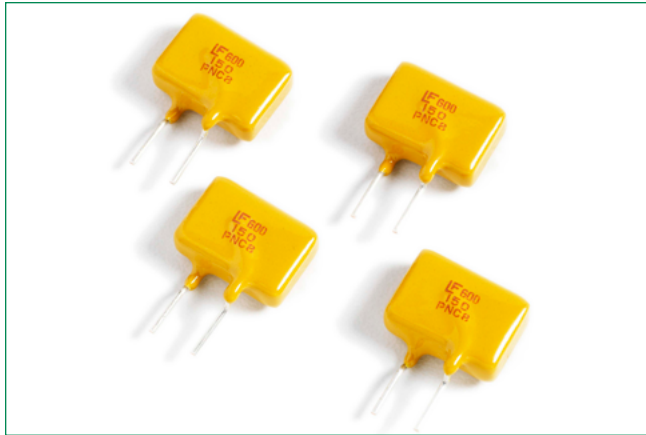


600R Series



Description

The 600R Series is designed to protect against power fault events typically found in telecom applications. This series is designed to be used in applications that need to meet the requirements of GR-1089-CORE and UL60950/EN60950/IEC60950. These resettable devices also help to meet the requirements of ITU K.20, K.21 and K.44.

Features

- 0.15 – 0.16A hold current range, 60VDC operating voltage
- 600VAC interrupt rating
- Fast time-to-trip
- Binned and sorted narrow resistance ranges available
- RoHS compliant, Lead-Free and Halogen-Free*

Applications

- Secondary overcurrent protection for:
- Central Office Equipment (CO)
 - Customer Premises Equipment (CE)
 - Alarm systems
 - Set Top Boxes (STB)
 - Voice over IP (VOIP)
 - Subscriber Line Interface Circuit (SLIC)

Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E183209 |
| | R50120008 |

Additional Information



Datasheet



Resources



Samples

Electrical Characteristics

| Part Number | I _{hold} (A) | I _{trip} (A) | V _{int} ^{max} / V _{op} | I _{max} (A) | P _d typ. (W) | Maximum Time To Trip | | Resistance | | | Agency Approvals | |
|-------------|-----------------------|-----------------------|---|----------------------|-------------------------|----------------------|-------------|----------------------|----------------------|-----------------------|------------------|---|
| | | | | | | Current (A) | Time (Sec.) | R _{min} (Ω) | R _{typ} (Ω) | R _{1max} (Ω) | | |
| 600R150 | 0.15 | 0.30 | 600/60 | 3 | 1.00 | 1 | 4 | 6 | 10 | 17 | X | X |
| 600R150-RA | 0.15 | 0.30 | 600/60 | 3 | 1.00 | 1 | 4 | 7 | 10 | 20 | X | X |
| 600R150-RB | 0.15 | 0.30 | 600/60 | 3 | 1.00 | 1 | 3 | 9 | 12 | 22 | X | X |
| 600R160 | 0.16 | 0.32 | 600/60 | 3 | 1.00 | 1 | 10 | 4 | 10 | 18 | X | X |

CAUTION: Operation beyond the specified rating may result in damage and possible arcing and flame.

- I_{hold} = Hold current: maximum current device will pass without tripping in 20°C still air.
- I_{trip} = Trip current: minimum current at which the device will trip in 20°C still air.
- V_{int}^{max} = Maximum voltage the device can withstand without damage at rated current (I_{max})
- V_{op} = The device regular operation voltage
- I_{max} = Maximum fault current device can withstand without damage (V_{max})
- P_d = Power dissipated from device when in the tripped state at 20°C still air.

- R_{min} = Minimum resistance of device in initial (un-soldered) state.
- R_{typ} = Typical resistance of device in initial (un-soldered) state.
- R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping.

* Effective February 11, 2010 onward, all 600R PTC products will be manufactured Halogen Free (HF). Existing Non-Halogen Free 600R PTC products may continue to be sold, until supplies are depleted. This change will have no effect on 600R product specifications or performance.

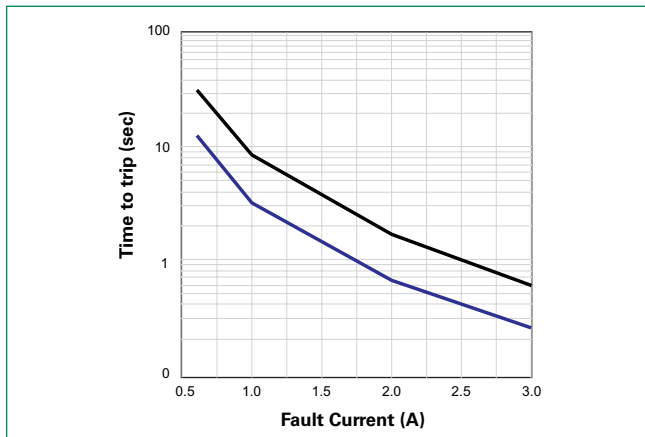
WARNING

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

Temperature Derating

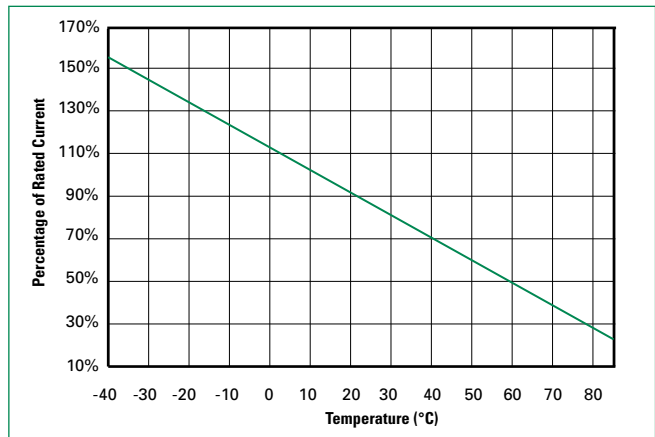
| Part Number | Ambient Operation Temperature | | | | | | |
|-------------|-------------------------------|-------|-------|-------|-------|-------|------|
| | -40°C | -20°C | 0°C | 23°C | 40°C | 60°C | 85°C |
| 600R150 | 0.241 | 0.219 | 0.183 | 0.150 | 0.129 | 0.102 | 0.74 |
| 600R160 | 0.274 | 0.244 | 0.206 | 0.160 | 0.135 | 0.093 | 0.44 |

Average Time Current Curves



The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

Temperature Derating Curve



Note: Typical Temperature derating curve, refer to table for derating data

Agency Specification Selection Guide For Telecom and Networking Applications

| Part Number | Lightning | Power Cross |
|-------------|--|-----------------------------------|
| 600R150 | TIA-968-A – 1.5kV 10/160µs 800V 10/560µs | UL60950, 3rd Ed – 600Vac |
| 600R160 | Telcordia GR 1089 – 1.0kV 10/1000µs 2.5kV 2/10µs | Telcordia GR – 1089 – 600Vac, 60A |

Note: Devices should be independently evaluated and tested for use in any specific application

Protection Application Guide

| Region/Specification | Application | Device Selection |
|--|--|--------------------|
| North America Telcordia GR-1089 | *Access network equipment Remote terminal Repeaters WAN equipment Cross -connect | 600R150 600R160 |
| North America TIA-968-A, UL60950 | Customer and IT equipment Analog modems ADSL, XDSL modems, Phone sets, PBX systems, Internet appliances, POS terminals | 600R150 600R160 |
| North America Telcordia GR-1089 | Central Office, POTS/ISDN linecards, T1/E1/J1 linecards, ADSL/VDSL splitters, CSU/DSU | 600R150 600R160 |
| North America Telcordia GR-1089 | *Intrabuilding communication systems, LAN, VOIP cards, Local loop handsets, | 600R150 600R160 |
| South America/Asia/Europe ITU K.20 and K.21 | | |

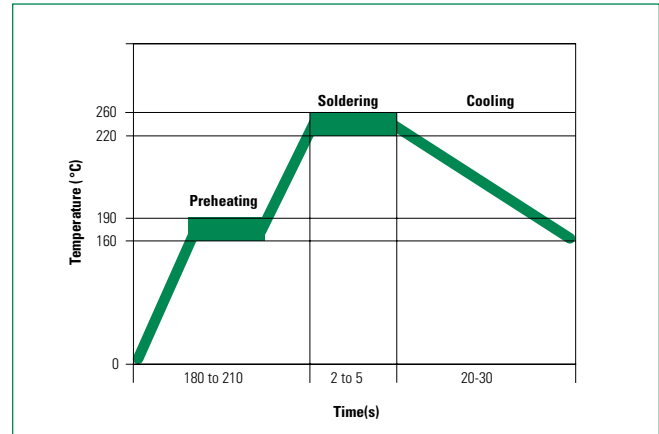
*Resistance binned parts are recommended

Soldering Parameters - Wave Soldering

| | |
|---------------------------------|-------------------|
| Condition | Wave Soldering |
| Peak Temp/ Duration Time | 260°C ≤ 5 Sec |
| ≥ 220°C | 2 Sec ~ 20 Sec |
| Preheat 140°C~ 180°C | 180 Sec ~ 210 Sec |
| Storage Condition | 0°C~35°C, ≤ 70%RH |

Note:

- Recommended soldering methods: heat element oven or N₂ environment for lead-free
- Devices are designed to be wave soldered to the bottom side of the board.
- Devices can be cleaned using standard industry methods and solvents.
- This profile can be used for lead-free device
- If soldering temperatures exceed the recommended profile, devices may not meet the performance requirements.



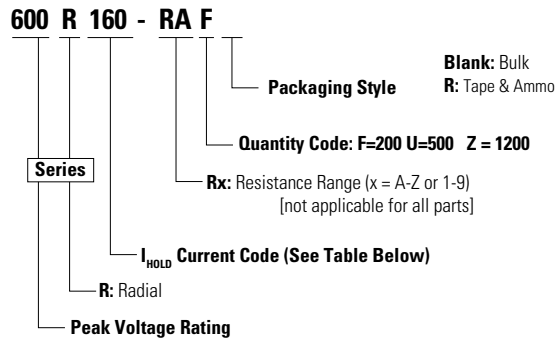
Physical Specifications

| | |
|----------------------------------|--|
| Lead Material | Tin-plated Copper |
| Soldering Characteristics | Solderability per MIL-STD-202, Method 208 |
| Insulating Material | Cured, flame retardant epoxy polymer meets UL94V-0 requirements. |
| Device Labeling | Marked with 'LF', voltage, current rating, and date code. |

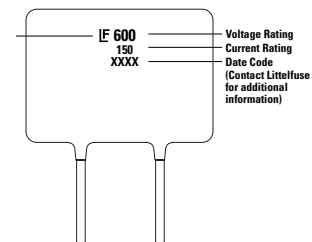
Environmental Specifications

| | |
|--|---|
| Operating/Storage Temperature | -40°C to +85°C |
| Maximum Device Surface Temperature in Tripped State | 125°C |
| Passive Aging | 85°C/85%RH, 1000 hours |
| Humidity Aging | +85°C, 85% R.H., 1000 hours |
| Thermal Shock | MIL-STD-202, Method 107 +125°C to -55°C 10 times |
| Solvent Resistance | MIL-STD-202, Method 215 |

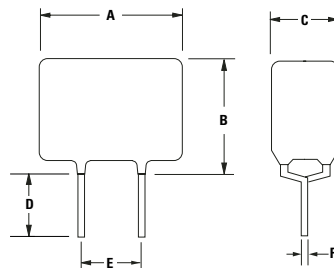
Part Ordering Number System



Part Marking System



Dimensions



| Part Number | A | | B | | C | | D | | E | | Physical Characteristics | | |
|-------------|--------|------|--------|------|--------|------|--------|------|--------|------|--------------------------|------|----------|
| | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Lead (dia) | | Material |
| | Max. | Max. | Max. | Max. | Max. | Max. | Min. | Min. | Typ. | Typ. | Inches | mm | |
| 600R150 | 0.35 | 9 | 0.49 | 12.5 | 0.18 | 4.6 | 0.19 | 4.7 | 0.20 | 5.1 | 0.026 | 0.65 | Sn/Cu |
| 600R150-RA | 0.35 | 9 | 0.49 | 12.5 | 0.18 | 4.6 | 0.19 | 4.7 | 0.20 | 5.1 | 0.026 | 0.65 | Sn/Cu |
| 600R150-RB | 0.35 | 9 | 0.49 | 12.5 | 0.18 | 4.6 | 0.19 | 4.7 | 0.20 | 5.1 | 0.026 | 0.65 | Sn/Cu |
| 600R160 | 0.63 | 16 | 0.50 | 12.6 | 0.24 | 6 | 0.19 | 4.7 | 0.20 | 5.1 | 0.026 | 0.65 | Sn/Cu |