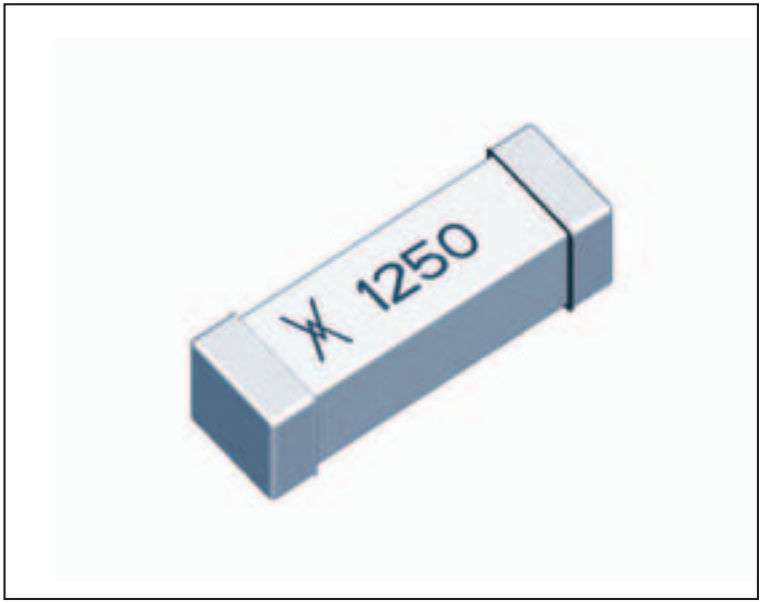
New Surface-mount Telecom Fuse for Overcurrent Protection of Telecommunications Equipment

Non-resettable Fuse Devices

The new FT600 fuse series is designed to assist telecommunications equipment manufacturers in complying with North American overcurrent protection requirements, including Telcordia GR-1089, TIA-968-A (formerly FCC Part 68), and UL60950 3rd edition.

The low profile and small footprint of the FT600 fuse provide a reliable, non-resettable overcurrent protection solution. The device offers low temperature-rise performance under sneak current fault events to prevent damage to circuit traces or multilayer boards. When used in conjunction with SiBar™ thyristor devices, it provides designers with a complete overcurrent/overvoltage protection solution to help them comply with regulatory standards.

This new fuse offering complements the telecom resettable PolySwitch device series for use in applications where intervention is desired after an overcurrent fault.



Benefits:

- High density placement in multi-port system designs
- Improved temperature rise performance over other similar SMT fuse devices under sneak-current testing
- In conjunction with a SiBar overvoltage protection device, assists the FT600 designers in meeting regulatory standards with no additional series components

Features:

- Low profile and small footprint
- The lightning robust surface-mount fuse offers overcurrent protection in case of power fault events
- Enables the design of equipment complying with applicable telecom specifications including UL60950, TIA-968-A (formerly FCC Part 68), and Telcordia GR-1089
- Low resistance

Target Applications:

- ADSL, ADSL2, ADSL2plus, SHDSL, VDSL linecards and modems
- T1/E1 systems
- Twisted-pair telecom ports requiring Telcordia GR-1089, UL60950 and FCC Part TIA-968-A (formerly FCC Part 68) compliance

Products in this section are grouped by:

Telecom Standards and Nominal Current

Selection Table for Telecom Surface-mount Fuses

Step 1. Review the Protection Application Guide on page 331 which is based on the agency specification required to qualify the final equipment.

Use the selection guide to narrow your product selection based on key device characteristics.

Step 2. Define your selection criteria and choose the appropriate nominal current device.

Step 3. Independently evaluate and test the device.

Telecom surface-mount fuses assist your telecommunications equipment in meeting agency requirements. To confirm your selection, independently evaluate and test the device to the application requirements.

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Protection Application Guide for Telecommunications and Networking Devices

To use this guide, follow the steps below:

1. Select your equipment type from the guide below.
2. Use the Key Device Selection Criteria (time-to-open, surface temperature) to determine best suitability for your application.
3. Use Agency Specification / Selection Guide on the next page to select a specific part number for each application based on the agency requirements.

		Key Device Selection Citeria		
Application	**Specification**	**Faster Time-To-Open**	**Cooler Surface Temperature**	**SiBar Thyristor Surge Protectors[1]**
Customer premises equipment, IT equipment Analog modems, V.90 modems, ISDN modems, xDSL modems, ADSL splitters, phone sets, fax machines, answering machines, caller ID, internet appliances, PBX systems, POS terminals, wall plugs	UL 60950 TIA-968-A	FT600-0500 FT600-1250	FT600-2000	TVBxxxSC
Access network equipment Remote terminals, line repeaters, multiplexers, cross-connects, WAN equipment	Telcordia GR-1089 TIA-968-A	FT600-1250	FT600-2000	TVBxxxSC
Central office switching equipment Analog/POTS linecards, ISDN linecards, xDSL modems, ADSL/VDSL splitters, T1/E1 linecards, multiplexers, CSU/DSU, servers	Telcordia GR-1089 TIA-968-A	FT600-1250	FT600-2000	TVBxxxSC

Notes: This list is not exhaustive. Raychem Circuit Protection welcomes our customers' input for additional application ideas for overcurrent protection of Telecom applications.
[1]For more information on Raychem Circuit Protection SiBar thyristor surge protectors, refer to the SiBar product section on page 339.

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Agency Specification/Selection Guide for FT600 Devices

Use the guide below to select FT600 devices appropriate for use in your application. The following pages contain specifications for part numbers recommended below. FT600 devices enable telecommunication equipment in meeting the applicable protection requirements of these industry specifications. Refer to individual agency specifications for test procedures and circuit schematics. Users should independently evaluate the suitability of, and test each product for their application.

Family	Product	Lightning	Power Cross
FT600	**FT600-050**	TIA-968-A (formerly FCC Part 68) - Type A & B	UL60950, 3rd Ed. – 600VAC, 40A
	FT600-1250 **FT600-2000**	Telcordia GR-1089 – Level 1 and 2 TIA-968-A	Telcordia GR-1089 – 600 VAC, 40A UL60950

Notes:
Note: FT600-1250 and FT600-2000 are designed to assist equipment in complying with Telcordia GR-1089 specifications. In-circuit testing is strongly recommended.

The FT600-0500, FT600-1250 and FT600-2000 are designed to meet the UL60950 Power Cross and FCC TIA-968-A 68 lightning surge requirements. Note that Type A tests allow for an overcurrent protection component to fuse open during the surge.

Interrupt Voltage and Current Ratings

Part Number	Ampere Rating (A)	Voltage Rating (V)	Typical Resistance (Ω)	Typical I2t (A^2s)*
FT600-0500	0.50	250	0.5	1
FT600-1250	1.25	250	0.1	16
FT600-2000	2.00	250	0.05	18

The FT600-xxxx devices are designed to carry 100% of rated current for 4 hours minimum and 250% of rated current for 1 second minimum, 120 seconds maximum. Resistance measured at 10% of rated current.

*I^2t is calculated at 10 ms or less.

Figure 1. Thermal Derating

Figure 1. Thermal Derating Curve (Normalized)

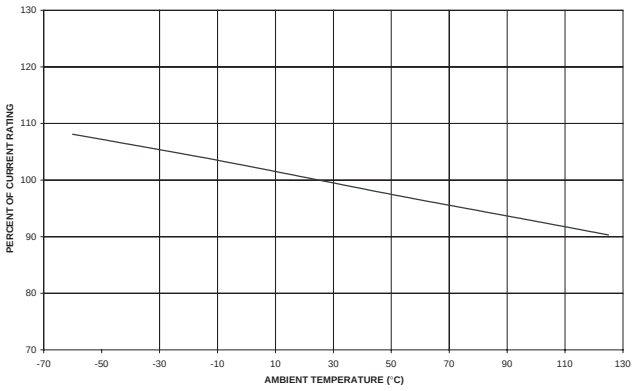

Figure 2. Physical Description for Dimensions for Telecommunications and Networking Devices

Figure F2. Product Dimensions

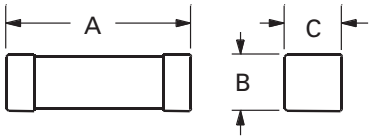

Table 1. Dimensions for FT600 Devices in Millimeters (Inches)

	Dimension						
	A		B		C		
Part Number	Min.	Max.	Min.	Max.	Min.	Max.	Figure
FT600							
FT600-050		10.5 (0.413)		3.4 (0.133)		3.4 (0.133)	F2
FT600-1250		10.5 (0.413)		3.4 (0.133)		3.4 (0.133)	F2
FT600-2000		10.5 (0.413)		3.4 (0.133)		3.4 (0.133)	F2

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Figures 3. Typical Time-to-open Characteristics (at 20°C) for FT600 Devices

FT600

A = FT600-0500

B = FT600-1250

C = FT600-2000

Figure F3

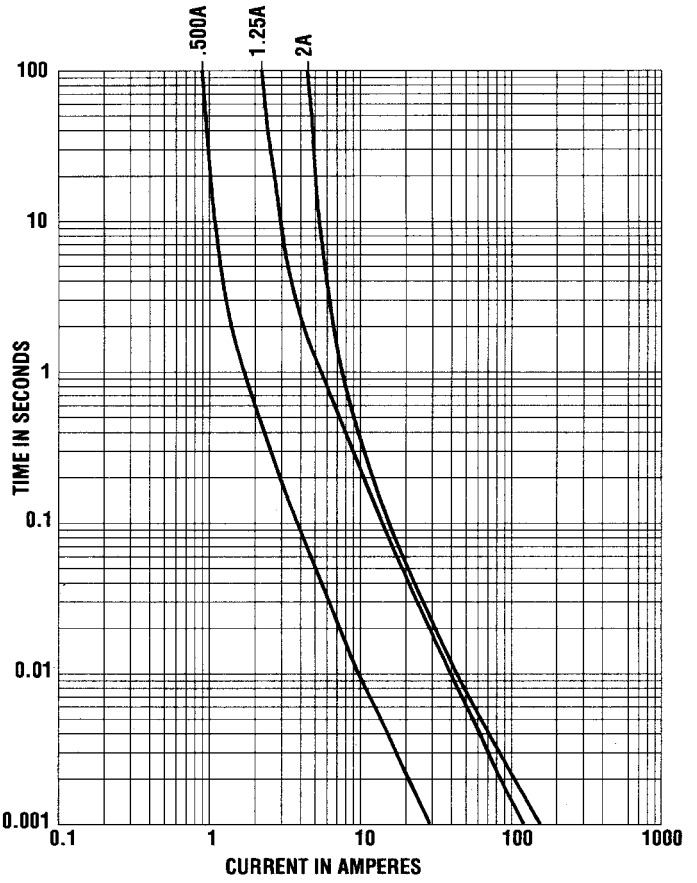

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Table 2. Physical Characteristics and Environmental Specifications for FT600 Devices*

FT600

Physical Characteristics

Terminal material	Silver-plated brass*
Body material	Ceramic
Termination solderability	Per IEC-60127-4

***FT600 devices use high Pb content solder for internal construction. They are RoHs compliant.

Environmental Specifications

Test	Conditions
Solder heat withstand	Per MIL-STD-202, Method 210, Test Condition J
Solvent resistance	Per MIL-STD-202F, Method 215J
Storage temperature	-40/+85°C
Storage humidity	Per MIL-STD-202F, Method 106F

Table 3. Packaging and Marking Information for FT600 Devices

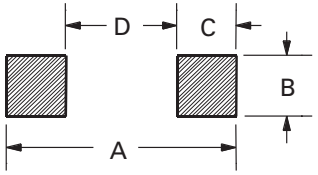
Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package	Part Marking	Agency Recognition
Chip—60/250 TC250/TCF250					
FT600-0500-2	—	2,500	10,000	500	UL, CSA
FT600-1250-2	—	2,500	10,000	1250	UL, CSA
FT600-2000-2	—	2,500	10,000	2000	UL, CSA

Notes: The -2 designates tape and reel, the package style for this product.

Table 4. Recommended Pad Layouts for FT600 Devices in millimeters (inches) Nominal

Device	A	B	C	D	Figures for Dimensions
FT600-050	12.6 (0.496)	4.0 (0.157)	3.7 (0.145)	5.2 0.204	4
FT600-1250	12.6 (0.496)	4.0 (0.157)	3.7 (0.145)	5.2 0.204	4
FT600-2000	12.6 (0.496)	4.0 (0.157)	3.7 (0.145)	5.2 0.204	4

Figure 4



Solder Reflow and Rework Recommendations for FT600 Devices

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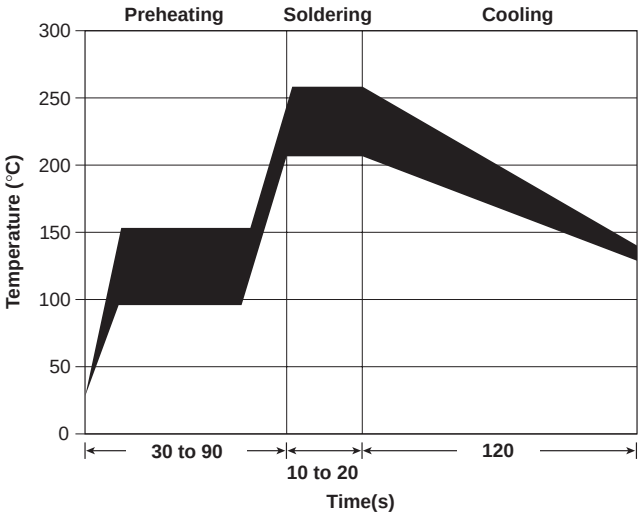
Solder Reflow:

- Recommended reflow methods: IR, vapor phase oven, hot air oven
- Devices can be cleaned using standard industry methods and solvents

Rework:

- If a device is removed from the board, it should be discarded and replaced by a new device

Figure 5



CAUTION:

- If reflow temperatures exceed recommended profile, devices may not meet the performance requirements.

Table 5. Tape and Reel Specifications for FT600 Devices

Dimension Description	EIA Mark	Dimension (mm)	Tolerance
Carrier tape width	W	24	±0.3
Sprocket hole pitch	P0	4	±0.1
	P_1	8	±0.1
	P_2	2	±0.1
	A0	3.3	±0.1
	B0	10.44	±0.1
	B_1 max.	11.24	
Sprocket hole diameter	D0	1.5	±0.1 – 0.0
	F	11.5	±0.1
	E_1	1.75	±0.1
	E_2 min.	22.25	
Tape thickness	T max.	0.35	
Tape thickness with splice	T_1 max.	0.1	
	K0	3.25	±1.0
	Leader min.	400	
	Trailer min.	160	
Reel Dimensions			
Reel diameter	A max.	330	
Core diameter	N min.	95	
Space between flanges less devices	W_1	24.4	±2.0 – 0.0
Reel width	W_2 max.	30.4	

Figure 6. EIA Referenced Taped Component Dimensions for FT Devices

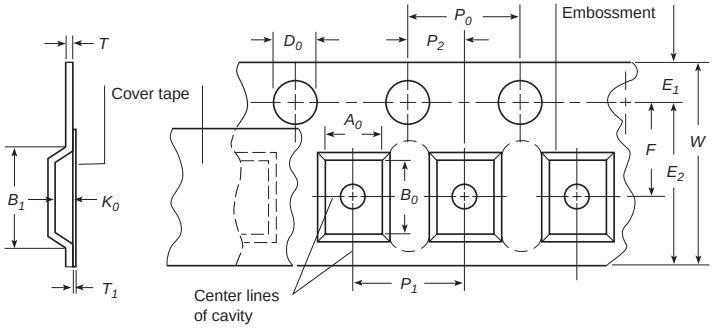
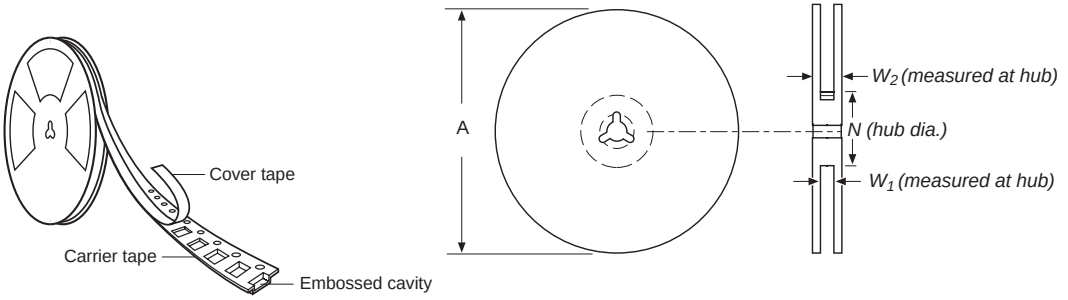


Figure 7. EIA Referenced Reel Dimensions for FT Devices



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Latest Information

- Please visit us at www.circuitprotection.com or contact your local representative for the latest information.
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