Contents

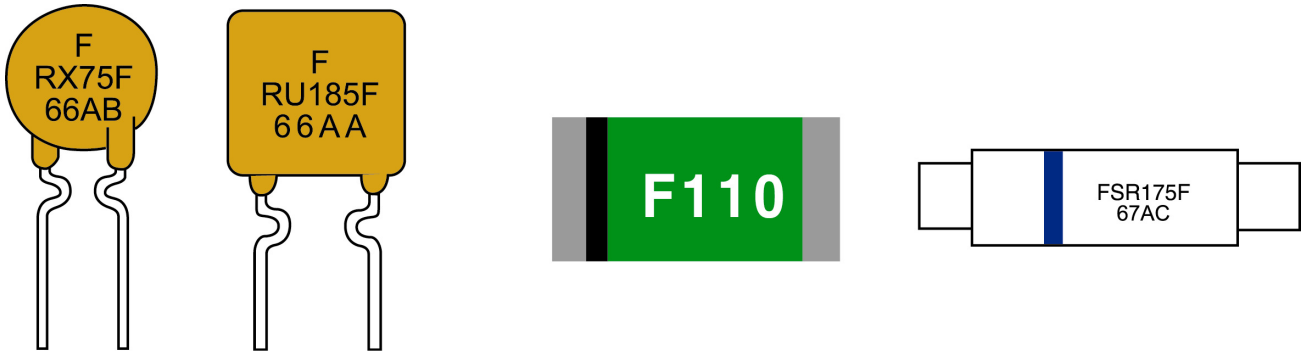
FUZETEC TECHNOLOGY

Founded in 1997, as a world leading device manufacturer and designer, Fuzetec Technology Co., Ltd. (FUZETEC) is committed to provide continuous circuit protection solutions to today's and tomorrow's electronic and electrical industries.

With the most advanced Positive Temperature Coefficient (PTC) conductive polymer technologies, FUZETEC offers a wide variety of Polymeric PTC resettable fuses to fulfill the needs of modern demanding high-tech applications. They include, but not limited to: Telecommunications, Networks, Computers & Peripherals, Notebook PC's, Primary & Secondary Batteries, Automotives, Instrumentations & Industrial Controls, Power Supplies, and Consumer Electronics etc.

FUZETEC ™ PRODUCT FAMILY

FUZETEC ™ product families are designed for today's demanding electronic and electrical industries. Its resettable feature, compact size, flexible construction, low thermal output and competitive cost out performed the traditional fuse, Ceramic PTC, Bimetal fuse and Current control IC. They are ideal for all low voltage DC and AC application. FUZETEC ™ resettable fuse are offered in a variety constructions, which include: Radial Leaded (16V, 30V, 60V, 90V, 120Vac, 240 VAC/DC, 250V & 600V), Surface Mount (1206, 1210, 1812 & 2920 sizes) & Axial Leaded for all battery packs applications. In addition to standard products we offer a flexible range of custom design devices (i.e. Disc Type).



SAFETY, QUALITY AND CUSTOMER SATISFACTORY

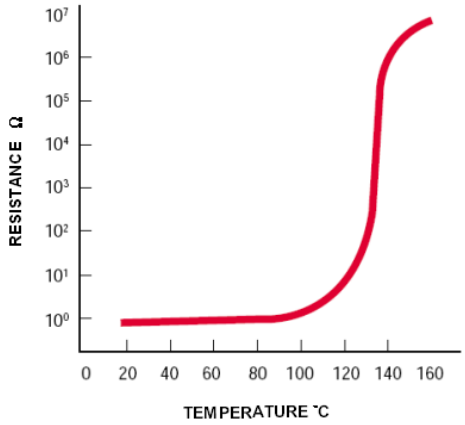
With third party approvals (UL, C-UL and TÜV), FUZETEC ™ products are ensured to provide long lasting safety and performance. From product design and development, through manufacturing and quality control to delivery and shipment. Fuzetec Technology strictly implements **ISO/TS16949:2002** **ISO9001:2000** and **ISO14001:2004** quality standards to assure its products quality and consistency. With continuous improvement, we are committed to provide top products and services to better satisfy our customer's needs. We strongly believe that excellent partnership between customers and us are the best and the only route to achieve success in tomorrow's competing business world.

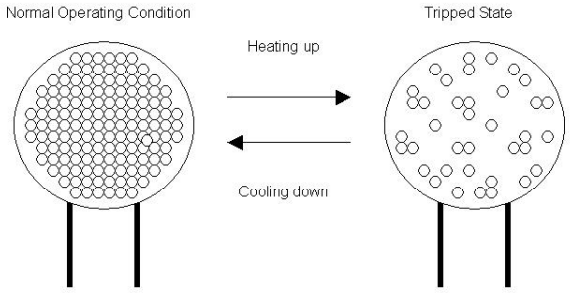
TECHNOLOGY NICHE

Polymeric PTC material and devices technology synergistically integrate the advance polymer material technologies, conductive material science, novel processing engineering, and fundamental electronic and electrical theory. Electrical resistance of such material and devices increases with temperature increases and vice versa. When experiencing "overcurrent and/or over voltage", the device generates thermal energy (Energy = I*V) and heats up itself. This makes polymer matrix's morphology change from crystalline to amorphous phase, and results in a resistance increase of thousand orders of magnitude such that "trip" the electricity. The device will remain hot and stay "tripped" until the fault is cleared and power is removed.

HOW DOES THE RESETTABLE FUSE WORK

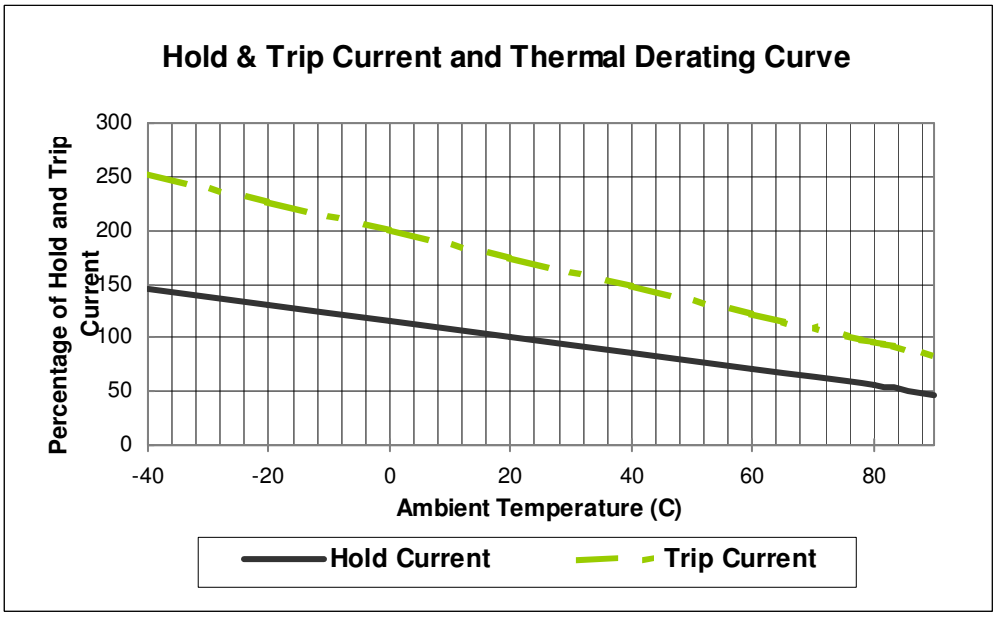
FUZETEC™ resettable fuses are designed and made of patented novel polymeric PTC material in thin chip form, developed solely by FUZETEC. With electrodes and leads attached on both sides, it is placed in series to protect a circuit. At “normal operating condition” the device remains at an extremely low resistance (mini-ohms) and allows the electrical current to flow through it without any restriction. When overcurrent conditions occur, the polymeric PTC material heats up and its resistance increases sharply. Such a sharp resistance increase (to an insulated status) cuts off the current in the circuit, and consequently protects the element and device in the circuit. Upon fault current being removed, the resettable fuse cools and its resistance drops to the original extremely low value. The resettable fuse is “resetted” and allows the current through the circuit again.



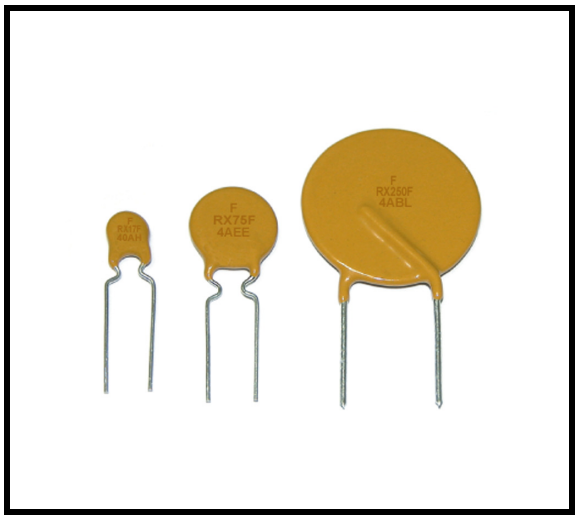


TRIP CURRENT, HOLD CURRENT AND THERMAL DERATING

Trip Current (IT) and Hold Current (IH) of FUZETEC™ resettable fuse are rated at 23℃. Typically its Trip Current is twice as much as its Hold Current. FUZETEC ™ device does not trip at or below its rated Hold Current, and will trip at or above its Trip Current value. However, due to PTC effect both IT and IH reduce with ambient temperature increase and vice versa. As shown bellow, the currents are reduced nearly 50% at 85℃ and increased to 150% at -40℃.



Radial Leaded PTC
FRX Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Pb Lead Free

Application:

Wide variety of electronic equipment

Product Features:

Low hold current, Solid state

Radial-leaded product ideal for up to 60V

Operation Current: 50mA ~ 3.75A

Maximum Voltage: 60V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)

C-UL(E211981)

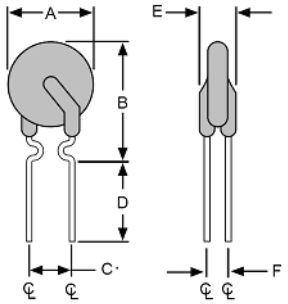
TÜV (R3-50004084)

Electrical Characteristics(23℃)

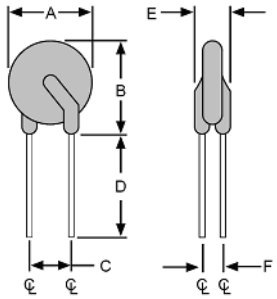
Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FRX005-60F	0.05	0.10	5.0	40	60	0.26	7.30	20.0
FRX010-60F	0.10	0.20	4.0	40	60	0.38	2.50	7.50
FRX017-60F	0.17	0.34	3.0	40	60	0.48	2.00	**8.00**
FRX020-60F	0.20	0.40	2.2	40	60	0.41	1.83	4.40
FRX025-60F	0.25	0.50	2.5	40	60	0.45	1.25	3.00
FRX030-60F	0.30	0.60	3.0	40	60	0.49	0.88	2.10
FRX040-60F	0.40	0.80	3.8	40	60	0.56	0.55	1.29
FRX050-60F	0.50	1.00	4.0	40	60	0.77	0.50	1.17
FRX065-60F	0.65	1.30	5.3	40	60	0.88	0.31	0.72
FRX075-60F	0.75	1.50	6.3	40	60	0.92	0.25	0.60
FRX090-60F	0.90	1.80	7.2	40	60	0.99	0.20	0.47
FRX110-60F	1.10	2.20	8.2	40	60	1.50	0.15	0.38
FRX135-60F	1.35	2.70	9.6	40	60	1.70	0.12	0.30
FRX160-60F	1.60	3.20	11.4	40	60	1.90	0.09	0.22
FRX185-60F	1.85	3.70	12.6	40	60	2.10	0.08	0.19
FRX250-60F	2.50	5.00	15.6	40	60	2.50	0.05	0.13
FRX300-60F	3.00	6.00	19.8	40	60	2.80	0.04	0.10
FRX375-60F	3.75	7.50	24.0	40	60	3.20	0.03	0.08

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FRX005F~FRX090F Tin plated copper, 24 AWG.
FRX110F~FRX375F Tin plated copper, 20 AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meet UL-94V-0 requirement.

FRX Product Dimensions (Millimeters)



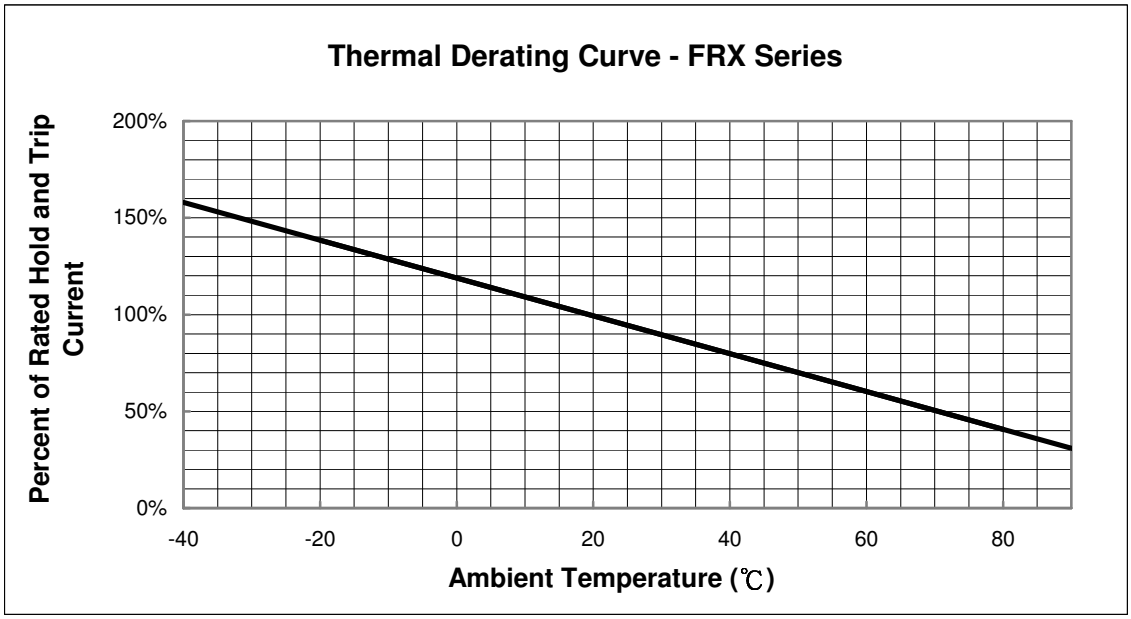
FRX 005-60F ~ FRX 090-60F
Lead Size: 24AWG,
Φ 0.51 mm Diameter



FRX FRX 110-60F ~ FRX 375-60F
Lead Size: 20AWG,
Φ 0.81 mm Diameter

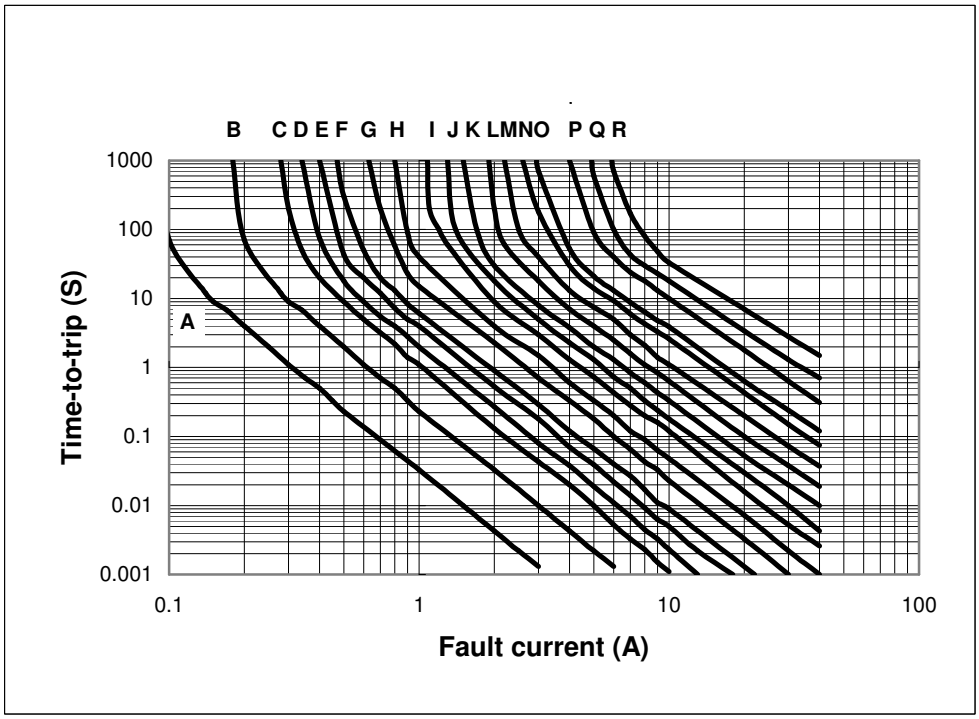
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRX005-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX010-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-60F	7.4	13.0	5.1	7.6	3.1	1.1
FRX040-60F	7.6	13.5	5.1	7.6	3.1	1.1
FRX050-60F	7.9	13.7	5.1	7.6	3.1	1.1
FRX065-60F	9.7	14.5	5.1	7.6	3.1	1.1
FRX075-60F	10.4	15.2	5.1	7.6	3.1	1.1
FRX090-60F	11.7	15.8	5.1	7.6	3.1	1.1
FRX110-60F	13.0	18.0	5.1	7.6	3.1	1.4
FRX135-60F	14.5	19.6	5.1	7.6	3.1	1.4
FRX160-60F	16.3	21.3	5.1	7.6	3.1	1.4
FRX185-60F	17.8	22.9	5.1	7.6	3.1	1.4
FRX250-60F	21.3	26.4	10.2	7.6	3.1	1.4
FRX300-60F	24.9	30.0	10.2	7.6	3.1	1.4
FRX375-60F	28.5	33.5	10.2	7.6	3.1	1.4

Thermal Derating Curve

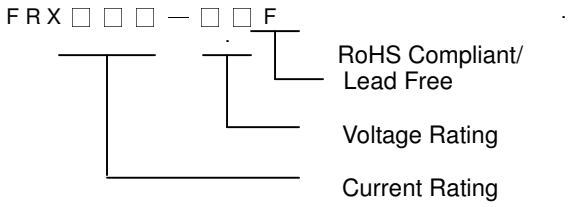


Typical Time-To-Trip at 23℃

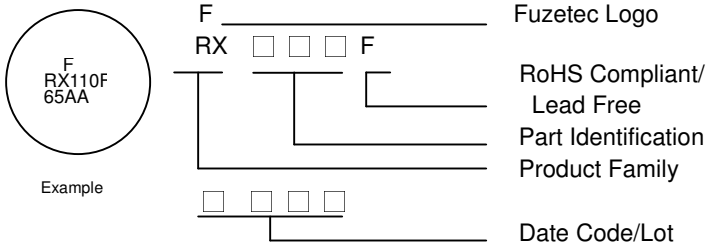
A= FRX005-60F
B = FRX010-60F
C = FRX017-60F
D = FRX020-60F
E = FRX025-60F
F = FRX030-60F
G = FRX040-60F
H = FRX050-60F
I = FRX065-60F
J = FRX075-60F
K= FRX090-60F
L = FRX110-60F
M = FRX135-60F
N = FRX160-60F
O = FRX185-60F
P = FRX250-60F
Q = FRX300-60F
R = FRX375-60F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FRX005-60F	500	3K
FRX010-60F	500	3K
FRX017-60F	500	3K
FRX020-60F	500	3K
FRX025-60F	500	3K
FRX030-60F	500	3K
FRX040-60F	500	3K
FRX050-60F	500	3K
FRX065-60F	300	3K

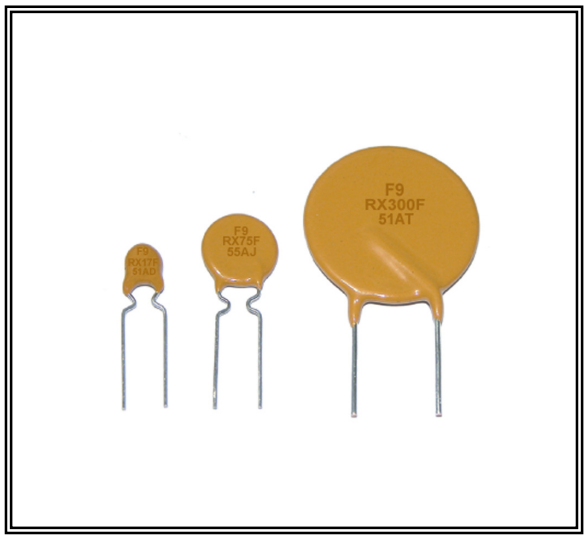
P/N	Pcs /Bag	Reel/Tape
FRX075-60F	300	3K
FRX090-60F	300	3K
FRX110-60F	300	1.5K
FRX135-60F	200	1.5K
FRX160-60F	200	1.5K
FRX185-60F	200	1.5K
FRX250-60F	100	------
FRX300-60F	100	------
FRX375-60F	100	------

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRX 90V Series



RoHS Compliant & Lead Free)

RoHS 2002/95/EC | Lead Free

Application:

Telecom & wide variety of electronic equipment

Product Features:

Low hold current, Solid state, Radial leaded product ideal for up to 90V

Operation Current: 100mA~3.75A

Maximum Voltage: Up to 90V

Temperature Range: -40℃ to 85℃

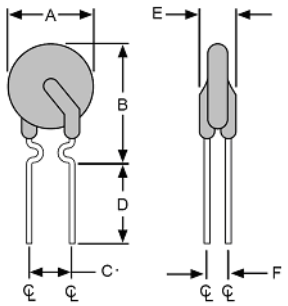
Agency Recognition: UL (E211981)
C-UL (E211981)
TÜV (R50004084)

Electrical Characteristics (23℃)

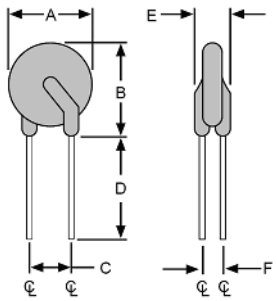
Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX},V_{DC}	Pd, W	Ohms	Ohms
FRX010-90F	0.10	0.20	4.0	40	72/90	0.38	2.50	7.50
FRX015-90F	0.15	0.35	10.0	40	72/90	0.70	2.40	7.00
FRX017-90F	0.17	0.34	3.0	40	72/90	0.48	2.00	**8.00**
FRX020-90F	0.20	0.40	2.2	40	72/90	0.41	1.83	4.40
FRX025-90F	0.25	0.50	2.5	40	72/90	0.45	1.25	3.00
FRX030-90F	0.30	0.60	3.0	40	72/90	0.49	0.88	2.10
FRX035-90F	0.35	0.75	10.0	40	72/90	1.30	0.70	2.50
FRX040-90F	0.40	0.80	3.8	40	72/90	0.56	0.55	1.29
FRX050-90F	0.50	1.00	4.0	40	72/90	0.77	0.50	1.17
FRX055-90F	0.55	1.20	10.0	40	72/90	1.50	0.40	1.50
FRX065-90F	0.65	1.30	5.3	40	72/90	0.88	0.31	0.72
FRX075-90F	0.75	1.50	6.3	40	72/90	0.92	0.25	0.60
FRX090-90F	0.90	1.80	7.2	40	72/90	0.99	0.20	0.47
FRX110-90F	1.10	2.20	8.2	40	72/90	1.50	0.15	0.38
FRX135-90F	1.35	2.70	9.6	40	72/90	1.70	0.12	0.30
FRX160-90F	1.60	3.20	11.4	40	72/90	1.90	0.09	0.22
FRX185-90F	1.85	3.70	12.6	40	72/90	2.10	0.08	0.19
FRX250-90F	2.50	5.00	15.6	40	72/90	2.50	0.05	0.13
FRX300-90F	3.00	6.00	19.8	40	72/90	2.80	0.04	0.10
FRX375-90F	3.75	7.50	24.0	40	72/90	3.20	0.03	0.08

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
Pd=Typical power dissipated from device when in tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FRX010F~FRX090F Tin plated copper, 24 AWG.
FRX110F~FRX375F Tin plated copper, 20 AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meets UL-94V-0 requirement.

FRX90V Production Dimensions (millimeter)



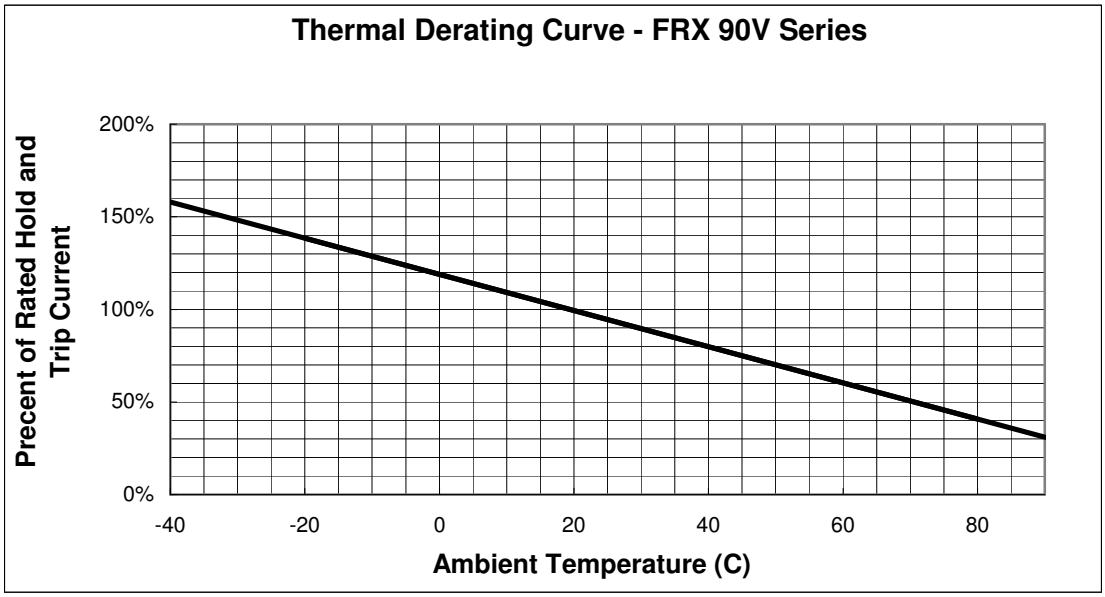
FRX 010-90F ~ FRX 090-90F
Lead Size : 24AWG
Φ 0.51 mm Diameter



FRX 110-90F ~ FRX 375-90F
Lead Size : 20AWG
Φ 0.81 mm Diameter

Part Number	A Maximum	B Maximum	C Typical	D Minimum	E Maximum	F Typical
FRX010-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX015-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-90F	7.4	13.0	5.1	7.6	3.1	1.1
FRX035-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX040-90F	7.6	13.5	5.1	7.6	3.1	1.1
FRX050-90F	7.9	13.7	5.1	7.6	3.1	1.1
FRX055-90F	9.7	14.0	5.1	7.6	3.1	1.1
FRX065-90F	9.7	14.5	5.1	7.6	3.1	1.1
FRX075-90F	10.4	15.2	5.1	7.6	3.1	1.1
FRX090-90F	11.7	15.8	5.1	7.6	3.1	1.1
FRX110-90F	13.0	18.0	5.1	7.6	3.1	1.4
FRX135-90F	14.5	19.6	5.1	7.6	3.1	1.4
FRX160-90F	16.3	21.3	5.1	7.6	3.1	1.4
FRX185-90F	17.8	22.9	5.1	7.6	3.1	1.4
FRX250-90F	21.3	26.4	10.2	7.6	3.1	1.4
FRX300-90F	24.9	30.0	10.2	7.6	3.1	1.4
FRX375-90F	28.5	33.5	10.2	7.6	3.1	1.4

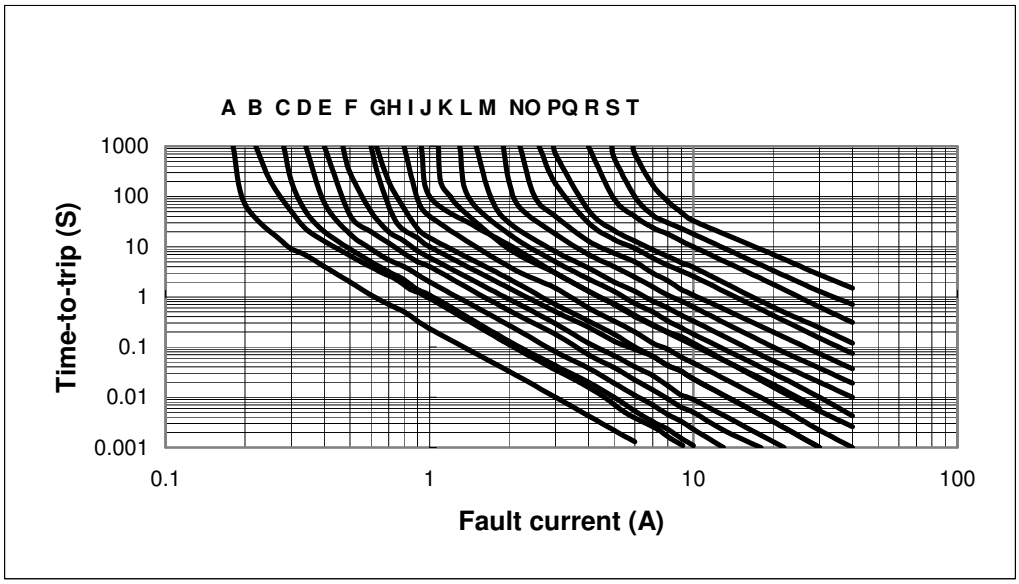
Thermal Derating Curve



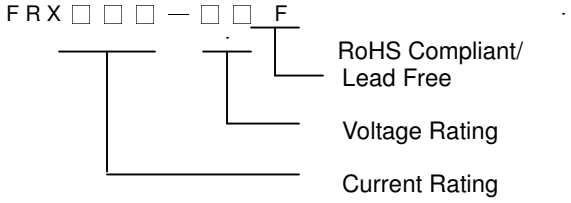
Radial Leaded PTC
FRX 90V Series

Typical Time-To-Trip at 23℃

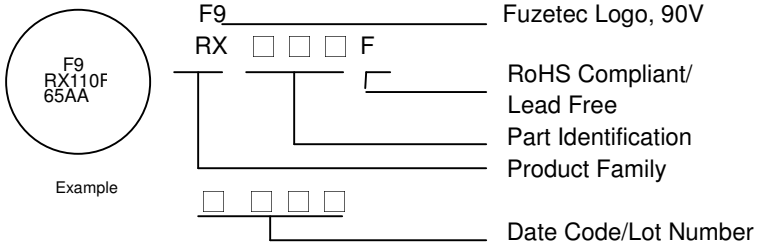
A = FRX010-90F
B = FRX015-90F
C = FRX017-90F
D = FRX020-90F
E = FRX025-90F
F = FRX030-90F
G = FRX035-90F
H = FRX040-90F
I = FRX050-90F
J = FRX055-90F
K= FRX065-90F
L = FRX070-90F
M= FRX090-90F
N = FRX110-90F
O = FRX135-90F
P = FRX160-90F
Q = FRX185-90F
R= FRX250-90F
S = FRX300-90F
T = FRX375-90F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FRX010-90F	500	3K
FRX015-90F	500	3K
FRX017-90F	500	3K
FRX020-90F	500	3K
FRX025-90F	500	3K
FRX030-90F	500	3K
FRX035-90F	500	3K
FRX040-90F	500	3K
FRX050-90F	500	3K
FRX055-90F	500	3K

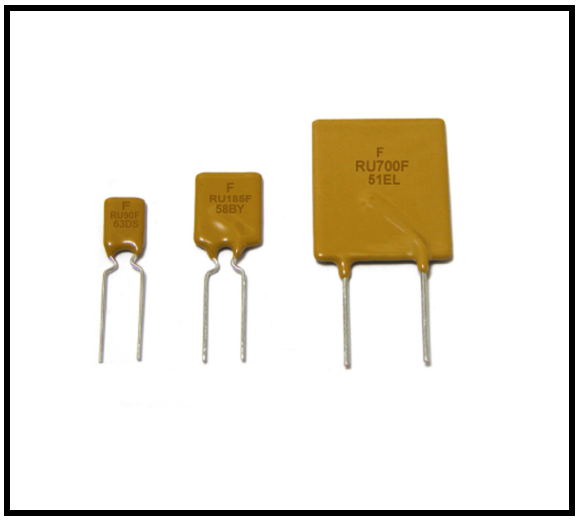
P/N	Pcs /Bag	Reel/Tape
FRX065-90F	300	3K
FRX075-90F	300	3K
FRX090-90F	300	3K
FRX110-90F	200	1.5K
FRX135-90F	200	1.5K
FRX160-90F	200	1.5K
FRX185-90F	200	1.5K
FRX250-90F	100	------
FRX300-90F	100	------
FRX375-90F	100	------

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRU Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Pb Lead Free

Application:

Wide variety of electronic equipment

Product Features:

Low resistance, High hold current, Solid state

Radial-leaded product ideal for up to 30V

Operation Current: 900mA~9A

Maximum Voltage: 30V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)

C-UL(E211981)

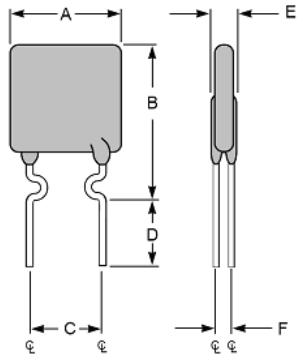
TÜV (R3-50004084)

Electrical Characteristics(23℃)

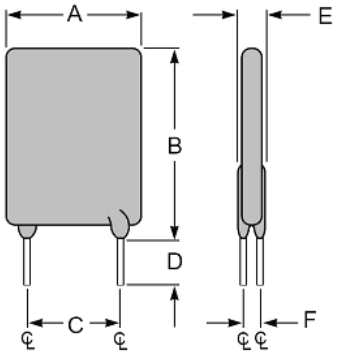
Part Number	Hold Current	Trip Current	Max.Time To Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FRU090-30F	0.90	1.80	5.9	40	30	0.6	0.070	0.22
FRU110-30F	1.10	2.20	6.6	40	30	0.7	0.050	0.17
FRU135-30F	1.35	2.70	7.3	40	30	0.8	0.040	0.13
FRU160-30F	1.60	3.20	8.0	40	30	0.9	0.030	0.11
FRU185-30F	1.85	3.70	8.7	40	30	1.0	0.030	0.09
FRU250-30F	2.50	5.00	10.3	40	30	1.2	0.020	0.07
FRU300-30F	3.00	6.00	10.8	40	30	2.0	0.020	0.08
FRU400-30F	4.00	8.00	12.7	40	30	2.5	0.010	0.05
FRU500-30F	5.00	10.00	14.5	40	30	3.0	0.010	0.05
FRU600-30F	6.00	12.00	16.0	40	30	3.5	0.005	0.04
FRU700-30F	7.00	14.00	17.5	40	30	3.8	0.005	0.03
FRU800-30F	8.00	16.00	18.8	40	30	4.0	0.005	0.02
FRU900-30F	9.00	18.00	20.0	40	30	4.2	0.005	0.02

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Maximum power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping.
Physical specifications:
Lead material: FRU090F~FRU250F Tin plated copper, 24 AWG.
FRU300F~FRU900F Tin plated copper, 20 AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meet UL-94V-0 requirement.

FRU Product Dimensions (millimeters)



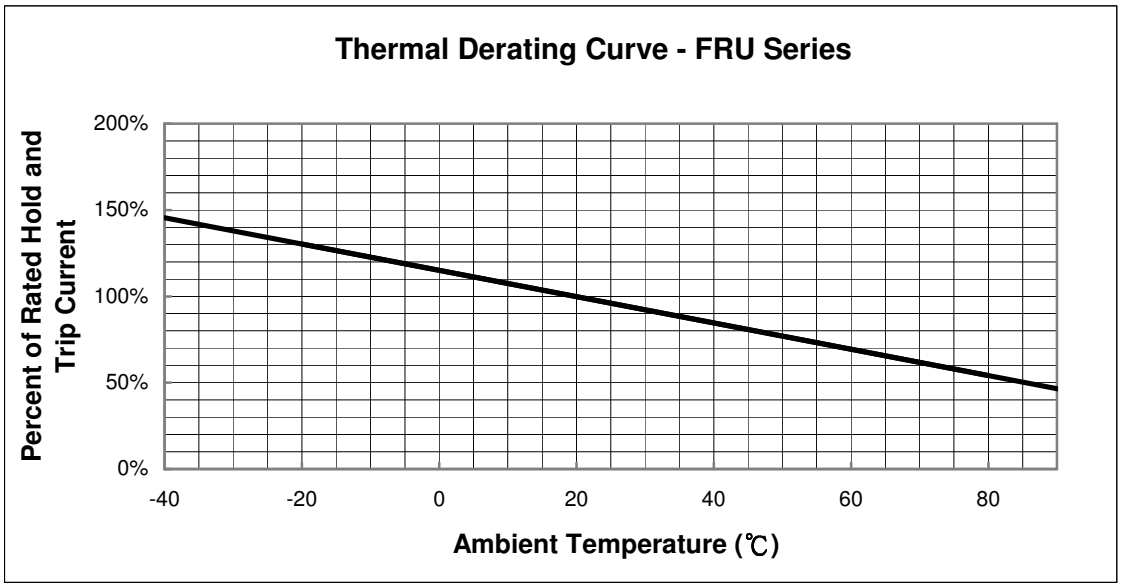
FRU 090-30F ~ FRU 250-30F
Lead Size: 24AWG,
Φ 0.51 mm Diameter



FRU 300-30F ~ FRU 900-30F
Lead Size: 20AWG
Φ 0.81 mm Diameter

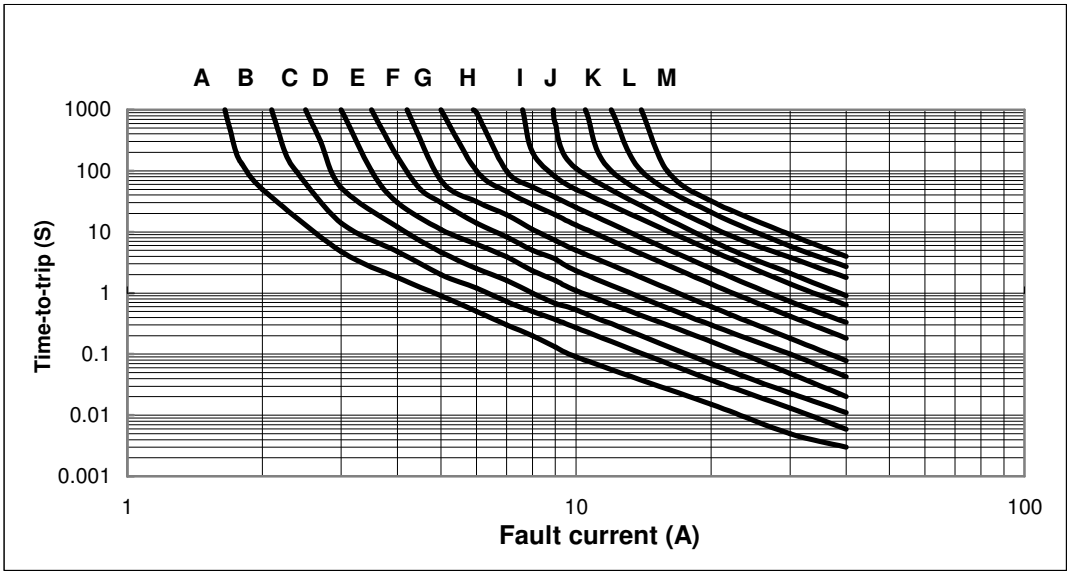
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRU090-30F	7.4	12.2	5.1	7.6	3.0	0.9
FRU110-30F	7.4	14.2	5.1	7.6	3.0	0.9
FRU135-30F	8.9	13.5	5.1	7.6	3.0	0.9
FRU160-30F	8.9	15.2	5.1	7.6	3.0	0.9
FRU185-30F	10.2	15.7	5.1	7.6	3.0	0.9
FRU250-30F	11.4	18.3	5.1	7.6	3.0	0.9
FRU300-30F	11.4	17.3	5.1	7.6	3.0	1.2
FRU400-30F	14.0	20.1	5.1	7.6	3.0	1.2
FRU500-30F	14.0	24.9	10.2	7.6	3.0	1.2
FRU600-30F	16.5	24.9	10.2	7.6	3.0	1.2
FRU700-30F	19.1	26.7	10.2	7.6	3.0	1.2
FRU800-30F	21.6	29.2	10.2	7.6	3.0	1.2
FRU900-30F	24.1	29.7	10.2	7.6	3.0	1.2

Thermal Derating Curve

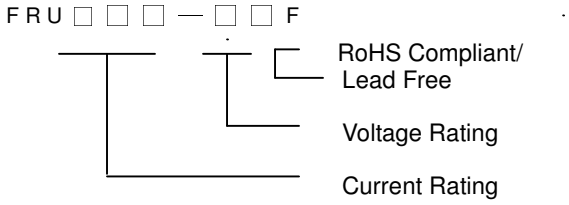


Typical Time-To-Trip at 23℃

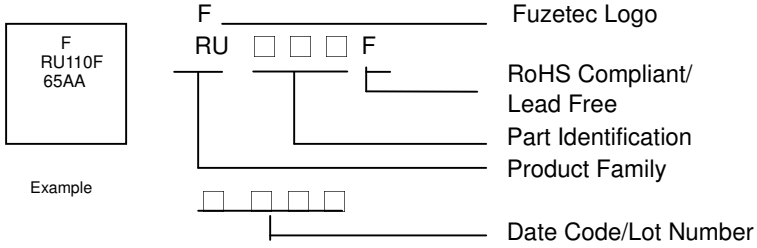
A = FRU090-30F
B = FRU110-30F
C = FRU135-30F
D = FRU160-30F
E = FRU185-30F
F = FRU250-30F
G = FRU300-30F
H = FRU400-30F
I = FRU500-30F
J = FRU600-30F
K = FRU700-30F
L = FRU800-30F
M = FRU900-30F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FRU090-30F	500	3k
FRU110-30F	500	3k
FRU135-30F	300	3k
FRU160-30F	300	3k
FRU185-30F	300	3k
FRU250-30F	300	3k
FRU300-30F	200	1.5k

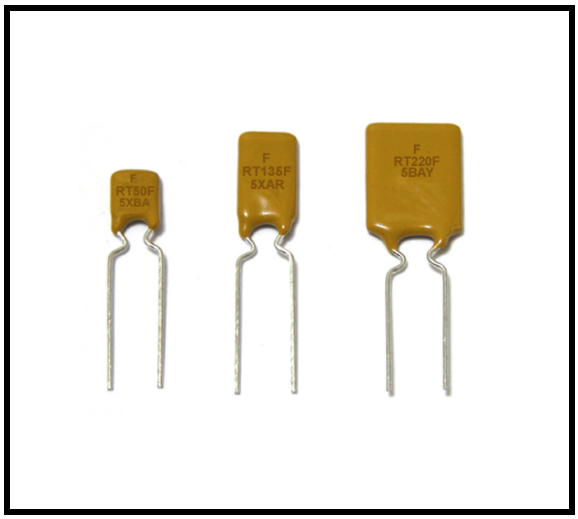
P/N	Pcs /Bag	Reel/Tape
FRU400-30F	200	1.5k
FRU500-30F	200	------
FRU600-30F	100	------
FRU700-30F	100	------
FRU800-30F	100	------
FRU900-30F	100	------

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRT Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

IEEE 1394 FireWire, Computers & Consumer electronics

Product Features:

Fast trip time, Lower Trip-to-hold Ratio, Radial-leaded product ideal for up to 36V

Operation Current: 0.5A~2.5A

Maximum Voltage: 36V

Temperature Range: -40℃ to 85℃

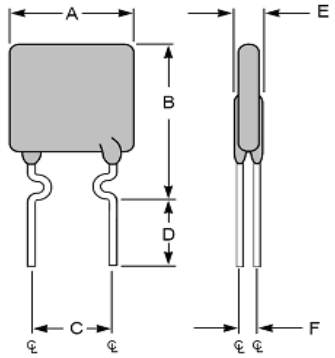
Agency Recognition: UL(E211981)
C-UL(E211981)

Electrical Characteristics (23℃)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S.	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FRT050-33F	0.50	1.00	5.0	40	36	0.67	0.140	0.448
FRT075-33F	0.75	1.50	4.0	40	36	0.71	0.115	0.368
FRT090-33F	0.90	1.80	3.5	40	36	0.74	0.090	0.288
FRT120-33F	1.20	2.30	3.5	40	36	0.78	0.074	0.180
FRT135-33F	1.35	2.50	4.5	40	36	0.84	0.059	0.143
FRT160-33F	1.60	2.75	4.5	40	36	0.86	0.041	0.131
FRT190-33F	1.90	3.00	3.5	40	36	0.90	0.045	0.092
FRT220-33F	2.20	3.50	6.5	40	36	0.95	0.025	0.080
FRT250-33F	2.50	4.00	8.0	40	36	0.99	0.020	0.064

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
Pd=Typical power dissipated from device when in tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: Tin plated copper, 24 AWG.
Soldering characteristics:MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meets UL-94V-0 requirement.

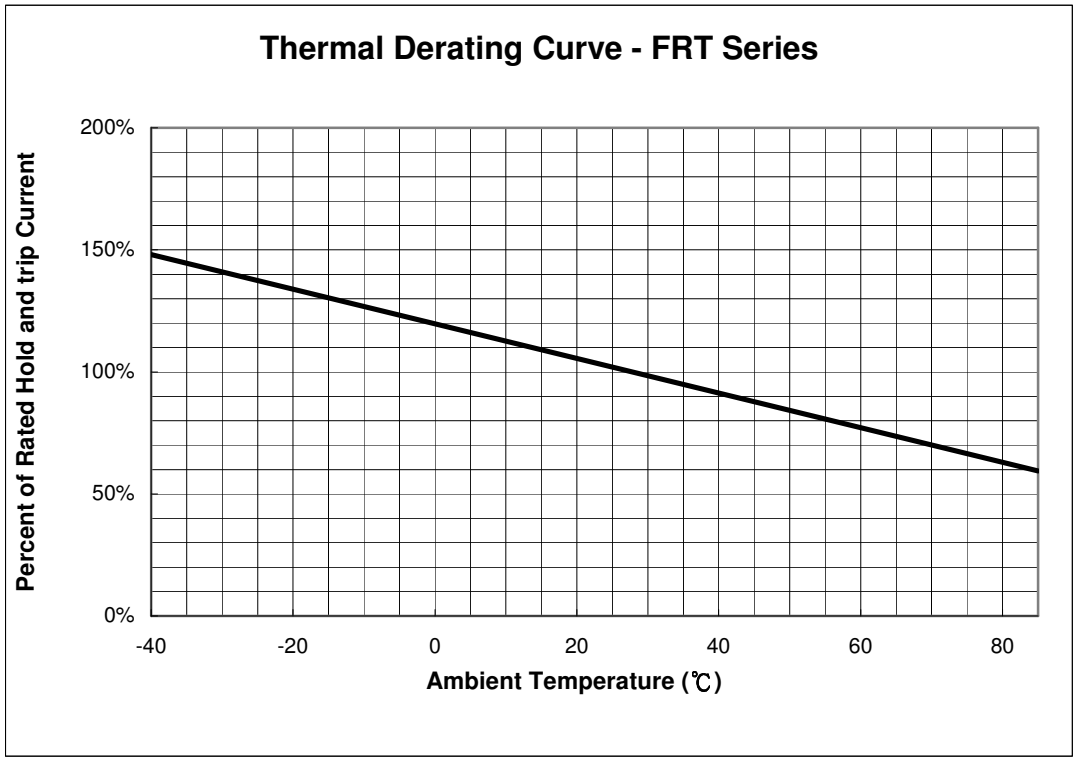
Production Dimensions (millimeter)



Lead Size: 24AWG,
Φ 0.51 mm Diameter

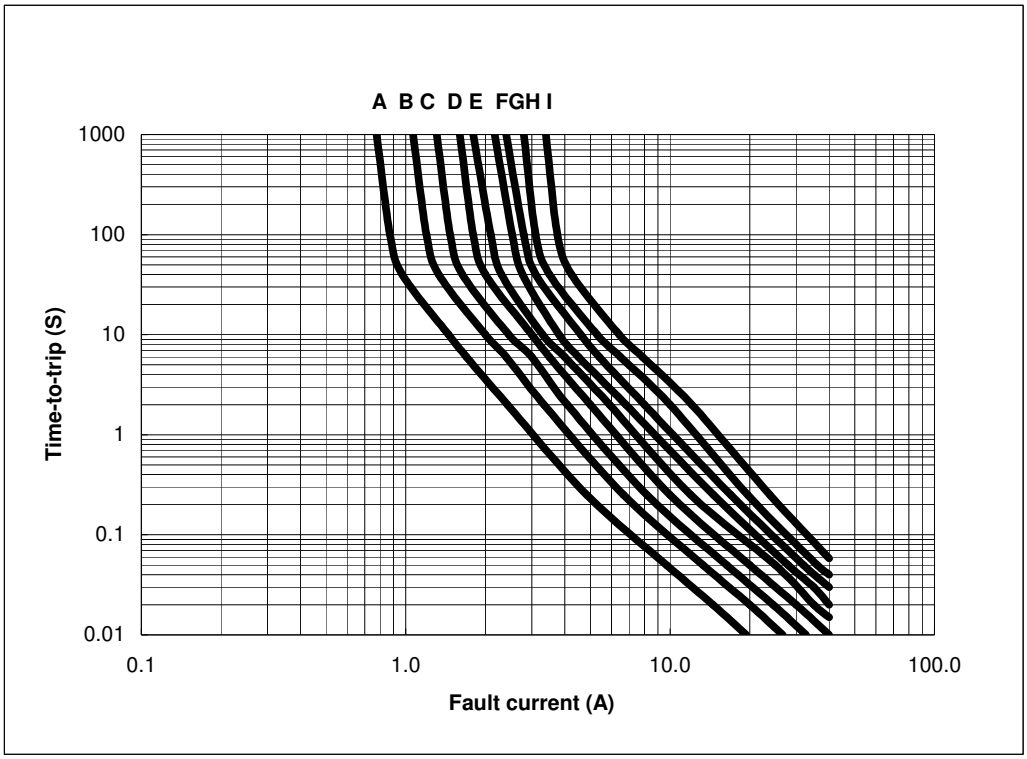
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRT050-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT075-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT090-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT120-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT135-33F	7.4	14.2	5.1	7.6	3.0	1.1
FRT160-33F	7.4	14.0	5.1	7.6	3.0	1.1
FRT190-33F	9.0	13.5	5.1	7.6	3.0	1.1
FRT220-33F	10.0	17.0	5.1	7.6	3.0	1.1
FRT250-33F	10.0	19.5	5.1	7.6	3.0	1.1

Thermal Derating Curve

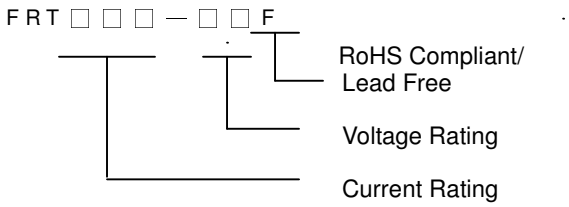


Typical Time-To-Trip at 23℃

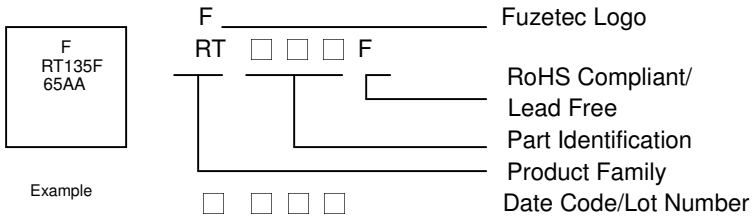
A= FRT 050-33F
B= FRT 075-33F
C= FRT 090-33F
D= FRT 120-33F
E= FRT 135-33F
F= FRT 160-33F
G= FRT 190-33F
H= FRT 220-33F
I = FRT 250-33F



Part Numbering System



Part Marking System

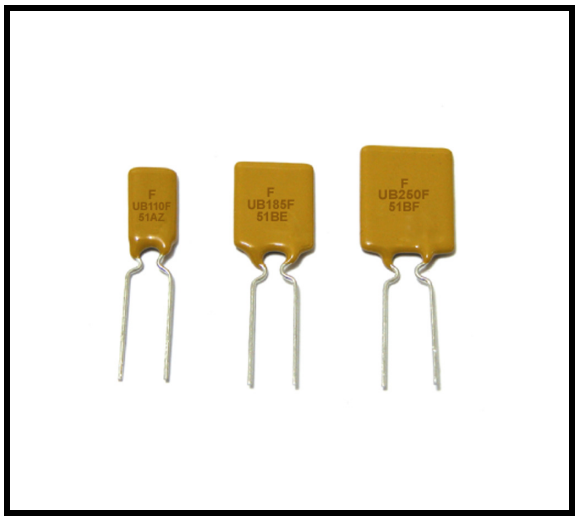


Standard Package

P/N	Pcs /Bag	Reel/Tape
FRT050-33F	500	3K
FRT075-33F	500	3K
FRT090-33F	500	3K
FRT120-33F	500	3K
FRT135-33F	500	3K

P/N	Pcs /Bag	Reel/Tape
FRT160-33F	500	3K
FRT190-33F	500	3K
FRT220-33F	500	3K
FRT250-33F	500	3K

Radial Leaded PTC
FUSB Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:
Low voltage USB equipment

Product Features:
Low resistance, Fast trip time , Lower Trip-to-hold Ratio

Operation Current: 750mA ~2.5A

Maximum Voltage: 16V/30V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)
C-UL(E211981)
TÜV (R3-50004084)

Electrical characteristics(23℃)

Part Number	Hold Current	Trip Current	Max.Time to Trip		Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
								R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 8A, S	at 5xI_H, S	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FUSB075F	0.75	1.30	0.4	--	40	16	0.3	0.08	0.23
FUSB090F	0.90	1.80	1.2	5.9	40	16/30	0.6	0.07	0.18
FUSB110F	1.10	2.20	2.3	6.6	40	16/30	0.7	0.05	0.14
FUSB120F	1.20	2.00	0.5	--	40	16	0.6	0.04	0.14
FUSB135F	1.35	2.70	4.5	7.3	40	16/30	0.8	0.04	0.12
FUSB155F	1.55	2.70	0.6	--	40	16	0.7	0.03	0.12
FUSB160F	1.60	3.20	9.0	8.0	40	16/30	0.9	0.03	0.11
FUSB185F	1.85	3.70	10.0	8.7	40	16/30	1.0	0.03	0.09
FUSB250F	2.50	5.00	40.0	10.3	40	16/30	1.2	0.02	0.07

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: Tin plated copper, 24 AWG.
Soldering characteristics: Soldering ability per ANSI/J-STD 002
Solder heat withstand per IEC 68-2-20

Insulating coating:Flame retardant epoxy polymer,meets UL 94V-0 requirement.

FUSB Product Dimensions (millimeters)

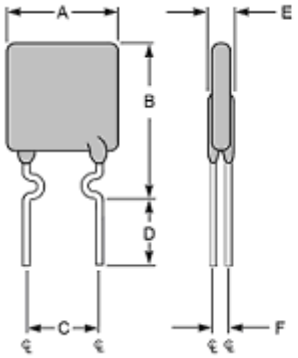


Figure 1
Lead Size: 24AWG,
Φ 0.51 mm Diameter

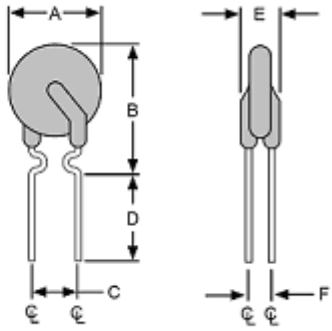
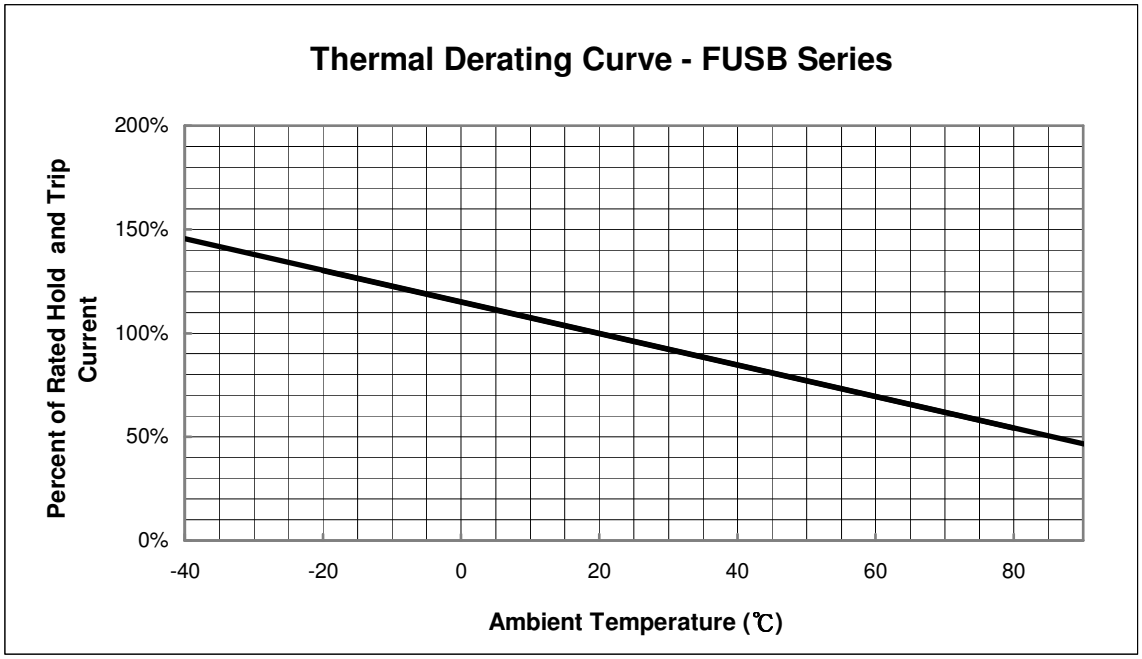


Figure 2
Lead Size : 24AWG
Φ 0.51 mm Diameter

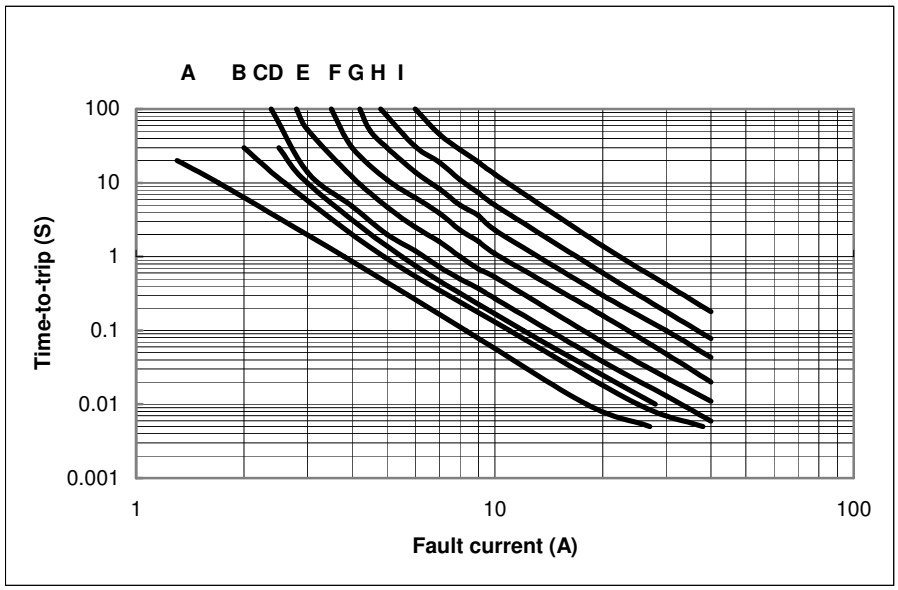
Part Number	Fig	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FUSB075F	2	6.9	11.4	5.1	7.6	3.0	0.8
FUSB090F	1	7.4	12.2	5.1	7.6	3.0	0.8
FUSB110F	1	7.4	14.2	5.1	7.6	3.0	0.8
FUSB120F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB135F	1	8.9	13.5	5.1	7.6	3.0	0.8
FUSB155F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB160F	1	8.9	15.2	5.1	7.6	3.0	0.8
FUSB185F	1	10.2	15.7	5.1	7.6	3.0	0.8
FUSB250F	1	11.4	18.3	5.1	7.6	3.0	0.8

Thermal Derating Curve

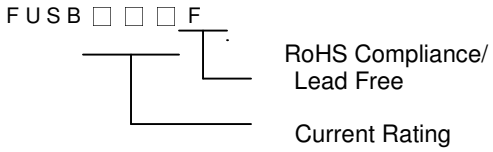


Typical Time-To-Trip at 23℃

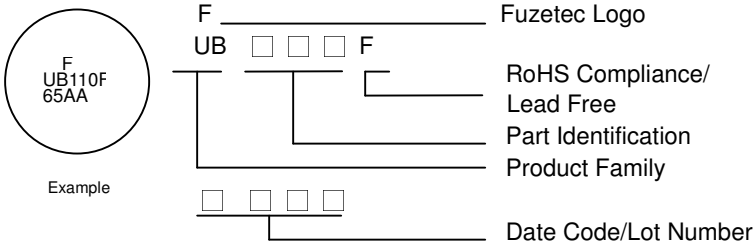
A = FUSB075F
B = FUSB120F
C = FUSB155F
D = FUSB090F
E = FUSB110F
F = FUSB135F
G = FUSB160F
H = FUSB185F
I = FUSB250F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FUSB075F	500	3K
FUSB090F	500	3K
FUSB110F	500	3K
FUSB120F	500	3K
FUSB135F	500	3K

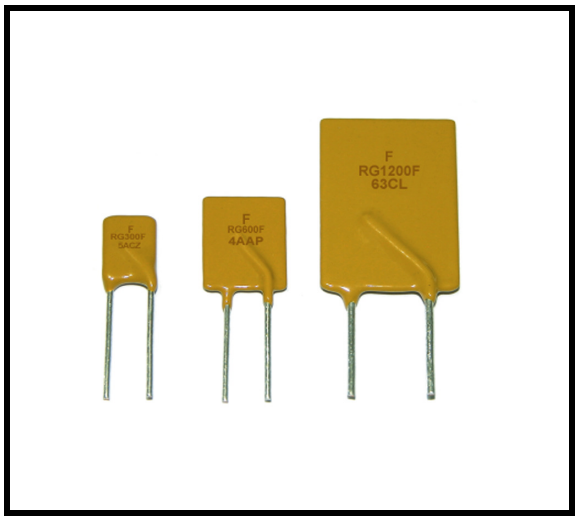
P/N	Pcs /Bag	Reel/Tape
FUSB155F	500	3K
FUSB160F	500	3K
FUSB185F	500	3K
FUSB250F	500	3K

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRG Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Wide variety of electronic equipment

Product Features:

Very high hold current, Solid state

Radial-leaded product ideal for up to 16Vdc

Operation Current: 2.5 A~14A

Maximum Voltage: 16V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)

C-UL(E211981)

TÜV (R50004084)

Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Max.time to trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FRG250-16F	**2.5**	**4.7**	**5.0**	**100**	**16**	**1.0**	**0.022**	**0.053**
FRG300-16F	3.0	5.1	2.0	100	16	2.3	0.034	0.105
FRG400-16F	4.0	6.8	3.5	100	16	2.4	0.020	0.063
FRG500-16F	5.0	8.5	3.6	100	16	2.6	0.014	0.044
FRG600-16F	6.0	10.2	5.8	100	16	2.8	0.009	0.033
FRG700-16F	7.0	11.9	8.0	100	16	3.0	0.006	0.021
FRG800-16F	8.0	13.6	9.0	100	16	3.0	0.005	0.018
FRG900-16F	9.0	15.3	12.0	100	16	3.3	0.004	0.015
FRG1000-16F	10.0	17.0	12.5	100	16	3.3	0.003	0.012
FRG1100-16F	11.0	18.7	13.5	100	16	3.7	0.003	0.010
FRG1200-16F	12.0	20.4	16.0	100	16	4.2	0.002	0.009
FRG1400-16F	14.0	23.8	20.0	100	16	4.6	0.002	0.008

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FRG250-16F Tin plated copper, 24 AWG.
FRG300-16F~FRG1100-16F Tin plated copper,20 AWG.
FRG1200-16F~FRHG400-16F Tin plated copper,18 AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meet UL-94V-0 requirement.

FRG Product Dimensions (millimeters)

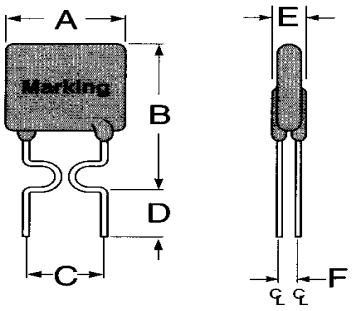


Figure 1
Lead Size: 24AWG
Φ 0.51 mm Diameter

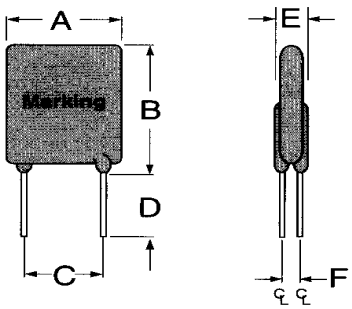


Figure 2
Lead Size: 20AWG
Φ 0.81 mm Diameter

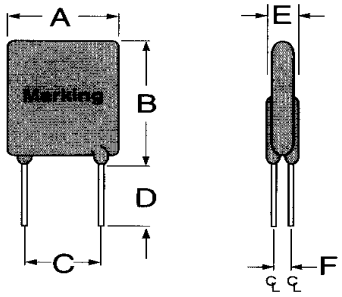
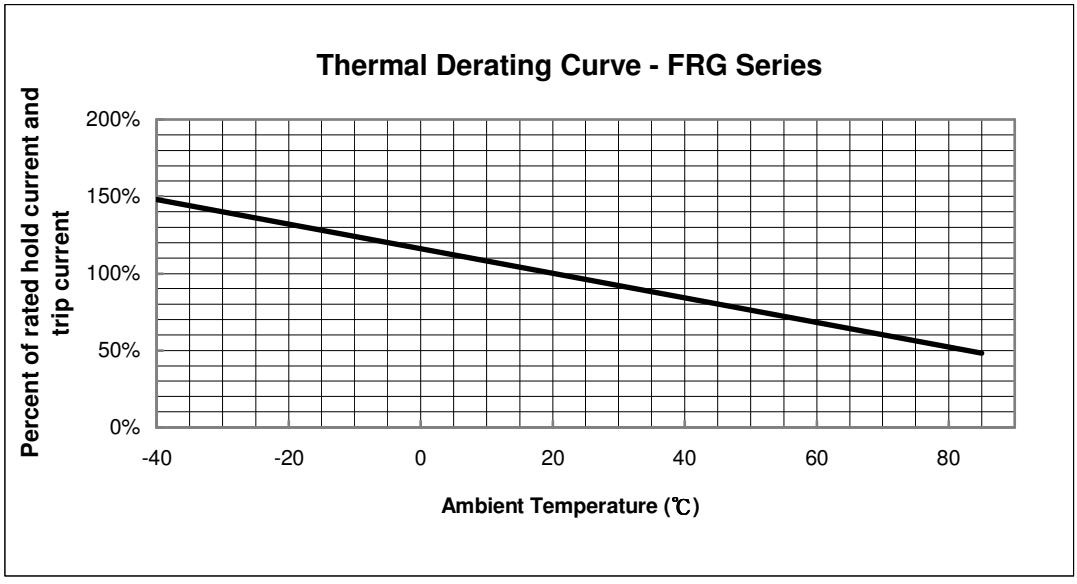


Figure 3
Lead Size: 18AWG
Φ 1.0 mm Diameter

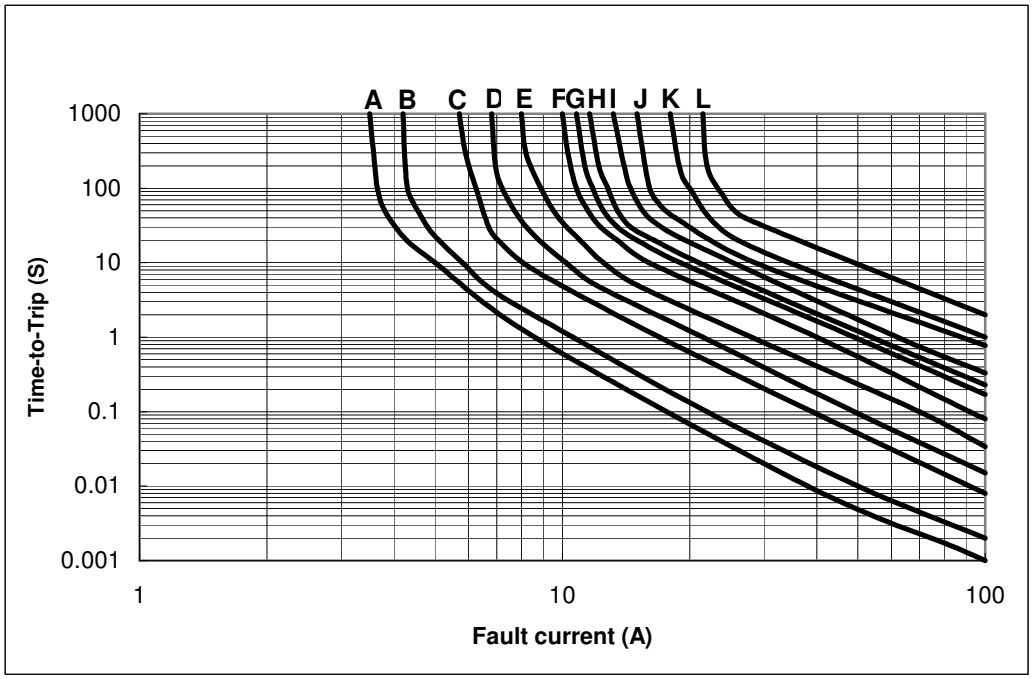
Part Number	Fig	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRG250-16F	1	8.9	12.8	5.1	7.6	3.0	1.2
FRG300-16F	2	7.1	11.0	5.1	7.6	3.0	1.2
FRG400-16F	2	8.9	12.8	5.1	7.6	3.0	1.2
FRG500-16F	2	10.4	14.3	5.1	7.6	3.0	1.2
FRG600-16F	2	10.7	17.1	5.1	7.6	3.0	1.2
FRG700-16F	2	11.2	19.7	5.1	7.6	3.0	1.2
FRG800-16F	2	12.7	20.9	5.1	7.6	3.0	1.2
FRG900-16F	2	14.0	21.7	5.1	7.6	3.0	1.2
FRG1000-16F	2	16.5	24.1	5.1	7.6	3.0	1.2
FRG1100-16F	2	17.5	26.0	5.1	7.6	3.0	1.2
FRG1200-16F	3	17.5	28.0	10.2	7.6	3.6	1.4
FRG1400-16F	3	27.9	27.9	10.2	7.6	3.6	1.4

Thermal Derating Curve

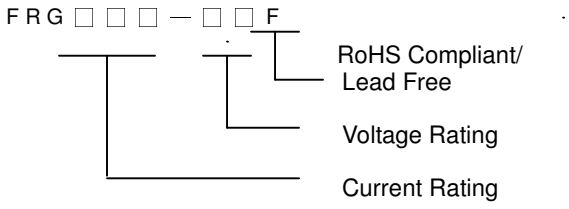


Typical Time-To-Trip at 23℃

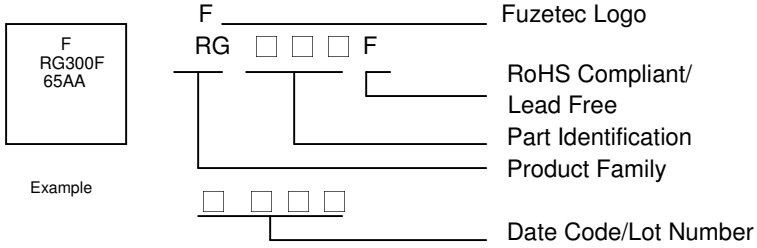
A=FRG250-16F
B=FRG300-16F
C=FRG400-16F
D=FRG500-16F
E=FRG600-16F
F=FRG700-16F
G=FRG800-16F
H=FRG900-16F
I=FRG1000-16F
J=FRG1100-16F
K=FRG1200-16F
L=FRG1400-16F



Part Numbering System



Part Marking System



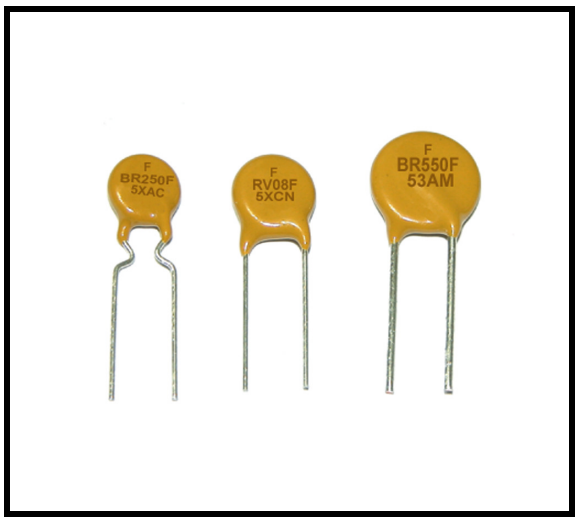
Standard Package

P/N	Pcs /Bag	Reel/Tape
FRG250-16F	500	2.5k
FRG300-16F	500	2.5k
FRG400-16F	300	2.5k
FRG500-16F	300	2.5k
FRG600-16F	300	2.5k
FRG700-16F	200	1.2k

P/N	Pcs /Bag	Reel/Tape
FRG800-16F	200	-------
FRG900-16F	200	-------
FRG1000-16F	100	-------
FRG1100-16F	100	-------
FRG1200-16F	100	-------
FRG1400-16F	100	-------

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.
-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.
-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FBR Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Cable /Telephone Electronics: Cable Power Passing Tap.

Product Features:

Low hold current, Solid state, Radial-leaded product ideal for up to 90V

Operation Current: 100mA~900mA

Maximum Voltage: 90V

Temperature Range: -40℃ to 85℃

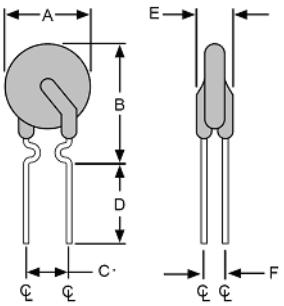
Agency Recognition: UL (E211981)
C-UL(E211981)
TÜV (R50004084)

Electrical Characteristics (23℃)

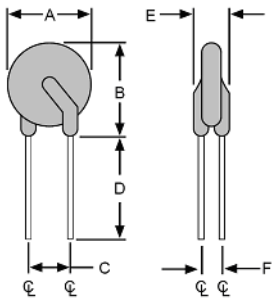
Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX}, V_{DC}	Pd, W	Ohms	Ohms
FBR100(U)F	0.10	0.20	10	40	90	0.38	2.50	7.50
FBR150(U)F	0.15	0.35	10	40	90	0.70	2.40	7.00
FBR200(U)F	0.20	0.45	10	40	90	0.80	1.50	4.50
FBR250(U)F	0.25	0.55	10	40	90	0.90	1.25	3.70
FBR350(U)F	0.35	0.75	10	40	90	1.30	0.90	2.50
FBR550(U)F	0.55	1.20	12	40	90	1.50	0.45	1.50
FBR750(U)F	0.75	1.60	13	40	90	1.70	0.30	1.20
FBR900(U)F	0.90	2.00	20	40	90	2.30	0.15	0.70

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
Pd=Typical power dissipated from device when in tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FBR100F~FBR350F Tin plated copper, 24 AWG.
FBR200F~FBR900F Tin plated copper, 20 AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meets UL-94V-0 requirement.

Production Dimensions (millimeter)



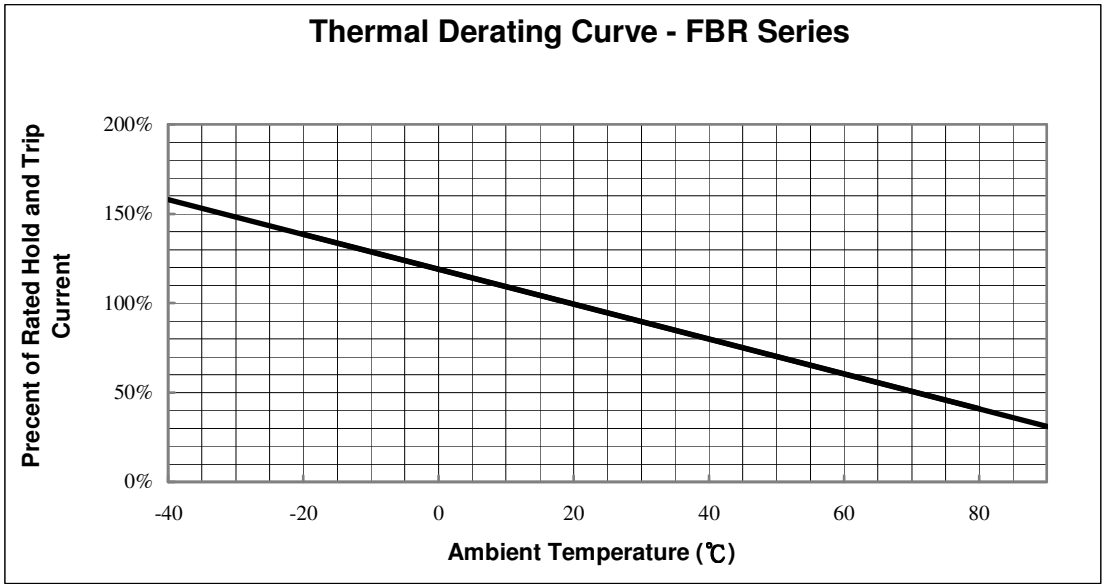
FBR100-90F ~ FBR350-90F
Lead Size: 24AWG
Φ 0.51 mm Diameter



FBR550-90F ~ FBR900-90F
Lead Size: 20AWG
Φ 0.81 mm Diameter

Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FBR100(U)F	7.4	12.7	5.1	7.6	3.6	1.4
FBR150(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR200(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR250(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR350(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR550(U)F	10.9	14.0	5.1	7.6	3.6	1.4
FBR750(U)F	11.9	15.5	5.1	7.6	3.6	1.4
FBR900(U)F	13.0	16.0	5.1	7.6	3.6	1.4

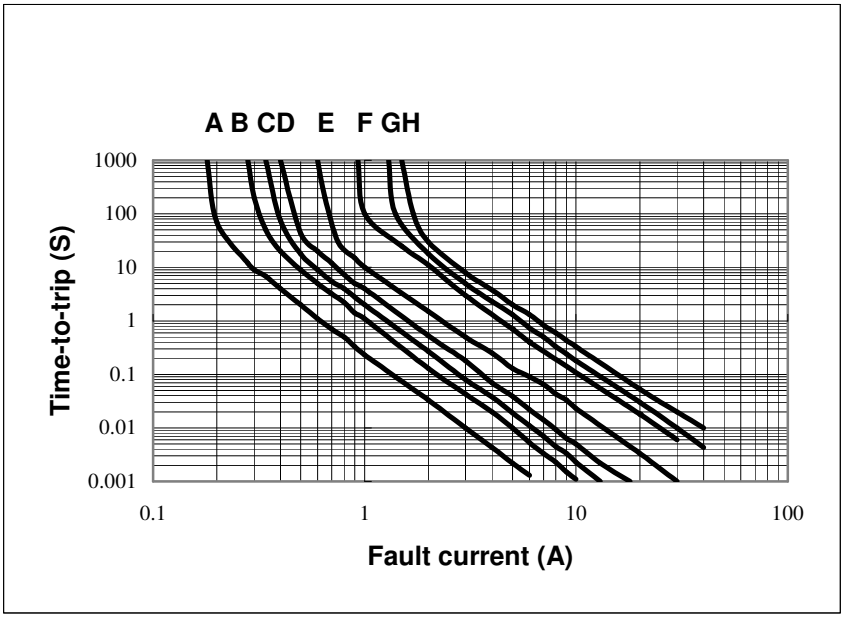
Thermal Derating Curve



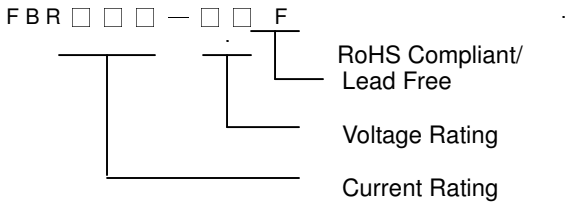
Radial Leaded PTC
FBR Series

Typical Time-To-Trip at 23℃

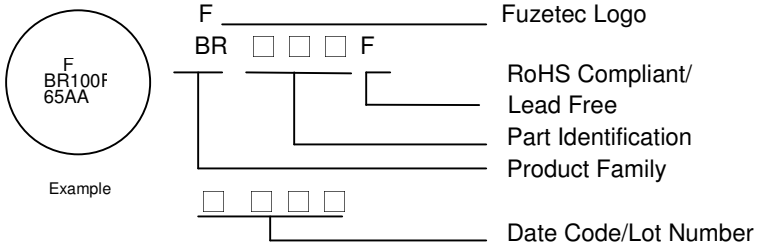
A = FBR100 (U)F
B = FBR150 (U)F
C = FBR200 (U)F
D = FBR250 (U)F
E = FBR350 (U)F
F = FBR550 (U)F
G = FBR750 (U)F
H = FBR900 (U)F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FBR100 (U)F	500	2.5K
FBR150 (U)F	500	2.5K
FBR200 (U)F	500	2.5K
FBR250 (U)F	500	2.5K

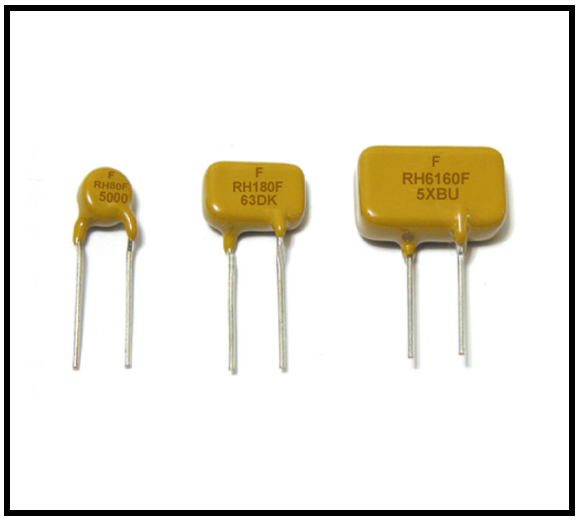
P/N	Pcs /Bag	Reel/Tape
FBR350 (U)F	500	2.5K
FBR550 (U)F	500	2K
FBR750 (U)F	500	2K
FBR900 (U)F	500	2K

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRH Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Telecommunication and Data transmitting

Product Features:

Low hold current, Solid state

Radial-leaded product ideal for up to 60V/250V/600V

Operation Current: 0.08 A~0.18A

Maximum Voltage: 60V/250V/600V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)
C-UL(E211981)
TÜV(R50021651)

Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Max.Time to Trip		Maximum Current	Max Oper. Voltage	Max Int. Voltage	Resistance Tolerance	
			Current	Time				R MIN	R1MAX
	IH, A	IT, A	A	Sec	IMAX, A	VMAX, VDC	VIMAX,V	Ohms	Ohms
FRH080-250UF	0.08	0.16	0.35	4.0	3.0	60	250	14.0	33.0
FRH080-250F	0.08	0.16	0.35	4.0	3.0	60	250	14.0	33.0
FRH110-250UF	0.11	0.22	1.00	2.0	3.0	60	250	5.0	16.0
FRH110-250F	0.11	0.22	1.00	2.0	3.0	60	250	5.0	16.0
FRH120-250UF	0.12	0.24	1.00	2.0	3.0	60	250	6.0	16.0
FRH120-250F	0.12	0.24	1.00	2.0	3.0	60	250	4.0	16.0
FRH145-250UF	0.15	0.29	1.00	2.5	3.0	60	250	3.5	12.0
FRH145-250F	0.15	0.29	1.00	2.5	3.0	60	250	3.0	12.0
FRH180-250UF	0.18	0.65	1.50	10.0	10.0	60	250	0.8	4.0
FRH180-250F	0.18	0.65	1.50	11.0	10.0	60	250	0.8	4.0
FRH150-600F	0.15	0.30	1.00	5.0	3.0	60	600	6.0	22.0
FRH160-600F	0.16	0.32	1.00	7.0	3.0	60	600	4.0	18.0

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
$V_{I\text{-}MAX}$ = Maximum interrupt voltage device can withstand for short period of time. (Not for long term.)
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FRH080-250F ~ FRH180-250F Tin plated copper, 22 AWG.
FRH150-600F ~ FRH160-600F Tin plated copper, 22 AWG.
Soldering characteristics:MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meet UL-94V-0 requirement.

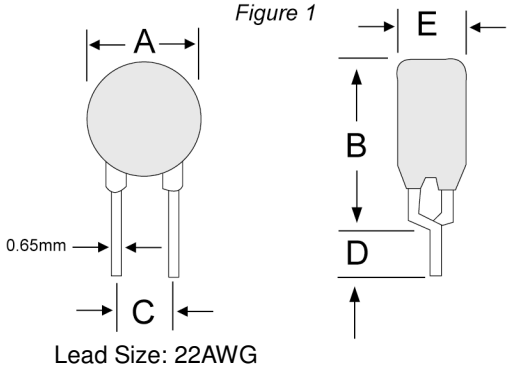
NOTE : All FRH products are designed to assist equipment to pass ITU, UL1950 or GR1089 specification.

CAUTION : FRH devices are not intended for continous use of Line Voltage such as 120 VAC~ 600VAC and above.

Radial Leaded PTC
FRH Series

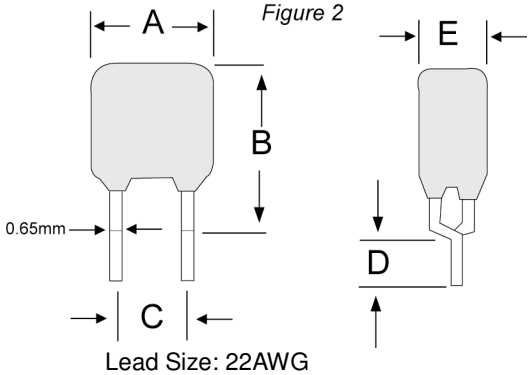
FRH Product Dimensions (millimeters)

Figure 1



Lead Size: 22AWG
Φ 0.65 mm Diameter

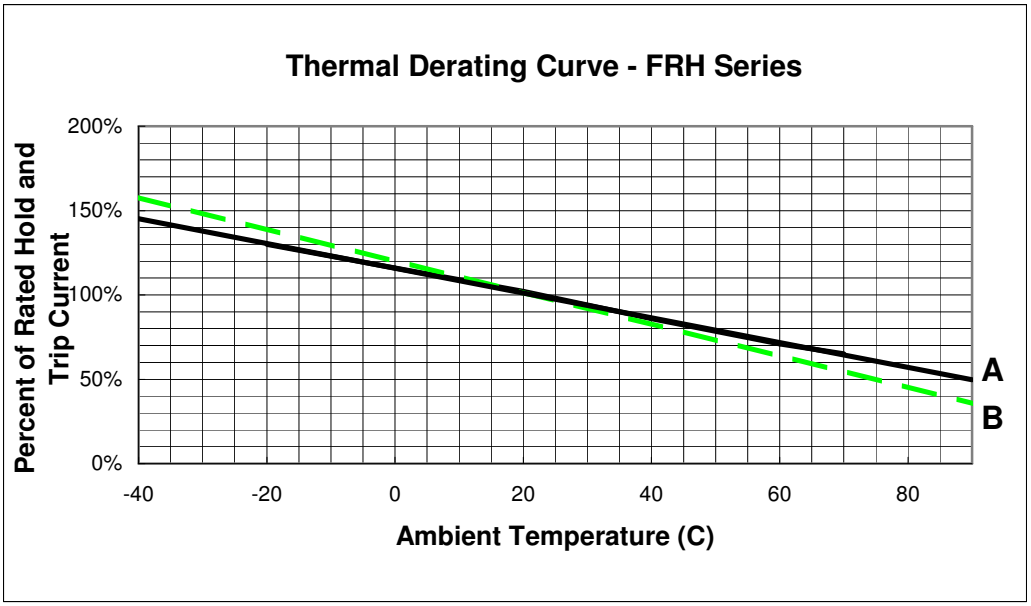
Figure 2



Lead Size: 22AWG
Φ 0.65 mm Diameter

Part Number	Fig	A	B	C	D	E
		Maximum	Maximum	Typical	Minimum	Maximum
FRH080-250UF	1	5.1	9.1	5.0	4.7	3.8
FRH080-250F	1	5.8	9.6	5.0	4.7	4.6
FRH110-250UF	1	5.9	9.4	5.0	4.7	3.8
FRH110-250F	1	6.8	9.9	5.0	4.7	4.6
FRH120-250UF	2	6.0	10.0	5.0	4.7	3.8
FRH120-250F	2	6.5	11.0	5.0	4.7	4.6
FRH145-250UF	2	6.0	10.0	5.0	4.7	3.8
FRH145-250F	2	6.5	11.0	5.0	4.7	4.6
FRH180-250UF	2	10.4	12.6	5.0	4.7	3.8
FRH180-250F	2	10.9	12.6	5.0	4.7	4.6
FRH150-600F	2	13.5	12.6	5.0	4.7	6.0
FRH160-600F	2	16.0	12.6	5.0	4.7	6.0

Thermal Derating Curve



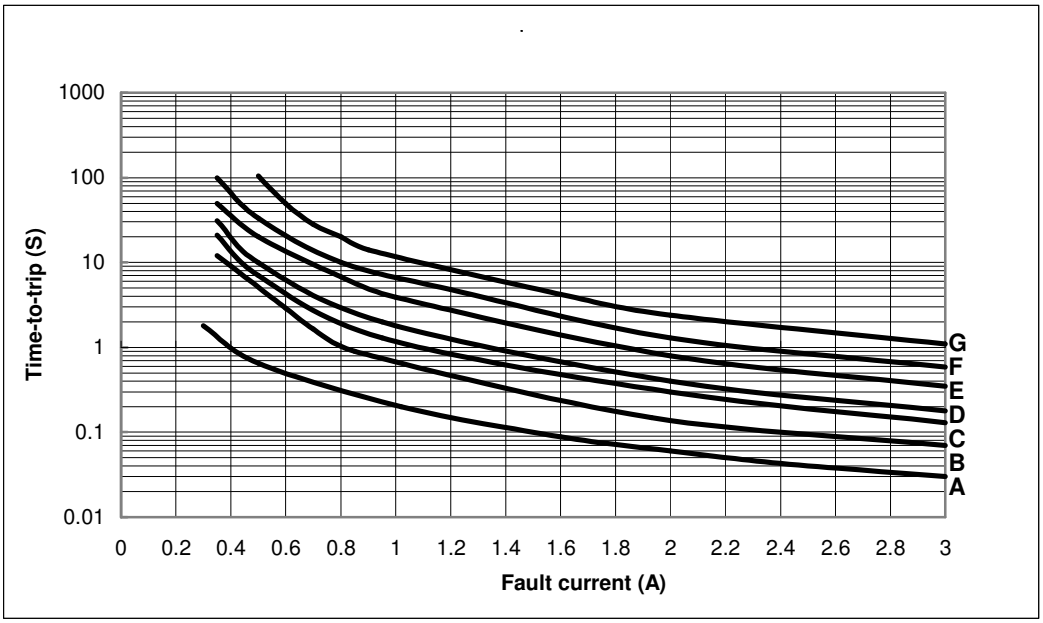
A= FRH180-250UF; FRH180-250F

B= All other FRH devices

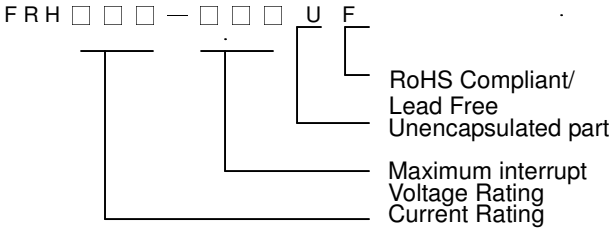
Radial Leaded PTC
FRH Series

Typical Time-To-Trip at 23℃

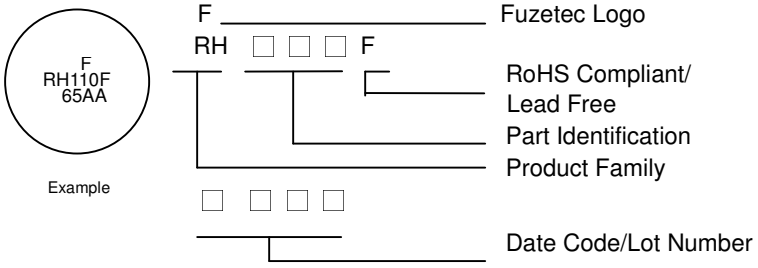
A= FRH080-250(U)F
B= FRH110-250(U)F
C= FRH120-250(U)F
D= FRH145-250(U)F
E= FRH180-250(U)F
F= FRH150-600F
G= FRH160-600F



Part Numbering System



Part Marking System



*** FRH150-600 Marking: RH6150**
*** FRH160-600 Marking: RH6160**

Standard Package

P/N	Pcs /Bag	Reel/Tape
FRH080-250UF	300	1.5K
FRH080-250F	300	1.5K
FRH110-250UF	300	1.5K
FRH110-250F	300	1.5K
FRH120-250UF	300	1.5K
FRH120-250F	300	1.5K

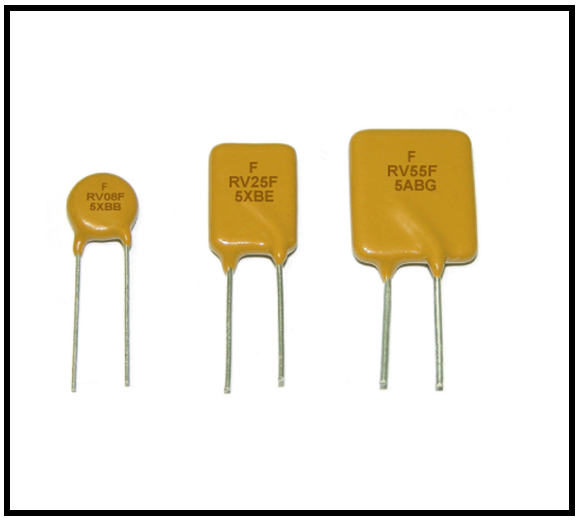
P/N	Pcs /Bag	Reel/Tape
FRH145-250UF	300	1.5K
FRH145-250F	300	1.5K
FRH180-250UF	200	1.2K
FRH180-250F	200	1.2K
FRH150-600F	100	600
FRH160-600F	100	600

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Radial Leaded PTC
FRV Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Line Voltage Power Supply, Transformer and Appliances

Product Features:

Low hold current, Solid state, Radial leaded product ideal for up to $265V_{AC/DC}$

Operation Current: 50mA~550mA

Maximum Operating Voltage: $240V_{AC/DC}$

Maximum Interrupt Voltage: $265V_{AC/DC}$

Temperature Range: -40℃ to 85℃

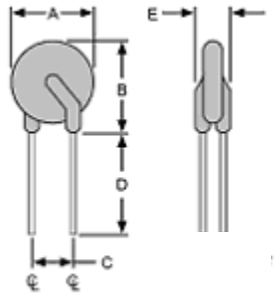
Agency Recognition: UL(E211981)
C-UL(E211981)
TÜV(R50021651)

Electrical Characteristics (23℃)

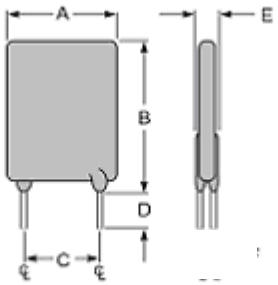
Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX}, $V_{AC/DC}$	Pd, W	Ohms	Ohms
FRV005-240F	0.05	0.12	15.0	1.0	240	0.70	18.50	65.00
FRV008-240F	0.08	0.19	15.0	1.2	240	0.80	7.40	26.00
FRV012-240F	0.12	0.30	15.0	1.2	240	1.00	3.00	12.00
FRV016-240F	0.16	0.37	15.0	2.0	240	1.40	2.50	7.80
FRV025-240F	0.25	0.56	18.5	3.5	240	1.50	1.30	3.80
FRV033-240F	0.33	0.74	18.5	4.5	240	1.70	0.83	2.60
FRV040-240F	0.40	0.90	24.0	5.5	240	2.00	0.60	1.90
FRV055-240F	0.55	1.25	26.0	7.0	240	3.40	0.45	1.45

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
Pd=Typical power dissipated from device when in tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping.
Physical specifications:
Lead material: FRV005-240F~FRV016-240F Tin plated copper, 24AWG.
FRV025-240F~FRV040-240F Tin plated copper, 22AWG.
FRV055-240F Tin plated copper, 20AWG.
Soldering characteristics: MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meets UL-94V-0 requirement.

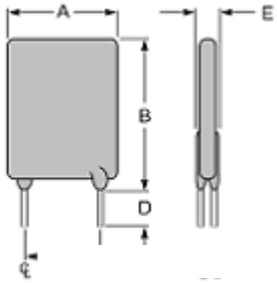
Production Dimensions (millimeter)



FRV 005-240F~FRV016-240F
Lead Size: 24AWG
Φ 0.51 mm Diameter



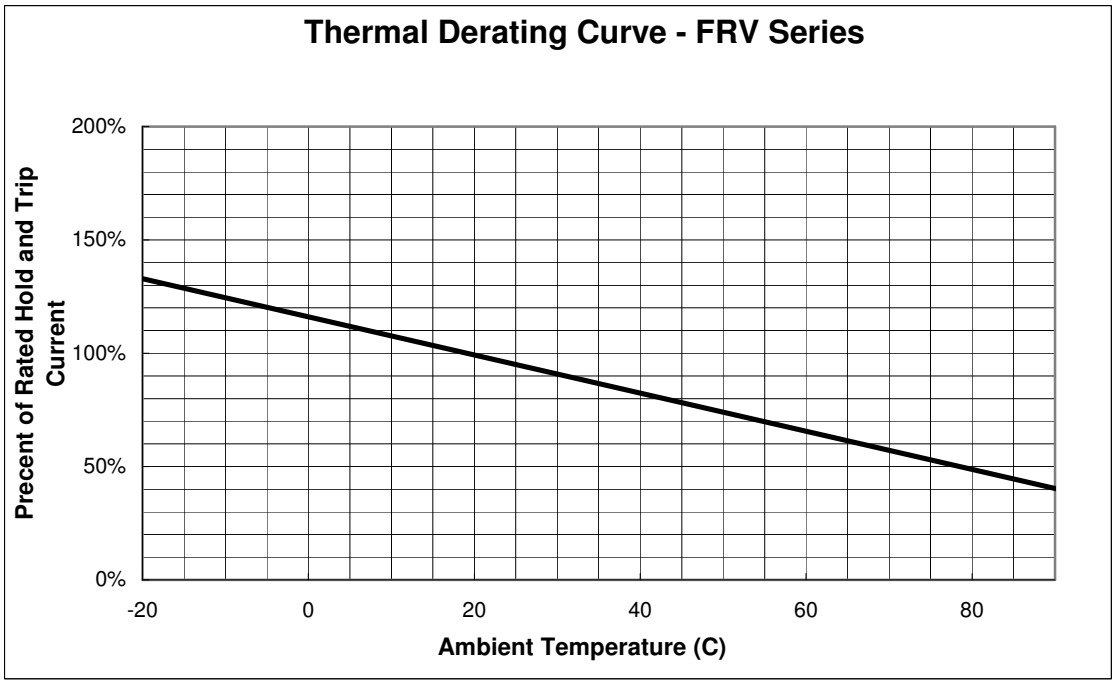
FRV025-240F~FRV040-240F
Lead Size: 22AWG
Φ 0.65 mm Diameter



FRV055-240F
Lead Size: 20AWG
Φ 0.81 mm Diameter

Part Number	A	B	C	D	E
	Maximum	Maximum	Typical	Minimum	Maximum
FRV005-240F	8.3	10.7	5.1	7.6	3.8
FRV008-240F	8.3	10.7	5.1	7.6	3.8
FRV012-240F	8.3	10.7	5.1	7.6	3.8
FRV016-240F	9.9	12.5	5.1	7.6	3.8
FRV025-240F	9.6	17.4	5.1	7.6	3.8
FRV033-240F	11.4	16.5	5.1	7.6	3.8
FRV040-240F	11.5	19.5	5.1	7.6	3.8
FRV055-240F	14.0	21.7	5.1	7.6	4.1

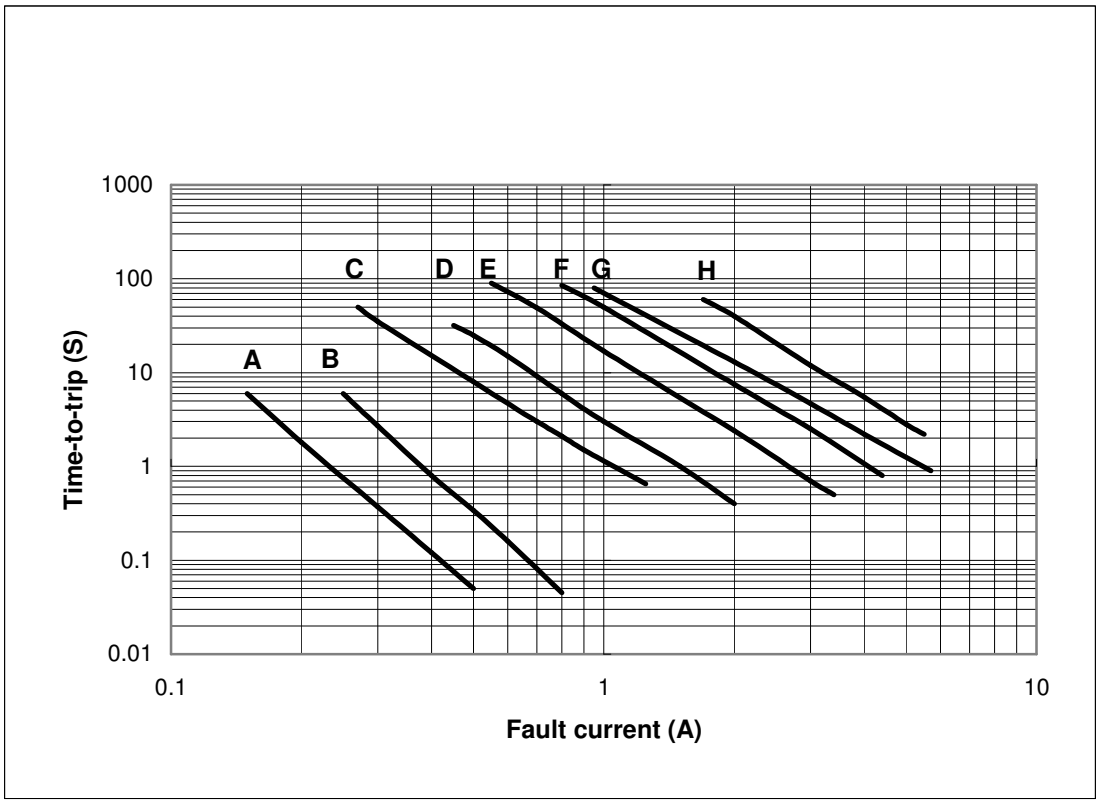
Thermal Derating Curve



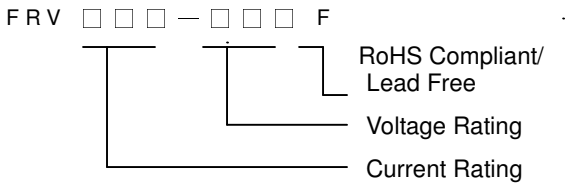
Radial Leaded PTC
FRV Series

Typical Time-To-Trip at 23℃

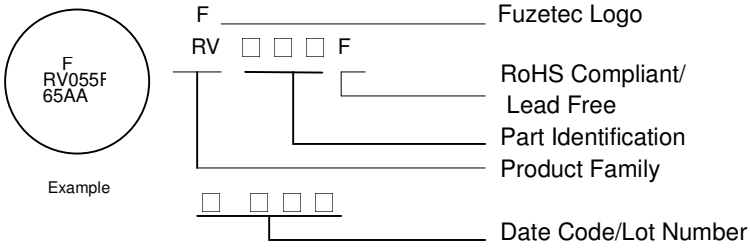
A= FRV005-240F
B= FRV008-240F
C= FRV012-240F
D= FRV016-240F
E= FRV025-240F
F= FRV033-240F
G= FRV040-240F
H= FRV055-240F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FRV005-240F	500	**2 K**
FRV008-240F	500	**2 K**
FRV012-240F	500	**2 K**
FRV016-240F	500	**2 K**

P/N	Pcs /Bag	Reel/Tape
FRV025-240F	500	**1.5K**
FRV033-240F	500	**1.5K**
FRV040-240F	500	**1.5K**
FRV055-240F	500	1K

Warning: - Each product should be carefully evaluated and tested for their suitability of application.

-Operation beyond the specified maximum rating or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.- Avoid contact of PPTC device with chemical solvent, including some inert material such as silicone based oil, lubricant and etc. Prolonged contact will damage the device performance.

- Additional protection mechanism are strongly recommended to be used in conjunction with the PPTC device for protection against abnormal or failure conditions.- Avoid use of PPTC device in a constrained space such as potting material, housing and containers where have limited space to accommodate device thermal

expansion and/or contraction.

Radial Leaded PTC
FRA Series

FUZETEC

RoHS Compliant & Lead Free

RoHS 2002/95/EC | Pb Lead Free

Application:

Wide variety of electronic equipment

Product Features:

Low hold current, Solid state

Radial-leaded product ideal for up to 120VDC/120VAC

Operation Current: 100mA~3.75A

Maximum Voltage: 120VDC/120VAC

Temperature Range: -40℃ to 85℃

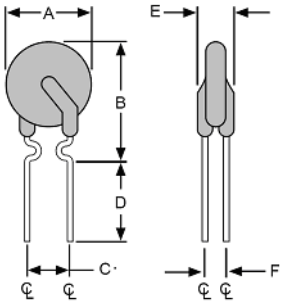
Agency Recognition: UL, C-UL＆TÜV pending

Electrical Characteristics(23℃)

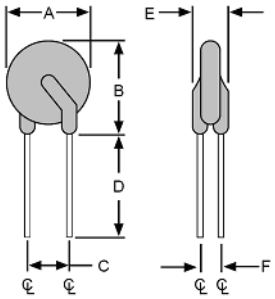
Part Number	Hold Current	Trip Current	Max.Time to Trip	Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	I_{MAX}, A	V_{MAX},$V_{AC/DC}$	Pd, W	Ohms	Ohms
FRA010-120F	0.10	0.20	4.0	2.0	120	0.57	2.50	7.50
FRA017-120F	0.17	0.34	3.0	2.0	120	0.59	2.00	7.00
FRA020-120F	0.20	0.40	2.2	2.0	120	0.62	1.83	4.40
FRA025-120F	0.25	0.50	2.5	3.0	120	0.68	1.25	3.00
FRA030-120F	0.30	0.60	3.0	3.0	120	0.74	0.88	2.10
FRA040-120F	0.40	0.80	3.8	3.0	120	0.84	0.55	1.29
FRA050-120F	0.50	1.00	4.0	3.0	120	1.16	0.50	1.17
FRA065-120F	0.65	1.30	5.3	3.0	120	1.32	0.31	0.72
FRA075-120F	0.75	1.50	6.3	5.0	120	1.38	0.25	0.60
FRA090-120F	0.90	1.80	7.2	5.0	120	1.49	0.20	0.47
FRA110-120F	1.10	2.20	8.2	5.0	120	2.25	0.15	0.38
FRA135-120F	1.35	2.70	9.6	8.0	120	2.55	0.12	0.30
FRA160-120F	1.60	3.20	11.4	8.0	120	2.85	0.09	0.22
FRA185-120F	1.85	3.70	12.6	8.0	120	3.15	0.08	0.19
FRA250-120F	2.50	5.00	15.6	12.0	120	3.75	0.05	0.13
FRA300-120F	3.00	6.00	19.8	15.0	120	4.20	0.04	0.10
FRA375-120F	3.75	7.50	24.0	15.0	120	4.80	0.03	0.08

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping .
Physical specifications:
Lead material: FRA010F~FRA090F Tin plated copper, 22 AWG.
FRA110F~FRA375F Tin plated copper, 20 AWG.
Soldering characteristics:MIL-STD-202, Method 208E.
Insulating coating:Flame retardant epoxy, meet UL-94V-0 requirement.

FRA Product Dimensions (millimeters)



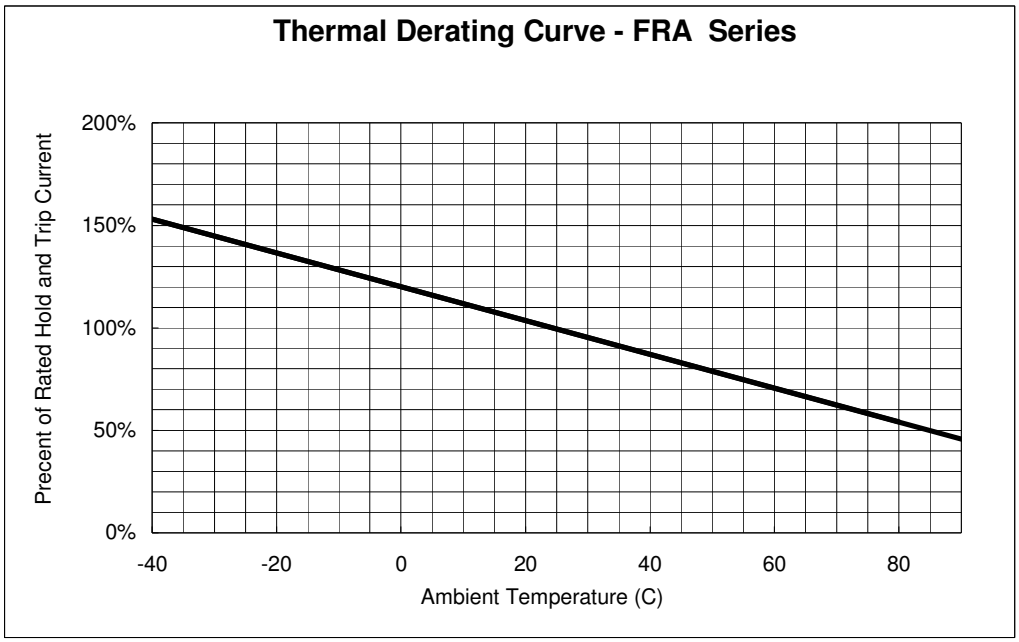
FRA010-120F ~ FRA090-120F
Lead Size: 22AWG,
Φ 0.65 mm Diameter



FRA110-120F ~ FRA375-120F
Lead Size : 20AWG,
Φ 0.81 mm Diameter

Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRA010-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA017-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA020-120F	7.9	12.2	5.1	7.6	5.0	3.0
FRA025-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA030-120F	7.9	13.0	5.1	7.6	5.0	3.0
FRA040-120F	8.2	14.2	5.1	7.6	5.0	3.0
FRA050-120F	9.2	14.9	5.1	7.6	5.0	3.0
FRA065-120F	9.7	14.9	5.1	7.6	5.0	3.0
FRA075-120F	10.6	15.5	5.1	7.6	5.0	3.0
FRA090-120F	11.9	15.9	5.1	7.6	5.0	3.0
FRA110-120F	13.3	18.3	5.1	7.6	5.0	3.0
FRA135-120F	15.5	20.6	5.1	7.6	5.0	3.0
FRA160-120F	17.5	22.5	5.1	7.6	5.0	3.0
FRA185-120F	19.9	24.9	5.1	7.6	5.0	3.0
FRA250-120F	22.5	27.5	10.2	7.6	5.0	3.0
FRA300-120F	25.5	30.0	10.2	7.6	5.0	3.0
FRA375-120F	29.5	34.0	10.2	7.6	5.0	3.0

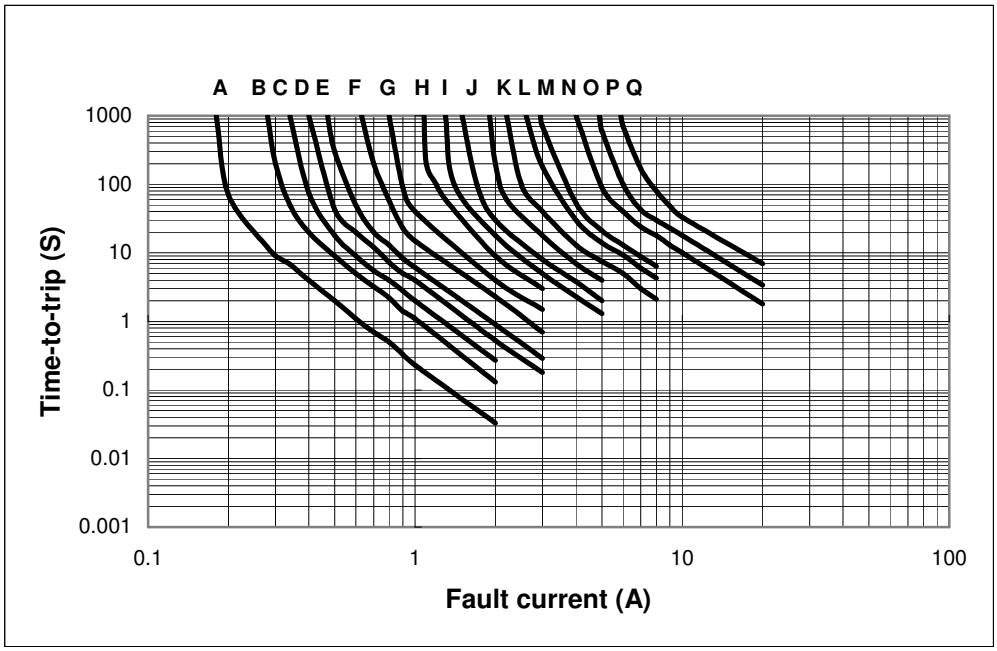
Thermal Derating Curve



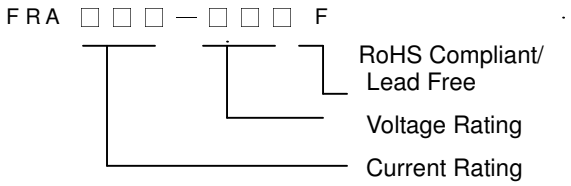
Radial Leaded PTC
FRA Series

Typical Time-To-Trip at 23℃

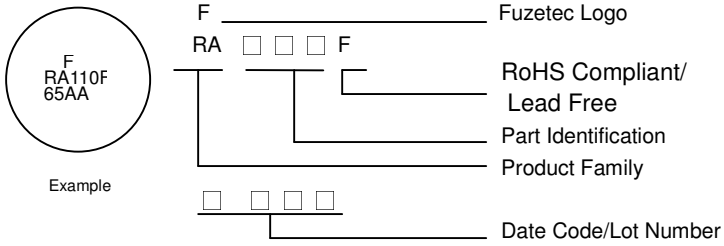
A = FRA010-120F
B = FRA017-120F
C = FRA020-120F
D = FRA025-120F
E = FRA030-120F
F = FRA040-120F
G = FRA050-120F
H = FRA065-120F
I = FRA075-120F
J = FRA090-120F
K = FRA110-120F
L = FRA135-120F
M = FRA160-120F
N = FRA185-120F
O = FRA250-120F
P = FRA300-120F
Q = FRA375-120F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FRA010-120F	300	1.5K
FRA017-120F	300	1.5K
FRA020-120F	300	1.5K
FRA025-120F	300	1.5K
FRA030-120F	300	1.5K
FRA040-120F	300	1.5K
FRA050-120F	300	1.5K
FRA065-120F	300	1.5K
FRA075-120F	300	1.5K

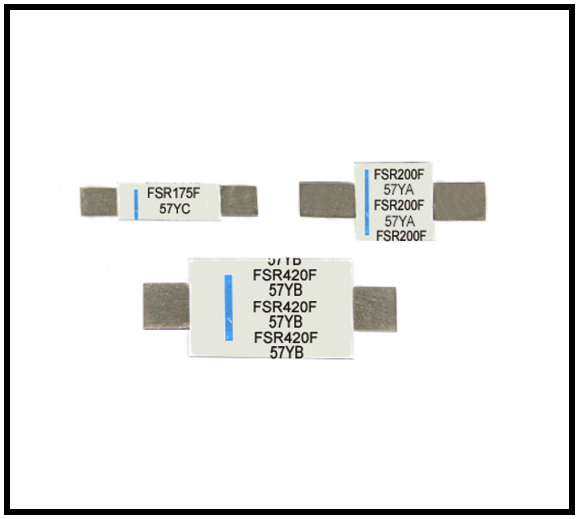
P/N	Pcs /Bag	Reel/Tape
FRA090-120F	300	1.5K
FRA110-120F	300	600
FRA135-120F	200	600
FRA160-120F	200	------
FRA185-120F	200	------
FRA250-120F	100	------
FRA300-120F	100	------
FRA375-120F	100	------

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Axial Leaded PTC
FSR Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Rechargeable battery packs

Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 1.2A~4.2 A

Maximum Voltage: 15V& 30V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL (E211981)

TÜV (R3-50004084)

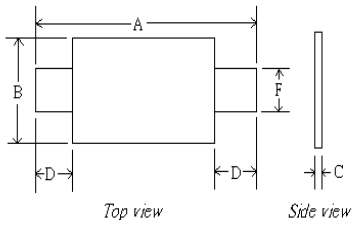
Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Max. Time to Trip	Rated Voltage	Maximum Current	Typical Power	Resistance Tolerance		
							R_{MIN}	R_{MAX}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	V_{MAX}, V_{DC}	I_{MAX}, A	Pd, W	Ohms	Ohms	Ohms
FSR120F	1.20	2.70	5.0	15	100	1.2	0.085	0.160	0.220
FSR175F	1.75	3.80	5.0	15	100	1.5	0.050	0.090	0.120
FSR200F	2.00	4.40	4.0	30	100	1.9	0.030	0.060	0.100
FSR350F	3.50	6.30	3.0	30	100	2.5	0.017	0.031	0.050
FSR420F	4.20	7.60	6.0	30	100	2.9	0.012	0.024	0.040

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Maximum power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping.
Physical specifications:
Lead material:0. 13mm nominal thickness, quarter-hard nickel.
Insulating material: Polyester tape.

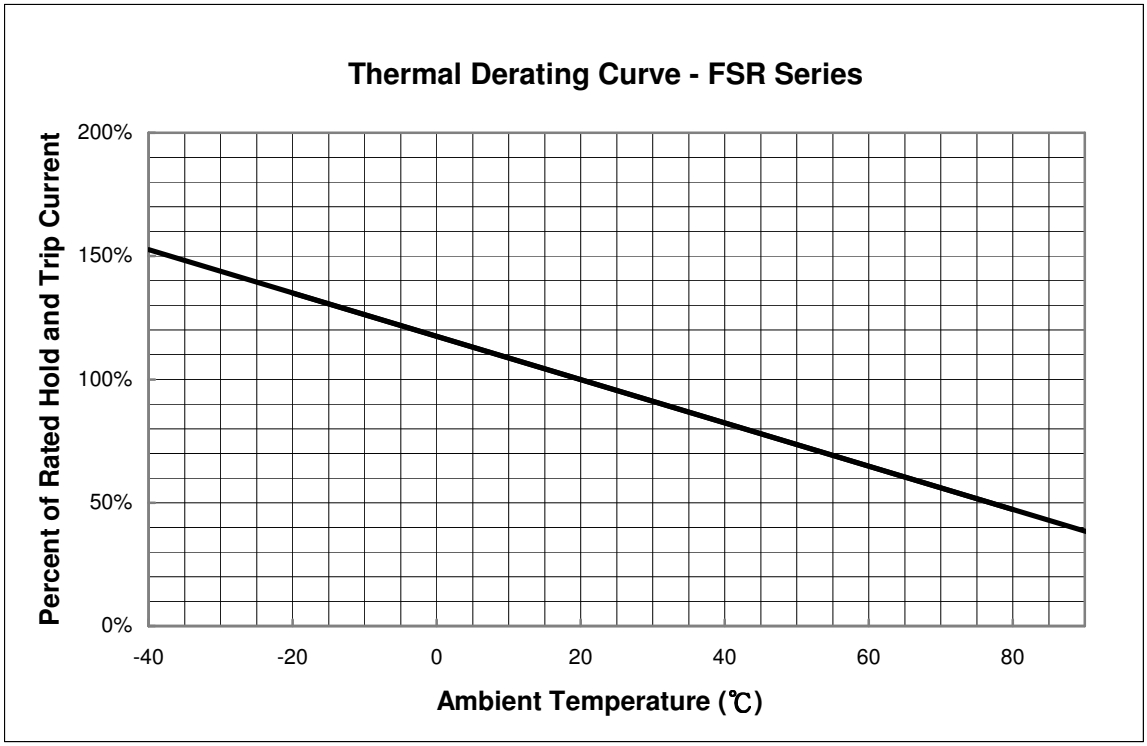
FSR Product Dimensions (Millimeters)

Figure 1



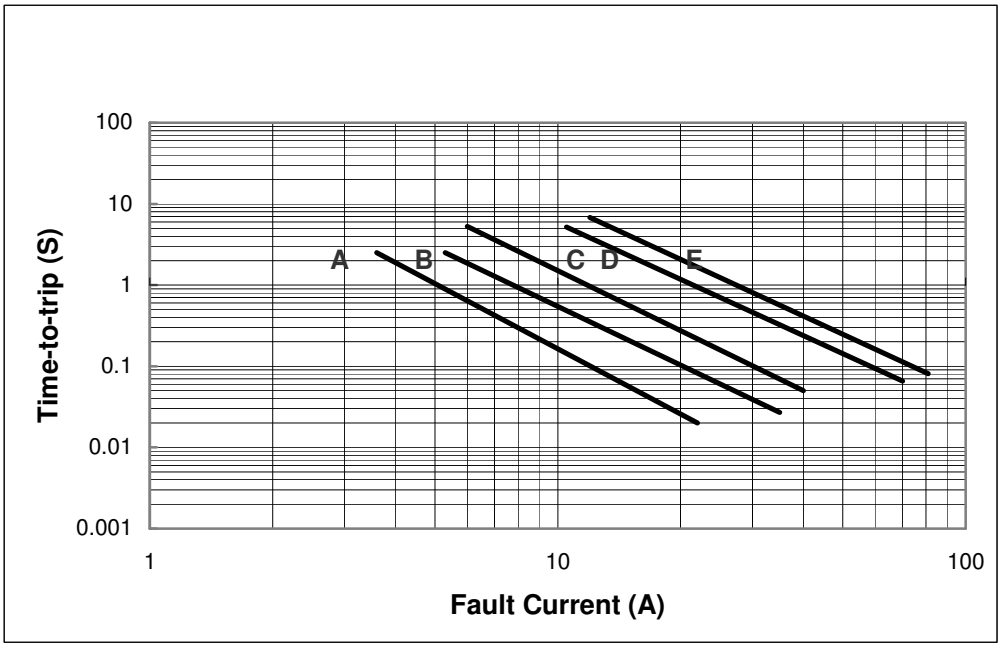
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSR120F	19.9	22.1	4.9	5.2	0.6	1.0	5.5	7.5	3.9	4.1
FSR175F	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FSR200F	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
FSR350F	28.4	31.8	13.0	13.5	0.5	1.1	6.3	8.9	6.0	6.6
FSR420F	30.6	32.4	12.9	13.6	0.5	1.1	5.0	7.5	6.0	6.7

Thermal Derating Curve

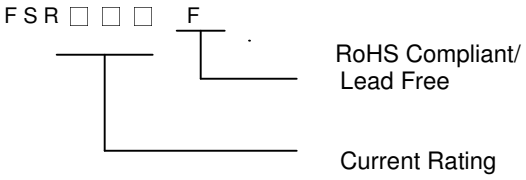


Typical Time-To-Trip at 23℃

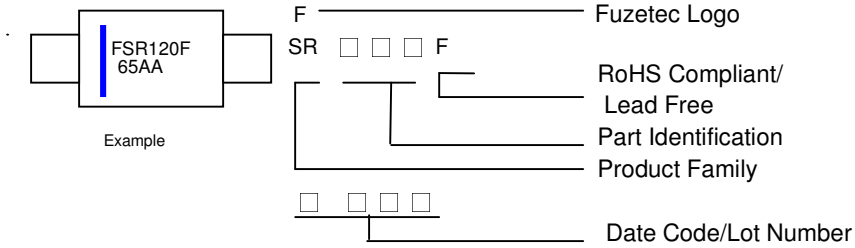
A = FSR120F
B = FSR175F
C = FSR200F
D = FSR350F
E = FSR420F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag
FSR120F	1K
FSR175F	1K
FSR200F	500

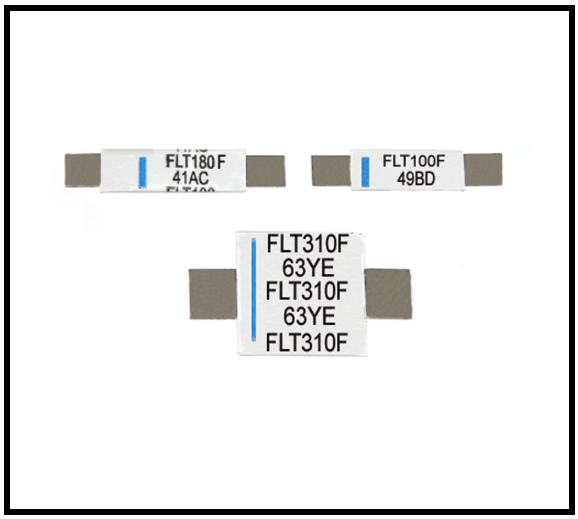
P/N	Pcs /Bag
FSR350F	500
FSR420F	500

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Axial Leaded PTC
FLT Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

Rechargeable battery packs

Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 0.7A~3.4 A

Maximum Voltage: 24V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL(E211981)

C-UL(E211981)

TÜV (R3-50004084)

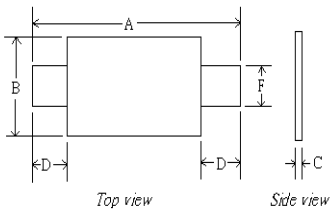
Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Max. Time to Trip	Rated Voltage	Maximum Current	Typical Power	Resistance Tolerance		
							R_{MIN}	R_{MAX}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	V_{MAX}, V_{DC}	I_{MAX}, A	Pd, W	Ohms	Ohms	Ohms
FLT070F	0.7	1.5	5.0	24	100	1.1	0.100	0.200	0.340
FLT100F	1.0	2.5	7.0	24	100	1.5	0.070	0.130	0.260
FLT180F	1.8	3.8	2.9	24	100	2.0	0.040	0.068	0.120
FLT190F	1.9	4.2	3.0	24	100	1.9	0.030	0.057	0.100
FLT260F	2.6	5.2	5.0	24	100	2.3	0.025	0.042	0.076
FLT300F	3.0	6.3	4.0	24	100	2.0	0.015	0.031	0.055
FLT310F	3.1	6.0	4.0	24	100	2.5	0.018	0.030	0.055
FLT340F	3.4	6.8	5.0	24	100	2.7	0.016	0.027	0.050

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Maximum power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping.
Physical specifications:
Lead material:0.13mm.nominal thickness ,quarter-hard nickel.
Insulating material: Polyester tape.

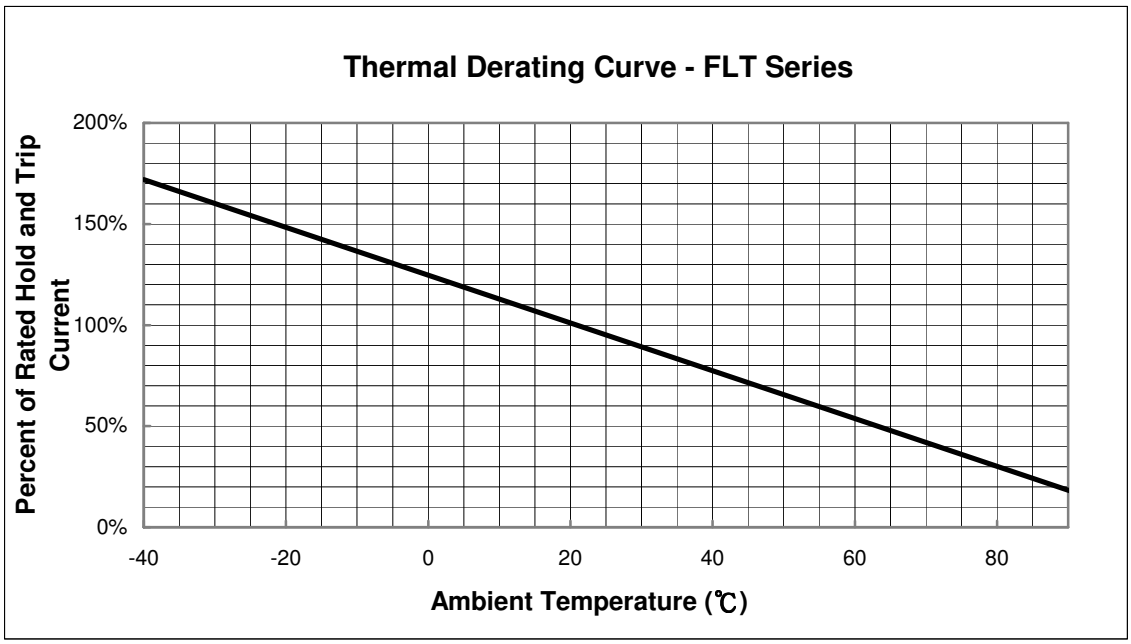
FLT Product Dimensions (Millimeters)

Figure 1



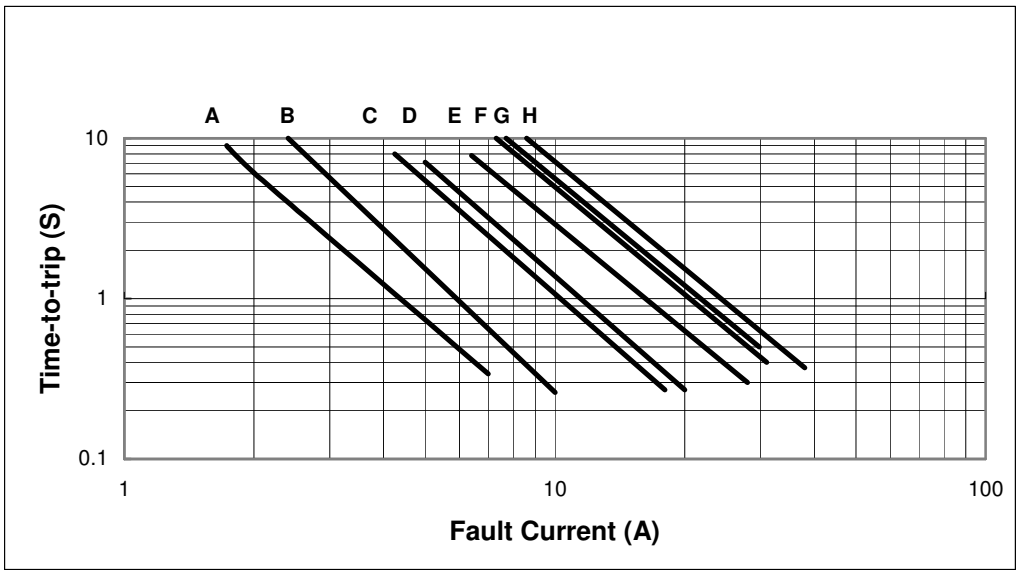
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FLT070F	19.9	22.1	4.9	5.2	0.7	1.2	5.5	7.5	3.9	4.1
FLT100F	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FLT180F	24.0	26.0	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FLT190F	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
FLT260F	24.0	26.0	10.8	11.9	0.6	1.0	5.0	7.0	5.9	6.1
FLT300F	28.4	31.8	13.0	13.5	0.5	1.1	6.3	8.9	6.0	6.6
FLT310F	24.0	26.0	14.8	15.9	0.6	1.0	5.0	7.0	5.9	6.1
FLT340F	24.0	26.0	14.8	15.9	0.6	1.0	4.0	5.0	5.9	6.1

Thermal Derating Curve

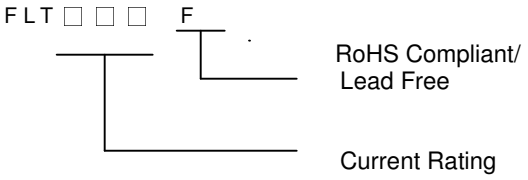


Typical Time-To-Trip at 23℃

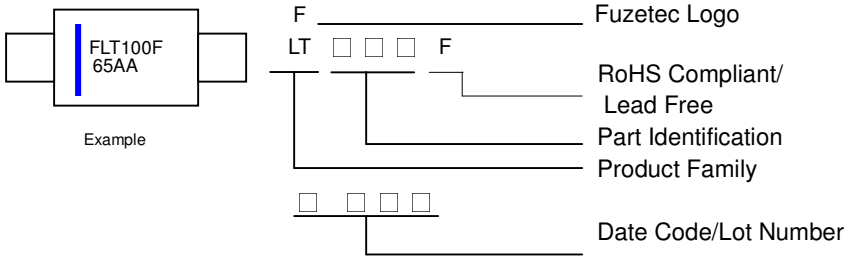
A=FLT070F
B=FLT100F
C=FLT180F
D=FLT190F
E=FLT260F
F=FLT300F
G=FLT310F
H=FLT340F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag
FLT070F	1K
FLT100F	1K
FLT180F	1K
FLT190F	500

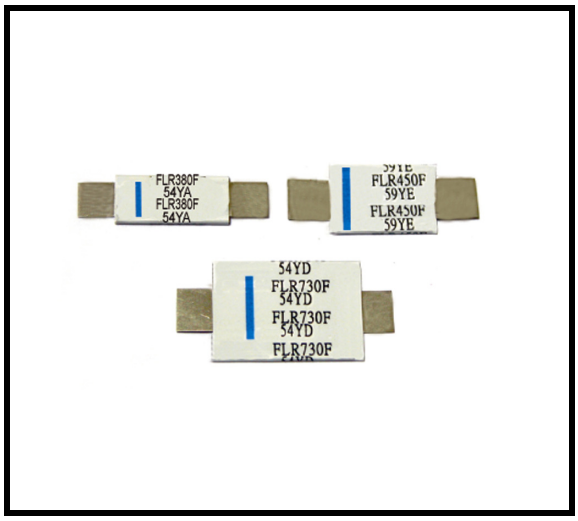
P/N	Pcs /Bag
FLT260F	500
FLT300F	500
FLT310F	500
FLT340F	500

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Axial Leaded PTC
FLR Series



RoHS Compliant & Lead Free Product

RoHS 2002/95/EC | Pb Lead Free

Application:

Rechargeable battery packs

Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 1.9A~7.3 A

Maximum Voltage: 15V& 20V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL (E211981)
C-UL (E211981)
TÜV (R50004084)

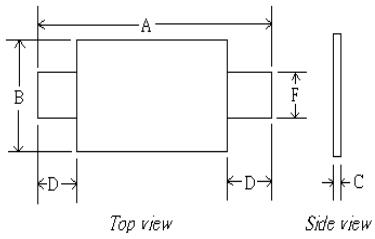
Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Max. Time to Trip	Rated Voltage	Maximum Current	Typical Power	Resistance Tolerance		
							R_{MIN}	R_{MAX}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H, S	V_{MAX}, V_{DC}	I_{MAX}, A	Pd, W	Ohms	Ohms	Ohms
FLR190F	1.9	3.9	5.0	15	100	1.2	0.039	0.072	0.102
FLR260F	2.6	5.8	5.0	15	100	2.5	0.020	0.042	0.063
FLR380F	3.8	8.3	5.0	15	100	2.5	0.013	0.026	0.037
FLR450F	4.5	8.9	5.0	20	100	2.5	0.011	0.020	0.028
FLR550F	5.5	10.5	5.0	20	100	2.8	0.009	0.016	0.022
FLR600F	6.0	11.7	5.0	20	100	2.8	0.007	0.014	0.019
FLR730F	7.3	14.1	5.0	20	100	3.3	0.006	0.012	0.015

I_H=Hold current-maximum current at which the device will not trip at 23℃ still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Maximum power dissipated from device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃.
$R1_{MAX}$=Maximum device resistance at 23℃, 1 hour after tripping.
Physical specifications:
Lead material:0. 13mm nominal thickness, quarter-hard nickel.
Insulating material: Polyester tape.

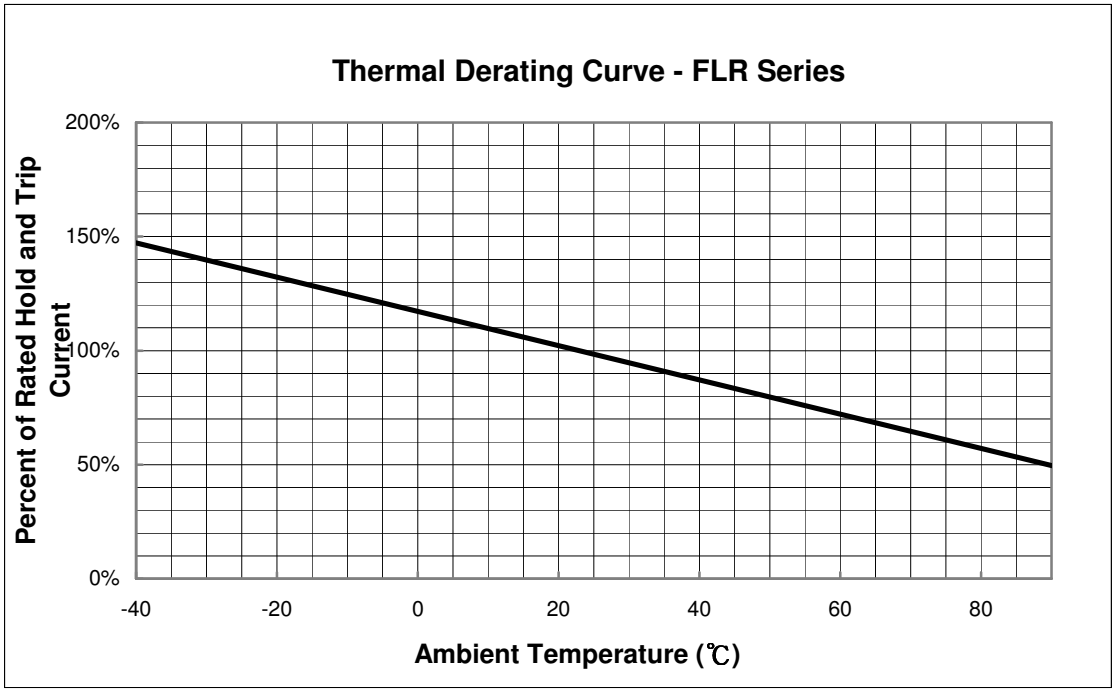
FLR Product Dimensions (Millimeters)

Figure 1



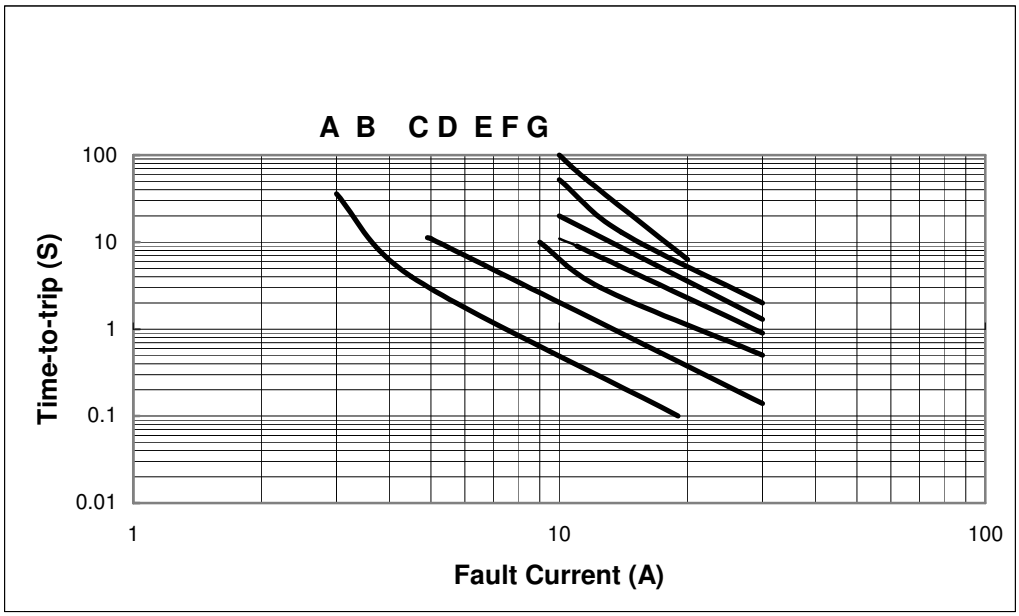
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FLR190F	19.9	22.1	4.9	5.5	0.6	1.0	5.5	7.5	3.9	4.1
FLR260F	20.9	23.1	4.9	5.5	0.6	1.0	4.1	5.5	3.9	4.1
FLR380F	24.0	26.0	6.9	7.5	0.6	1.0	4.1	5.5	4.9	5.1
FLR450F	24.0	26.0	9.9	10.5	0.6	1.0	5.3	6.7	5.9	6.1
FLR550F	35.0	37.0	6.9	7.5	0.6	1.0	5.3	6.7	4.9	5.1
FLR600F	24.0	26.0	13.9	14.5	0.6	1.0	4.1	5.5	5.9	6.1
FLR730F	27.1	29.1	13.9	14.5	0.6	1.0	4.1	5.5	5.9	6.1

Thermal Derating Curve

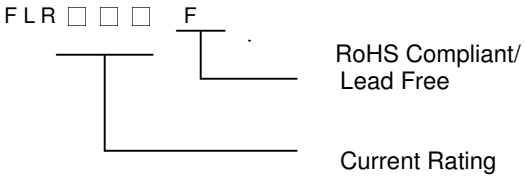


Typical Time-To-Trip at 23℃

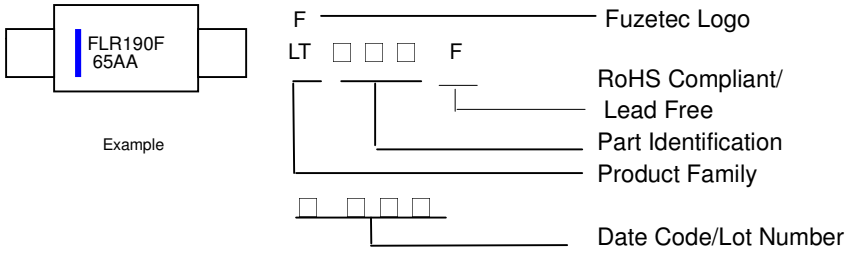
A=FLR190F
B=FLR260F
C=FLR380F
D=FLR450F
E=FLR550F
F=FLR600F
G=FLR730F



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag
FLR190F	1K
FLR260F	1K
FLR380F	1K
FLR450F	500

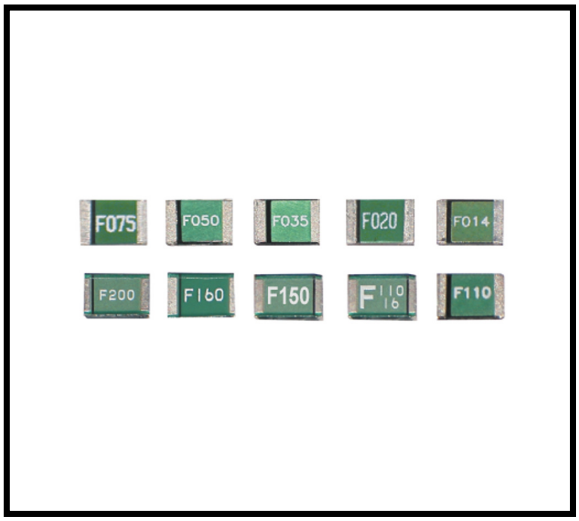
P/N	Pcs /Bag
FLR550F	500
FLR600F	500
FLR730F	500

Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Surface Mount PTC
FSMD1812 Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

All high-density boards

Product Features:

Small surface mount, Solid state

Faster time to trip than standard SMD devices

Lower resistance than standard SMD devices

Operation Current: 140mA~2.0A

Maximum Voltage: 6V~60V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL (E211981)

C-UL (E211981)

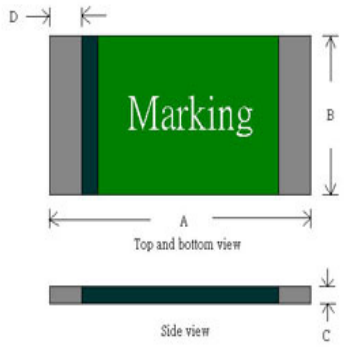
TÜV (R50004084)

Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
						Current	Time	RMIN	R1MAX
	I_H, A	I_T, A	V_{MAX}, V_{AC}	I_{MAX}, A	Pd, W	Amp	Sec	Ohms	Ohms
FSMD014	0.14	0.30	60	10	0.8	8.0	**0.008**	1.20	6.50
FSMD020	0.20	0.40	30	10	0.8	8.0	0.02	0.80	5.00
FSMD035	0.35	0.70	16	40	0.8	8.0	0.10	0.32	1.50
FSMD050	0.50	1.00	16	40	0.8	8.0	0.15	0.15	1.00
FSMD075	0.75	1.50	16	40	0.8	8.0	0.2	0.11	0.45
FSMD110	1.10	2.20	6	40	0.8	8.0	0.30	0.04	0.21
FSMD110-16	1.10	1.95	16	40	0.8	8.0	0.50	0.04	0.18
FSMD125	1.25	2.50	6	40	0.8	8.0	0.40	0.05	0.14
FSMD150	1.50	3.00	6	40	0.8	8.0	0.50	0.04	0.11
FSMD160	1.60	3.20	6	40	0.8	8.0	〈0.5	0.03	0.10
FSMD200	2.00	3.50	8	40	0.8	8.0	2	0.02	0.07

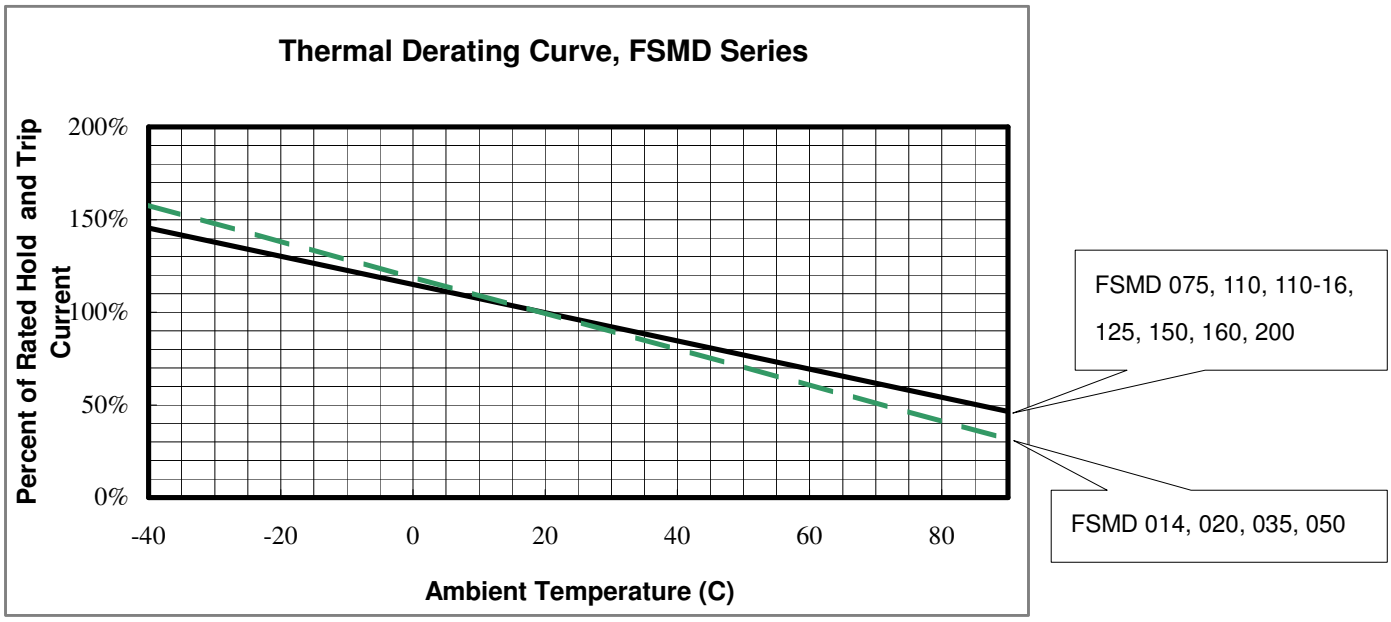
I_H=Hold current-maximum current at which the device will not trip at 23℃still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at it rated current.(I max)
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃ prior to tripping.
$R1_{MAX}$=Maximum device resistance at 23℃ measured 1 hour post trip.
Termination pad characteristics
Termination pad materials: 100% Tin

FSMD Product Dimensions (Millimeters)



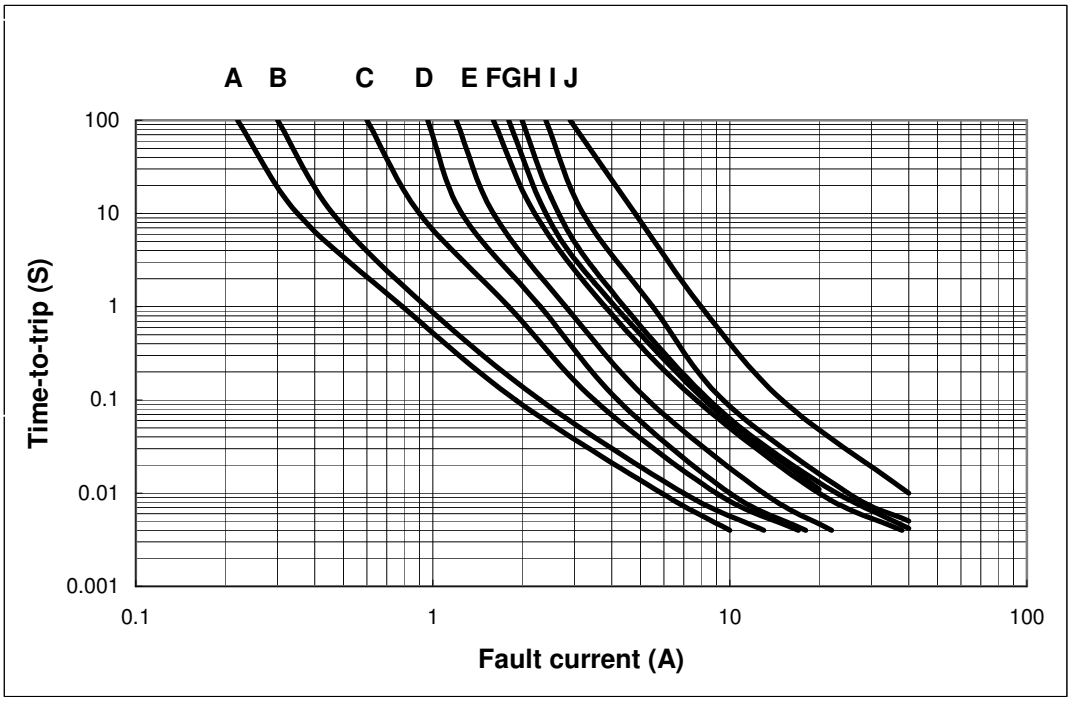
PART NUMBER	A		B		C		D
	Min	Max	Min	Max	Min	Max	Min
FSMD014	4.37	4.73	3.07	3.41	0.60	0.90	0.3
FSMD020	4.37	4.73	3.07	3.41	0.60	0.90	0.3
FSMD035	4.37	4.73	3.07	3.41	0.40	0.70	0.3
FSMD050	4.37	4.73	3.07	3.41	0.35	0.65	0.3
FSMD075	4.37	4.73	3.07	3.41	0.35	0.65	0.3
FSMD110	4.37	4.73	3.07	3.41	0.25	0.55	0.3
FSMD110-16	4.37	4.73	3.07	3.41	0.25	0.55	0.3
FSMD125	4.37	4.73	3.07	3.41	0.25	0.55	0.3
FSMD150	4.37	4.73	3.07	3.41	0.25	0.55	0.3
FSMD160	4.37	4.73	3.07	3.41	0.25	0.90	0.3
FSMD200	4.37	4.73	3.07	3.41	0.50	0.90	0.3

Thermal Derating Curve



Typical Time-To-Trip at 23℃

A = FSMD014
B = FSMD020
C = FSMD035
D = FSMD050
E = FSMD075
F= FSMD110/ FSMD110-16
G = FSMD125
H = FSMD150
I = FSMD160
J= FSMD200



Part Numbering System

FSMD □ □ □

Current rating

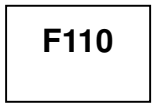
FSMD110-16

F S M D □ □ □ - □ □

Voltage rating

Current rating

Part Marking System

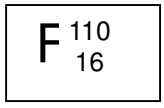


Example

F □ □ □

Part Identification

Fuzetec Logo



Example

F □ □ □

□ □

Part Identification

Fuzetec Logo

Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD014	--------	2K
FSMD020	--------	2K
FSMD035	--------	2K
FSMD050	--------	2K
FSMD075	--------	2K
FSMD110	--------	2K

P/N	Pcs /Bag	Reel/Tape
FSMD110-16	--------	2K
FSMD125	--------	2K
FSMD150	--------	2K
FSMD160	--------	2K
FSMD200	--------	2K

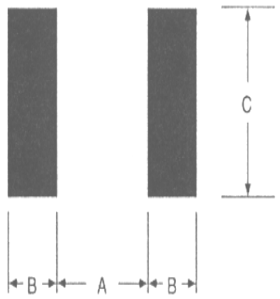
Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

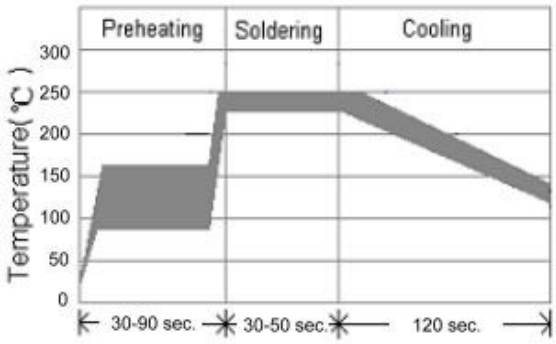
-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance..

Pad Layouts、Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD1812 device



Pad dimensions (millimeters)			
Device	A Nominal	B Nominal	C Nominal
FSMD014	3.45	1.78	3.50
FSMD020	3.45	1.78	3.50
FSMD035	3.45	1.78	3.50
FSMD050	3.45	1.78	3.50
FSMD075	3.45	1.78	3.50
FSMD110	3.45	1.78	3.50
FSMD110-16	3.45	1.78	3.50
FSMD125	3.45	1.78	3.50
FSMD150	3.45	1.78	3.50
FSMD160	3.45	1.78	3.50
FSMD200	3.45	1.78	3.50



Solder reflow

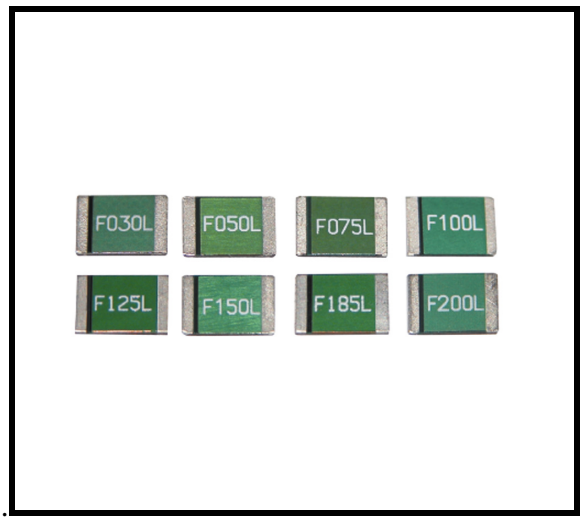
※ **Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.**

1. Recommended reflow methods; IR , vapor phase oven, hot air oven.
2. The FSMD1812 Series are suitable for use with wave-solder application methods.
3. Recommended maximum paste thickness is 0.25mm.
4. Devices can be cleaned using standard industry methods and solvents.

CAUTION:
If reflow temperatures exceed the recommended Profile, devices may not meet the performance requirements.

Rework:
Use standard industry practices.

Surface Mount PTC
FSMD2920 Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

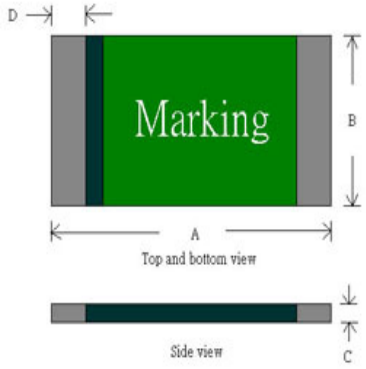
Application:
All high-density boards
Product Features: 2920 Dimension, Surface mountable, Solid state, Faster time to trip than standard SMD devices.
Operation Current: 300mA~2.6A
Maximum Voltage: 6V~60V
Temperature Range: -40℃ to 85℃
Agency Recognition: UL (E211981)
C-UL (E211981)
TÜV (R50090556)

Electrical Characteristics (23℃)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
						Current	Time	R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	V_{MAX},V_{DC}	I_{MAX}, A	Pd, W	A	Sec	Ω	Ω
FSMD030-2920	0.30	0.60	60	10	1.5	1.5	3.0	1.000	4.800
FSMD050-2920	0.50	1.00	60	10	1.5	2.5	4.0	0.300	1.400
FSMD075-2920	0.75	1.50	33	40	1.5	8.0	0.3	0.180	1.000
FSMD100-2920	1.10	2.20	33	40	1.5	8.0	0.5	0.090	0.410
FSMD125-2920	1.25	2.50	33	40	1.5	8.0	2.0	0.050	0.250
FSMD150-2920	1.50	3.00	33	40	1.5	8.0	2.0	0.050	0.230
FSMD185-2920	1.85	3.70	33	40	1.5	8.0	2.5	0.040	0.150
FSMD200-2920	2.00	4.00	16	40	1.5	8.0	4.5	0.035	0.120
FSMD250-2920	2.50	5.00	16	40	1.5	8.0	16.0	0.025	0.085
FSMD260-2920	2.60	5.20	6	40	1.5	8.0	20.0	0.020	0.075

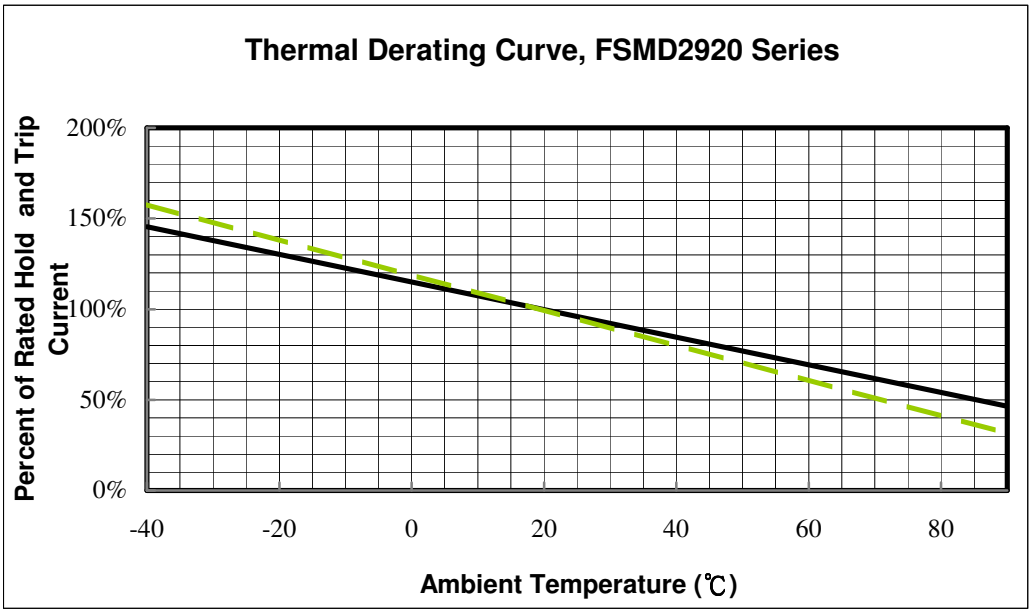
I_H=Hold current-maximum current at which the device will not trip at 23℃still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at it rated current.(I_{MAX})
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23℃ still air evironmentn
R_{MIN}=Minimum device resistance at 23℃ prior to tripping.
$R1_{MAX}$=Maximum device resistance at 23℃ measured 1 hour post trip.
Termination pad characteristics
Termination pad materials: 100% Tin

FSMD2920 Product Dimensions (Millimeters)



PART NUMBER	A		B		C		D
	Min	Max	Min	Max	Min	Max	Min
FSMD030-2920	6.73	7.98	4.80	5.44	0.60	1.15	0.35
FSMD050-2920	6.73	7.98	4.80	5.44	0.60	1.15	0.35
FSMD075-2920	6.73	7.98	4.80	5.44	0.60	1.15	0.35
FSMD100-2920	6.73	7.98	4.80	5.44	0.40	1.00	0.35
FSMD125-2920	6.73	7.98	4.80	5.44	0.40	0.90	0.35
FSMD150-2920	6.73	7.98	4.80	5.44	0.40	0.90	0.35
FSMD185-2920	6.73	7.98	4.80	5.44	0.30	0.90	0.35
FSMD200-2920	6.73	7.98	4.80	5.44	0.30	0.90	0.35
FSMD250-2920	6.73	7.98	4.80	5.44	0.30	0.90	0.35
FSMD260-2920	6.73	7.98	4.80	5.44	0.30	0.90	0.35

Thermal Derating Curve



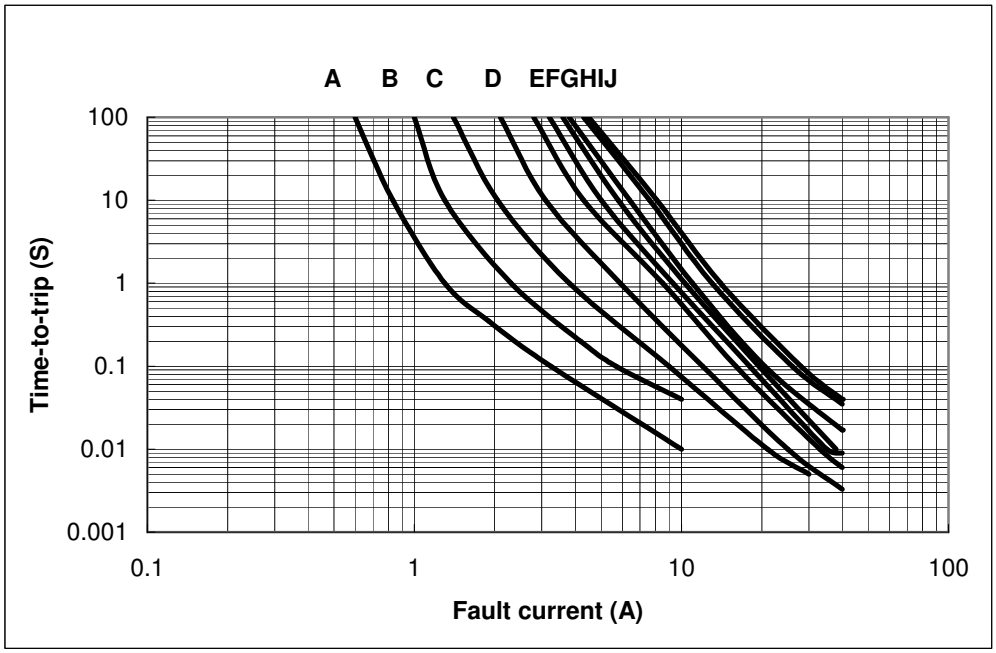
A=FSMD125~FSMD260

B=FSMD030~FSMD100

Surface Mount PTC
FSMD2920 Series

Typical Time-To-Trip at 23℃

A = FSMD030-2920
B = FSMD050-2920
C = FSMD075-2920
D = FSMD100-2920
E = FSMD125-2920
F = FSMD150-2920
G = FSMD185-2920
H = FSMD200-2920
I = FSMD250-2920
J = FSMD260-2920

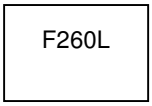


Part Numbering System

F S M D □ □ □ - 2920

Current Rating

Part Marking System



Example

F □ □ □ L

Part Identification
Fuzetec Logo

Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD030-2920	--------	**2K**
FSMD050-2920	--------	**2K**
FSMD075-2920	--------	**2K**
FSMD100-2920	--------	**2K**
FSMD125-2920	--------	**2K**

P/N	Pcs /Bag	Reel/Tape
FSMD150-2920	--------	**2K**
FSMD185-2920	--------	**2K**
FSMD200-2920	--------	**2K**
FSMD250-2920	--------	**2K**
FSMD260-2920	--------	**2K**

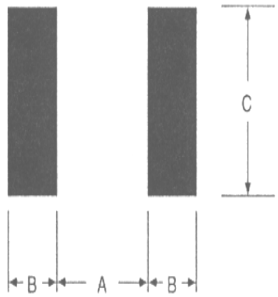
Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

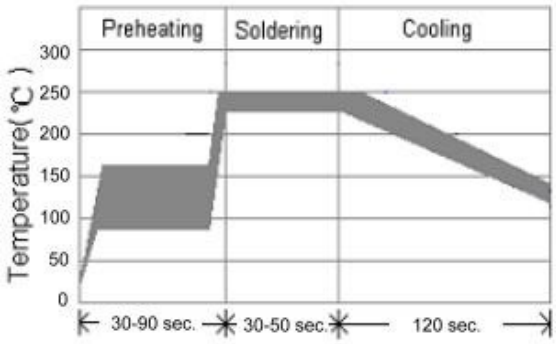
-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance..

Pad Layouts、Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD2920 device



Pad dimensions (millimeters)			
Device	A Nominal	B Nominal	C Nominal
FSMD030-2920	5.1	2.3	5.6
FSMD050-2920	5.1	2.3	5.6
FSMD075-2920	5.1	2.3	5.6
FSMD100-2920	5.1	2.3	5.6
FSMD125-2920	5.1	2.3	5.6
FSMD150-2920	5.1	2.3	5.6
FSMD185-2920	5.1	2.3	5.6
FSMD200-2920	5.1	2.3	5.6
FSMD250-2920	5.1	2.3	5.6
FSMD260-2920	5.1	2.3	5.6



Solder reflow

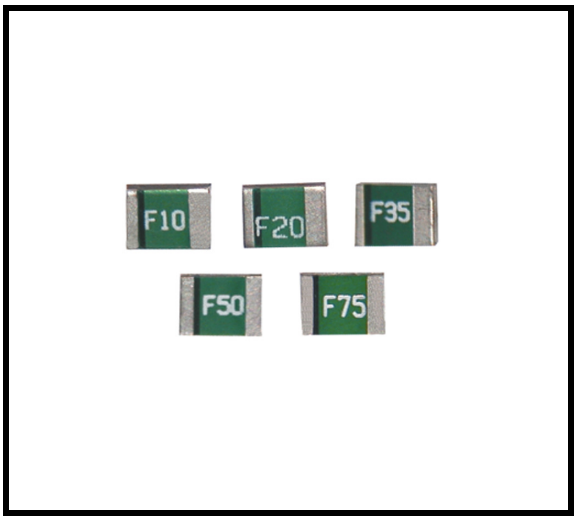
※ **Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.**

1. Recommended reflow methods; IR , vapor phase oven, hot air oven.
2. The FSMD2920 Series are suitable for use with wave-solder application methods.
3. Recommended maximum paste thickness is 0.25mm.
4. Devices can be cleaned using standard industry methods and solvents.

CAUTION:
If reflow temperatures exceed the recommended Profile, devices may not meet the performance requirements.

Rework:
Use standard industry practices.

Surface Mount PTC
FSMD1210 Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Lead Free

Application:

All high-density boards

Product Features:

Small surface mount, Solid state

Faster time to trip than standard SMD devices

Lower resistance than standard SMD devices

Operation Current: 50mA~0.75A

Maximum Voltage: 6V~60V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL (E211981)

C-UL (E211981)

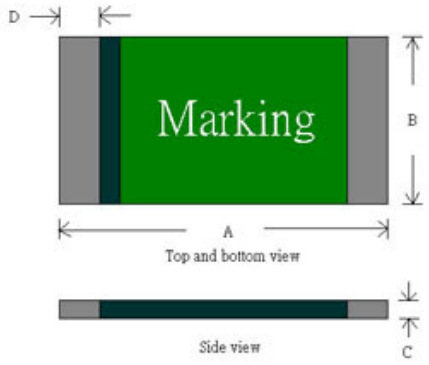
TUV(R50090556)

Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
						Current	Time	R MIN	R1 MAX
	I_H,A	I_T,A	V_{MAX},V_{DC}	I_{MAX}, A	Pd, W	A	S	Ohms	Ohms
FSMD005-1210	0.05	0.15	60	10	0.60	0.25	1.50	3.60	50.00
FSMD010-1210	0.10	0.25	60	10	0.60	0.50	1.50	1.60	15.00
FSMD020-1210	0.20	0.40	30	10	0.60	8.00	0.02	0.80	5.00
FSMD035-1210	0.35	0.70	16	40	0.60	8.00	0.20	0.32	1.30
FSMD050-1210	0.50	1.00	16	40	0.60	8.00	0.10	0.25	0.90
FSMD075-1210	0.75	1.50	8	40	0.60	8.00	0.10	0.13	0.40

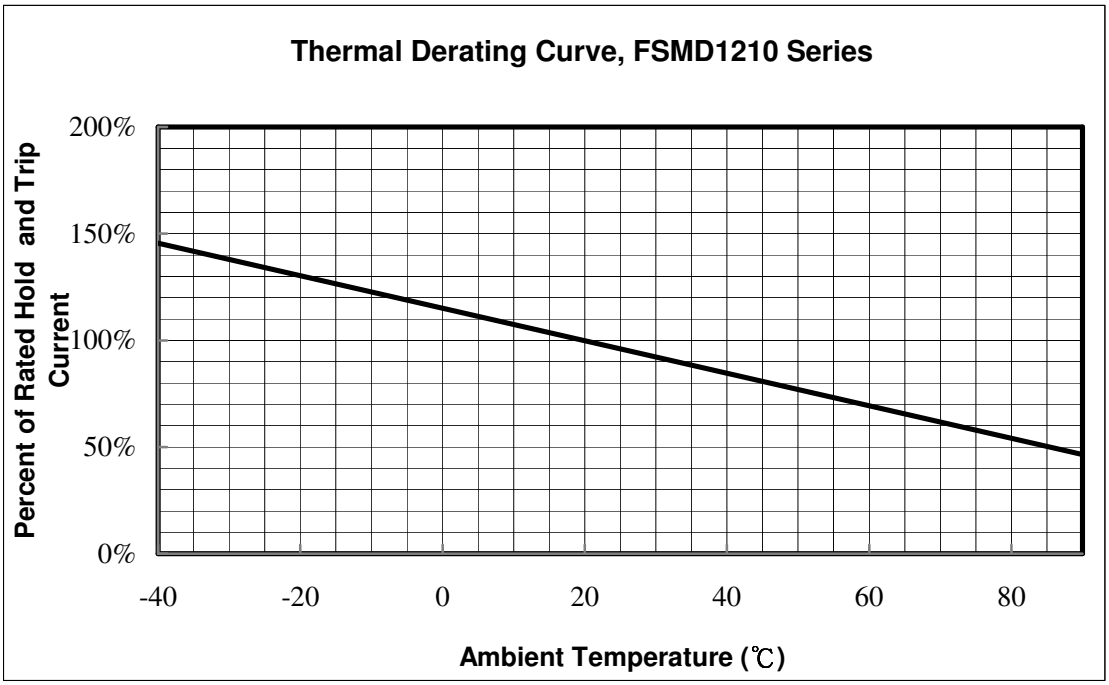
I_H=Hold current-maximum current at which the device will not trip at 23℃still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at it rated current.(I max)
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃ prior to tripping.
$R1_{MAX}$=Maximum device resistance at 23℃ measured 1 hour post trip.
Termination pad characteristics
Termination pad materials : 100% Tin

FSMD Product Dimensions (Millimeters)



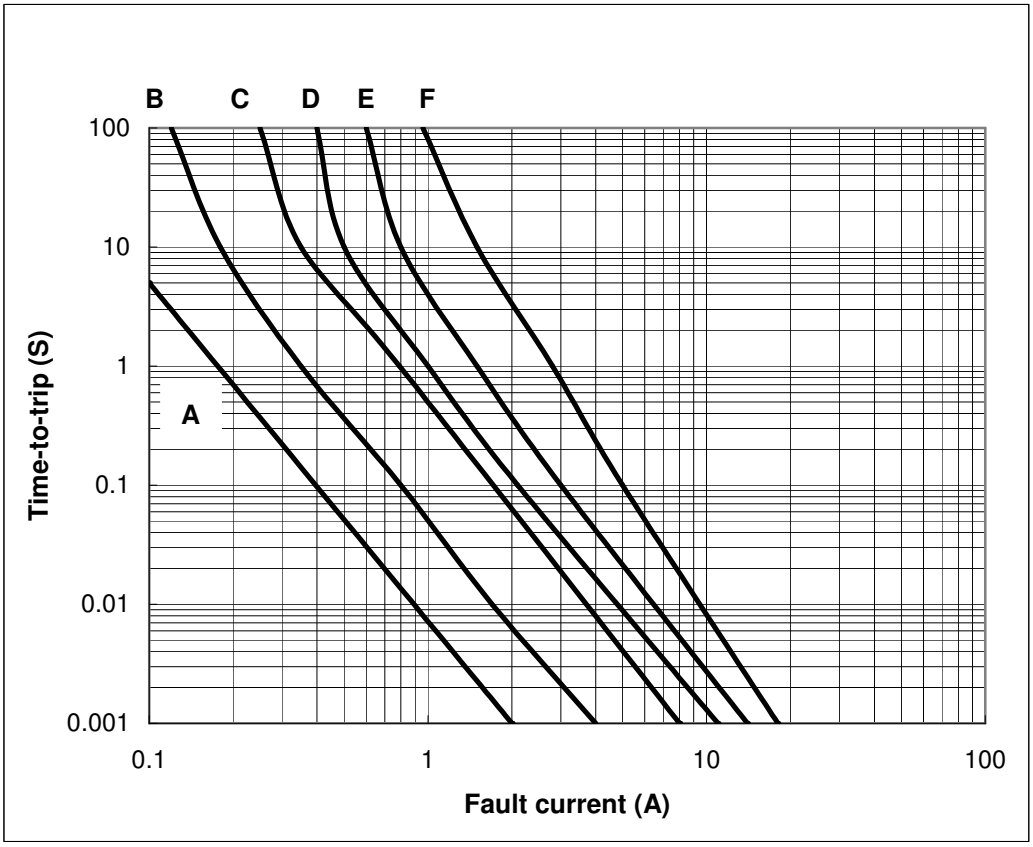
Part Number	A		B		C		D
	Min	Max	Min	Max	Min	Max	Min
FSMD005-1210	3.00	3.43	2.35	2.80	0.60	1.15	0.25
FSMD010-1210	3.00	3.43	2.35	2.80	0.60	1.15	0.25
FSMD020-1210	3.00	3.43	2.35	2.80	0.40	0.85	0.25
FSMD035-1210	3.00	3.43	2.35	2.80	0.40	0.80	0.25
FSMD050-1210	3.00	3.43	2.35	2.80	0.30	0.75	0.25
FSMD075-1210	3.00	3.43	2.35	2.80	0.30	0.70	0.25

Thermal Derating Curve



Typical Time-To-Trip at 23℃

A =FSMD005-1210
B =FSMD010-1210
C =FSMD020-1210
D =FSMD035-1210
E =FSMD050-1210
F =FSMD075-1210

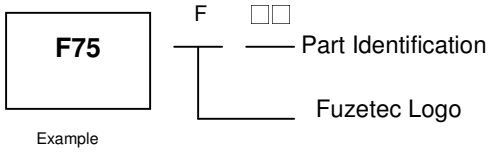


Part Numbering System

F S M D □ □ □ - 1210

Current Rating

Part Marking System



Example

F05 =FSMD005-1210
F10 =FSMD010-1210
F20 =FSMD020-1210
F35 =FSMD035-1210
F50 =FSMD050-1210
F75 =FSMD075-1210

Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD005-1210	--------	3K
FSMD010-1210	--------	3K
FSMD020-1210	--------	3K

P/N	Pcs /Bag	Reel/Tape
FSMD035-1210	--------	4K
FSMD050-1210	--------	4K
FSMD075-1210	--------	4K

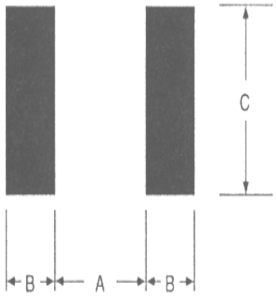
Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

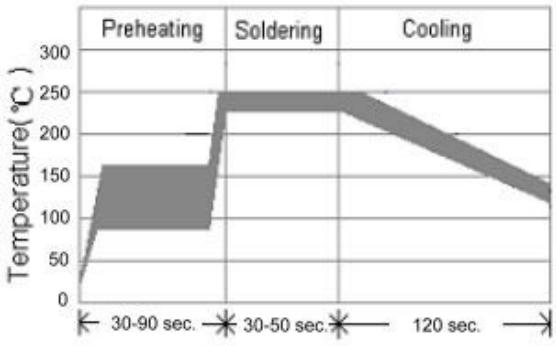
-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

Pad Layouts、Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD1210 device



Pad dimensions(millimeters)			
Device	A Nominal	B Nominal	C Nominal
FSMD005-1210	2.00	1.00	2.80
FSMD010-1210	2.00	1.00	2.80
FSMD020-1210	2.00	1.00	2.80
FSMD035-1210	2.00	1.00	2.80
FSMD050-1210	2.00	1.00	2.80
FSMD075-1210	2.00	1.00	2.80



Solder reflow

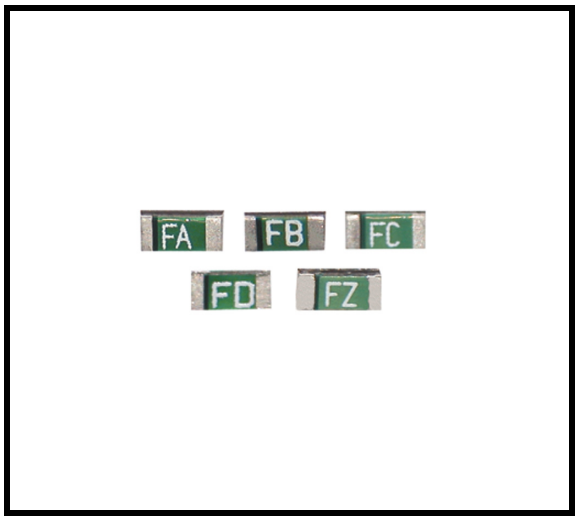
※ **Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.**

1. Recommended reflow methods; IR , vapor phase oven, hot air oven.
2. The FSMD1210 Series are suitable for use with wave-solder application methods.
3. Recommended maximum paste thickness is 0.25mm.
4. Devices can be cleaned using standard industry methods and solvents.

CAUTION:
If reflow temperatures exceed the recommended Profile, devices may not meet the performance requirements.

Rework:
Use standard industry practices.

Surface Mount PTC
FSMD1206 Series



RoHS Compliant & Lead Free

RoHS 2002/95/EC | Pb Lead Free

Application:

All high-density boards

Product Features:

Small surface mount, Solid state

Faster time to trip than standard SMD devices

Lower resistance than standard SMD devices

Operation Current: 50mA~500mA

Maximum Voltage: 6V~60V

Temperature Range: -40℃ to 85℃

Agency Recognition: UL (E211981)

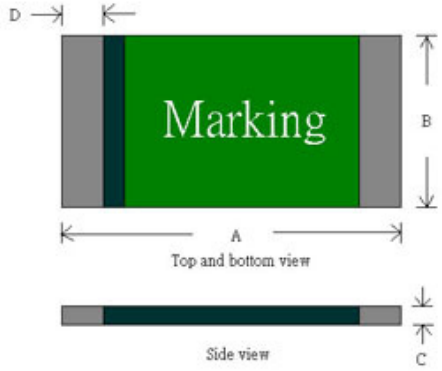
C-UL (E211981)

Electrical Characteristics(23℃)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
						Current	Time	R MIN	R1 MAX
	I_H,A	I_T,A	V_{MAX},V_{DC}	I_{MAX}, A	Pd, W	A	Sec	Ohms	Ohms
FSMD005-1206	0.05	0.15	60	10	0.4	0.25	1.50	3.60	50.00
FSMD010-1206	0.10	0.25	60	10	0.4	0.50	1.00	1.60	15.00
FSMD020-1206	0.20	0.40	30	10	0.4	8.00	0.05	0.60	2.50
FSMD035-1206	0.35	0.75	16	40	0.4	8.00	0.10	0.30	1.20
FSMD050-1206	0.50	1.00	8	40	0.4	8.00	0.10	0.15	0.70

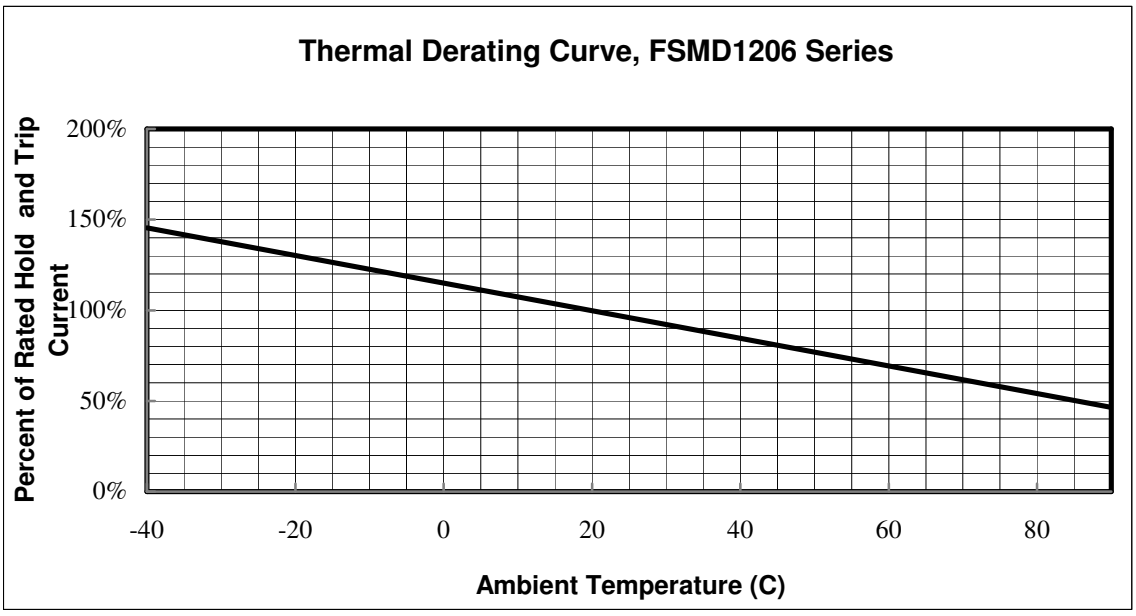
I_H=Hold current-maximum current at which the device will not trip at 23℃still air.
I_T=Trip current-minimum current at which the device will always trip at 23℃ still air.
V_{MAX}=Maximum voltage device can withstand without damage at it rated current.(I max)
I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23℃ still air environment.
R_{MIN}=Minimum device resistance at 23℃ prior to tripping.
$R1_{MAX}$=Maximum device resistance at 23℃ measured 1 hour post trip.
Termination pad characteristics
Termination pad materials : 100% Tin

FSMD Product Dimensions (Millimeters)



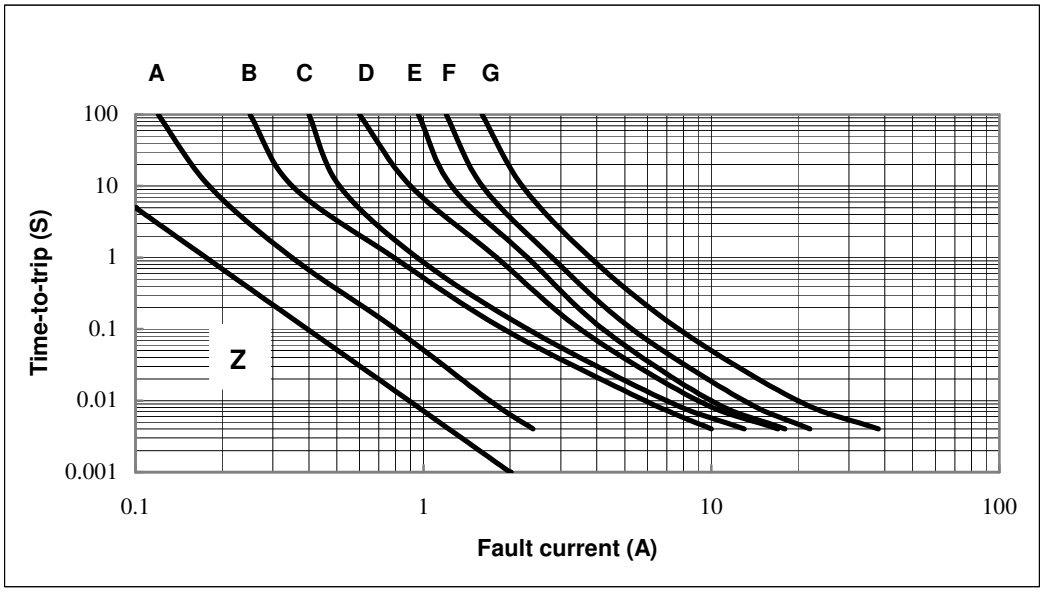
Part Number	A		B		C		D
	Min	Max	Min	Max	Min	Max	Min
FSMD005-1206	3.0	3.5	1.50	1.80	0.45	0.75	0.10
FSMD010-1206	3.0	3.5	1.50	1.80	0.45	0.75	0.10
FSMD020-1206	3.0	3.5	1.50	1.80	0.45	0.75	0.10
FSMD035-1206	3.0	3.5	1.50	1.80	0.45	0.75	0.10
FSMD050-1206	3.0	3.5	1.50	1.80	0.25	0.55	0.10

Thermal Derating Curve



Typical Time-To-Trip at 23℃

Z =FSMD005-1206
A =FSMD010-1206
B =FSMD020-1206
C =FSMD035-1206
D =FSMD050-1206



Part Numbering System

F S M D □ □ □ - 1206

Current Rating

Example

Part Marking System

F □

Part Identification

Fuzetec Logo

FZ =FSMD005-1206
FA =FSMD010-1206
FB =FSMD020-1206
FC =FSMD035-1206
FD =FSMD050-1206

Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD005-1206	--------	3K
FSMD010-1206	--------	3K
FSMD020-1206	--------	3K

P/N	Pcs /Bag	Reel/Tape
FSMD035-1206	--------	4K
FSMD050-1206	--------	4K

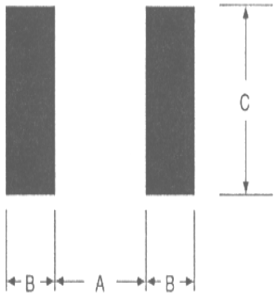
Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

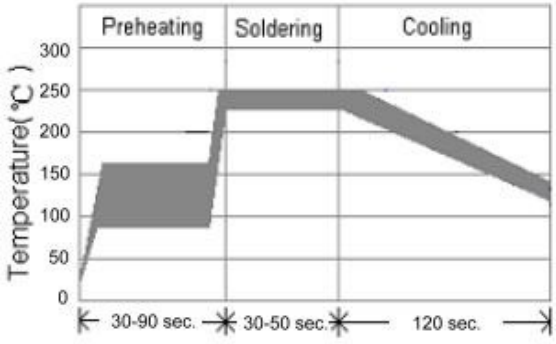
Pad Layouts、Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD1206 device



Pad dimensions(millimeters)

Device	A Nominal	B Nominal	C Nominal
FSMD005-1206	2.00	1.00	1.90
FSMD010-1206	2.00	1.00	1.90
FSMD020-1206	2.00	1.00	1.90
FSMD035-1206	2.00	1.00	1.90
FSMD050-1206	2.00	1.00	1.90



Solder reflow

※ **Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.**

1. Recommended reflow methods; IR , vapor phase oven, hot air oven.
2. The FSMD1206 Series are suitable for use with wave-solder application methods.
3. Recommended maximum paste thickness is 0.25mm.
4. Devices can be cleaned using standard industry methods and solvents.

CAUTION:
If reflow temperatures exceed the recommended Profile, devices may not meet the performance requirements.

Rework:
Use standard industry practices.

Quick Selection Guide

Fill in the following BLANKS to help us out in suggesting the **"Right"** product for your applications.

1. Determine the followings to define your circuit operation parameter,

Normal operating current :_____. Typical fault current:_____.

Normal operating voltage :_____. Required opening time at fault:_____

Maximum interrupt current: _____. Form factor: _____.

Maximum operating voltage: _____.

Maximum Ambient Temperature/ Derating : Between _____℃ and _____℃

Typical resistance (in circuit):_____Agency approvals:_____

2. Select the appropriate Fuzetec series from the table listed below:_____

Fuzetec Family	Voltage	Hold Current	Form factor	Application
FRX	60V	**0.05A~3.75A**	Radial Leaded	Computer & Electronic Equipment
FRX90V	90V	**0.10A~3.75A**	Radial Leaded	Telecom and electronic Equipment
FRU	30 V	**0.90A~9.00A**	Radial Leaded	Computer & Electronic Equipment
FRT	36V	**0.50A~2.50A**	Radial Leaded	IEEE 1394 FireWire, Computers & Consumer electronics
FUSB	16V/30V	**0.75A~2.50A**	Radial Leaded	Computer & Electronic Equipment
FRG	16V	**2.5A~14.0A**	Radial Leaded	Electronics, Automotive & Appliance
FBR	90V	**0.10A~0.90A**	Radial Leaded	Cable Telephone Electronics/Cable Power Passing Tap
FRH	60V/250V/600V	**0.08A~0.18A**	Radial Leaded	Telecom Equipment
FRV	240V$_{AC/DC}$	**0.50A~0.55A**	Radial Leaded	Line Voltage Power Supply, Transformer and Appliances
FRA	120V$_{AC/DC}$	**0.10A~3.75A**	Radial Leaded	Electrical & Electronic Appliance
FSR	15V&30V	**1.2A~4.2A**	Axial Leaded	Rechargeable Battery & Packs
FLT	24V	**0.7A ~3.4A**	Axial Leaded	Rechargeable Battery & Packs
FLR	15V&20V	**1.9A~7.3A**	Axial Leaded	Rechargeable Battery & Packs
FSMD 1812	6V~60V	**0.14A~2.00A**	Surface Mount	High-density PCB
FSMD 1206	6V~60V	**0.05A ~0.50A**	Surface Mount	High-density PCB
FSMD 1210	6V~60V	**0.05A ~0.75A**	Surface Mount	High-density PCB
FSMD 2920	6V~60V	**0.30A~2.60A**	Surface Mount	High-density PCB

3. Fill in the followings:

a) Quantity of samples requested:_____

b) Application Type:_____

c) Company name:_____

_____

d) Address:_____

Contact Person:_____Position :_____

Tel:_____Fax:_____

E-mail: _____Website:_____

e) Type of Business:_____

Cross Reference

Fuzetec		Raychem		Bourns		Littelfuse	
FRX	005-60F	RXEF	005	MF-R	005	--	--
FRX	010-60F	RXEF	010	MF-R	010	60R	010
FRX	017-60F	RXEF	017	MF-R	017	--	--
FRX	020-60F	RXEF	020	MF-R	020	60R	020
FRX	025-60F	RXEF	025	MF-R	025	60R	025
FRX	030-60F	RXEF	030	MF-R	030	60R	030
FRX	040-60F	RXEF	040	MF-R	040	60R	040
FRX	050-60F	RXEF	050	MF-R	050	60R	050
FRX	065-60F	RXEF	065	MF-R	065	60R	065
FRX	075-60F	RXEF	075	MF-R	075	60R	075
FRX	090-60F	RXEF	090	MF-R	090	60R	090
FRX	110-60F	RXEF	110	MF-RX	110	60R	110
FRX	135-60F	RXEF	135	MF-RX	135	60R	135
FRX	160-60F	RXEF	160	MF-RX	160	60R	160
FRX	185-60F	RXEF	185	MF-RX	185	60R	185
FRX	250-60F	RXEF	250	MF-RX	250	60R	250
FRX	300-60F	RXEF	300	MF-RX	300	60R	300
FRX	375-60F	RXEF	375	MF-RX	375	60R	375
FRX	010-90F	--	--	--	--	--	--
FRX	015-90F	--	--	--	--	--	--
FRX	017-90F	--	--	--	--	--	--
FRX	020-90F	RXEF	020 (72V)	--	--	--	--
FRX	025-90F	RXEF	025 (72V)	--	--	--	--
FRX	030-90F	RXEF	030 (72V)	--	--	--	--
FRX	035-90F	--	--	--	--	--	--
FRX	040-90F	RXEF	040 (72V)	--	--	--	--
FRX	050-90F	RXEF	050 (72V)	--	--	--	--
FRX	055-90F	--	--	--	--	--	--
FRX	065-90F	RXEF	065 (72V)	--	--	--	--
FRX	075-90F	RXEF	075 (72V)	--	--	--	--
FRX	090-90F	RXEF	090 (72V)	--	--	--	--
FRX	110-90F	RXEF	110 (72V)	MF-RX	110/72	--	--
FRX	135-90F	RXEF	135 (72V)	MF-RX	135/72	--	--
FRX	160-90F	RXEF	160 (72V)	MF-RX	160/72	--	--
FRX	185-90F	RXEF	185 (72V)	MF-RX	185/72	--	--
FRX	250-90F	RXEF	250 (72V)	MF-RX	250/72	--	--
FRX	300-90F	RXEF	300 (72V)	MF-RX	300/72	--	--
FRX	375-90F	RXEF	375 (72V)	MF-RX	375/72	--	--
FBR	100(U)F	--	--	--	--	--	--
FBR	150(U)F	--	--	--	--	--	--
FBR	200(U)F	--	--	--	--	--	--
FBR	250(U)F	--	--	--	--	--	--
FBR	350(U)F	--	--	--	--	--	--
FBR	550(U)F	BBRF	550	MF-R	055/90U	--	--
FBR	750(U)F	BBRF	750	MF-R	075/90	--	--
FBR	900(U)F	--	--	--	--	--	--
FRU	090-30F	RUEF	090	MF-R	090-0-9	30R	090
FRU	110-30F	RUEF	110	MF-R	110	30R	110
FRU	135-30F	RUEF	135	MF-R	135	30R	135
FRU	160-30F	RUEF	160	MF-R	160	30R	160
FRU	185-30F	RUEF	185	MF-R	185	30R	185
FRU	250-30F	RUEF	250	MF-R	250	30R	250
FRU	300-30F	RUEF	300	MF-R	300	30R	300
FRU	400-30F	RUEF	400	MF-R	400	30R	400
FRU	500-30F	RUEF	500	MF-R	500	30R	500
FRU	600-30F	RUEF	600	MF-R	600	30R	600
FRU	700-30F	RUEF	700	MF-R	700	30R	700
FRU	800-30F	RUEF	800	MF-R	800	30R	800
FRU	900-30F	RUEF	900	MF-R	900	30R	900

Cross Reference

Fuzetec		Raychem		Bourns		Littelfuse	
FRT	050-33F	-	-	-	-	-	-
FRT	075-33F	-	-	-	-	-	-
FRT	090-33F	-	-	-	-	-	-
FRT	120-33F	RTEF	120	-	-	-	-
FRT	135-33F	RTEF	135	-	-	-	-
FRT	160-33F	-	-	-	-	-	-
FRT	190-33F	RTEF	190	-	-	-	-
FRT	220-33F	-	-	-	-	-	-
FRT	250-33F	-	-	-	-	-	-

FUSB	075F	RUSBF	075	--	--	RLD	06P075B
FUSB	090F	RUSBF	090	--	--	RLD	16P090B
FUSB	110F	RUSBF	110	--	--	RLD	16P110B
FUSB	120F	RUSBF	120	--	--	RLD	06P120B
FUSB	135F	RUSBF	135	--	--	RLD	16P135B
FUSB	155F	RUSBF	155	--	--	RLD	06P155B
FUSB	160F	RUSBF	160	--	--	RLD	16P160B
FUSB	185F	RUSBF	185	--	--	RLD	16P185B
FUSB	250F	RUSBF	250	--	--	RLD	16P250B

FRG	250-16F	RGEF	250	--	--	--	--
FRG	300-16F	RGEF	300	MF-RG	300	--	--
FRG	400-16F	RGEF	400	--	--	--	--
FRG	500-16F	RGEF	500	MF-RG	500		
FRG	600-16F	RGEF	600	--	--	--	--
FRG	700-16F	RGEF	700	--	--	RLD	16P700G
FRG	800-16F	RGEF	800	--	--	--	--
FRG	900-16F	RGEF	900	--	--	RLD	16P900G
FRG	1000-16F	RGEF	1000	--	--	--	--
FRG	1100-16F	RGEF	1100	--	--	RLD	16P1100G
FRG	1200-16F	RGEF	1200	--	--	--	--
FRG	1400-16F	RGEF	1400	--	--	RLD	16P1400G

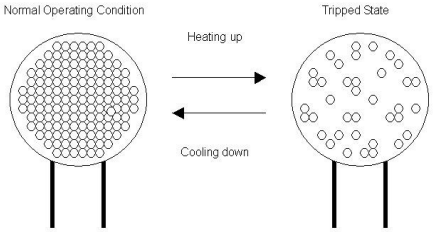
FRH	080-250UF	TRF250	080U	--	--	--	250R080
FRH	080-250F	TRF250	080	--	--	--	--
FRH	110-250UF	TRF250	110U	--	--	--	--
FRH	110-250F	TRF250	---	--	--	--	HVR250P110U
FRH	120-250UF	TRF250	120U	MF-RX	012/250U	--	--
FRH	120-250F	TRF250	120	MF-RX	012/250	--	250R120
FRH	145-250UF	TRF250	145U	MF-RX	014/250U	--	--
FRH	145-250F	TRF250	145	MF-RX	014/250	--	250R145
FRH	180-250UF	TRF250	180U	MF-RX	018/250U	--	--
FRH	180-250F	TRF250	180	MF-RX	018/250	--	250R180
FRH	150-600F	TRF250	150	MF-R	015/600	--	600R150
FRH	160-600F	TRF250	160	MF-R	016/600	--	600R160

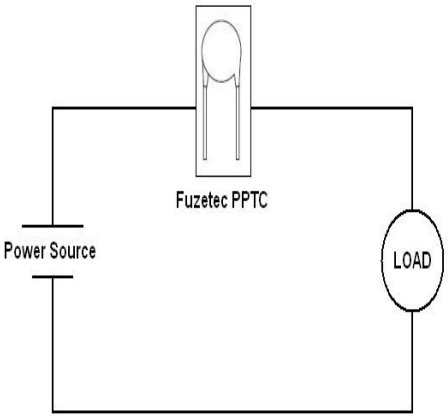
FRV	005-240F	LVR	005	--	--	--	--
FRV	008-240F	LVR	008	--	--	--	--
FRV	012-240F	LVR	012	--	--	--	--
FRV	016-240F	LVR	016	--	--	--	--
FRV	025-240F	LVR	025	--	--	--	--
FRV	033-240F	LVR	033	--	--	--	--
FRV	040-240F	LVR	040	--	--	--	--
FRV	055-240F	LVR	055K	--	--	--	--

Fuzetec		Raychem		Bourns		Littelfuse	
FSR	120F	SRP	120F	MF-S	120	15ST	120
FSR	175F	SRP	175F	MF-S	175	15ST	175
FSR	200F	SRP	200F	MF-S	200	STD	200
FSR	350F	SRP	350F	MF-S	350	STD	350
FSR	420F	SRP	420F	MF-S	420	STD	420
FLT	070F	LTP	070F	MF-LS	070	15LT	070
FLT	100F	LTP	100F	--	--	24LT	100
FLT	180F	LTP	180F	MF-LS	180	24LT	180
FLT	190F	LTP	190F	MF-LS	190	24LT	190
FLT	260F	LTP	260F	MF-LS	260	24LT	260
FLT	300F	LTP	300F	MF-LS	300	24LT	300
FLT	310F	LTP	310F	--	--	24LT	310
FLT	340F	LTP	340F	MF-LS	340	24LT	340
FLR	190F	LR4	190F	MF-LR	190	15LR	190
FLR	260F	LR4	260F	MF-LR	260	15LR	260
FLR	380F	LR4	380F	MF-LR	380	15LR	380
FLR	450F	LR4	450F	MF-LR	450	20LR	450
FLR	550F	LR4	550F	MF-LR	550	20LR	550
FLR	600F	LR4	600F	MF-LR	600	20LR	600
FLR	730F	LR4	730F	MF-LR	730	20LR	730
FSMD	014	miniSMDC	014F	MF-MSMF	014	--	--
FSMD	020	miniSMDC	020F	MF-MSMF	020	--	--
FSMD	035	--	--	MF-MSMF	030	--	--
FSMD	050	miniSMDC	050F	MF-MSMF	050	1812L	050
FSMD	075	miniSMDC	075F	MF-MSMF	075	1812L	075
FSMD	110	miniSMDC	110F	MF-MSMF	110	1812L	110
FSMD	110-16	miniSMDC	110F/16	MF-MSMF	M110/16	--	--
FSMD	125	miniSMDC	125F	MF-MSMF	125	1812L	125
FSMD	150	miniSMDC	150F	MF-MSMF	150	1812L	150
FSMD	160	miniSMDC	160F	MF-MSMF	160	1812L	160
FSMD	200	miniSMDC	200F	MF-MSMF	200	1812L	200
FSMD*	030-2920	SMD	030F	MF-SM	030	2920L	030
FSMD*	050-2920	SMD	050F	MF-SM	050	2920L	050
FSMD*	075-2920	SMD	075F	MF-SM	075	2920L	075
FSMD*	100-2920	SMD	100F	MF-SM	100/33	2920L	100
FSMD*	125-2920	SMD	125F	MF-SM	125	2920L	125
FSMD**	150-2920	SMD	150F	MF-SM	150/33	2920L	150/33
FSMD**	185-2920	SMD	185F	MF-SM	185	2920L	185
FSMD**	200-2920	SMD	200F	MF-SM	200	2920L	200
FSMD**	250-2920	SMD	250F	MF-SM	250	2920L	250
FSMD**	260-2920	SMD	260F	MF-SM	260	2920L	260
FSMD	005-1210	microSMD	005F	MF-USMF	005	1210L	005
FSMD	010-1210	microSMD	010F	MF-USMF	010	1210L	010
FSMD	020-1210	--	--	MF-USMF	020	1210L	020
FSMD	035-1210	microSMD	035F	MF-USMF	035	1210L	035
FSMD	050-1210	microSMD	050F	MF-USMF	050	1210L	050
FSMD	075-1210	microSMD	075F	MF-USMF	075	1210L	075
FSMD	005-1206	--	--	--	--	--	--
FSMD	010-1206	--	--	MF-NSMF	012	1206L	012
FSMD	020-1206	nanoSMDC	020F	MF-NSMF	020	1206L	020
FSMD	035-1206	nanoSMDC	035F	MF-NSMF	035	1206L	035
FSMD	050-1206	nanoSMDC	050F	MF-NSMF	050	1206L	050

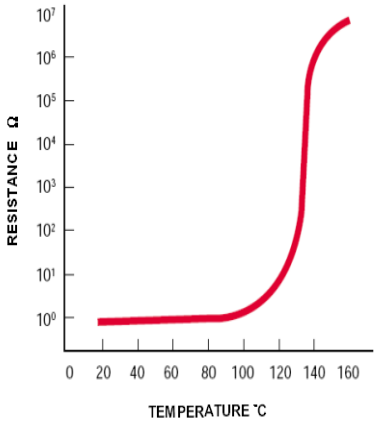
*** : Dimensional equivalent. Functional identical.**
*** * : Dimensional smaller. Functional identical.**

The conductive carbon black particles in Fuzetec's PPTC resettable fuses are dispersed in a polymer that has a crystalline structure. At normal operating conditions there are numerous carbon chains forming conductive paths trough the material. Under fault conditions (Tripped State), excessive current flows through the PPTC device and the PTC material heats up making the conductive particles move apart from each other, most of them no longer conduct current and the resistance of the device increases sharply. Upon fault current being removed, the resettable fuse is resetted and allows the current through the circuit again.





When connected in series to a circuit, Fuzetec's PPTC resettable fuses remain at extremely low resistance and allow the electrical current to flow through it without any restriction. When overcurrent situations occur, Fuzetec PPTC resettable fuses limit the current to a very small value and therefore protect the circuit from being damaged by the high current.



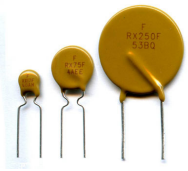
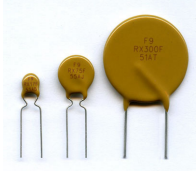
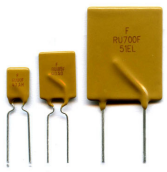
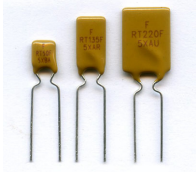
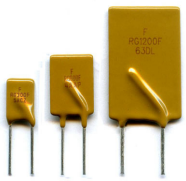
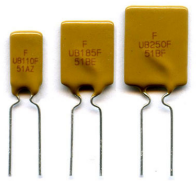
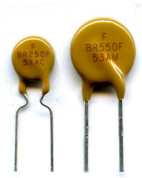
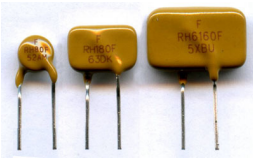
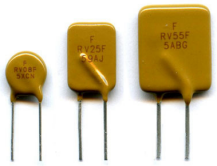
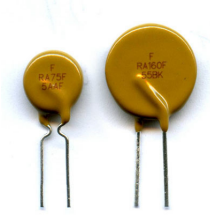
PPTC Applications by Industry

Telecom & Communications	ADSL, VDSL Cable modems, Set Top Box	Customer Premise Equipment/UL-1495
	MDF Module	Telecom Network Equipment
Computer / Consumer Electronics	Mother board	Printer, Scanner, Modem
	USB & IEEE1394 & I/O Card	Digital Audio & Vedio Equipment
	Portable Game	GPS Navagation
Industrial, Power Supply & Other Electronics	Power Supply Devices	Test & Measurement Equipment
	Ballast	Industrial Process Controls
	Motors, Fans & Blowers	Speakers
	Security & Fire Alarm Systems	Other Consumer Electronics
Automotive Industry	Automobile cigar-lighter adapters (CLAs)	
	Wire Harness	
	Automotive Security Alarm & other Automotive Electronics	
	Automotive actuators & motors (i.e. Power Windows)	
Battery & Portable Electronics	PCM Module; Battery Cell & Battery Packs	
	Battery Chargers	
	Notebook, PDA & Cellphone Batteries	

PPTC Resettable Fuse(PPTC 可復式保險絲)

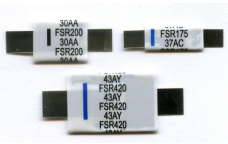
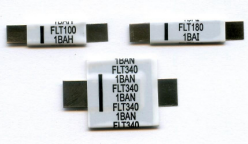
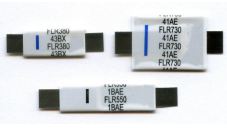
Radial Leaded (For Telecom & Electronic Equipment)

RoHS 2002/95/EC | Lead Free

	**FRX** Operation Current:0.05A ~3.75A VMAX:60V, IMAX: 40A. Wide Variety of Electronic Equipment		**FRX90V** Operation Current:0.1A ~3.75A VMAX:72V/90V, IMAX: 40A. Wide Variety of Electronic Equipment
	**FRU** Operation Current:0.9A ~9A VMAX:30V, IMAX: 40A. Wide Variety of Electronic Equipment		**FRT** Operation Current:0.5A ~2.5A VMAX:36V, IMAX: 40A. Wide Variety of Electronic Equipment
	**FRG** Operation Current:2.5A~14A VMAX:16V, IMAX: 100A. Wide Variety of Electronic Equipment		**FUSB** Operation Current:0.75A~2.5A VMAX:16/30V, IMAX: 40A. Low Voltage USB Equipment
	**FBR** Operation Current:0.10A ~0.9A VMAX:90V, IMAX: 40A. Cable/Telephone Electronic		**FRH** Operation Current:0.08A~0.18A Max Operation Voltage:60V Interrupt Voltage: 250V or 600V Telecommunication and Net Work
	**FRV** Operation Current: 50mA~550mA Max Operation Voltage: 240$V_{AC/DC}$ Interrupt Voltage: 265V Line Voltage application		**FRA** Operation Current:0.1A ~3.75A VMAX:120$V_{AC/DC}$, IMAX: 2A~15A. Wide Variety of Electronic Equipment

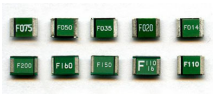
Axial Leaded (For Rechargeable Battery Packs)

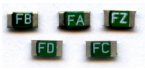
RoHS 2002/95/EC | Lead Free

	**FSR** Operation Current: 1.2A~4.2 A VMAX:15V/30V, IMAX: 100A. Rechargeable Battery Packs		**FLT** Operation Current: 0.7A~3.4A VMAX:24V, IMAX: 100A. Rechargeable Battery Packs
	**FLR** Operation Current: 1.9A~7.3 A VMAX:15V/20V, IMAX: 100A. Rechargeable Battery Packs		**Disc (Donut type)** **Custom Design** Battery Cell and Charger

Surface Mount (For High Density Board)

RoHS 2002/95/EC | Lead Free

	**FSMD1812** Operation Current:0.14A ~2.0A VMAX:6V~60V, IMAX: 10A~40A. All High-Density Board		**FSMD2920** Operation Current:0.3A ~2.6A VMAX:6V~60V, IMAX: 10A~40A. All High-Density Board

	**FSMD1210** Operation Current:0.05A ~0.75A VMAX:6V~60V, IMAX: 10A~40A. All High-Density Board		**FSMD1206** Operation Current:0.05A ~0.5A VMAX:6V~60V, IMAX: 10A~40A. All High-Density Board

Thermal Derating for PPTC Device at Various Ambient Temperature.

FUZETEC PPTC Family	-20℃	0℃	23℃	30℃	40℃	50℃	60℃	70℃	85℃
FRG	132%	120%	100%	95%	88%	80%	71%	61%	47%
FUSB	130%	115%	100%	91%	83%	76%	67%	61%	52%
FRU	130%	115%	100%	91%	83%	76%	67%	61%	52%
FRT	135%	120%	100%	98%	90%	85%	78%	70%	64%
FRX-60/90	136%	119%	100%	90%	81%	72%	63%	54%	40%
FBR	136%	118%	100%	90%	81%	72%	63%	54%	40%
FSMD-2920	134%	117%	100%	92%	83%	75%	66%	58%	45%
FSMD-1812	135%	118%	100%	93%	87%	79%	72%	65%	56%
FSMD-1210	132%	115%	100%	92%	83%	75%	64%	59%	46%
FSMD-1206	135%	117%	100%	94%	88%	81%	71%	66%	52%
FLT	143%	122%	100%	90%	80%	69%	59%	46%	26%
FSR	135%	118%	100%	92%	85%	77%	69%	62%	50%
FLR	130%	115%	100%	93%	86%	78%	71%	64%	56%
FRH	138%	119%	100%	92%	83%	73%	64%	55%	42%
FRA	137%	122%	100%	95%	88%	79%	70%	65%	50%
FRV	133%	114%	100%	92%	86%	73%	64%	52%	40%