



Fundamentals of Telecom Surface-mount Fuses

The Problem of Overcurrents

An overcurrent is an abnormally high current that has the potential to cause failure in an electrical circuit. Overcurrent events can be caused by various events such as fluctuations in the power source or a decrease in load impedance.

Power-line overvoltages may arise from power crosses, surges, transients or swells, and can result in overcurrent events.

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.

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

Transients are short-duration increases in system voltage due to the emptying of a circuit energy-storage element, such as a capacitor.

Swells are relatively long-duration increases in system voltage, generally caused by a failure in the system, such as the loss of the neutral connection at the grid transformer.

Overcurrent Protection Using a Telecom Surface-mount Fuse

As opposed to resettable PTC devices, the telecom surface-mount fuses are devices that are no longer operational after activation. The fuses are placed in series in the circuit and protect it by going from a low resistance link to an open circuit in response to

an overcurrent. When used in networking equipment operator intervention will be required after a fault occurs.

Device Construction

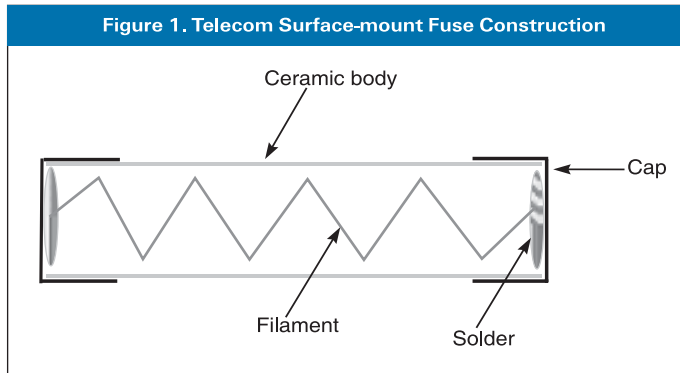
Raychem Circuit Protection telecom surface-mount fuse devices are built as described in Figure 1. A metallic filament is placed inside a ceramic body ended with two metallic caps. The filament and the end caps are soldered together.

Device Design Parameters

Fuses, in general, are characterized by a nominal current below which they do not interrupt the circuit operation. In telecom applications, since the fuses are nonresettable devices, it is critical that they remain transparent during short pulses such as lightning surges. Fuse devices designed around these requirements are commonly referred to as "slow blow" fuses. Raychem Circuit Protection telecom surface-mount fuses are designed with high enough I^2t ratings to meet, or exceed, applicable lightning surge standards (GR-1089 and TIA-968- A) for telecommunications equipment in North America.

Agency Requirements

Raychem Circuit Protection telecom surface-mount fuses are designed to help telecom network and CPE equipment manufacturers meet stringent requirements of Telcordia GR-1089, UL60950 and TIA-968-A. These fuses are designed to remain transparent (not activated) to lightning surges as described in Telcordia GR-1089 and TIA-968, (formerly FCC Part 68). They are designed to open under AC power cross faults which reach high enough I^2t levels.



Raychem Circuit Protection Products

308 Constitution Drive, Building H Tel : (800) 227-7040, (650) 361-6900
Menlo Park, CA USA 94025-1164 Fax : (650) 361-4600

www.circuitprotection.com
www.circuitprotection.com.hk (Chinese)
www.tycoelectronics.com/japan/raychem (Japanese)

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