



POLYMER PTC RF Series

1. Fundamentals:

The traditional fuses can work on protection for only one time when used for over-current protection and have to be replaced then. But Polymer PTC, a new element for over-current protection, can recover and be used continuously. When short-circuit happen or unusual high current rush in, PTC's self-heating result in increasing impedance which will limit the current and work as protection. The fault being removed, PTC will recover to low-resistance state automatically, which can avoid being replaced and the continuously circulating switching state causing damage to circuit. The reasons for Polymer PTC having these two function are its special structure and materials which is a kind of composite of macromolecule polymer and conducting material. Under normal situation, the polymer will expand with the PTC's temperature increase, which will result in conducting passage inside polymer breaking, impedance increasing, current lowering, and all of these will make the circuit work as an open-circuit and is protected. When rush current disappear, PTC will recover to low-resistance state with its self-heating low down. Polymer PTC, a resettable fuse, will be smaller and more steady than the traditional one.

2. Instruction to choose the suitable item:

- 1) **Normal operating current (I_{hold}):**
- 2) **Maximum circuit voltage (V_{max}):**
- 3) **Maximum broken-down current (I_{max}):**
- 4) **Normal operating temperature** and its range, and calculate the **Normal operation current:** $I_{hold} = \text{average operating current}(I) / \text{discount rate of ambient temperature}$ and current (Please find the discount rate in Chart II)
- 5) To find the most suitable item according to the above index.
- 6) The V_{max} and I_{max} of the polymer PTC will be higher than V_{max} and broken-down current of the equipment.

If there is any requirement on Resistance (at 25°C) and operating time on over-current protection in the circuit, you also can choose the suitable item according to the resistance (at 25°C) and operation time after using the above mentioned method.

*Customers' designs are welcome

CHART I

ELECTRICAL CHARACTERISTIC OF POLYMER PTC

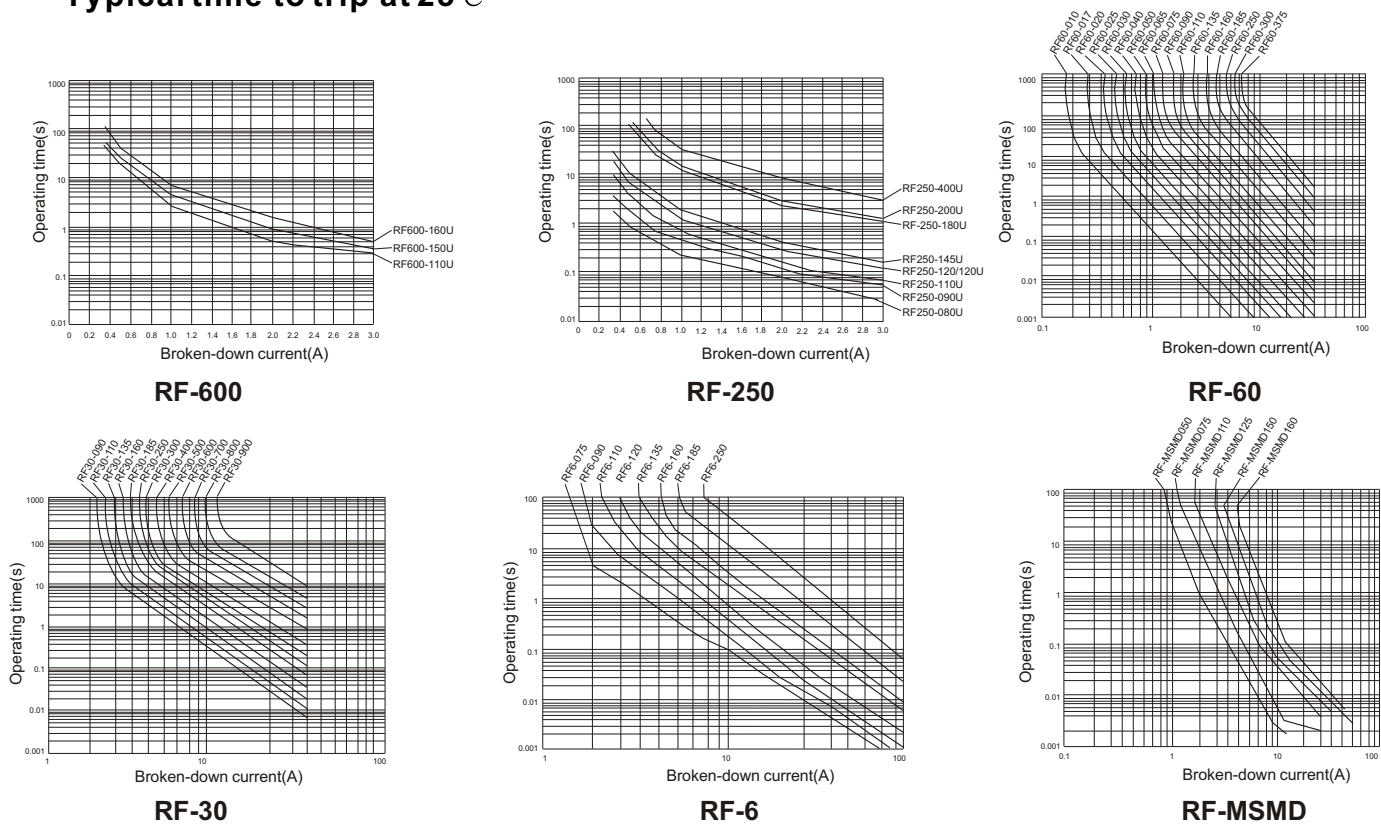
Series	Max interrupt Voltage(V)	Hold Current(I_{hold})	Figure	Application
RF600	600V	90mA-180mA	SMD/Radial lead	Telecommunication
RF250	250V	90mA-180mA	SMD/Radial lead	Telecommunication
RF60	60V	100mA-3.75A	Radial lead	Home application
RF30	30V	900mA-9A	Radial lead	Home application
RF6	6V	750mA-2.5A	Radial lead	Computer/home application
RF-MSMD	6-15V	50mA-1.6A	SMD	Computer/home application

Discount rate of ambient temperature and current

CHART II

Series No.	-20°C	-0°C	20°C	30°C	40°C	50°C	60°C	70°C	85°C
RF600	138%	119%	100%	92%	83%	73%	64%	55%	42%
RF250	132%	117%	100%	91%	85%	77%	68%	61%	48%
RF60	136%	119%	100%	90%	81%	72%	63%	54%	40%
RF30	130%	115%	100%	91%	83%	77%	68%	61%	52%
RF6	130%	115%	115%	91%	83%	77%	68%	61%	52%
RF-MSMD	135%	118%	100%	93%	87%	80%	73%	65%	57%

Typical time to trip at 25°C



Environmental Characteristics:

Operating temperature: -40 °C -- +85°C

Max device surface temperature in tripped state: 125°C

Passive aging: +85°C, 1000HRS (±8% typical resistance change)

Humidity aging: +85°C, 85% R.H. 1000HRS (±8% typical resistance change)

Thermal shock: MIL-STD-883C, Method 107G (±12% typical resistance change)
+125°C to -10°C, 10 times

Vibration: MIL-STD-883C, Method 2007, 1 (No change)
Condition A

Text precedures and reuirements:

Test	Test conditions	Accept/Reject criteria
Visual/Mech	Verify Dimensions & Materials	
Resistance	In still air at 25°C	$R_{min} \leq R \leq R_{max}$
Time to trip	5 times, I_{hold} , V_{max} , 25°C	$T \leq \text{max.time to trip(seconds)}$
Hold current	1H, AT I_{hold} , 40°C	no trip
Trip cycle life	V_{max} , I_{max} , 100 cycles	no arcing or burning
Trip endurance	V_{max} , 48 hours	no arcing or burning

RF600 Series

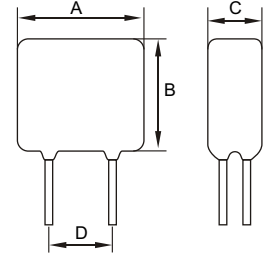
Electrical characteristics(at 25°C)(Max voltage:60V Max interrupt volt:600V)

Series No.	Max current(A)	Hold current(mA)	Max resistance(Ω)	Minimum resistance(Ω)	Measurement (AXBXCXD) (mm)
RF600-100U	3	110	14	7	14X14X6X5.1
RF600-150U	3	150	12	6	14X14X6X5.1
RF600-160U	3	160	10	4	14X14X6X5.1

Ordering code:

RF 600 110 U

Epoxy resin coating
Hold Current(mA)
Maximum Interrupt Voltage(V)
Series No.



RF250 Series

Electrical characteristics(at 25°C)(Max voltage:60V Max interrupt volt:250V)

Series No.	Max current(A)	Hold current(mA)	Max resistance(Ω)	Minimum resistance(Ω)	Figure	Measurement (AXBXCXD) (mm)
RF250-080U	3	80	22	14	3	6.0X9.3X3.8X5.1
RF250-090U	3	90	20	10	4	6.0X9.3X3.8X5.1
RF250-110U	3	110	12	6	2	6.0X10X3.8X5.1
RF250-120	3	120	10	5	1	5.5X5.5X2.6X--
RF250-120U	3	120	10	6	2	7.0X10X3.8X5.1
RF250-120U-TS-1	3	120	12	9	2	7.0X11X3.8X5.1
RF250-145U	3	145	6.5	3.5	4	7.0X10X3.8X5.1
RF250-180U	10		3	1	4	10.4X14.5X3.8X5.1
RF250-200U	10	200	6	3	2	10.5X17X3.8X5.1
RF250-400U	10	400	3	1	2	10.5X17X3.8X5.1
RF250-600U	10	600	2	0.6	2	16X18X4.5X5.1
RF250-800U	10	800	1.0	0.4	2	20X22X4.5X5.1

Electrical characteristics/Test procedures and requirements will be same with the one of Jk600.

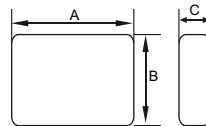


Figure 1

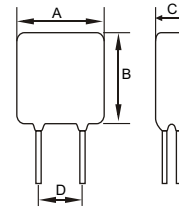


Figure 2

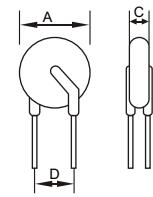


Figure 3

Ordering code:

RF 250 120 U

Epoxy resin coating
Hold Current(mA)
Maximum Interrupt Voltage(V)
Series No.

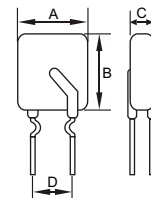


Figure 4

RF60 Series

Electrical characteristics(at 25°C)(Max voltage:60V Max current:40A)

Series No.	Hold current(A)	Max resistance(Ω)	Minimum resistance(Ω)	Power(W)	Figure	Measurement (AXBXCXD) (mm)
RF60-010	0.1	6.00	2.50	0.38	3	7.4X12.7X3.1X5.1
RF60-017	0.17	5.21	3.30	0.48	3	7.4X12.7X3.1X5.1
RF60-020	0.20	2.84	1.83	0.41	3	7.4X12.7X3.1X5.1
RF60-025	0.25	1.95	1.25	0.45	3	7.4X12.7X3.1X5.1
RF60-030	0.30	1.36	0.88	0.49	3	7.4X13.0X3.1X5.1
RF60-040	0.40	0.88	0.55	0.56	5	7.4X13.5X3.1X5.1
RF60-050	0.50	0.79	0.50	0.77	5	7.8X13.7X3.1X5.1
RF60-065	0.65	0.50	0.31	0.88	5	9.7X14.5X3.1X5.1
RF60-075	0.75	0.42	0.25	0.92	5	10.4X15.2X3.1X5.1
RF60-090	0.90	0.33	0.20	0.99	5	11.7X15.8X3.1X5.1
RF60-110-Y	1.10	0.27	0.15	1.50	3	13.0X18.0X3.1X5.1
RF60-110-F	1.10	0.27	0.15	1.50	2	13.0X18.0X3.1X5.1
RF60-135	1.35	0.21	0.12	1.70	3	14.5X19.6X3.1X5.1
RF60-160	1.60	0.16	0.09	1.90	3	16.3X21.3X3.1X5.1
RF60-185	1.85	0.14	0.08	2.10	3	17.8X22.9X3.1X5.1
RF60-250	2.50	0.10	0.05	2.50	3	21.3X26.4X3.1X10.2
RF60-300	3.00	0.08	0.04	2.80	3	24.9X30.0X3.1X10.2
RF60-375	3.75	0.07	0.03	3.20	3	28.5X33.5X3.1X10.2

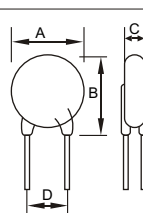


Figure 3

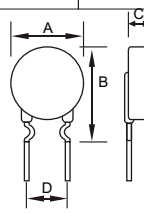


Figure 5

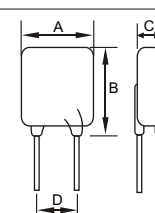


Figure 2

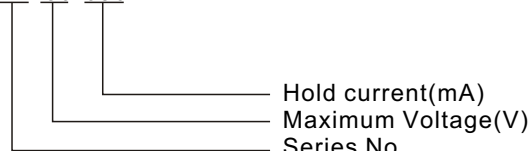
RF30 Series

Electrical characteristics(at 25°C)(Max voltage:30V Max current:40A)

Series No.	Hold current(A)	Max resistance(Ω)	Minimum resistance(Ω)	Power(W)	Measurement (AXBXCXD XEF) (mm)
RF30-090	0.90	0.12	0.070	0.60	7.4X12.2X5.1X7.6X3.0X0.9
RF30-110	1.10	0.10	0.050	0.70	7.4X14.2X5.1X7.6X3.0X0.9
RF30-135	1.35	0.08	0.040	0.80	8.9X13.5X5.1X7.6X3.0X0.9
RF30-160	1.60	0.07	0.030	0.90	8.9X15.2X5.1X7.6X3.0X0.9
RF30-185	1.85	0.06	0.030	1.00	10.2X15.7X5.1X7.6X3.0X0.9
RF30-250	2.50	0.04	0.020	1.20	11.4X18.3X5.1X7.6X3.0X0.9
RF30-300	3.00	0.05	0.020	2.00	11.4X17.3X5.1X7.6X3.0X1.2
RF30-400	4.00	0.03	0.010	2.50	14.0X20.1X5.1X7.6X3.0X1.2
RF30-500	5.00	0.03	0.010	3.00	14.0X24.9X10.2X7.6X3.0X1.2
RF30-600	6.00	0.02	0.005	3.50	16.5X24.9X10.2X7.6X3.0X1.2
RF30-700	7.00	0.02	0.005	3.80	19.1X26.7X10.2X7.6X3.0X1.2
RF30-800	8.00	0.02	0.005	4.00	21.6X29.2X10.2X7.6X3.0X1.2
RF30-900	9.00	0.01	0.005	4.20	24.1X29.7X10.2X7.6X3.0X1.2

Ordering code:

RF 30 090



4

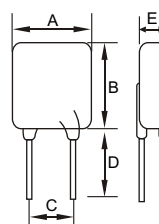


Figure 2

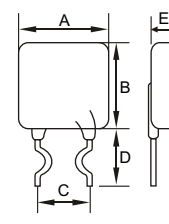


Figure 4

RF6 Series

Electrical characteristics(at 25°C)(Max voltage:6V Max current:40A)

Series No.	Hold current(mA)	Max resistance(Ω)	Minimum resistance(Ω)	Power(W)	Figure	Measurement (AXBXCXDxE) (mm)
RF6-075	0.75	0.23	0.14	0.3	5	6.9X11.4X5.1X7.6X3.10
RF6-090	0.90	0.18	0.10	0.6	4	7.4X12.2X5.1X7.6X3.10
RF6-110	1.10	0.14	0.08	0.7	4	7.4X14.2X5.1X7.6X3.10
RF6-120	1.20	0.14	0.08	0.6	5	6.9X11.7X5.1X7.6X3.10
RF6-135	1.35	0.115	0.06	0.8	4	8.9X13.5X5.1X7.6X3.10
RF6-160	1.60	0.11	0.05	0.9	4	8.9X15.2X5.1X7.6X3.10
RF6-185	1.85	0.085	0.05	1.0	4	10.2X15.7X5.1X7.6X3.10
RF6-250	2.50	0.060	0.03	1.2	4	11.4X18.3X5.1X7.6X3.10



Figure 4

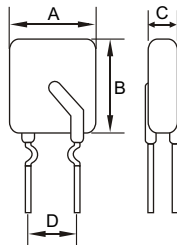


Figure 4

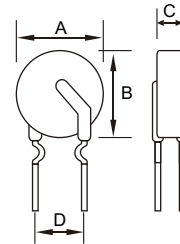


Figure 5

Ordering code:

RF 6 075



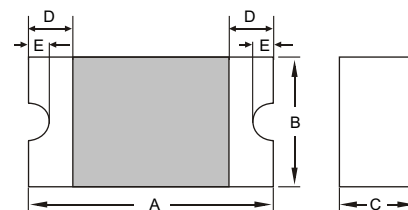
RF-MSMD Series

Electrical characteristics(at 25°C)(Max current:40A)

Series No.	Max voltage(V)	Hold current(A)	Trip current(A)	Max resistanc (Ω)	Minimum resistanc (Ω)	Power(W)	Measurement (AXBXCXDxE) (mm)
RF-MSMD050	15	0.50	1.00	1.00	0.15	0.8	4.73X3.41X0.75X0.3X0.25
RF-MSMD075	13.2	0.75	1.50	0.45	0.11	0.8	4.73X3.41X0.75X0.3X0.25
RF-MSMD110	6	1.10	2.20	0.21	0.04	0.8	4.73X3.41X0.75X0.3X0.25
RF-MSMD125	6	1.25	2.50	0.18	0.05	0.8	4.73X3.41X1.25X0.3X0.25
RF-MSMD150	6	1.50	3.00	0.15	0.03	0.8	4.73X3.41X0.75X0.3X0.25
RF-MSMD160	6	1.60	2.80	0.06	0.02	0.8	4.73X3.41X0.75X0.3X0.25

Ordering code:

RF MSMD 050



RF SERIES-----REFERENCE LIST

RFPTC Model No.	BOURNS Model No.	RAYCHEM Model No.	MAXIMUM Voltage(V)	Maximum current(A)
RF600-110U	-----	-----	60	3
RF600-150U	-----	TR600-150	60	3
RF600-160U	-----	TR600-160	60	3
RF250-080U	-----	TR250-080U	60	3
RF250-090U	-----		60	3
RF250-110U	-----	TR250-110U	60	3
RF250-120	-----	TC250-120	60	3
RF250-120U	-----	TR250-120U	60	3
RF250-120U-ts-1	-----	TR250-120UT-B-0.5	60	3
RF250-145U	-----	TR250-145U	60	3
RF250-180U	-----	TR250-180U	60	10.
RF250-200U	-----	-----	60	10
RF250-400U	-----	-----	60	10
RF250-600U	-----	-----	60	10
RF250-800U	-----	-----	60	10
RF60-010	MF-R 010	RXE 010	60	40
RF60-017	MF-R 017	RXE 017	60	40
RF60-020	MF-R 020	RXE 020	60	40
RF60-025	MF-R 025	RXE 025	60	40
RF60-030	MF-R 030	RXE 030	60	40
RF60-040	MF-R 040	RXE 040	60	40
RF60-050	MF-R 050	RXE 050	60	40
RF60-065	MF-R 065	RXE 065	60	40
RF60-075	MF-R 075	RXE 075	60	40
RF60-090	MF-R 090	RXE 090	60	40
RF60-110	MF-Rx 110	RXE 110	60	40
RF60-135	MF-Rx 135	RXE 135	60	40
RF60-160	MF-Rx 160	RXE 160	60	40
RF60-185	MF-Rx 185	RXE 185	60	40
RF60-250	MF-Rx 250	RXE 250	60	40
RF60-300	MF-Rx 300	RXE 300	60	40
RF60-375	MF-Rx 375	RXE 375	60	40
RF30-090	MF-R090-0-9	RUE 090	30	40
RF30-110	MF-R110	RUE 110	30	40
RF30-135	MF-R135	RUE 135	30	40
RF30-160	MF-R160	RUE 160	30	40
RF30-185	MF-R185	RUE 185	30	40
RF30-250	MF-R250-0-10	RUE 250	30	40
RF30-300	MF-R300	RUE 300	30	40
RF30-400	MF-R400	RUE 400	30	40
RF30-500	MF-R500	RUE 500	30	40
RF30-600	MF-R600	RUE 600	30	40
RF30-700	MF-R700	RUE 700	30	40
RF30-800	MF-R800	RUE 800	30	40
RF30-900	MF-R900	RUE 900	30	40
RF6-075	-----	RUSB 075	6	40
RF6-090	-----	RUSB 090	6	40
RF6-110	-----	RUSB 110	6	40
RF6-120	-----	RUSB 120	6	40
RF6-135	-----	RUSB 135	6	40
RF6-160	-----	RUSB 160	6	40
RF6-185	-----	RUSB 185	6	40
RF6-250	-----	RUSB 250	6	40
RF-MSMD 050	MF-MSMD 050	MinSMD 050	15	40
RF-MSMD 075	MF-MSMD 075	MinSMD 075	13.2	40
RF-MSMD 110	MF-MSMD 110	MinSMD 110	6	40
RF-MSMD 125	MF-MSMD 125	MinSMD 125	15	40
RF-MSMD 150	MF-MSMD 150	MinSMD 150	6	40
RF-MSMD 160	MF-MSMD 160	MinSMD 160	6	40