4.0 ± 0.1 | D | 1.50 + 0.1/-0.0 |
| P2 | 2.0 ± 0.1 | B0 | 4.5 ± 0.1 |
| W | 12.0 ± 0.3 | K0 | 3.9 ± 0.1 |
| F | 5.5 ± 0.1 | T | 0.4 ± 0.1 |
| A0 | 3.9 ± 0.1 | 10P0 | 4.0 ± 0.2 |




**Packaging Quantity:**
2000 pcs per reel (13")
1 reels per inner box
10 inners box per carton
20,000 pcs per full carton

## Part Numbering System and Ordering Information

**CG6 XXX SM**

**Series**
**CG6**

**Breakdown Voltage**
**75 = 75V**
**90 = 90V**
**145 = 145V**
**230 = 230V**
**250 = 250V**
**300 = 300V**
**350 = 350V**
**400 = 400V**
**470 = 470V**
**600 = 600V**

**Lead Option Code**
**SM (Surface Mount, Two Square Terminals)**