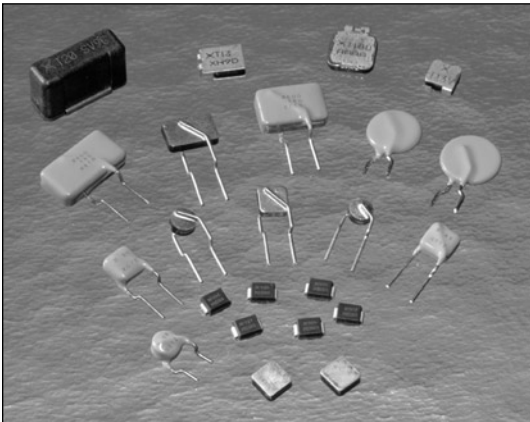


PolySwitch Telecom and Network Resettable Fuses



PolySwitch® devices for telecommunication and networking applications were initially designed over ten years ago to meet the growing demand for resettable overcurrent protection. These product families provide protection against power cross and power induction surge as defined in ITU, Telcordia, and UL. Available in chip, surface mount, and radial leaded configurations, PolySwitch devices help improve the reliability of customer premise and network equipment world wide.

Applications:

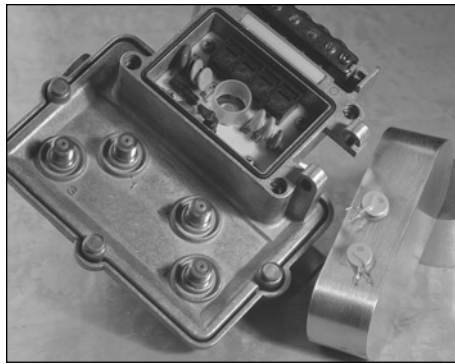
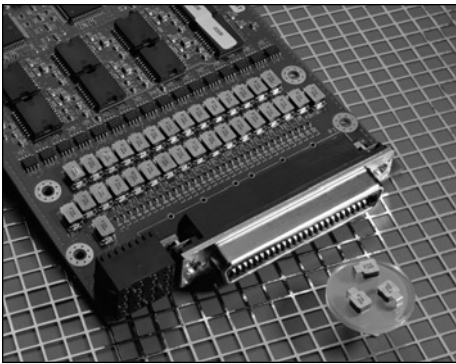
- Modems
- Phone sets
- Fax machines
- Phone wall outlets
- Alarm systems
- PBX systems
- MDF modules
- Analog and digital line cards
- T1/E1 equipment
- xDSL modems and splitters
- Powered Ethernet systems
- VoIP (Voice over IP equipment)
- LAN, WAN equipment
- Customer premise equipment
- Access network hardware

Features:

- Resettable overcurrent protection
- Surface mount, radial leaded, and chip form factors
- Fast time to trip
- Agency recognition, UL, CSA, TUV
- Resistance sorted and matched devices available
- Low parasitic capacitance / flat impedance with frequency

Benefits:

- Many product choices give engineers more design flexibility
- Compatible with high volume electronics assembly
- Assists in meeting regulatory requirements
- Improved line balance
- Applicable for legacy POTS and modern digital communications equipment



Among the new products featured within are:

TSV

A new surface mount device which occupies less board space for ITU applications.

TSL

A new surface mount device specifically designed to meet Telcordia intrabuilding specifications for VoIP applications and other LAN equipment.

TSU600

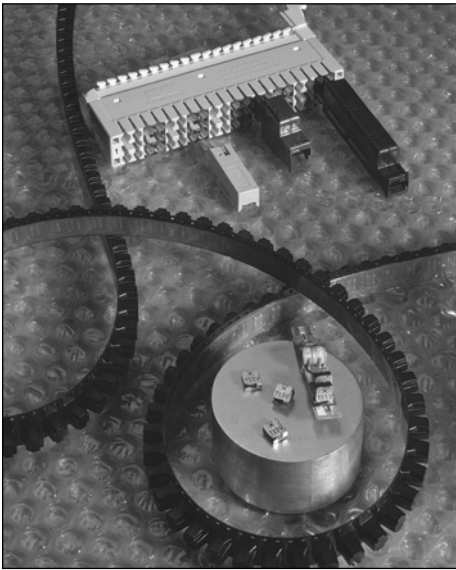
A new surface mount device designed to meet UL1950/7A Mini PCI and compact modem applications.

BBR550/BBR750

Two new radial leaded devices to meet broadband cable tap and set-top box applications.

SMD030-2018

A new surface mount product specifically designed for powered Ethernet applications.



Selection guide for telecom devices

- Step 1. Review the equipment specification table on the following page based on the agency specification required to qualify the final equipment.**

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

- Step 2. Verify that the PolySwitch device hold current will accommodate the telecom circuit's maximum ambient temperature and normal operating current.**

Look across the top of the Thermal Derating Table on page 4 to find the temperature that most closely matches the circuit's maximum operating temperature. Look down that column to find the value equal to or greater than the circuit's normal operating current. Now look to the far left of that row to find the part number for the PolySwitch telecom device that will best accommodate the circuit.

Note:

The Thermal Derating Curves located in figure T1 are the normalized representations of the data in the Thermal Derating Table.

- Step 3. Verify that the time to trip characteristic of the chosen device meets the protection requirements of the telecommunications equipment circuit.**

Time to trip is the amount of time it takes for a device to switch to a high resistance state once a fault current has been applied across the device. Identifying the PolySwitch device's time to trip is important in order to provide the desired protection capabilities. If the device you choose trips too fast, undesired or nuisance tripping will occur. If the device trips too slowly, the components being protected may be damaged before the device switches to a high resistance state.

Refer to typical time to trip curves for each of the possible PolySwitch devices.

If the PolySwitch device time to trip is too fast or too slow for the circuit, go back to Step 2 and choose an alternate device.

- Step 4. Verify ambient operating condition.**

Ensure that your application's minimum and maximum ambient temperatures are within the operating temperature of -40°C to 85°C.

- Step 5. Independently evaluate and test the device.**

PolySwitch devices can help your telecom equipment to meet agency requirements. To confirm your selection, independently evaluate and test the device to the application requirements.

Equipment/specification table

To use this guide, follow the steps below:

1. Select your equipment type from the list on the left side of the equipment/protection application table.
2. Select the type of protection depending on the agency and regional specifications in the second column.
3. Note the Key Device Selection Criteria (Size, Resistance, Time to trip) to determine best suitability for your application.
4. Use the table on the next page (Agency specification/PolySwitch telecom device selection) to select a specific part number for each application based on the agency requirements.

Application	Region/Specification	PolySwitch Resettable Fuses Key Device Selection Criteria			SiBar Thyristor Surge Protectors ¹
		Small Footprint	Low Resistance	Fast Time to Trip	
Customer premise 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	North America FCC Part 68, UL 1950, UL 1459	TR600-150 TS600-170	TR600-150-RA TS600-200-RA TSU600-180	TR600-150-RB TS600-170 TSU600-180	TVBxxxSA with TR/TS TVSxxxSC with fuse
	Europe/Asia/South America ITU K.21	TR250-120 TR250-145 TS250-130 TSV250-130	TR250-180U TS250-130-RA TSV250-130 TSU600-180	TR250-120T-R2 TS250-130-RB	TVBxxxSA
Access network equipment (*) Remote terminals, line repeaters, multiplexers, cross-connects, WAN equipment	North America Telcordia GR-1089	TR600-150-RA TS600-200-RA	TR600-160-RA TS600-200-RA	TR600-150-RB TS600-170	TVBxxxSC
	Europe/Asia/South America ITU K.45	TR250-120 TR250-145 TS250-130 TSV250-130	TR250-180U TS250-130-RA TSV250-130 TSU600-180	TR250-120T-R2 TS250-130-RB	TVBxxxSA
Central office switching equipment (*) Analog/POTS linecards, ISDN linecards, xDSL modems, ADSL/VDSL splitters, T1/E1 linecards, multiplexers, CSU/DSU, servers	North America Telcordia GR-1089	TR600-150-RA TS600-200-RA	TR600-160-RA TS600-200-RA	TR600-150-RB TS600-170	TVBxxxSC
	Europe/Asia/South America ITU K.20	TR250-120 TR250-145 TS250-130 TSV250-130	TR250-180U TS250-130-RA TSV250-130 TSU600-180	TR250-120T-R2 TS250-130-RB	TVBxxxSA
Primary protection modules (*) MDF modules, Network Interface Devices (NID)	North America Telcordia GR-974	TR250-180U	TR250-180U	TR250-180U	N/A
	Europe/Asia/South America ITU K.20	TGC250-120T TR250-120T TS250-130 TSV250-130	TGC250-145T TR250-145-RA TS250-130-RA TSV250-130	TGC250-120T TR250-120T-R2 TS250-130-RB	N/A
Short-haul/intrabuilding communications equipment (*) LAN equipment, VoIP cards, cable telephony NIU's, wireless local loop handsets	North America Telcordia GR-1089 intrabuilding	TSL250-080 TR250-120 TS250-130 TSV250-130	TR250-145 TR250-180U TS250-130-RA TSV250-130	TR250-120T-R2 TSL250-080	TVBxxxSA
	Europe/Asia/South America ITU K.21	TR250-120 TR250-145 TS250-130 TSV250-130	TR250-180U TS250-130-RA TSV250-130 TSU600-180	TR250-120T-R2 TS250-130-RB	TVBxxxSA
LAN intrabuilding power cross protection LAN equipment, VoIP cards, IP phones		TSL250-080	TSL250-080	TSL250-080	TVBxxxSA
IEEE 802.3 Power over LAN protection Powered Ethernet switches and terminals, IP phones, wireless LAN base stations, microcellular base stations, VoIP cards		miniSMDC014	SMD030-2018 SMD030	SMD030-2018	N/A
Cable telephony powering systems Power passing taps		BBR550	BBR750	BBR550	N/A

Note: This list is not exhaustive. Raychem Circuit Protection welcomes our customers' input for additional application ideas for PolySwitch resettable fuses. (*) For improved line balance in these applications, resistance binned parts are recommended. Use suffix -B-0.5 for binned parts.

Note 1 - For more information on Raychem SiBar[®] Thyristor surge protectors see the Raychem Circuit Protection Databook or the Raychem Circuit Protection website: www.circuitprotection.com.

Agency specification/PolySwitch telecom device selection

Use the table below to select the PolySwitch device which most closely fits your application criteria. The following pages contain the specifications for the part numbers recommended below. PolySwitch devices assist telecommunications equipment to meet the applicable protection requirements of these industry specifications. Refer to individual agency specifications for test procedures and circuit schematics.

Family	Product (*)	Lightning	Power Cross
TC250 TGC250	TGC250-120	ITU K.20/21/45 - 1.5kV 10/700µs	ITU K.20/21/45 - 230Vac, 10Ω
	TGC250-145	ITU K.20/21/45 - 4.0kV 10/700µs (**)	ITU K.20/21/45 - 600Vac, 600Ω
	TC250-180		
TR250	TR250-080U	ITU K.20 - 1.0kV 10/700µs	ITU K.20 - 230Vac, 10Ω
	TR250-080T		ITU K.20 - 600Vac, 600Ω
	TR250-110U	ITU K.20/21/45 - 1.5kV 10/700µs	ITU K.20/21/45 - 230Vac, 10Ω
	TR250-120	ITU K.20/21/45 - 4.0kV 10/700µs (**)	ITU K.20/21/45 - 600Vac, 600Ω
	TR250-120T		
	TR250-120U		
	TR250-120UT		
	TR250-145		
	TR250-145U		
	TR250-180U	ITU K.20/21/45 - 1.5kV 10/700µs ITU K.20/21/45 - 4.0kV 10/700µs (**) Telcordia GR-974 - 1.0kV, 10/1000µs	ITU K.20/21/45 - 230Vac, 10Ω ITU K.20/21/45 - 600Vac, 600Ω Telcordia GR-974 - 283Vac, 10A
TS250 TSV250	TS250-130	ITU K.20/21/45 - 1.5kV 10/700µs	ITU K.20/21/45 - 230Vac, 10Ω
	TSV250-130	ITU K.20/21/45 - 4.0kV 10/700µs (**)	ITU K.20/21/45 - 600Vac, 600Ω
TSL	TSL250-080	Telcordia GR-1089 Intrabuilding -Surge 1 & 2	Telcordia GR-1089 Intrabuilding - 120Vac, 25A ITU K.20/21/45 - 230Vac, 10Ω
TR600	TR600-150	Telcordia GR-1089 - Level 1 and 2 (***)	Telcordia GR-1089 - 600Vac, 60A
	TR600-160	FCC Part 68 - Type A and B	UL 1950, 3rd Ed. - 600Vac, 40A
TSU600	TSU600-180	FCC Part 68 - Type A and B	UL 1950, 3rd Ed. - 600Vac, 7A
		ITU K.20/21/45 - 1.5kV 10/700µs	ITU K.20/21/45 - 230Vac, 10Ω
		ITU K.20/21/45 - 4.0kV 10/700µs (**)	
TS600	TS600-170	Telcordia GR-1089 - Level 1 and 2 (***)	Telcordia GR-1089 - 600Vac, 60A
	TS600-200-RA	FCC Part 68 - Type A and B	UL 1950, 3rd Ed. - 600Vac, 40A

(*) Applies to all products which share the same prefix.

(**) Tested with 230V gas discharge tube primary protector.

(***) Recommend 10 Ohm series resistor for Test 3 (1kV, 10/1000µs).

Once a device is selected, suitability of the device in the specific application should be evaluated independently.

Referenced specifications are a sample list only. For detailed applications information, refer to the Application Notes section of the Raychem Circuit Protection Databook.

Voltage Rating for Telecom Devices

For Raychem Circuit protection telecom devices (TC, TGC, TRx, TSx) there are two applicable voltage ratings. These are **V_{max} Operating** and **V_{max} Interrupt**. To help understand the nature of these two different voltage ratings the following definitions are provided:

V_{max} Interrupt: Under specified conditions this is the highest voltage that can be applied to the device at the max current. Devices have been designed to trip safely under higher power level cross conditions, as listed above, to assist equipment in meeting the appropriate industry conditions.

V_{max} Operating: For telecom devices this is the voltage we have used to obtain component recognition under UL1434. Raychem Circuit Protection devices (TC, TGC, TRx, TSx) are certified at 60V but can withstand higher **V_{max} Interrupt** conditions as noted above.

For the purposes of this brochure we have included in the table of electrical ratings the more applicable **V_{max} Interrupt** value.



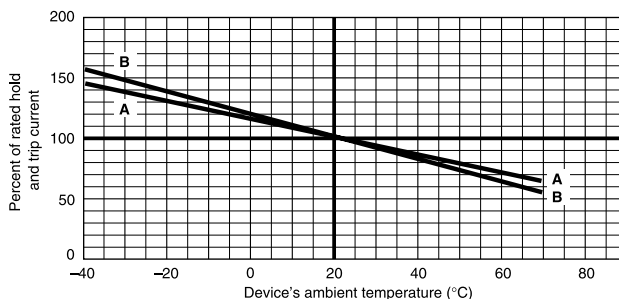
WARNING:

TR devices are not intended for continuous utility line voltage such as 120/220 V or 240 V.

Thermal derating [Hold current (A) at ambient temperature (°C)]

Figure T1 : Thermal Derating Curve (Normalized)

A = TR250-180U
B = All other "T" devices



For thermal derating of all non "T" parts see the appropriate section of BBR and RXE (radial leaded products), SMD and miniSMD (surface mount products) of the Raychem Circuit Protection Databook.

		Maximum Ambient Temperature								
		-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
Part Number		Amps								
Chip ¹ 60/250V	TC250									
	TGC250									
	TGC250-120T	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
	TGC250-145T	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
	TC250-180*	0.269	0.240	0.211	0.180	0.153	0.138	0.123	0.109	0.087
Leaded ¹ 60/250V	TR250									
	TR250-080	0.124	0.110	0.095	0.080	0.066	0.059	0.051	0.044	0.033
	TR250-110U	0.171	0.151	0.131	0.110	0.091	0.081	0.071	0.061	0.046
	TR250-120	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.060	0.050
	TR250-145	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
	TR250-180U*	0.269	0.240	0.211	0.180	0.153	0.138	0.123	0.109	0.087
Surface ² 80/250V NEW	TSL250									
	TSL250-080	0.124	0.110	0.095	0.080	0.066	0.059	0.051	0.044	0.033
Surface ¹ 60/250V NEW	TS250									
	TSV250									
	TS250-130	0.208	0.182	0.156	0.130	0.104	0.091	0.078	0.065	0.045
	TSV250-130	0.208	0.182	0.156	0.130	0.104	0.091	0.078	0.065	0.045
Leaded ³ 60/600V	TR600									
	TR600-150	0.233	0.206	0.178	0.150	0.124	0.110	0.096	0.083	0.062
	TR600-160	0.249	0.219	0.190	0.160	0.132	0.117	0.103	0.088	0.066
Surface ⁴ 60/600V NEW	TSU600									
	TSU600-180*	0.270	0.240	0.210	0.180	0.150	0.140	0.120	0.100	0.080
Surface ³ 60/600V NEW	TS600									
	TS600-170	0.230	0.218	0.178	0.150	0.124	0.110	0.096	0.090	0.062
	TS600-200-RA	0.310	0.275	0.238	0.200	0.165	0.147	0.128	0.110	0.083
Leaded 90 V NEW	BBR									
	BBR550*	0.850	0.750	0.650	0.550	0.450	0.400	0.350	0.300	0.220
	BBR750*	1.150	1.000	0.900	0.750	0.610	0.550	0.480	0.410	0.300
Leaded 60-72V	RXE									
	RXE010*	0.160	0.140	0.110	0.100	0.080	0.072	0.067	0.050	0.040
	RXE017*	0.260	0.230	0.210	0.170	0.140	0.120	0.110	0.090	0.070
	RXE020*	0.310	0.270	0.240	0.200	0.160	0.140	0.130	0.110	0.080
	RXE025*	0.390	0.340	0.300	0.250	0.200	0.180	0.160	0.140	0.100
	RXE030*	0.470	0.410	0.360	0.300	0.240	0.220	0.190	0.160	0.120
Surface 60 V NEW	SMD									
	SMD030*	0.420	0.380	0.320	0.300	0.240	0.220	0.190	0.170	0.140
	SMD030-2018*	0.480	0.420	0.350	0.300	0.230	0.200	0.170	0.140	0.010
Surface 60 V	miniSMD									
	miniSMD014*	0.230	0.190	0.170	0.140	0.120	0.100	0.090	0.080	0.060

Note 1 - 60/250V products are designed to help equipment pass ITU specifications (K20, K21, etc) and Telcordia Intra-building power cross

Note 2 - 80/250V products are designed to help equipment pass Telcordia GR-1089 Intra-building power cross (120AC/25A)

Note 3 - 60/600V products are designed to help equipment pass UL1950, FCC Part 68 and GR-1089 specifications

Note 4 - 60/600V products are designed to help equipment pass UL1950 7A max

*Product is not available in a resistance binned or sorted option.

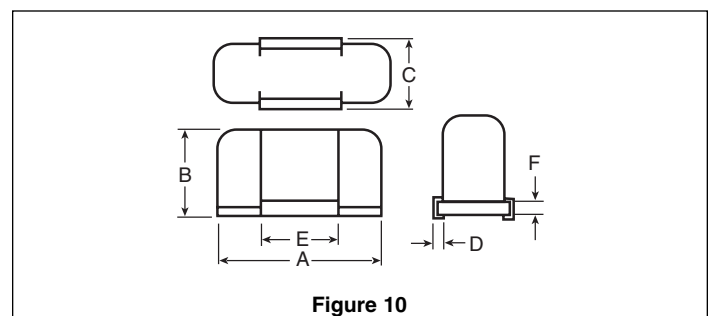
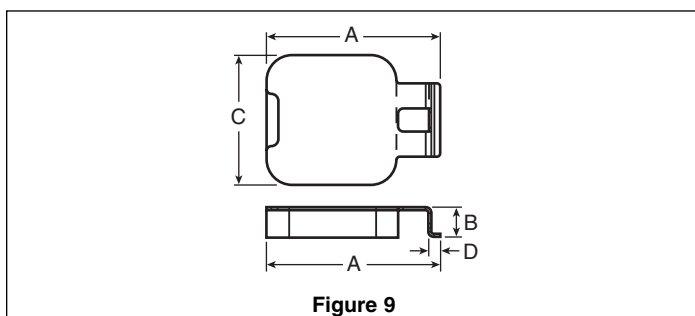
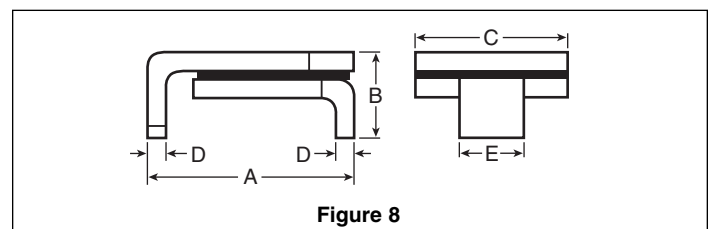
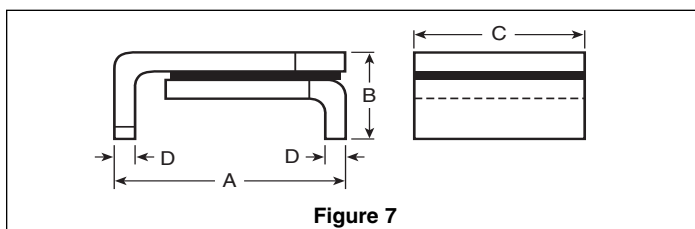
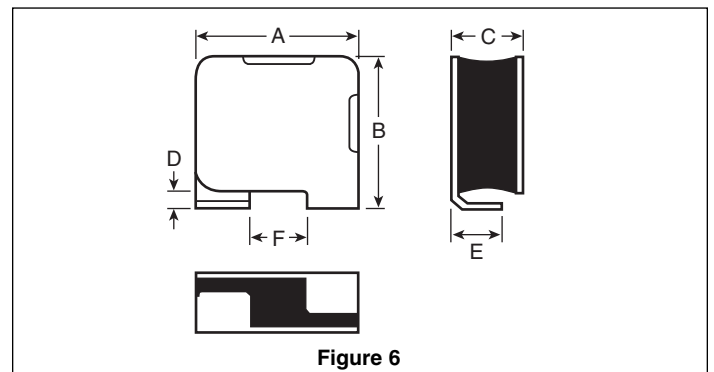
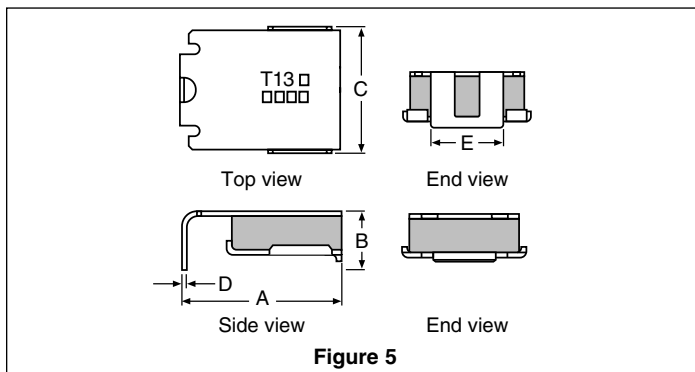
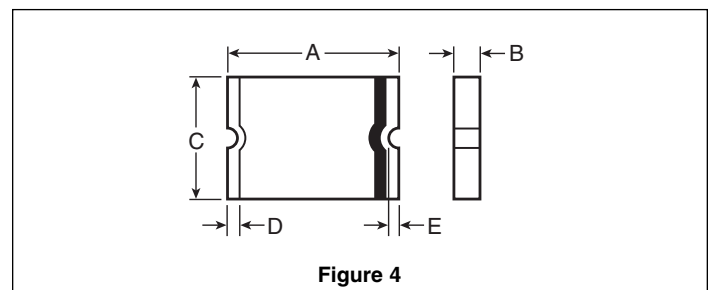
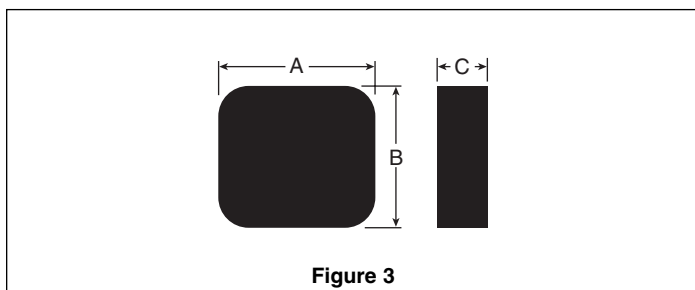
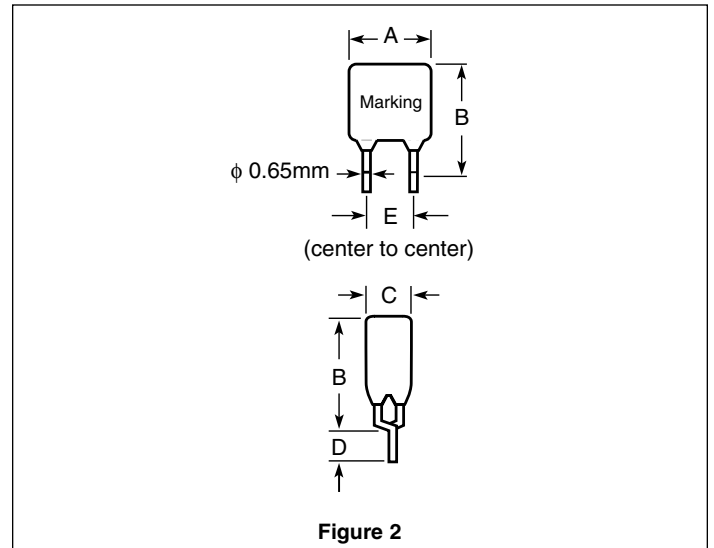
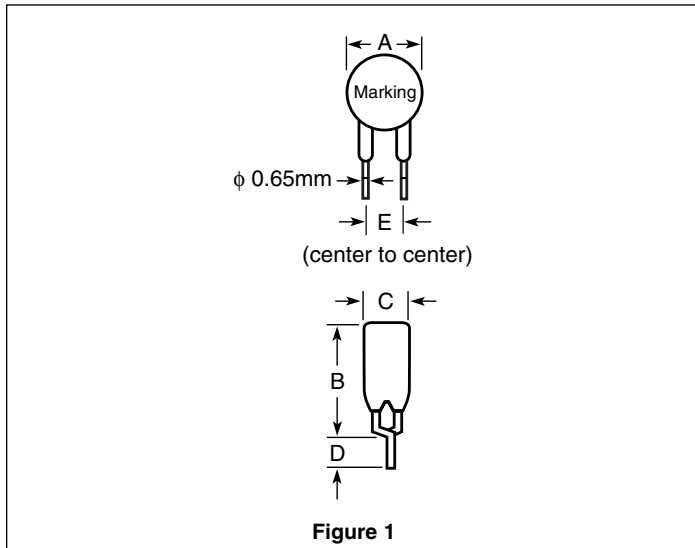
Product electrical characteristics

	I_H (A)	I_T (A)	V_{max} Interrupt	I_{max} (A)	P_d Typ (W)	Typ. Time to Trip (*Max.) (A) (s)		R_{MIN} Ω	R_{MAX} Ω	R_{1MAX} Ω	Figures for Dims.	
Part Number												
Chip¹	TC250											
60/250V	TGC250											
	TGC250-120T	0.120	0.240	250	3.0	1.00	1.00	*1.20	8.00	13.00	18.00	3
	TGC250-145T	0.145	0.290	250	3.0	1.00	1.00	1.50	6.00	10.00	14.00	3
	TC250-180	0.180	0.360	250	3.0	1.00	1.00	12.00	0.80	2.00	4.00	3
Leaded¹	TR250											
60/250V	TR250-080T	0.080	0.160	250	3.0	1.00	0.35	*3.00	15.00	22.00	33.00	1
	TR250-080U	0.080	0.160	250	3.0	1.00	0.35	*3.00	14.00	20.00	33.00	1
	TR250-110U	0.110	0.220	250	3.0	1.00	1.00	0.75	5.00	9.00	16.00	1
	TR250-120	0.120	0.240	250	3.0	1.00	1.00	1.50	4.00	8.00	16.00	2
	TR250-120T	0.120	0.240	250	3.0	1.00	1.00	0.90	7.00	12.00	16.00	2
	TR250-120T-RA	0.120	0.240	250	3.0	1.00	1.00	0.90	7.00	9.00	16.00	2
	TR250-120T-RC	0.130	0.260	250	3.0	1.00	1.00	*3.00	5.40	7.50	14.00	2
	TR250-120T-RF	0.120	0.240	250	3.0	1.00	1.00	0.90	6.00	10.50	16.00	2
	TR250-120T-R1	0.120	0.240	250	3.0	1.00	1.00	1.00	6.00	9.00	16.00	2
	TR250-120T-R2	0.120	0.240	250	3.0	1.00	1.00	0.75	8.00	10.50	16.00	2
	TR250-120U	0.120	0.240	250	3.0	1.00	1.00	1.00	6.00	10.00	16.00	2
	TR250-120UT	0.120	0.240	250	3.0	1.00	1.00	0.90	7.00	12.00	16.00	2
	TR250-145	0.145	0.290	250	3.0	1.00	1.00	2.50	3.00	6.00	14.00	2
	TR250-145-RA	0.145	0.290	250	3.0	1.00	1.00	2.50	3.00	5.50	12.00	2
	TR250-145-RB	0.145	0.290	250	3.0	1.00	1.00	2.50	4.50	6.00	14.00	2
	TR250-145T	0.145	0.290	250	3.0	1.00	1.00	2.00	5.40	7.50	14.00	2
	TR250-145U	0.145	0.290	250	3.0	1.00	1.00	2.00	3.50	6.50	12.00	2
	TR250-180U	0.180	0.360	250	10.0	1.00	1.00	12.00	0.80	2.00	4.00	2
Surface²	TSL250											
80/250	NEW TSL250-080											
		0.080	0.160	250	3.0	1.00	1.00	0.80	5.00	11.00	20.00	8
Surface¹	TS250											
60/250	TSV250											
	TS250-130	0.130	0.260	250/(650)	3.0/(1.1)	3.00	1.00	*2.50	6.50	12.00	20.00	5
	TS250-130-RA	0.130	0.260	250/(650)	3.0/(1.1)	3.00	1.00	*2.50	6.50	9.00	20.00	5
	TS250-130-RB	0.130	0.260	250/(650)	3.0/(1.1)	3.00	1.00	*2.50	9.00	12.00	20.00	5
	TS250-130-RC	0.130	0.260	250/(650)	3.0/(1.1)	3.00	1.00	*2.50	7.00	10.00	20.00	5
NEW	TSV250-130	0.130	0.260	250	3.0	3.00	1.00	2.00	4.00	7.00	12.00	6
Leaded³	TR600											
60/600	TR600-150	0.150	0.300	600	3.0	1.00	1.00	5.00	6.00	12.00	22.00	2
	TR600-150-RA	0.150	0.300	600	3.0	1.00	1.00	5.00	7.00	10.00	20.00	2
	TR600-150-RB	0.150	0.300	600	3.0	1.00	1.00	5.00	9.00	12.00	22.00	2
	TR600-160	0.160	0.320	600	3.0	1.00	1.00	7.00	4.00	10.00	18.00	2
	TR600-160-RA	0.160	0.320	600	3.0	1.00	1.00	7.00	4.00	7.00	16.00	2
	TR600-160-R1	0.160	0.320	600	3.0	1.00	1.00	7.00	4.00	8.00	17.00	2
Surface⁴	TSU600											
60/600	NEW TSU600-180⁽⁵⁾											
		0.180	0.360	600	3.0	3.00	1.00	6.00	3.00	6.00	12.00	9
Surface³	TS600											
60/600	NEW TS600-170											
		0.170	0.340	600	3.0	2.50	1.00	12.00	4.00	9.00	18.00	10
NEW	TS600-200-RA											
		0.200	0.400	600	3.0	2.50	1.00	12.00	4.00	7.50	13.50	10
Leaded	90 V BBR											
NEW	BBR550⁽⁵⁾											
		0.550	1.100	⁽⁶⁾ 90	20.0	2.00	1.60	*60	0.45	0.90	2.00	1
NEW	BBR750⁽⁵⁾											
		0.750	1.500	⁽⁶⁾ 90	20.0	2.50	2.00	*60	0.37	0.75	1.65	1
Leaded	60-72V RXE											
60-72V	RXE010⁽⁵⁾											
		0.100	0.200	⁽⁶⁾ 60	40.0	0.38	0.50	4.00	2.50	4.50	7.50	1
	RXE017⁽⁵⁾											
		0.170	0.340	⁽⁶⁾ 60	40.0	0.48	0.85	3.00	3.30	5.21	8.00	1
	RXE020⁽⁵⁾											
		0.200	0.400	⁽⁶⁾ 72	40.0	0.41	1.00	2.20	1.83	2.75	4.40	1
	RXE025⁽⁵⁾											
		0.250	0.500	⁽⁶⁾ 72	40.0	0.45	1.25	2.50	1.25	1.95	3.00	1
	RXE030⁽⁵⁾											
		0.300	0.600	⁽⁶⁾ 72	40.0	0.49	1.50	3.00	0.88	1.33	2.10	1
Surface⁶	60 V SMD											
60 V	SMD030⁽⁵⁾											
		0.300	0.600	⁽⁶⁾ 60	10.0	1.70	1.50	3.00	1.20	3.00	4.80	8
NEW	SMD030-2018⁽⁵⁾											
		0.300	0.800	⁽⁶⁾ 60	20.0	0.70	1.50	*1.50	0.50	1.40	2.30	7
Surface⁶	60 V miniSMD											
60 V	miniSMDC014⁽⁵⁾											
		0.140	0.340	⁽⁶⁾ 60	10.0	0.60	1.50	0.15	1.50	5.00	6.00	4

Note 1- 60/250V products are designed to help equipment pass ITU specifications (K20, K21, etc) and Telcordia Intrabuilding power cross
 Note 2- 80/250V products are designed to help equipment pass Telcordia GR-1089 Intrabuilding power cross (120AC/25A)
 Note 3- 60/600V products are designed to help equipment pass UL1950, FCC Part 68 and GR-1089 specifications
 Note 4- 60/600V products are designed to help equipment pass UL1950 7A max
 Note 5- Product is not available in a resistance binned or sorted option
 Note 6- Voltage rating for these products is V_{max} operating

I_H = Hold current - maximum current device will pass without interruption in 20°C still air
 I_T = Trip current - minimum current that will switch the device from low resistance to high resistance in 20°C still air
 V_{max} Interrupt = Maximum voltage that can be safely placed across a device in its tripped state under specified fault conditions
 I_{max} = Maximum fault current device can withstand without damage at rated voltage
 P_d = Power dissipated from device when in the tripped state in 20°C still air
 R_{1max} = Maximum device resistance, measured one-hour post trip

Physical description for dimensions



Product dimensions (millimeters/inches)

Part Number	Dim A	Dim A	Dim B	Dim B	Dim C	Dim C	Dim D	Dim D	Dim E	Dim E	Dim F	Dim F	Figure
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
TC/TGC 60/250V¹													
TGC250-120T	5.5 (0.216)	5.9 (0.232)	5.5 (0.216)	5.9 (0.232)	2.0 (0.080)	2.3 (0.090)							3
TGC250-145T	5.5 (0.216)	5.9 (0.232)	5.5 (0.216)	5.9 (0.232)	2.0 (0.080)	2.3 (0.090)							3
TC250-180		10.4 (0.410)		6.6 (0.260)		2.54 (0.100)							3
TR250 60/250V¹													
TR250-080T		5.3 (0.209)		9.9 (0.390)		3.8 (0.150)	4.7 (0.185)		*5.0 (0.197)				1
TR250-080U		4.8 (0.189)		9.3 (0.366)		3.8 (0.150)	4.7 (0.185)		*5.0 (0.197)				1
TR250-110U		5.3 (0.210)		9.4 (0.370)		3.8 (0.15)	4.7 (0.185)		*5.0 (0.197)				1
TR250-120		6.5 (0.256)		11.0 (0.433)		4.6 (0.180)	4.7 (0.185)		*5.0 (0.197)				2
TR250-120U		6.0 (0.236)		10.0 (0.394)		3.8 (0.150)	4.7 (0.185)		*5.0 (0.197)				2
TR250-145		6.5 (0.256)		11.0 (0.433)		4.6 (0.180)	4.7 (0.185)		*5.0 (0.197)				2
TR250-145U		6.0 (0.236)		10.0 (0.394)		3.8 (0.150)	4.7 (0.185)		*5.0 (0.197)				2
TR250-180U		10.4 (0.410)		12.6 (0.495)		3.6 (0.140)	4.7 (0.185)		*5.0 (0.197)				2
TSL250 80/250V²													
TSL250-080	6.7 (0.265)	7.9 (0.310)	2.7 (0.110)	3.7 (0.145)	4.8 (0.190)	5.4 (0.210)	0.2 (0.008)	0.3 (0.012)	2.5 (0.100)	3.1 (0.120)			8
TS250/TSV250 60/250V¹													
TS250-130	8.5 (0.335)	9.4 (0.370)		3.4 (0.135)		7.4 (0.290)	*0.3 (0.011)		*3.8 (0.150)				5
TSV250-130		6.1 (0.240)		6.9 (0.270)		3.2 (0.126)	0.56 (0.022)		1.9 (0.075)	1.6 (0.065)	2.3 (0.091)		6
TR600 60/600V³													
TR600-150		13.5 (0.531)		12.6 (0.496)		6.0 (0.236)	4.7 (0.185)		*5.0 (0.197)				2
TR600-160		16.0 (0.630)		12.6 (0.496)		6.0 (0.236)	4.7 (0.185)		*5.0 (0.197)				2
TSU600 60/600V⁴													
TSU600-180	11.4 (0.450)	12.2 (0.480)	1.7 (0.070)	2.1 (0.084)	8.5 (0.335)	9.3 (0.365)	0.5 (0.02)	1.0 (0.04)					9
TS600 60/600V³													
TS600-170	18.2 (0.720)	19.4 (0.765)	11.5 (0.452)	12.3 (0.485)	7.6 (0.300)	8.4 (0.330)	1.6 (0.065)	2.4 (0.095)	9.9 (0.390)	10.4 (0.410)	1.5 (0.060)	2.3 (0.090)	10
TS600-200-RA	18.2 (0.720)	19.4 (0.765)	11.5 (0.452)	12.3 (0.485)	7.6 (0.300)	8.4 (0.330)	1.6 (0.065)	2.4 (0.095)	9.9 (0.390)	10.4 (0.410)	1.5 (0.060)	2.3 (0.090)	10
BBR 90 V													
BBR550		10.9 (0.43)		14.0 (0.55)		3.6 (0.14)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
BBR750		11.9 (0.47)		15.5 (0.61)		3.6 (0.14)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
RXE 60-72V													
RXE010		7.4 (0.29)		12.7 (0.50)		3.0 (0.12)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
RXE017		7.4 (0.29)		12.7 (0.50)		3.0 (0.12)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
RXE020		7.4 (0.29)		12.2 (0.48)		3.0 (0.12)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
RXE025		7.4 (0.29)		12.7 (0.50)		3.0 (0.12)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
RXE030		7.4 (0.29)		13.0 (0.51)		3.0 (0.12)	7.6 (0.30)		4.3 (0.17)	5.8 (0.23)			1
SMD 60V													
SMD030	6.73 (0.265)	7.98 (0.314)		3.18 (0.125)		5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)			8
SMD030-2018	4.72 (0.186)	5.44 (0.214)		1.78 (0.070)	4.22 (0.166)	4.93 (0.194)	0.25 (0.010)	0.36 (0.014)					7
miniSMD 60V													
miniSMD0C14	4.37 (0.172)	4.73 (0.186)	0.63 (0.025)	0.89 (0.035)	3.07 (0.121)	3.41 (0.134)	0.30 (0.012)		0.25 (0.010)	0.50 (0.020)			4

*Indicates dimensional is typical, not minimum.

Note 1 - 60/250V products are designed to help equipment pass ITU specifications (K20, K21, etc) and Telcordia Intrabuilding power cross

Note 2 - 80/250V products are designed to help equipment pass Telcordia GR-1089 Intrabuilding power cross (120AC/25A)

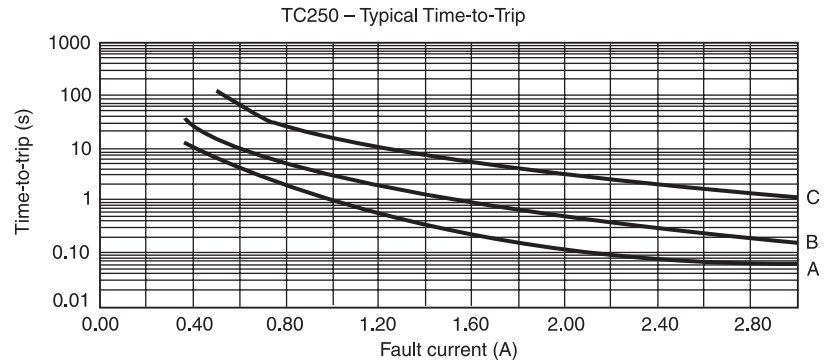
Note 3 - 60/600V products are designed to help equipment pass UL1950, FCC Part 68 and GR-1089 specifications

Note 4 - 60/600V products are designed to help equipment pass UL1950 7A max

Time-to-trip at 20°C

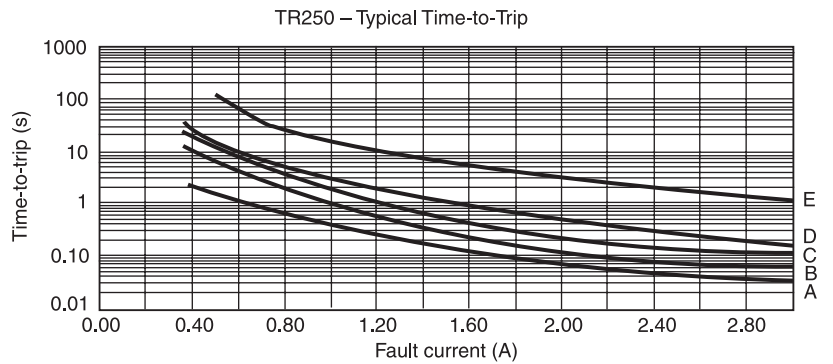
TC250

- A -- TGC250-120T
- B -- TGC250-145T
- C -- TC250-180U



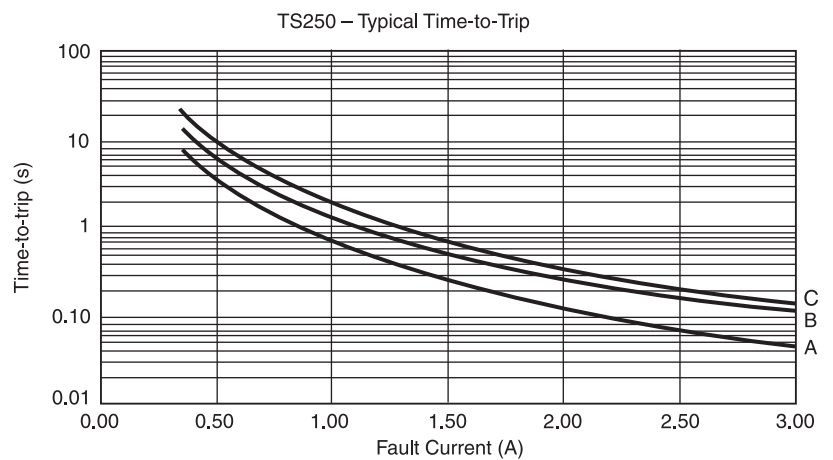
TR250

- A – TR250-080T/080U
- B – TR250-110U/120UT/120T
- C – TR250-120/120U
- D – TR250-145/145U
- E – TR250-180U



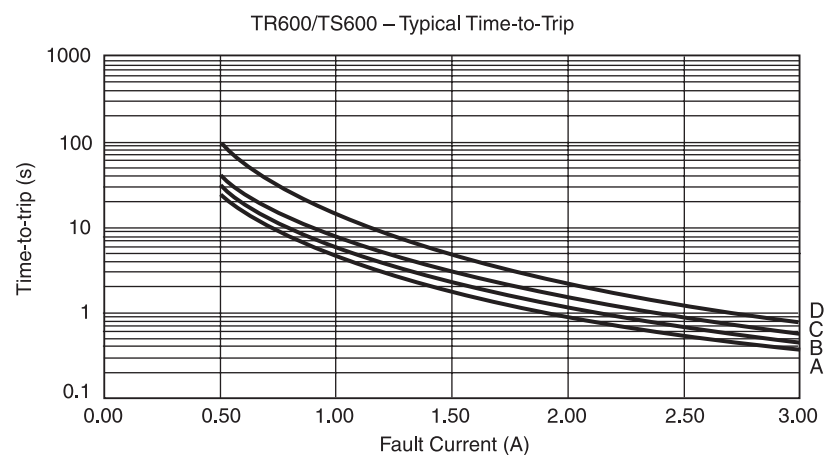
TS250/TSV250

- A – TSL250-080
- B – TSV250-130
- C – TS250-130



TR600/TS600/TSU600

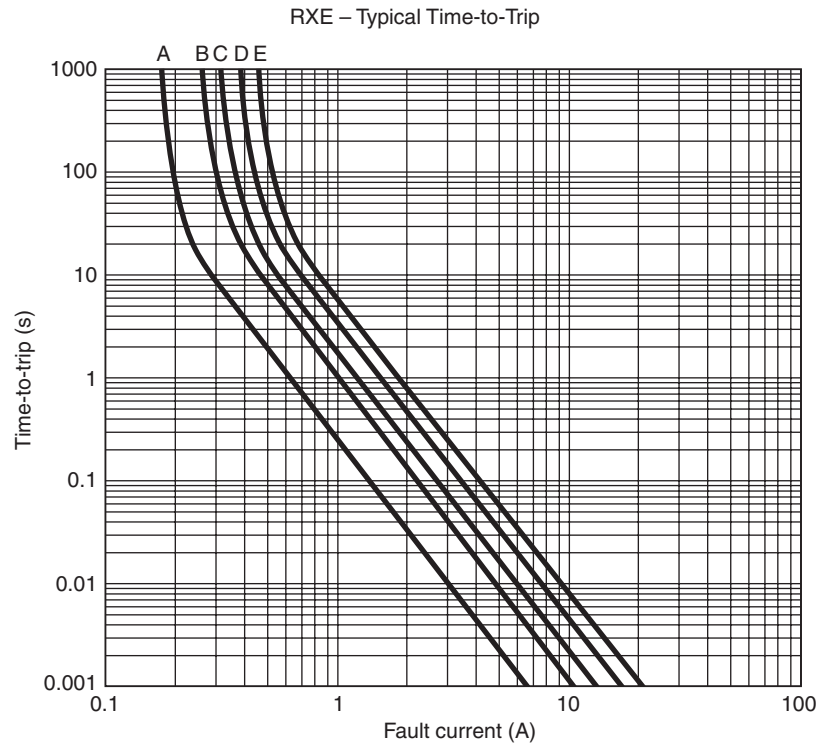
- A – TR600-150
- B – TSU600-180
- C – TR600-160
- D – TS600-170/200



Time-to-trip at 20°C

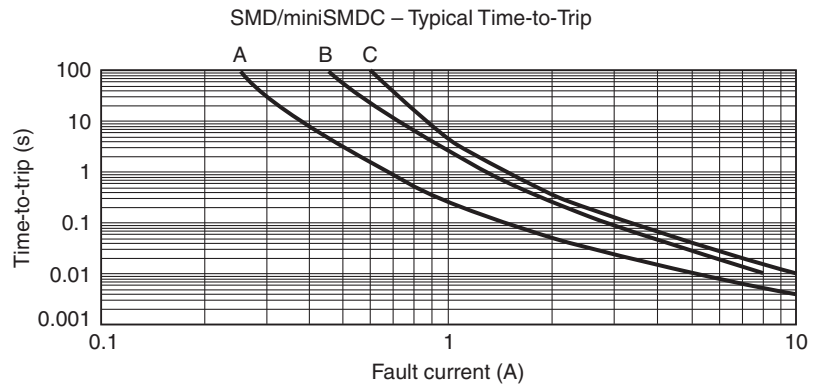
RXE

- A – RXE010
- B – RXE017
- C – RXE020
- D – RXE025
- E – RXE030



SMD/miniSMDC

- A – miniSMDC014
- B – SMD030-2018
- C – SMD030



Physical characteristics and environmental specifications

(Operating temperature range for all listed products is -40°C to 85°C)

TC250¹/TGC250¹**Physical characteristics**

Lead material	Nickel foil or tin/lead plated nickel foil
---------------	--

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal Shock	125°C, -55°C (10 times)
Solvent Resistance	MIL-STD-202, Method 215F

TR250¹**Physical characteristics**

Lead material	Tin/lead plated copper, 22 AWG, Ø0.65mm (0.026 in)
Insulating material	Cured epoxy polymer
Flammability	per IEC 695-2-2 Needle flame test for 20 sec.
Soldering characteristics	ANSI/J-STD-002, Category 3
Solder heat withstand	IEC-STD 68-2-20, Test Tb, Section 5 Method 1A

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal Shock	125°C, -55°C (10 times)
Solvent Resistance	MIL-STD-202, Method 215F

TS250¹/TSV250¹/TSL250²**Physical characteristics**

Lead material	Tin plated brass
Soldering characteristics	ANSI/J-STD-002, Category 3

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 500 hours
Thermal shock	125°C, -55°C (10 times)
Solvent resistance	MIL-STD-202, Method 215F

TR600³**Physical characteristics**

Lead material	Tin/lead plated copper, 22 AWG, Ø0.65mm (0.026 in)
Insulating material	Cured epoxy polymer
Flammability	per IEC 695-2-2 Needle flame test for 20 sec.
Soldering characteristics	ANSI/J-STD-002, Category 3
Solder heat withstand	IEC-STD 68-2-20, Test Tb, Section 5 Method 1A

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal shock	125°C, -55°C (10 times)
Solvent resistance	MIL-STD-202, Method 215F

Physical characteristics and environmental specifications

TS600³

Physical characteristics

Lead material	Tin-plated brass
Insulating material	Nylon resin (UL94V-0), 1000V dielectric rating
Flammability	IEC 695-2-2 Needle flame test for 20 sec.
Soldering characteristics	ANSI/J-STD-002, Category 3
Solder heat withstand	IEC-STD 68-2-20, Test Tb, Section 5 Method 1A

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal shock	125°C, -55°C (10 times)
Solvent resistance	MIL-STD-202, Method 215F

TSU600⁴

Physical characteristics

Lead material	Tin plated brass and nickel foil
Soldering characteristics	ANSI/J-STD-002, Category 3
Solder heat withstand	IEC-STD 68-2-20, Test Tb, Section 5 Method 1A

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal shock	125°C, -55°C (10 times)
Solvent resistance	MIL-STD-202, Method 215F

BBR

Physical characteristics

Lead material	Tin/lead plated copper, 20 AWG, Ø0.81mm (0.032 in)
Insulating material	Cured, flame-retardant epoxy polymer; meets UL 94V-0 requirements
Flammability	per IEC 695-2-2 Needle flame test for 20 sec.
Soldering characteristics	ANSI/J-STD-002, Category 3
Solder heat withstand	IEC-STD 68-2-20, Test Tb, Section 5 Method 1A

Environmental specifications

Test	Conditions
Passive aging	60°C, 1000 hours
	85°C, 1000 hours
Humidity aging	85°C, 85% RH, 1000 hours
Thermal Shock	125°C, -55°C (10 times)
Solvent Resistance	MIL-STD-202, Method 215F

Note 1 - 60/250V products are designed to help equipment pass ITU specifications (K20, K21, etc) and Telcordia Intrabuilding power cross

Note 2 - 80/250V products are designed to help equipment pass Telcordia GR-1089 Intrabuilding power cross (120AC/25A)

Note 3 - 60/600V products are designed to help equipment pass UL1950, FCC Part 68 and GR-1089 specifications

Note 4 - 60/600V products are designed to help equipment pass UL1950 7A max

Note 5 - Product is not available in a resistance binned or sorted option

For physical and environmental characteristics of RXE, SMD, and miniSMD, products see the Raychem Circuit Protection Databook.

Recommended pad layouts

The dimensions in the table below provide the recommended pad layout for each surface mount device. Pad dimensions in millimeters (inches).

Device	A nom	B nom	*C nom	D nom	E nom	F nom	Figure
TS250 (all)	4.6 (0.18)	1.8 (0.07)	6.1 (0.24)				1
TSV250-130	2.29 (0.09)	2.41 (0.095)	6.35 (0.25)	3.43 (0.135)			2
TSL250-080	3.6 (0.14)	1.8 (0.07)	5.5 (0.22)				1
TS600 (all)	9.91 (0.390)	3.30 (0.130)	3.35 (0.132)				1
TSU600-180	9.4 (0.37)	8.9 (0.35)	1.78 (0.07)	1.27 (0.05)	5.6 (0.22)	1.9 (0.075)	3
SMD030-2018	4.6 (0.18)	1.5 (0.06)	3.4 (0.13)				1
SMD030	3.1 (0.12)	2.3 (0.09)	5.1 (0.20)				1
miniSMDC014	3.15 (0.124)	1.78 (0.07)	*3.45 (0.136)				1

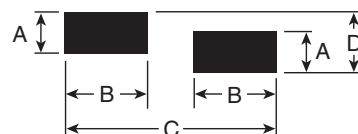
*Indicates minimum dimension.

For TS, SMD and miniSMD devices only (Radial leaded devices [TR250, TR600, RXE, BBR] are not designed to be placed in a reflow process).

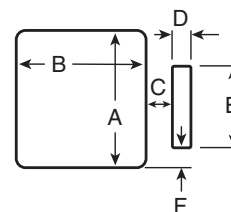
Pad Layout Figure 1



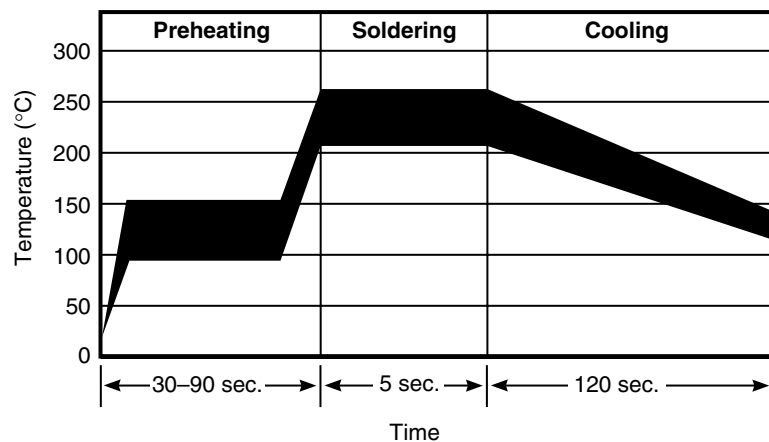
Pad Layout Figure 2



Pad Layout Figure 3



Solder reflow and rework recommendations for surface mount devices



Solder Reflow

- Recommended reflow methods: IR, vapor phase oven, hot air oven.
- Devices are not designed to be wave soldered to the bottom side of the board.
- Gluing of the devices is not recommended.
- Recommended maximum paste thickness of 0.25mm (0.010 in).
- Devices can be cleaned using standard industry methods and solvents.

Rework

- If a device is removed from the board, it should be discarded and a new device used as a replacement.

Caution

- If reflow temperatures exceed recommended profile, devices may not meet the performance requirements.
- Leaded devices are not designed to be compatible with reflow manufacturing operations.
- Recommended solder/temperature exposure for leaded devices is designated in the environmental/physical tables for the product family. Exposure to temperatures or duration at temperature in excess of these values may lead to device not meeting performance requirements.

Packaging and marking information

	Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package	Part Marking	Agency Recognition
Chip ¹ 60/250	TC250					
	TGC250					
	TGC250-120T	5,000		25,000	x	
	TGC250-145T	5,000		25,000	x	
	TC250-180	2,500		10,000		
Leaded ¹ 60/250V	TR250					
	TR250-080U	500		10,000	x08	UL, CSA, TUV
	TR250-080U-2		1,500	7,500	x08	UL, CSA, TUV
	TR250-080T	500		10,000	x08	UL, CSA, TUV
	TR250-110U	500		10,000	x10	UL, CSA, TUV
	TR250-110U-2		1,500	7,500	x10	UL, CSA, TUV
	TR250-120	500		10,000	x20	UL, CSA, TUV
	TR250-120-2		1,500	7,500	x20	UL, CSA, TUV
	TR250-120T	500		10,000	x20	UL, CSA, TUV
	TR250-120T-2		1,500	7,500	x20	UL, CSA, TUV
	TR250-120U	500		10,000	x20	UL, CSA, TUV
	TR250-120U-2		1,500	7,500	x20	UL, CSA, TUV
	TR250-120UT	500		10,000	x20	UL, CSA, TUV
	TR250-145	500		10,000	x45	UL, CSA, TUV
	TR250-145-2		1,500	7,500	x45	UL, CSA, TUV
	TR250-145-RA	500		10,000	x45	UL, CSA, TUV
	TR250-145U	500		10,000	x45	UL, CSA, TUV
	TR250-145U-2		1,500	7,500	x45	UL, CSA, TUV
	TR250-180U	500		10,000	x80	UL, CSA, TUV
	TR250-180U-2		1,500	7,500	x80	UL, CSA, TUV
	Surface ² 80/250V	TSL250				
TSL250-080-2			1,500	7,500	xT08	UL Pending
Surface ¹ 60/250V	TS250					
	TSV250					
	TS250-130-2		1,500	7,500	xT13	UL, CSA, TUV
	TSV250-130-2		1,300	6,500	xT13V	UL Pending
Leaded ³ 60/600V	TR600					
	TR600-150	500		10,000	x150	UL, CSA
	TR600-150-2		600	3,000	x150	UL, CSA
	TR600-160	500		10,000	x160	UL, CSA
	TR600-160-2		600	3,000	x160	UL, CSA
Surface ⁴ 60/600V	TS6U00					
	TSU600-180-2		900	4,500	xT18U	UL
Surface ³ 60/600V	TS600					
	TS600-170-2		300	900	xT20	UL, CSA
	TS600-200-RA-2		300	900	xT20	UL, CSA
Radial 90V	BBR					
	BBR550	500		10,000	B550	UL
	BBR750	500		10,000	B750	UL Pending
Radial 60-72V	RXE					
	RXE010	500		10,000	x010	UL, CSA, TUV
	RXE017	500		10,000	x017	UL, CSA, TUV
	RXE020	500		10,000	x020	UL, CSA, TUV
	RXE025	500		10,000	x025	UL, CSA, TUV
	RXE030	500		10,000	x030	UL, CSA, TUV
Surface 60V	SMD					
	SMD030-2		2,000	10,000	x030	UL, CSA, TUV
	SMD030-2018-2		4,000	20,000	A03	UL
Surface 60V	miniSMD					
	miniSMDC014-2		4,000	20,000	14	UL, CSA, TUV

*Bold indicates minimum specified dimension

Note 1 - 60/250V products are designed to help equipment pass ITU specifications (K20, K21, etc) and Telcordia Intra-building power cross

Note 2 - 80/250V products are designed to help equipment pass Telcordia GR-1089 Intra-building power cross (120AC/25A)

Note 3 - 60/600V products are designed to help equipment pass UL1950, FCC Part 68 and GR-1089 specifications

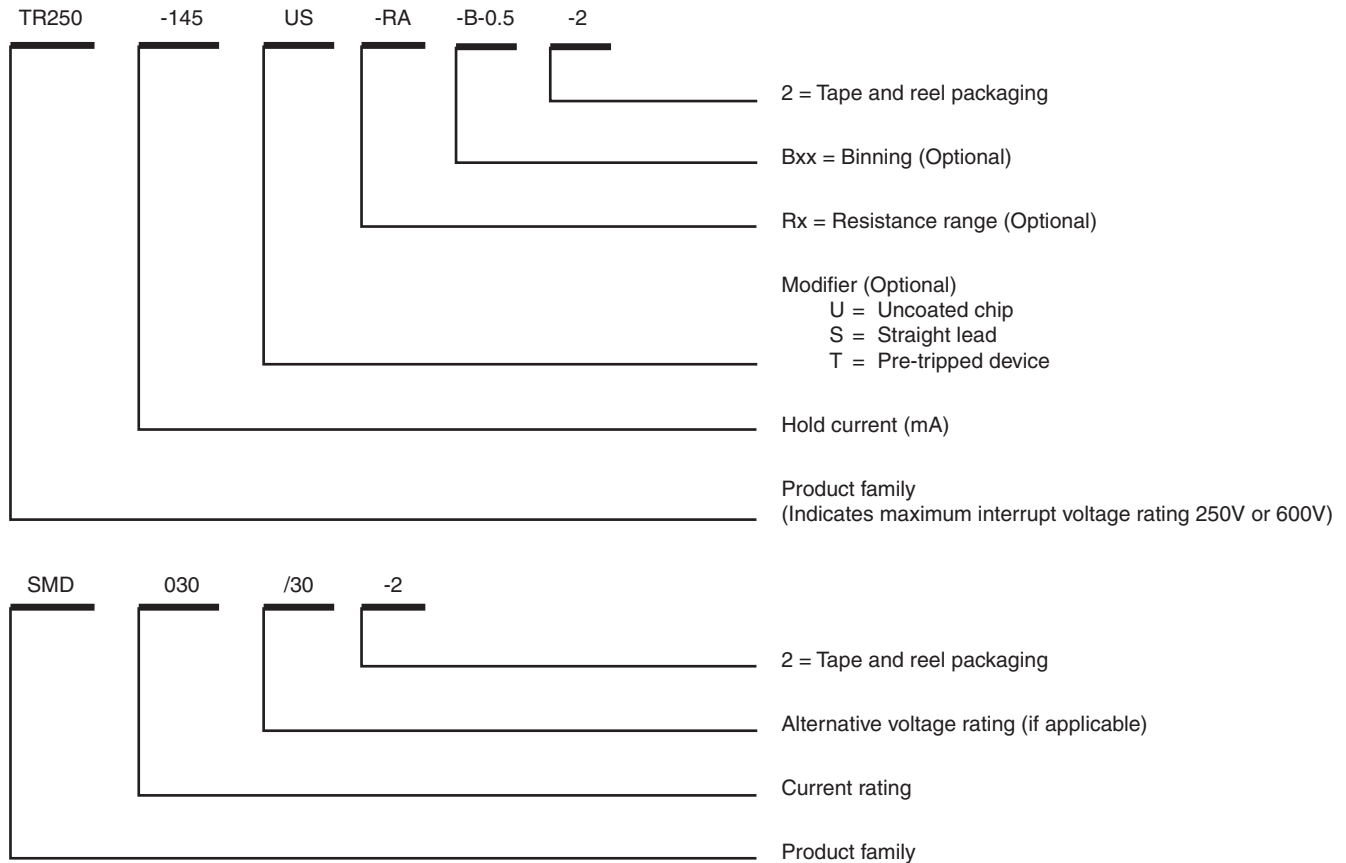
Note 4 - 60/600V products are designed to help equipment pass UL1950 7A max

Note 5 - Product is not available in a resistance binned or sorted option

Agency recognition

UL	File # E74889
CSA	File #78165C
TUV	Certificate #R9872248.1

Part numbering



Resistance sorted and binned

TC, TGC, TR, and TS devices are available in resistance sorted and resistance binned.

Resistance sorted devices

Resistance sorted devices (part number suffix “Rx”, where x=1, 2, A, B, C, F etc.) are supplied with resistance values that are within specified limits of the product’s full range of resistance.

Feature

- Tighter resistance limits.

Benefits

- Tighter resistance ranges offer greater flexibility for design engineers.
 - Lower resistance range devices allow designers a tighter resistance budget which can allow for increased loop length on line card designs.
 - Higher resistance range parts may allow the designer to adjust line balance while still meeting total resistance requirements.

Resistance binned devices

Resistance binned devices are supplied such that all parts in one particular package (or reel) are within 0.5Ω of each other (1.0Ω for 080T devices). Individual binned packages are supplied from the full resistance limits of the specified product.

Feature

- Tighter resistance balance between any two parts in a package.

Benefit

- Resistance binned devices provide tighter tolerance parts on a tip-ring line pair. This reduces the tip-ring resistance differential, limiting the possibility of line imbalance.

TR250/TR600 Tape and Reel specifications (dimensions in millimeters)

TR250/TR600 devices are available tape and reeled per EIA 468-B standard. See Figures 1 and 2 for details.

Dimension Description	EIA mark	IEC mark	Dimensions	
			Dimensions (mm)	Dimensions (mm)
Carrier tape width	<i>W</i>	<i>W</i>	18	-0.5/+1.0
Hold down tape width	<i>W₄</i>	<i>W₀</i>	5	min.
Top distance between tape edges	<i>W₆</i>	<i>W₂</i>	3	max.
Sprocket hole position	<i>W₅</i>	<i>W₁</i>	9	-0.5/+0.75
Sprocket hole diameter	<i>D₀</i>	<i>D₀</i>	4	±0.2
Abcissa to plane (straight lead)*	<i>H</i>	<i>H</i>	18.5	±3.0
Abcissa to plane (kinked lead)*	<i>H₀</i>	<i>H₀</i>	16	-0.5/+0.6
Abcissa to top	<i>H₁</i>	<i>H₁</i>	32.2	max.
Overall width w/lead protrusion		<i>C₁</i>	43.2	max.
Overall width w/o lead protrusion		<i>C₂</i>	42.5	max.
Lead protrusion	<i>L₁</i>	<i>l₁</i>	1.0	max.
Protrusion of cut-out	<i>L</i>	<i>L</i>	11	max.
Protrusion beyond hold down tape	<i>l₂</i>	<i>l₂</i>	Not specified	
Sprocket hole pitch	<i>P₀</i>	<i>P₀</i>	12.7	±0.3
Device pitch: TR250			12.7	
Device pitch: TR600			25.4	
Pitch tolerance			20 consecutive	±1
Tape thickness	<i>t</i>	<i>t</i>	0.9	max.
Tape thickness with splice*	<i>t₁</i>		2.0	max.
Splice sprocket hole alignment			0	±0.3
Body lateral deviation	Δh	Δh	0	±1.0
Body tape plane deviation	Δp	Δp	0	±1.3
Lead spacing plane deviation	ΔP_1	<i>P₁</i>	0	±0.7
Lead seating	<i>F</i>	<i>F</i>	5.08	-0.5/+0.6
Reel width	<i>w₂</i>	<i>w</i>	56	max.
Reel diameter	<i>a</i>	<i>d</i>	370	max.
Space between flanges less device	<i>w₁</i>		4.75	±3.25
Arbor hole diameter	<i>c</i>	<i>f</i>	26	±12.0
Core diameter	<i>n</i>	<i>h</i>	80	max.
Box			56/372/372	max.
Consecutive missing pieces*			3 maximum	
Empty places per reel*			Not specified	

*Differs from EIA Specification.

Figure 1: EIA referenced taped component dimensions for TR devices

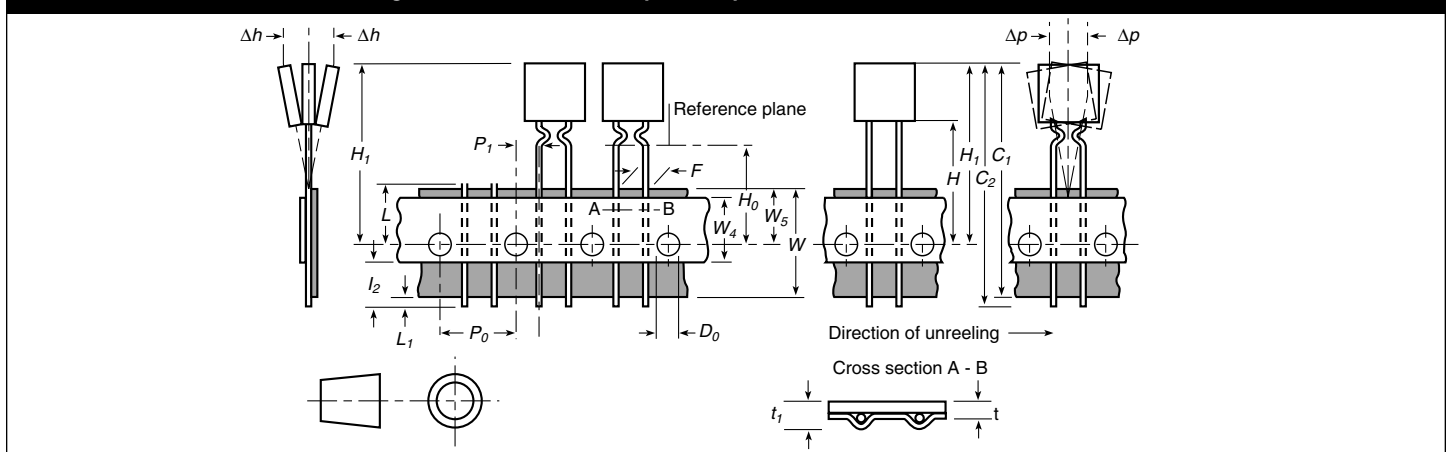
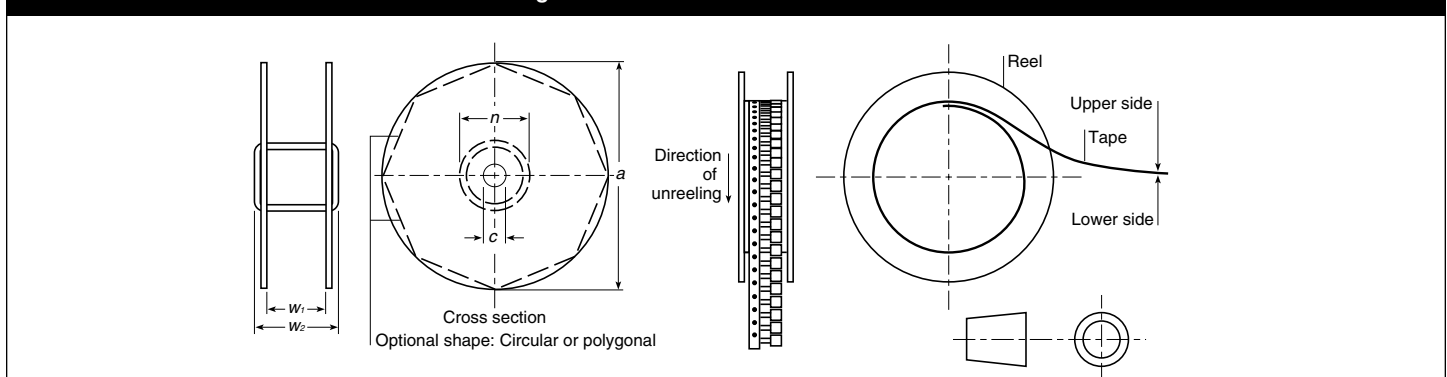


Figure 2: Reel dimensions for TR devices



TS Tape and reel specifications (dimensions in millimeters)

TS devices are packaged per EIA 481 and EIA 481-2 standards. See Figures 3 and 4 for details

TS250/TSL250/TSV250

Dimension Description	EIA mark	TS250		TSV250		TSL250	
		Dimension (mm)	Tolerance (mm)	Dimension (mm)	Tolerance (mm)	Dimension (mm)	Tolerance (mm)
Carrier Tape width	W	16	±0.3	16	±0.3	16	±0.3
Sprocket hole pitch	P ₀	4.0	±0.10	4.0	±0.1	4.0	±0.10
	P ₁	12.0	±0.10	8.0	±0.1	8.0	±0.10
	P ₂	2.0	±0.10	2.0	±0.1	2.0	±0.10
	A ₀	7.7	±0.23	5.5	±0.1	5.5	±0.10
	B ₀	9.6	±0.15	6.2	±0.1	7.9	±0.10
Sprocket hole diameter	B _{1 max.}	12.1					
	D ₀	1.5	-0/+0.1	1.5	-0/+0.1	1.5	-0/+0.1
	F	7.5	±0.10	7.5	±0.10	7.5	±0.10
	E ₁	1.75	±0.10	1.75	±0.10	1.75	±0.10
Tape thickness	E _{2 min.}	14.25					
	T _{max.}	0.4		0.45		0.4	
Cover tape thickness	T _{1 max.}	0.1		0.1		0.1	
	K ₀	3.4	±0.15	7.00	±0.1	3.70	±0.10
	Leader min.	390		390		390	
	Trailer min.	160		160		160	
Reel Dimensions							
Reel diameter	A max.	340		340		340	
Core diameter	N min.	50		50		50	
Space between flanges less device	W ₁	16.4	-0/+2.0	16.4	-0/+2.0	16.4	-0/+2.0
Reel width	W _{2 max.}	22.4		22.4		22.4	

TS600/TSU600

Dimension Description	EIA mark	TS600		TSU600	
		Dimension (mm)	Tolerance (mm)	Dimension (mm)	Tolerance (mm)
Carrier Tape width	W	32	±0.3	24	±0.3
Sprocket hole pitch	P ₀	4.0	±0.1	4.0	±0.1
	P ₁	16	±0.1	12.0	±0.1
	P ₂	2.0	±0.1	2.0	±0.1
	A ₀	10	±0.1	9.3	±0.1
	B ₀	19.2	±0.1	9.3	±0.1
Sprocket hole diameter	B _{1 max.}	12.1			
	D ₀	1.5	-0/+0.1	1.5	-0/+0.1
	F	14.2	±0.1	11.5	±0.1
	E ₁	1.75	±0.1	1.75	±0.1
Tape thickness	E _{2 min.}	28.4	±0.1		
	T _{max.}	0.50	±0.5	0.30	±0.1
Tape thickness with splice	T _{1 max.}	0.1		0.1	
	K ₀	13.2	±0.1	2.4	±0.1
	Leader min.	390		390	
	Trailer min.	160		160	
Reel Dimensions					
Reel diameter	A max.	360		360	
Core diameter	N min.	50		50	
Space between flanges less device	W ₁	32.4	-0/+2.0	24.4	-0/+2.0
Reel width	W _{2 max.}	40		30.4	

Refer to applicable sections for tape and reel information on BBR and RXE (radial leaded products) and miniSMDC and SMD (surface mount products). See the Raychem Circuit Protection Databook.

Figure 3: EIA referenced taped component dimensions for TS devices

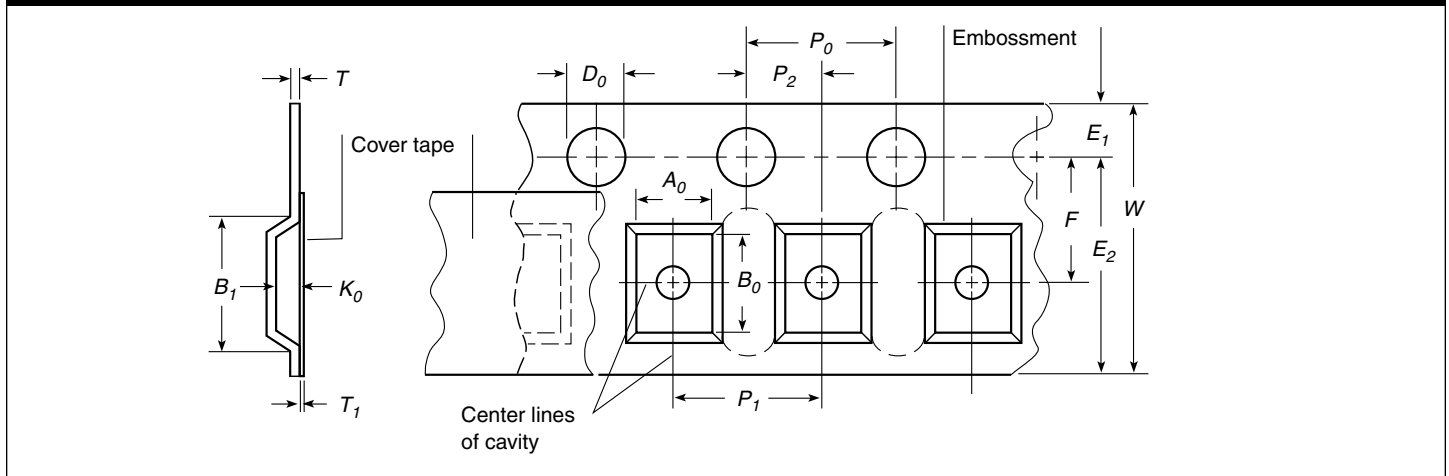
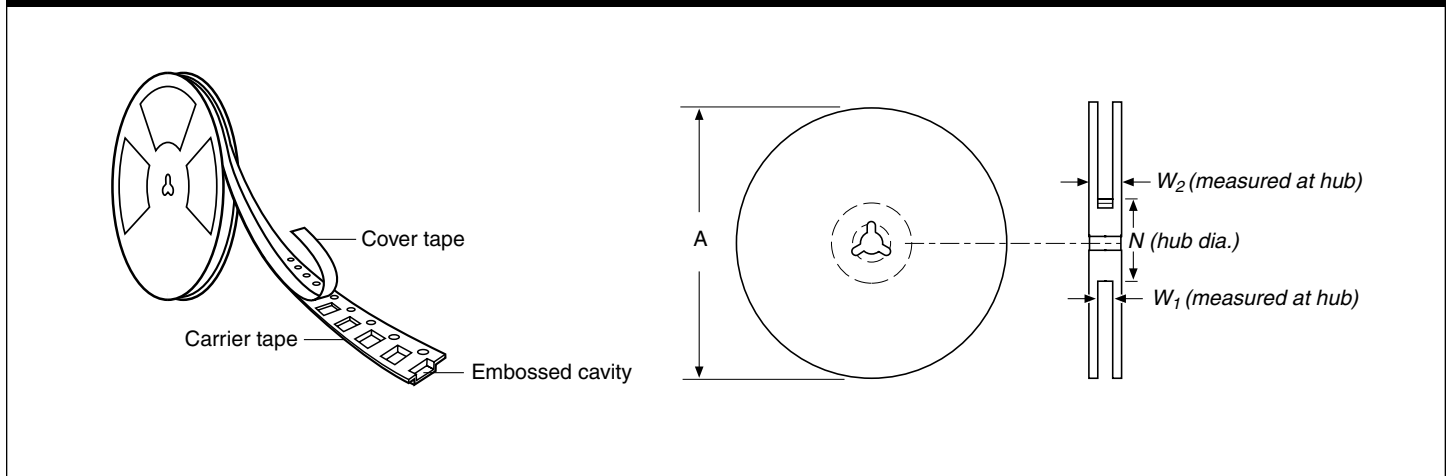


Figure 4: Reel dimensions for TS devices



Latest Information

- Please check the Raychem Circuit Protection web site (www.circuitprotection.com) or contact your local representative for the latest information.
- The information in this data package contains some preliminary information. Raychem Circuit Protection reserves the right to change any of the specifications without notice. In addition, Raychem Circuit Protection reserves the right to make changes—without notification to Buyer—to materials or processing that do not affect compliance with any applicable specification.

WARNING



- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- These devices are intended for protection against occasional overcurrent or overtemperature fault conditions, and should not be used when repeated fault conditions are anticipated.

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