Raychem

- Remotely resettable
- Latching operation
- Easy to install
- Variety of applications

PolySwitch SMD

Surface mount devices for PTC overcurrent protection

609-020 TO 609-092

Overcurrent protection
The PolySwitch circuit protector is a positive temperature coefficient (PTC) resistor that undergoes a large, abrupt change in resistance when an overcurrent or high temperature heats it above its transition temperature.

Normally just tenths of an ohm, the resistance of the PolySwitch device increases by several orders of magnitude when switched. This increase limits the circuit current to milliamps.

Remotely resettable
The device will reset when voltage in the circuit is removed or in some cases will reset automatically when the overload condition is corrected. Normal circuit operation can then be resumed. The device requires no manual resetting or replacement.

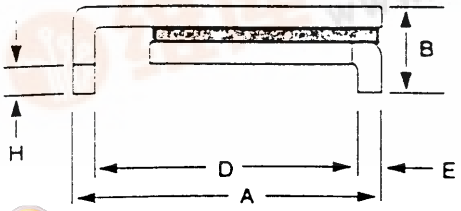
Latching (noncycling) operation
After switching, the PolySwitch device is latched into its high-resistance protective state by the small, sustained self-heating current. The device will reset only after it has cooled and the fault condition has been corrected, thus avoiding continuous cycling that could cause circuit damage.

Variety of applications
Possible applications for PolySwitch devices include:
- Computers and peripherals
- PBX, KTS systems
- Electronic instruments
- Alarm systems
- Power supplies
- Local area networks
- Disk drives
- Printers

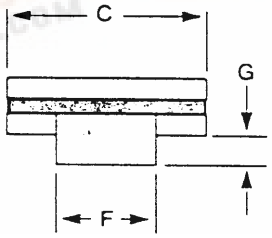
Product dimensions in millimeters

Part number	A min.	A max.	B max.	C max.	D min.	D max.
SMD030-2	6.73	7.98	3.18	5.44	0.56	0.71
SMD050-2	6.73	7.98	3.18	5.44	0.56	0.71
SMD075-2	6.73	7.98	3.18	5.44	0.56	0.71
SMD100-2	6.73	7.98	3.00	5.44	0.56	0.71
SMD100-2018-2	4.72	5.44	1.52	4.93	0.25	0.36
SMD125-2	6.73	7.98	3.00	5.44	0.56	0.71
SMD150-2	8.00	9.50	3.00	6.71	0.56	0.71
SMD200-2	8.00	9.50	3.00	6.71	0.56	0.71
SMD250-2	8.00	9.50	3.00	6.71	0.56	0.71

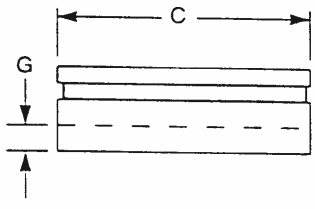
Part number	E min.	E max.	F min.	F max.	G min.	G max.	H min.
SMD030-2	0.56	0.71	2.16	2.41	0.66	1.37	0.43
SMD050-2	0.20	0.30	2.16	2.41	0.66	1.37	0.43
SMD075-2	0.56	0.71	2.16	2.41	0.66	1.37	0.43
SMD100-2	0.56	0.71	2.16	2.41	0.66	1.37	0.43
SMD100-2018-2	0.25	0.36	N/A	N/A	0.30	0.46	N/A
SMD125-2	0.56	0.71	2.16	2.41	0.66	1.37	0.43
SMD150-2	0.56	0.71	3.68	3.94	0.66	1.37	0.43
SMD200-2	0.56	0.71	3.68	3.94	0.66	1.37	0.43
SMD250-2	0.56	0.71	3.68	3.94	0.66	1.37	0.43



Side view



End view



End view–SMD100-2018-2

Ordering information

Packaging

Packaged by tape-and-reel carrier per EIA 481 standard.

Part	Standard reel quantity	Device marking
SMD030	2,000	X 030
SMD050	2,000	X 050
SMD075	2,000	X 075
SMD100	2,000	X 100
SMD100-2018	4,000	X A10
SMD125	2,000	X 125
SMD150	1,500	X 150
SMD200	1,500	X 200
SMD250	1,500	X 250

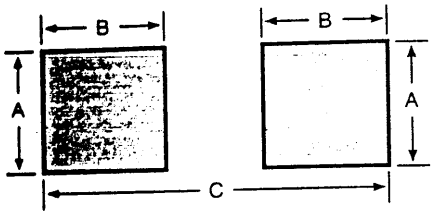
Order in multiples of standard reel quantity. Part number SMDXXX-2*.

Minimum order quantity is one reel.

* -2 designates tape-and-reel packaging.

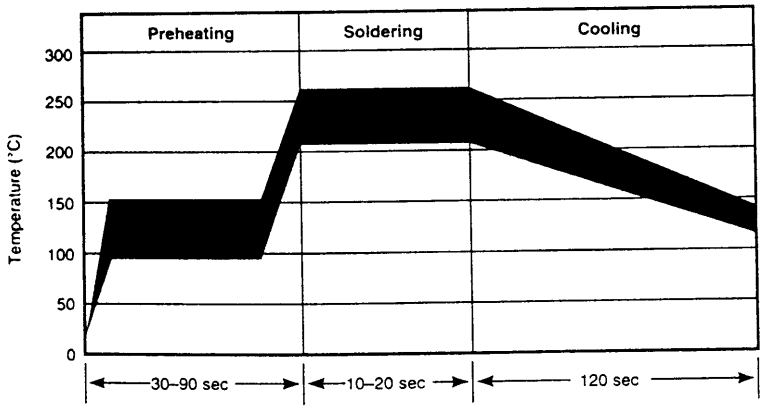
Installation and reflow guidelines

Recommended pad layout (dimensions in millimeters)



Device	A nom.	B nom.	C nom.
SMD030	3.05	2.03	9.65
SMD050	3.05	2.03	9.65
SMD075	3.05	2.03	9.65
SMD100	3.05	2.03	9.65
SMD100-2018	4.57	1.52	6.35
SMD125	3.05	2.03	9.65
SMD150	4.57	2.03	10.67
SMD200	4.57	2.03	10.67
SMD250	4.57	2.03	10.67

Recommended solder reflow conditions



Reflow methods and rework

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 the devices is not recommended.
- Recommended maximum paste thickness is .010 inch.
- Devices can be cleaned using standard industry methods and solvents.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Rework

- A device should not be reused after being reworked.
- If a soldering iron is used to replace a device, heat should be applied only to the leads.

Caution

Operation beyond maximum ratings may result in device damage and possible electrical arcing and flame.

Note:
These devices are intended for overcurrent/overtemperature protection, not for continual, repeated tripping.

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Operating characteristics

Operating/storage temperature	–40°C to 85°C
Maximum device surface temperature in tripped state	125°C*
Resistance in tripped state	V^2/P_d**

* Temperature measured at contact point to printed circuit board will be lower.
** V = Voltage across device. P_d = Power dissipation in tripped state.

Physical characteristics

Lead material	Tin-plated brass to MIL-T-10727B
Lead solderability	Meets EIA specification RS186-9E

Electrical characteristics

Part number	I_H (A)	I_T (A)	V* max. (V)	I max. (A)	P_d max. (W)	Maximum time to trip (A)	(S)	Initial resistance R min. (Ω)	R max. (Ω)	1 hr post reflow R_1 max. (Ω)
SMD030	0.30	0.6	60	10	1.7	1.5	3.0	1.200	2.400	4.80
SMD050	0.50	1.0	60	10	1.7	2.0	4.0	0.350	0.700	1.40
SMD075	0.75	1.5	30	40	1.7	8.0	0.3	0.350	0.500	1.00
SMD100	1.10	2.2	30	40	1.7	8.0	0.5	0.120	0.240	0.48
SMD100-2018	1.10	2.2	15	40	1.7	8.0	0.5	0.100	0.150	0.48
SMD125	1.25	2.5	15	40	1.7	8.0	2.0	0.070	0.140	0.25
SMD150	1.50	3.0	15	40	1.9	8.0	5.0	0.060	0.120	0.25
SMD200	2.00	4.0	15	40	1.9	8.0	12.0	0.050	0.070	0.15
SMD250	2.50	5.0	15	40	1.9	8.0	25.0	0.045	0.065	0.10

I_H = Hold current—maximum current device will pass without interruption in 20°C still air environment.
I_T = Trip current, minimum current that will switch the device from low resistance to high resistance in 20°C still air.
V max. = Maximum voltage device can withstand without damage at rated current.
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 environment.
R_1 max. measured 1 hour post reflow with reflow conditions of 260°C for 20 secs.
* Voltage rating is V_{RMS} except for SMD 100-2018, which is 15 Vdc.

Environmental specifications

Test	Test method	Conditions	Resistance change
Passive aging	Raychem PS300, Section 5.3.2	70°C, 1000 hours	±2% typical
		85°C, 1000 hours	±5% typical
Humidity	Raychem PS300, Section 5.3.1	85°C, 95% R.H. 7 days	±5% typical
Thermal shock	MIL-STD-202, Method 107G	85°C, -40°C/20x	-3% typical
		125°C, -55°C/10x	-3% typical
Vibration	MIL-STD-883C	MIL-STD-883C	No change
Solvent resistance	Raychem PS300, Section 5.2.2, with the following solvents:	Freon	No change
		Trichlorofluoroethylene	No change
		Hydrocarbons	No change

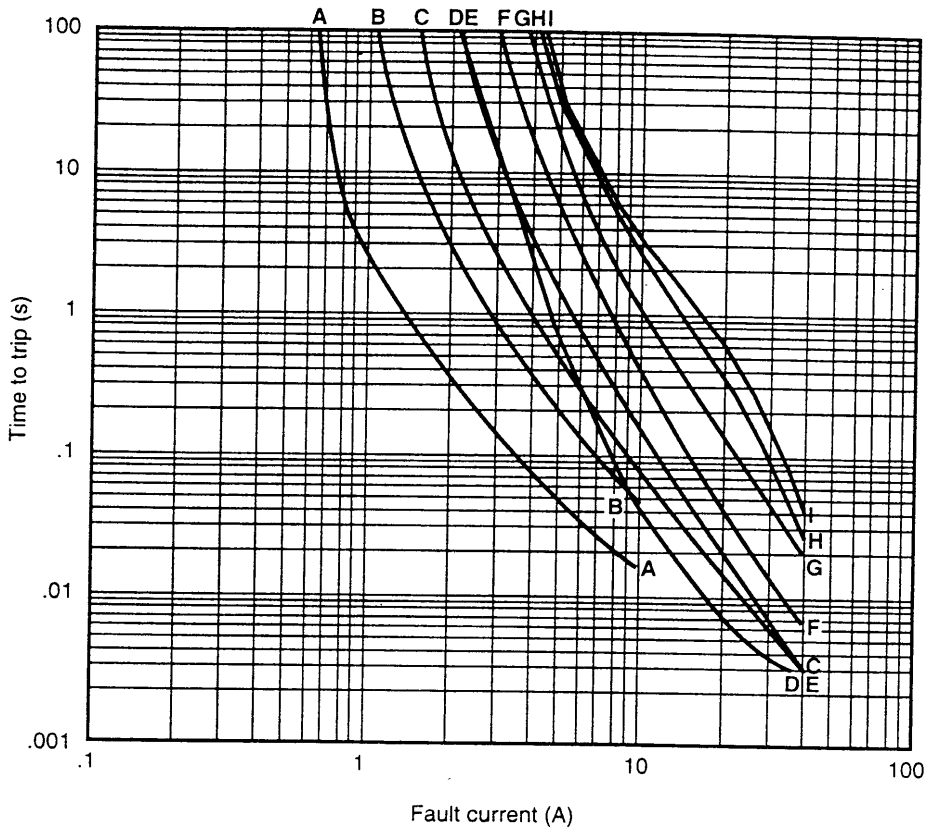
Approvals and reference documents

Agency approvals	UL-recognized component under file #E74889, Thermistor Type Devices (XGPU2); CSA-recognized under file CA 78165-1; TUV approval.
Reference documents	Application bulletins:
	Computer Applications of PolySwitch Devices
	PCMCIA
	Disk Drive
	Engineering Note SMD 1.01, Principal characteristics of PolySwitch SMD devices when reflowed.
	RS300, Test Methods and Requirements for PolySwitch Devices

Performance curves

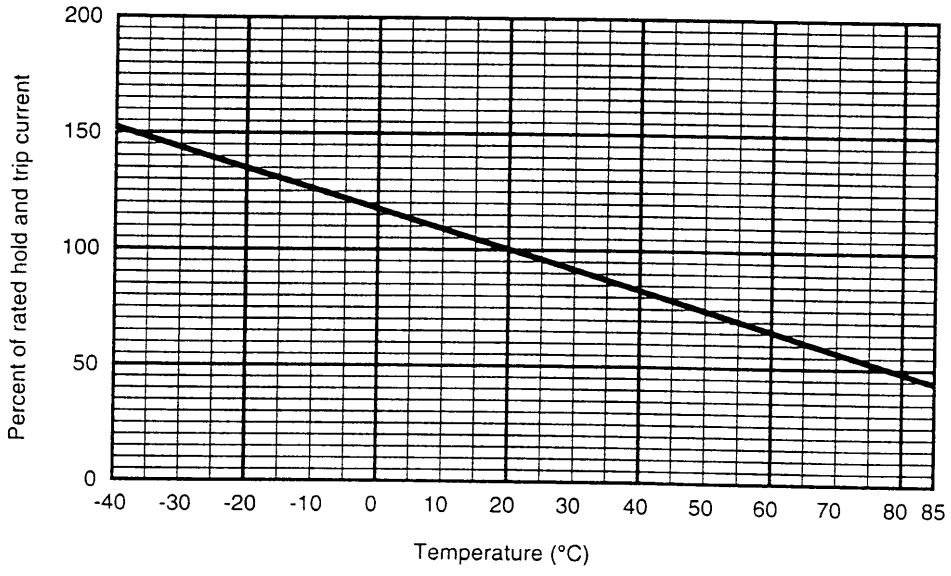
Typical time to trip at 20°C

A = SMD030
B = SMD050
C = SMD075
D = SMD100
E = SMD100-2018
F = SMD125
G = SMD150
H = SMD200
I = SMD250



Example: The SMD125 will typically trip within .400 sec at a fault current of 10 A.

Thermal derating



Example: At 55°C, the hold current for a SMD125 is .875 A and the trip current is 1.75 A, which is 70% of their rated values.