

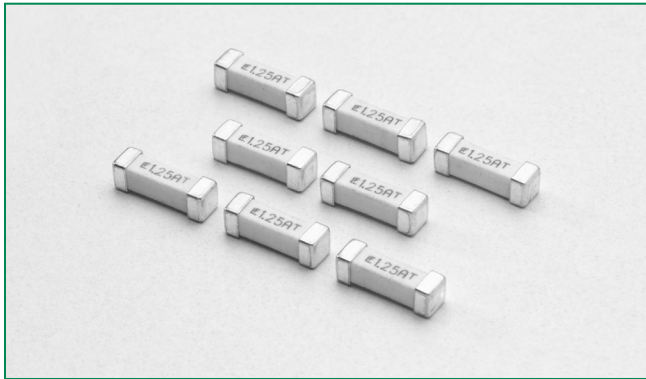
## 阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

## Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets" .



### 461 Series TeleLink® Fuse



#### Description

The Littelfuse 461 Series TeleLink® Surface Mount, Surge Resistant Fuse, offers over-current protection for a wide range of telecom applications without requiring a series resistor. When used in conjunction with a Littelfuse SIDACtor® Transient Voltage Suppressor (TVS) or a Greentube™ Gas Plasma Arrestor, this combination provides a compliant solution for standards and recommendations such as GR-1089–Core, TIA-968-A, UL/EN/IEC 60950, and ITU K.20 and K.21. The coordination requirement contained in GR-1089–Core, and ITU K.20/21 may require a series of impedance devices.

#### Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	.5A - 2A
	29862	.5A - 2A

#### Electrical Characteristics for Series

% of Ampere Rating	Opening Time
100%	4 hours, Minimum
250%	1 sec., Min.; 120 secs., Max.

#### Maximum Temperature Rise

Telecom Nano <sup>2</sup> ® Fuse	Temperature Reading
04611.25	< 82°C (180°F)
0461002.	< 50°C (122°F)

Higher Currents and PCB layout designs can affect this parameter. Readings are measured at rated current after temperature stabilizes.

#### Features

- Surface mount surge resistant Slo-Blo® fuse networking equipment
- Meet UL 60950 3rd Edition power cross requirements standard alone
- Designed to allow compliance with Telcordia GR-1089-CORE and TIA-968-A (formerly FCC Part 68) Surge Specifications
- Provide coordinated protection with Littelfuse SIDACtor® Transient Voltage Suppressor (TVS) or a Greentube™ Gas Plasma Arrestor, without series resistors
- Designed to serve the requirements of a wide range of telecommunication and
- 2A rating has improved temperature rise performance under 2.2A surge current testing when compared with 1.25A rating
- Product is Halogen Free and RoHS compliant and compatible with lead-free solder and higher temperature profiles when ordered with Standard Silver Plated Brass Caps
- Standard product is RoHS Compliant and compatible with lead-free solders and higher temperature profiles

#### Additional Information



Datasheet



Resources





Samples

#### Applications

- T1/E1/J1 and HDSL2/4
- SLIC interface portion of Fiber to the Curb (FTTC) and Fiber to the Premises (FTTP)
- Non-Fiber SLIC interface for Central Office (CO) locations and Remote Terminals (RT)
- xDSL applications such as ADSL, ADSL2+, VDSL, and VDSL2+
- Ethernet 10/100/1000BaseT
- POTS applications such as modems, answering machines, telephones, fax machines, and security systems
- ISDN “U” interface
- Baystation T1/E1/J1, T3 (DS3) trunk cards

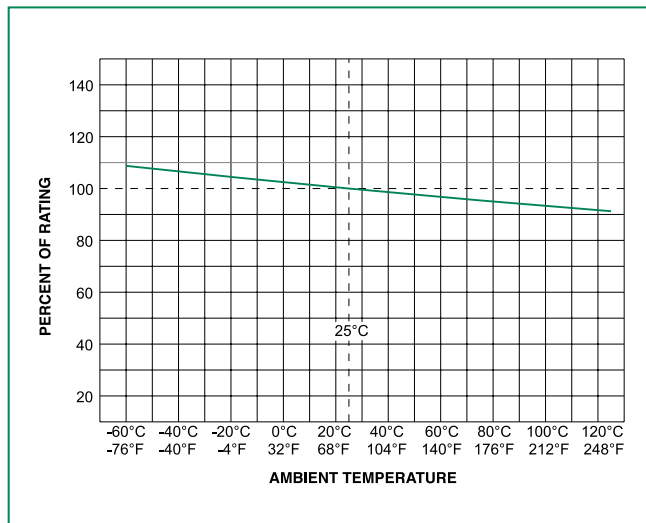
## Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max Voltage Rating (V)	Interrupting Rating	Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec)	Agency Approvals	
							
0.500	.500	600	50A @ 250 VAC 60 A @600 VAC 100 A @80 VDC	0.560	0.840 <sup>1</sup>	x	x
1.25	1.25	600		.1040	16.5 <sup>1</sup>	x	x
2.00	002.	600		.0450	17.5 <sup>1</sup>	x	x

<sup>1</sup> I<sup>2</sup>t is calculated at 10 msec. or less. I<sup>2</sup>t at 10 times rated current has a typical value of: 24 A<sup>2</sup>sec (2.0A), 22 A<sup>2</sup>sec (1.25A), 1.3 A<sup>2</sup>sec (0.5A).

- Typical inductance <40nH up to 500 MHz.
- Resistance changes 0.5% for every °C.
- Resistance is measured at 10% rated current.

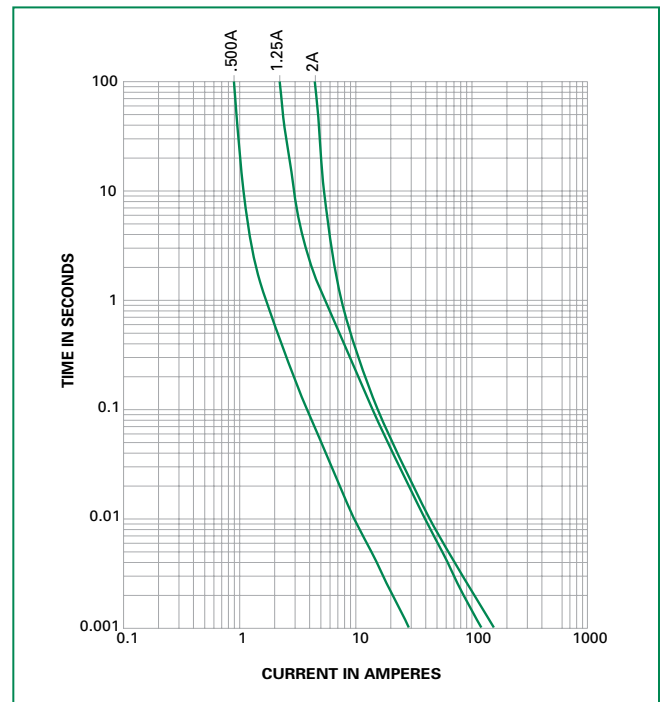
## Temperature Re-rating Curve



Note:

1. Re-rating depicted in this curve is in addition to the standard re-rating of 25% for continuous operation.

## Average Time Current Curves



## GR 1089 Inter-building requirements

**GR 1089 1st level lighting surge inter-building**  
 (Equipment under test can not be damaged and must continue to operate properly)

Surge	Minimum Peak Voltage (V)	Minimum Peak Current (A)	Max. Rise/Min. Decay (µs)	Repetitions Each Polarity	Fuse Choices
1	600	100	10/1000	25	1.25, 2.0
2	1000	100	10/360	25	1.25, 2.0
3	1000	100	10/1000	25	1.25, 2.0
4	2500	500	2/10	10	1.25, 2.0
5	1000	25	10/360	5	0.5, 1.25, 2.0

If sufficient series resistance is used, then the 0.5 fuse may be used in test conditions 1-4.

**GR 1089 2nd level lightning surge telecom port**  
 (Equipment under test shall not become a fire or electrical safety hazard)

Surge	Minimum Peak Voltage (V)	Minimum Peak Current (A)	Max. Rise/Min. Decay (µs)	Repetitions Each Polarity	Fuse Choices
1	5000	500	2/10	1	0.5, 1.25, 2.0
Alternative	5000	500/8=625	8/10	1	0.5, 1.25, 2.0

The 0.5 fuse will open during these test conditions. The 1.25 & 2.0 will not open thus providing operational compliance.

### GR 1089 AC power fault 1st level inter-building (fuse not allowed to open)

Test	Vrms	Short Circuit Current (A)	Hits	Duration	Primary Protector	Fuse Choices
1	50	0.33	1	15 min.	removed	1.25, 2.0
2	100	0.17	1	15 min.	removed	1.25, 2.0
3	200,400, 600	1	60	1 sec.	removed	1.25, 2.0
4	1000	1	60	1 sec.	operative	1.25, 2.0
5	Diagram	Diagram	60	5 secs.	removed	1.25, 2.0
6	600	0.5	1	30 secs.	removed	1.25, 2.0
7	440	2.2	5	2 secs.	removed	1.25, 2.0
8	600	3	1	1.1 secs.	removed	1.25, 2.0
9	1000	5	1	0.4 sec.	in place	1.25, 2.0

### GR 1089 AC power fault 2nd level (fuse can open but must open in a safe and controlled manner)

Test Circuit	Vrms	Short Circuit Current (A)	Duration	Fuse
1	120,277	25	15 min.	0.5, 1.25, 2.0
2	600	60	5 secs.	0.5, 1.25, 2.0
3	600	7	5 secs.	0.5, 1.25, 2.0
4	100-600	2.2	15 min..	0.5, 1.25, 2.0
5	Diagram	Diagram	15 min.	0.5, 1.25, 2.0

Fuse must open before wiring simulator fuse (MDL 2.0).

### TIA -968-A (formerly FCC Part 68) Surge Waveforms (fuse can not open during type B events)

Surge	Voltage (V)	Waveform (µs)	Current (A)	Repetitions	Recommended Fuse
Metallic A	800	10x560	100	1 ea. polarity	1.25
Longitudinal A	1500	10x160	200	1 ea. polarity	1.25
Metallic B	1000	9x720	25	1 ea. polarity	1.25
Longitudinal B	1500	9x720	375	1 ea. polarity	1.25

For the type A events the 0.5 fuse will open, providing non-operational compliance. The 1.25 & 2.0 will not open, providing for operational compliance with TIA-968-A type A surge events.

### UL 60950 requirements

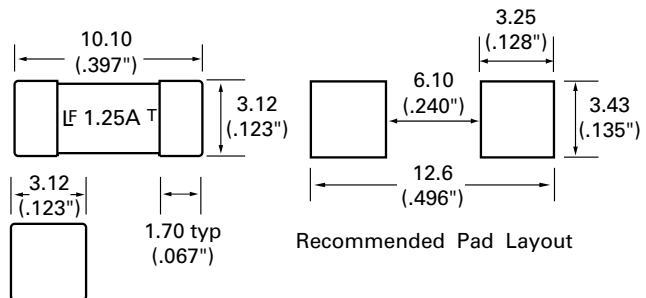
#### UL60950 (EN 60950) (formerly UL 1950) Power Cross (L = longitudinal, M = metallic)

Test Number	Voltage (V)	Current (A)	Time	Fuse Choices
L1	600	40	1.5 secs.	0.5, 1.25, 2.0
L2	600	7	5 secs.	0.5, 1.25, 2.0
L3	600	2.2	30 min.	0.5, 1.25, 2.0
L4	200	2.2	30 min.	0.5, 1.25, 2.0
L5	120	25	30 min.	0.5, 1.25, 2.0
M1	600	40	1.5 secs.	0.5, 1.25, 2.0
M2	600	7	5 secs.	0.5, 1.25, 2.0
M3	600	2.2	30 min.	0.5, 1.25, 2.0
M4	600	2.2	30 min.	0.5, 1.25, 2.0

Selection of test number depends on current limiting F fire enclosure/spacing of end product

- 26 AWG line cord removes L1/M1 test requirement
  - L5 conducted only if product does not pass section 6.1.2
  - L2,M2,L3,M3,L4,M4 conducted if not in a fire enclosure
- Fuse must open before the wiring simulator fuse (MDL 2.0).

### Dimensions

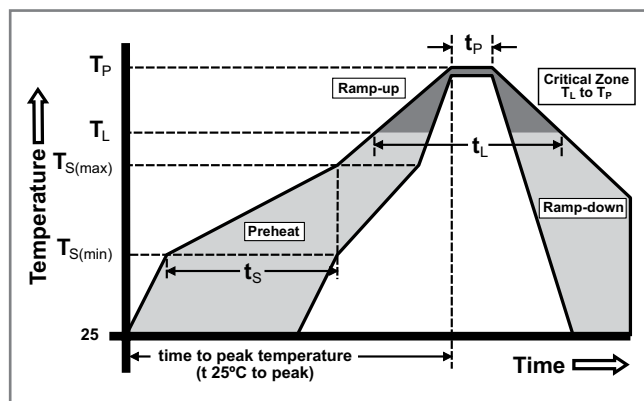


### UL60950 (EN 60950) (formerly UL 1950) Impulse Test and Steady-State Electric Strength Test

Test	Voltage (V)	Current (A)	Waveform	Repetitions	Fuse Choices
<b>Impulse</b>					
For handheld units	2500	62.5	10x700ms	+/- 10 w/60 secs. rest	0.5, 1.25, 2.0
Non handheld	1500	375	10x700ms	+/- 10 w/60 secs. rest	0.5, 1.25, 2.0
<b>Steady-State</b>					
For handheld units	1500		60Hz		0.5, 1.25, 2.0
Non handheld	1000		60Hz		0.5, 1.25, 2.0

## Soldering Parameters

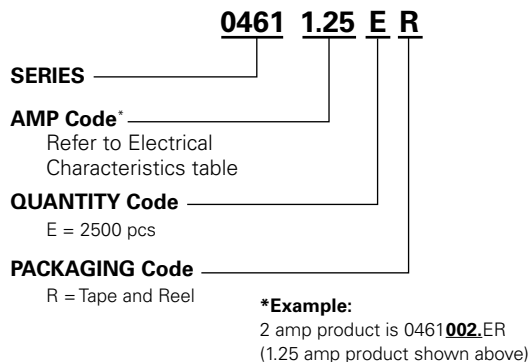
Reflow Condition		Pb – free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (Min to Max) ( $t_s$ )	60 – 120 seconds
Average Ramp-up Rate (Liquidus Temp ( $T_L$ ) to peak)		5°C/second max.
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max.
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 90 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260°C



## Product Characteristics

<b>Materials</b>	<b>Body:</b> Ceramic <b>Terminations:</b> Silver-plated Caps
<b>Product Marking</b>	Brand Logo, Ampere Rating, T
<b>Operating Temperature</b>	-55°C to 125°C
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020C
<b>Solderability</b>	IEC-60127-4 (215°C immersion, 3 seconds)
<b>Resistance to Dissolution of Metallization</b>	IPC / EIA J-STD-002-Test D 260°C for 120 seconds
<b>Thermal Shock</b>	MIL-STD-202, Method 107, Test Condition B, -55°C to +125°C, 30 minutes @ each extreme
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Test Condition A - Half Sine, 50 G's, 11 msec. duration
<b>High Frequency Vibration</b>	MIL-STD-202, Method 204, Test Condition D
<b>Moisture Resistance</b>	MIL-STD-202, Method 106, 50 cycles
<b>Terminal Strength</b>	Board deflection per EIA / IS-722, 1mm deflection for 1 minute
<b>Terminal Attachment</b>	MIL-STD-202, Method 211, Test Condition A, 5 lbs applied to end caps

## Part Numbering System



## Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
24mm Tape and Reel	EIA RS-481-2 (IEC 286, part 3)	2500	ER