



**THE DATASHEET OF  
SL1011A230D**



SL1011A and SL1411A Series



**Description**

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

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

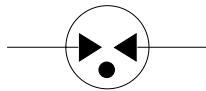
**Agency Approvals**

| Agency | Agency File Number |
|--------|--------------------|
|        | E128662            |

**Features**

- Lead-free and RoHS compliant
- Low insertion loss
- Excellent response to fast rising transients
- Ultra low capacitance
- 5kA (SL1011A) or 10kA (SL1411A) surge capability tested with 8/20μs pulse as defined by IEC 61000-4-5 2nd Edition

**2 Electrode GDT Graphical Symbol**



**Applications**

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

**Additional Information**



Datasheet  
SL1011A



Resources  
SL1011A



Samples  
SL1011A



Datasheet  
SL1411A



Resources  
SL1411A



Samples  
SL1411A

### 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 (8/20μs)            | 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<br>SL1411A075                            | 60   | 75  | 90  | 500  | 700                                  | 10 <sup>10</sup> Ω (at 50V)  | 1.5 pF              | ~20 V                                     | 300 shots                    | SL1011A: 10 shots (@5kA)<br>SL1411A: 10 shots (@10kA) | SL1011A: 5 A<br>SL1411A: 10 A                 | SL1011A: 20 A<br>SL1411A: 65 A         | 50 V                             | SL1411A: 12 kA                                | 1 kA       |
| SL1011A090<br>SL1411A090                            | 72   | 90  | 108 | 500  | 600                                  |                              |                     |   |                              |   |   |  |                                  |   |            |
| SL1011A145<br>SL1011A150<br>SL1411A150 <sup>5</sup> | 116  | 145 | 174 | 500  | 650                                  | 10 <sup>10</sup> Ω (at 100V) | 1.5 pF              | ~20 V                                     | 300 shots                    | SL1011A: 10 shots (@5kA)<br>SL1411A: 10 shots (@10kA) | SL1011A: 5 A<br>SL1411A: 10 A                 | SL1011A: 20 A<br>SL1411A: 65 A         | 135 V                            | SL1411A: 12 kA                                | 1 kA       |
| SL1011A230<br>SL1411A230                            | 184  | 230 | 276 | 550  | 700                                  |                              |                     |   |                              |   |   |  |                                  |   |            |
| SL1011A250<br>SL1411A250                            | 200  | 250 | 300 | 600  | 800                                  | 10 <sup>10</sup> Ω (at 100V) | 1.5 pF              | ~20 V                                     | 300 shots                    | SL1011A: 10 shots (@5kA)<br>SL1411A: 10 shots (@10kA) | SL1011A: 5 A<br>SL1411A: 10 A                 | SL1011A: 20 A<br>SL1411A: 65 A         | 135 V                            | SL1411A: 12 kA                                | 1 kA       |
| SL1011A260<br>SL1011A350<br>SL1411A350              | 210  | 260 | 310 | 600  | 800                                  |                              |                     |   |                              |   |   |  |                                  |   |            |
| SL1011A470<br>SL1411A470                            | 376  | 470 | 564 | 1000   | 1100                                 | 10 <sup>10</sup> Ω (at 100V) | 1.5 pF              | ~20 V                                     | 300 shots                    | SL1011A: 10 shots (@5kA)<br>SL1411A: 10 shots (@10kA) | SL1011A: 5 A<br>SL1411A: 10 A                 | SL1011A: 20 A<br>SL1411A: 65 A         | 135 V                            | SL1411A: 12 kA                                | 1 kA       |
| SL1011A500<br>SL1011A600<br>SL1411A600 <sup>5</sup> | 400  | 500 | 600 | 1100   | 1200                                 |                              |                     |   |                              |   |   |  |                                  |   |            |
| SL1011A600<br>SL1411A600 <sup>5</sup>               | 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.
- Not UL Recognized

### 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 |

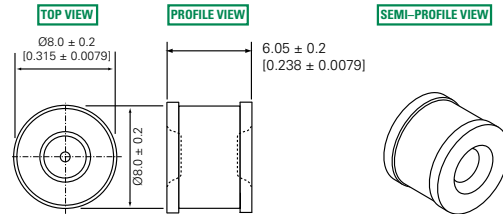
**Device Dimensions**

**For SL1011A Series:**

**'A' Type Axial Lead Devices**

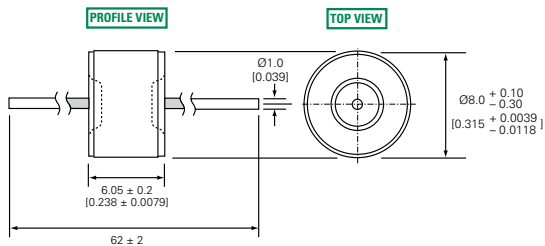


**'C' Type Core Devices**

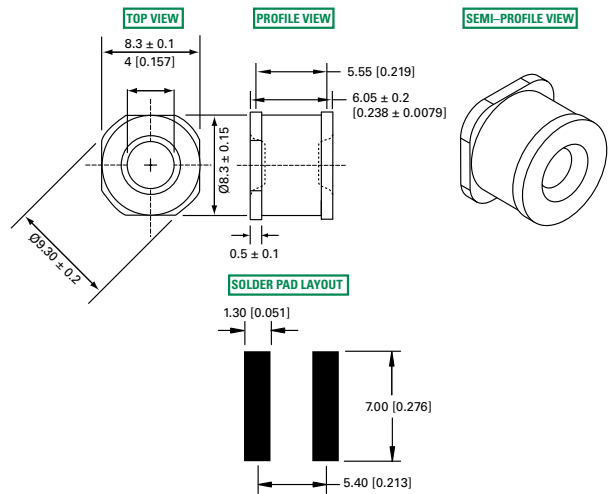


**For SL1411A series:**

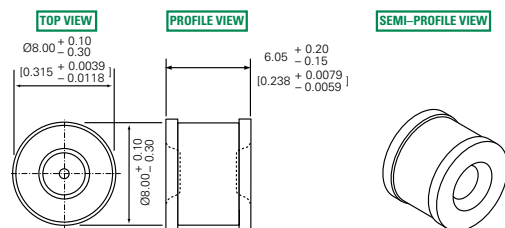
**'A' Type Axial Lead Devices**



**'SM' Type Surface Mount Devices**

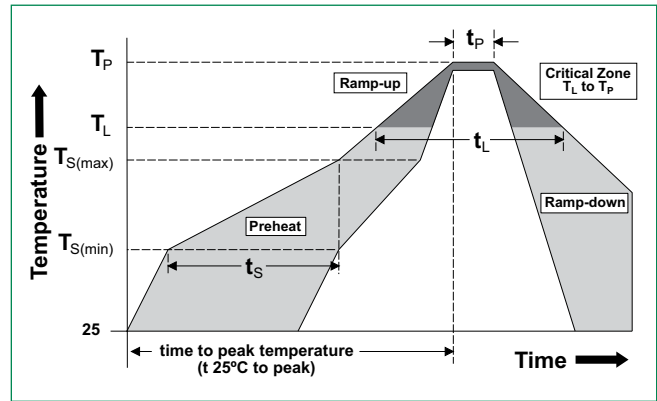


**'C' Type Core Devices**

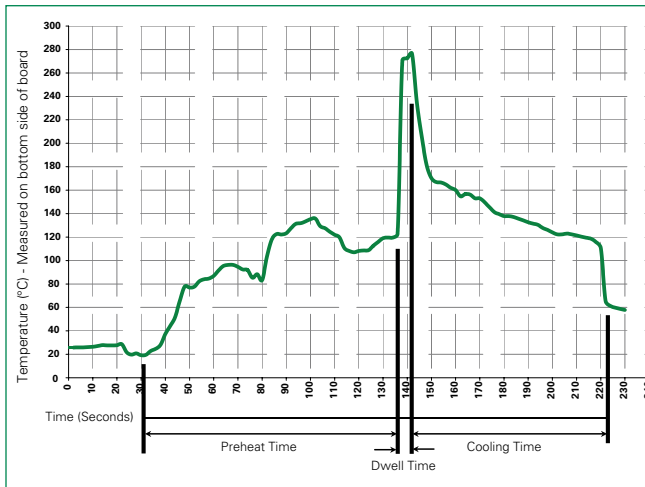


**Soldering Parameters - Reflow Soldering (Surface Mount Devices)**

|  |                                    |                         |
|--|------------------------------------|-------------------------|
| <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 seconds        |
| <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          |
|---|-----------------------------------|
| <b>Preheat:</b><br>(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.

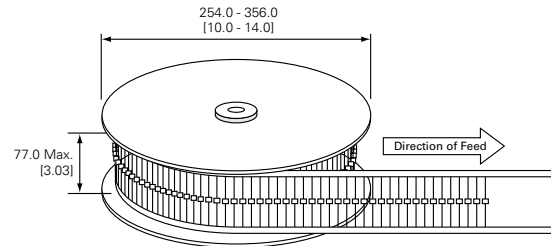
**Packaging Dimensions**

**For Axial Lead Items**

Dimensions are in millimeters [and inches]



Dimensions are in millimeters [and inches]

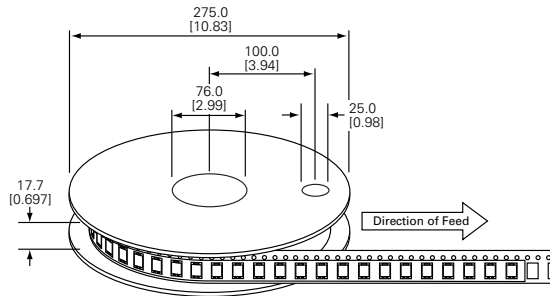


**For 'SM' Type Surface Mount Items (SL1411A series only)**

Dimensions are in millimeters [and inches]



Dimensions are in millimeters [and inches]



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

**Part Numbering System and Ordering Information**

**For SL1011A series:**

**SL1011A XXX X**

**Voltage**

**Pin Configuration**

- A = Axial Lead
- C = Core

Remarks: Formed leads are available on request

**SL1411 A XXX XX**

**Surge Capability**



**Voltage**

**Pin Configuration**

- A = Axial Lead
- C = Core
- SM = Surface Mount

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