

## TF 600



## Telcordia GR-1089 · 600 VAC · Time-Lag T

**Description**

- Directly solderable on printed circuit boards

**Standards**

- IEC 60127-4
- UL 248-14
- CSA C22.2 no. 248.14
- Telcordia GR-1089
- UL 60950 / IEC 60950
- ITU-T K.20 and K.21
- TIA-968-A

**Approvals**

- UL File Number: E41599

**Applications**

- Twisted pair telecom ports requiring Telcordia GR-1089 / TIA-968-A / ITU-T / UL 60950 / IEC 60950 compliance
- see following pages

**References**

[General Product Information](#)

Time-Current Curves see last page


[Packaging Details](#)

**Weblinks**

Approvals: <http://www.schurter.com/approvals>

RoHS: <http://www.schurter.com/rohs>

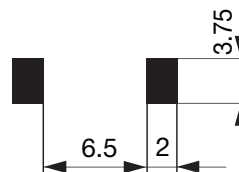
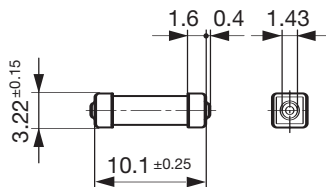
**Technical Data**

|                              |  |
|------------------------------|--|
| Rated Voltage                | 600 VAC  |
| Rated Current                | 0.5 - 2 A  |
| Breaking Capacity            | 60 A   |
| Characteristic               | Time-Lag T   |
| Mounting                     | PCB,SMT  |
| Admissible Ambient Air Temp. | -55 °C to 125 °C   |
| Climatic Category            | 55/125/21 acc. to IEC 60068-1  |
| Material: Housing            | Ceramic  |
| Material: Terminals          | Tin-Plated Copper Alloy  |
| Unit Weight                  | 0.23 g   |
| Stock Conditions             | 0 °C to 60 °C, max. 70% r.h.   |
| Product Marking              |  Type, Current Rating, Characteristic |

|                              |  |
|------------------------------|--|
| Soldering Methods            | Reflow   |
| Solderability                | 245 °C / 3 sec acc. to IEC 60068-2-58, Test Td   |
| Resistance to Soldering Heat | 260 °C / 10 sec acc. to IEC 60068-2-58, Test Td  |
| Flammability                 | min. UL 94V-1<br>(acc. to EIA/IS-722, Test 4.12) |

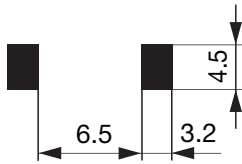
**Dimensions**

Length  10.1 mm



Solder pads reflow soldering

## TF 600



Solder pads wave soldering

### Pre-Arcing Time

| Rated Current In | 1.0 x In<br>min. | 2.5 x In<br>min. | 2.5 x In<br>max |
|------------------|------------------|------------------|-----------------|
| 0.5 A - 2 A      | 4 h              | 1 s              | 120 s           |

### Variants

| Order Number | Rated Current [A] | Rated Voltage [V] | Voltage Drop 1.0 In typ [mV] | Cold Resistance typ [mΩ] | Melting I <sup>2</sup> t 10.0 In typ [A <sup>2</sup> s] |
|--------------|-------------------|-------------------|------------------------------|--------------------------|---|
| 2000.0010.xx | 0.5               | 600               | 107                          | 210                      | 1.14  |
| 2000.0011.xx | 1.25              | 600               | 94                           | 73.2                     | 21.4  |
| 2000.0012.xx | 2                 | 600               | 55                           | 27.8                     | 22.3  |

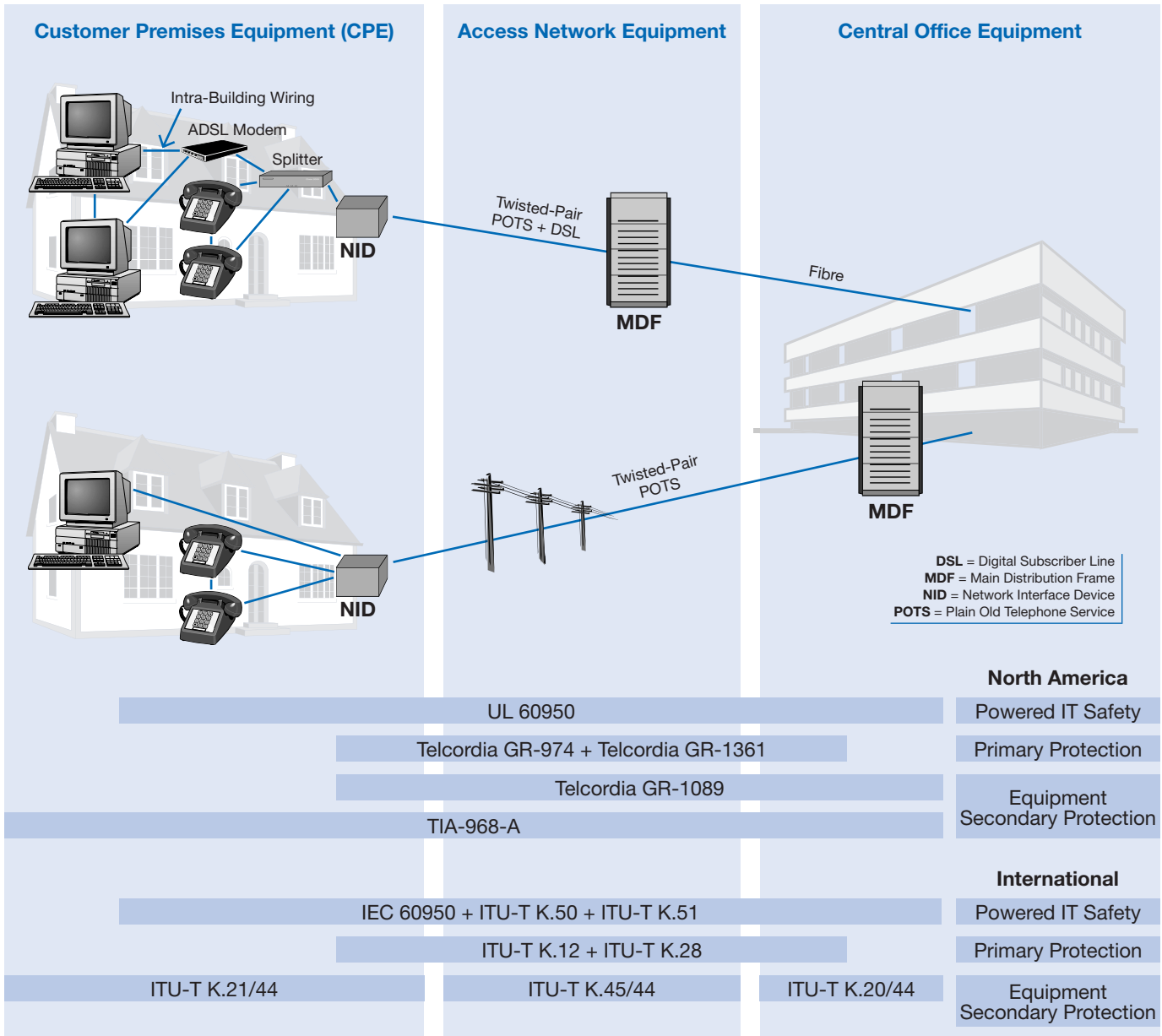
1) 60 A @ 600 VAC , p.f. = 1.0 / 60 A @ 125 VDC

### Packaging Unit

.xx = .11 Plastic Bag (100 pcs.)  
.xx = .24 Blister Tape 33 cm Reel (2000 pcs.)

**TF 600**

**GLOBAL TELECOM STANDARDS**



**HOW TO SELECT THE RIGHT FUSE-LINK FOR SECONDARY PROTECTION?**

1. Select your equipment type
2. Use the Key Device Selection Criteria to determine best suitability for your application

| Application  | Specification   | Key Device Selection Criteria                                 |                            |
|--|---|---|----------------------------|
|  |   | Faster Time-to-Open   | Cooler Surface Temperature |
| <b>Customer Premises Equipment (CPE)</b><br>Modems (Analog, V.90, ISDN, xDSL), ADSL splitters, phone sets, fax machines, answering machines, caller ID, internet appliance, PBX systems, POS terminals | TIA-968-A<br>UL 60950/IEC 60950<br>ITU-T K.21/44                      | TF 600, 0.5 A (2000.0010.xx)<br>TF 600, 1.25 A (2000.0011.xx) | TF 600, 2 A (2000.0012.xx) |
| <b>Access Network Equipment</b><br>Remote terminals, line repeaters, multiplexers, cross-connects  | Telcordia GR-1089<br>TIA-968-A<br>UL 60950/IEC 60950<br>ITU-T K.45/44 | TF 600, 1.25 A (2000.0011.xx)                                 | TF 600, 2 A (2000.0012.xx) |
| <b>Central Office Equipment</b><br>Analog linecards (SLIC), ISDN linecards, xDSL modems, ADSL/VDSL splitters, T1/E1 linecards, multiplexers, servers   | Telcordia GR-1089<br>TIA-968-A<br>UL 60950/IEC 60950<br>ITU-T K.20/44 | TF 600, 1.25 A (2000.0011.xx)                                 | TF 600, 2 A (2000.0012.xx) |

## TF 600

## 3. Use Agency Specification based on the requirement

## Lighting Surge Specifications

Surges are short-duration increases in system voltage due to external events, such as lightning

| Telcordia                   | First Level | First Level | First Level | First Level | First Level | Second Level |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| GR-1089                     | Test 1      | Test 2      | Test 3      | Test 4      | Test 5      | Test 1       |
| Surge Voltage [V]           | 600         | 1000        | 1000        | 2500        | 1000        | 5000         |
| Surge Current [A]           | 100         | 100         | 100         | 500         | 25          | 500          |
| Waveform [us]               | 10x1000     | 10x360      | 10x1000     | 2x10        | 10x360      | 2x10         |
| Repetitions [each polarity] | 25          | 25          | 25          | 10          | 5           | 1            |
| 2000.0010.xx, 0.5 A         | *           | *           | *           | *           | ✓           |              |
| 2000.0011.xx, 1.25 A        | ✓           | ✓           | ✓           | ✓           | ✓           | ✓            |
| 2000.0012.xx, 2.0 A         | ✓           | ✓           | ✓           | ✓           | ✓           | ✓            |

■ Equipment under test can not be damaged & must continue to operate properly

\* If sufficient series resistance is used, the 0.5 A fuse may pass Test 1-4

| TIA-968-A                   | Type A    | Type A       | Type B   | Type B       | ITU-T K.20                  | Test   |
|-----------------------------|-----------|--------------|----------|--------------|-----------------------------|--------|
| (former FCC Part 68)        | Metallic  | Longitudinal | Metallic | Longitudinal |                             |        |
| Surge Voltage [V]           | 800       | 1500         | 1000     | 1500         | Surge Voltage [V]           | 1000   |
| Surge Current [A]           | 100       | 200          | 25       | 37.5         | Surge Current [A]           | 67     |
| Waveform [us]               | 10x560    | 10x160       | 5x320    | 5x320        | Waveform [us]               | 10x700 |
| Repetitions [each polarity] | 1         | 1            | 1        | 1            | Repetitions [each polarity] | 10     |
| 2000.0010.xx, 0.5 A         | Fuse open | Fuse open    | ✓        | ✓            | 2000.0010.xx, 0.5 A         | 26 A*  |
| 2000.0011.xx, 1.25 A        | ✓         | ✓            | ✓        | ✓            | 2000.0011.xx, 1.25 A        | ✓      |
| 2000.0012.xx, 2.0 A         | ✓         | ✓            | ✓        | ✓            | 2000.0012.xx, 2.0 A         | ✓      |

■ Fuse can not open during type B events

■ Fuse does not open during test

\* If sufficient series resistance is used, the 0.5 A fuse may pass

## Power Cross Specifications

A power-cross is an instance where a high-voltage circuit is inadvertently connected to a low-voltage circuit; for example, a power line can fall onto a telephone line during a storm initiating a power-cross event.

| Telcordia            | First Level | First Level | First Level   | First Level | First Level | First Level | First Level | First Level | First Level |
|----------------------|-------------|-------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|
| GR-1089              | Test 1      | Test 2      | Test 3        | Test 4      | Test 5      | Test 6      | Test 7      | Test 8      | Test 9      |
| Voltage [Vrms]       | 50          | 100         | 200, 400, 600 | 1000        | see GR-1089 | 600         | 440         | 600         | 1000        |
| Overload Current [A] | 0.33        | 0.17        | 1             | 1           |             | 0.5         | 2.2         | 3           | 5           |
| Duration             | 15 min.     | 15 min.     | 60x1 s        | 60x1 s      | 60x5 s      | 30 s        | 5x2 s       | 1.1 s       | 0.5 s       |
| 2000.0010.xx, 0.5 A  |             |             |               |             |             |             |             |             |             |
| 2000.0011.xx, 1.25 A | ✓           | ✓           | ✓             | ✓           | ✓           | ✓           | ✓           | ✓           | ✓           |
| 2000.0012.xx, 2.0 A  | ✓           | ✓           | ✓             | ✓           | ✓           | ✓           | ✓           | ✓           | ✓           |

■ Fuse not allowed to open

| Telcordia            | Second Level | Second Level | Second Level | Second Level | Second Level | ITU-T K.20           | Power     | Power     |
|----------------------|--------------|--------------|--------------|--------------|--------------|----------------------|-----------|-----------|
| GR-1089              | Test 1       | Test 2       | Test 3       | Test 4       | Test 5       |                      | Induction | Induction |
| Voltage [Vrms]       | 120, 277     | 600          | 600          | 100-600      | see GR-1089  | Voltage [Vrms]       | 300       | 250       |
| Overload Current [A] | 25           | 60           | 7            | 2.2          |              | Current [A]          | 0.5       | 60        |
| Duration             | 15 min.      | 5 s          | 5 s          | 15 min.      | 15 min.      | Duration             | 200 ms    | 15 min.   |
| 2000.0010.xx, 0.5 A  | ✓            | ✓            | ✓            | ✓            | ✓            | Repetitions          | 5         | 1         |
| 2000.0011.xx, 1.25 A | ✓            | ✓            | ✓            | ✓*           | ✓            | 2000.0010.xx, 0.5 A  | ✓         | ✓*        |
| 2000.0012.xx, 2.0 A  | ✓            | ✓            | ✓            | ✓*           | ✓            | 2000.0011.xx, 1.25 A | ✓         | ✓*        |
|                      |              |              |              |              |              | 2000.0012.xx, 2.0 A  | ✓         | ✓*        |

■ Fuse opens in a safe and controlled manner before wiring simulator fuse (MDL 2.0)

\* Fuse does not open during test

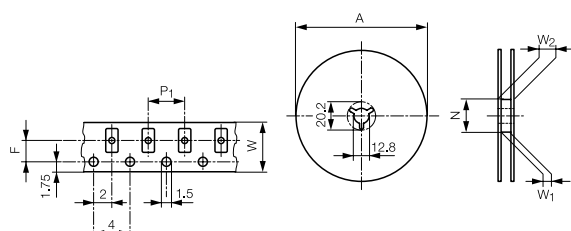
■ Fuse does not open during test

\* Fuse opens during test

| UL 60950             | Longitudinal | Longitudinal | Longitudinal | Longitudinal | Longitudinal | Metallic | Metallic | Metallic | Metallic |
|----------------------|--------------|--------------|--------------|--------------|--------------|----------|----------|----------|----------|
| IEC 60950            | Test 1       | Test 2       | Test 3       | Test 4       | Test 5       | Test 1   | Test 2   | Test 3   | Test 4   |
| Voltage [V]          | 600          | 600          | 600          | 200          | 120          | 600      | 600      | 600      | 600      |
| Current [A]          | 40           | 7            | 2.2          | 2.2          | 25           | 40       | 7        | 2.2      | 2.2      |
| Time                 | 1.5 s        | 5 s          | 30 min.      | 30 min.      | 30 min.      | 1.5 s    | 5 s      | 30 min.  | 30 min.  |
| 2000.0010.xx, 0.5 A  | ✓            | ✓            | ✓            | ✓            | ✓            | ✓        | ✓        | ✓        | ✓        |
| 2000.0011.xx, 1.25 A | ✓            | ✓            | ✓*           | ✓*           | ✓            | ✓        | ✓        | ✓*       | ✓*       |
| 2000.0012.xx, 2.0 A  | ✓            | ✓            | ✓*           | ✓*           | ✓            | ✓        | ✓        | ✓*       | ✓*       |

■ Fuse opens in a safe and controlled manner before wiring simulator fuse (MDL 2.0)

\* Fuse does not open during test



## Blistertape and Reel Dimensions

according to IEC 60286-3

| Type   | P1 [mm] | F [mm] | W [mm] | N [mm] | W1 [mm] | W2 [mm] | A [mm]   |
|--------|---------|--------|--------|--------|---------|---------|----------|
| TF 600 | 8       | 11.5   | 24     | 62     | 24.4    | 30.4    | 330 Pcs. |

**TF 600**

