

## SL1003A Series



### Agency Approvals

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

### 3 Electrode GDT Graphical Symbol



### Additional Information



Datasheet



Resources



Samples

### Description

The SL1003A series has been especially developed for Broadband equipment. Special design features provide high levels of protection against fast rising transients in the 100V/ $\mu$ s to 1kV/ $\mu$ s range usually caused by lightning disturbances.

These devices have ultra low capacitance 1.5pF and present insignificant signal losses up to 1.5GHz. These devices are extremely robust and are able to divert a 5000A pulse without destruction. For AC Power Cross of long duration, over-current protection is recommended.

### Features

- RoHS compliant
- Low insertion loss
- Surface mountable
- 5kA surge capability tested with 8/20/ $\mu$ s pulse as defined by IEC 61000-4-5
- GHz working frequency
- Excellent response to fast rising transients
- Can be used to meet Telcordia GR1089 without series resistance
- 10/700 6kV capability, as per ITU-Tk.21, enhanced test level
- 2000 Amp 2/10/ $\mu$ s surge rating

### Applications

- Broadband equipment
- ADSL equipment
- XDSL equipment
- Satellite and CATV equipment
- General telecom equipment

### Electrical Characteristics

| Part Number | Device Specifications (at 25°C)                        |     |     |                                                               |                                                              |                                |                                        |                                                      | Life Ratings                          |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
|-------------|--------------------------------------------------------|-----|-----|---------------------------------------------------------------|--------------------------------------------------------------|--------------------------------|----------------------------------------|------------------------------------------------------|---------------------------------------|--------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|--|--|--|
|             | DC Breakdown<br>in Volts <sup>1,2,3</sup><br>(@100V/s) |     |     | Impulse<br>Breakdown<br>in Volts <sup>2,3</sup><br>(@100V/μs) | Impulse<br>Breakdown<br>In Volts <sup>2,3</sup><br>(@1kV/μs) | Insulation<br>Resistance       | Capaci-<br>tance<br>(@1MHz<br>0V Bias) | Arc<br>Voltage<br>(on state<br>Voltage)<br>@1Amp Min | Surge<br>Life<br>(@200A<br>10/1000μs) | Nominal<br>Impulse<br>Discharge<br>Current<br>(8/20μs) | Nominal<br>AC<br>Discharge<br>Current<br>(10x1s<br>@50Hz) | AC<br>Discharge<br>Current<br>(9 Cycles @<br>50Hz) | DC<br>Holdover<br>Voltage <sup>4</sup> | Max Impulse<br>Discharge<br>Current<br>(1 Application) |  |  |  |  |  |  |  |
|             | MIN                                                    | TYP | MAX | MAX                                                           |                                                              | MIN                            | MAX                                    | TYP                                                  |                                       |                                                        |                                                           |                                                    | TYP                                    | @ 10/350μs                                             |  |  |  |  |  |  |  |
| SL1003A090  | 72                                                     | 90  | 108 | 600                                                           | 700                                                          | 10 <sup>9</sup> Ω<br>(at 50V)  | 1.5 pF                                 | ~10 to<br>35 V                                       | 300<br>shots                          | 10 shots<br>(@10kA)                                    | 10 A                                                      | 30 A                                               | 50 V                                   | 2 kA                                                   |  |  |  |  |  |  |  |
| SL1003A230  | 184                                                    | 230 | 276 |                                                               | 750                                                          | 10 <sup>9</sup> Ω<br>(at 100V) |                                        |                                                      |                                       |                                                        |                                                           |                                                    | 135 V                                  |                                                        |  |  |  |  |  |  |  |
| SL1003A250  | 200                                                    | 250 | 300 |                                                               |                                                              |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
| SL1003A260  | 210                                                    | 260 | 310 |                                                               |                                                              |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
| SL1003A300  | 240                                                    | 300 | 360 | 750                                                           | 850                                                          |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    | 135 V                                  |                                                        |  |  |  |  |  |  |  |
| SL1003A350  | 280                                                    | 350 | 420 | 800                                                           | 900                                                          |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
| SL1003A400  | 320                                                    | 400 | 480 | 850                                                           | 950                                                          |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
| SL1003A450  | 360                                                    | 450 | 540 | 900                                                           | 1000                                                         |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |
| SL1003A500  | 400                                                    | 500 | 600 | 1100                                                          | 1400                                                         |                                |                                        |                                                      |                                       |                                                        |                                                           |                                                    |                                        |                                                        |  |  |  |  |  |  |  |

Notes:

- At delivery AQL 0.65 level II, DIN ISO 2859
- In ionized mode, tested according to ITU-T Rec. K.12
- Comparable to the silicon measurement Switching Voltage (Vs)
- Reference REA PE-80, 0.2A. Tested to ITU-T Rec. K.12 and REA PE-80 < 150 msecs.

### Product Characteristics

|                        |                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------|
| <b>Materials</b>       | <b>Leaded Device:</b><br>Tin-plated copper wire<br><b>Core and Surface Mount:</b> Dull Tin-plated |
| <b>Product Marking</b> | Littelfuse 'LF' Mark, voltage and date code                                                       |

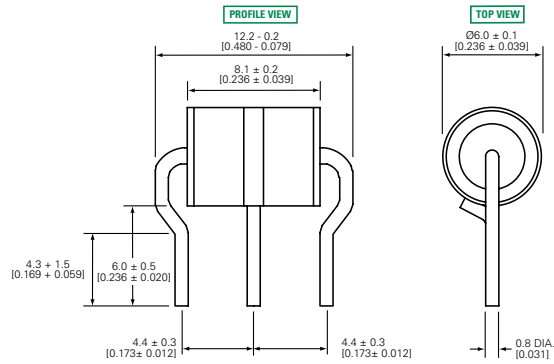
|                                            |                  |
|--------------------------------------------|------------------|
| <b>Glow to Arc Transition Current</b>      | ~1 Amp           |
| <b>Glow Voltage</b>                        | ~60 to 200 Volts |
| <b>Storage and Operational Temperature</b> | -40 to +90°C     |

### Device Dimensions

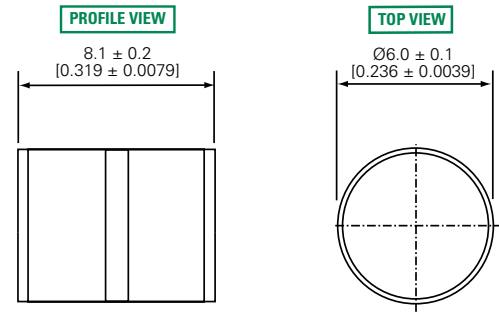
For SL1003A series:

Dimensions are in millimeters [and inches]

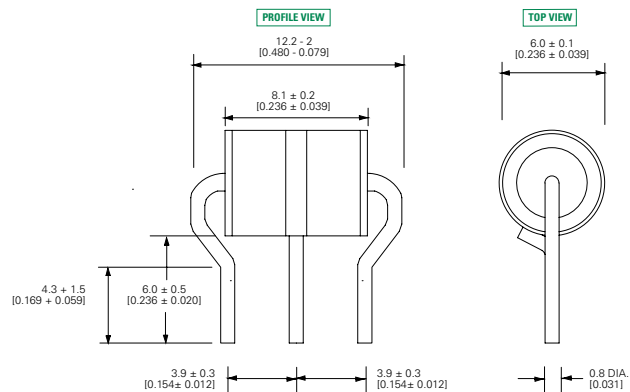
'R' Type Radial Lead Devices (SL1003AxxxR-001)



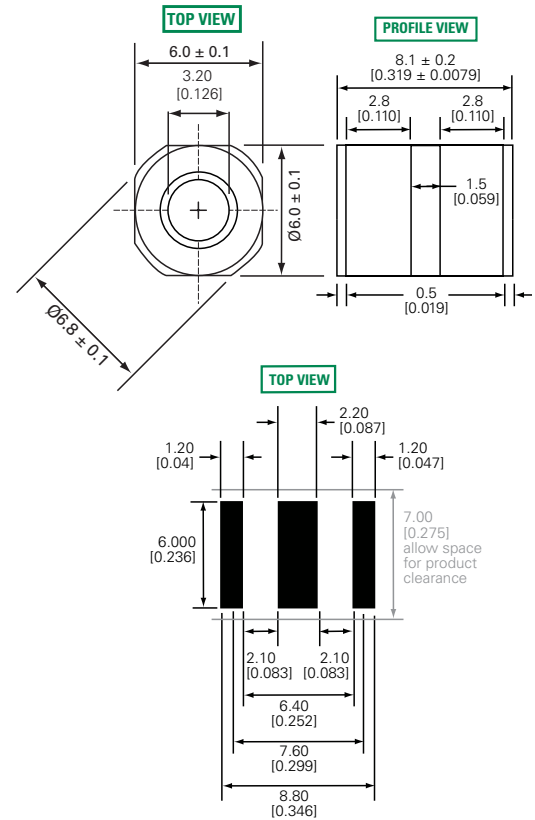
'C' Type Core Devices



'R' Type Radial Lead Devices (SL1003AxxxR and SL1003AxxxRF)

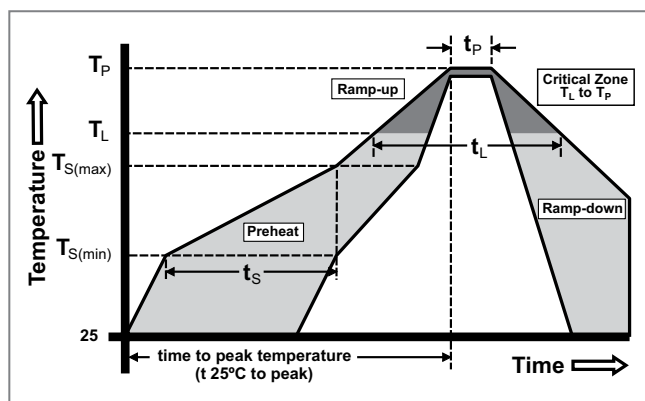


'SM' Type Surface Mount Devices

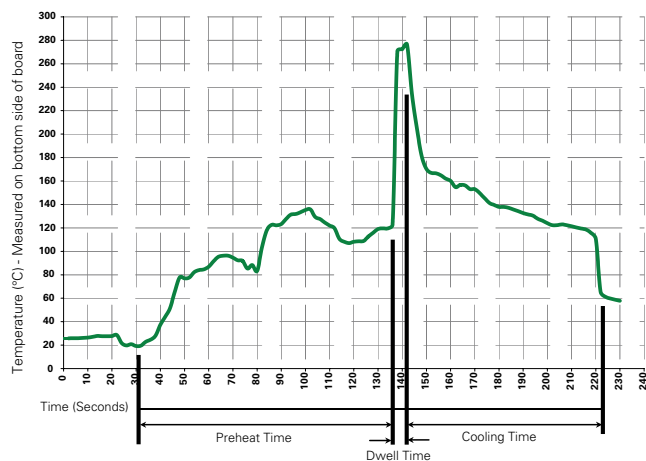


### Soldering Parameters - Reflow Soldering (Surface Mount Devices)

|                                                        |                                    |                         |
|--------------------------------------------------------|------------------------------------|-------------------------|
| 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 seconds        |
| 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)



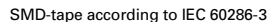
### Recommended Process Parameters:

| Wave Parameter                           | Lead-Free Recommendation          |
|------------------------------------------|-----------------------------------|
| <b>Preheat:</b>                          |                                   |
| (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.

**'SM' Type Surface Mount Items:** Packaged tape and reel carrier, 700 pcs/reel (specifications below)



**C** = Core type (Packed in polybag, 500pcs/bag)  
**R** = Radial Lead without Failsafe (Packed in tray, 100pcs/tray)  
**RF** = Radial Lead with Failsafe (Packed in tray, 100pcs/tray)  
**SM** = Surface Mount (Packed in carrier and tape, 700pcs/reel)

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Specifications are subject to change without notice.  
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