

# AC and CG3 Series

## Gas Discharge Tubes



### Description

Littelfuse AC series two-electrode line protectors provide a high degree of surge protection in AC line applications. The two models, AC120 and AC240 are designed for use with 120VAC and 240VAC lines respectively. They are able to extinguish AC follow-on currents of at least 200A.

Littelfuse CG3 two electrode high voltage (1.0 - 7.5 KV) devices are designed for surge protection and high isolation applications, and for applications for which bias voltages or signal levels of several hundred volts are normally present.

### Features

- Rugged ceramic-metal construction
- Low capacitance (<1.5 pF)
- Available in tape-and-reel packaging
- Available with or without leads

### Additional Information



Resources  
AC Series



Accessories  
AC Series



Samples  
AC Series



Resources  
CG3 Series



Accessories  
CG3 Series



Samples  
CG3 Series

### Applications

#### AC Series:

- Long branch circuits (AC wall outlet)
- Short branch circuits (at breaker box, computer, etc)
- Power supplies
- Test equipment
- Submersible pumps
- Medical electronics

#### CG3 Series:

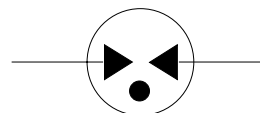
- CRT terminals
- CATV equipment
- Antennas
- Power supplies
- Medical electronics

### Agency Approvals

| Agency | Agency file number |
|--------|--------------------|
|        | E320116*           |

\*Note: CG3 7.5 product UL approval is currently pending

### 2 Electrode GDT Graphical Symbol



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## Gas Discharge Tubes

### Electrical Characteristics

| Part Number              | Device Dimension Type | 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 | Max Follow On Current <sup>3</sup> | Nominal AC Discharge Current (10x1sec @50-60Hz) | AC Discharge Current (1 x 50Hz 9 cycles) | Nominal Impulse Discharge Current <sup>4</sup> (@8/20μs) | Max Surge Current <sup>5</sup> (@8/20μs) |
|                          |                       | MIN                             | TYP  | MAX  | MAX                                    |                                          | MIN                   | MAX                 | TYP                                      |                                    |                                                 |                                          |                                                          |                                          |
| AC120 <sup>1</sup>       | A                     | 230                             | 285  | 340  | 500                                    | 550                                      | 10 GΩ (at 100V)       | <1.5 pf             | ~ 25 V                                   | 200 Amps                           | 5 A                                             | 65 A                                     | 10 shots 5kA                                             | 1 shot 10kA                              |
| AC240 <sup>1</sup>       | A                     | 480                             | 600  | 720  | 1100                                   | 1200                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 1.0 <sup>1</sup>     | A                     | 800                             | 1000 | 1200 | 1400                                   | 1500                                     | 10 GΩ (at 100V)       | <1.5 pf             | ~ 25 V                                   | 200 Amps                           | N/A                                             | N/A                                      | 10 shots 5kA                                             | 1 shot 10kA                              |
| CG3 1.1 <sup>1</sup>     | A                     | 880                             | 1100 | 1320 | 1600                                   | 1700                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 1.2 <sup>1</sup>     | A                     | 960                             | 1200 | 1440 | 1700                                   | 1800                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 1.3 <sup>1</sup>     | A                     | 1040                            | 1300 | 1560 | 1800                                   | 1900                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 1.5 <sup>1</sup>     | A                     | 1200                            | 1500 | 1800 | 1800                                   | 2000                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 2.0 <sup>1</sup>     | A                     | 1600                            | 2000 | 2400 | 2500                                   | 2750                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 2.5 <sup>1</sup>     | A                     | 2000                            | 2500 | 3000 | 3200                                   | 3500                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 2.7 <sup>1</sup>     | A                     | 2160                            | 2700 | 3240 | 3600                                   | 4000                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 3.0 <sup>1</sup>     | A                     | 2400                            | 3000 | 3600 | 4000                                   | 4200                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 3.3 <sup>1</sup>     | A                     | 2640                            | 3300 | 3960 | 4600                                   | 4700                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 4.0 <sup>2</sup>     | B                     | 3200                            | 4000 | 4800 | 5800                                   | 6000                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 4.5 <sup>2</sup>     | B                     | 3600                            | 4500 | 5400 | 6150                                   | 6500                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 5.0 <sup>2</sup>     | B                     | 4000                            | 5000 | 6000 | 7500                                   | 8000                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 6.2 <sup>2,7</sup>   | B                     | 4960                            | 6200 | 7440 | 8100                                   | 9500                                     |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 6.5 <sup>2,7</sup>   | B                     | 5200                            | 6500 | 7800 | 9500                                   | 10000                                    |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |
| CG3 7.5 <sup>2,6,7</sup> | B                     | 6000                            | 7500 | 9000 | 10000                                  | 10600                                    |                       |                     |                                          |                                    |                                                 |                                          |                                                          |                                          |

#### NOTES:

1. Refer to Production Dimensions section, outline A devices
2. Refer to Production Dimensions section, outline B devices
3. Tested to UL1449 -- 120V r.m.s. for AC120, 230V r.m.s. all others.  
Conducted with suitable MOV connected in series.
4. 5x(+) and 5x(-) applications 5kA @ 8/20 $\mu$ s
5. 1 application 10kA @ 8/20 $\mu$ s
6. CG3 7.5 product UL approval is currently pending
7. When ordering this item, use suffix code D004 when entering the part number.  
The older product version without D004 suffix code has been discontinued.  
Refer to Part Numbering System section for additional information.

### Product Characteristics

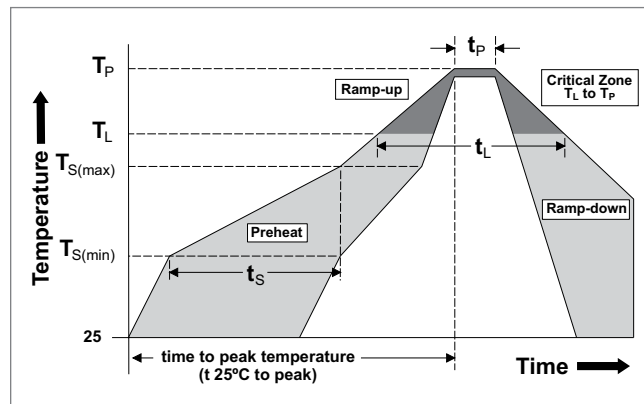
|                                            |                                                                                                                                                                                      |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Materials</b>                           | <b>Core Outline A &amp; B items:</b><br>Device: Tin Plated 17.5 $\pm$ 12.5 Microns<br><br><b>Axial Outline A &amp; B items:</b><br>Device & Wire: Tin Plated 17.5 $\pm$ 12.5 Microns |
| <b>Product Marking</b>                     | LF Logo, Voltage and date code;<br>Black ink positive print                                                                                                                          |
| <b>Glow to arc transition current</b>      | < 0.5Amps                                                                                                                                                                            |
| <b>Glow Voltage</b>                        | ~ 140 Volts                                                                                                                                                                          |
| <b>Storage and Operational Temperature</b> | -40 to +90                                                                                                                                                                           |

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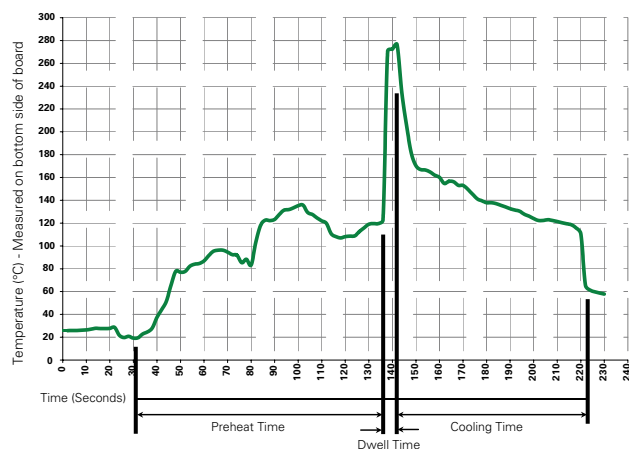
## Gas Discharge Tubes

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

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



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



### Recommended Process Parameters:

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

### Soldering Parameters - Hand Soldering

Solder Iron Temperature: 350° C +/- 5°C

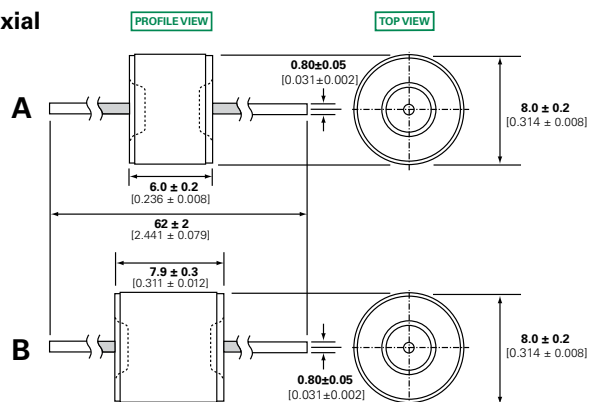
Heating Time: 5 seconds max.

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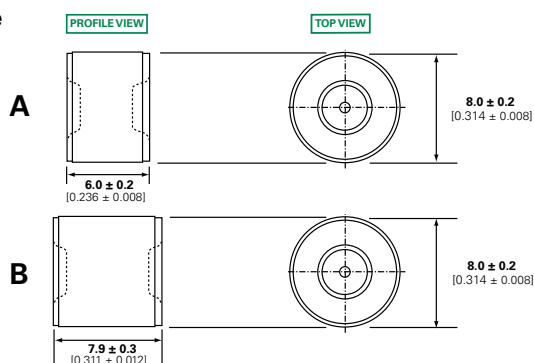
## Gas Discharge Tubes

### Device Dimensions

#### Axial



#### Core



### Part Numbering System and Ordering Information

Series **AC XXX XXX**

AC Line Voltage

120 = 120V

240 = 240V

Lead / Packaging Option

= Core (no leads) / Bulk pack, 400 pcs per bag

L = Leaded / Bulk pack, 50 pcs per tray

LTR = Leaded / Tape & Reel, 500 pcs per reel

Series **CG3 X.X XXX D004**

Series

CG3

Breakdown Voltage

1.0 = 1000V 3.0 = 3000V

1.1 = 1100V 3.3 = 3300V

1.2 = 1200V 4.0 = 4000V

1.3 = 1300V 4.5 = 4500V

1.5 = 1500V 5.0 = 5000V

2.0 = 2000V 6.2 = 6200V

2.5 = 2500V 6.5 = 6500V

2.7 = 2700V 7.5 = 7500V

Lead / Packaging Option

= Core (no leads) / Bulk pack, 400 pcs per bag

L = Leaded / Bulk pack, 50 pcs per tray

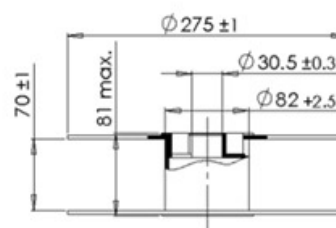
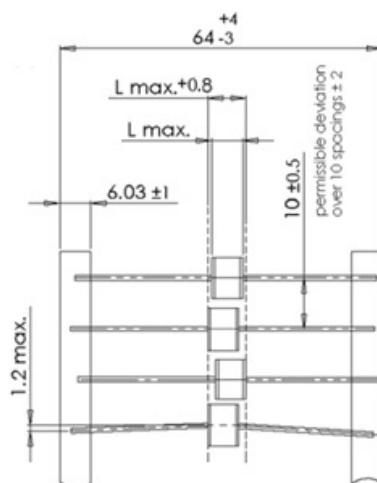
LTR = Leaded / Tape & Reel, 500 pcs per reel

Special Suffix Code

Enter this D004 special suffix code when placing orders for CG36.2, CG36.5 and CG37.5 only

### Packaging Dimensions

#### For 'LTR' Option Code Axial Lead Items



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