RoHS 461E Series Enhanced TeleLink® Fuse

Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	1.25 A

Electrical Characteristics for Series

% of Ampere Rating	Opening Time
100%	4 Hours, Minimum
2.2A (176%)	300 Seconds, Maximum
200%	1 Second, Minimum; 60 Seconds, Maximum

Maximum Temperature Rise

Telecom Nano² Fuse	Temperature Reading
04611.25E	< 82°C (180°F)

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

Description

The Littelfuse 461E Series Enhanced TeleLink® Surface Mount, Surge – Tolerant Fuse, is the next generation of the popular 461 Telelink® Fuse. With optimized opening times at certain overload conditions, this enhanced TeleLink® Fuse works in harmony with Littelfuse's new SIDACtor® Transient Voltage Suppressor products in the QFN package. 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/.21. The coordination requirement contained in GR–1089–Core and ITU K.20/.21, may require a series impedance device.

Features

- Surface Mount Surge Resistant Slo-Blo® Fuse.
- Meets UL/EN/IEC 60950, 3rd Edition, Power Fault Requirements stand alone.
- Designed for compliance with Telcordia GR–1089–CORE and TIA–968–A (formerly FCC Part 68) Surge Specifications.
- Designed to serve the requirements of a wide range of telecommunication and networking equipment.
- Provides GR–1089 compliant overcurrent protection with Littelfuse SIDACtor®, TVS or GDT, without the need of any additional resistance.
- Product is RoHS compliant and compatible with lead-free solders and higher temperature profiles.

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

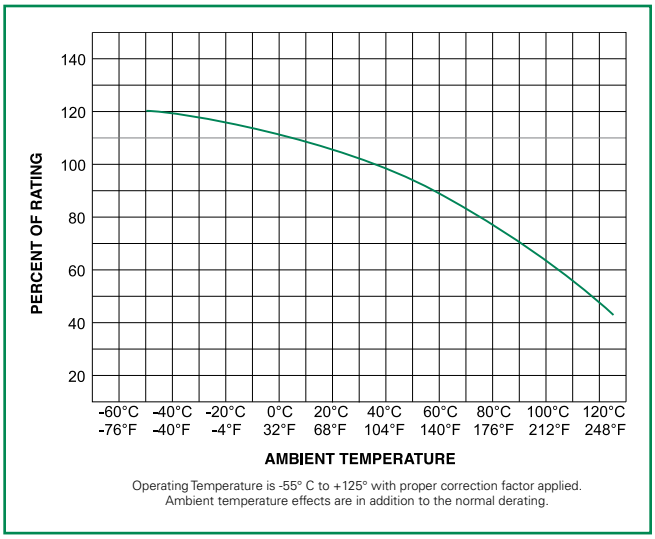
Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max Voltage Rating (V)	Interrupting Rating	Nominal Cold Resistance (Ohms)	Nominal Melting I^2t (A^2sec)	Agency Approvals
1.25	1.25	600	60 amperes @600 VAC	0.112	14.2	x

I^2t is calculated at 10 msec or less. I^2t at 10 times rated current has a typical value of 17 A^2sec (1.25A)

Resistance is measured at 10% rated current.

Temperature Rerating Curve

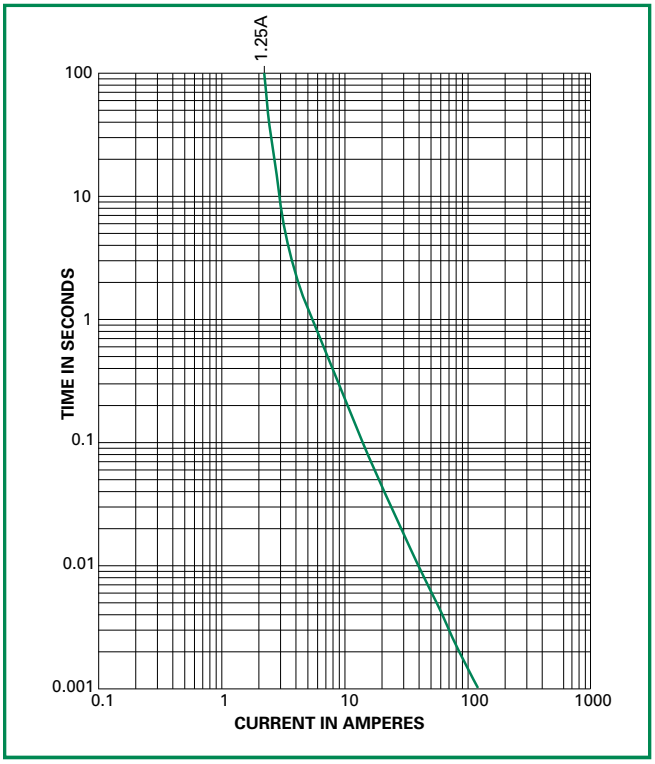


Operating Temperature is -55° C to +125° with proper correction factor applied.
Ambient temperature effects are in addition to the normal derating.

Note:

1. Derating depicted in this curve is in addition to the standard derating 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
1	600	100	10/1000	25
2	1000	100	10/360	25
3	1000	100	10/1000	25
4	2500	500	2/10	10
5	1000	25	10/360	5

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)	Repe-titions Each Polarity
1	5000	500	2/10	1
Alter-native	5000	500/8=625	8/10	1

The 1.25 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
1	50	0.33	1	15 min.	removed
2	100	0.17	1	15 min.	removed
3	200,400,600	1	60	1 sec.	removed
4	1000	1	60	1 sec.	operative
5	Diagram	Diagram	60	5 sec.	removed
6	600	0.5	1	30 sec.	removed
7	440	2.2	5	2 sec.	removed
8	600	3	1	1.1 sec.	removed
9	1000	5	1	0.4 sec.	in place

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
1	120,277	25	15 min.
2	600	60	5 sec.
3	600	7	5 sec.
4	100-600	2.2	15 min.
5	Diagram	Diagram	15 min.

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)	Reps
Metallic A	800	10 x 560	100	1 ea. polarity
Longitudinal A	1500	10 x 160	200	1 ea. polarity
Metallic B	1000	9 x 720	25	1 ea. polarity
Longitudinal B	1500	9 x 720	37.5	1 ea. polarity

For the type A events the fuse 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)

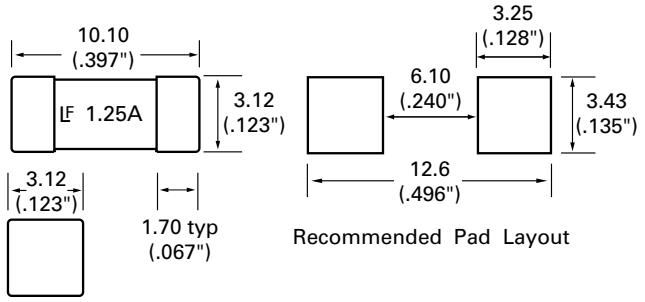
Test Number	Voltage (V)	Current (A)	Time
L1	600	40	1.5 sec.
L2	600	7	5 sec.
L3	600	2.2	30 min.
L4	200	2.2	30 min.
L5	120	25	30 min.
M1	600	40	1.5 sec.
M2	600	7	5 sec.
M3	600	2.2	30 min.
M4	600	2.2	30 min.

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

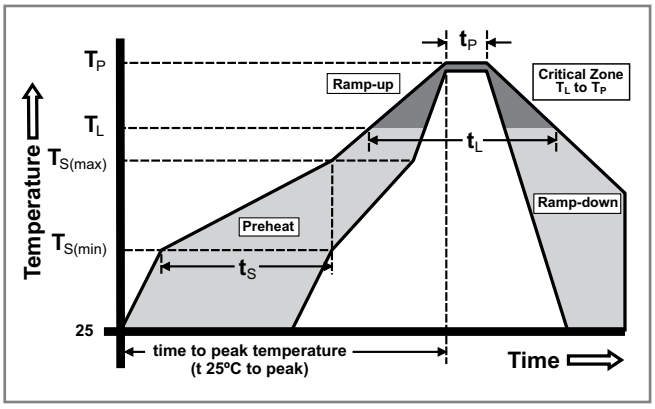


UL60950 (EN 60950) (formerly UL 1950) Impulse Test and Steady-State Electric Strength Test

Test	Voltage (V)	Current (A)	Waveform	Repetitions
Impulse				
For handheld units	2500	62.5	10 x 700ms	-/+ 10 w/60 Sec. rest
Non handheld	1500	37.5	10 x 700ms	-/+ 10 w/60 Sec. rest
Steady-State				
For handheld units	1500		60Hz	
Non handheld	1000		60Hz	

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		3°C/Sec. Max.
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/Sec. Max.
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Temperature (t_L)	60 – 90 Seconds
Peak Temperature (T_P)		$250^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 Seconds
Ramp-down Rate		6°C/Sec. Max.
Time 25°C to peak Temperature (T_P)		8 Minutes Max.
Do not exceed		260°C



Product Characteristics

Materials	Body: Ceramic Terminations: Silver-plated Caps
Product Marking	Brand Logo, Ampere Rating
Operating Temperature	-55°C to +125°C
Moisture Sensitivity Level	Level 1, J–STD–020C
Solderability	IEC–60127–4 (215°C immersion, 3 Sec.)
Resistance to Dissolution of Metallization	IPC / EIA J–STD–002A–Test D 260°C for 120 Sec.

Thermal Shock	MIL–STD–202, Method 107, Test Condition B, 200 cycles, -55°C to +125°C, 30 minutes @ each extreme
Mechanical Shock	MIL–STD–202, Method 213, Test Condition A – Half Sine, 50 G's, 11 mSec duration
High Frequency Vibration	MIL–STD–202, Method 204, Test Condition D
Moisture Resistance	MIL–STD–202, Method 106, 50 cycles
Terminal Strength	Board deflection per EIA / IS–722, 1mm Deflection for 1 Minute
Terminal Attachment	MIL–STD–202, Method 211, Test Condition A, 5 lbs applied to end caps

Part Numbering System

0461 1.25 E E R

SERIES

AMP Code

Enhanced TELELINK®

QUANTITY Code
E = 2500 pcs

PACKAGING Code
R = Tape and Reel

Packaging

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