

# SL1002A Series









# **Agency Approvals**

AGENCY	AGENCY FILE NUMBER	
<b>71</b> .	E128662	

# 2 Electrode GDT Graphical Symbol



#### **Additional Information**







#### **Description**

The Broadband Optimized™ SL1002A series has been especially developed for use in broadband equipment. Special design features provide high levels of protection against fast rising transients in the 100V/µs to 1kV/µs range usually caused by lightning disturbances. These devices have ultra low capacitance (typically 1.2pF or less) 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, overcurrent protection is recommended.

#### **Features**

- RoHS compliant/Lead-
- Ultra low insertion loss
- Surface mountable
- 5kA surge capability tested with 8/20µS-Pulse as defined by IEC 61000-4-5
- Excellent response to fast rising transients
- Can be used to meet Telcordia GR1089 without series resistance

- 10/700 6kV capability, as per ITU-T Rec. K.21, enhanced test level
- 2000 A 2/10µs surge rating
- Meet FCC part 68 10/160µs waveform, 200A test and 10/560µs waveform 100A test
- Halogen-free

# **Applications**

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



## **Electrical Characteristics**

Device Specifications (at 25°C)					Life Ratings									
Part Number	DC Breakdown in Volts <sup>1,2</sup> (@100V/s)		Impulse Breakdown in Volts <sup>3,4</sup> (@100V/µs)	Impulse Breakdown in Volts <sup>3,4</sup> (@1kV/µs)	Insulation Resistance		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)	DC Holdover Voltage⁵	ldover Current		
	MIN	TYP	MAX	MAX		MIN	MAX	TYP				TYP	@ 2/10 µs	@ 10/350 μs
SL1002A075	60	75	90	400	CEO.	10 <sup>9</sup> Ω (at 50V)	(at 50V)		15 V 300 shots <sup>6</sup>	10 shots <sup>7</sup> (@ 5kA)	5 A	50 V	2 kA	1.5 kA
SL1002A090	72	90	108	400	650			~15 V						
SL1002A230	184	230	276		700	10° Ω						135 V		
SL1002A250	200	250	300	600										
SL1002A260	210	260	310											
SL1002A350	280	350	420	800	900	(at 100V)								
SL1002A470	376	470	564	900	1000						100 V			
SL1002A600	480	600	720	1100	1200	10 <sup>9</sup> Ω (at 500V)	-							
SL1002A600SP	570	600	780	1200	1300									

#### Notes:

- 1. At delivery AQL 0.65 level II, DIN ISO 2859
- 2. In ionized mode
- 3. In ionized mode, tested according to ITU-T Rec. K.12
- 4. Comparable to the silicon measurement Switching Voltage (Vs)

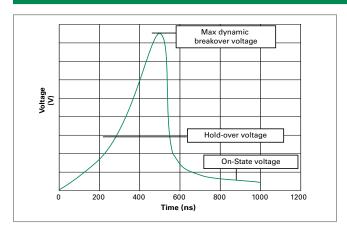
  5. Reference REA PE-80, 0.2A. Tested to ITU-T Rec. K.12 and REA PE-80 < 150 msecs.
- 6. 300 Applications [150(+) & 150(-)]
- 7. 10x[5x (+) & 5x (-)] Applications

## **Product Characteristics**

Materials	Construction = Ceramic Insulator Device Finish = Dull Tin-plated 17.5 +/-12.5 microns	
Product Marking	Littelfuse 'LF' Mark, voltage and date code	

Glow to Arc Transition Current	< 0.5 Amps
Glow Voltage	~60 - 140 Volts
Storage and Operational Temperature	-40 to +90°C

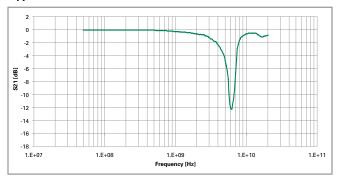
# Voltage vs. Time Characteristics



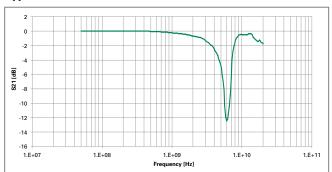


#### **Insertion Loss Characteristics**

# **Typical Insertion Loss Characteristics (90V)**



# **Typical Insertion Loss Characteristics (600V)**



#### **Device Dimensions**

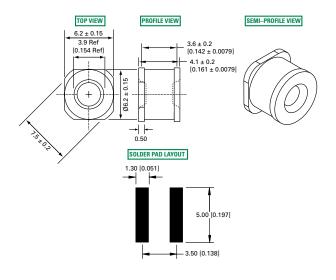
#### 'C' Type Core Devices

Dimensions are in millimeters [and inches]

# | TOP VIEW | PROFILE VIEW | SEMI-PROFILE VIEW | | 06.0 ± 0.15 | | (0.236 ± 0.0059) | | (1.161 ± 0.0079) | | 3.6 ± 0.2 | (0.142 ± 0.0079) | | 4.1 ± 0.2 | (0.161 ± 0.0079) | | 5.5 | (0.142 ± 0.0079) | | 6.5 | (0.142 ± 0.0079) | | 7.5 | (0.142 ± 0.0079) | | 8.5 | (0.142 ± 0.0079) | | 9.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.142 ± 0.0079) | | 1.5 | (0.

## 'SM' Type Surface Mount Devices

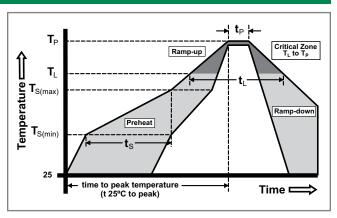
Dimensions are in millimeters [and inches]



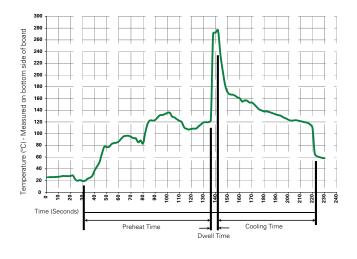


# **Soldering Parameters - Reflow Soldering (Surface Mount Devices)**

Reflow Co	ndition	Pb-free assembly		
	-Temperature Min (T <sub>s(min)</sub> )	150°C		
Pre Heat	-Temperature Max (T <sub>s(max)</sub> )	200°C		
	-Time (Min to Max) (t <sub>s</sub> )	60 – 180 seconds		
Average R (T <sub>L</sub> ) to pea	amp-up Rate (Liquidus Temp k)	3°C/second max.		
T <sub>S(max)</sub> to T <sub>L</sub>	- Ramp-up Rate	5°C/second max.		
Reflow	-Temperature (T <sub>L</sub> ) (Liquidus)	217°C		
nellow	-Temperature (t <sub>L</sub> )	60 – 150 seconds		
PeakTemp	perature (T <sub>P</sub> )	260 <sup>+0/-5</sup> °C		
Time with	in 5°C of Actual Peak ure (t <sub>p</sub> )	10 – 30 seconds		
Ramp-dov	vn Rate	6°C/second max.		
Time 25°C	to Peak Temperature (T <sub>P</sub> )	8 minutes max.		
Do not exc	ceed	260°C		



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



# **Recommended Process Parameters:**

Wave Parameter	Lead-Free Recommendation		
Preheat:			
(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 DwellTime:	2-5 seconds		

# **Soldering Parameters - Hand Soldering**

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

Heating Time: 5 seconds max.