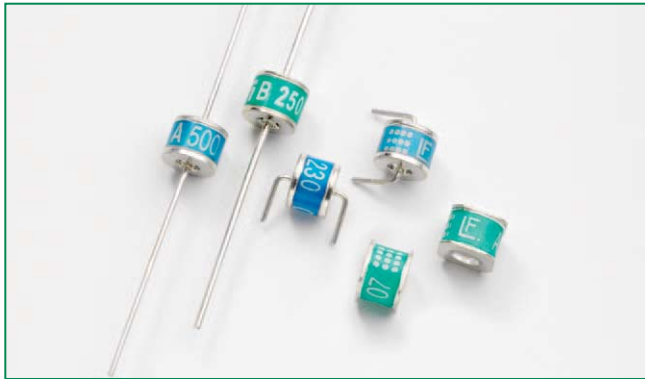


RoHS  **SL1011A/B and SL1411A Series**



**Description**

The SL1011A/B and SL1411A series provides high levels of protection against fast rising transients in the 100V/μs to 1kV/μs range usually caused by lightning disturbances.

The SL1011A/B and SL1411A series offers low capacitance (< 1.5pf) which provides low insertion loss at high frequencies.

SL1011A offers 5kA protection without destruction whereas the SL1011B and SL1411A offer 10kA surge protection without destruction (maximum single surge of 12kA @ 8/20μs).

**Agency Approvals**

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

**2 Electrode GDT Graphical Symbol**



**Features**

- RoHS compliant
- Low insertion loss
- Excellent response to fast rising transients
- Ultra low capacitance
- 5kA (SL1011A) or 10kA (SL1011B & SL1411A) surge capability tested with 8/20μs pulse as defined by IEC 61000-4-5

**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 in Volts <sup>1,2</sup> (@100V/s) |     |     | Impulse Breakdown in Volts <sup>3</sup> (@100V/μs) | Impulse Breakdown In Volts (@1kV/μs) | Insulation Resistance       | Capacitance (@1MHz) | Arc Voltage (on state Voltage) @1Amp Min | Surge Life (@100A 10/1000μs) | Nominal Impulse Discharge Current (@20μs) | Nominal AC Discharge Current (10x1s @50-60Hz) | AC Discharge Current (9 Cycles @ 50Hz) | DC Holdover Voltage <sup>4</sup> | Max Impulse Discharge Current (1 Application) |            |
|             | MIN  | TYP | MAX | MAX  |                                      | MIN                         | MAX                 | TYP                                      |                              |   |   |  | TYP                              | @ 8/20μs                                      | @ 10/350μs |
| SL1011A075  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B075  | 60   | 75  | 90  | 500  | 700                                  | 10 <sup>10</sup> Ω (at 50V) |                     |  |                              |   |   | 50 V                                   |                                  |   |            |
| SL1411A075  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A090  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B090  | 72   | 90  | 108 | 500  | 600                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A090  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A145  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B145  | 116  | 145 | 174 | 500  | 650                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A150  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B150  | 120  | 150 | 180 | 500  | 650                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A230  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B230  | 184  | 230 | 276 | 550  | 700                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A230  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A250  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B250  | 200  | 250 | 300 | 600  | 800                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A250  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A260  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B260  | 210  | 260 | 310 | 600  | 800                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A350  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011B350  | 280  | 350 | 420 | 800  | 900                                  |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A350  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A470  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A470  | 376  | 470 | 564 | 1000   | 1100                                 |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A500  | 400  | 500 | 600 | 1100   | 1200                                 |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1011A600  |  |     |     |  |                                      |                             |                     |  |                              |   |   |  |                                  |   |            |
| SL1411A600  | 480  | 600 | 720 | 1200   | 1400                                 |                             |                     |  |                              |   |   |  |                                  |   |            |

- Notes:
- At delivery AQL 0.65 level II, DIN ISO 2859
  - In ionized mode
  - Comparable to the silicon measurement Switching Voltage (Vs)
  - Tested according to ITU-T Rec. K.12 < 150 msec.

### Product Characteristics

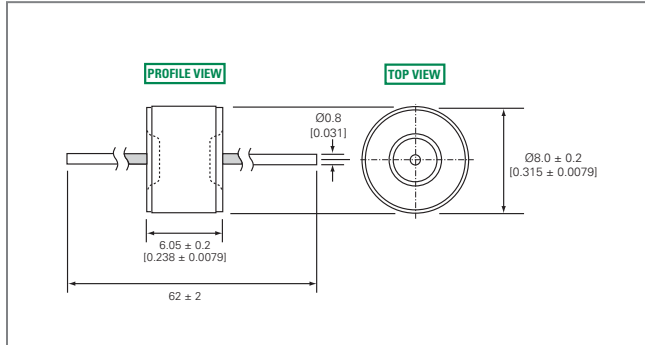
|                        |   |
|------------------------|---|
| <b>Materials</b>       | <b>Leaded Device:</b> Nickel-plated with Tin-plated wires<br><b>Core and Surface Mount:</b> Dull Tin-plated |
| <b>Product Marking</b> | Littelfuse 'LF' Mark, voltage and date code   |

|  |              |
|--|--------------|
| <b>Glow to Arc Transition Current</b>      | < 0.5 Amps   |
| <b>Glow Voltage</b>                        | ~60 Volts    |
| <b>Storage and Operational Temperature</b> | -40 to +90°C |

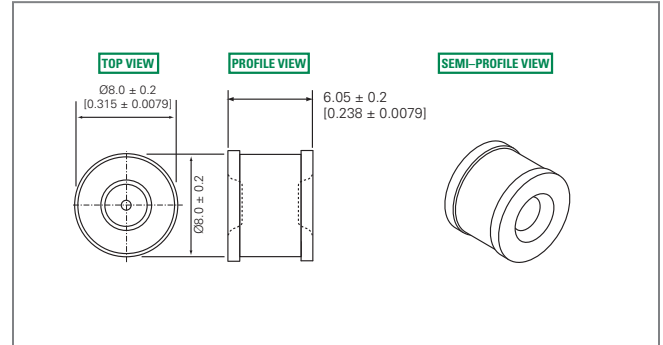
### Device Dimensions

For SL1011A/SL1011B series:

#### 'A' Type Axial Lead Devices

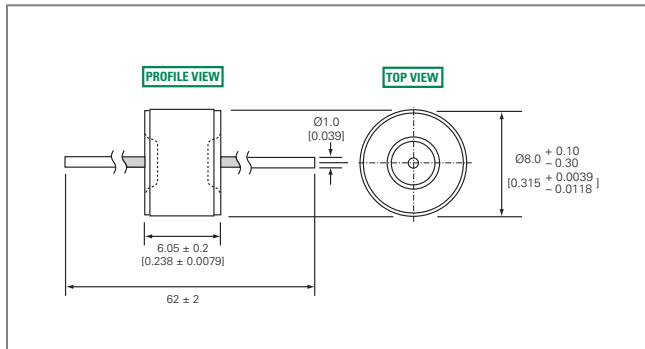


#### 'C' Type Core Devices

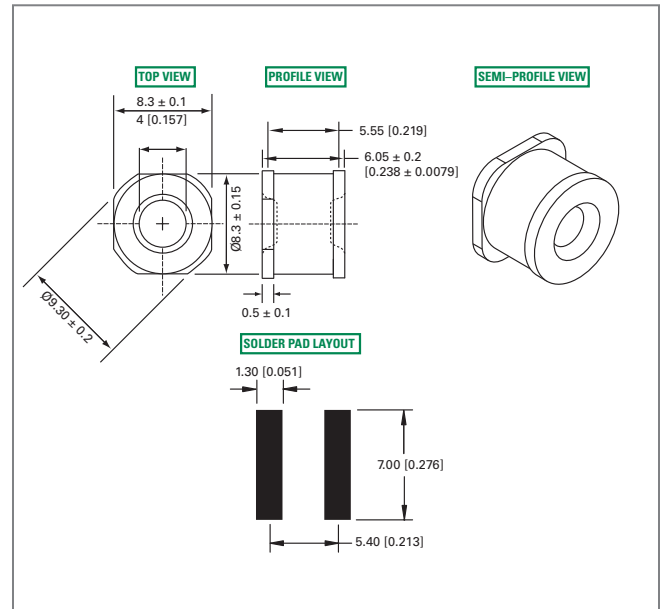


For SL1411A series:

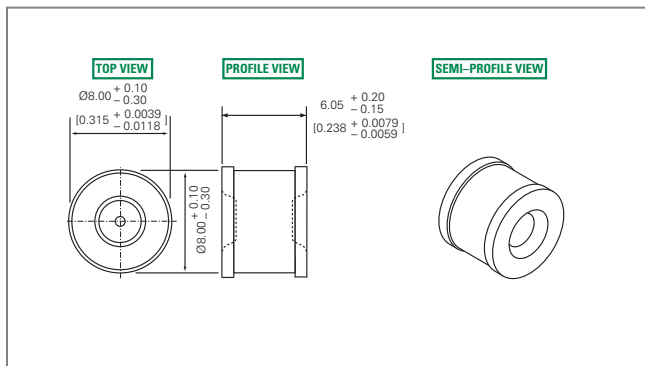
#### 'A' Type Axial Lead Devices



#### 'SM' Type Surface Mount Devices

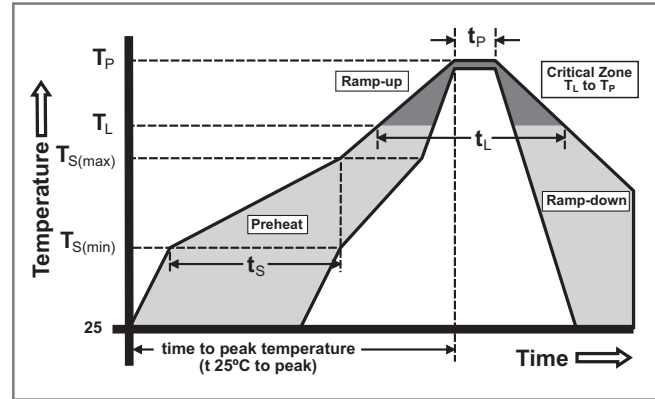


#### 'C' Type Core Devices

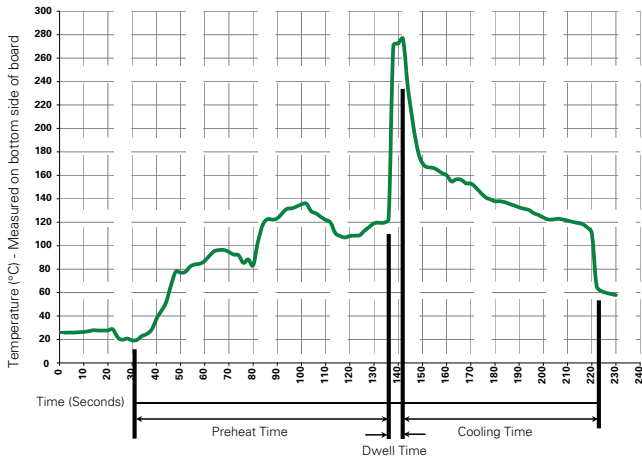


### Soldering Parameters - Reflow Soldering (Surface Mount Devices)

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| 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:

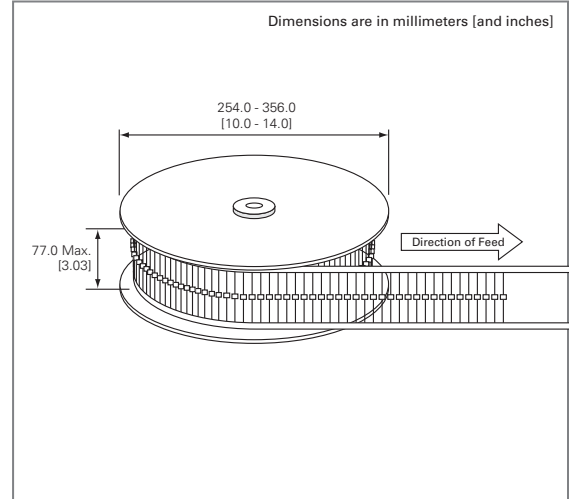
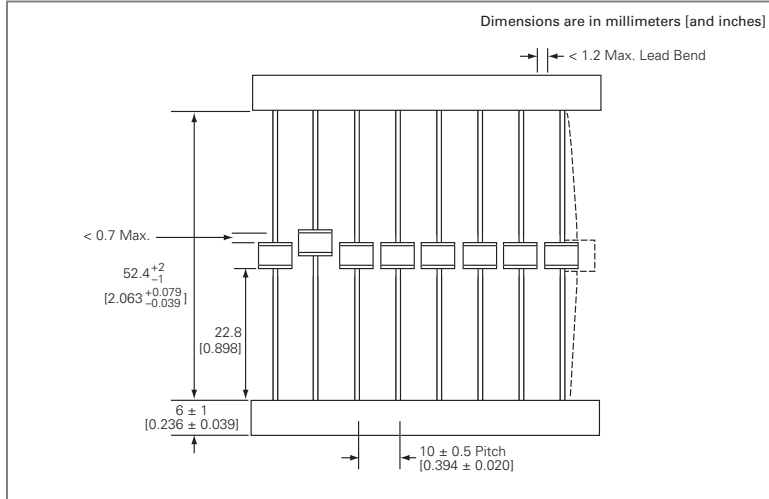
| Wave Parameter                           | Lead-Free Recommendation          |
|--|-----------------------------------|
| <b>Preheat:</b>                          |                                   |
| (Depends on Flux Activation Temperature) | (Typical Industry Recommendation) |
| Temperature Minimum:                     | 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

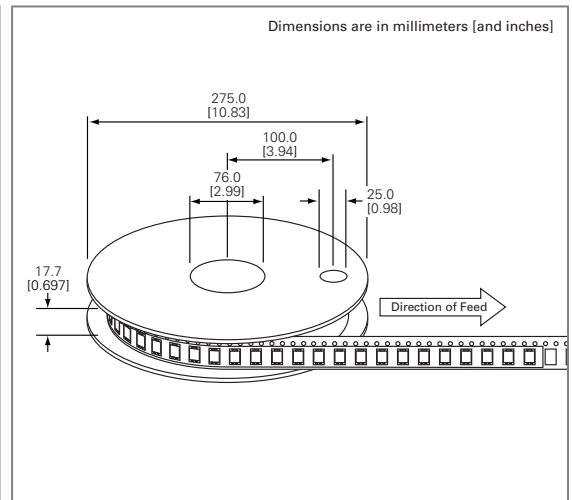
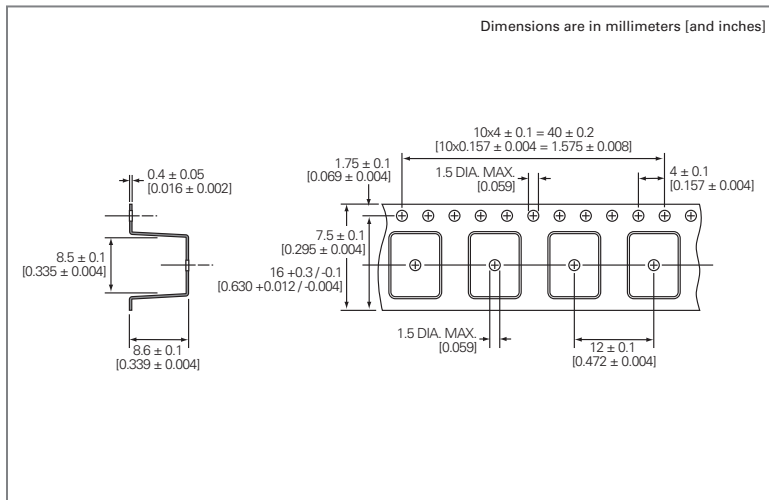
Solder Iron Temperature: 350° C +/- 5°C  
 Heating Time: 5 seconds max.

**Packaging Dimensions**

**For 'A' Type Axial Lead Items**



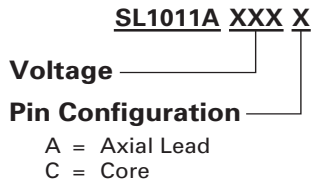
**For 'SM' Type Surface Mount Items (SL1411A series only)**



**For 'C' Type Core Items: Packed in plastic bag (500 pcs)**

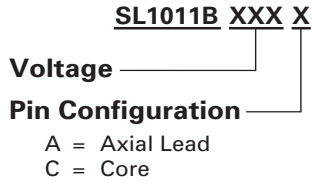
**Part Numbering System and Ordering Information**

**For SL1011A series:**



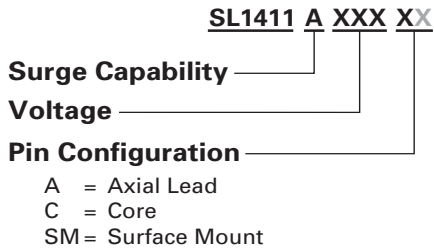
Remarks: Formed leads are available on request

**For SL1011B series:**



Remarks: Formed leads are available on request

**For SL1411A series:**



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