

# SL1011A and SL1411A Series

## Gas Discharge Tubes



### Web Resources



Download ECAD models, order samples, and find technical resources at [www.littelfuse.com/SL1011A](http://www.littelfuse.com/SL1011A)

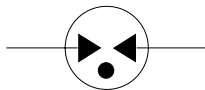


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### Agency Approvals

Agency	Agency File Number
	E128662

### 2 Electrode GDT Graphical Symbol



### 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).

### Features & Benefits

- 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

### Applications

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

# SL1011A and SL1411A Series

## Gas Discharge Tubes

### 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 SL1411A075	60	75	90	500	700	10 <sup>10</sup> Ω (at 50V)						50 V			
SL1011A090 SL1411A090	72	90	108	500	600										
SL1011A145 SL1011A150 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)	SL1011A: 5 A	SL1011A: 20 A	SL1411A: 12 kA	1 kA	
SL1011A230 SL1411A230	184	230	276	550	700										
SL1011A250 SL1411A250	200	250	300	600	800							135 V			
SL1011A260 SL1011A350 SL1411A350	210	260	310	600	800					SL1411A: 10 shots (@10kA)	SL1411A: 10 A		SL1411A: 65 A		
SL1011A470 SL1411A470	376	470	564	1000	1100										
SL1011A500 SL1011A600 SL1411A600 <sup>5</sup>	400	500	600	1100	1200										
	480	600	720	1200	1400										

**Notes:**

1. At delivery AQL 0.65 level II, DIN ISO 2859
2. In ionized mode
3. Comparable to the silicon measurement Switching Voltage (Vs)
4. 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 <b>Core and Surface Mount:</b> Dull Tin-plated	<b>Glow to Arc Transition Current</b>	< 0.5 Amps
<b>Product Marking</b>	Littelfuse 'LF' Mark, voltage and date code	<b>Glow Voltage</b>	~60 Volts
		<b>Storage and Operational Temperature</b>	-40 to +90°C

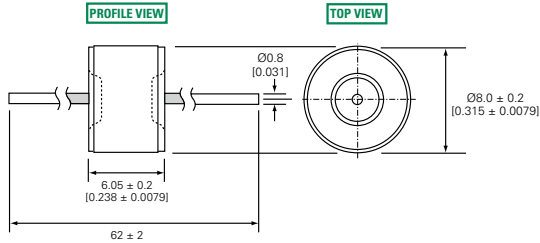
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## Gas Discharge Tubes

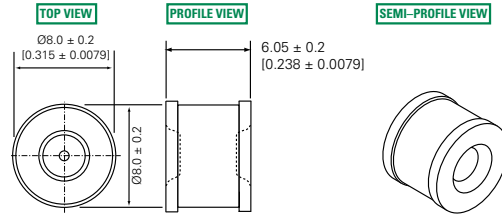
### Device Dimensions

#### For SL1011A Series:

##### 'A' Type Axial Lead Devices

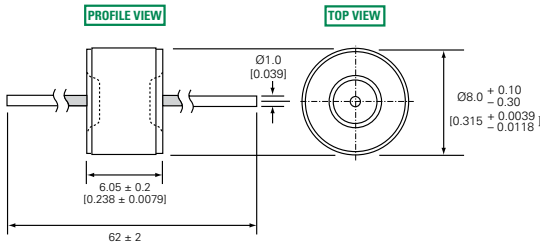


##### 'C' Type Core Devices

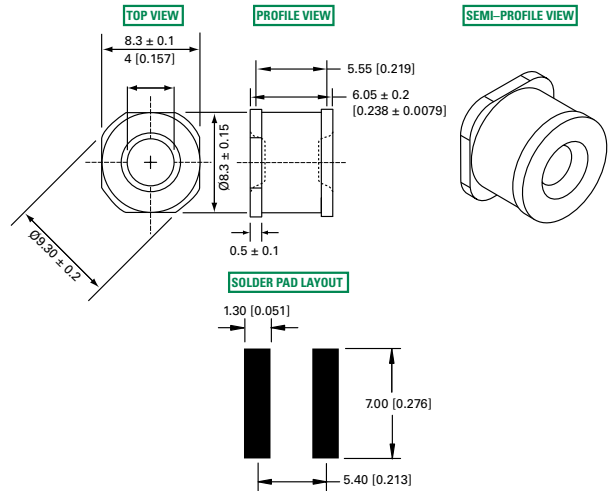


#### For SL1411A series:

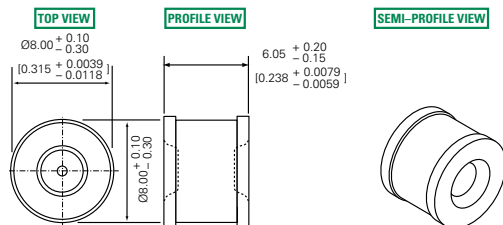
##### 'A' Type Axial Lead Devices



##### 'SM' Type Surface Mount Devices



##### 'C' Type Core Devices

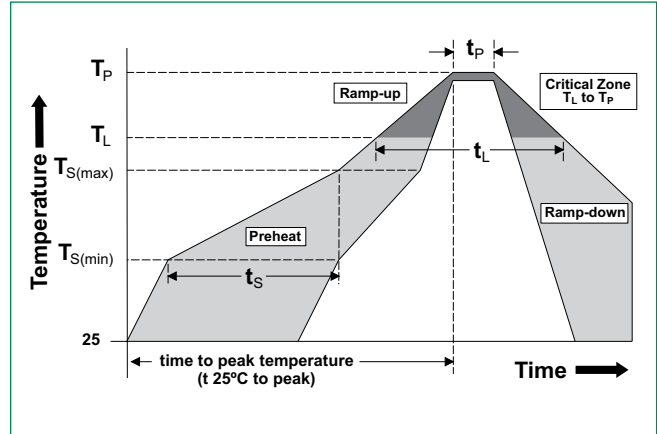


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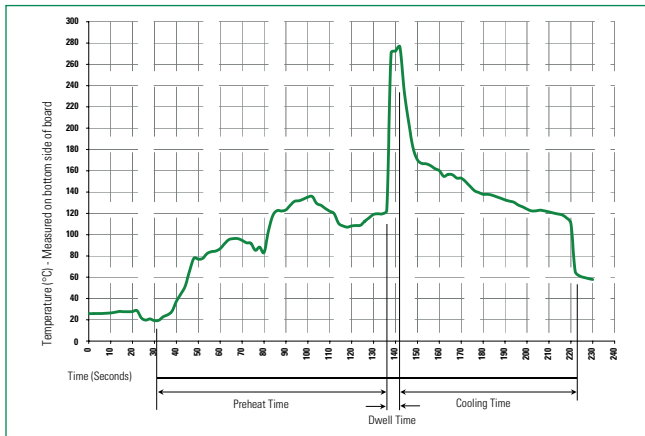
## Gas Discharge Tubes

### 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 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> (Depends on Flux Activation Temperature)	
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.

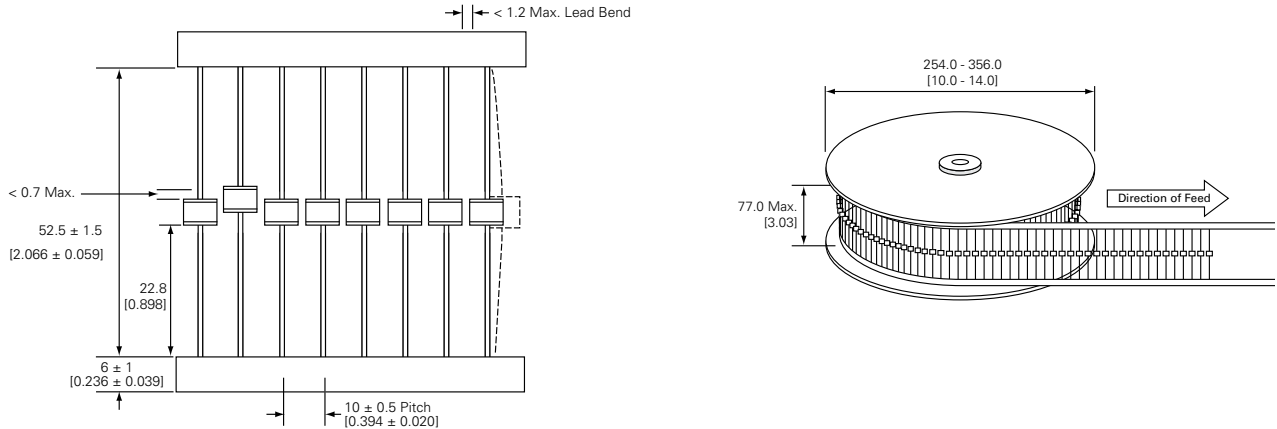
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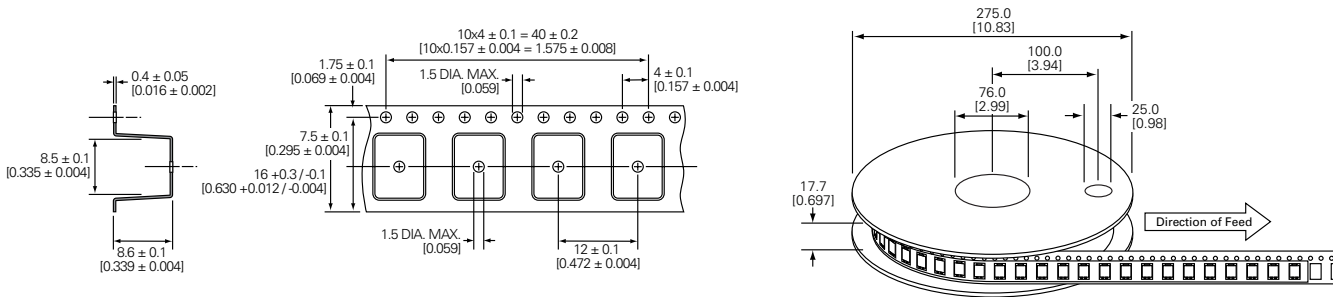
### Packaging Dimensions

Dimensions are in millimeters [and inches]

#### For 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:

**SL1011A XXX X**

**Voltage** \_\_\_\_\_

**Pin Configuration** \_\_\_\_\_

- A = Axial Lead
- C = Core

Remarks: Formed leads are available on request

For SL1411A series:

**SL1411 A XXX XX**

**Surge Capability** \_\_\_\_\_

**Voltage** \_\_\_\_\_

**Pin Configuration** \_\_\_\_\_

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

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