RoHS Telecom NANO²® Fuse 461 Series and Teccor TeleLink® Fuse

- Surface mount surge resistant Slo-Blo® fuse.
- Meets UL 60950 3rd Edition power cross requirements stand alone.
- Designed to allow compliance with Telcordia GR-1089-CORE and TIA-968-A *(formerly FCC Part 68)* Surge Specifications.
- Provides coordinated protection with Littelfuse SIDACtor® Protection Thyristors without series resistors.
- Ideal for use in telecommunication equipment including line cards, modems, fax machines, phones, answering machines, caller ID devices and other products connected to phone network.
- 2A rating has improved temperature rise performance under 2.2A surge current testing when compared with 1.25A rating.
- Product is **RoHS Compliant** and compatible with lead-free solders 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.

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

Littelfuse: UL E10480
CSA LR29862

Teccor: UL E191008
CSA LR702828

PHYSICAL SPECIFICATIONS:
Materials: Body: Ceramic
RoHS Compliant Terminations: Silver Plated Brass Caps
Terminations: Tin-Lead Alloy also available, add suffix, T.

Soldering Parameters:
Reflow Solder — 230°C, 30 seconds maximum.
Wave Solder — 260°C, 3 seconds maximum.

PACKAGING SPECIFICATIONS: 24mm Tape and Reel per EIA-RS481-2, (IEC 286 part 3); 2500 fuses per reel, add suffix, ER.

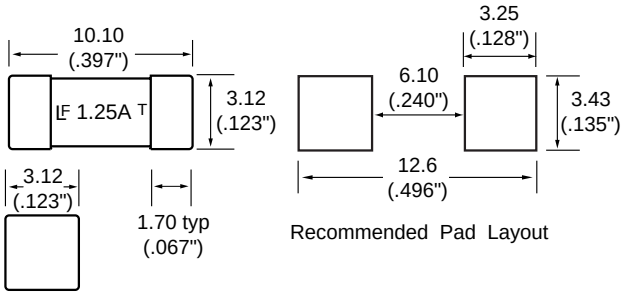
ORDERING INFORMATION:

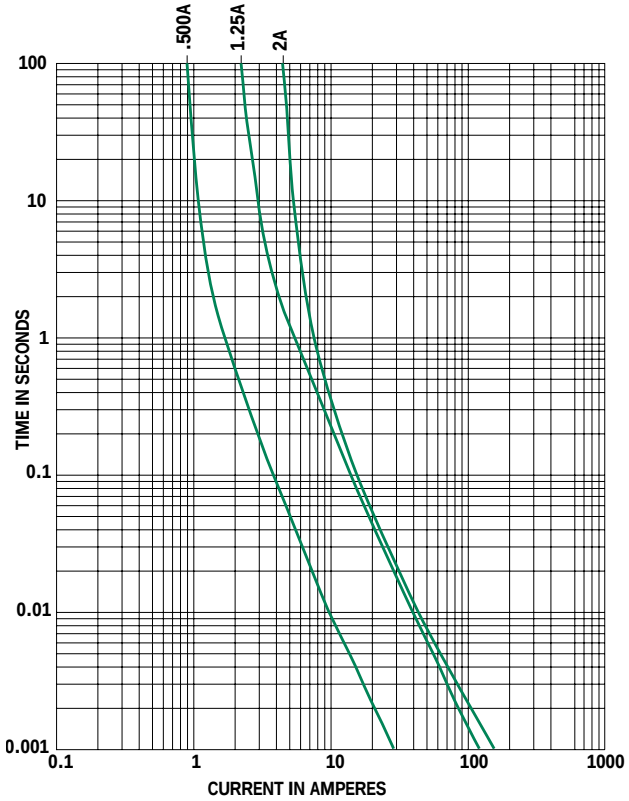
Telecom Nano² Catalog Number	Teccor TeleLink Catalog Number	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I²t A² Sec.
0461.500	F0500T	0.5	250	.560	.840[1]
0461 1.25	F1250T	1.25	250	.110	16.5[1]
0461 002.	F1251T	2.00	250	.050	17.5[1]

Notes:
[1] I²t is calculated at 10 msec or less. I²t at 10 times rated current has a typical value of: 24 A²sec (2.0A), 22 A²sec (1.25A), 1.3 A²sec (0.5A).
- Typical inductance < 40nH up to 500 MHz.
- Resistance changes 0.5% for every °C.
- Resistance is measured at 10% rated current.



Reference Dimensions:





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ELECTRICAL CHARACTERISTICS:

% of AmpereRating	OpeningTime
100%	4 hours, **Min.**
250%	1 Second, **Min.;** 120 Seconds, **Max.**

INTERRUPTING RATINGS:
50 amperes at 250 VAC.

GR 1089 Inter-building requirements

GR 1089 1st level lighting surge inter-building (Equipment under test can not be damaged & 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, fragmentation, 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	5000/8=625	8/20	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)	Duration	Primary Protector	Fuse Choices
1	50	.33	15 min.	removed	1.25, 2.0
2	100	.17	15 min	removed	1.25, 2.0
3	200,400, 600	1	60 x 1 sec.	removed	1.25, 2.0
4	1000	1	60 x 1 sec.	operative	1.25, 2.0
5	Diagram	Diagram	60 x 5 sec.	removed	1.25, 2.0
6	600	0.5	30s	removed	1.25, 2.0
7	440	2.2	5 x 2 sec.	removed	1.25, 2.0
8	600	3	1.1 sec.	removed	1.25, 2.0
9	1000	5	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 (A)	Duration	Fuse
1	120, 277	25	15 min.	0.5, 1.25, 2.0
2	600	60	5 sec.	0.5, 1.25, 2.0
3	600	7	5 sec.	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).

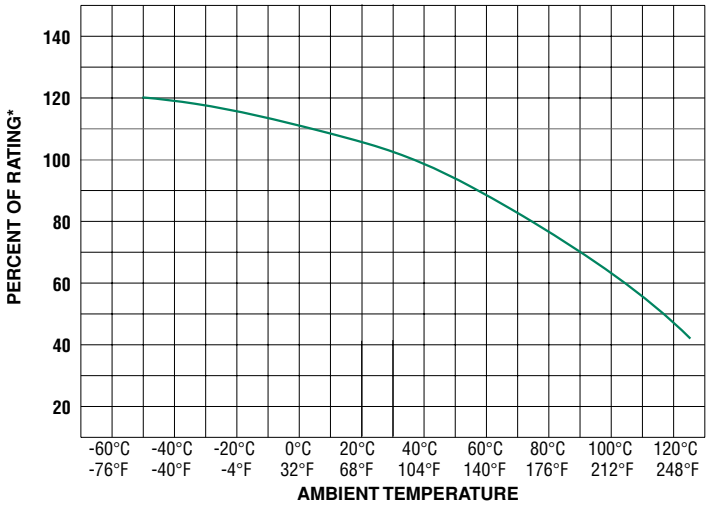
Maximum Temperature Rise:

Telecom Nano² 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.

Temperature Derating Curve

Operating Temperature is -55˚C to +125˚C with proper correction factor applied



• Ambient temperature effects are in addition to the normal derating.

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

Surge	Voltage (V)	Waveform (µs)	Current (A)	Waveform (µs)	Reps	Recommended Fuse
Metallic A	800	10 x 560	100	10 x 560	1 ea. polarity	1.25
Longitudinal A	1500	10 x 160	200	10 x 160	1 ea. polarity	1.25
Metallic B	1000	9 x 720	25	5 x 320	1 ea. polarity	1.25
Longitudinal B	1500	9 x 720	37.5	5 x 320	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 sec.	0.5, 1.25, 2.0
L2	600	7	5 sec.	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 sec.	0.5, 1.25, 2.0
M2	600	7	5 sec.	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 & 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).

UL60950 (EN 60950) (formerly UL 1950) Impulse Test & Steady-state electric strength test

Test	Voltage (V)	Current (A)	Waveform	Repetitions	Fuse Choices
Impulse					
For handheld units	2500	62.5	10 x 700µs	± 10 w/60 sec. rest	0.5, 1.25, 2.0
Non handheld	1500	37.5	10 x 700µs	± 10 w/60 sec. rest	0.5, 1.25, 2.0
Steady-State					
For handheld units	1500		60Hz		0.5, 1.25, 2.0
Non handheld	1000		60Hz		0.5, 1.25, 2.0