

- Small size
- Low resistance
- High hold currents
- Remotely resettable fuses
- Latching operation
- Rugged, monolithic construction

PolySwitch RUE

R-Line PTC
overcurrent protection

608-890 → 609-018

Overcurrent and overtemperature 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 a specific point.

Normally just tens of milliohms, the resistance of the PolySwitch device increases by orders of magnitude when switched. This increase limits circuit current to several 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.

Rugged, monolithic construction

Since they are made from solid-state material, PolySwitch devices have no moving parts that can be damaged.

Wide variety of applications

Possible applications for PolySwitch devices include:

- audio speakers
- batteries
- motors
- power supplies
- transformers
- solenoids
- PBXs
- telephones
- modems
- key telephone systems
- medical equipment
- test instruments
- industrial control circuits
- computers
- automotive small motor and electronics circuits

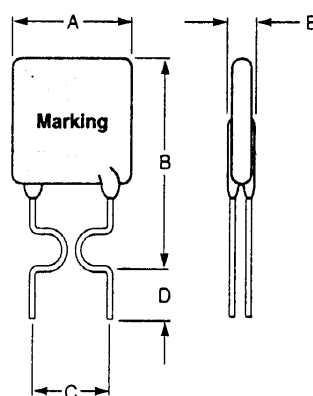
Product dimensions (in millimeters)

Part number	A max.	B max.	C typ.	D min.	E max.
RUE090	6.6	12.2	5.1	7.6	3.0
RUE110	6.6	14.2	5.1	7.6	3.0
RUE135	8.9	13.5	5.1	7.6	3.0
RUE160	8.9	15.2	5.1	7.6	3.0
RUE185	10.2	15.7	5.1	7.6	3.0
RUE250	11.4	18.3	5.1	7.6	3.0
RUE300	11.4	17.3	5.1	7.6	3.0
RUE400	14.0	20.1	5.1	7.6	3.0
RUE500	14.0	24.9	10.2	7.6	3.0
RUE600	16.5	24.9	10.2	7.6	3.0
RUE700	19.1	26.7	10.2	7.6	3.0
RUE800	21.6	29.2	10.2	7.6	3.0
RUE900	24.1	29.7	10.2	7.6	3.0

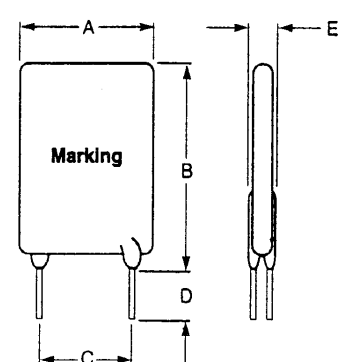
Lead size

RUE090-RUE250 Ø 0.51 mm (24 AWG)
RUE300-RUE900 Ø 0.81 mm (20 AWG)

RUE090-RUE250



RUE300-RUE900



Operating characteristics

Maximum voltage	30 Vrms
Maximum interrupt current*	40 A
Operating/storage temperature range	-40°C to 85°C
Maximum surface temperature	125°C in tripped state
Typical reset time	<20 seconds (at 20°C), after power removed
Device resistance in tripped state**	V^2/P_d

* Note: Device may withstand higher interrupt current at lower voltages. Each application will need to be individually qualified.

** Note: Device will reset when $V^2/4R_L < P_d$ (R_L = load resistance, V = circuit voltage, P_d = power dissipated in tripped state).

Physical characteristics

Lead material	RUE090-250: 24 AWG Sn-plated Fe (= 0.51 mm) RUE300-900: 20 AWG Sn-plated Cu (= 0.81 mm)
Soldering characteristics	Solderability per MIL-STD-202, Method 208E Solder heat withstand per MIL-STD-202, Method 210, Condition B
Insulating material	Cured, flame-retardant epoxy polymer, meets UL94V-O requirements

Electrical characteristics (20°C)

Part Number	I_H (A)	I_T (A)	Max. time to trip @ $5 \times I_H$ (s)	P_d (W)	Initial resistance		Post trip resistance
					R min. (Ω)	R max. (Ω)	R ₁ max. (Ω)
RUE090	0.90	1.80	5.9	0.6	0.070	0.12	0.22
RUE110	1.10	2.20	6.6	0.7	0.050	0.10	0.17
RUE135	1.35	2.70	7.3	0.8	0.040	0.08	0.13
RUE160	1.60	3.20	8.0	0.9	0.030	0.07	0.11
RUE185	1.85	3.70	8.7	1.0	0.030	0.06	0.09
RUE250	2.50	5.00	10.3	1.2	0.020	0.04	0.07
RUE300	3.00	6.00	10.8	2.0	0.020	0.05	0.08
RUE400	4.00	8.00	12.7	2.5	0.010	0.03	0.05
RUE500	5.00	10.00	14.5	3.0	0.010	0.03	0.05
RUE600	6.00	12.00	16.0	3.5	0.005	0.02	0.04
RUE700	7.00	14.00	17.5	3.8	0.005	0.02	0.03
RUE800	8.00	16.00	18.8	4.0	0.005	0.02	0.02
RUE900	9.00	18.00	20.0*	4.2	0.005	0.01	0.02

I_H = Hold current. The maximum current at which the device will not trip at 20°C.

I_T = Trip current. The minimum current at which the device will always trip at 20°C.

P_d = Typical power dissipation. Typical amount of power dissipated by the device when in tripped state in 20°C still air environment.

R min. = Minimum device resistance at 20°C prior to tripping.

R max. = Maximum device resistance at 20°C prior to tripping.

R₁ max. = Maximum device resistance at 20°C measured 1 hour post trip.

* Device tested at 40 A.

Environmental specifications

Test	Test method	Conditions	Resistance change
Passive aging	Raychem PS300	70°C, 1000 hours	±5%
		85°C, 1000 hours	±5%
Humidity aging	Raychem PS300	85°C, 85% R.H., 1000 hours	±5%
Thermal shock	Raychem PS300	125°C, -55°C (ten times)	±5%
Solvent resistance	Raychem PS300, Method 215	MIL-STD-202, Method 215F	No change

Approvals and reference documents

Agency approvals

UL-recognized component under file #E74889, thermistor type devices (X6PU2)

CSA-recognized component under file CA 78165-1

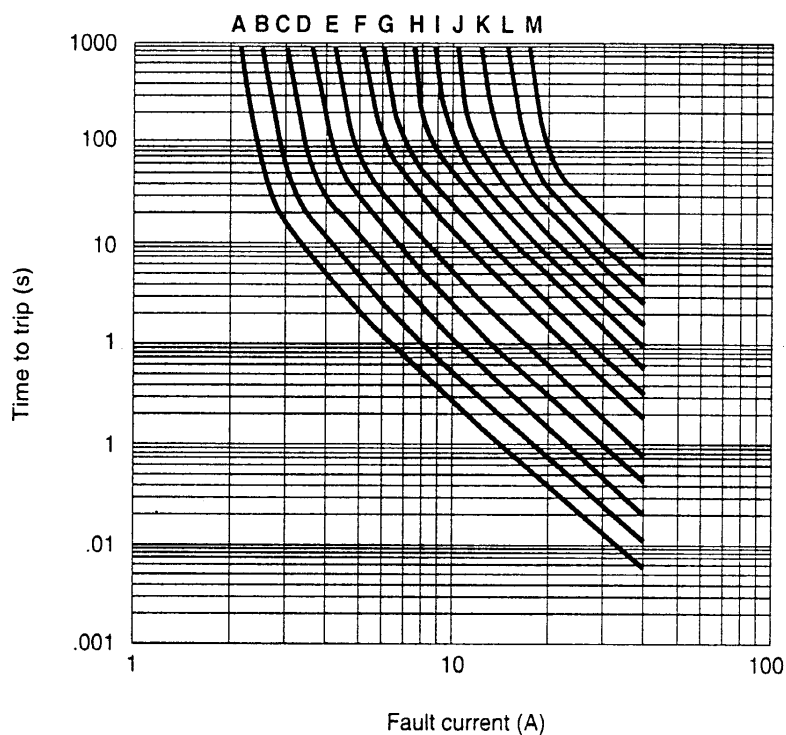
Reference documents

PS300 Test Methods and Requirements for PolySwitch Devices

Performance curves

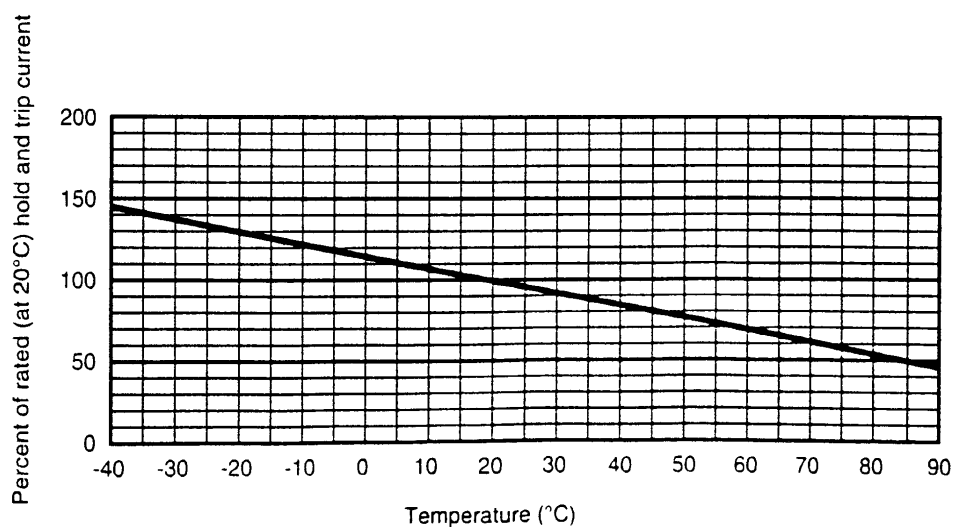
Typical time to trip at 20°C

A = RUE090
B = RUE110
C = RUE135
D = RUE160
E = RUE185
F = RUE250
G = RUE300
H = RUE400
I = RUE500
J = RUE600
K = RUE700
L = RUE800
M = RUE900



Example: The typical time to trip of RUE110 at 8 A is 1 second.

Thermal derating



Example: At 60°C, the hold current of an RUE300 is 2.1 A and the trip current is 4.2 A—70 percent of their rated values.

Ordering information

Packaging

Bulk	Product supplied in bags; multiples of 500 pieces per bag
Tape and reel	RUE090 through RUE250 available per EIA RS-468-A and IEC 286-2 RUE300 and RUE400 available per PolySwitch Tape and Reel Selection Guide*
AMMO pack	RUE090 through RUE250 available per EIA RS-468-A and IEC 286-2 RUE300 and RUE400 available per PolySwitch Tape and Reel Selection Guide*

* Note: PolySwitch Tape and Reel Selection Guide available upon request.

Part numbering system

RUEXXX - suffix

- 2 = Tape and reel
- AP = AMMO pack
- 1 = 25.4 mm (1") minimum lead length

XXX = Current rating

Part marking system

X - □ □

Voltage rating

PolySwitch symbol

U □ □ □

Part I.D. (last three digits of part number)

Second letter of part number

□ □ □ □

Lot number (may be on back)

Caution

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

Note:

These devices are intended for over-current/overtemperature protection, not for continual, repeated tripping.

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