tyco Electronics

Power Components

PolySwitch Resettable Device Short Form Catalog

JUNE 2003

OVERVIEW

Raychem's families of PolySwitch™ resettable devices continue to expand to include devices with wider voltage, current, and temperature ranges. PolySwitch devices are thermistors based on a polymer positive temperature coefficient (PPTC) material. Standard product families of PolySwitch devices are available in radial-leaded, axial, and surface-mount configurations. Many have received UL component recognition and meet the requirements of other agencies, including CSA and TÜV.

PolySwitch Resettable Device Benefits:

- Reduced warranty and service costs
- Increased reliability
- Superior shock and vibration withstand
- Automated insertion
- Wide variety of applications

Features:

- Remotely resettable
- Testable
- Solid-state
- Tape and reel
- Variety of form factors
- Low resistance

PolySwitch devices are used in a wide variety of applications:

Automotive

- Actuators and medium motors
- Trace protection
- Wire harnesses
- Electronic control modules

Battery Protection

- Lithium cells and battery packs
- Rechargeable battery packs
- Chargers

Computers and Peripherals

- DDC.2 computer video ports
- Hard disk drives/storage devices
- IEEE 1394 ports
- Mouse and keyboard ports
- USB (Universal Serial Bus) ports
- PC (PCMCIA) cards and sockets
- SCSI

Industrial

- MOSFET device protection
- Motors, fans, and blowers
- POS equipment
- Process and industrial controls
- Security and fire alarm systems
- Test and measurement equipment
- Transformers
- Medical electronics

Consumer

- Loudspeakers
- Satellite video receivers

Telecommunications & Networking

- Customer premise equipment
- Primary protection: MDF modules, Network Interface Devices (NIDs)
- Analog modems, ISDN and xDSL equipment
- WAN, LAN, T1/E1 Equipment
- Access network equipment, Central Office switches
- Cable power passing taps
- UL 60950, Telcordia GR-1089, GR-974 power fault protection
- ITU-T K.20, K.21, K.45 resistibility requirements
- Distributed power supplies

What's New Inside:

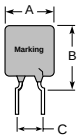
- Radial-Leaded Products
  - LVR
  - Lead-free RXE
  - Lead-free RTE
  - Lead-free RUE
  - Lead-free RUSB
- Surface-Mount Products
  - Lead-free nanoSMD
  - Lead-free microSMD
  - Lead-free miniSMD
  - Lead-free SMD

power components

Raychem CIRCUIT PROTECTION

The AGR, AHR, AHS and ASMD series devices are qualified to operate in automotive environments per the AEC-Q200 Stress Test Qualification for Passive Electronics in automotive applications. This specification requires devices to pass a rigorous test plan designed for automotive environments. Raychem Circuit Protection's document is PS400.

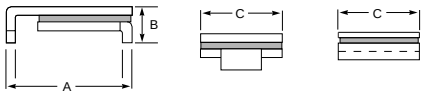
Figure 1



Lead size
AGR400-1100, AHR450-1000
Ø 0.81 *(0.032)*
20 AWG

Lead size
AGR1200-1400, AHR1300
Ø 1.0 *(0.04)*
18 AWG

Figure 2



Side view *End view* *End view (AHS080 only)*

AGR: Radial-Leaded

Part number	I_H* (A) R_1max.	I_H* (A) $R_a$max.	V max. (Vdc)	I max. (A)	R min. (Ω)	R_1max. (Ω)	$R_a$max. (Ω)	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (typ.)	Fig.
AGR400	4.0	3.0	16	100	0.0186	0.0610	0.0850	8.90 *(0.35)*	14.1 *(0.56)*	5.08 *(0.2)*	*1*
AGR500	5.0	4.3	16	100	0.0140	0.0340	0.0480	10.40 *(0.41)*	15.6 *(0.61)*	5.08 *(0.2)*	*1*
AGR600	6.0	5.3	16	100	0.0095	0.0280	0.0320	10.70 *(0.42)*	18.4 *(0.73)*	5.08 *(0.2)*	*1*
AGR700	7.0	6.5	16	100	0.0066	0.0200	0.0220	11.20 *(0.44)*	21.0 *(0.83)*	5.08 *(0.2)*	*1*
AGR800	8.0	7.6	16	100	0.0049	0.0175	0.0181	12.70 *(0.50)*	22.2 *(0.88)*	5.08 *(0.2)*	*1*
AGR900	9.0	8.6	16	100	0.0041	0.0135	0.0140	14.00 *(0.55)*	23.0 *(0.91)*	5.08 *(0.2)*	*1*
AGR1000	10.0	9.6	16	100	0.0034	0.0102	0.0106	16.51 *(0.65)*	25.7 *(1.01)*	5.08 *(0.2)*	*1*
AGR1100	11.0	10.5	16	100	0.0033	0.0089	0.0093	17.50 *(0.69)*	26.5 *(1.04)*	5.08 *(0.2)*	*1*
AGR1200	12.0	11.5	16	100	0.0030	0.0086	0.0091	17.50 *(0.69)*	28.8 *(1.14)*	10.20 *(0.4)*	*1*
AGR1400	14.0	13.0	16	100	0.0022	0.0064	0.0067	23.50 *(0.93)*	28.7 *(1.13)*	10.20 *(0.4)*	*1*

*Hold current @ 25°C.

AHR: High Temp Radial-Leaded

Part number	I_H* (A) R_1max.	I_H* (A) $R_a$max.	V max. (Vdc)	I max. (A)	R min. (Ω)	R_1max. (Ω)	$R_a$max. (Ω)	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (typ.)	Fig.
AHR450	4.5	4.5	16	100	0.0170	0.054	0.054	10.4 *(0.41)*	15.6 *(0.61)*	5.08 *(0.2)*	*1*
AHR600	6.0	6.0	16	100	0.0100	0.032	0.032	11.2 *(0.44)*	21.0 *(0.83)*	5.08 *(0.2)*	*1*
AHR650	6.5	6.5	16	100	0.0090	0.026	0.026	12.7 *(0.50)*	22.2 *(0.88)*	5.08 *(0.2)*	*1*
AHR750	7.5	7.5	16	100	0.0074	0.022	0.022	14.0 *(0.55)*	23.5 *(0.93)*	5.08 *(0.2)*	*1*
AHR1000	10.0	10.0	16	100	0.0051	0.015	0.015	17.5 *(0.69)*	26.5 *(1.04)*	10.20 *(0.4)*	*1*
AHR1300	13.0	13.0	16	100	0.0034	0.010	0.010	23.5 *(0.93)*	28.7 *(1.13)*	10.20 *(0.4)*	*1*

*Hold current @ 25°C.

AHS: High Temp Surface-Mount

Part number	I_H* (A) R_1max.	I_H* (A) $R_a$max.	V max. (Vdc)	I max. (A)	R min. (Ω)	R_1max. (Ω)	$R_a$max. (Ω)	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (typ.)	Fig.
AHS080-2018	0.80	0.8	16	70	0.170	0.550	0.550	5.44 *(0.214)*	1.52 *(0.060)*	4.93 *(0.194)*	*2*
AHS160	1.60	1.6	16	70	0.050	0.150	0.150	9.40 *(0.370)*	3.00 *(0.118)*	6.60 *(0.260)*	*2*

*Hold current @ 25°C.

ASMD: Surface-Mount

Part number	I_H (A) R_1max.	I_H (A) $R_a$max.	V max. (Vdc)	I max. (A)	R min. (Ω)	R_1max. (Ω)	$R_a$max. (Ω)	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
ASMD030*	0.23	0.23	60	10	0.980	4.800	4.800	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*2*
ASMD050	0.39	0.39	60	10	0.029	1.400	1.400	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*2*
ASMD075*	0.60	0.60	30	40	0.029	1.000	1.000	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*2*
ASMD100*	0.90	0.90	30	40	0.098	0.480	0.480	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*2*
ASMD125	1.04	1.04	15	40	0.057	0.250	0.250	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*2*
ASMD150	1.27	1.27	15	40	0.049	0.250	0.250	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*2*
ASMD200	1.73	1.73	15	40	0.050	0.120	0.120	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*2*
ASMD250*	1.97	1.97	15	40	0.035	0.085	0.085	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*2*

*Hold current @ 25°C.

240V

The LVR series is the first PolySwitch device family designed for use at line voltages of $120V_{AC}$ to $240V_{AC}$. They may be used to help provide primary side protection of chargers, power supplies, and control transformers in many industrial, commercial and consumer applications. They are also appropriate to help protect many $120V_{AC}$ or $240V_{AC}$ motors. In addition, the LVR series is lead-free.

Figure 1

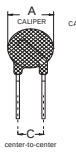
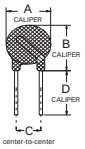


Figure 2



Lead size
LVR005-016
Ø 0.51 *(0.020)*
24 AWG

Figure 3

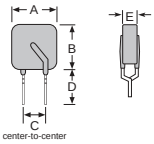
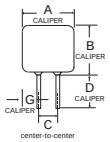


Figure 4



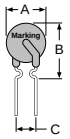
Lead size
LVR025–040
Ø 0.81 *(0.032)*
20 AWG

	Part number	I_H (A)	V max. (Vac)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (nom.)	Fig.
New	LVR005K	0.05	240	1.0	65.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	12.9 *(0.51)*	5.08	1
New	LVR005S	0.05	240	1.0	65.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	10.7 *(0.43)*	5.08	2
New	LVR008K	0.08	240	1.2	26.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	12.9 *(0.51)*	5.08	1
New	LVR008S	0.08	240	1.2	26.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	10.7 *(0.43)*	5.08	2
New	LVR012K	0.12	240	1.2	12.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	12.9 *(0.51)*	5.08	1
New	LVR012S	0.12	240	1.2	12.0	UL, TÜV (CSA coming soon)	8.3 *(0.33)*	10.7 *(0.43)*	5.08	2
New	LVR016K	0.16	240	2.0	7.8	UL, TÜV (CSA coming soon)	9.9 *(0.39)*	13.8 *(0.54)*	5.08	1
New	LVR016S	0.16	240	2.0	7.8	UL, TÜV (CSA coming soon)	9.9 *(0.39)*	12.5 *(0.50)*	5.08	1
New	LVR025K	0.25	240	3.5	3.8	UL, TÜV, CSA	9.6 *(0.38)*	18.8 *(0.74)*	5.08	3
New	LVR025S	0.25	240	3.5	3.8	UL, TÜV, CSA	9.6 *(0.38)*	17.4 *(0.69)*	5.08	4
New	LVR040K	0.40	240	5.5	1.9	UL, TÜV (CSA coming soon)	11.5 *(0.46)*	20.9 *(0.82)*	5.08	3
New	LVR040S	0.40	240	5.5	1.9	UL, TÜV (CSA coming soon)	11.5 *(0.46)*	19.5 *(0.77)*	5.08	4

60V - 72V

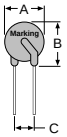
The RXE series devices offer hold currents ranging from 50mA to 3.75A while offering voltage ratings of 60V to 72V. The RXE products are used in a wide range of applications such as power input, and I/O port protection. They are also used in many markets including computer/multimedia, industrial equipment and controls, consumer, general electronics and communications and networking.

Figure 1



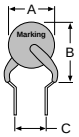
Lead size
RXE010–090
Ø 0.51 *(0.020)*
24 AWG

Figure 2



Lead size
RXE110-375
Ø 0.81 *(0.032)*
20 AWG

Figure 3



Lead size
RXE005
Ø 0.40 *(0.016)*
26 AWG

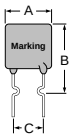
Part number	I_H (A)	V max. (V)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	Fig.
RXE005	0.05	60	40	20.00	UL, TÜV, CSA	8.0 *(0.32)*	8.3 *(0.33)*	5.08 *(0.20)*	*3*
RXE010	0.10	60	40	7.50	UL, TÜV, CSA	7.4 *(0.29)*	11.6 *(0.46)*	5.08 *(0.20)*	*1*
RXE017	0.17	60	40	8.00	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	*1*
RXE020	0.20	72	40	4.40	UL, TÜV, CSA	7.4 *(0.29)*	11.7 *(0.46)*	5.08 *(0.20)*	*1*
RXE025	0.25	72	40	3.00	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	*1*
RXE030	0.30	72	40	2.10	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	*1*
RXE040	0.40	72	40	1.29	UL, TÜV, CSA	7.6 *(0.30)*	13.5 *(0.53)*	5.08 *(0.20)*	*1*
RXE050	0.50	72	40	1.17	UL, TÜV, CSA	7.9 *(0.31)*	13.7 *(0.54)*	5.08 *(0.20)*	*1*
RXE065	0.65	72	40	0.72	UL, TÜV, CSA	9.4 *(0.37)*	14.5 *(0.57)*	5.08 *(0.20)*	*1*
RXE075	0.75	72	40	0.60	UL, TÜV, CSA	10.2 *(0.40)*	15.0 *(0.59)*	5.08 *(0.20)*	*1*
RXE090	0.90	72	40	0.47	UL, TÜV, CSA	11.2 *(0.44)*	15.8 *(0.62)*	5.08 *(0.20)*	*1*
RXE110	1.10	72	40	0.38	UL, TÜV, CSA	12.8 *(0.50)*	17.5 *(0.69)*	5.08 *(0.20)*	*2*
RXE135	1.35	72	40	0.30	UL, TÜV, CSA	14.5 *(0.57)*	19.1 *(0.75)*	5.08 *(0.20)*	*2*
RXE160	1.60	72	40	0.22	UL, TÜV, CSA	16.3 *(0.64)*	20.8 *(0.82)*	5.08 *(0.20)*	*2*
RXE185	1.85	72	40	0.19	UL, TÜV, CSA	17.5 *(0.69)*	22.2 *(0.88)*	5.08 *(0.20)*	*2*
RXE250	2.50	72	40	0.13	UL, TÜV, CSA	20.8 *(0.82)*	28.4 *(1.00)*	10.20 *(0.40)*	*2*
RXE300	3.00	72	40	0.10	UL, TÜV, CSA	23.9 *(0.94)*	28.6 *(1.13)*	10.20 *(0.40)*	*2*
RXE375	3.75	72	40	0.08	UL, TÜV, CSA	27.2 *(1.07)*	31.8 *(1.25)*	10.20 *(0.40)*	*2*

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

33V

The RTE series devices offer a 33V rating and tighter trip-to-hold ratios to help comply with the IEEE 1394 specification. These devices can also be used in other applications where the benefit of a tighter trip-to-hold ratio is desired.

Figure 4



Lead size
Ø 0.51 *(0.020)*
24 AWG

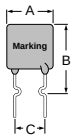
Part number	I_H (A)	V max. (V)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	Fig.
RTE120	1.20	33	40	0.180	UL, TÜV , CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	*4*
RTE135	1.35	33	40	0.143	UL, TÜV , CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	*4*
RTE190	1.90	33	40	0.092	UL, TÜV , CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	*4*

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

30V

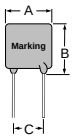
The RUE series devices offer hold currents from 900mA to 9.0A. They are used in many markets including computer/multimedia, industrial equipment and controls, as well as consumer and general electronics.

Figure 5



Lead size
RUE090-250
Ø 0.51 *(0.020)*
24 AWG

Figure 6



Lead size
RUE300–900
Ø 0.81 *(0.032)*
20 AWG

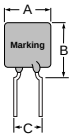
Part number	I_H (A)	V max. (V)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	Fig.
RUE090	0.90	30	40	0.22	UL, TÜV, CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	*5*
RUE110	1.10	30	40	0.17	UL, TÜV, CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	*5*
RUE135	1.35	30	40	0.13	UL, TÜV, CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	*5*
RUE160	1.60	30	40	0.11	UL, TÜV, CSA	8.9 *(0.35)*	15.2 *(0.60)*	5.08 *(0.20)*	*5*
RUE185	1.85	30	40	0.09	UL, TÜV, CSA	10.2 *(0.40)*	15.7 *(0.62)*	5.08 *(0.20)*	*5*
RUE250	2.50	30	40	0.07	UL, TÜV, CSA	11.4 *(0.45)*	18.3 *(0.72)*	5.08 *(0.20)*	*5*
RUE300	3.00	30	40	0.08	UL, TÜV, CSA	11.4 *(0.45)*	17.3 *(0.68)*	5.08 *(0.20)*	*6*
RUE400	4.00	30	40	0.05	UL, TÜV, CSA	14.0 *(0.55)*	20.1 *(0.79)*	5.08 *(0.20)*	*6*
RUE500	5.00	30	40	0.05	UL, TÜV, CSA	14.0 *(0.55)*	24.9 *(0.98)*	10.20 *(0.40)*	*6*
RUE600	6.00	30	40	0.04	UL, TÜV, CSA	16.5 *(0.65)*	24.9 *(0.98)*	10.20 *(0.40)*	*6*
RUE700	7.00	30	40	0.03	UL, TÜV, CSA	19.1 *(0.75)*	26.7 *(1.05)*	10.20 *(0.40)*	*6*
RUE800	8.00	30	40	0.02	UL, TÜV, CSA	21.6 *(0.85)*	29.2 *(1.15)*	10.20 *(0.40)*	*6*
RUE900	9.00	30	40	0.02	UL, TÜV, CSA	24.1 *(0.95)*	29.7 *(1.17)*	10.20 *(0.40)*	*6*

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

16V High Temperature

The RHE series devices offer a high operating temperature (up to 125°C) and the broadest range of hold currents available in the radial-leaded form factor (70mA to 15A). The RHE series devices can also be advantageous for use in standard operating temperatures of up to 85°C because they have a flatter thermal derating curve than other radial-leaded devices. Over the same temperature range, the trip-to-hold ratio is lower for an RHE device compared with other PPTC devices.

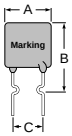
Figure 7



Lead size
RHE450-1000
Ø 0.81 *(0.032)*
20 AWG

Lead size
RHE1300,
RHE1500
Ø 1.0 *(0.04)*
18 AWG

Figure 8



Lead size
RHE070
Ø 0.51 *(0.020)*
24 AWG

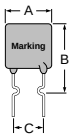
	Part number	I_H* (A)	V max. (Vdc)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	Fig.
Coming Soon	RHE050	0.5	30	TBD	TBD	Pending	7.40 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	TBD
	RHE070	0.7	16	40	0.80	UL, TÜV, CSA	6.86 *(0.27)*	10.8 *(0.43)*	5.08 *(0.20)*	*8*
Coming Soon	RHE100	1.0	30	TBD	TBD	Pending	9.70 *(0.38)*	13.6 *(0.54)*	5.08 *(0.20)*	TBD
Coming Soon	RHE250	2.5	16	TBD	TBD	Pending	TBD	TBD	5.08 *(0.20)*	TBD
	RHE400	4.0	16	100	0.044	UL, TÜV, CSA	11.40 *(0.45)*	18.0 *(0.71)*	5.08 *(0.20)*	*7*
	RHE450	4.5	16	100	0.054	UL, TÜV, CSA	10.40 *(0.41)*	15.6 *(0.61)*	5.08 *(0.20)*	*7*
	RHE600	6.0	16	100	0.032	UL, TÜV, CSA	11.20 *(0.44)*	21.0 *(0.83)*	5.08 *(0.20)*	*7*
	RHE650	6.5	16	100	0.026	UL, TÜV, CSA	12.70 *(0.50)*	22.2 *(0.88)*	5.08 *(0.20)*	*7*
	RHE750	7.5	16	100	0.022	UL, TÜV, CSA	14.00 *(0.55)*	23.5 *(0.93)*	5.08 *(0.20)*	*7*
Coming Soon	RHE900	9.0	16	TBD	TBD	Pending	21.30 *(0.84)*	20.8 *(0.82)*	5.08 *(0.20)*	*TBD*
	RHE1000	10.0	16	100	0.015	UL, TÜV, CSA	17.50 *(0.69)*	26.5 *(1.04)*	10.20 *(0.40)*	*7*
	RHE1300	13.0	16	100	0.010	UL, TÜV, CSA	23.50 *(0.925)*	28.7 *(1.13)*	10.20 *(0.40)*	*7*
	RHE1500	15.0	16	100	0.0092	UL, TÜV, CSA	23.50 *(0.925)*	28.7 *(1.13)*	10.20 *(0.40)*	*7*

*Hold current @ 25°C.
**Device may withstand higher interrupt current at lower voltages. Each application will need to be individually evaluated.

16V

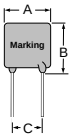
The RUSB series devices were developed for the USB serial bus specification for computer and multimedia applications.

Figure 9



Lead size
RUSB090-250
Ø 0.51 *(0.020)*
24 AWG

Figure 10



Lead size
RGE300-RGE1100
Ø 0.81 *(0.032)*
20 AWG

Lead size
RGE1200-RGE1400
Ø 1.0 *(0.04)*
18 AWG

Part number	I_H (A)	V max. (V)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	
RUSB090	0.90	16	40	0.18	UL, TÜV, CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	*9*
RUSB110	1.10	16	40	0.14	UL, TÜV, CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	*9*
RUSB135	1.35	16	40	0.12	UL, TÜV, CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	*9*
RUSB160	1.60	16	40	0.11	UL, TÜV, CSA	8.9 *(0.35)*	15.2 *(0.60)*	5.08 *(0.20)*	*9*
RUSB185	1.85	16	40	0.09	UL, TÜV, CSA	10.2 *(0.40)*	15.7 *(0.62)*	5.08 *(0.20)*	*9*
RUSB250	2.50	16	40	0.06	UL, TÜV, CSA	11.4 *(0.45)*	18.3 *(0.72)*	5.08 *(0.20)*	*9*

The RGE series devices are rated for 16V and have hold current ranges of 2.5A to 14A. These parts are smaller and trip faster than the RUE devices with the same hold currents. In addition, they have tight trip-to-hold ratios. If the application requires 16V rather than 30V and there are limitations on space, the RGE devices can be the preferred choice. Like the RXE and RUE series devices, the RGE devices are used in many markets including computer/multi-media, industrial equipment and controls, consumer and general electronics, as well as motor protection.

Part number	I_H* (A)	V max. (Vdc)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	
RGE250	2.5	16	100	0.0530	UL, TÜV, CSA	8.9 *(0.35)*	12.8 *(0.50)*	5.8 *(0.23)*	*9*
RGE300	3.0	16	100	0.0980	UL, TÜV, CSA	7.1 *(0.28)*	11.0 *(0.50)*	5.08 *(0.20)*	*10*
RGE400	4.0	16	100	0.0600	UL, TÜV, CSA	8.9 *(0.35)*	12.8 *(0.56)*	5.08 *(0.20)*	*10*
RGE500	5.0	16	100	0.0340	UL, TÜV, CSA	10.4 *(0.41)*	14.3 *(0.67)*	5.08 *(0.20)*	*10*
RGE600	6.0	16	100	0.0280	UL, TÜV, CSA	10.7 *(0.42)*	17.1 *(0.78)*	5.08 *(0.20)*	*10*
RGE700	7.0	16	100	0.0220	UL, TÜV, CSA	11.2 *(0.44)*	19.7 *(0.82)*	5.08 *(0.20)*	*10*
RGE800	8.0	16	100	0.0175	UL, TÜV, CSA	12.7 *(0.50)*	20.9 *(0.85)*	5.08 *(0.20)*	*10*
RGE900	9.0	16	100	0.0135	UL, TÜV, CSA	14.0 *(0.55)*	21.7 *(0.99)*	5.08 *(0.20)*	*10*
RGE1000	10.0	16	100	0.0102	UL, TÜV, CSA	16.5 *(0.65)*	25.2 *(1.02)*	5.08 *(0.20)*	*10*
RGE1100	11.0	16	100	0.0089	UL, TÜV, CSA	17.5 *(0.69)*	26.0 *(1.10)*	5.08 *(0.20)*	*10*
RGE1200	12.0	16	100	0.0086	UL, TÜV, CSA	17.5 *(0.69)*	28.0 *(1.10)*	10.20 *(0.40)*	*10*
RGE1400	14.0	16	100	0.0064	UL, TÜV, CSA	23.5 *(0.92)*	27.9 *(1.10)*	10.20 *(0.40)*	*10*

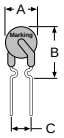
*Hold current @ 25°C.

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

6V

The RUSB series devices were developed for the USB serial bus specification for computer and multimedia applications. These 6V products are particularly well suited for USB computer monitor protection applications where through-hole devices are still the preferred solution.

Figure 11



Lead size
RUSB-6V products
Ø 0.51 *(0.020)*
24 AWG

Part number	I_H (A)	V max. (Vdc)	I max.** (A)	R_1max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (nom.)	Fig.
RUSB075	0.75	6	40	0.23	UL, TÜV, CSA	6.9 *(0.27)*	11.4 *(0.45)*	5.08 *(0.20)*	*11*
RUSB120	1.20	6	40	0.14	UL, TÜV, CSA	6.9 *(0.27)*	11.7 *(0.46)*	5.08 *(0.20)*	*11*
RUSB155	1.55	6	40	0.10	UL, TÜV, CSA	6.9 *(0.27)*	11.7 *(0.46)*	5.08 *(0.20)*	*11*

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

60V – 72V

	Part number	I_H (A)	V max. (V)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	RXEF005	0.05	60	40	20.00	UL, TÜV, CSA	8.0 *(0.32)*	8.3 *(0.33)*	5.08 *(0.20)*	3
New	RXEF010	0.10	60	40	7.50	UL, TÜV, CSA	7.4 *(0.29)*	11.6 *(0.46)*	5.08 *(0.20)*	1
New	RXEF017	0.17	60	40	8.00	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	1
New	RXEF020	0.20	72	40	4.40	UL, TÜV, CSA	7.4 *(0.29)*	11.7 *(0.46)*	5.08 *(0.20)*	1
New	RXEF025	0.25	72	40	3.00	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	1
New	RXEF030	0.30	72	40	2.10	UL, TÜV, CSA	7.4 *(0.29)*	12.7 *(0.50)*	5.08 *(0.20)*	1
New	RXEF040	0.40	72	40	1.29	UL, TÜV, CSA	7.6 *(0.30)*	13.5 *(0.53)*	5.08 *(0.20)*	1
New	RXEF050	0.50	72	40	1.17	UL, TÜV, CSA	7.9 *(0.31)*	13.7 *(0.54)*	5.08 *(0.20)*	1
New	RXEF065	0.60	72	40	0.72	UL, TÜV, CSA	9.4 *(0.37)*	14.5 *(0.57)*	5.08 *(0.20)*	1
New	RXEF075	0.75	72	40	0.60	UL, TÜV, CSA	10.2 *(0.40)*	15.0 *(0.59)*	5.08 *(0.20)*	1
New	RXEF090	0.90	72	40	0.47	UL, TÜV, CSA	11.2 *(0.44)*	15.8 *(0.62)*	5.08 *(0.20)*	1

33V

	Part number	I_H (A)	V max. (V)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	RTEF120	1.20	33	40	0.180	UL, TÜV, CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	4
New	RTEF135	1.35	33	40	0.143	UL, TÜV, CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	4
New	RTEF190	1.90	33	40	0.092	UL, TÜV, CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	4

30V

	Part number	I_H (A)	V max. (V)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	RUEF090	0.90	30	40	0.22	UL, TÜV, CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	5
New	RUEF110	1.10	30	40	0.17	UL, TÜV, CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	5
New	RUEF135	1.35	30	40	0.13	UL, TÜV, CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	5
New	RUEF160	1.60	30	40	0.11	UL, TÜV, CSA	8.9 *(0.35)*	15.2 *(0.60)*	5.08 *(0.20)*	5
New	RUEF185	1.85	30	40	0.09	UL, TÜV, CSA	10.2 *(0.40)*	15.7 *(0.62)*	5.08 *(0.20)*	5
New	RUEF250	2.50	30	40	0.07	UL, TÜV, CSA	11.4 *(0.45)*	18.3 *(0.72)*	5.08 *(0.20)*	5

16V

	Part number	I_H (A)	V max. (V)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	RUSBF090	0.90	16	40	0.18	UL, TÜV, CSA	7.4 *(0.29)*	12.2 *(0.48)*	5.08 *(0.20)*	9
New	RUSBF110	1.10	16	40	0.14	UL, TÜV, CSA	7.4 *(0.29)*	14.2 *(0.56)*	5.08 *(0.20)*	9
New	RUSBF135	1.35	16	40	0.12	UL, TÜV, CSA	8.9 *(0.35)*	13.5 *(0.53)*	5.08 *(0.20)*	9
New	RUSBF160	1.60	16	40	0.11	UL, TÜV, CSA	8.9 *(0.35)*	15.2 *(0.60)*	5.08 *(0.20)*	9
New	RUSBF185	1.85	16	40	0.09	UL, TÜV, CSA	10.2 *(0.40)*	15.7 *(0.62)*	5.08 *(0.20)*	9
New	RUSBF250	2.50	16	40	0.06	UL, TÜV, CSA	11.4 *(0.45)*	18.3 *(0.72)*	5.08 *(0.20)*	9

6V

	Part number	I_H (A)	V max. (Vdc)	I max. (A)	R_1 max. (Ω)	Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	RUSBF075	0.75	6	40	0.23	UL, TÜV, CSA	6.9 *(0.27)*	11.4 *(0.45)*	5.08 *(0.20)*	11
New	RUSBF120	1.20	6	40	0.14	UL, TÜV, CSA	6.9 *(0.27)*	11.7 *(0.46)*	5.08 *(0.20)*	11
New	RUSBF155	1.55	6	40	0.10	UL, TÜV, CSA	6.9 *(0.27)*	11.7 *(0.46)*	5.08 *(0.20)*	11

These product lines consist of radial-leaded and surface-mount devices that help protect against short duration high voltage faults (250-600Vrms). TR and TS products are designed to help meet the protection needs of telecommunications applications. BBR devices provide overcurrent protection of the power tap in hybrid-coaxial applications.

Figure 1

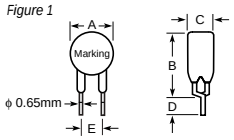
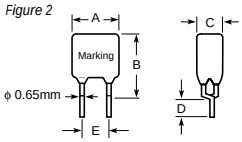


Figure 2



TR250

Part number	I_H (A)	V max. Operating (Vdc)	V max. Interrupt (Vrms)	I max. (A)	R min. (Ω)	R max. (Ω)	R_1 max. (Ω)	Agency recognition	Fig.
TR250-080T	0.080	60	250	3.0	15.0	22.0	33.0	UL, TÜV, CSA	1
TR250-080U	0.080	60	250	3.0	14.0	20.0	33.0	UL, TÜV, CSA	1
TR250-110U	0.110	60	250	3.0	5.0	9.0	16.0	UL, TÜV, CSA	1
TR250-120	0.120	60	250	3.0	4.0	8.0	16.0	UL, TÜV, CSA	2
TR250-120T	0.120	60	250	3.0	7.0	12.0	16.0	UL, TÜV, CSA	2
TR250-120T-RA	0.120	60	250	3.0	7.0	9.0	16.0	UL, TÜV, CSA	2
TR250-120T-RC	0.130	60	250	3.0	5.4	7.5	14.0	UL, TÜV, CSA	2
TR250-120T-RF	0.120	60	250	3.0	6.0	10.5	16.0	UL, TÜV, CSA	2
TR250-120T-R1	0.120	60	250	3.0	6.0	9.0	16.0	UL, TÜV, CSA	2
TR250-120T-R2	0.120	60	250	3.0	8.0	10.5	16.0	UL, TÜV, CSA	2
TR250-120U	0.120	60	250	3.0	6.0	10.0	16.0	UL, TÜV, CSA	2
TR250-120UT	0.120	60	250	3.0	7.0	12.0	16.0	UL, TÜV, CSA	2
TR250-145	0.145	60	250	3.0	3.0	6.0	14.0	UL, TÜV, CSA	2
TR250-145-RA	0.145	60	250	3.0	3.0	5.5	12.0	UL, TÜV, CSA	2
TR250-145-RB	0.145	60	250	3.0	4.5	6.0	12.0	UL, TÜV, CSA	2
TR250-145T	0.145	60	250	3.0	5.4	7.5	14.0	UL, TÜV, CSA	2
TR250-145U	0.145	60	250	3.0	3.5	6.5	12.0	UL, TÜV, CSA	2
TRF250-180†	0.180	100	250	10.0	0.8	2.2	4.0	UL, TÜV, CSA	1

These products are intended for telecom applications. For continuous line voltage applications, see LVR product line. Please see the Raychem Circuit Protection Databook for application details. Most products are available in binned versions for resistance-matched applications. See Raychem Circuit Protection Databook for performance details.
† F is for Pb-free devices.

	Dimensions (millimeters/*inches*)					
Part number	A (max.)	B (max.)	C (max.)	D (min.)	E (typ.)	Fig.
TR250-080T	5.8 *(0.228)*	9.9 *(0.390)*	4.6 *(0.181)*	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 *(0.150)*	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
TRF250-180	9.0 *(0.354)*	12.0 *(0.472)*	3.8 *(0.150)*	4.7 *(0.185)*	5.0 *(0.197)*	1

TS250

Figure 3

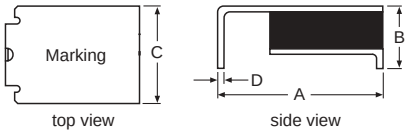


Figure 4

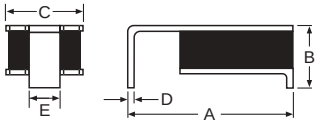
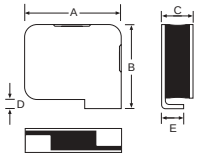


Figure 5



Part number	I_H (A)	V max. Operating (Vdc)	V max. Interrupt (Vrms)	I max. (A)	R min. (Ω)	R max. (Ω)	R_1 max. (Ω)	Agency recognition	Fig.
TS250-130	0.130	60	250 *(650)*	3.0/*(1.1)*	6.5	12.0	20.0	UL, TÜV, CSA	3
TS250-130-RA	0.130	60	250 *(650)*	3.0/*(1.1)*	6.5	9.0	15.0	UL, TÜV, CSA	3
TS250-130-RB	0.130	60	250 *(650)*	3.0/*(1.1)*	9.0	12.0	20.0	UL, TÜV, CSA	3
TS250-130-RC	0.130	60	250 *(650)*	3.0/*(1.1)*	7.0	10.0	17.0	UL, TÜV, CSA	3
TSL250-080	0.080	60	250	3.0/*(1.1)*	5.0	11.0	20.0	UL, TÜV, CSA	4
TSV250-130	0.130	60	250	3.0/*(1.1)*	4.0	7.0	12.0	UL, TÜV, CSA	5

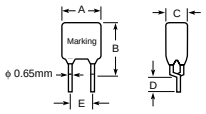
These products are intended for telecom applications. For continuous line voltage applications, see LVR product line. Please see the Raychem Circuit Protection Databook for application details. Most products are available in binned versions for resistance-matched applications. See Raychem Circuit Protection Databook for performance details.

	Dimensions (millimeters/*inches*)				
Part number	A (max.)	B (max.)	C (max.)	D (typ.)	Fig.
TS250-130	9.4 *(0.370)*	3.4 *(0.135)*	7.4 *(0.290)*	0.3 *(0.011)*	3
TS250-130-RA	9.4 *(0.370)*	3.4 *(0.135)*	7.4 *(0.290)*	0.3 *(0.011)*	3
TS250-130-RB	9.4 *(0.370)*	3.4 *(0.135)*	7.4 *(0.290)*	0.3 *(0.011)*	3
TS250-130-RC	9.4 *(0.370)*	3.4 *(0.135)*	7.4 *(0.290)*	0.3 *(0.011)*	3

	Dimensions (millimeters/*inches*)					
	A (max.)	B (max.)	C (max.)	D (max.)	E (max.)	Fig.
TSL250-080	7.9 *(0.310)*	3.7 *(0.145)*	5.3 *(0.210)*	0.4 *(0.015)*	3.1 *(0.120)*	4
TSV250-130	6.1 *(0.240)*	6.9 *(0.270)*	3.0 *(0.126)*	1.9 *(0.075)*	2.3 *(0.091)*	5

TR600

Figure 6



Part number	I_H (A)	V max. Operating (Vdc)	V max. Interrupt (Vrms)	I max. (A)	R min. (Ω)	R max. (Ω)	R_1 max. (Ω)	Agency recognition	Fig.
TR600-150	0.150	60	600	3.0	6.0	12.0	22.0	UL, CSA	6
TR600-150-RA	0.150	60	600	3.0	7.0	10.0	20.0	UL, CSA	6
TR600-150-RB	0.150	60	600	3.0	9.0	12.0	22.0	UL, CSA	6
TR600-160	0.160	250	600	3.0	4.0	10.0	18.0	UL, CSA	6
TR600-160-RA	0.160	250	600	3.0	4.0	7.0	16.0	UL, CSA	6
TR600-160-R1	0.160	250	600	3.0	4.0	8.0	17.0	UL, CSA	6

These products are intended for telecom applications. For continuous line voltage applications, see LVR product line. Please see the Raychem Circuit Protection Databook for application details. Most products are available in binned versions for resistance-matched applications. See Raychem Circuit Protection Databook for performance details.

	Dimensions (millimeters/*inches*)				
Part number	A (max.)	B (max.)	C (max.)	D (min.)	E (max.)	Fig.
TR600-150	13.5 *(0.531)*	12.6 *(0.496)*	6.0 *(0.236)*	4.7 *(0.185)*	5.0 *(0.197)*	6
TR600-160	16.0 *(0.630)*	12.6 *(0.496)*	6.0 *(0.236)*	4.7 *(0.185)*	5.0 *(0.197)*	6

TS600

Figure 7

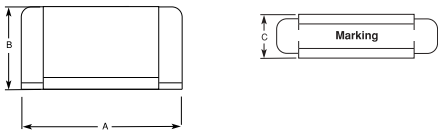
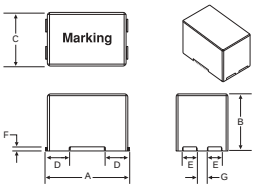


Figure 8



Part number	I_H (A)	V max. Operating (Vdc)	V max. Interrupt (Vrms)	I max. (A)	R min. (Ω)	R max. (Ω)	R_1 max. (Ω)	Agency recognition	Fig.
TS600-170	0.170	60	600	3.0	4.0	9.0	18.0	UL, CSA	7
TS600-200-RA-B-0.5	0.200	60	600	3.0	4.0	7.5	13.5	UL, CSA	7
TSM600-250	0.250	250	600	3.0	1.0	3.5 (typ.)	7.0	UL, CSA	8
TSM600-250-RA	0.250	250	600	3.0	1.0	3.0 (typ.)	5.0	UL, CSA	8

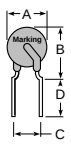
These products are intended for telecom applications. For continuous line voltage applications, see LVR product line. Please see the Raychem Circuit Protection Databook for application details.

	Dimensions (millimeters/*inches*)			
Part number	A (max.)	B (max.)	C (max.)	Fig.
TS600-170	19.4 *(0.765)*	12.3 *(0.485)*	8.3 *(0.325)*	7
TS600-200-RA-B-0.5	19.4 *(0.765)*	12.3 *(0.485)*	8.3 *(0.325)*	7

	Dimensions (millimeters/*inches*)							
Part number	A (max.)	B (max.)	C (max.)	D (max.)	E (max.)	F (max.)	G (min.)	Fig.
TSM600-250	17.6 *(0.691)*	11.7 *(0.460)*	11.2 *(0.440)*	5.2 *(0.230)*	2.8 *(0.111)*	1.0 *(0.038)*	2.0 *(0.080)*	8
TSM600-250-RA	17.6 *(0.691)*	11.7 *(0.460)*	11.2 *(0.440)*	5.2 *(0.230)*	2.8 *(0.111)*	1.0 *(0038)*	2.0 *(0.080)*	8

BBR

Figure 9



Lead size
Ø 0.81 *(0.032)*
20 AWG

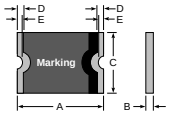
Part number	I_H (A)	V max. (Vdc)	I max. (A)	R min. (Ω)	R max. (Ω)	R_1 max. (Ω)	Agency recognition	Fig.
BBR550	0.55	99	20	0.80	1.30	1.95	UL, CSA	9
BBR750	0.75	99	20	0.40	0.75	1.20	UL, CSA	9

These products are intended for telecom applications. For continuous line voltage applications, see LVR product line. Please see the Raychem Circuit Protection Databook for application details.

	Dimensions (millimeters/*inches*)				
Part number	A (max.)	B (max.)	C (nom.)	D (min.)	Fig.
BBR550	10.9 *(0.43)*	14.0 *(0.55)*	5.08 *(0.2)*	7.6 *(0.3)*	9
BBR750	11.9 *(0.47)*	15.5 *(0.61)*	5.08 *(0.2)*	7.6 *(0.3)*	9

This product line is designed for surface-mount applications. The variety of sizes enables installation in limited space applications such as crowded printed circuit boards, digital cameras, PC cards, subnotebook computers, computer peripheral equipment, and general electronics. These devices are designed for applications where such space is constrained and resettable circuit protection is desired.

Figure 1



Top view *Side view*

Figure 2

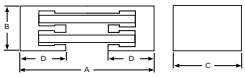
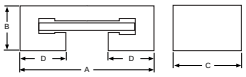


Figure 3



nanoSMDC Series Size: 3216 (mm), 1206 (mils)

						Dimensions (millimeters/*inches*)					
Part number	**I_H* (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**Fig.**
nanoSMDC150	1.50	6	40	0.040	0.11	UL, TÜV, CSA	3.4 *(0.134)*	1.4 *(0.055)*	1.8 *(0.071)*	0.25 *(0.010)*	*1*

*Hold current @ 25°C.

nanoSMDM Series Size: 3216 (mm), 1206 (mils)

						Dimensions (millimeters/*inches*)					
Part number	**I_H* (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**Fig.**
nanoSMDM012	0.125	30	10	1.500	6.00	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM016	0.160	30	10	1.200	4.50	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM050	0.500	6	40	0.150	0.70	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM075	0.750	6	40	0.100	0.29	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM100	1.000	6	40	0.060	0.21	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*

*Hold current @ 25°C.

microSMD Series Size: 3225 (mm), 1210 (mils)

							Dimensions (millimeters/*inches*)					
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**E (min.)**	**Fig.**
microSMD005	0.05	30	10	3.60	50.00	UL, TÜV, CSA	3.43 *(0.135)*	0.85 *(0.034)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD010	0.10	30	10	2.10	15.00	UL, TÜV, CSA	3.43 *(0.135)*	0.85 *(0.034)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD035	0.35	6	40	0.32	1.30	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD050	0.50	13.2	40	0.25	0.90	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD075	0.75	6	40	0.11	0.40	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD110	1.10	6	40	0.07	0.21	UL, TÜV, CSA	3.43 *(0.135)*	0.48 *(0.019)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
microSMD150	1.50	6	40	0.04	0.11	UL, TÜV, CSA	3.43 *(0.135)*	1.22 *(0.048)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*

miniSMDC Series Size: 4532 (mm), 1812 (mils)

							Dimensions (millimeters/*inches*)					
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**E (min.)**	**Fig.**
miniSMDC014	0.14	60	10	1.500	6.000	UL, TÜV, CSA	4.73 *(0.186)*	0.89 *(0.035)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC020	0.20	30	10	.0600	3.300	UL, TÜV, CSA	4.73 *(0.186)*	0.89 *(0.035)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC050	0.50	24	40	0.150	1.000	UL, TÜV, CSA	4.73 *(0.186)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC075	0.75	13.2	40	0.110	0.450	UL, TÜV, CSA	4.73 *(0.186)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC110	1.10	8	40	0.040	0.210	UL, TÜV, CSA	4.73 *(0.186)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC125	1.25	6	40	0.050	0.140	UL, TÜV, CSA	4.73 *(0.186)*	0.48 *(0.019)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC150	1.50	6	40	0.040	0.110	UL, TÜV, CSA	4.73 *(0.186)*	0.48 *(0.019)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC200	2.00	6	40	0.020	0.070	UL, TÜV, CSA	4.73 *(0.186)*	1.22 *(0.048)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
miniSMDC260	2.60	6	40	0.015	0.047	UL, TÜV, CSA	4.73 *(0.186)*	1.25 *(0.050)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*

miniSMDM Series Size: 4532 (mm), 1812 (mils)

							Dimensions (millimeters/*inches*)					
Part number	**I_H* (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**E (min.)**	**Fig.**
miniSMDM075	0.75	13.2	40	0.100	0.290	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*3*
miniSMDM075/24	0.75	24	40	0.090	0.290	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM110	1.10	8	40	0.060	0.180	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*3*
miniSMDM110/16	1.10	16	40	0.060	0.180	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM150/24	1.50	24	20	0.040	0.120	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM160	1.60	8	40	0.033	0.099	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM200	2.00	8	40	0.020	0.060	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM260	2.60	6	40	0.010	0.043	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*

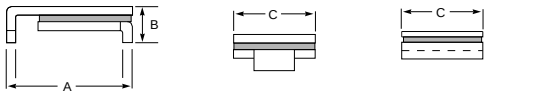
*Hold current @ 25°C.

miniSMDE Series Size: 11550 (mm), 4420 (mils)

							Dimensions (millimeters/*inches*)					
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**D (min.)**	**E (min.)**	**Fig.**
miniSMDE190	1.90	16	100	0.024	0.08	UL, TÜV, CSA	11.51 *(0.453)*	0.53 *(0.021)*	5.33 *(0.210)*	0.51 *(0.020)*	0.381 *(0.015)*	*1*

This product line is also designed for surface-mount applications. The products range in hold currents from 0.3A to 3.0A and voltages from 6V to 60V. These devices are suited for high-density board applications in computer and computer peripheral products, telecommunications, and general electronics applications. They are designed to be reflowed onto a printed circuit board using standard surface-mount processes.

Figure 4



Side view *End view* *End view* (midSMD products only)

midSMD Series Size: 5050 (mm), 2018 (mils)

						Dimensions (millimeters/*inches*)				
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**Fig.**
SMD030-2018	0.30	60	20	0.500	2.300	UL, TÜV, CSA	5.44 *(0.214)*	1.78 *(0.070)*	4.93 *(0.194)*	*4*
SMD050-2018	0.55	57	10	0.200	1.000	UL, TÜV, CSA	5.44 *(0.214)*	1.78 *(0.070)*	4.93 *(0.194)*	*4*
SMD100-2018	1.10	15	40	0.100	0.400	UL, TÜV, CSA	5.44 *(0.214)*	1.52 *(0.060)*	4.93 *(0.194)*	*4*
SMD150-2018	1.50	15	40	0.070	0.180	UL, TÜV, CSA	5.44 *(0.214)*	1.52 *(0.060)*	4.93 *(0.194)*	*4*
SMD200-2018	2.00	6	40	0.048	0.100	UL, TÜV, CSA	5.44 *(0.214)*	1.52 *(0.060)*	4.93 *(0.194)*	*4*

SMD Series Size: 7555 (mm), 2920 (mils)

						Dimensions (millimeters/*inches*)				
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**Fig.**
SMD030	0.30	60	10	1.200	4.800	UL, TÜV, CSA	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*4*
SMD050	0.50	60	10	0.350	1.400	UL, TÜV, CSA	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*4*
SMD075	0.75	30	40	0.350	1.000	UL, TÜV, CSA	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*4*
SMD100	1.10	30	40	0.120	0.480	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*
SMD100/33	1.10	33	40	0.120	0.410	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*
SMD125	1.25	15	40	0.070	0.250	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*
SMD260	2.60	6	40	0.025	0.075	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*
SMD260-RB	2.60	6	40	0.030	0.075	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*
SMD300	3.00	6	40	0.015	0.048	UL, TÜV, CSA	7.98 *(0.314)*	3.00 *(0.118)*	5.44 *(0.214)*	*4*

SMD2 Series Size: 8763 (mm), 3425 (mils)

						Dimensions (millimeters/*inches*)				
Part number	**I_H (A)**	**V max. (Vdc)**	**I max. (A)**	**R_{min} (Ω)**	**R_1 max. (Ω)**	**Agency recognition**	**A (max.)**	**B (max.)**	**C (max.)**	**Fig.**
SMD150	1.50	15	40	0.060	0.250	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
SMD150/33	1.50	33	40	0.080	0.230	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
SMDH160	1.60	16	70	0.050	0.150	—	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
SMD185	1.80	33	40	0.065	0.165	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
SMD200	2.00	15	40	0.050	0.125	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
SMD250	2.50	15	40	0.035	0.085	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*

nanoSMDC Series Size: 3216 (mm), 1206 (mils)

	Part number	I_H* (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Dimensions (millimeters/*inches*) Agency recognition	A (max.)	B (max.)	C (max.)	D (min.)	Fig.
New	nanoSMDC050F/13.2	0.50	13.2	40	0.20	0.800	UL, TÜV, CSA	3.4 *(0.134)*	.38 *(0.015)*	1.8 *(0.071)*	0.15 *(0.006)*	*1*
New	nanoSMDC075F	0.75	6	40	0.12	0.400	UL, TÜV, CSA	3.4 *(0.134)*	.38 *(0.015)*	1.8 *(0.071)*	0.15 *(0.006)*	*1*
New	nanoSMDC110F	1.10	6	40	0.07	0.200	UL, TÜV, CSA	3.4 *(0.134)*	1.00 *(0.039)*	1.8 *(0.071)*	0.25 *(0.010)*	*1*
Coming Soon	nanoSMDC125F	1.25	6	40	0.05	0.140	UL, TÜV, CSA	3.4 *(0.134)*	1.40 *(0.055)*	1.8 *(0.071)*	0.25 *(0.010)*	*1*
New	nanoSMDC150F	1.50	6	40	0.04	0.110	UL, TÜV, CSA	3.4 *(0.134)*	1.40 *(0.055)*	1.8 *(0.071)*	0.25 *(0.010)*	*1*

*Hold current @ 25°C.

nanoSMDM Series Size: 3216 (mm), 1206 (mils)

Part number	I_H* (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Dimensions (millimeters/*inches*) Agency recognition	A (max.)	B (max.)	C (max.)	D (min.)	Fig.
nanoSMDM012F	0.125	30	10	1.50	6.00	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM020F	0.200	24	10	0.65	2.60	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM050F	0.500	6	40	0.15	0.70	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM050F/13.2	0.500	13.2	40	0.15	0.70	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM075F	0.750	6	40	0.10	0.29	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*
nanoSMDM100F	1.000	6	40	0.06	0.21	UL, TÜV, CSA	3.4 *(0.134)*	1.2 *(0.047)*	1.8 *(0.071)*	0.75 *(0.030)*	*3*

*Hold current @ 25°C.

microSMD Series Size: 3225 (mm), 1210 (mils)

	Part number	I_H (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	D (min.)	E (min.)	Fig.
New	microSMD010F	0.10	30	10	2.10	15.00	UL, TÜV, CSA	3.43 *(0.135)*	0.85 *(0.034)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	microSMD035F	0.35	6	40	0.32	1.30	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	microSMD050F	0.50	13.2	40	0.25	0.90	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	microSMD075F	0.75	6	40	0.11	0.40	UL, TÜV, CSA	3.43 *(0.135)*	0.62 *(0.025)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
	microSMD110F	1.10	6	40	0.07	0.21	UL, TÜV, CSA	3.43 *(0.135)*	0.48 *(0.019)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	microSMD150F	1.50	6	40	0.04	0.11	UL, TÜV, CSA	3.43 *(0.135)*	1.22 *(0.048)*	2.80 *(0.110)*	0.25 *(0.010)*	0.20 *(0.008*	*1*

miniSMDC Series Size: 4532 (mm), 1812 (mils)

	Part number	I_H (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	D (min.)	E (min.)	Fig.
New	miniSMDC014F	0.14	60	10	1.500	6.000	UL, TÜV, CSA	4.73 *(0.186)*	0.89 *(0.035)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC020F	0.20	30	10	0.600	3.300	UL, TÜV, CSA	4.73 *(0.186)*	0.89 *(0.035)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
	miniSMDC050F	0.50	24	40	0.150	1.000	UL, TÜV, CSA	4.73 *(0.186)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC075F	0.75	13.2	40	0.110	0.450	UL, TÜV, CSA	4.73 *(0.186)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC110F	1.10	8	40	0.040	0.210	UL, TÜV, CSA	4.75 *(0.187)*	0.62 *(0.025)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC125F	1.25	6	40	0.050	0.140	UL, TÜV, CSA	4.73 *(0.186)*	0.48 *(0.019)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
	miniSMDC150F	1.50	6	40	0.040	0.110	UL, TÜV, CSA	4.73 *(0.186)*	0.48 *(0.019)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
	miniSMDC160F	1.60	9	40	0.030	0.100	UL, TÜV, CSA	4.73 *(0.186)*	0.48 *(0.019)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC200F	2.00	6	40	0.020	0.070	UL, TÜV, CSA	4.73 *(0.186)*	1.22 *(0.048)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*
New	miniSMDC260F	2.60	6	40	0.015	0.047	UL, TÜV, CSA	4.73 *(0.186)*	1.25 *(0.050)*	3.41 *(0.134)*	0.25 *(0.010)*	0.20 *(0.008)*	*1*

miniSMDM Series Size: 4532 (mm), 1812 (mils)

Part number	I_H* (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	D (min.)	E (min.)	Fig.
miniSMDM075F/24	0.75	24	40	0.090	0.290	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM110F	1.10	8	40	0.060	0.180	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*3*
miniSMDM110F/16	1.10	16	40	0.060	0.180	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM200F	2.00	8	40	0.020	0.060	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*
miniSMDM260F	2.60	6	40	0.010	0.043	UL, TÜV, CSA	4.75 *(0.187)*	2.00 *(0.079)*	3.60 *(0.142)*	1.4 *(0.055)*	—	*2*

*Hold current @ 25°C.

SMD Series Size: 7555 (mm), 2920 (mils)

	Part number	I_H (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Dimensions (millimeters/*inches*) Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	SMD030F	0.30	60	10	1.20	4.800	UL, TÜV, CSA	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*4*
New	SMD075F	0.75	30	40	0.35	1.000	UL, TÜV, CSA	7.98 *(0.314)*	3.18 *(0.125)*	5.44 *(0.214)*	*4*

SMD2 Series Size: 8763 (mm), 3425 (mils)

	Part number	I_H (A)	V max. (Vdc)	I max. (A)	R_{min} (Ω)	R_1 max. (Ω)	Dimensions (millimeters/*inches*) Agency recognition	A (max.)	B (max.)	C (max.)	Fig.
New	SMD150F/33	1.50	33	40	0.080	0.230	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*
New	SMD250F	2.50	15	40	0.035	0.085	UL, TÜV, CSA	9.40 *(0.370)*	3.00 *(0.118)*	6.71 *(0.264)*	*4*

This product line is designed for battery pack applications. Several material platforms are available to help meet the specific protection needs of different cell chemistries (e.g. Li-ion, NiMH, and NiCd). A variety of space efficient form factors allows the designer to minimize pack size.

Figure 1

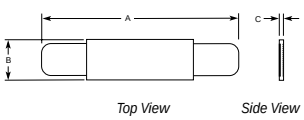


Figure 2

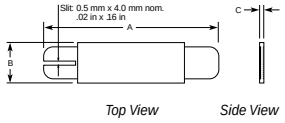
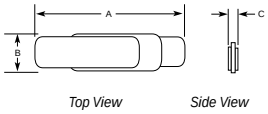


Figure 3



VLR: 85˚C Typical Activation

Part number	I_H* (A)	V max. (Vdc)	I max. (A)	R max. initial (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
VLR170	1.7	12	100	0.032	UL, TÜV, CSA	23.2 *(0.913)*	3.9 *(0.153)*	0.8 *(0.032)*	*1*
VLR170U	1.7	12	100	0.032	UL, TÜV, CSA	23.2 *(0.913)*	3.7 *(0.146)*	0.7 *(0.028)*	*3*
VLR175	1.75	12	100	0.031	UL, TÜV, CSA	24.5 *(0.965)*	3.3 *(0.130)*	0.8 *(0.032)*	*1*
VLR175L	1.75	12	100	0.031	UL, TÜV, CSA	31.7 *(1.248)*	3.3 *(0.130)*	0.8 *(0.032)*	*1*
VLR230	2.3	12	100	0.018	UL, TÜV, CSA	23.1 *(0.909)*	5.3 *(0.208)*	0.8 *(0.032)*	*1*
VLR230S	2.3	12	100	0.018	UL, TÜV, CSA	23.1 *(0.909)*	5.3 *(0.208)*	0.8 *(0.032)*	*2*
VLR230SU	2.3	12	100	0.018	UL, TÜV, CSA	23.1 *(0.909)*	5.1 *(0.201)*	0.7 *(0.028)*	*2*
VLR230U	2.3	12	100	0.018	UL, TÜV, CSA	23.1 *(0.909)*	5.1 *(0.201)*	0.7 *(0.028)*	*3*

*Hold current @ 25°C.

VLP: 90˚C Typical Activation

Figure 4

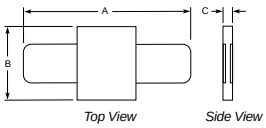
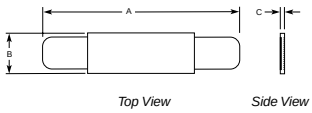


Figure 5



Part number	I_H (A)	V max. (Vdc)	I max. (A)	R max. initial (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
VLP210	2.1	16	60	0.030	UL, TÜV, CSA	17.5 *(0.689)*	7.3 *(0.287)*	0.8 *(0.032)*	*4*
VLP220	2.2	16	60	0.029	UL, TÜV, CSA	23.3 *(0.917)*	3.9 *(0.154)*	0.8 *(0.032)*	*5*
VLP270	2.7	16	60	0.018	UL, TÜV, CSA	23.1 *(0.909)*	5.3 *(0.208)*	0.8 *(0.032)*	*5*

VTP: 90˚C Typical Activation

The conductive polymer composite in the VTP battery overcurrent protection devices helps provide increased safety with extended battery run time. These devices reach a high-resistance state at lower temperatures in NiMH and rechargeable lithium temperature-sensitive chemistries.

Figure 6

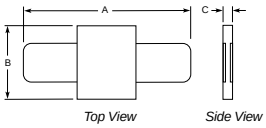


Figure 7

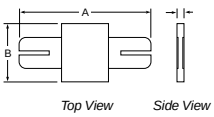


Figure 8

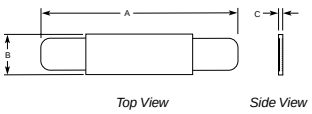


Figure 9

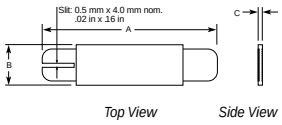


Figure 10

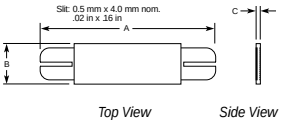
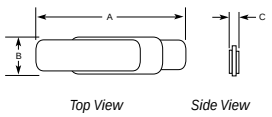


Figure 11



Part number	I_H* (A)	V max. (Vdc)	I max. (A)	R max. initial (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
VTP110	1.1	16	100	0.070	UL, TÜV, CSA	25.6 *(1.007)*	2.9 *(0.114)*	0.7 *(0.028)*	*11*
VTP170	1.7	16	100	0.052	UL, TÜV, CSA	17.5 *(0.689)*	7.4 *(0.292)*	0.8 *(0.03)*	*6*
VTP170SS	1.7	16	100	0.052	UL, TÜV, CSA	17.5 *(0.689)*	7.4 *(0.292)*	0.8 *(0.03)*	*7*
VTP170X	1.7	16	100	0.052	UL, TÜV, CSA	22.9 *(0.90)*	5.3 *(0.21)*	0.8 *(0.03)*	*8*
VTP170XS	1.7	16	100	0.052	UL, TÜV, CSA	22.9 *(0.90)*	5.3 *(0.21)*	0.8 *(0.03)*	*9*
VTP175L	1.75	16	100	0.051	UL, TÜV, CSA	28.0 *(1.10)*	3.9 *(0.15)*	0.8 *(0.03)*	*8*
VTP175U	1.75	16	100	0.051	UL, TÜV, CSA	23.2 *(0.91)*	3.7 *(0.15)*	0.7 *(0.03)*	*11*
VTP200G	2.0	16	100	0.039	UL, TÜV, CSA	23.1 *(0.91)*	4.5 *(0.18)*	0.8 *(0.03)*	*8*
VTP200U	2.0	16	100	0.039	UL, TÜV, CSA	23.1 *(0.91)*	4.3 *(0.17)*	0.7 *(0.03)*	*11*
VTP210G	2.1	16	100	0.030	UL, TÜV, CSA	23.1 *(0.91)*	5.3 *(0.21)*	0.8 *(0.03)*	*8*
VTP210GU	2.1	16	100	0.030	UL, TÜV, CSA	23.2 *(0.91)*	5.1 *(0.20)*	0.8 *(0.03)*	*11*
VTP210L	2.1	16	100	0.030	UL, TÜV, CSA	26.0 *(1.02)*	5.3 *(0.21)*	0.8 *(0.03)*	*8*
VTP210S	2.1	16	100	0.030	UL, TÜV, CSA	23.1 *(0.91)*	5.3 *(0.21)*	0.8 *(0.03)*	*9*
VTP210SL	2.1	16	100	0.030	UL, TÜV, CSA	32.0 *(1.26)*	5.3 *(0.21)*	0.8 *(0.03)*	*9*
VTP210SL-19.2/5.8	2.1	16	100	0.030	UL, TÜV, CSA	37.0 *(1.46)*	5.3 *(0.21)*	0.8 *(0.03)*	*9*
VTP210SS	2.1	16	100	0.030	UL, TÜV, CSA	23.1 *(0.91)*	5.3 *(0.21)*	0.8 *(0.03)*	*10*
VTP210ULD	2.1	16	100	0.030	UL, TÜV, CSA	25.2 *(1.00)*	5.1 *(0.20)*	0.8 *(0.03)*	*11*
VTP240	2.4	16	100	0.026	UL, TÜV, CSA	26.2 *(1.03)*	5.3 *(0.21)*	0.8 *(0.03)*	*8*

*Hold current @ 25°C.

LTP, miniSMDE, TAC: 110˚C Typical Activation

LTP and TAC devices help provide reliable, noncycling protection for rechargeable batteries. LTP devices also help provide additional protection at elevated temperatures. The TAC devices' unique cap design makes them easy to install directly on AAA size battery cells.

Figure 12

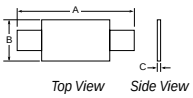


Figure 13

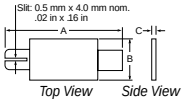


Figure 14

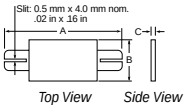


Figure 15

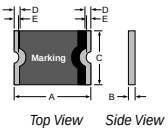
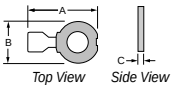


Figure 16



Part number	I_H (A)	V max. (Vdc)	I max. (A)	R max. initial (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
LTP									
LTP070	0.7	15	100	0.200	UL, TÜV, CSA	22.1 *(0.87)*	5.2 *(0.20)*	1.2 *(0.048)*	*12*
LTP070S	0.7	15	100	0.200	UL, TÜV, CSA	22.1 *(0.87)*	5.2 *(0.20)*	1.2 *(0.048)*	*13*
LTP100	1.0	24	100	0.130	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*12*
LTP100S	1.0	24	100	0.130	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*13*
LTP100SL	1.0	24	100	0.130	UL, TÜV, CSA	32.0 *(1.26)*	5.2 *(0.20)*	1.0 *(0.04)*	*13*
LTP100SS	1.0	24	100	0.130	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*14*
LTP180	1.8	24	100	0.068	UL, TÜV, CSA	26.0 *(1.02)*	5.2 *(0.20)*	1.0 *(0.04)*	*12*
LTP180L	1.8	24	100	0.068	UL, TÜV, CSA	37.5 *(1.48)*	5.2 *(0.20)*	1.0 *(0.04)*	*12*
LTP180S	1.8	24	100	0.068	UL, TÜV, CSA	26.0 *(1.02)*	5.2 *(0.20)*	1.0 *(0.04)*	*13*
LTP190	1.9	24	100	0.057	UL, TÜV, CSA	23.4 *(0.92)*	11.0 *(0.43)*	1.1 *(0.04)*	*12*
LTP260	2.6	24	100	0.042	UL, TÜV, CSA	26.0 *(1.02)*	11.9 *(0.47)*	1.0 *(0.04)*	*12*
LTP300	3.0	24	100	0.031	UL, TÜV, CSA	31.8 *(1.25)*	13.5 *(0.53)*	1.1 *(0.04)*	*12*
LTP340	3.4	24	100	0.027	UL, TÜV, CSA	26.0 *(1.02)*	15.9 *(0.63)*	1.0 *(0.04)*	*12*
miniSMDE									
miniSMDE190	1.9	16	100	0.040	UL, TÜV, CSA	11.51 *(0.453)*	0.53 *(0.021)*	5.33 *(0.21)*	*15*
TAC									
TAC100-09	1.0	15	50	0.155	UL	17.5 *(0.69)*	10.5 *(0.45)*	0.9 *(0.04)*	*16*

LR4, SRP, TAC: 120˚C Typical Activation

The LR4 devices' smaller thermal mass means reduced reaction time to overcurrent events. The LR4 devices are suited for battery packs intended for computer and camcorder applications. The SRP products help provide reliable, non-cycling protection for rechargeable batteries. Weldable nickel leads and a narrow, low-profile design make these devices easy to install directly onto battery cells.

Figure 17

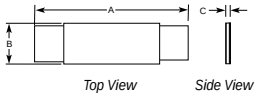


Figure 18

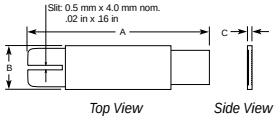


Figure 19

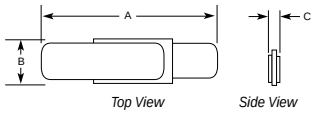


Figure 20

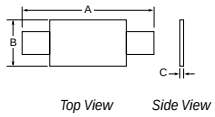


Figure 21

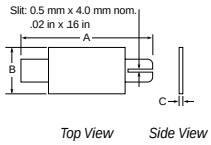


Figure 22

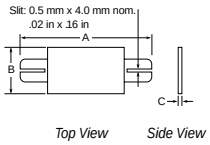
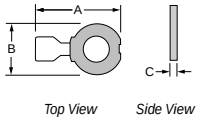


Figure 23



Part number	I_H (A)	V max. (Vdc)	I max. (A)	R max. initial (Ω)	Agency recognition	Dimensions (millimeters/*inches*) A (max.)	B (max.)	C (max.)	Fig.
LR4									
LR4-170U	1.7	15	100	0.078	UL	21.0 *(0.83)*	4.0 *(0.16)*	0.7 *(0.03)*	*19*
LR4-190	1.9	15	100	0.072	UL, TÜV, CSA	22.1 *(0.87)*	5.5 *(0.22)*	1.0 *(0.04)*	*17*
LR4-190S	1.9	15	100	0.072	UL, TÜV, CSA	22.1 *(0.87)*	5.5 *(0.22)*	1.0 *(0.04)*	*18*
LR4-260	2.6	15	100	0.042	UL, TÜV, CSA	23.1 *(0.91)*	5.5 *(0.22)*	1.0 *(0.04)*	*17*
LR4-260S	2.6	15	100	0.042	UL, TÜV, CSA	23.1 *(0.91)*	5.5 *(0.22)*	1.0 *(0.04)*	*18*
LR4-380	3.8	15	100	0.026	UL, TÜV, CSA	26.0 *(1.02)*	7.5 *(0.30)*	1.0 *(0.04)*	*17*
LR4-450	4.5	20	100	0.020	UL, TÜV, CSA	26.0 *(1.02)*	10.5 *(0.41)*	1.0 *(0.04)*	*17*
LR4-550	5.5	20	100	0.016	UL, TÜV, CSA	37.0 *(1.46)*	7.5 *(0.30)*	1.0 *(0.04)*	*17*
LR4-600	6.0	20	100	0.014	UL, TÜV, CSA	26.0 *(1.02)*	14.5 *(0.57)*	1.0 *(0.04)*	*17*
LR4-730	7.3	20	100	0.012	UL, TÜV, CSA	29.1 *(1.15)*	14.5 *(0.57)*	1.0 *(0.04)*	*17*
LR4-900	9.0	20	100	0.010	UL, TÜV, CSA	47.6 *(1.874)*	8.5 *(0.335)*	1.3 *(0.051)*	*17*
SRP									
SRP120	1.2	15	100	0.160	UL, TÜV, CSA	22.1 *(0.87)*	5.2 *(0.20)*	1.0 *(0.04)*	*20*
SRP120L	1.2	15	100	0.160	UL, TÜV, CSA	27.1 *(1.07)*	5.2 *(0.20)*	1.0 *(0.04)*	*20*
SRP120S	1.2	15	100	0.160	UL, TÜV, CSA	22.1 *(0.87)*	5.2 *(0.20)*	1.0 *(0.04)*	*21*
SRP175	1.75	15	100	0.090	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*20*
SRP175L	1.75	15	100	0.090	UL, TÜV, CSA	32.1 *(1.26)*	5.2 *(0.20)*	1.0 *(0.04)*	*20*
SRP175S	1.75	15	100	0.090	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*21*
SRP175SS	1.75	15	100	0.090	UL, TÜV, CSA	23.1 *(0.91)*	5.2 *(0.20)*	1.0 *(0.04)*	*22*
SRP200	2.0	30	100	0.060	UL, TÜV, CSA	23.4 *(0.92)*	11.0 *(0.43)*	1.1 *(0.04)*	*20*
SRP350	3.5	30	100	0.031	UL, TÜV, CSA	31.8 *(1.25)*	13.5 *(0.53)*	1.1 *(0.04)*	*20*
SRP420	4.2	30	100	0.024	UL, TÜV, CSA	32.4 *(1.28)*	13.6 *(0.54)*	1.1 *(0.04)*	*20*
TAC									
TAC170-09	1.7	15	50	0.098	UL	17.5 *(0.69)*	10.5 *(0.42)*	0.9 *(0.04)*	*23*
TAC210	2.1	15	50	0.062	UL, TÜV, CSA	17.5 *(0.69)*	10.5 *(0.42)*	0.9 *(0.04)*	*23*

Definitions

I_H = Hold current—maximum current at which the device will not trip under specified conditions at 20°C unless otherwise specified.

$I_{max.}$ = The highest fault current that can safely be used to trip a PolySwitch device under specified conditions.

$V_{max.}$ = The highest voltage that can safely be dropped across a PolySwitch device continuously in its tripped state under specified fault conditions.

R_1**max.** = Maximum device resistance under specified conditions measured 1 hour post trip or post reflow.

R_a**max.** = Maximum device resistance under automotive conditions specified in PS400 measured 1 hour after stress has been removed.

Rmax. Initial = Maximum device resistance under specified conditions as supplied.

Trip Current = Minimum current at which a device will trip under specified conditions.

WARNING!

- Operation beyond 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.
- TR and TS devices are not intended for continuous utility line voltage such as 120/220V or 240V.
- LVR Product Notes:
  1. A PTC device is not a fuse—it is a nonlinear thermistor that limits current. Because under a fault condition all PTC devices go into a high resistance state but not open circuit, hazardous voltage may be present at PTC locations.
  2. The devices are intended for protection against occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
  3. Please refer to the SCD for complete information and applications limitations, which can be obtained from product management (650-361-6900) or the web: www.circuitprotection.com/lvr/

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 maximum 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. Most Raychem Circuit Protection devices (TC, TGC, TRx, TSx) are certified at 60V but can withstand higher $V_{max.}$ TR600 and TS600 product families are certified at 250V 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.

Standard PolySwitch product families include RGE, RHE, RTE, RUE, RXE, LVR, SMD, nanoSMD, microSMD, miniSMD, TS, BBR, TR, LR4, LTP, SRP, TAC, VTP, VLR, VLP, AHR, AGR, ASMD, and AHS devices. Some of these devices are also available in a lead-free version. In addition, special devices, such as speaker devices (SPK), terminal devices (TD) and custom chip devices, can be manufactured to meet performance requirements that could be outside of the performance band of the standard products listed in this short-form catalog. Please contact a Raychem Circuit Protection Customer Service representative to discuss your special product needs.

Agency approvals for PolySwitch devices:

PolySwitch devices, where appropriate, have been tested and have gained the following safety agency approvals:

- UL Component Recognition in Category XGPU2, Thermistor Type Devices
- CSA Component Acceptance Class 9073 32, Thermistors—PTC Type
- TÜV Rheinland Certification, PTC Resistors

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Chile
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Fax 56-2-223-1477

Colombia
Tel 57-1-218-2460
Fax 57-1-218-2472

Peru
Tel 51-1-221-4165
Fax 51-1-421-0368

Uruguay
Tel 59-8-982-2428
Fax 59-8-982-2430

Venezuela
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Fax (49)-89-608-9394

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China, Guangzhou
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Fax 86-20-8385-6139

China, Hong Kong
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Fax 852-2735-1185

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Fax 86-21-6485-5109

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Fax 63-2-867-8661
or 63-2-867-0201

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