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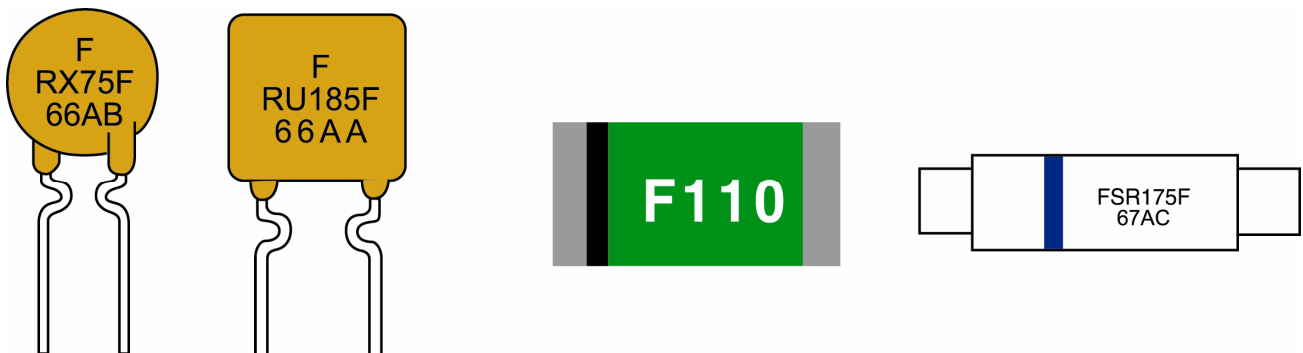
FUZETEC TECHNOLOGY

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 are not limited to: Telecommunications, Networks, Computers & Peripherals, Notebook PC's, Primary & Secondary Batteries, Automotives, Instrumentation & 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 fuses are offered in a variety of constructions, which include: Radial Leaded (16V, 30V, 60V, 90V, 120Vac, 240 Vac, 250V & 600V), Surface Mount (0805,1206, 1210, 1812 & 2920 sizes) & Axial Leaded for all battery pack applications. In addition to standard products we offer a flexible range of custom design devices (i.e. Disc Type).



SAFETY, QUALITY AND CUSTOMER SATISFACTION

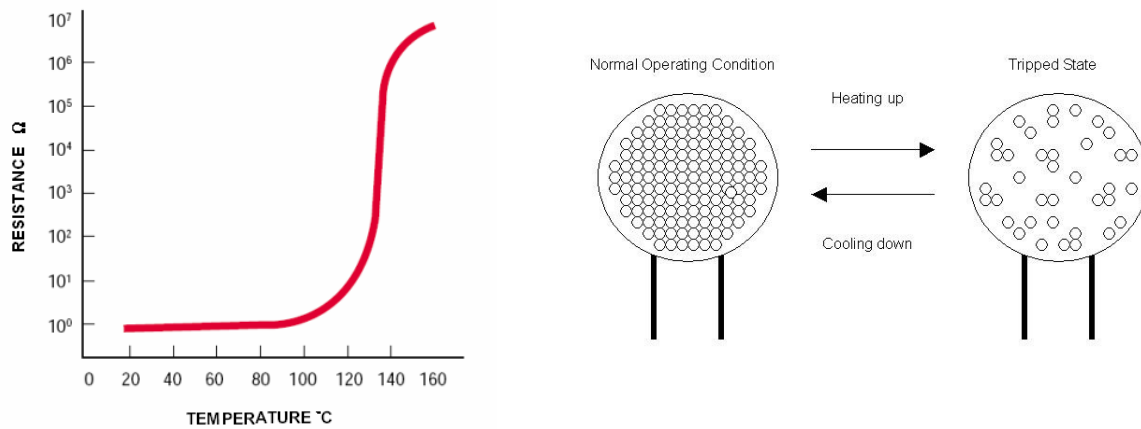
With third party approvals (UL, C-UL and TÜV), FUZETEC™ products are ensured to provide long lasting safety and performance. From product design and development, through manufacturing and quality control to delivery and shipment. Fuzetec Technology strictly implements ISO/TS16949:2002 ISO9001:2000 and 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 advanced 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 ($\text{Energy} = I \cdot V$) and heats up itself. This makes the polymer matrix's morphology change from crystalline to amorphous phase, and results in a resistance increase of thousand orders of magnitude such that "trips" the electricity. The device will remain hot and stay "tripped" until the fault is cleared and power is removed.

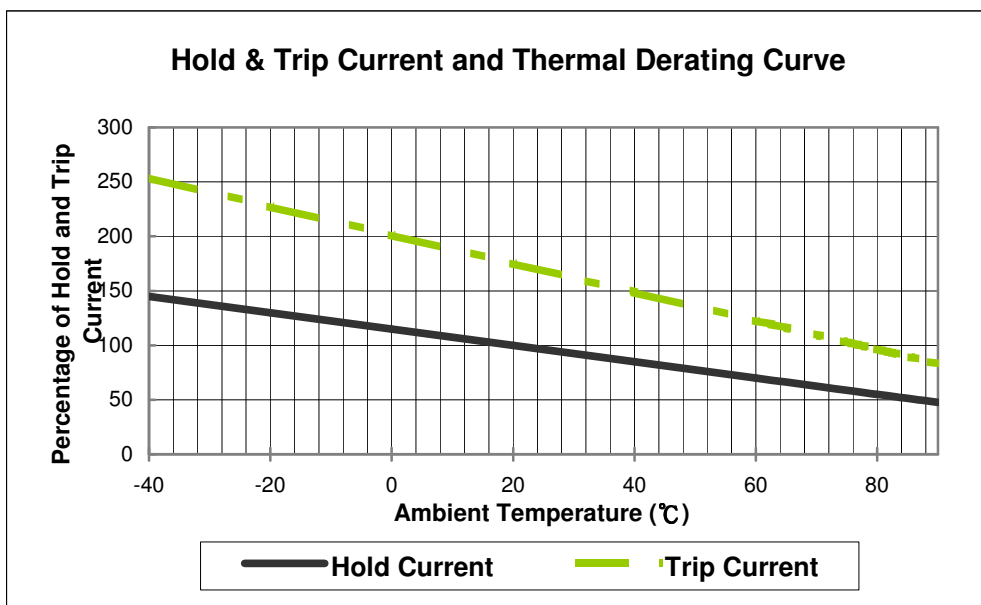
HOW DOES THE RESETTABLE FUSE WORK

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 (milli-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 “reset” and allows the current through the circuit again.



TRIP CURRENT, HOLD CURRENT AND THERMAL DERATING

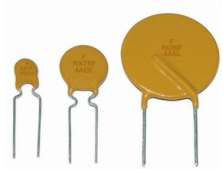
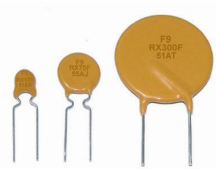
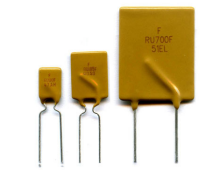
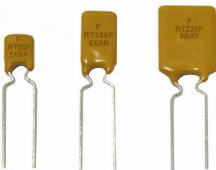
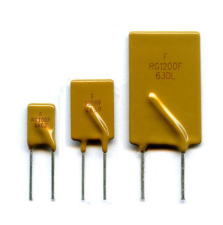
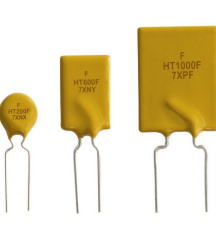
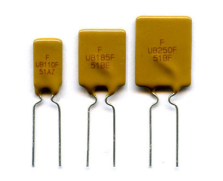
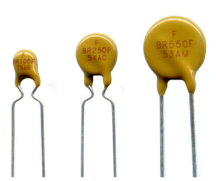
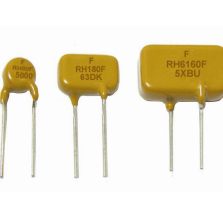


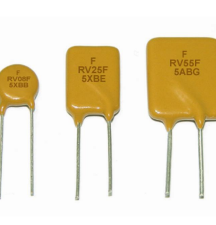
Trip Current (I_T) and Hold Current (I_H) of FUZETEC™ resettable fuse are rated at 23°C. Typically its Trip Current is twice as much as its Hold Current. FUZETEC™ device does not trip at or below its rated Hold Current, and will trip at or above its Trip Current value. However, due to PTC effect both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



PRODUCT SUMMARY



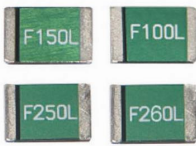
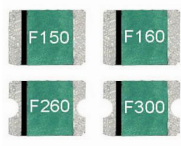
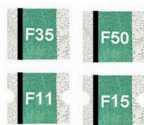


Radial Leaded (For Telecom & Electronic Equipment)

	<p>FRX Operation Current:0.05A ~3.75A VMAX:60V, IMAX: 40A. Wide Variety of Electronic Equipment</p>		<p>FRX90V Operation Current:0.10A ~3.75A VMAX:72V/90V, IMAX: 40A. Wide Variety of Electronic Equipment</p>
	<p>FRU Operation Current:0.90A ~9.00A VMAX:30V, IMAX: 40A. Wide Variety of Electronic Equipment</p>		<p>FRT Operation Current:0.50A ~2.50A VMAX:36V, IMAX: 40A. Wide Variety of Electronic Equipment</p>
	<p>FRG Operation Current:2.50A~14.00A VMAX:16V, IMAX: 100A. Wide Variety of Electronic Equipment</p>		<p>FHT Operation Current: 0.50A~15.00A VMAX:16V/30V, IMAX: 40A/100A. Operating temperatures up to 125°C.</p>
	<p>FUSB Operation Current:0.75A~2.50A VMAX:16V/30V, IMAX: 40A. Low Voltage USB Equipment</p>		<p>FBR Operation Current:0.10A ~0.90A VMAX:90V, IMAX: 40A. Cable/Telephone Electronic</p>
	<p>ERH Operation Current:0.08A~0.18A Max Operation Voltage:60V Max Interrupt Voltage: 250V/600V Telecommunication and Net Work</p>		<p>ERHV Operation Current:0.08A~0.18A Max Operation Voltage:100V/250V Max Interrupt Voltage: 250V/600V Wide Variety of Electronic Equipment</p>
	<p>ERVL Operation Current:0.10A ~3.75A VMAX:120V_{AC/DC}, IMAX: 2A~20A. Max Interrupt Voltage: 135V_{AC/DC} Line Voltage application</p>		<p>ERV Operation Current: 0.05A~2.00A VMAX: 240V_{AC/DC}, IMAX: 1A~20A. Max Interrupt Voltage: 265V_{AC/DC} Line Voltage application</p>

PRODUCT SUMMARY




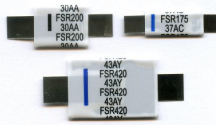
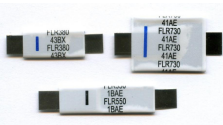
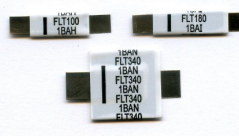
Surface Mount (For High Density Board)



	<p>ESMD2920</p> <p>Operation Current: 0.30A ~3.00A VMAX:6V~60V, IMAX: 10A~40A. All High-Density Board</p>		<p>ESMD1812</p> <p>Operation Current: 0.10A ~3.00A VMAX:6V~60V, IMAX: 10A~100A. All High-Density Board</p>
	<p>ESMD1210</p> <p>Operation Current:0.05A ~1.50A VMAX:6V~60V, IMAX: 10A~100A. All High-Density Board</p>		<p>ESMD1206</p> <p>Operation Current:0.05A ~2.00A VMAX: 6V~60V, IMAX: 10A~100A. All High-Density Board</p>
	<p>ESMD0805</p> <p>Operation Current:0.10A~1.00A VMAX:6V~15V All High-Density Board</p>		

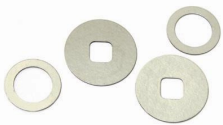
Axial Leaded (For Rechargeable Battery Packs)



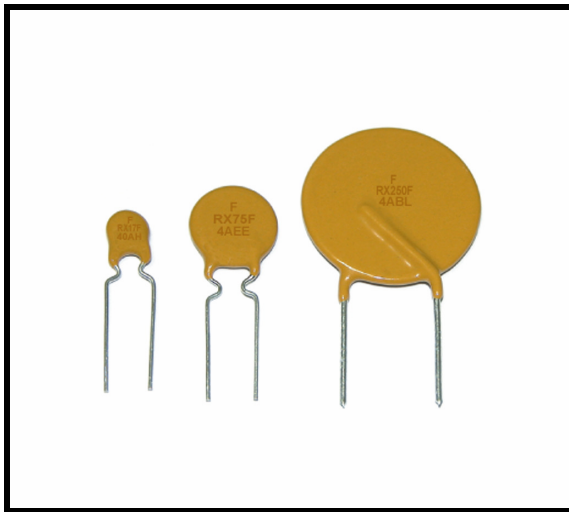
	<p>FVT</p> <p>Operation Current: 1.10A~2.40 A VMAX:16V, IMAX: 100A. Rechargeable battery packs, Lithium cell and battery packs</p>		<p>FVL</p> <p>Operation Current: 1.70A~2.30 A VMAX:12V, IMAX: 100A. Rechargeable battery packs, Lithium cell and battery packs</p>
	<p>FSL</p> <p>Operation Current: 1.90A VMAX:6V, IMAX: 50A. Rechargeable battery packs, Lithium cell and battery packs</p>		<p>FSR</p> <p>Operation Current: 1.20A~4.20 A VMAX:15V/30V, IMAX: 100A. Rechargeable Battery Packs</p>
	<p>FLR</p> <p>Operation Current: 1.90A~7.30 A VMAX:15V/20V, IMAX: 100A. Rechargeable Battery Packs</p>		<p>FLT</p> <p>Operation Current: 0.70A~3.40A VMAX:24V, IMAX: 100A. Rechargeable Battery Packs</p>

Disk type (For Battery Cell and Charger)



	<p>Disc (Donut type)</p> <p>Custom Design Battery Cell and Charger</p>
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FRX Series



RoHS Compliant & 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: 0.05A ~ 3.75A

Maximum Voltage: 60V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

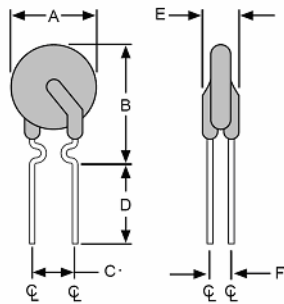
TÜV (R3-50004084)

Electrical Characteristics(23°C)

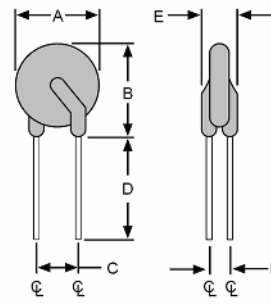
Part Number	Hold Current I _H , A	Trip Current I _T , A	Max.Time to Trip at 5xI _H , s	Maximum Current I _{MAX} , A	Rated Voltage V _{MAX} , V _{DC}	Typical Power P _d , W	Resistance Tolerance	
							R _{MIN} Ohms	R _{1MAX} Ohms
FRX005-60F	0.05	0.10	5.0	40	60	0.26	7.30	20.0
FRX010-60F	0.10	0.20	4.0	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°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).
 P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping .
 Physical specifications:
 Lead material: FRX005-60F~FRX090-60F Tin plated copper, 24 AWG.
 FRX110-60F~FRX375-60F Tin plated copper, 20 AWG.
 Soldering characteristics: MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

FRX Product Dimensions (Millimeter)



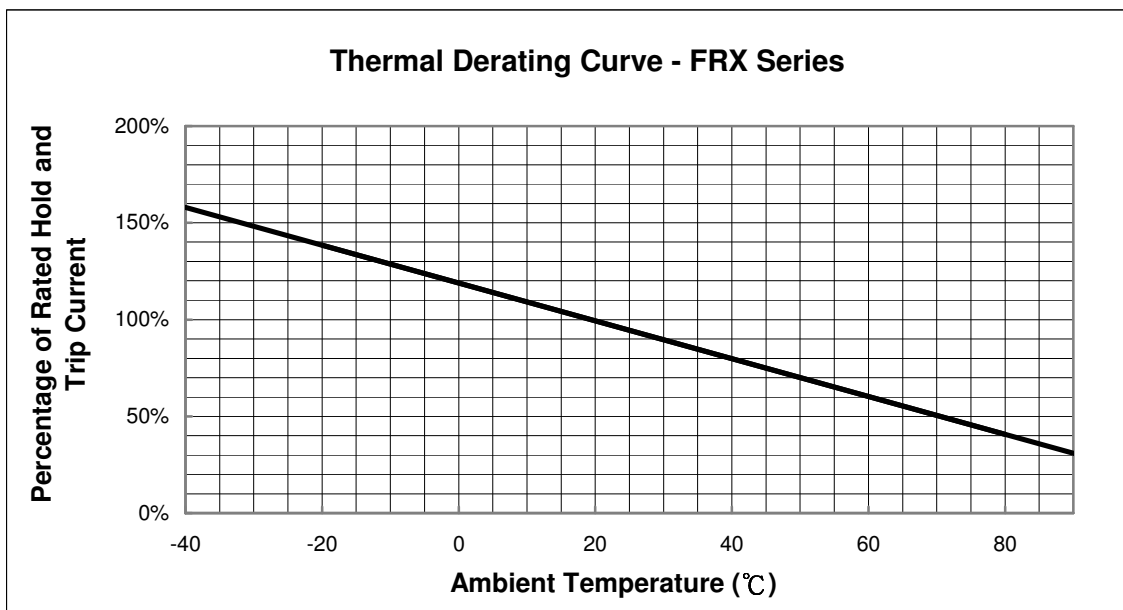
FRX 005-60F ~ FRX 090-60F
Lead Size: 24AWG,
Φ 0.51 mm Diameter



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

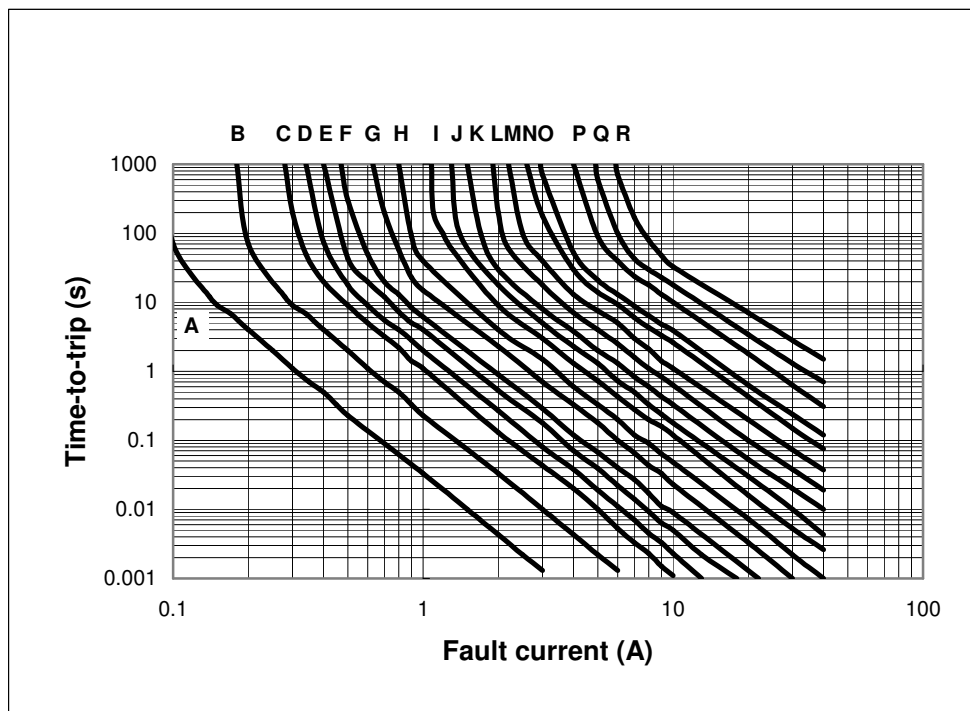
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRX005-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX010-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-60F	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-60F	7.4	13.0	5.1	7.6	3.1	1.1
FRX040-60F	7.6	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

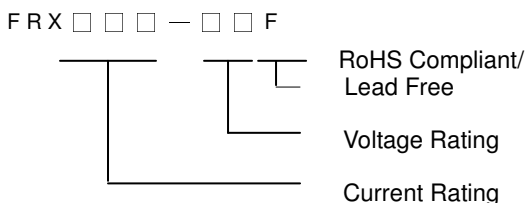


Typical Time-To-Trip at 23°C

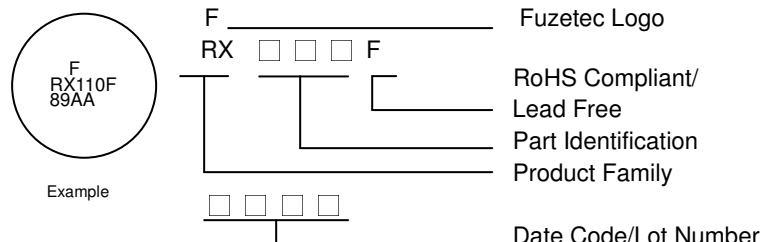
- A= FRX005-60F
- B = FRX010-60F
- C = FRX017-60F
- D = FRX020-60F
- E = FRX025-60F
- F = FRX030-60F
- G = FRX040-60F
- H = FRX050-60F
- I = FRX065-60F
- J = FRX075-60F
- K= FRX090-60F
- L = FRX110-60F
- M = FRX135-60F
- N = FRX160-60F
- O = FRX185-60F
- P = FRX250-60F
- Q = FRX300-60F
- R = FRX375-60F



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	-----

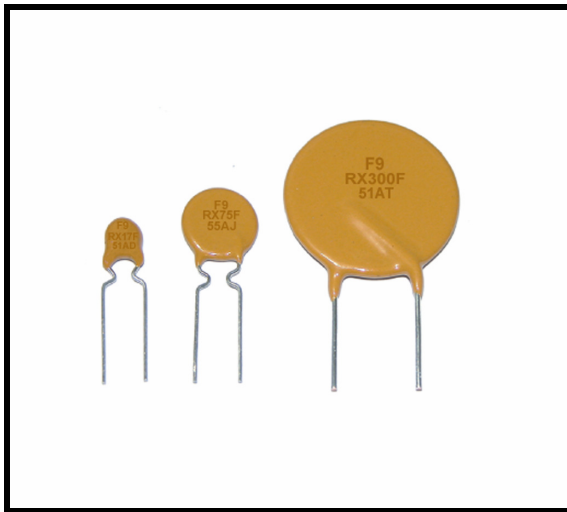
Warning:



- 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.

FRX90V Series

RoHS Compliant & 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: 0.10A~3.75A

Maximum Voltage: Up to 90V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

*TÜV (R50004084)

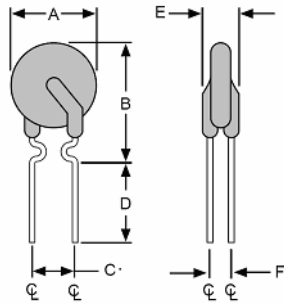
Electrical Characteristics (23°C)

Part Number	Hold Current I _H , A	Trip Current I _T , A	Max.Time to Trip at 5xI _H , s	Max. Current I _{MAX} , A	Rated Voltage V _{MAX} , V _{DC}	Typical Power Pd, W	Resistance Tolerance	
							R _{MIN} Ohms	R _{1MAX} 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

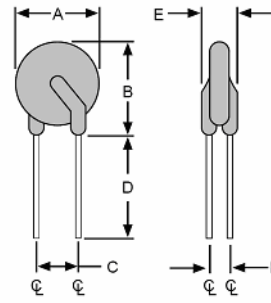
I_H=Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C still air.
 V_{MAX}=Maximum voltage device can withstand without damage at its rated current.
 I_{MAX}= Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
 Pd=Typical power dissipated from device when in tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping .
 Physical specifications:
 Lead material: FRX010-90F~FRX090-90F Tin plated copper, 24 AWG.
 FRX110-90F~FRX375-90F Tin plated copper, 20 AWG.
 Soldering characteristics: MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.
 * NOTE : TÜV is only applied for FRX040-90F~FRX375-90F.

NOTE : All Specifications subject to change without notice. 8

FRX90V Product Dimensions (Millimeter)



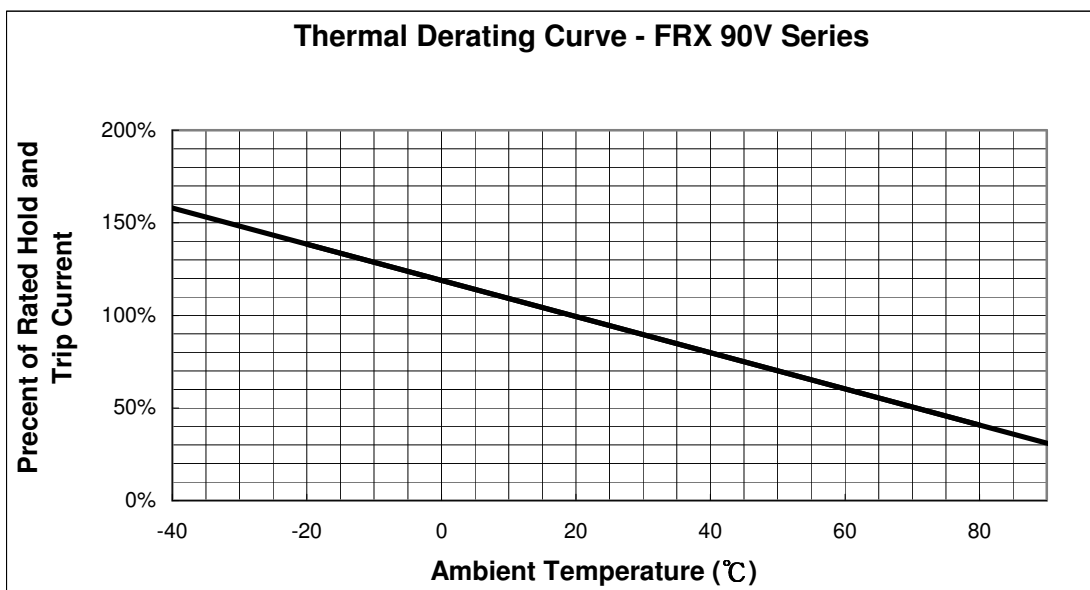
FRX 010-90F ~ FRX 090-90F
Lead Size : 24AWG
Φ 0.51 mm Diameter



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

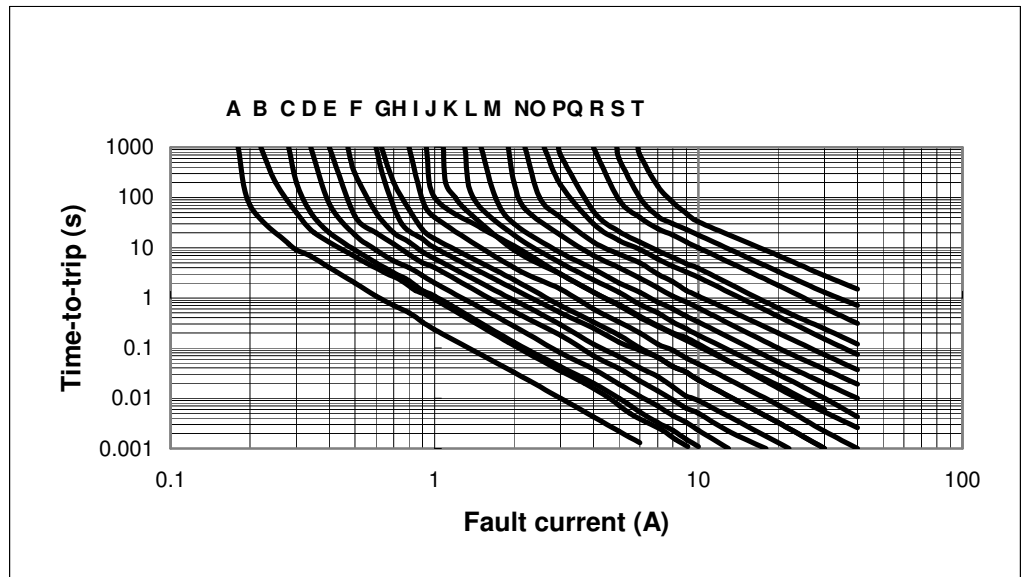
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRX010-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX015-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-90F	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-90F	7.4	13.0	5.1	7.6	3.1	1.1
FRX035-90F	7.4	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

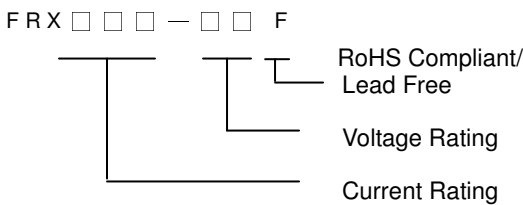


Typical Time-To-Trip at 23°C

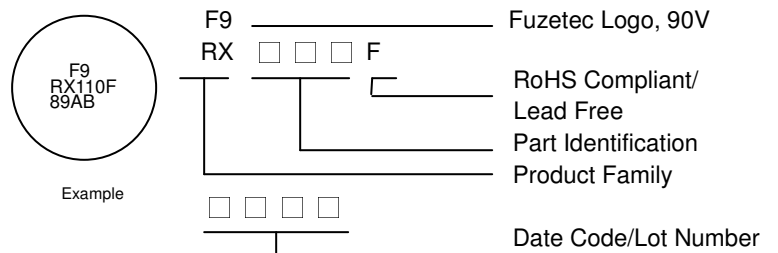
- A = FRX010-90F
- B = FRX015-90F
- C = FRX017-90F
- D = FRX020-90F
- E = FRX025-90F
- F = FRX030-90F
- G = FRX035-90F
- H = FRX040-90F
- I = FRX050-90F
- J = FRX055-90F
- K = FRX065-90F
- L = FRX070-90F
- M = FRX090-90F
- N = FRX110-90F
- O = FRX135-90F
- P = FRX160-90F
- Q = FRX185-90F
- R = FRX250-90F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

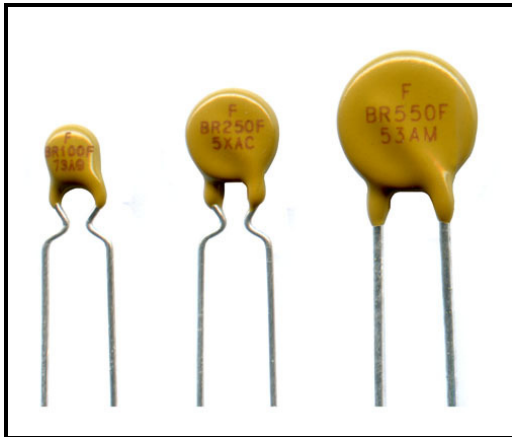
P/N	Pcs /Bag	Reel/Tape
FRX065-90F	300	3K
FRX075-90F	300	3K
FRX090-90F	300	3K
FRX110-90F	200	1.5K
FRX135-90F	200	1.5K
FRX160-90F	200	1.5K
FRX185-90F	200	1.5K
FRX250-90F	100	-----
FRX300-90F	100	-----
FRX375-90F	100	-----

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.



FBR Series



RoHS Compliant & 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: 0.1A~0.9A

Maximum Voltage: 90V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL(E211981)

*TÜV (R50004084)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
	I_H, A	I_T, A	at $5xI_H, s$	I_{MAX}, A	V_{MAX}, V_{DC}	P_d, W	R_{MIN}	$R1_{MAX}$
							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°C still air.

I_T =Trip current-minimum current at which the device will always trip at 23°C 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}).

P_d =Typical power dissipated from device when in tripped state in 23°C still air environment.

R_{MIN} =Minimum device resistance at 23°C.

$R1_{MAX}$ =Maximum device resistance at 23°C, 1 hour after tripping .

Physical specifications:

Lead material: FBR100F~FBR350F Tin plated copper, 24 AWG.

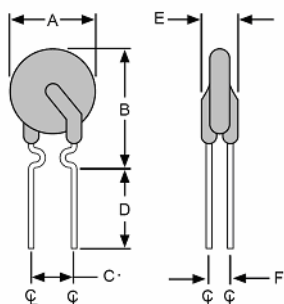
FBR200F~FBR900F Tin plated copper, 20 AWG.

Soldering characteristics: MIL-STD-202, Method 208E.

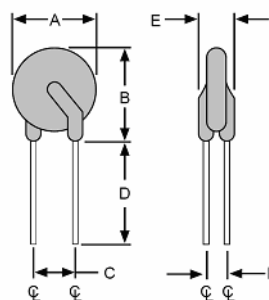
Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

*NOTE : TÜV is only applied for FBR550(U)F~ FBR900(U)F

FBR Product Dimensions (Millimeter)



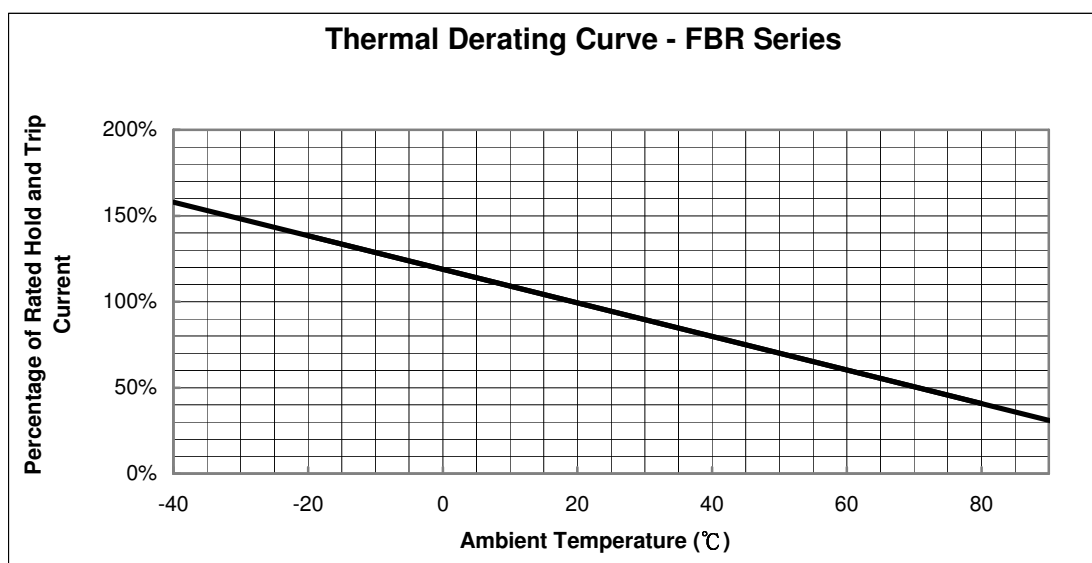
FBR100F ~ FBR350F
Lead Size: 24AWG
Φ 0.51 mm Diameter



FBR550F ~ FBR900F
Lead Size: 20AWG
Φ 0.81 mm Diameter

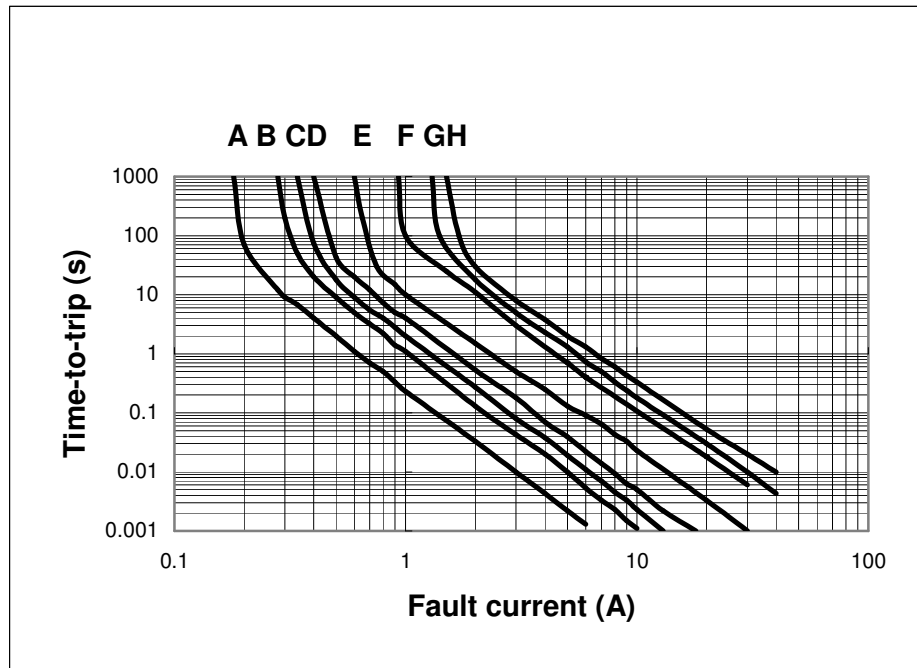
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FBR100(U)F	7.4	12.7	5.1	7.6	3.6	1.4
FBR150(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR200(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR250(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR350(U)F	9.0	12.7	5.1	7.6	3.6	1.4
FBR550(U)F	10.9	14.0	5.1	7.6	3.6	1.4
FBR750(U)F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

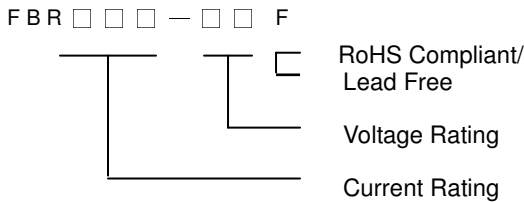


Typical Time-To-Trip at 23°C

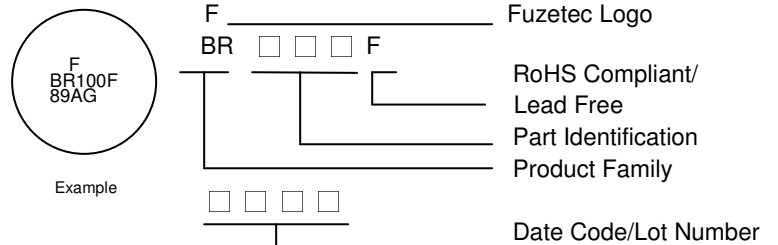
- A = FBR100 (U)F
- B = FBR150 (U)F
- C = FBR200 (U)F
- D = FBR250 (U)F
- E = FBR350 (U)F
- F = FBR550 (U)F
- G = FBR750 (U)F
- H = FBR900 (U)F



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

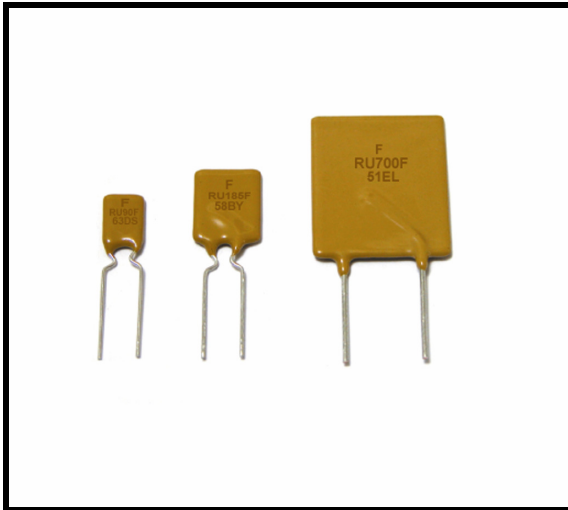
P/N	Pcs /Bag	Reel/Tape
FBR350 (U)F	500	2.5K
FBR550 (U)F	500	2K
FBR750 (U)F	500	2K
FBR900 (U)F	500	2K

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.

FRU Series



RoHS Compliant & 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: 0.9A~9.0A

Maximum Voltage: 30V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

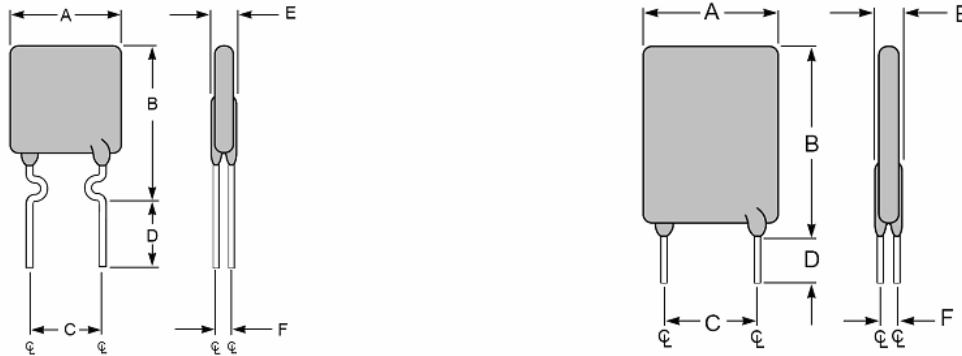
TÜV (R3-50004084)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Max.Time To Trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	Ohms	Ohms
FRU090-30F	0.90	1.80	5.9	40	30	0.6	0.070	0.220
FRU110-30F	1.10	2.20	6.6	40	30	0.7	0.050	0.170
FRU135-30F	1.35	2.70	7.3	40	30	0.8	0.040	0.130
FRU160-30F	1.60	3.20	8.0	40	30	0.9	0.030	0.110
FRU185-30F	1.85	3.70	8.7	40	30	1.0	0.030	0.090
FRU250-30F	2.50	5.00	10.3	40	30	1.2	0.020	0.070
FRU300-30F	3.00	6.00	10.8	40	30	2.0	0.020	0.080
FRU400-30F	4.00	8.00	12.7	40	30	2.5	0.010	0.050
FRU500-30F	5.00	10.00	14.5	40	30	3.0	0.010	0.050
FRU600-30F	6.00	12.00	16.0	40	30	3.5	0.005	0.040
FRU700-30F	7.00	14.00	17.5	40	30	3.8	0.005	0.030
FRU800-30F	8.00	16.00	18.8	40	30	4.0	0.005	0.020
FRU900-30F	9.00	18.00	20.0	40	30	4.2	0.005	0.020

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).
 P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.
 Physical specifications:
 Lead material: FRU090-30F~FRU250-30F Tin plated copper, 24 AWG.
 FRU300-30F~FRU900-30F Tin plated copper, 20 AWG.
 Soldering characteristics: MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

FRU Product Dimensions (Millimeter)

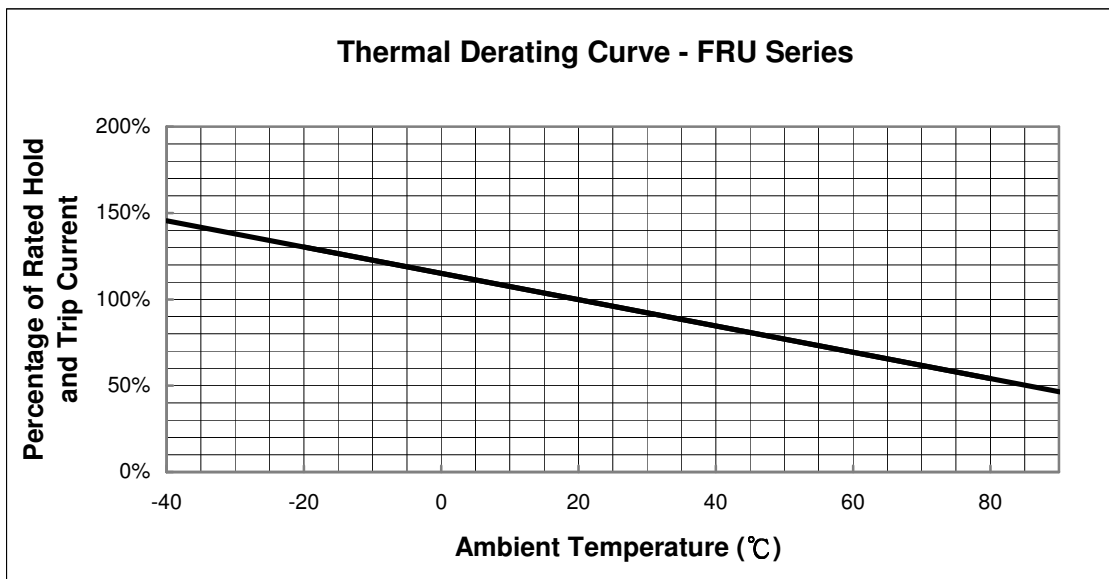


FRU 090-30F ~ FRU 250-30F
Lead Size: 24AWG,
Φ 0.51 mm Diameter

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

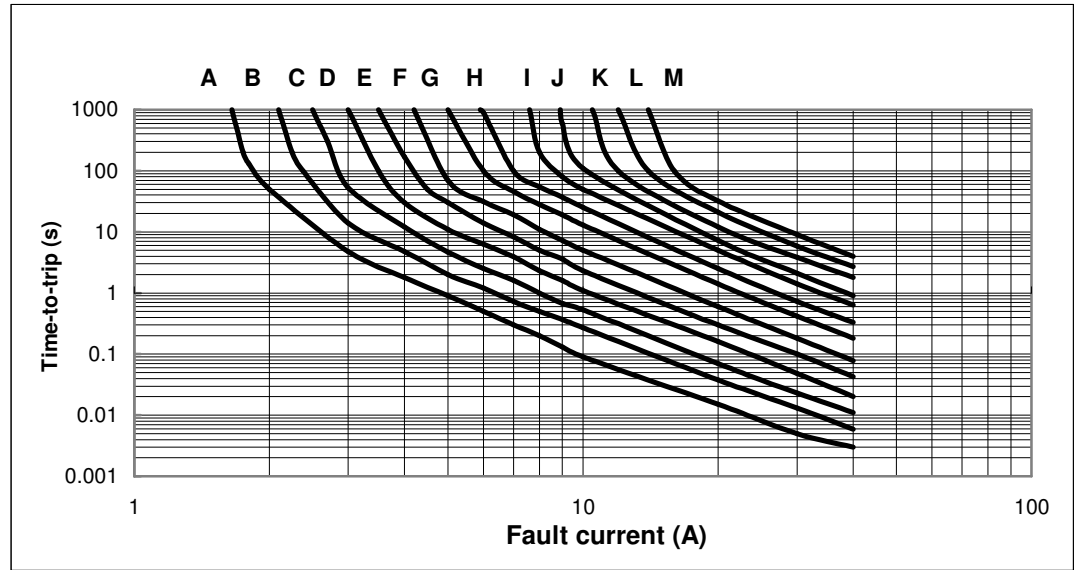
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRU090-30F	7.4	12.2	5.1	7.6	3.0	0.9
FRU110-30F	7.4	14.2	5.1	7.6	3.0	0.9
FRU135-30F	8.9	13.5	5.1	7.6	3.0	0.9
FRU160-30F	8.9	15.2	5.1	7.6	3.0	0.9
FRU185-30F	10.2	15.7	5.1	7.6	3.0	0.9
FRU250-30F	11.4	18.3	5.1	7.6	3.0	0.9
FRU300-30F	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

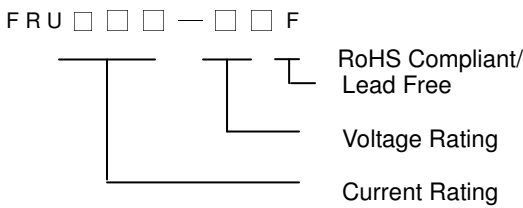


Typical Time-To-Trip at 23°C

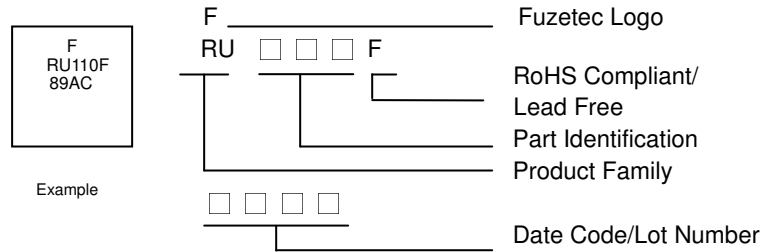
- A = FRU090-30F
- B = FRU110-30F
- C = FRU135-30F
- D = FRU160-30F
- E = FRU185-30F
- F = FRU250-30F
- G = FRU300-30F
- H = FRU400-30F
- I = FRU500-30F
- J = FRU600-30F
- K = FRU700-30F
- L = FRU800-30F
- M = FRU900-30F



Part Numbering System



Part Marking System



Standard Package

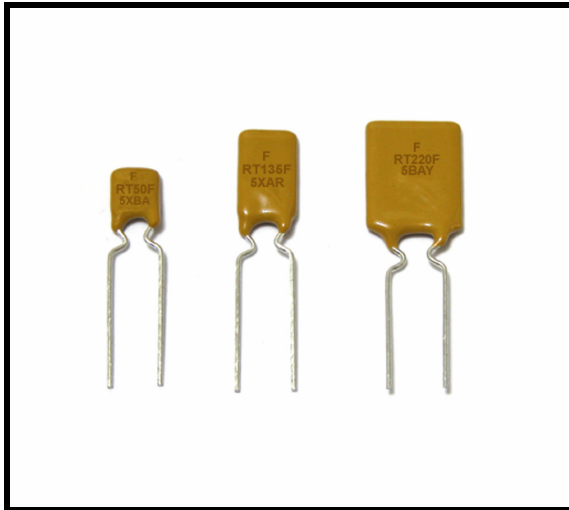
P/N	Pcs /Bag	Reel/Tape
FRU090-30F	500	3k
FRU110-30F	500	3k
FRU135-30F	300	3k
FRU160-30F	300	3k
FRU185-30F	300	3k
FRU250-30F	300	3k
FRU300-30F	200	1.5k

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.



FRT Series



RoHS Compliant & 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°C to 85°C

Agency Recognition: UL(E211981)

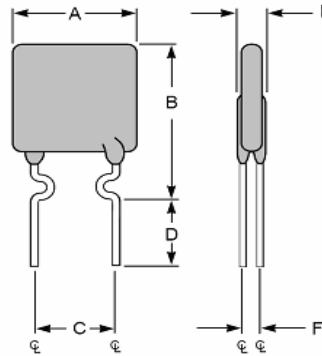
C-UL(E211981)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max.Time To Trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	Pd, W	R _{MIN}	R _{1MAX}
							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°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 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 94 V-0 requirement.

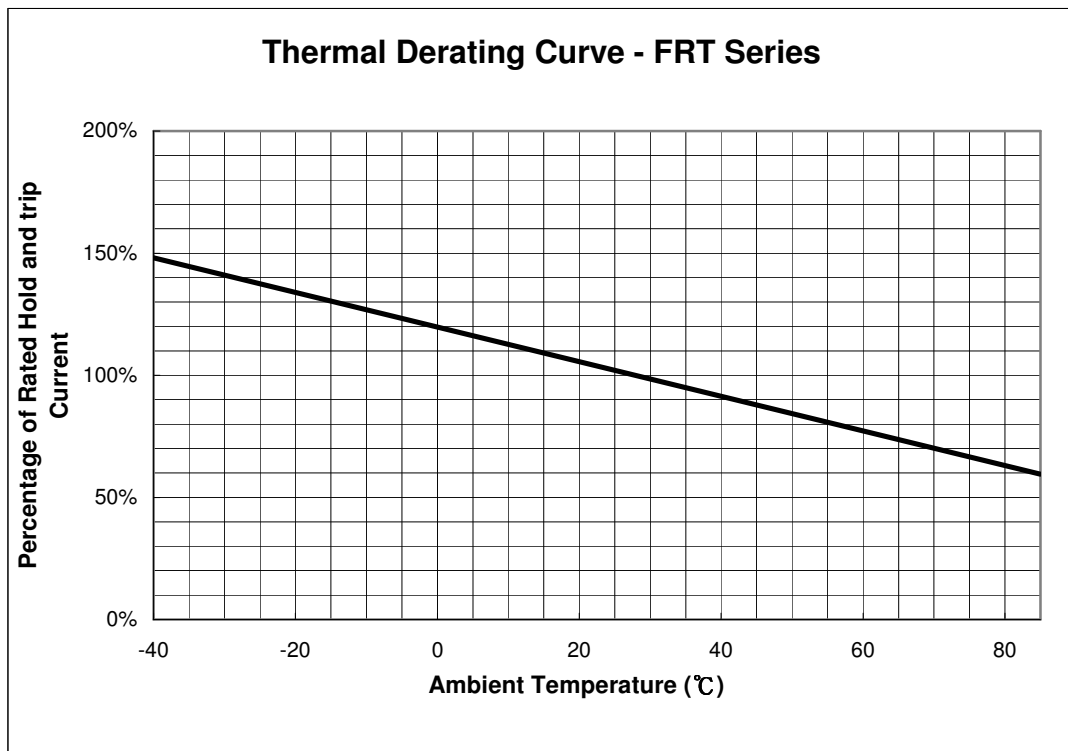
FRT Product Dimensions (Millimeter)



Lead Size: 24AWG,
 Φ 0.51 mm Diameter

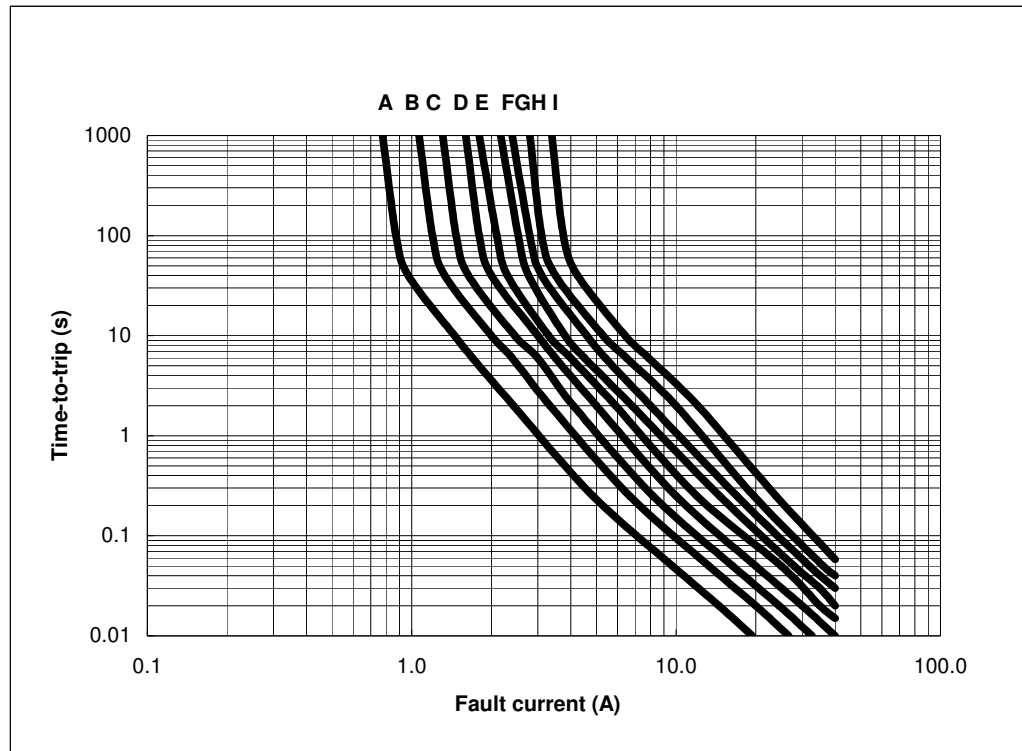
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRT050-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT075-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT090-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT120-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT135-33F	7.4	14.2	5.1	7.6	3.0	1.1
FRT160-33F	7.4	14.0	5.1	7.6	3.0	1.1
FRT190-33F	9.0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

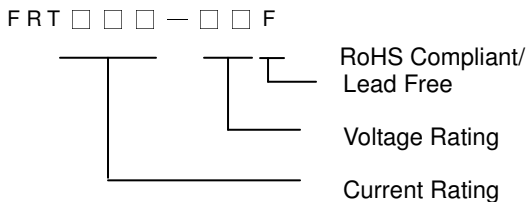


Typical Time-To-Trip at 23°C

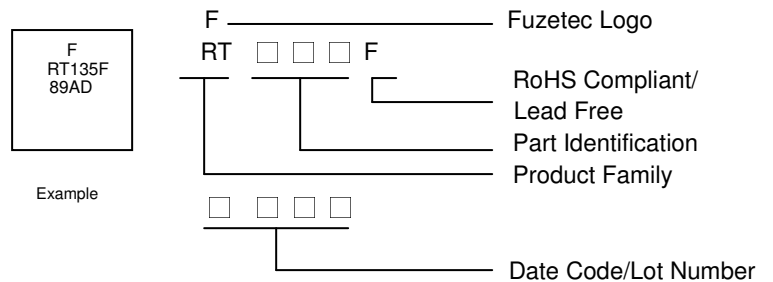
- A= FRT 050-33F
- B= FRT 075-33F
- C= FRT 090-33F
- D= FRT 120-33F
- E= FRT 135-33F
- F= FRT 160-33F
- G= FRT 190-33F
- H= FRT 220-33F
- I = FRT 250-33F



Part Numbering System



Part Marking System

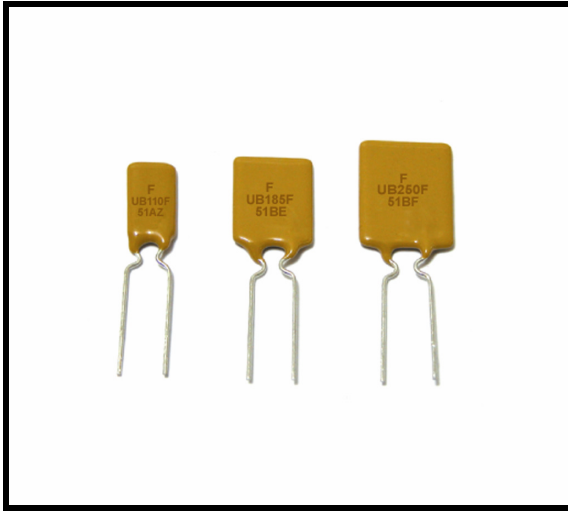


Standard Package

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

FUSB Series



RoHS Compliant & Lead Free



Application:

Low voltage USB equipment

Product Features:

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

Operation Current: 0.75A ~2.50A

Maximum Voltage: 16V/30V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

TÜV (R3-50004084)

Electrical characteristics(23°C)

Part Number	Hold Current	Trip Current	Max. Time to Trip		Maximum Current	Rated Voltage	Typical Power	Resistance Tolerance	
			at 8A, s	at 5xI _H , s				R _{MIN}	R _{1MAX}
								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°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).

P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 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 polymer,meets UL 94V-0 requirement.

FUSB Product Dimensions (Millimeter)

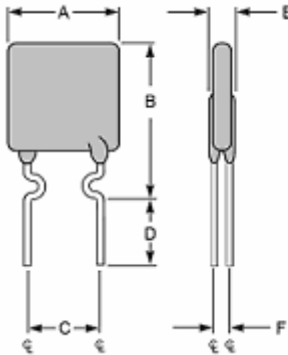


Figure 1
Lead Size: 24AWG,
Φ 0.51 mm Diameter

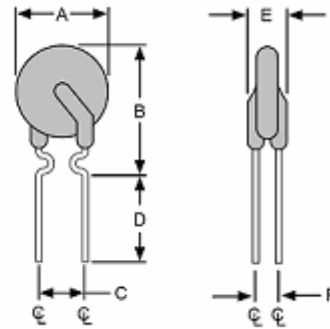
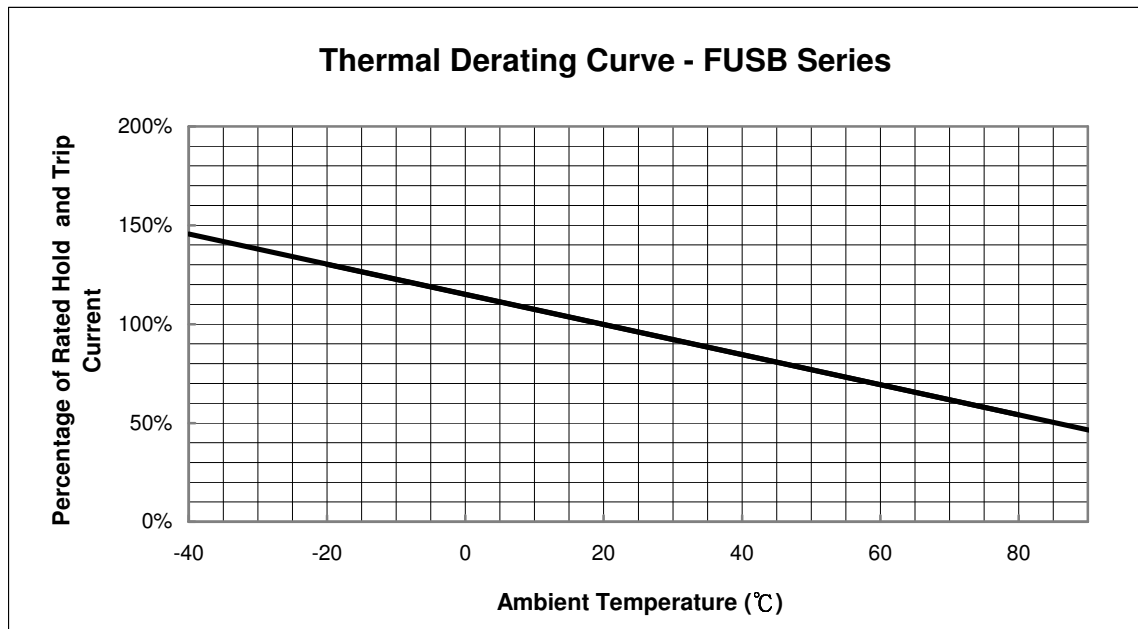


Figure 2
Lead Size : 24AWG
Φ 0.51 mm Diameter

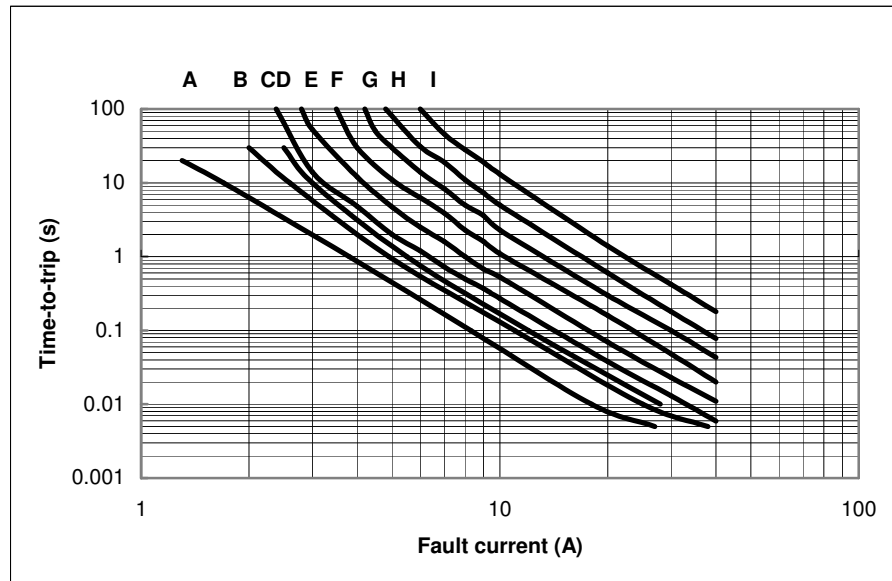
Part Number	Fig	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FUSB075F	2	6.9	11.4	5.1	7.6	3.0	0.8
FUSB090F	1	7.4	12.2	5.1	7.6	3.0	0.8
FUSB110F	1	7.4	14.2	5.1	7.6	3.0	0.8
FUSB120F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB135F	1	8.9	13.5	5.1	7.6	3.0	0.8
FUSB155F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB160F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

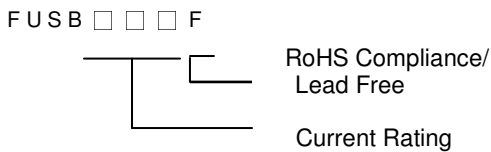


Typical Time-To-Trip at 23°C

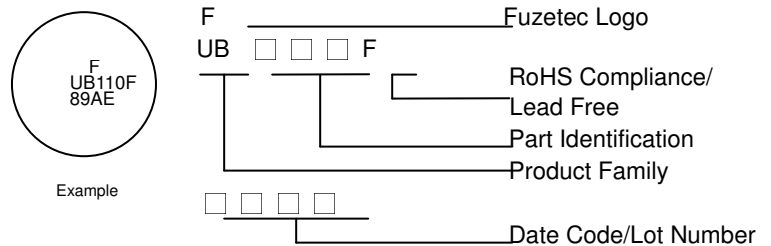
- A = FUSB075F
- B = FUSB120F
- C = FUSB155F
- D = FUSB090F
- E = FUSB110F
- F = FUSB135F
- G = FUSB160F
- H = FUSB185F
- I = FUSB250F



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

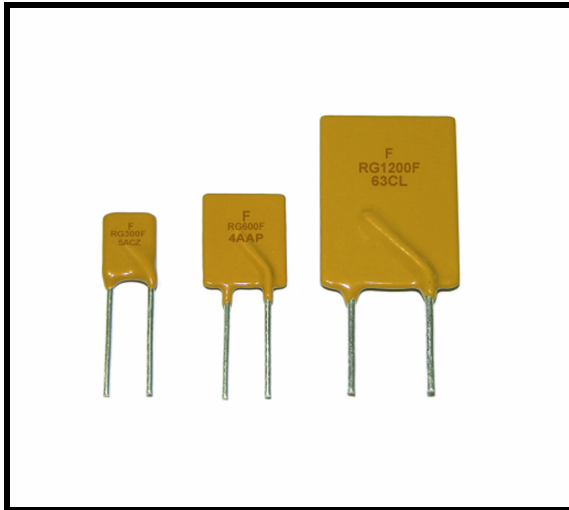
P/N	Pcs /Bag	Reel/Tape
FUSB155F	500	3K
FUSB160F	500	3K
FUSB185F	500	3K
FUSB250F	500	3K

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.

FRG Series



RoHS Compliant & 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~14.0A

Maximum Voltage: 16V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

TÜV (R50004084)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Max.time to trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , 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°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).
 P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 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~FRG1400-16F Tin plated copper,18 AWG.
 Soldering characteristics: MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

FRG Product Dimensions (Millimeter)

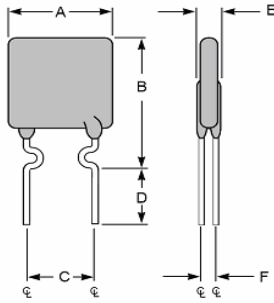


Figure 1
Lead Size: 24AWG
Φ 0.51 mm Diameter

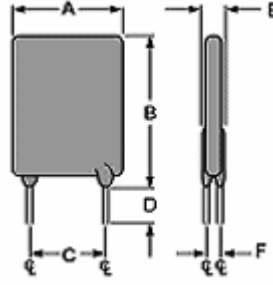


Figure 2
Lead Size: 20AWG
Φ 0.81 mm Diameter

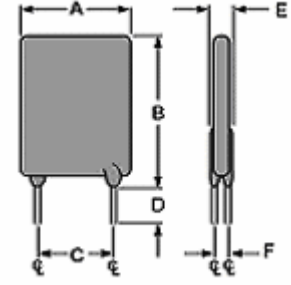
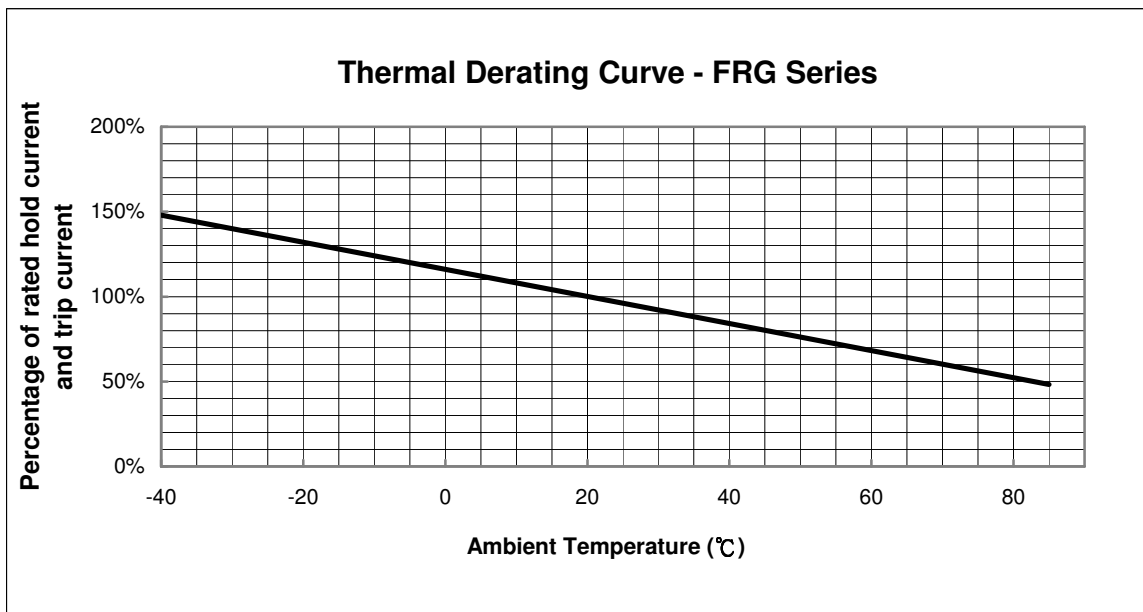


Figure 3
Lead Size: 18AWG
Φ 1.0 mm Diameter

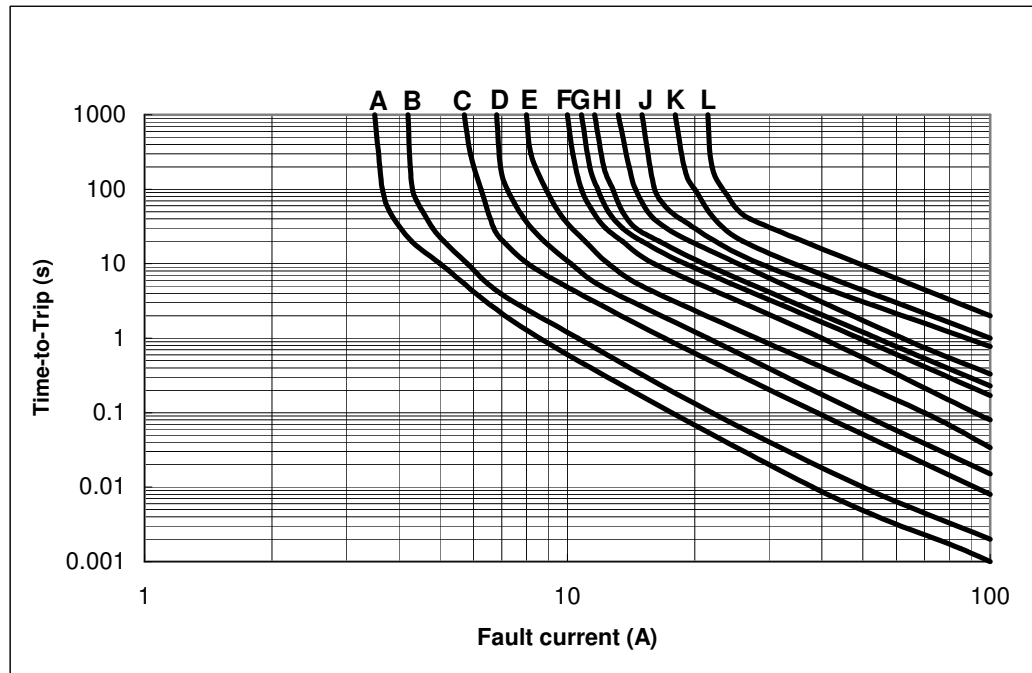
Part Number	Fig	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRG250-16F	1	8.9	12.8	5.1	7.6	3.0	1.2
FRG300-16F	2	7.1	11.0	5.1	7.6	3.0	1.2
FRG400-16F	2	8.9	12.8	5.1	7.6	3.0	1.2
FRG500-16F	2	10.4	14.3	5.1	7.6	3.0	1.2
FRG600-16F	2	10.7	17.1	5.1	7.6	3.0	1.2
FRG700-16F	2	11.2	19.7	5.1	7.6	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

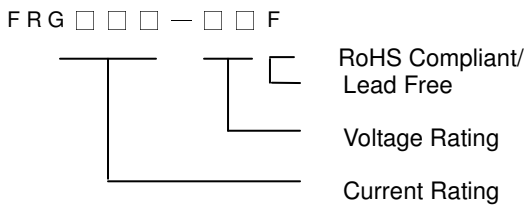


Typical Time-To-Trip at 23°C

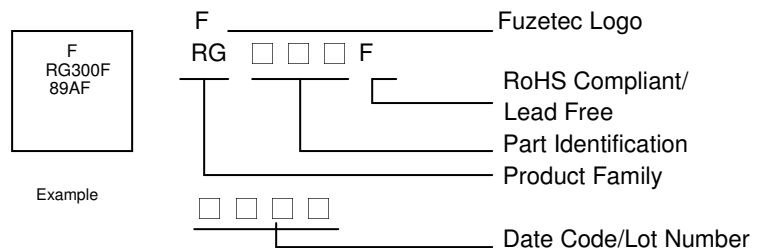
- A=FRG250-16F
- B=FRG300-16F
- C=FRG400-16F
- D=FRG500-16F
- E=FRG600-16F
- F=FRG700-16F
- G=FRG800-16F
- H=FRG900-16F
- I=FRG1000-16F
- J=FRG1100-16F
- K=FRG1200-16F
- L=FRG1400-16F



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

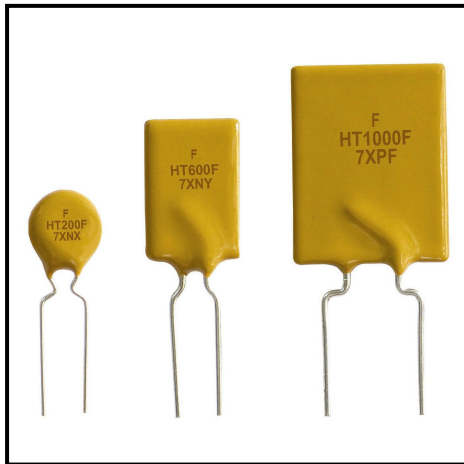
P/N	Pcs /Bag	Reel/Tape
FRG800-16F	200	-----
FRG900-16F	200	-----
FRG1000-16F	100	-----
FRG1100-16F	100	-----
FRG1200-16F	100	-----
FRG1400-16F	100	-----

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.

FHT Series



RoHS Compliant & Lead Free



Application:

Wide variety of electronic equipment

Product Features:

Very Low resistance, Very High hold current, Solid state, Radial leaded product ideal for up to 16V/30 and Operating temperatures up to 125°C .

Operation Current: 0.5A~15.0A

Maximum Voltage: 16V/30V

Temperature Range: -40°C to 125°C

Agency Recognition: *UL(E211981)

*C-UL(E211981)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	R _{MIN}	R _{1MAX}
							Ohms	Ohms
FHT050-30F	0.5	0.9	2.5	40	30	0.9	0.4800	1.1000
FHT070-30F	0.7	1.4	3.2	40	30	1.4	0.3000	0.8000
FHT100-30F	1.0	1.8	5.2	40	30	1.4	0.1800	0.4300
FHT200-16F	2.0	3.8	3.0	100	16	1.4	0.0450	0.1100
FHT300-16F	3.0	6.0	5.0	100	16	3.0	0.0330	0.0790
FHT400-16F	4.0	7.0	5.0	100	16	3.3	0.0240	0.0600
FHT450-16F	4.5	7.8	3.0	100	16	3.6	0.0220	0.0540
FHT550-16F	5.5	10.0	6.0	100	16	3.5	0.0150	0.0370
FHT600-16F	6.0	10.8	5.0	100	16	4.1	0.0130	0.0320
FHT650-16F	6.5	12.0	5.5	100	16	4.3	0.0110	0.0260
FHT700-16F	7.0	13.0	7.0	100	16	4.0	0.0100	0.0250
FHT750-16F	7.5	13.1	7.0	100	16	4.5	0.0094	0.0220
FHT800-16F	8.0	15.0	8.0	100	16	4.2	0.0080	0.0200
FHT900-16F	9.0	16.5	10.0	100	16	5.0	0.0074	0.0170
FHT1000-16F	10.0	18.5	9.0	100	16	5.3	0.0062	0.0150
FHT1100-16F	11.0	20.0	11.0	100	16	5.5	0.0055	0.0130
FHT1300-16F	13.0	24.0	13.0	100	16	6.9	0.0041	0.0100
FHT1400-16F	14.0	27.0	13.0	100	16	6.9	0.0030	0.0090
FHT1500-16F	15.0	28.0	20.0	100	16	7.0	0.0032	0.0092

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).
 P_d=Typical power dissipated from device when in tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping .
 Physical specifications:

Lead material: FHT050-30F~FHT100-30F and FHT200-16F Tin plated copper, 24 AWG.
 FHT300-16F~FHT1100-16F Tin plated copper, 20 AWG.
 FHT1300-16F~FHT1500-16F Tin plated copper, 18 AWG.

Soldering characteristics:MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

*Note: FHT050-30F, FHT070-30F and FHT100-30F UL, C-UL Pending

FHT Product Dimensions (Millimeter)

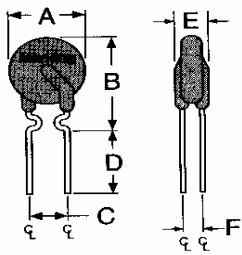


Figure 1
Lead Size :24AWG
Φ0.51 mm Diameter

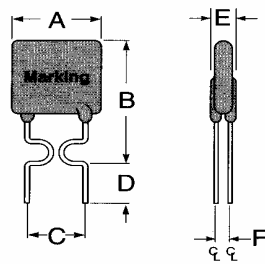


Figure 2
Lead Size :24AWG
Φ0.51 mm Diameter

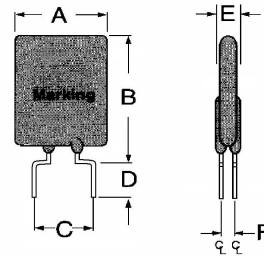


Figure 3
Lead Size : 20AWG
Φ 0.81 mm Diameter

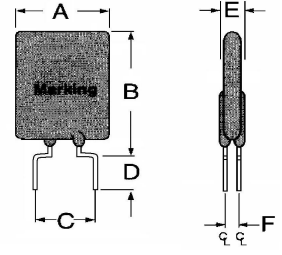
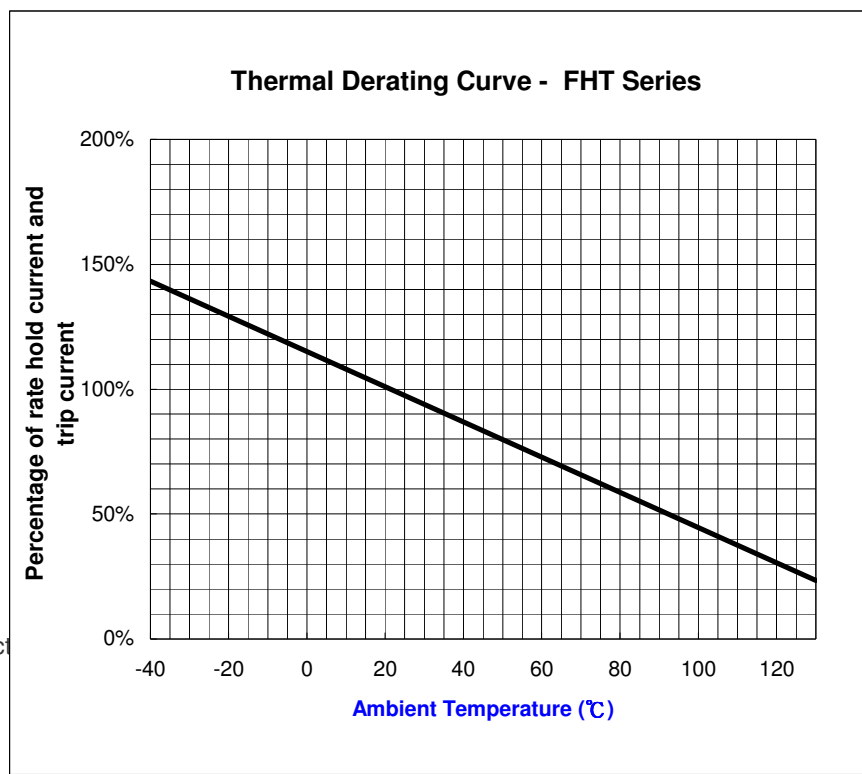


Figure 4
Lead Size : 18AWG
Φ 1.00 mm Diameter

Part Number	Fig	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FHT050-30F	1	7.4	12.7	5.1	7.6	3.0	1.2
FHT070-30F	2	6.9	10.8	5.1	7.6	3.0	1.2
FHT100-30F	1	9.7	13.6	5.1	7.6	3.0	1.2
FHT200-16F	1	9.4	14.4	5.1	7.6	3.0	1.2
FHT300-16F	3	8.8	13.8	5.1	7.6	3.0	1.2
FHT400-16F	3	10.0	15.0	5.1	7.6	3.0	1.2
FHT450-16F	3	10.4	15.6	5.1	7.6	3.0	1.2
FHT550-16F	3	11.2	18.9	5.1	7.6	3.0	1.2
FHT600-16F	3	11.2	21.0	5.1	7.6	3.0	1.2
FHT650-16F	3	12.7	22.2	5.1	7.6	3.0	1.2
FHT700-16F	3	14.0	21.9	5.1	7.6	3.0	1.2
FHT750-16F	3	14.0	23.5	5.1	7.6	3.0	1.2
FHT800-16F	3	16.5	22.5	5.1	7.6	3.0	1.2
FHT900-16F	3	16.5	25.7	5.1	7.6	3.0	1.2
FHT1000-16F	3	17.5	26.5	10.2	7.6	3.0	1.2
FHT1100-16F	3	21.0	26.1	10.2	7.6	3.0	1.2
FHT1300-16F	4	23.5	28.7	10.2	7.6	3.6	1.4
FHT1400-16F	4	23.5	28.7	10.2	7.6	3.6	1.4
FHT1500-16F	4	23.5	28.7	10.2	7.6	3.6	1.4

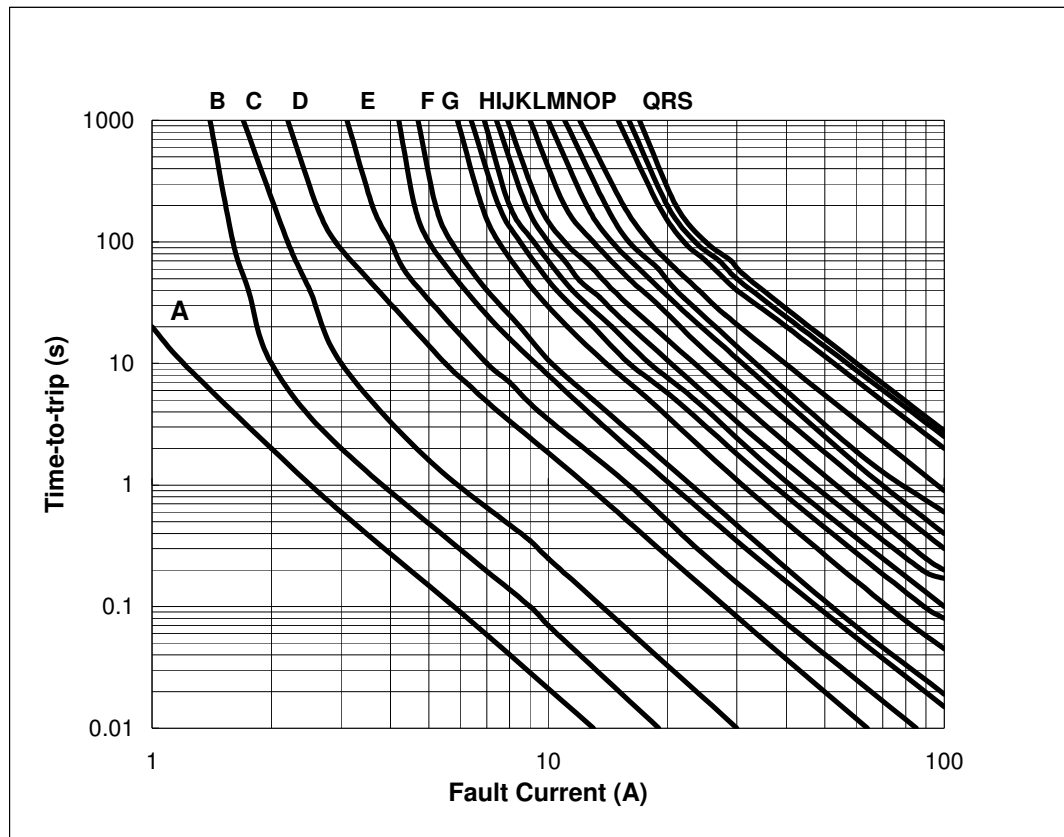
Thermal Derating Curve



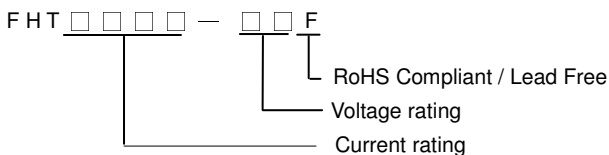
NOTE : All Specifications subject

Typical Time-To-Trip at 23°C

- A=FHT050-30F
- B=FHT070-30F
- C=FHT100-30F
- D=FHT200-16F
- E=FHT300-16F
- F=FHT400-16F
- G=FHT450-16F
- H=FHT550-16F
- I=FHT600-16F
- J=FHT650-16F
- K=FHT700-16F
- L= FHT750-16F
- M=FHT800-16F
- N=FHT900-16F
- O=FHT1000-16F
- P=FHT1100-16F
- Q=FHT1300-16F
- R=FHT1400-16F
- S=FHT1500-16F

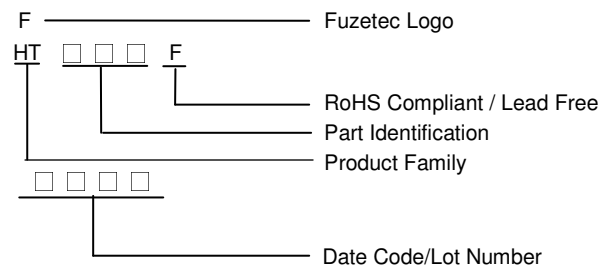


Part Numbering System



Example

Part Marking System



Standard Package

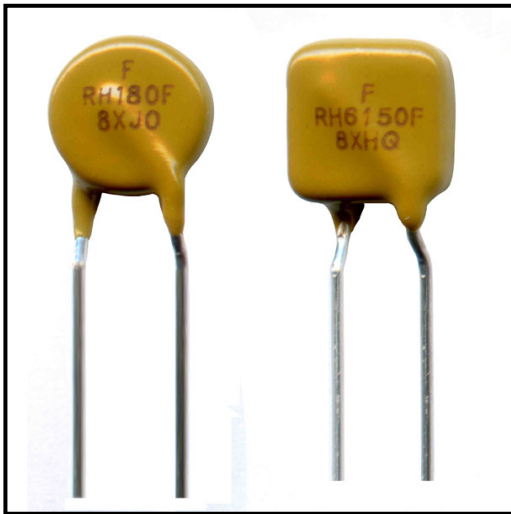
P/N	Pcs /Bag	Reel/Tape
FHT050-16F	500	2.5k
FHT070-16F	500	2.5k
FHT100-16F	500	2.5k
FHT200-16F	500	2.5k
FHT300-16F	500	2.5k
FHT400-16F	300	2.5k
FHT450-16F	300	2.5k
FHT550-16F	300	2.5k
FHT600-16F	200	1.2k
FHT650-16F	200	-----

P/N	Pcs /Bag	Reel/Tape
FHT700-16F	200	-----
FHT750-16F	100	-----
FHT800-16F	100	-----
FHT900-16F	100	-----
FHT1000-16F	100	-----
FHT1100-16F	100	-----
FHT1300-16F	100	-----
FHT1400-16F	100	-----
FHT1500-16F	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.



FRHV Series



RoHS Compliant & Lead Free



Application:

Telecommunication and Data transmitting

Product Features:

Low hold current, Solid state

Radial-leaded product ideal for up to 100V /250V/600V

Operation Current: 0.08 A~0.18A

Max. Operation Voltage: 100V/250V

Max. Interrupt Voltage: 250V/600V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max. Time To Trip		Max. Current	Max. Oper. Voltage	Max. Int. Voltage	Typical Power	Resistance Tolerance	
			Current	Time					R _{MIN}	R _{1MAX}
FRH080-250UVF	0.08	0.16	0.35	4.0	3.0	100	250	1.0	14.0	33.0
FRH080-250VF	0.08	0.16	0.35	4.0	3.0	100	250	1.0	14.0	33.0
FRH110-250UVF	0.11	0.22	1.00	2.0	3.0	100	250	1.0	5.0	16.0
FRH110-250VF	0.11	0.22	1.00	2.0	3.0	100	250	1.0	5.0	16.0
FRH120-250UVF	0.12	0.24	1.00	2.0	3.0	100	250	1.0	6.0	16.0
FRH120-250VF	0.12	0.24	1.00	2.0	3.0	100	250	1.0	4.0	16.0
FRH145-250UVF	0.15	0.29	1.00	2.5	3.0	100	250	1.0	3.5	12.0
FRH145-250VF	0.15	0.29	1.00	2.5	3.0	100	250	1.0	3.0	12.0
FRH180-250UVF	0.18	0.65	1.50	10.0	10.0	100	250	1.5	0.8	4.0
FRH180-250VF	0.18	0.65	1.50	11.0	10.0	100	250	1.5	0.8	4.0
FRH180-250XF	0.18	0.65	3.00	2.0	10.0	100	250	1.5	0.8	4.0
FRH150-600VF	0.15	0.30	1.00	5.0	3.0	250	600	1.0	6.0	22.0
FRH150-600MF	0.15	0.30	1.00	3.0	3.0	250	600	1.0	6.0	17.0
FRH160-600VF	0.16	0.32	1.00	7.0	3.0	250	600	1.0	4.0	18.0

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-maximum current at which the device will always trip at 23°C still air.

V_{MAX}=Maximum operating voltage at which the device can withstand without damage at its rated current.

V_{I-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}).

P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C 1 hour after tripping .

Physical specifications:

Lead material: FRH080-250VF ~ FRH180-250VF Tin plated copper,22 AWG.

FRH150-600VF ~ FRH160-600VF Tin plated copper,22 AWG.

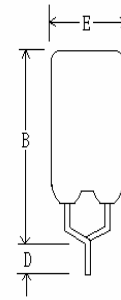
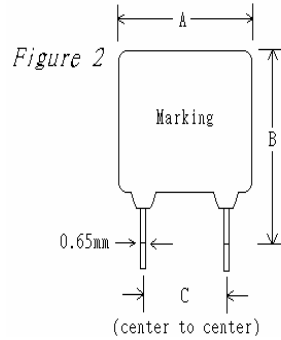
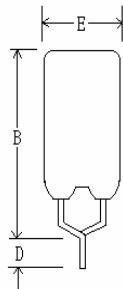
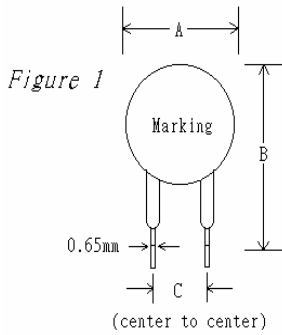
Soldering characteristics:MIL-STD-202, Method 208E.

Insulating coating:Flame retardant epoxy ,meet UL 94 V-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 continuous use of Line Voltage such as 120 VAC ~ 600VAC and above.

FRHV Product Dimensions (Millimeter)

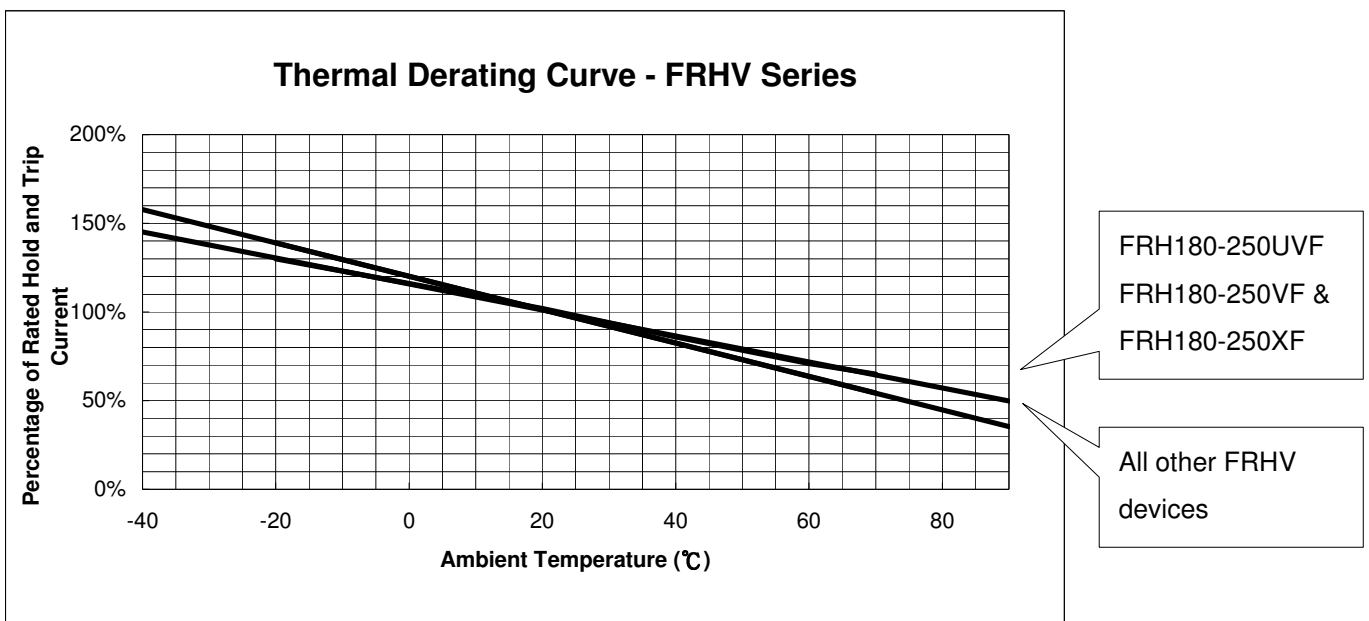


Lead Size :22AWG,
Φ 0.65 mm Diameter

Lead Size : 22AWG,
Φ 0.65 mm Diameter

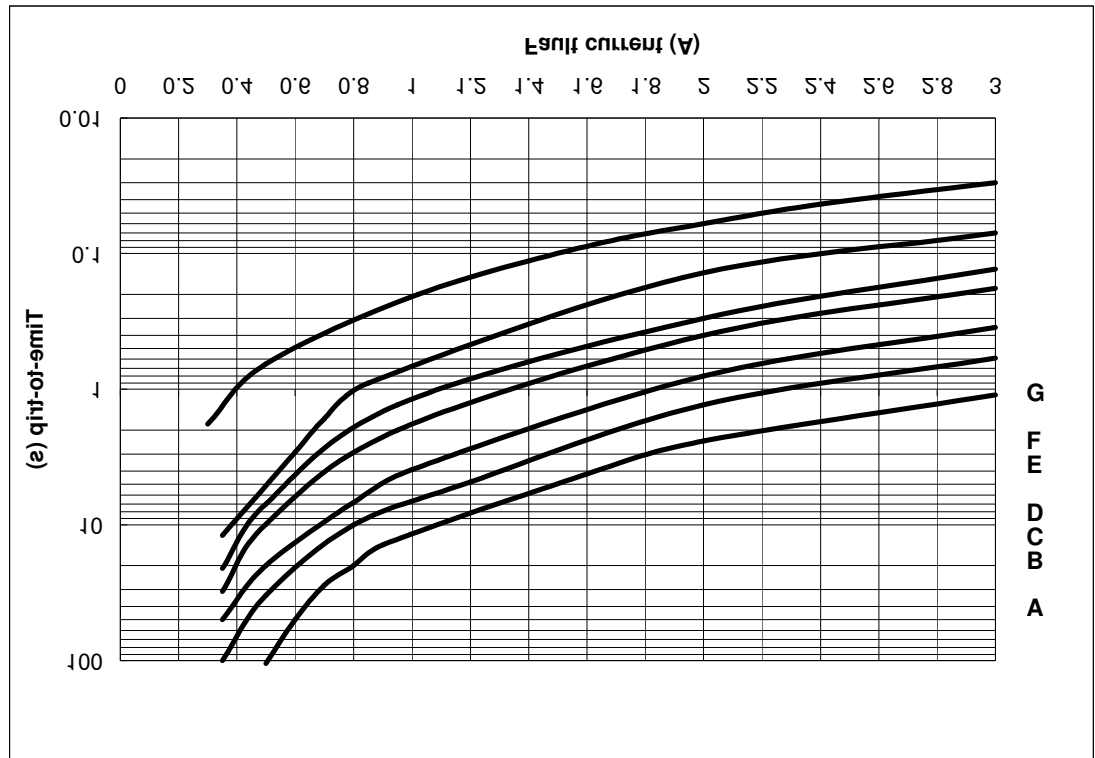
Part Number	Fig	A	B	C	D	E
		Maximum	Maximum	Typical	Minimum	Maximum
FRH080-250UVF	1	5.1	9.1	5.0	4.7	3.8
FRH080-250VF	1	5.8	9.6	5.0	4.7	4.6
FRH110-250UVF	1	5.9	9.4	5.0	4.7	3.8
FRH110-250VF	1	6.8	9.9	5.0	4.7	4.6
FRH120-250UVF	2	6.0	10.0	5.0	4.7	3.8
FRH120-250VF	2	6.5	11.0	5.0	4.7	4.6
FRH145-250UVF	2	6.0	10.0	5.0	4.7	3.8
FRH145-250VF	2	6.5	11.0	5.0	4.7	4.6
FRH180-250UVF	2	10.4	12.6	5.0	4.7	3.8
FRH180-250VF	2	10.9	12.6	5.0	4.7	4.6
FRH180-250XF	1	9.0	12.0	5.0	4.7	3.8
FRH150-600VF	2	13.5	12.6	5.0	4.7	6.0
FRH150-600MF	2	9.0	12.5	5.0	4.7	4.6
FRH160-600VF	2	16.0	12.6	5.0	4.7	6.0

Thermal Derating Curve

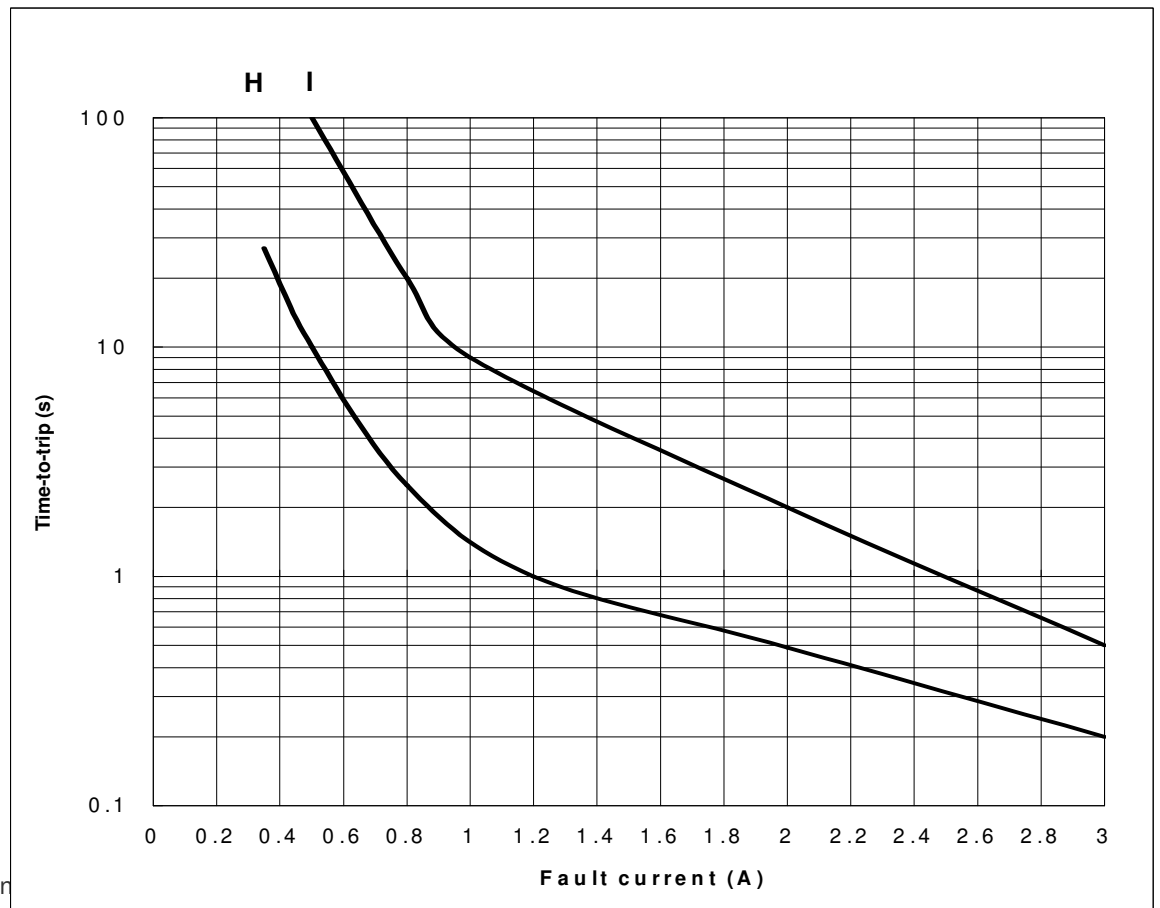


Typical Time-To-Trip at 23°C

- A=FRH080-250UVF & FRH080-250VF
- B=FRH110-250UVF & FRH110-250VF
- C=FRH120-250UVF & FRH120-250VF
- D=FRH145-250UVF & FRH145-250VF
- E=FRH180-250UVF & FRH180-250VF
- F=FRH150-600VF
- G=FRH160-600VF

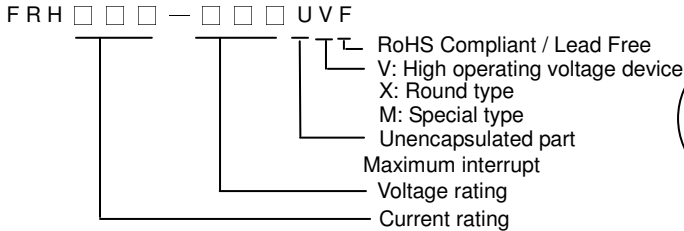


- H = FRH180-250XF
- I = FRH150-600MF

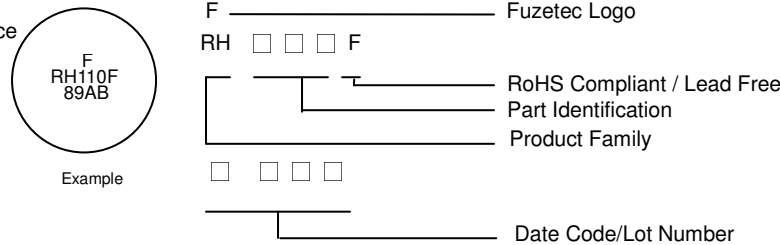


NOTE : All Specification

Part Numbering System



Part Marking System



- * FRH150-600F Marking : RH6150F
- * FRH160-600F Marking : RH6160F

Standard Package

P/N	Pcs /Bag	Reel/Tape
FRH080-250UVF	300	1.5K
FRH080-250VF	300	1.5K
FRH110-250UVF	300	1.5K
FRH110-250VF	300	1.5K
FRH120-250UVF	300	1.5K
FRH120-250VF	300	1.5K
FRH145-250UVF	300	1.5K

P/N	Pcs /Bag	Reel/Tape
FRH145-250VF	300	1.5K
FRH180-250UVF	300	1.2K
FRH180-250VF	200	1.2K
FRH180-250XF	200	1.2K
FRH150-600VF	100	600
FRH150-600MF	100	600
FRH160-600VF	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.



FRH Series



RoHS Compliant & Lead Free



Application:

Telecommunication and Data transmitting

Product Features:

Low hold current, Solid state

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

Maximum Operation Current: 0.08 A~0.18A

Maximum Interrupt Voltage : 250V/600V

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

TÜV(R50021651)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Max.Time to Trip		Max. Current	Max .Oper. Voltage	Max. Int. Voltage	Resistance Tolerance	
			Current	Time				R MIN	R1MAX
			I _H , A	I _T , A				A	Sec
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°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C still air.

V_{MAX}=Maximum voltage device can withstand without damage at its rated current.

V_{I-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}).

P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 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.

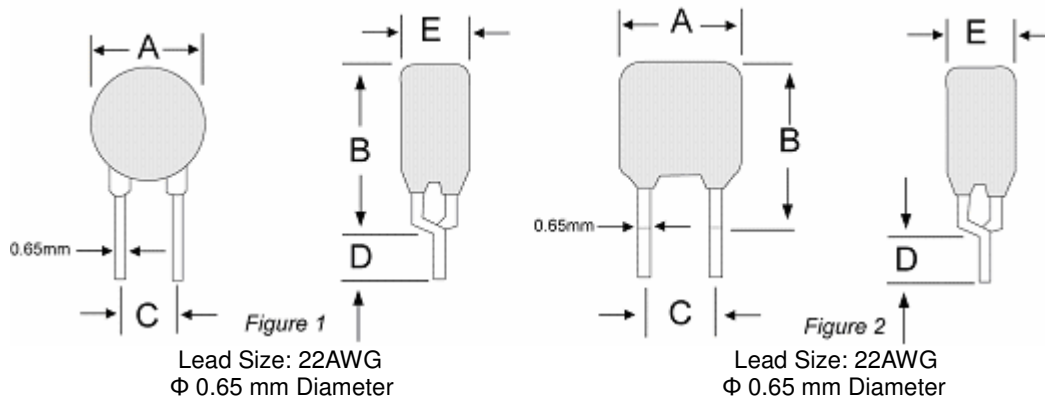
Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

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

III - Product - Radial Leaded PTC

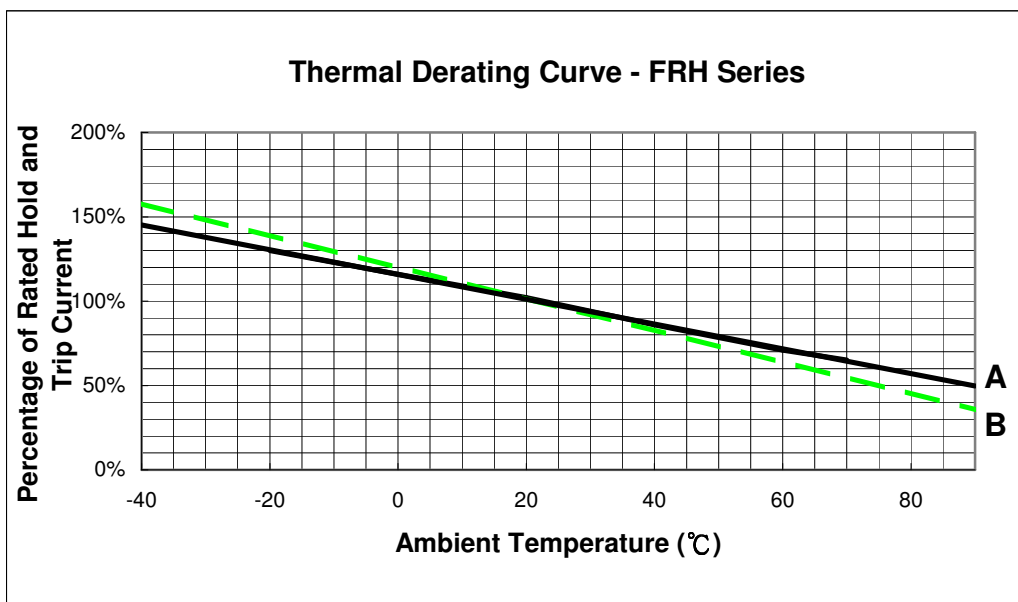


FRH Product Dimensions (Millimeter)



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	14.0	12.6	5.0	4.7	6.0
FRH160-600F	2	16.0	12.6	5.0	4.7	6.0

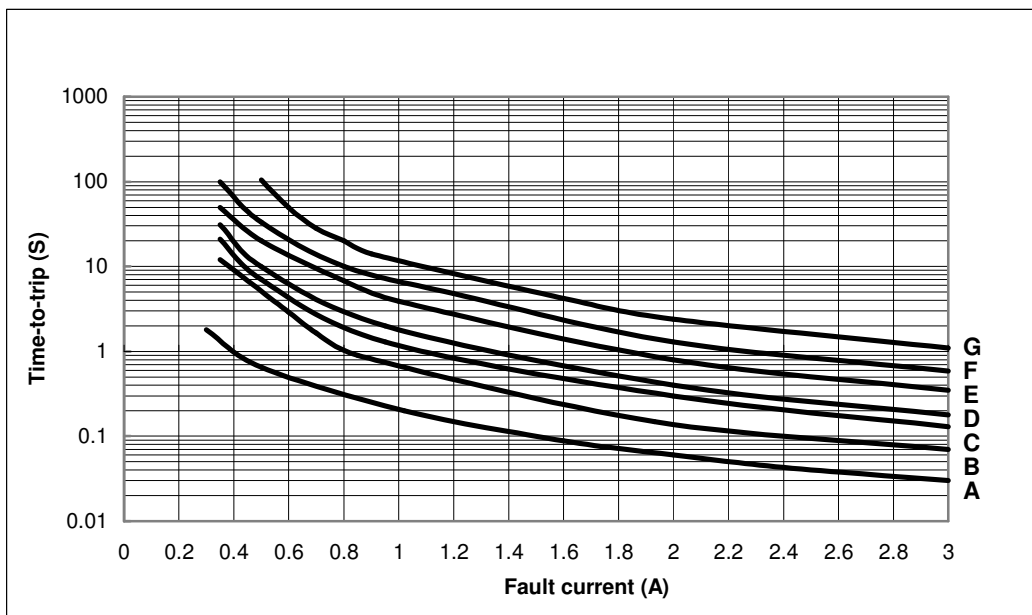
Thermal Derating Curve



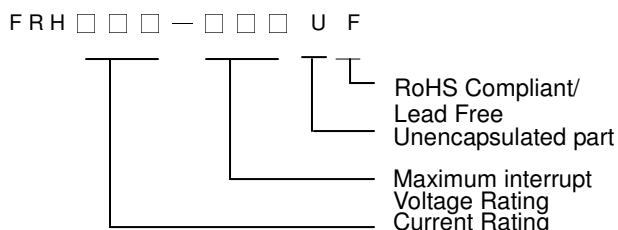
A= FRH180-250UF; FRH180-250F
B= All other FRH devices

Typical Time-To-Trip at 23°C

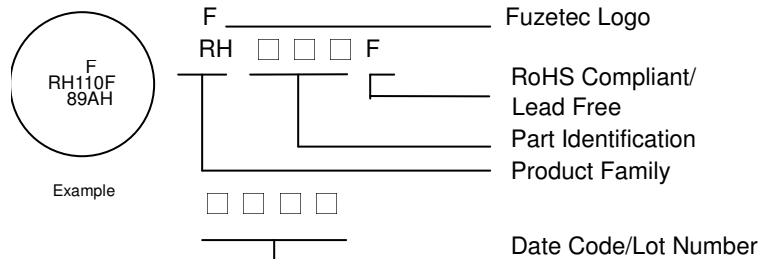
- A= FRH080-250(U)F
- B= FRH110-250(U)F
- C= FRH120-250(U)F
- D= FRH145-250(U)F
- E= FRH180-250(U)F
- F= FRH150-600F
- G= FRH160-600F



Part Numbering System



Part Marking System



* FRH150-600F Marking: RH6150F

* FRH160-600F Marking: RH6160F

Standard Package

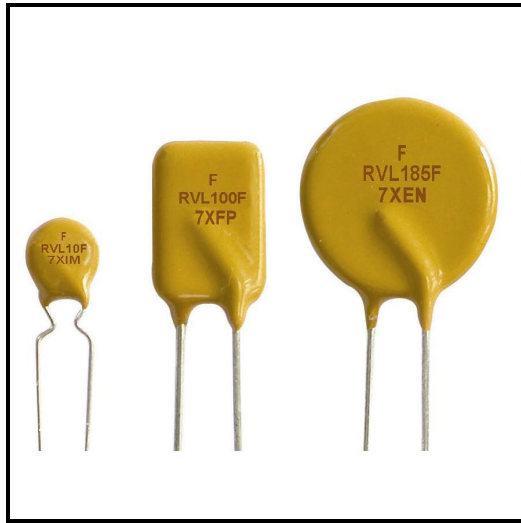
P/N	Pcs /Bag	Reel/Tape
FRH080-250UF	300	1.5K
FRH080-250F	300	1.5K
FRH110-250UF	300	1.5K
FRH110-250F	300	1.5K
FRH120-250UF	300	1.5K
FRH120-250F	300	1.5K

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.



FRVL Series



RoHS Compliant & Lead Free



Application:

Line Voltage Power Supply, Transformer and Appliances Product

Features:

Solid state, Radial leaded product ideal for up to 120V_{AC}/V_{DC}

Maximum Operation Current: 0.10A~3.75A

Maximum Voltage: 120V_{AC}/V_{DC}

Maximum Interrupt Voltage: 135V_{AC/DC}

Temperature Range: -40°C to 85°C

Agency Recognition: UL :File No. E211981

*C-UL:File No. E211981

TÜV :File No. R50122733

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Max. Oper. Voltage	Max. Int. Voltage	Typical Power	Resistance Tolerance	
	I _H , A	I _T , A	at 5xI _H ,s	I _{MAX} , A	V _{MAX} , V _{AC/DC}	V _{I-MAX} , V _{AC/DC}		R _{MIN}	R _{1MAX}
							Pd, W	Ohms	Ohms
FRVL010-120F	0.10	0.20	10.0	2.0	120	135	0.84	3.00	7.50
FRVL017-120F	0.17	0.34	10.0	2.0	120	135	0.84	2.00	7.00
FRVL020-120F	0.20	0.40	9.0	2.0	120	135	1.08	1.83	4.40
FRVL025-120F	0.25	0.50	7.5	3.0	120	135	1.08	1.25	3.00
FRVL030-120F	0.30	0.60	8.5	3.0	120	135	1.44	0.88	2.10
FRVL040-120F	0.40	0.80	6.5	3.0	120	135	1.44	0.55	1.29
FRVL050-120F	0.50	1.00	6.0	3.0	120	135	1.56	0.50	1.17
FRVL065-120F	0.65	1.30	5.7	5.0	120	135	1.68	0.31	0.72
FRVL070-120F	0.75	1.50	6.3	5.0	120	135	1.80	0.25	0.60
FRVL075-120F	0.75	1.50	15.0	7.5	120	135	2.64	0.25	0.69
FRVL090-120F	0.90	1.80	7.2	5.0	120	135	1.80	0.20	0.47
FRVL100-120F	1.00	2.00	15.0	10.0	120	135	2.64	0.18	0.47
FRVL110-120F	1.10	2.20	8.2	8.0	120	135	2.28	0.15	0.38
FRVL125-120F	1.25	2.50	20.0	12.5	120	135	2.88	0.11	0.33
FRVL130-120F	1.35	2.70	9.6	10.0	120	135	2.64	0.12	0.30
FRVL135-120F	1.35	2.70	20.0	13.5	120	135	3.12	0.11	0.30
FRVL160-120F	1.60	3.20	11.4	12.0	120	135	3.12	0.09	0.22
FRVL185-120F	1.85	3.70	12.6	12.0	120	135	3.36	0.08	0.19
FRVL200-120F	2.00	4.20	36.0	20.0	120	135	4.32	0.08	0.21
FRVL250-120F	2.50	5.00	15.6	15.0	120	135	4.44	0.05	0.13
FRVL300-120F	3.00	6.00	19.8	17.0	120	135	4.56	0.04	0.10
FRVL375-120F	3.75	7.50	24.0	20.0	120	135	4.80	0.03	0.08

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping .

Physical specifications:

Lead material: Tin plated copper,24AWG、22AWG、20AWG

Soldering characteristics:MIL-STD-202, Method 208E.

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

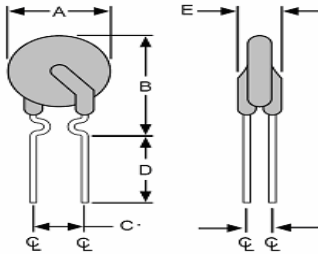
NOTE : All Specifications subject to change without notice.

III - Product - Radial Leaded PTC



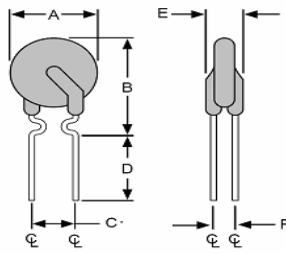
FRVL Product Dimensions (Millimeter)

Figure 1



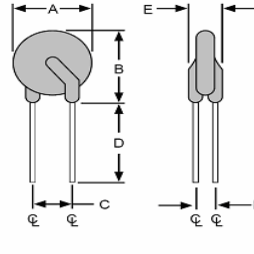
Lead Size :24AWG
 Φ 0.51 mm Diameter

Figure 2



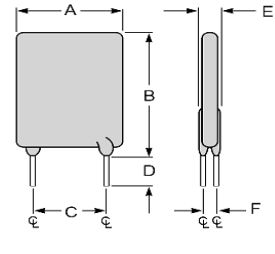
Lead Size :22AWG
 Φ 0.65 mm Diameter

Figure 3



Lead Size :20AWG
 Φ 0.81 mm Diameter

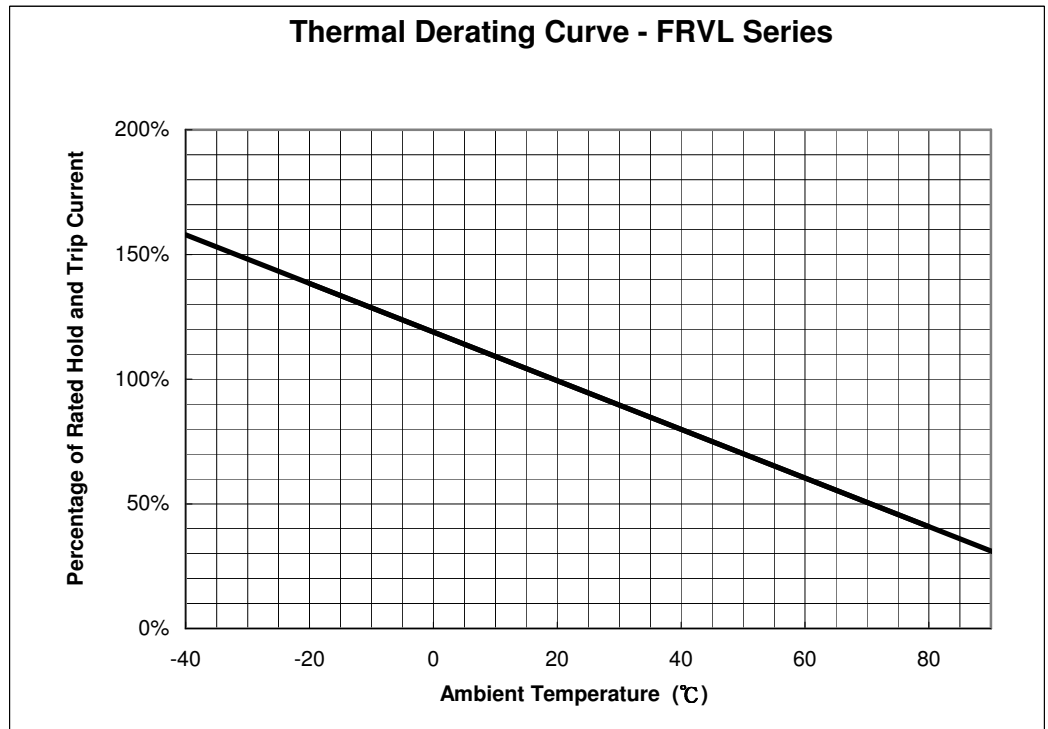
Figure 4



Lead Size : 20AWG
 Φ 0.81 mm Diameter

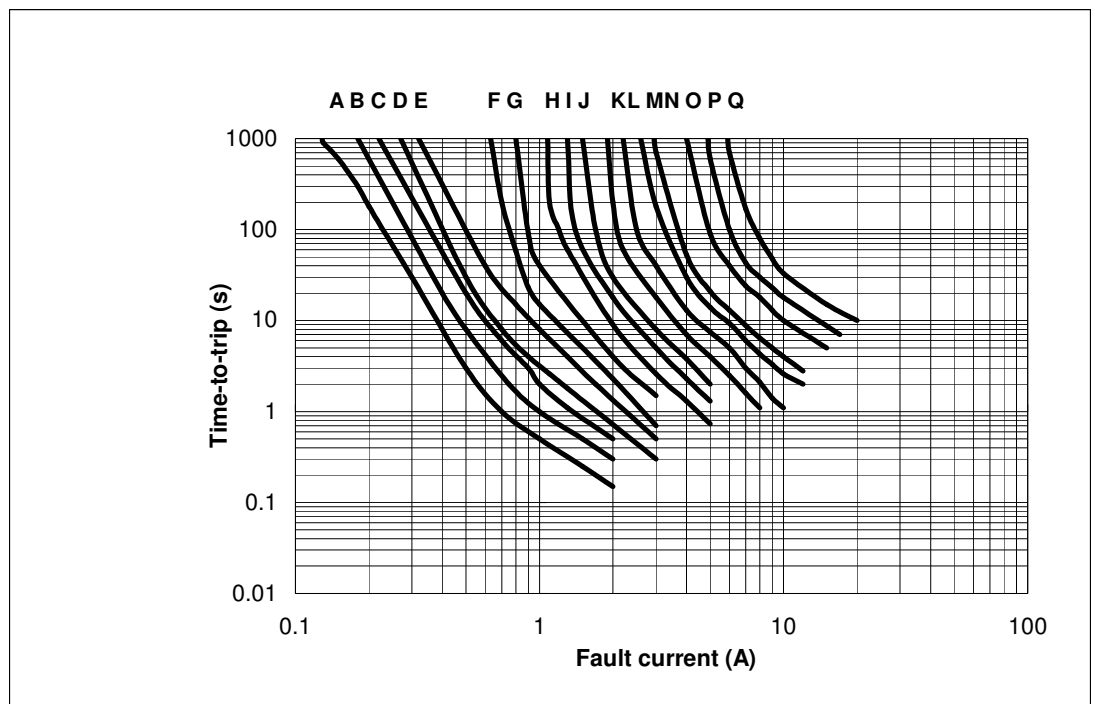
Part Number	Figure	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRVL010-120F	1	7.9	13.0	5.1	7.6	3.8	2.2
FRVL017-120F	1	7.9	13.0	5.1	7.6	3.8	2.2
FRVL020-120F	2	7.9	13.0	5.1	7.6	3.8	2.2
FRVL025-120F	2	7.9	13.0	5.1	7.6	3.8	2.2
FRVL030-120F	2	7.9	13.0	5.1	7.6	3.8	2.2
FRVL040-120F	2	8.2	14.2	5.1	7.6	3.8	2.2
FRVL050-120F	2	9.2	14.9	5.1	7.6	3.8	2.2
FRVL065-120F	2	9.7	14.9	5.1	7.6	3.8	2.2
FRVL070-120F	2	10.6	15.5	5.1	7.6	3.8	2.2
FRVL075-120F	4	10.9	17.0	5.1	7.6	4.1	2.2
FRVL090-120F	2	11.9	15.9	5.1	7.6	3.8	2.2
FRVL100-120F	4	11.5	20.1	5.1	7.6	4.1	2.2
FRVL110-120F	3	13.3	18.3	5.1	7.6	4.1	2.2
FRVL125-120F	4	14.0	21.7	5.1	7.6	4.1	2.2
FRVL130-120F	3	15.5	20.6	5.1	7.6	4.1	2.2
FRVL135-120F	4	16.3	21.7	5.1	7.6	4.1	2.2
FRVL160-120F	3	17.5	22.5	5.1	7.6	4.1	2.2
FRVL185-120F	3	19.9	24.9	5.1	7.6	4.1	2.2
FRVL200-120F	4	23.5	27.9	10.2	7.6	4.1	2.2
FRVL250-120F	3	22.5	27.5	10.2	7.6	4.1	2.2
FRVL300-120F	3	25.5	30.0	10.2	7.6	4.1	2.2
FRVL375-120F	3	29.5	34.0	10.2	7.6	4.1	2.2

Thermal Derating Curve

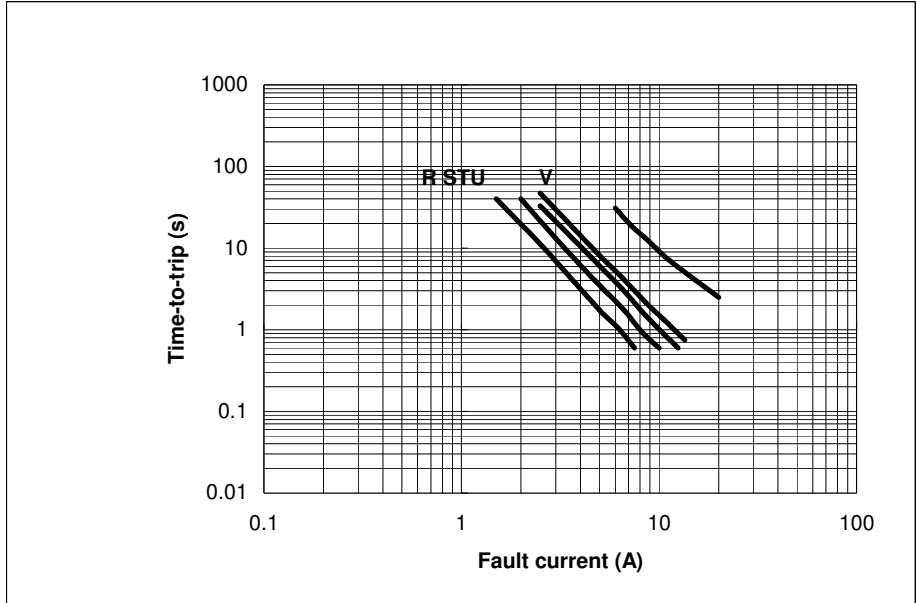


Typical Time-To-Trip at 23°C

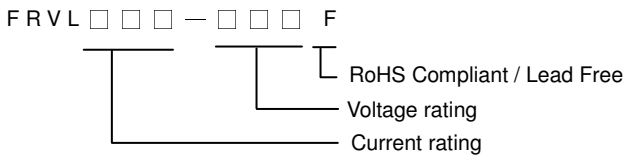
- A=FRVL010-120F
- B=FRVL017-120F
- C=FRVL020-120F
- D=FRVL025-120F
- E=FRVL030-120F
- F=FRVL040-120F
- G=FRVL050-120F
- H=FRVL065-120F
- I=FRVL070-120F
- J=FRVL090-120F
- K=FRVL110-120F
- L=FRVL130-120F
- M=FRVL160-120F
- N=FRVL185-120F
- O=FRVL250-120F
- P=FRVL300-120F
- Q=FRVL375-120F



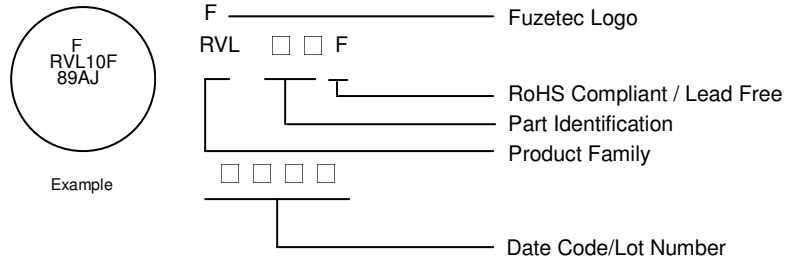
- R=FRVL075-120F
- S=FRVL100-120F
- T=FRVL125-120F
- U=FRVL135-120F
- V=FRVL200-120F



Part Numbering System



Part Marking System



Standard Package

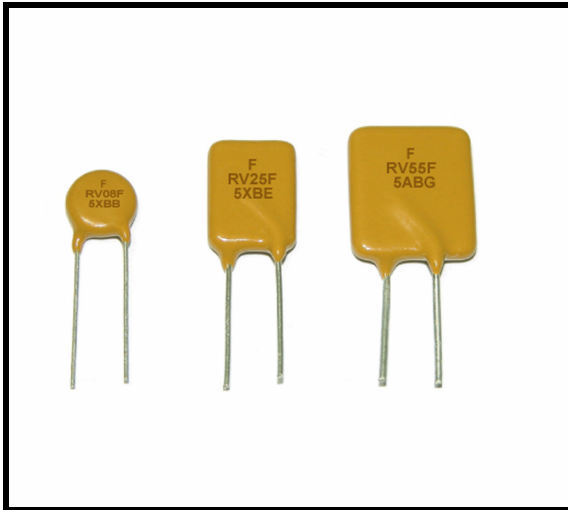
P/N	Pcs /Bag	Reel/Tape
FRVL010-120F	500	2K
FRVL017-120F	500	2K
FRVL020-120F	500	2K
FRVL025-120F	500	2K
FRVL030-120F	500	2K
FRVL040-120F	500	2K
FRVL050-120F	500	2K
FRVL065-120F	300	1.5K
FRVL070-120F	300	1.5K
FRVL075-120F	300	1.5K
FRVL090-120F	300	1.5K

P/N	Pcs /Bag	Reel/Tape
FRVL100-120F	300	1.5K
FRVL110-120F	300	1.5K
FRVL125-120F	200	----
FRVL130-120F	200	----
FRVL135-120F	200	----
FRVL160-120F	200	----
FRVL185-120F	100	----
FRVL200-120F	100	----
FRVL250-120F	100	----
FRVL300-120F	100	----
FRVL375-120F	100	----

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



FRV Series



RoHS Compliant & 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}

Maximum Operation Current: 0.05A~2.00A

Maximum Operating Voltage: 240V_{AC/DC}

Maximum Interrupt Voltage: 265V_{AC/DC}

Temperature Range: -40°C to 85°C

Agency Recognition: UL(E211981)

C-UL(E211981)

*TÜV(R50021651)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Rated Voltage	Max.Int Voltage	Typical Power	Resistance Tolerance	
								R _{MIN}	R _{1MAX}
								I _H , A	I _T , A
FRV005-240F	0.05	0.12	15.0	1.0	240	265	0.70	18.50	65.00
FRV008-240F	0.08	0.19	15.0	1.2	240	265	0.80	7.40	26.00
FRV012-240F	0.12	0.30	15.0	1.2	240	265	1.00	3.00	12.00
FRV016-240F	0.16	0.37	15.0	2.0	240	265	1.40	2.50	7.80
FRV025-240F	0.25	0.56	18.5	3.5	240	265	1.50	1.30	3.80
FRV033-240F	0.33	0.74	18.5	4.5	240	265	1.70	0.83	2.60
FRV040-240F	0.40	0.90	24.0	5.5	240	265	2.00	0.60	1.90
FRV055-240F	0.55	1.25	26.0	7.0	240	265	3.40	0.45	1.45
FRV075-240F	0.75	1.50	18.0	7.5	240	265	2.60	0.32	0.84
FRV100-240F	1.00	2.00	21.0	10.0	240	265	2.90	0.22	0.58
FRV125-240F	1.25	2.50	23.0	12.5	240	265	3.30	0.17	0.44
FRV200-240F	2.00	4.00	28.0	20.0	240	265	4.50	0.09	0.22

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 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~FRV200-240F Tin plated copper, 20AWG.
 Soldering characteristics: MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

*Note: FRV075-240F~FRV200-240F UL, C-UL and TÜV Pending

FRV Product Dimensions (Millimeter)

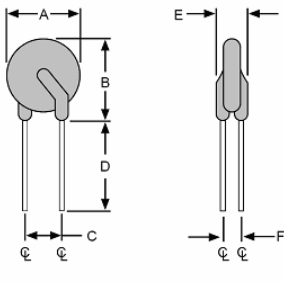


Figure 1
Lead Size: 24AWG
Φ 0.51 mm Diameter

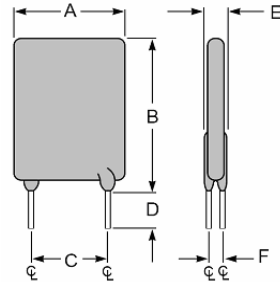


Figure 2
Lead Size: 22AWG
Φ 0.65 mm Diameter

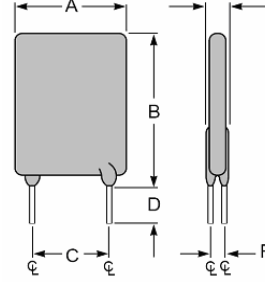


Figure 3
Lead Size: 20AWG
Φ 0.81 mm Diameter

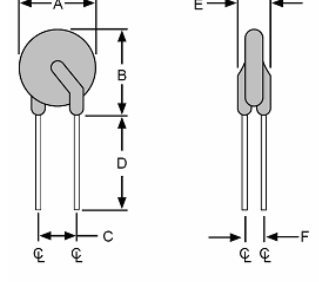
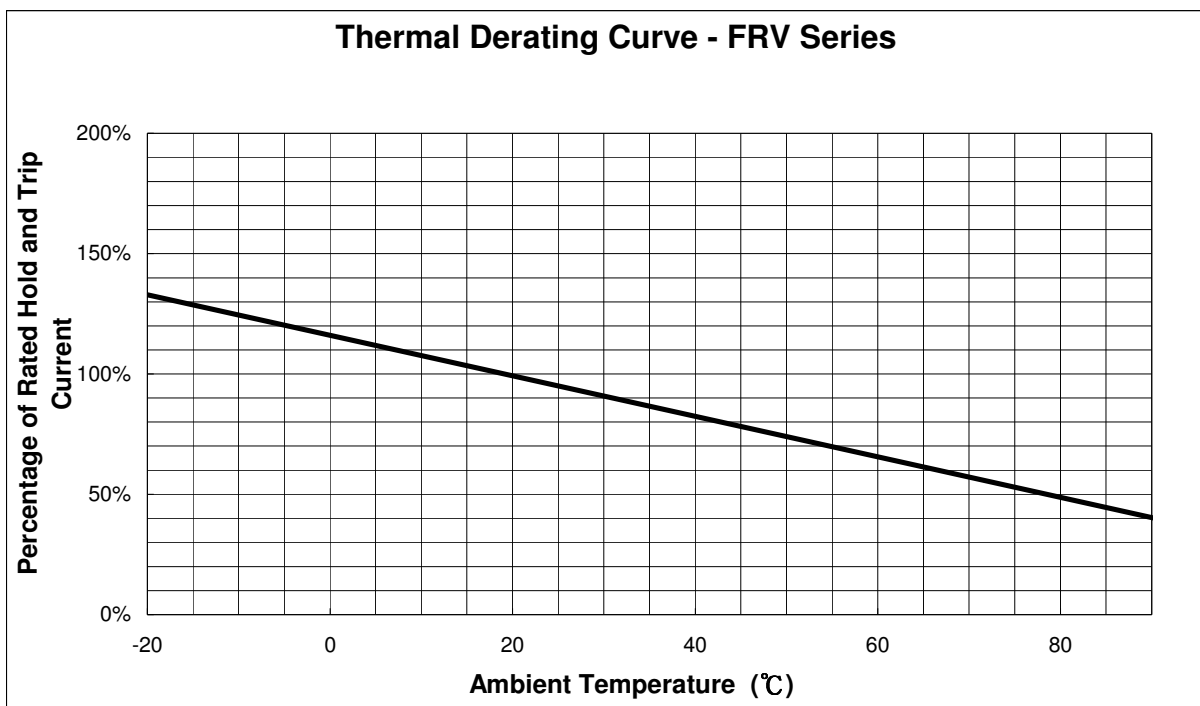


Figure 4
Lead Size: 20AWG
Φ 0.81 mm Diameter

Part Number	Figure	A	B	C	D	E	F
		Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRV005-240F	1	8.3	10.7	5.1	7.6	3.8	1.6
FRV008-240F	1	8.3	10.7	5.1	7.6	3.8	1.6
FRV012-240F	1	8.3	10.7	5.1	7.6	3.8	1.6
FRV016-240F	1	9.9	12.5	5.1	7.6	3.8	1.6
FRV025-240F	2	9.6	17.4	5.1	7.6	3.8	1.8
FRV033-240F	2	11.4	16.5	5.1	7.6	3.8	1.8
FRV040-240F	2	11.5	19.5	5.1	7.6	3.8	1.8
FRV055-240F	3	14.0	21.7	5.1	7.6	4.1	1.9
FRV075-240F	3	11.5	23.4	5.1	7.6	4.8	1.9
FRV100-240F	4	18.7	24.4	10.2	7.6	5.1	1.9
FRV125-240F	4	21.2	27.4	10.2	7.6	5.3	1.9
FRV200-240F	3	24.9	33.8	10.2	7.6	6.1	1.9

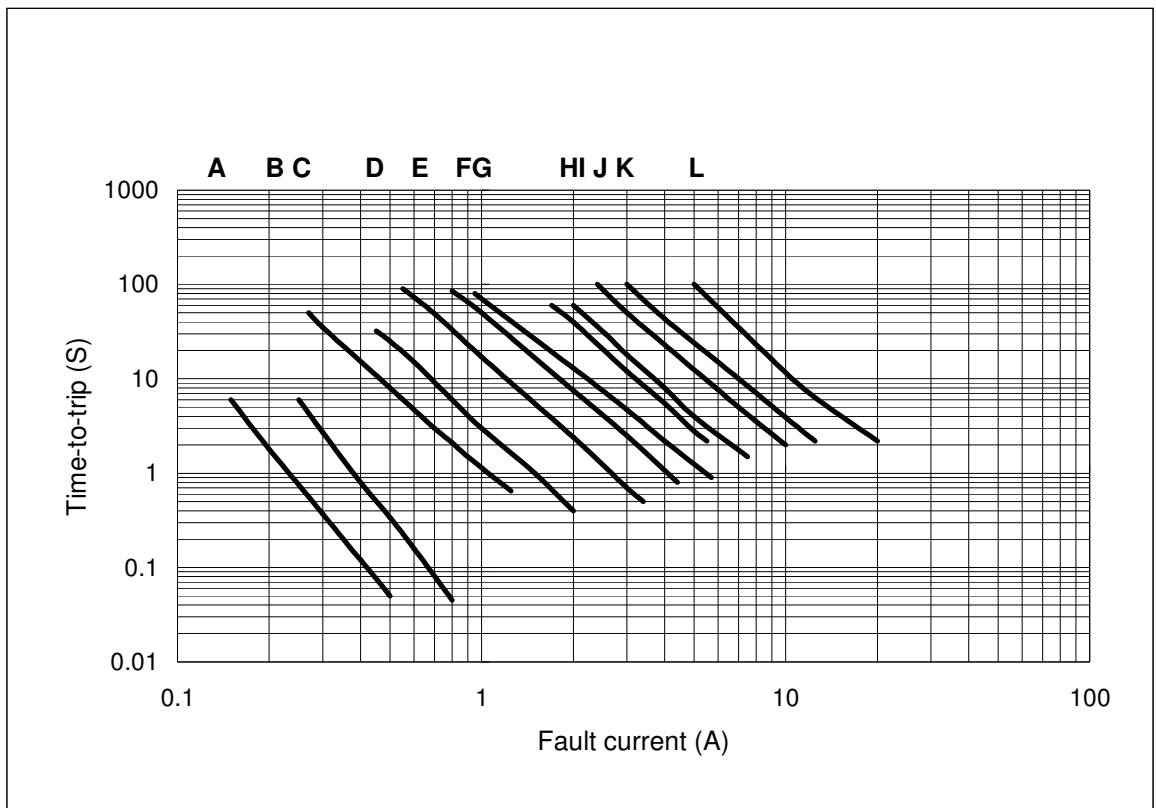
Thermal Derating Curve



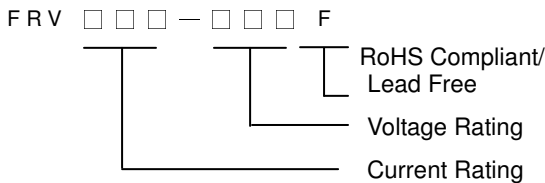
NOTE : All Specifications subject to change without notice.

Typical Time-To-Trip at 23°C

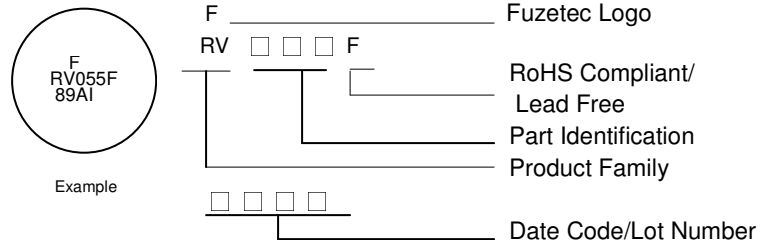
- A= FRV005-240F
- B= FRV008-240F
- C= FRV012-240F
- D= FRV016-240F
- E= FRV025-240F
- F= FRV033-240F
- G= FRV040-240F
- H= FRV055-240F
- I= FRV075-240F
- J= FRV100-240F
- K= FRV125-240F
- L= FRV200-240F



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
FRV025-240F	300	1.5K
FRV033-240F	200	1.5K

P/N	Pcs /Bag	Reel/Ta
FRV040-240F	200	1.5K
FRV055-240F	200	1K
FRV075-240F	200	-
FRV100-240F	100	-
FRV125-240F	100	-
FRV200-240F	100	-

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

FRA Series (Obsolete)



RoHS Compliant & Lead Free



Application:

Wide variety of electronic equipment

Product Features:

Low hold current, Solid state
Radial-leaded product ideal for up to 120V_{DC}/120V_{AC}

Operation Current: 0.10A~3.75A

Maximum Voltage: 120V_{DC}/120V_{AC}

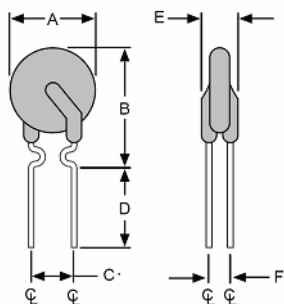
Temperature Range: -40°C to 85°C

Electrical Characteristics(23°C)

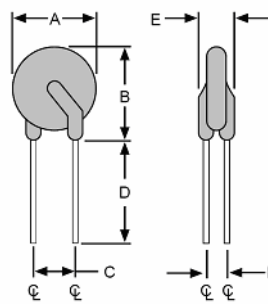
Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Rated Voltage	Typical Power	Resistance Tolerance	
							R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{AC/DC}	P _d , W	Ohms	Ohms
FRA010-120F	0.10	0.20	4.0	2.0	120	0.57	2.50	7.50
FRA017-120F	0.17	0.34	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°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).
 P_d=Typical power dissipated from device when in the tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C.
 R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping .
 Physical specifications:
 Lead material: FRA010-120F~FRA090-120F Tin plated copper, 22 AWG.
 FRA110-120F~FRA375-120F Tin plated copper, 20 AWG.
 Soldering characteristics:MIL-STD-202, Method 208E.
 Insulating coating:Flame retardant epoxy, meets UL 94 V-0 requirement.

FRA Product Dimensions (Millimeter)



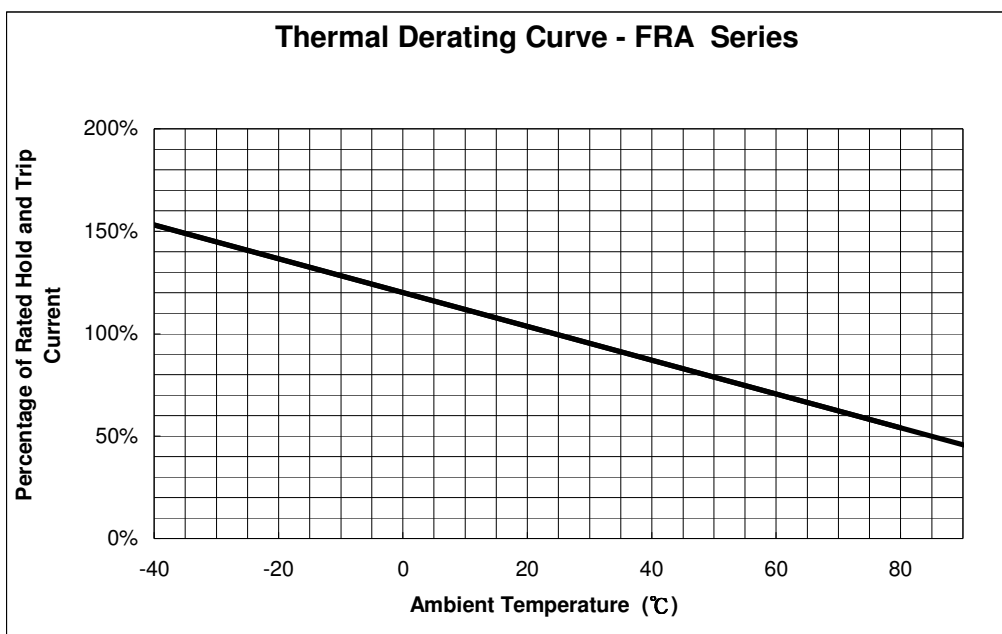
FRA010-120F ~ FRA090-120F
Lead Size: 22AWG,
Φ 0.65 mm Diameter



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

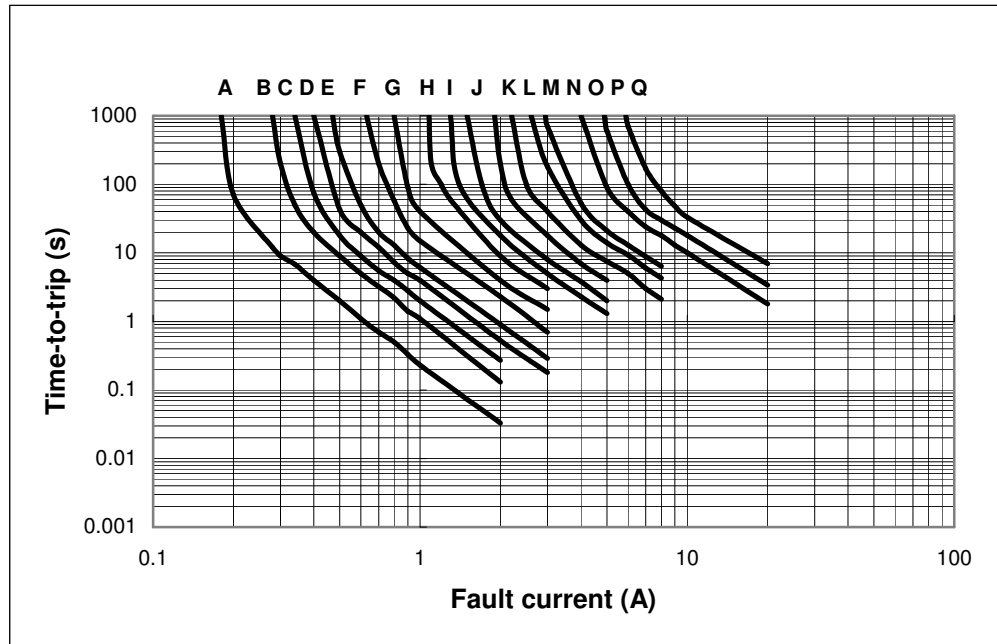
Part Number	A	B	C	D	E	F
	Maximum	Maximum	Typical	Minimum	Maximum	Typical
FRA010-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA017-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA020-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA025-120F	7.9	12.7	5.1	7.6	5.0	3.0
FRA030-120F	7.9	13.0	5.1	7.6	5.0	3.0
FRA040-120F	8.2	14.2	5.1	7.6	5.0	3.0
FRA050-120F	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

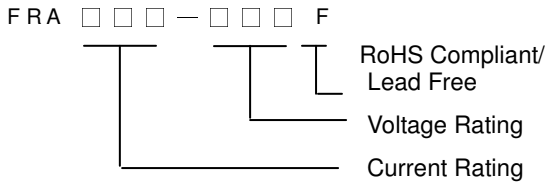


Typical Time-To-Trip at 23°C

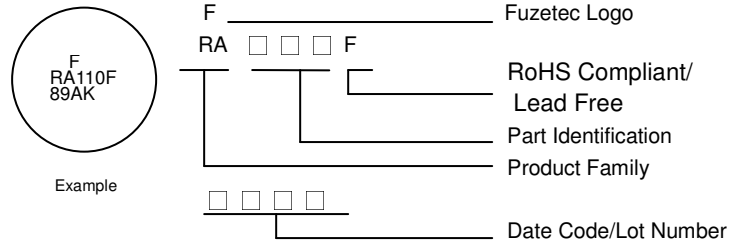
- A = FRA010-120F
- B = FRA017-120F
- C = FRA020-120F
- D = FRA025-120F
- E = FRA030-120F
- F = FRA040-120F
- G = FRA050-120F
- H = FRA065-120F
- I = FRA075-120F
- J = FRA090-120F
- K = FRA110-120F
- L = FRA135-120F
- M = FRA160-120F
- N = FRA185-120F
- O = FRA250-120F
- P = FRA300-120F
- Q = FRA375-120F



Part Numbering System



Part Marking System



Standard Package

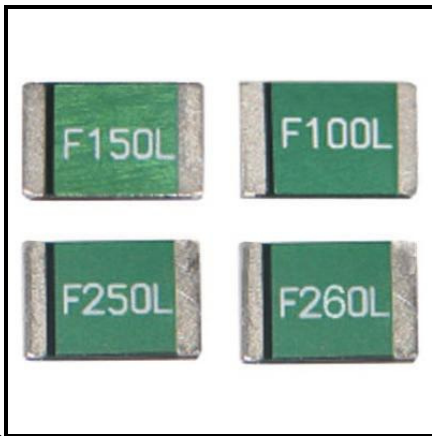
P/N	Pcs /Bag	Reel/Tape
FRA010-120F	300	1.5K
FRA017-120F	300	1.5K
FRA020-120F	300	1.5K
FRA025-120F	300	1.5K
FRA030-120F	300	1.5K
FRA040-120F	300	1.5K
FRA050-120F	300	1.5K
FRA065-120F	300	1.5K
FRA075-120F	300	1.5K

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.



FSMD2920 Series



RoHS Compliant & 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: 0.3A~3.0A

Maximum Voltage: 6V~60V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

*TÜV (R50090556)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Max. Time to Trip		Resistance Tolerance	
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	Current	Time	R _{MIN}	R _{1MAX}
						A	Sec	Ohms	Ohms
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
FSMD300-2920	3.00	5.20	6	40	1.5	8.0	25.0	0.015	0.048

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C prior to tripping.

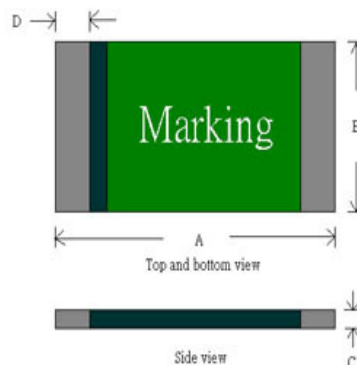
R_{1MAX}=Maximum resistance of device at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.

Termination pad characteristics

Termination pad materials: Pure Tin

*Note:FSMD300-2920 TÜV Pending

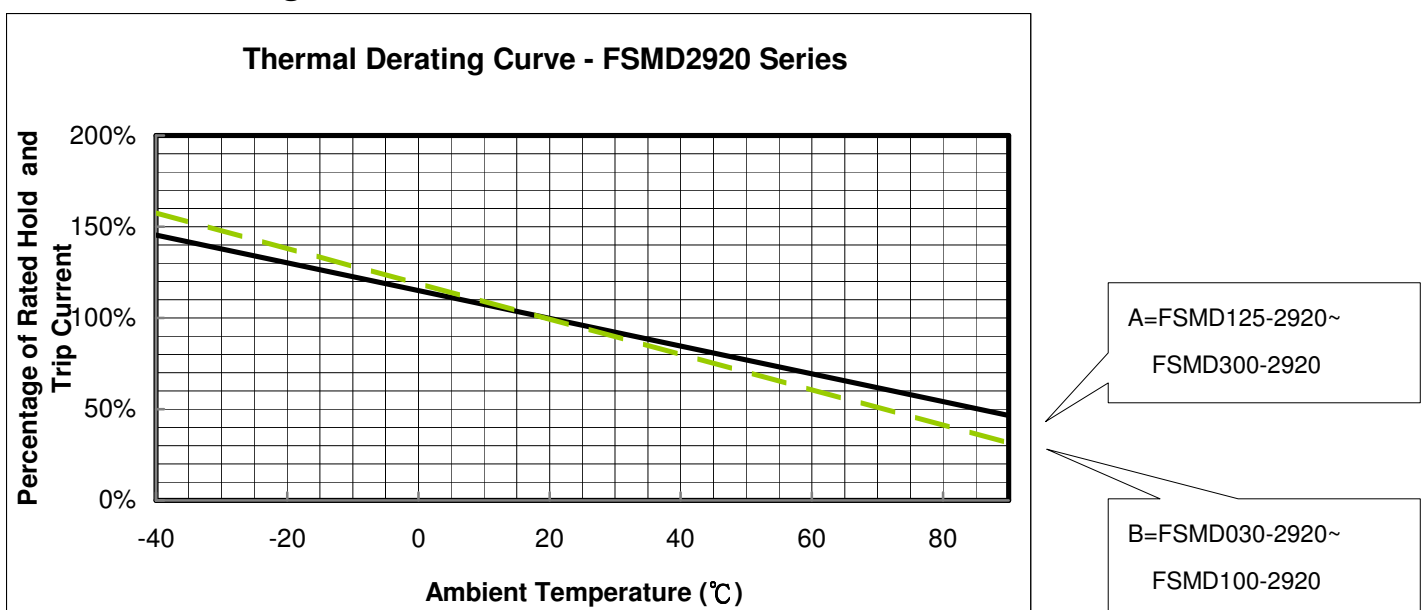
FSMD2920 Product Dimensions (Millimeter)



For Reflow Soldering Profile information, please refer to P.86 ” Appendix III SMD product Solder Reflow Recommendations “

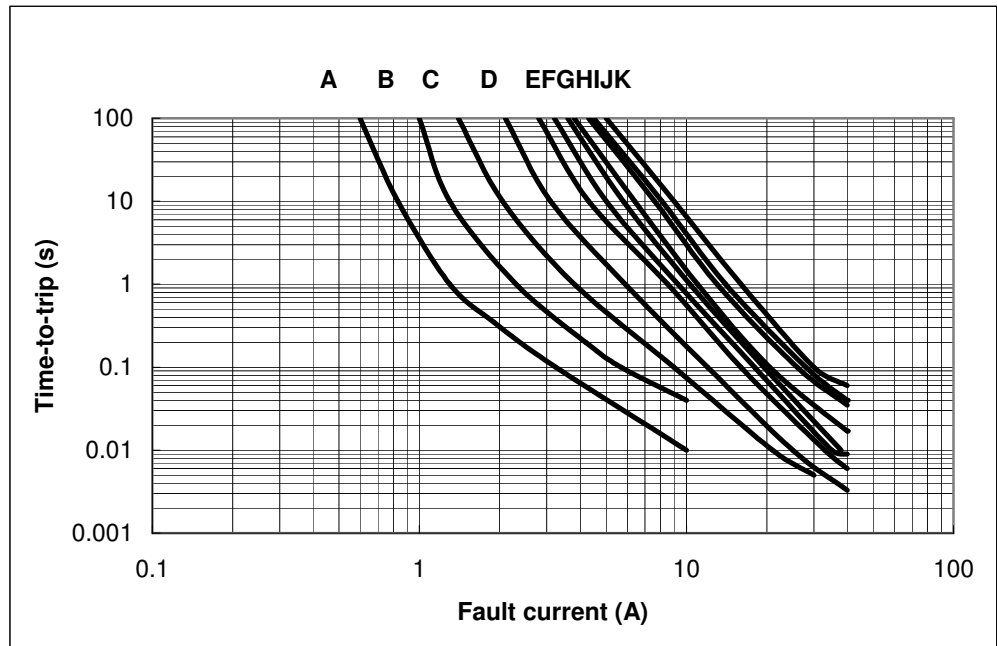
Part Number	A		B		C		D
	Min	Max	Min	Max	Min	Max	Min
FSMD030-2920	6.73	7.98	4.80	5.44	0.60	1.15	0.35
FSMD050-2920	6.73	7.98	4.80	5.44	0.60	1.15	0.35
FSMD075-2920	6.73	7.98	4.80	5.44	0.35	1.15	0.35
FSMD100-2920	6.73	7.98	4.80	5.44	0.40	1.00	0.35
FSMD125-2920	6.73	7.98	4.80	5.44	0.40	0.90	0.35
FSMD150-2920	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
FSMD300-2920	6.73	7.98	4.80	5.44	0.30	0.90	0.35

Thermal Derating Curve

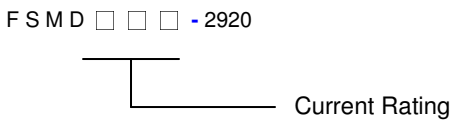


Typical Time-To-Trip at 23°C

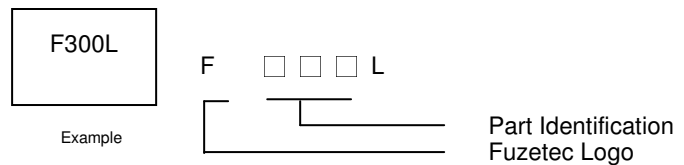
- A =FSMD030-2920
- B =FSMD050-2920
- C =FSMD075-2920
- D =FSMD100-2920
- E =FSMD125-2920
- F =FSMD150-2920
- G =FSMD185-2920
- H =FSMD200-2920
- I = FSMD250-2920
- J = FSMD260-2920
- K= FSMD300-2920



Part Numbering System



Part Marking System



Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD030-2920	-----	2K
FSMD050-2920	-----	2K
FSMD075-2920	-----	2K
FSMD100-2920	-----	2K
FSMD125-2920	-----	2K
FSMD150-2920	-----	2K

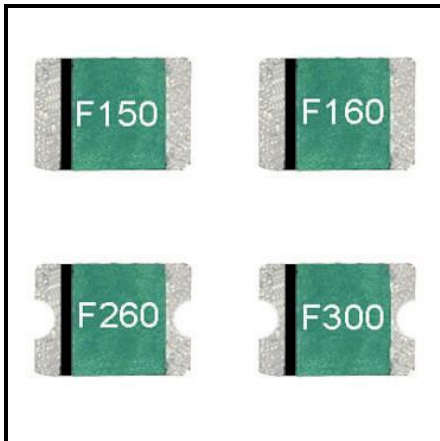
P/N	Pcs /Bag	Reel/Tape
FSMD185-2920	-----	2K
FSMD200-2920	-----	2K
FSMD250-2920	-----	2K
FSMD260-2920	-----	2K
FSMD300-2920	-----	2K

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..

FSMD1812 Series



**RoHS Compliant &
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: 0.1A~3.0A

Maximum Voltage: 6V~60V

Temperature Range: -40°C to 85°C

Agency Recognition: *UL (E211981)

*C-UL (E211981)

*TÜV (R50004084)

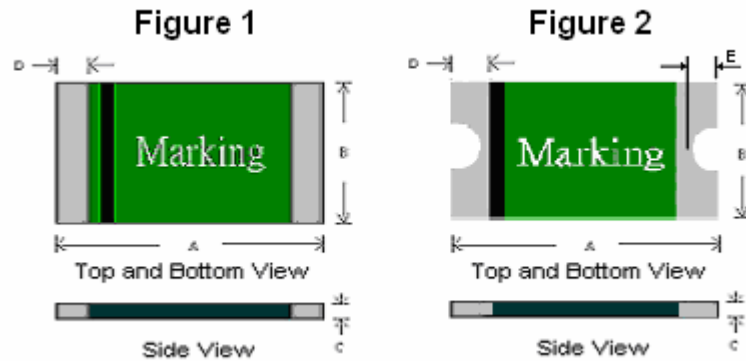
Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Max. Time to Trip		Resistance Tolerance	
						Current	Time	R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	Amp	Sec	Ohms	Ohms
FSMD010	0.10	0.30	60	10	0.8	8.0	< 0.02	1.600	15.00
FSMD014	0.14	0.30	60	10	0.8	8.0	0.008	1.200	6.500
FSMD020	0.20	0.40	30	10	0.8	8.0	0.020	0.800	5.000
FSMD035	0.35	0.70	16	40	0.8	8.0	0.100	0.320	1.500
FSMD050	0.50	1.00	16	40	0.8	8.0	0.150	0.150	1.000
FSMD075	0.75	1.50	16	40	0.8	8.0	0.200	0.110	0.450
FSMD110	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
FSMD110-16	1.10	1.95	16	40	0.8	8.0	0.500	0.040	0.180
FSMD125	1.25	2.50	6	40	0.8	8.0	0.400	0.050	0.140
FSMD150	1.50	3.00	6	40	0.8	8.0	0.500	0.040	0.110
FSMD160	1.60	3.20	6	40	0.8	8.0	0.500	0.030	0.100
FSMD200	2.00	3.50	8	40	0.8	8.0	2.000	0.020	0.070
FSMD200R	2.00	3.50	8	100	1.0	8.0	2.000	0.020	0.070
FSMD260R	2.60	5.00	6	100	1.0	8.0	2.500	0.015	0.047
FSMD300R	3.00	5.00	6	100	1.0	8.0	4.000	0.012	0.040

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T=Trip current-minimum current at which the device will always trip at 23°C 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 (Vmax).
 Pd=Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23°C still air environment.
 R_{MIN}=Minimum device resistance at 23°C prior to tripping.
 R_{1MAX}=Maximum resistance of device at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.
 Termination pad characteristics
 Termination pad materials: Pure Tin

*Note: FSMD010 , FSMD200R, FSMD260R & FSMD300R UL, C-UL and TÜV: Pending

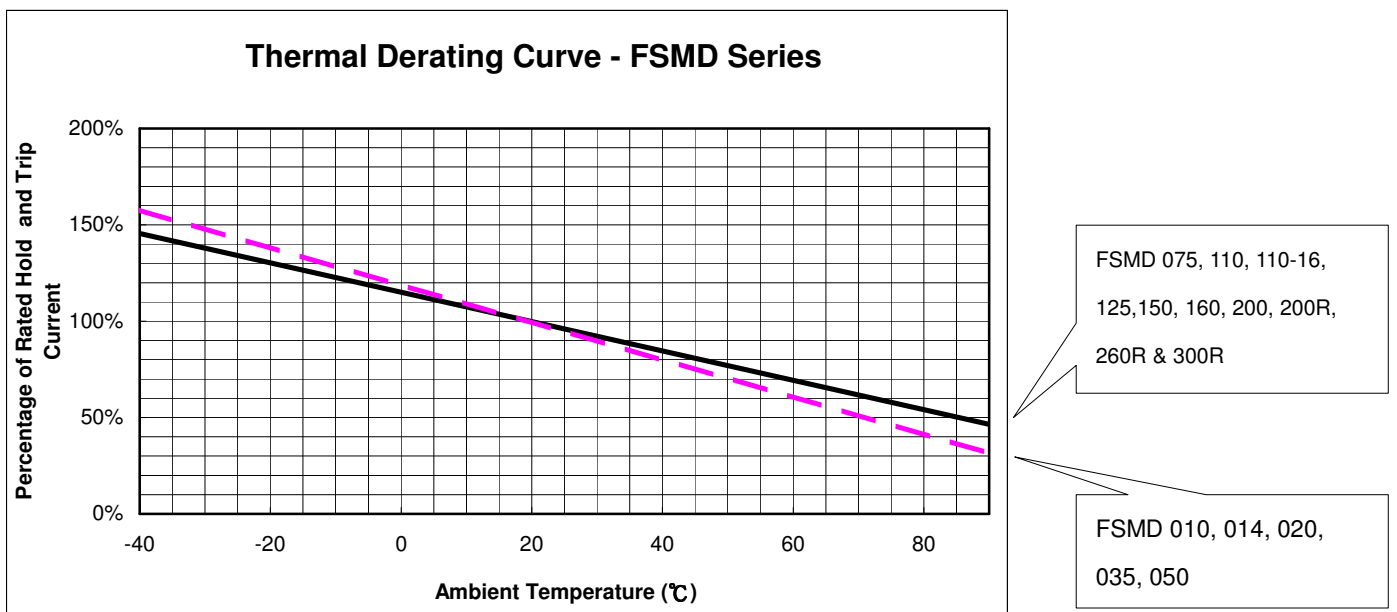
FSMD1812 Product Dimensions (Millimeter)



For Reflow Soldering Profile information, please refer to P.86 ” IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS “

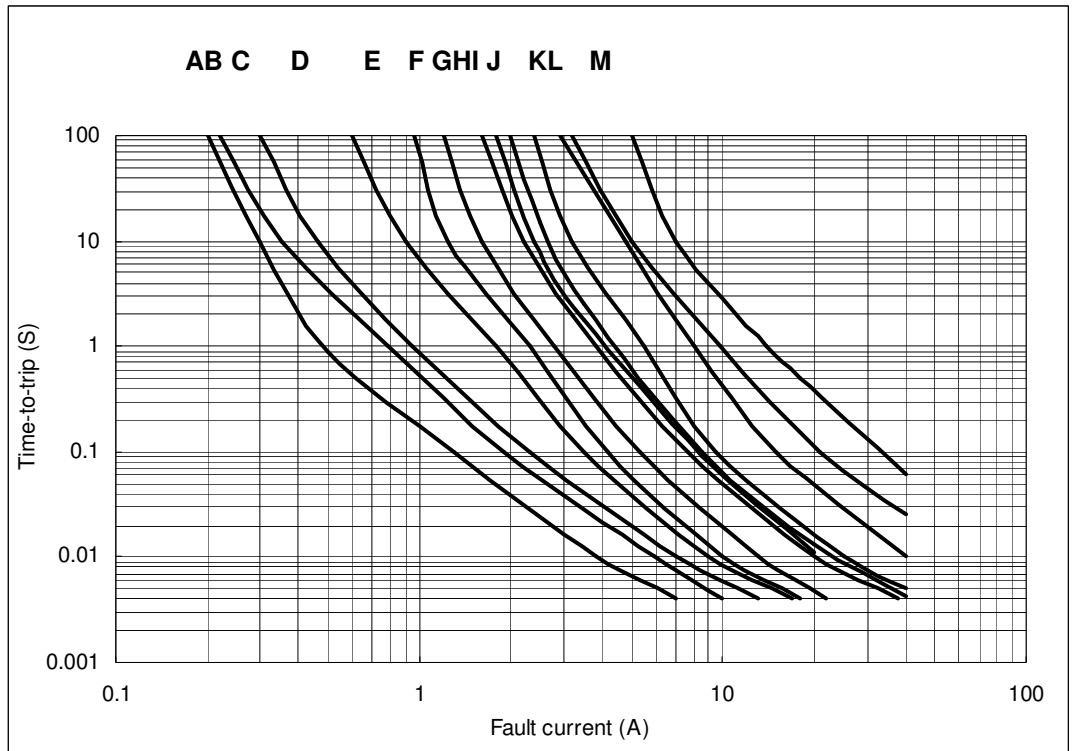
Part Number	Fig.	A		B		C		D		E	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD010	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD014	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD020	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD035	1	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	—	—
FSMD050	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	—	—
FSMD075	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	—	—
FSMD110	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD110-16	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	—	—
FSMD125	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD150	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD160	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	—	—
FSMD200	1	4.37	4.73	3.07	3.41	0.50	0.90	0.30	0.95	—	—
FSMD200R	2	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
FSMD260R	2	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
FSMD300R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65

Thermal Derating Curve



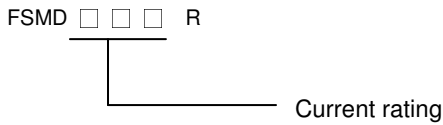
Typical Time-To-Trip at 23°C

- A = FSMD010
- B = FSMD014
- C = FSMD020
- D = FSMD035
- E = FSMD050
- F = FSMD075
- G = FSMD110/110-16
- H = FSMD125
- I = FSMD150
- J = FSMD160
- K = FSMD200/200R
- L = FSMD260R
- M = FSMD300R

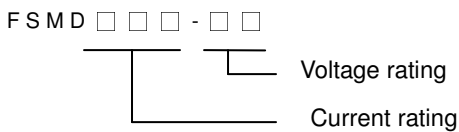


Part Numbering System

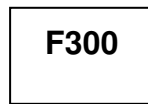
FSMD014~FSMD300R



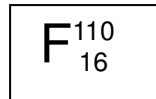
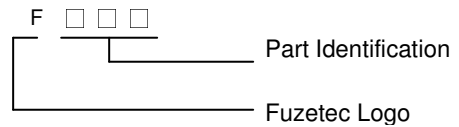
FSMD110-16



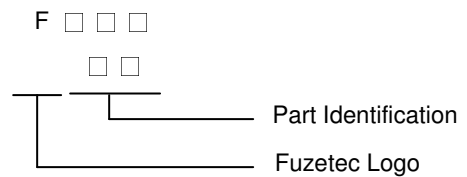
Part Marking System



Example



Example



Standard Package

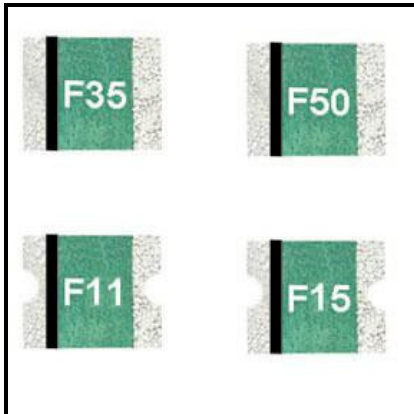
P/N	Pcs /Bag	Reel/Tape
FSMD010	-----	2K
FSMD014	-----	2K
FSMD020	-----	2K
FSMD035	-----	2K
FSMD050	-----	2K
FSMD075	-----	2K
FSMD110	-----	2K
FSMD110-16	-----	2K

P/N	Pcs /Bag	Reel/Tape
FSMD125	-----	2K
FSMD150	-----	2K
FSMD160	-----	2K
FSMD200	-----	2K
FSMD200R	-----	2K
FSMD260R	-----	2K
FSMD300R	-----	1.5K

- 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..



FSMD1210 Series



RoHS Compliant & 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: 0.05A~1.50A

Maximum Voltage: 6V~60V

Temperature Range: -40°C to 85°C

Agency Recognition: *UL (E211981)

*C-UL (E211981)

*TÜV(R50090556)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Max. Time to Trip		Resistance Tolerance	
						Current	Time	R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	Amp	Sec	Ohms	Ohms
FSMD005-1210	0.05	0.15	60	10	0.60	0.25	1.50	3.600	50.000
FSMD010-1210	0.10	0.25	60	10	0.60	0.50	1.50	1.600	15.000
FSMD020-1210	0.20	0.40	30	10	0.60	8.00	0.02	0.800	5.000
FSMD035-1210	0.35	0.70	16	40	0.60	8.00	0.20	0.320	1.300
FSMD050-1210	0.50	1.00	16	40	0.60	8.00	0.10	0.250	0.900
FSMD075-1210	0.75	1.50	8	40	0.60	8.00	0.10	0.130	0.400
FSMD110-1210R	1.10	2.20	6	100	0.80	8.00	0.30	0.060	0.210
FSMD150-1210R	1.50	3.00	6	100	0.80	8.00	0.50	0.040	0.110

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C prior to tripping.

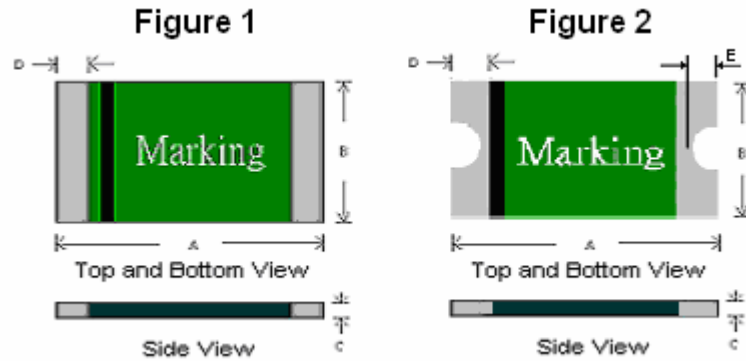
R_{1 MAX} =Maximum resistance of device at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.

Termination pad characteristics

Termination pad materials : Pure Tin

Note: FSMD110-1210R & FSMD150-1210R UL & C-UL and TUV Pending

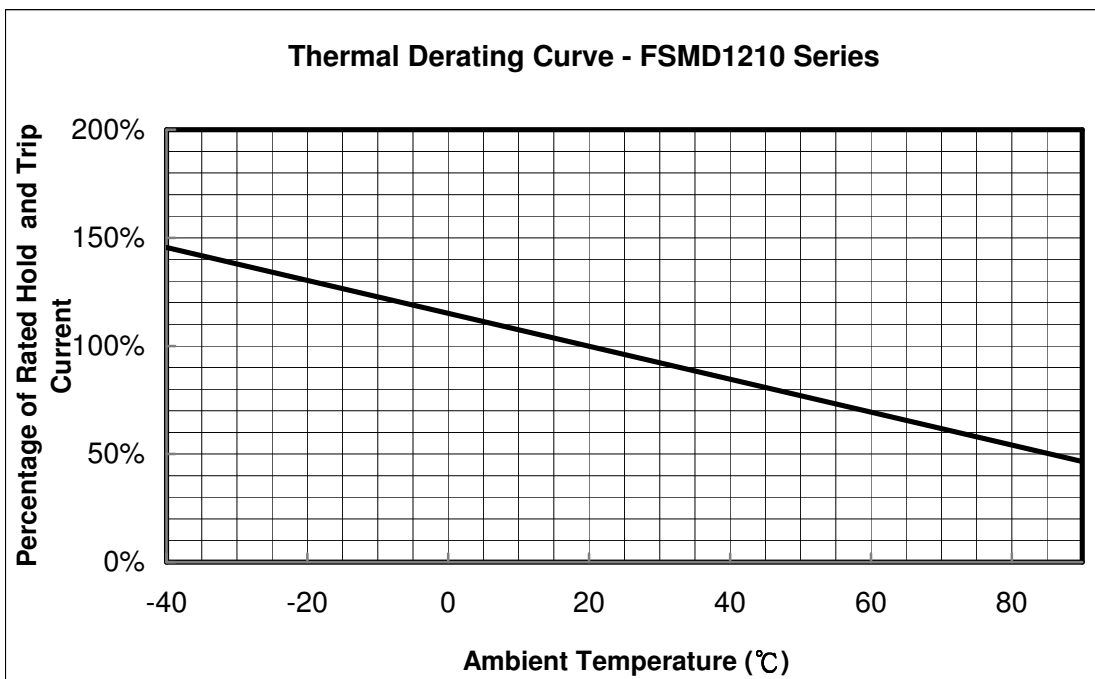
FSMD Product Dimensions (Millimeter)



For Reflow Soldering Profile information, please refer to P.86 " IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

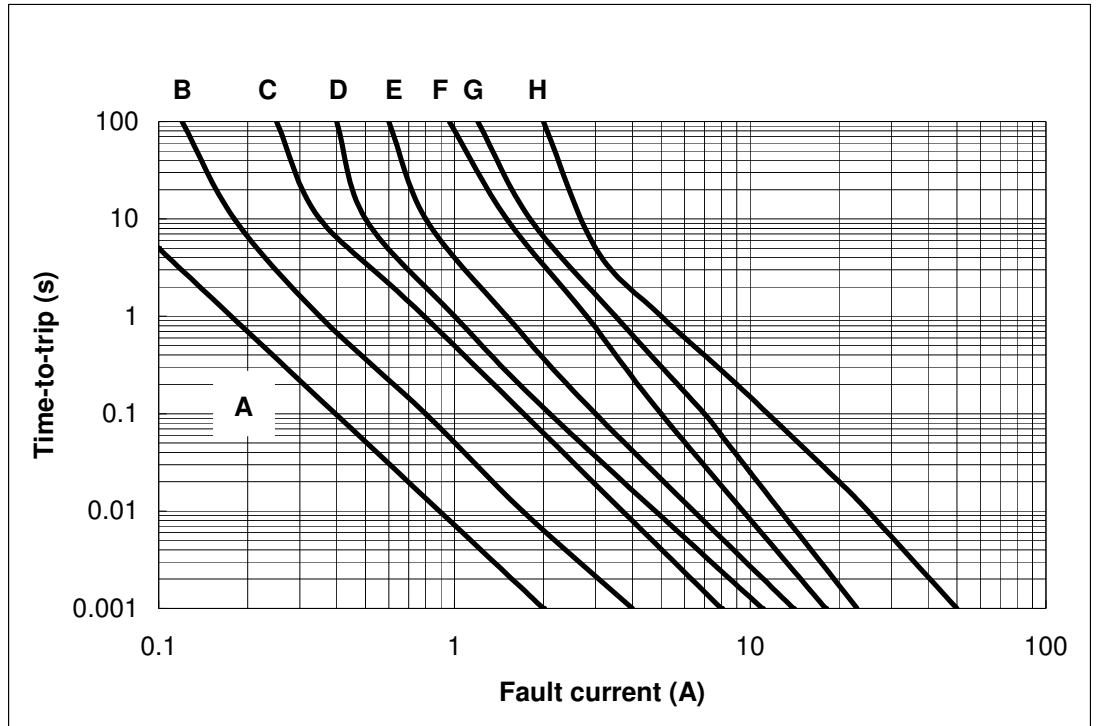
Part Number	Fig.	A		B		C		D		E	
		Min	Max	Min	Max	Min	Min	Min	Max	Min	Max
FSMD005-1210	1	3.00	3.43	2.35	2.80	0.60	1.15	0.25	0.75	—	—
FSMD010-1210	1	3.00	3.43	2.35	2.80	0.60	1.15	0.25	0.75	—	—
FSMD020-1210	1	3.00	3.43	2.35	2.80	0.40	0.85	0.25	0.75	—	—
FSMD035-1210	1	3.00	3.43	2.35	2.80	0.40	0.80	0.25	0.75	—	—
FSMD050-1210	1	3.00	3.43	2.35	2.80	0.30	0.75	0.25	0.75	—	—
FSMD075-1210	1	3.00	3.43	2.35	2.80	0.30	0.70	0.25	0.75	—	—
FSMD110-1210R	2	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD150-1210R	2	3.00	3.43	2.35	2.80	0.50	0.90	0.25	0.75	0.10	0.45

Thermal Derating Curve

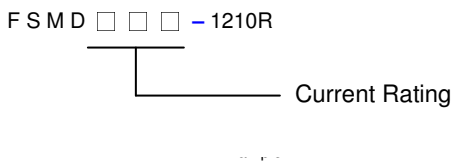


Typical Time-To-Trip at 23°C

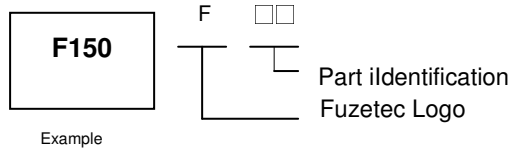
- A = FSMD005-1210
- B = FSMD010-1210
- C = FSMD020-1210
- D = FSMD035-1210
- E = FSMD050-1210
- F = FSMD075-1210
- G = FSMD110-1210R
- H = FSMD150-1210R



Part Numbering System



Part Marking System



- F05 = FSMD005-1210
- F10 = FSMD010-1210
- F20 = FSMD020-1210
- F35 = FSMD035-1210
- F50 = FSMD050-1210
- F75 = FSMD075-1210
- F11 = FSMD110-1210R
- F15 = FSMD150-1210R

Standard Package

P/N	Pcs /Bag	Reel/Tape
FSMD005-1210	-----	3K
FSMD010-1210	-----	3K
FSMD020-1210	-----	3K
FSMD035-1210	-----	4K

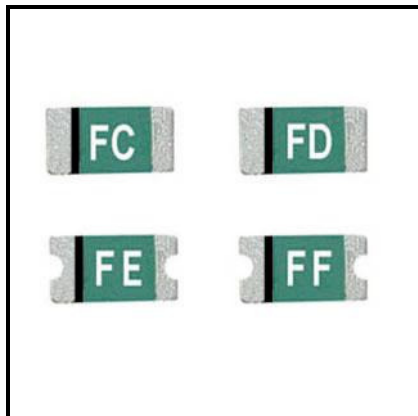
P/N	Pcs /Bag	Reel/Tape
FSMD050-1210	-----	4K
FSMD075-1210	-----	4K
FSMD110-1210R	-----	3K
FSMD150-1210R	-----	3K

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.

FSMD1206 Series



RoHS Compliant & 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: 0.05A~2.00A

Maximum Voltage: 6V~60V

Temperature Range: -40°C to 85°C

Agency Recognition: *UL (E211981)

*C-UL (E211981)

*TUV (R50090556)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
						Current	Time	R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	Amp	Sec	Ohms	Ohms
FSMD005-1206	0.05	0.15	60	10	0.4	0.25	1.50	3.600	50.0
FSMD010-1206	0.10	0.25	60	10	0.4	0.50	1.00	1.600	15.0
FSMD020-1206	0.20	0.40	30	10	0.4	8.00	0.05	0.600	2.500
FSMD035-1206	0.35	0.75	16	40	0.4	8.00	0.10	0.300	1.200
FSMD050-1206	0.50	1.00	8	40	0.4	8.00	0.10	0.150	0.700
FSMD075-1206R	0.75	1.50	6	100	0.6	8.00	0.20	0.090	0.290
FSMD100-1206R	1.00	1.80	6	100	0.6	8.00	0.30	0.055	0.210
FSMD110-1206R	1.10	2.20	6	100	0.8	8.00	0.30	0.040	0.180
FSMD150-1206R	1.50	3.00	6	100	0.8	8.00	1.00	0.040	0.120
FSMD200-1206R	2.00	3.50	6	100	0.8	8.00	1.50	0.018	0.080

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C prior to tripping.

R_{1MAX}=Maximum resistance of device at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.

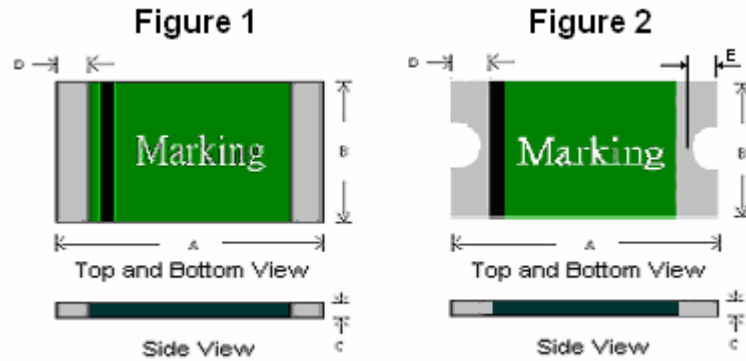
Termination pad characteristics

Termination pad materials : Pure Tin

*Note:(1) FSMD075-1206 TUV Pending

(2) FSMD100-1206R , FSMD110-1206R, FSMD150-1206R & FSMD200-1206R UL , C-UL and TUV Pending

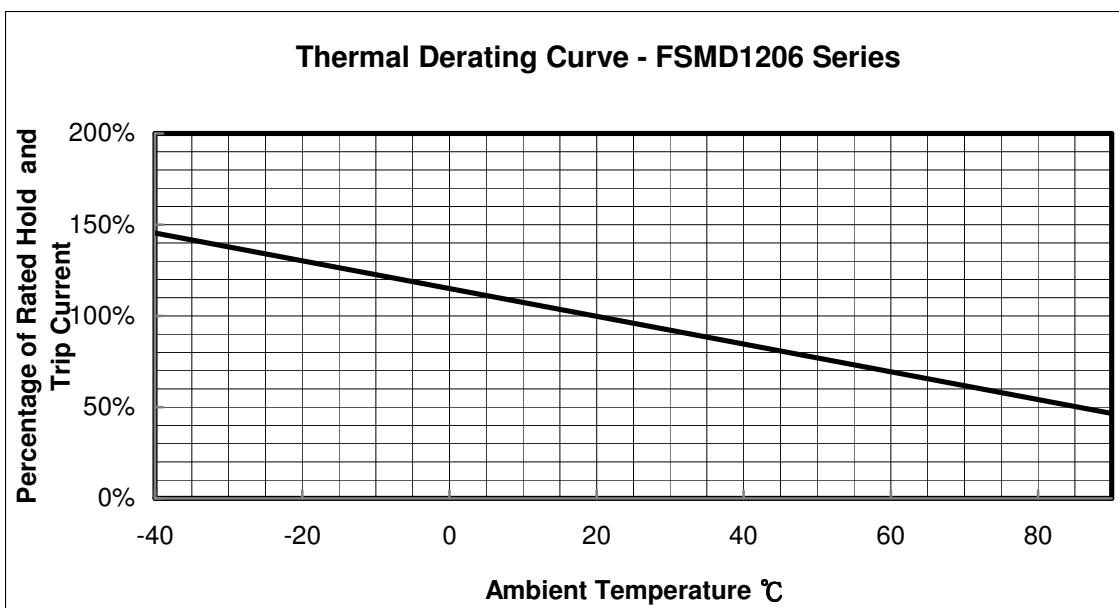
FSMD1206 Product Dimensions (Millimeter)



For Reflow Soldering Profile information, please refer to P.86 " IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

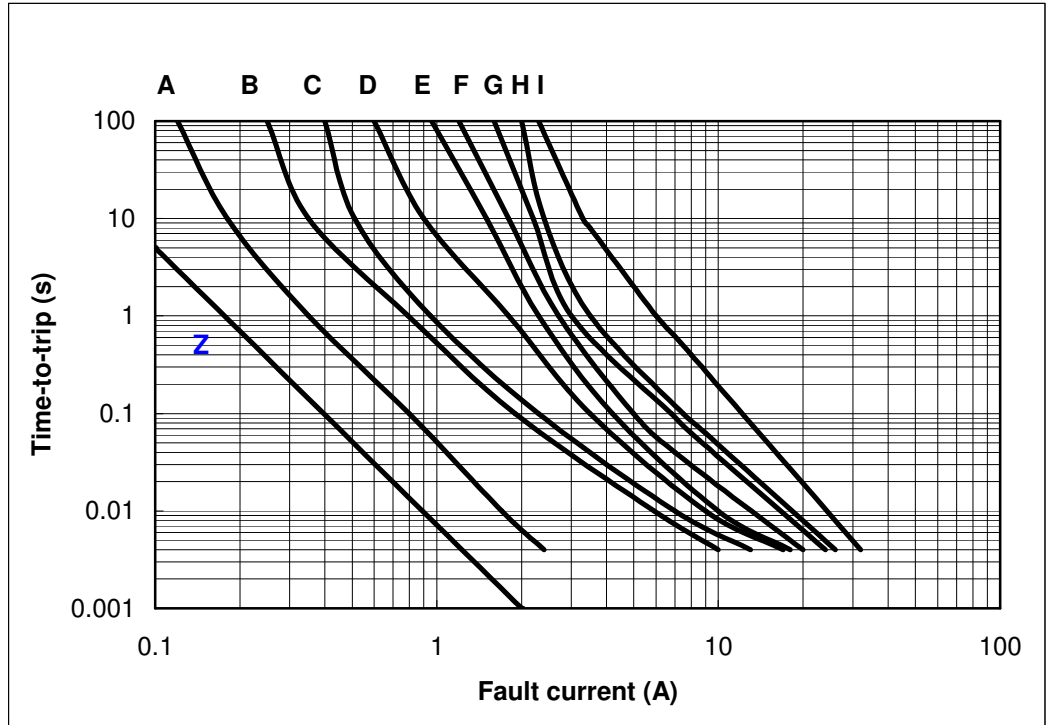
Part Number	Fig.	A		B		C		D		E	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD005-1206	1	3.00	3.50	1.50	1.80	0.45	0.85	0.10	0.75	—	—
FSMD010-1206	1	3.00	3.50	1.50	1.80	0.45	0.85	0.10	0.75	—	—
FSMD020-1206	1	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	—	—
FSMD035-1206	1	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	—	—
FSMD050-1206	1	3.00	3.50	1.50	1.80	0.25	0.55	0.10	0.75	—	—
FSMD075-1206R	2	3.00	3.50	1.50	1.80	0.45	1.25	0.25	0.75	0.10	0.45
FSMD100-1206R	2	3.00	3.50	1.50	1.80	0.45	1.00	0.25	0.75	0.10	0.45
FSMD110-1206R	2	3.00	3.50	1.50	1.80	0.45	1.00	0.25	0.75	0.10	0.45
FSMD150-1206R	2	3.00	3.50	1.50	1.80	0.80	1.40	0.25	0.75	0.10	0.45
FSMD200-1206R	2	3.00	3.50	1.50	1.80	0.85	1.60	0.25	0.75	0.10	0.45

Thermal Derating Curve

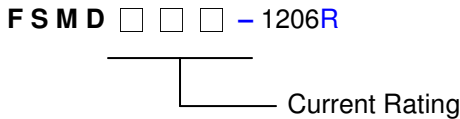


Typical Time-To-Trip at 23°C

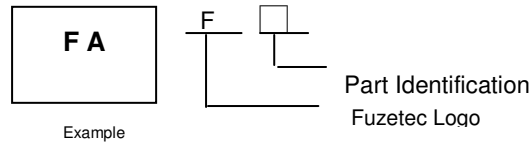
- Z =FSMD005-1206
- A =FSMD010-1206
- B =FSMD020-1206
- C =FSMD035-1206
- D =FSMD050-1206
- E =FSMD075-1206R
- F =FSMD100-1206R
- G =FSMD110-1206R
- H =FSMD150-1206R
- I = FSMD200-1206R



Part Numbering System



Part Marking System



- FZ =FSMD005-1206
- FA =FSMD010-1206
- FB =FSMD020-1206
- FC =FSMD035-1206
- FD =FSMD050-1206
- FE =FSMD075-1206R
- FF =FSMD100-1206R
- FG =FSMD110-1206R
- FH =FSMD150-1206R
- FI = FSMD200-1206R

Standard Package

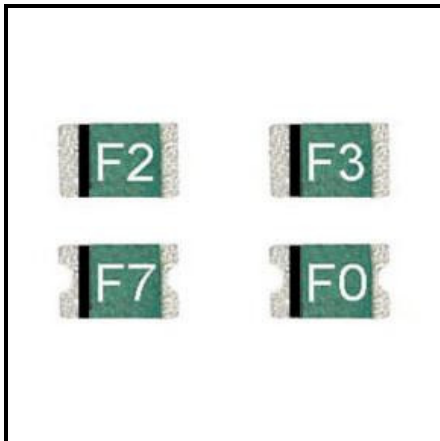
P/N	Pcs /Bag	Reel/Tape
FSMD005-1206	-----	3K
FSMD010-1206	-----	3K
FSMD020-1206	-----	3K
FSMD035-1206	-----	4K
FSMD050-1206	-----	4K

P/N	Pcs /Bag	Reel/Tape
FSMD075-1206R	-----	3K
FSMD100-1206R	-----	3K
FSMD110-1206R	-----	3K
FSMD150-1206R	-----	2K
FSMD200-1206R	-----	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.



FSMD0805 Series



RoHS Compliant & Lead Free



Application:

All high-density boards

Product Features:

Small surface mountable, Solid state, Faster time to trip than standard SMD devices, Lower resistance than standard SMD devices

Operation Current: 0.1A~1.0A

Maximum Voltage: 6V~15V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (Pending)

C-UL (Pending)

TÜV (Pending)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Max. Time to Trip		Resistance Tolerance	
	I_H , A	I_T , A	V_{MAX} , V_{DC}	I_{MAX} , A	P_d , W	Current	Time	R_{MIN}	$R1_{MAX}$
	I_H , A	I_T , A	V_{MAX} , V_{DC}	I_{MAX} , A	P_d , W	Amp	Sec	Ohms	Ohms
FSMD010-0805	0.10	0.30	15	100	0.5	0.50	1.50	0.700	6.000
FSMD020-0805	0.20	0.50	9	100	0.5	8.00	0.02	0.400	3.500
FSMD035-0805	0.35	0.75	6	100	0.5	8.00	0.10	0.250	1.200
FSMD050-0805R	0.50	1.00	6	100	0.5	8.00	0.10	0.150	0.850
FSMD075-0805R	0.75	1.50	6	40	0.6	8.00	0.20	0.090	0.350
FSMD100-0805R	1.00	1.95	6	40	0.6	8.00	0.30	0.060	0.210

I_H =Hold current-maximum current at which the device will not trip at 23°C still air.

I_T =Trip current-minimum current at which the device will always trip at 23°C 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}).

P_d =Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23°C still air environment.

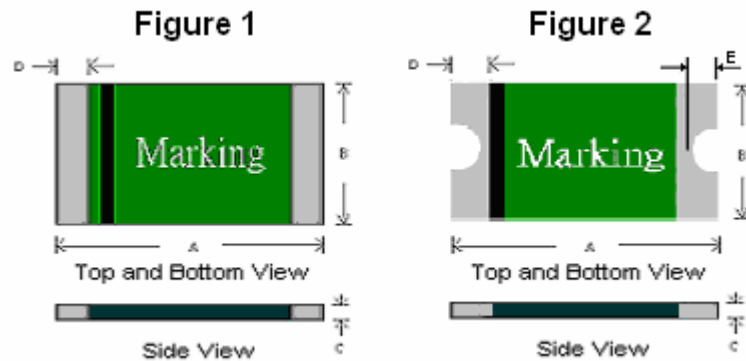
R_{MIN} =Minimum device resistance at 23°C prior to tripping.

$R1_{MAX}$ =Maximum device resistance at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.

Termination pad characteristics

Termination pad materials: Pure Tin

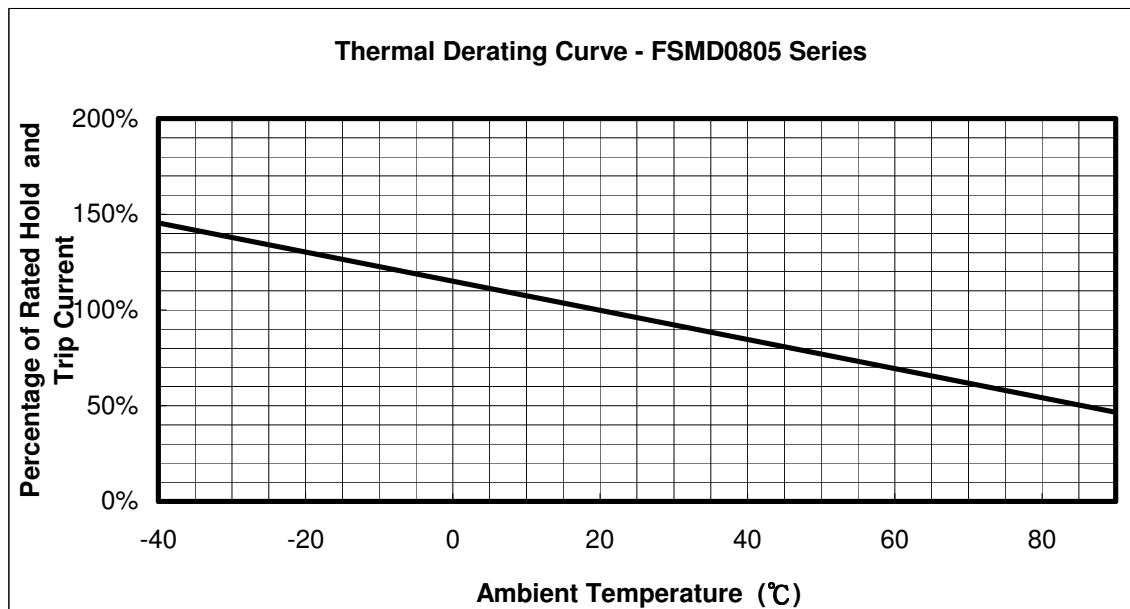
FSMD0805 Product Dimensions (Millimeter)



For Reflow Soldering Profile information, please refer to P.86 " IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

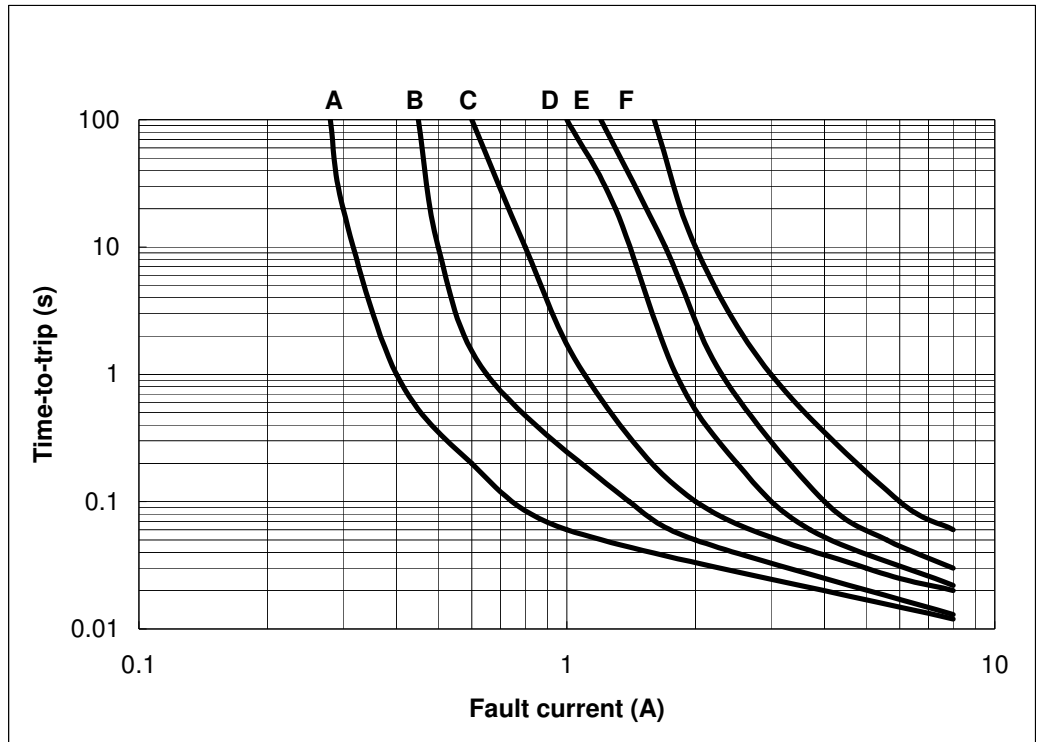
Part Number	Fig.	A		B		C		D		E	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD010-0805	1	2.00	2.30	1.20	1.50	0.55	1.00	0.20	0.60	-	-
FSMD020-0805	1	2.00	2.30	1.20	1.50	0.55	1.00	0.20	0.60	-	-
FSMD035-0805	1	2.00	2.30	1.20	1.50	0.45	0.75	0.20	0.60	-	-
FSMD050-0805R	2	2.00	2.20	1.20	1.50	0.55	1.25	0.20	0.60	0.10	0.45
FSMD075-0805R	2	2.00	2.20	1.20	1.50	0.55	1.25	0.20	0.60	0.10	0.45
FSMD100-0805R	2	2.00	2.20	1.20	1.50	0.75	1.80	0.20	0.60	0.10	0.45

Thermal Derating Curve

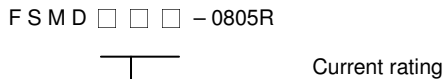


Typical Time-To-Trip at 23°C

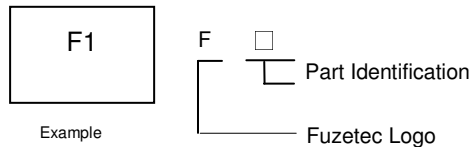
- A =FSMD010-0805
- B =FSMD020-0805
- C =FSMD035-0805
- D =FSMD050-0805R
- E =FSMD075-0805R
- F =FSMD100-0805R



Part Numbering System



Part Marking System



- F1 =FSMD010-0805
- F2 =FSMD020-0805
- F3 =FSMD035-0805
- F5 =FSMD050-0805R
- F7 =FSMD075-0805R
- F0 =FSMD100-0805R

Standard Package

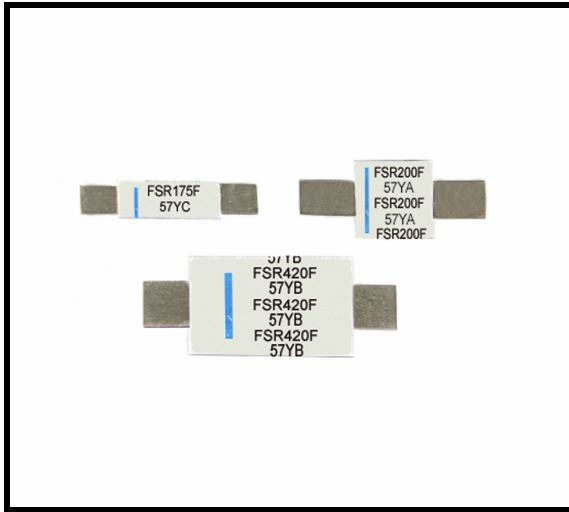
P/N	Pcs /Bag	Reel/Tape
FSMD010-0805	-----	4K
FSMD020-0805	-----	4K
FSMD035-0805	-----	4K

P/N	Pcs /Bag	Reel/Tape
FSMD050-0805R	-----	3K
FSMD075-0805R	-----	3K
FSMD100-0805R	-----	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.



FSR Series



RoHS Compliant & 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°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

TÜV (R3-50004084)

Electrical Characteristics(23°C)

Part Number	Hold Current I _H , A	Trip Current I _T , A	Max. Time to Trip at 5xI _H , s	Rated Voltage V _{MAX} , V _{DC}	Max. Current I _{MAX} , A	Typical Power Pd, W	Resistance Tolerance		
							R _{MIN} Ohms	R _{MAX} Ohms	R _{1MAX} 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°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

Physical specifications:

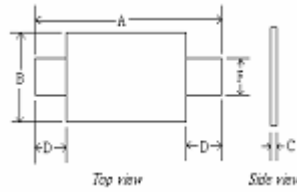
Lead material:0.13mm nominal thickness, quarter-hard nickel.

Insulating material: Polyester tape.

III - Product – Axial Leaded PTC

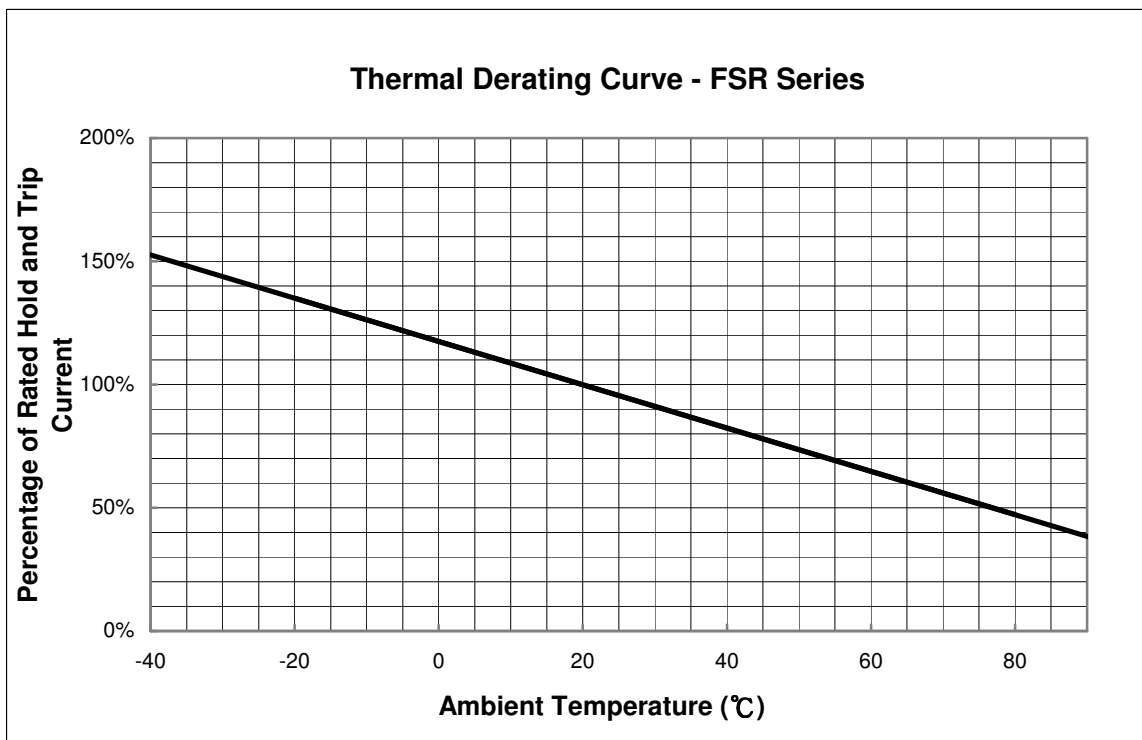


FSR Product Dimensions (Millimeter)



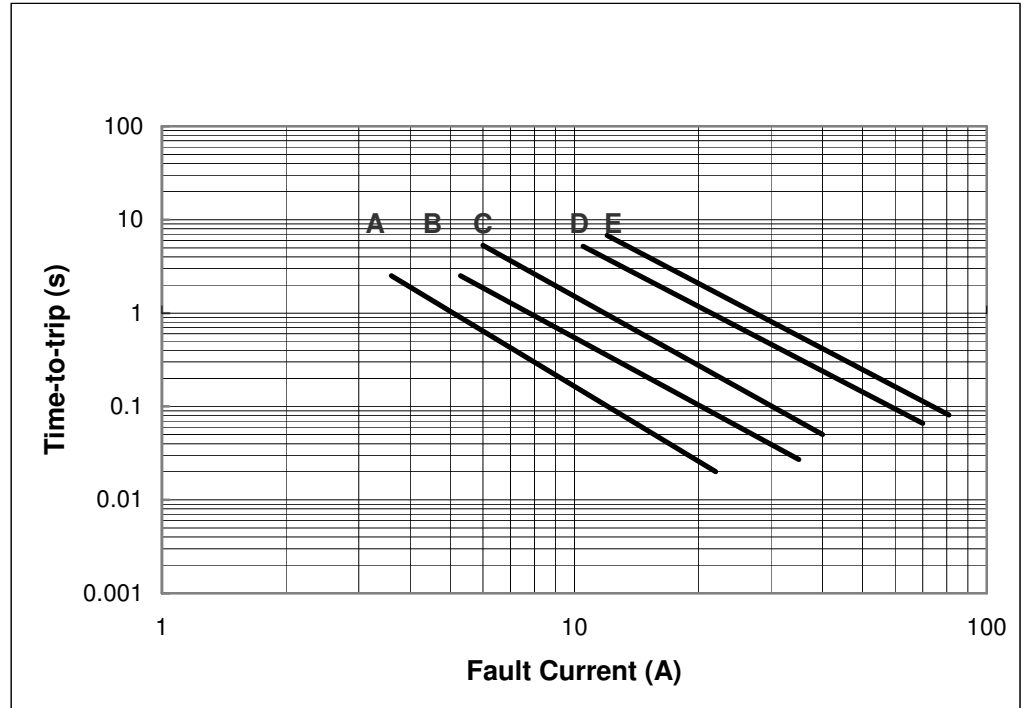
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSR120F	19.9	22.1	4.9	5.2	0.6	1.0	5.5	7.5	3.9	4.1
FSR175F	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FSR200F	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
FSR350F	28.4	31.8	13.0	13.5	0.5	1.1	6.3	8.9	6.0	6.6
FSR420F	30.6	32.4	12.9	13.6	0.5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

Thermal Derating Curve

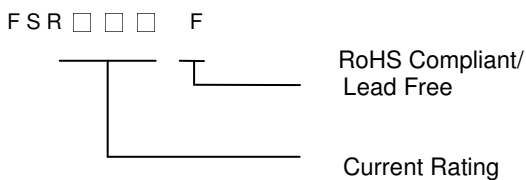


Typical Time-To-Trip at 23°C

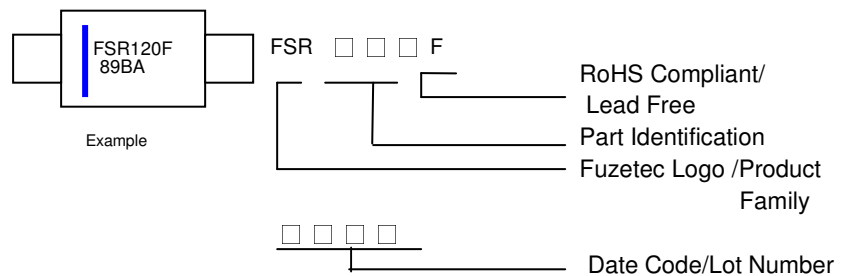
- A = FSR120F
- B = FSR175F
- C = FSR200F
- D = FSR350F
- E = FSR420F



Part Numbering System



Part Marking System



Standard Package

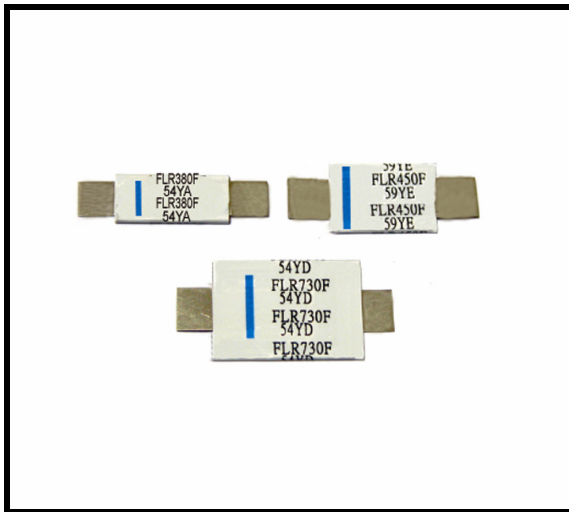
P/N	Pcs /Bag
FSR120F	1K
FSR175F	1K
FSR200F	500

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.



FLR Series



RoHS Compliant & Lead Free Product



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°C to 85°C

Agency Recognition: UL (E211981)

*C-UL (E211981)

TÜV (R50004084)

Electrical Characteristics(23°C)

Part Number	Hold Current I _H , A	Trip Current I _T , A	Max. Time to Trip at 5xI _H , s	Rated Voltage V _{MAX} , V _{DC}	Max. Current I _{MAX} , A	Typical Power Pd, W	Resistance Tolerance		
							R _{MIN} Ohms	R _{MAX} Ohms	R _{1MAX} 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°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

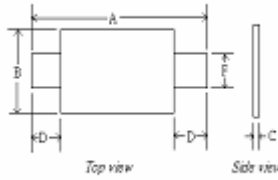
Physical specifications:

Lead material:0.13mm nominal thickness, quarter-hard nickel.

Insulating material: Polyester tape.

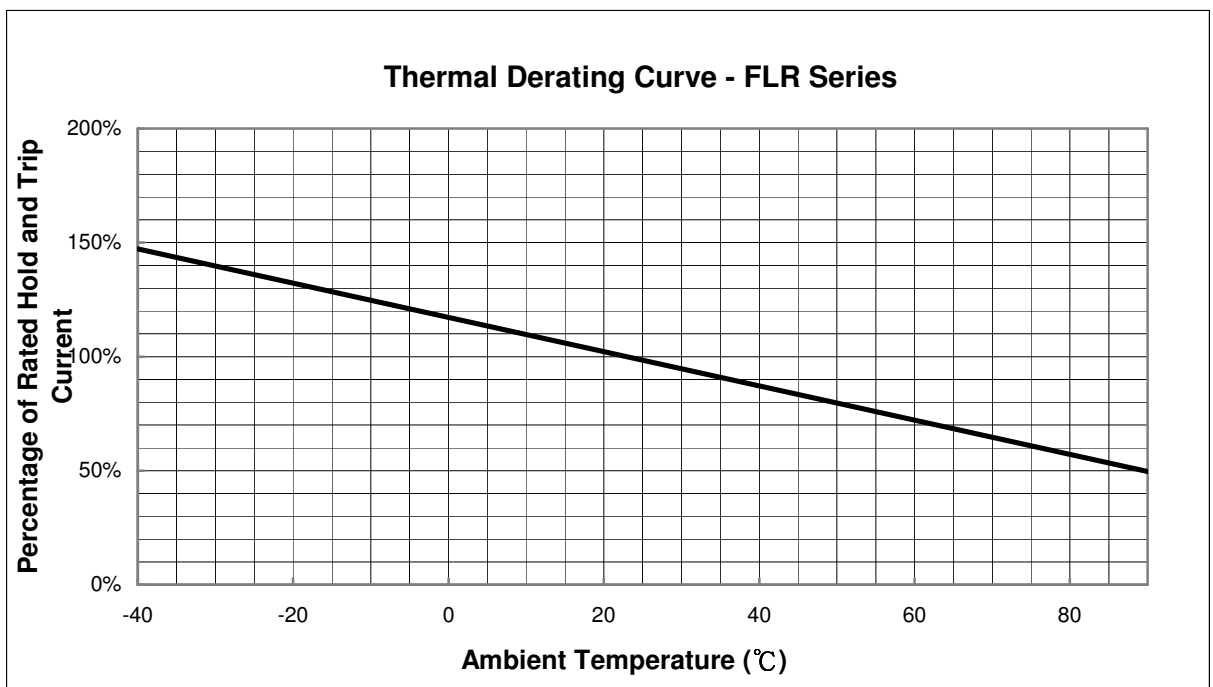
*NOTE : C-UL is not applied for FLR450 ~ FLR730.

FLR Product Dimensions (Millimeter)



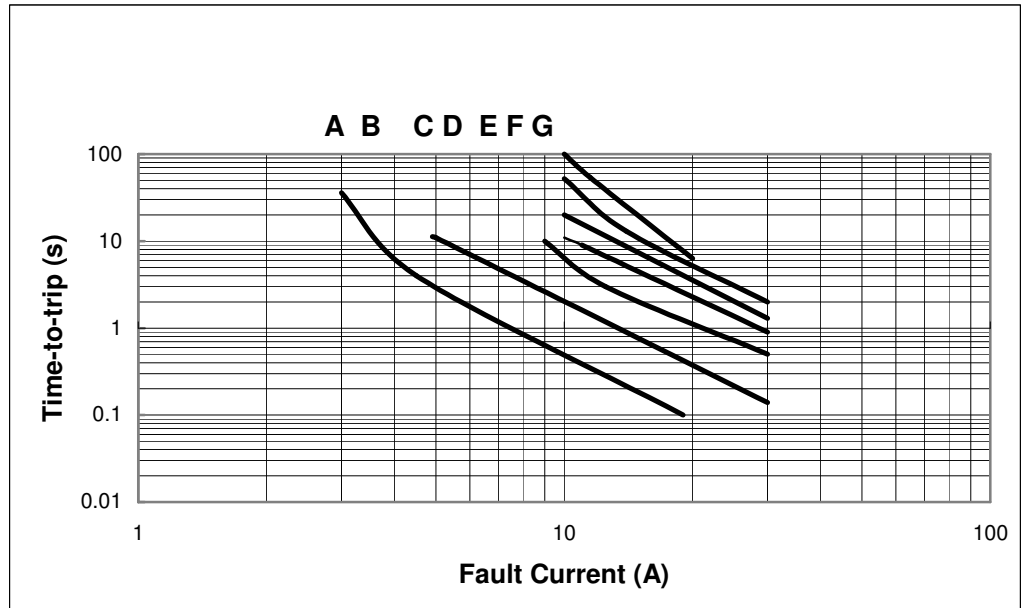
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FLR190F	19.9	22.1	4.9	5.5	0.6	1.0	5.5	7.5	3.9	4.1
FLR260F	20.9	23.1	4.9	5.5	0.6	1.0	4.1	5.5	3.9	4.1
FLR380F	24.0	26.0	6.9	7.5	0.6	1.0	4.1	5.5	4.9	5.1
FLR450F	24.0	26.0	9.9	10.5	0.6	1.0	5.3	6.7	5.9	6.1
FLR550F	35.0	37.0	6.9	7.5	0.6	1.0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

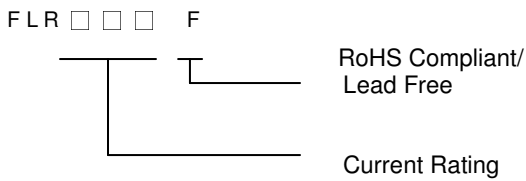


Typical Time-To-Trip at 23°C

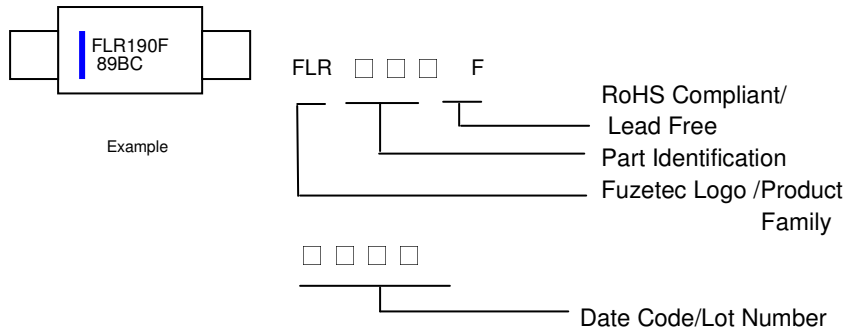
- A=FLR190F
- B=FLR260F
- C=FLR380F
- D=FLR450F
- E=FLR550F
- F=FLR600F
- G=FLR730F



Part Numbering System



Part Marking System



Standard Package

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

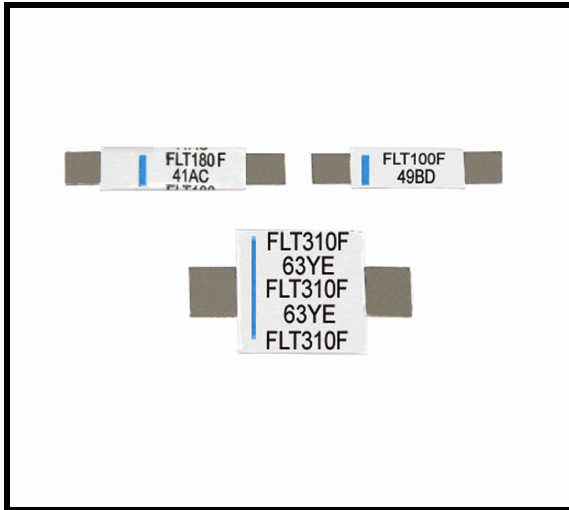
P/N	Pcs /Bag
FLR550F	500
FLR600F	500
FLR730F	500

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.

FLT Series



RoHS Compliant & 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°C to 85°C

Agency Recognition:UL(E211981)

C-UL(E211981)

TÜV (R3-50004084)

Electrical Characteristics(23°C)

Part Number	Hold Current I _H , A	Trip Current I _T , A	Max. Time to Trip at 5xI _H , s	Rated Voltage V _{MAX} , V _{DC}	Max. Current I _{MAX} , A	Typical Power Pd, W	Resistance Tolerance		
							R _{MIN} Ohms	R _{MAX} Ohms	R _{1MAX} 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°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

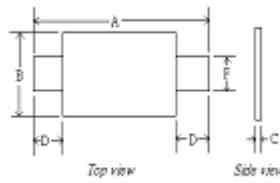
R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

Physical specifications:

Lead material:0.13mm nominal thickness, quarter-hard nickel.

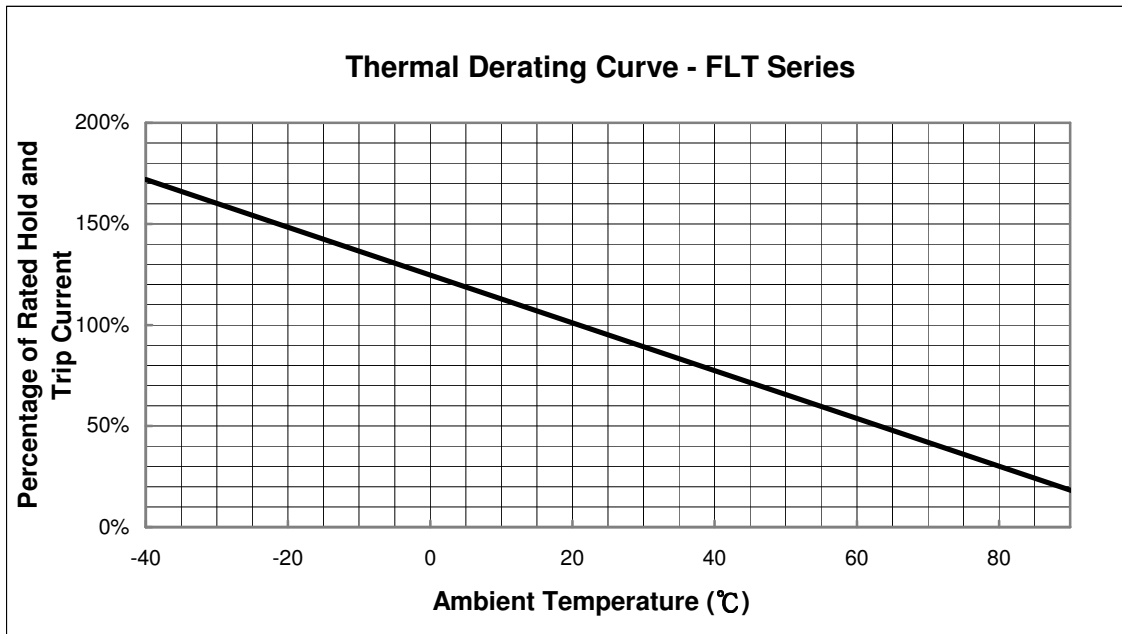
Insulating material: Polyester tape.

FLT Product Dimensions (Millimeter)



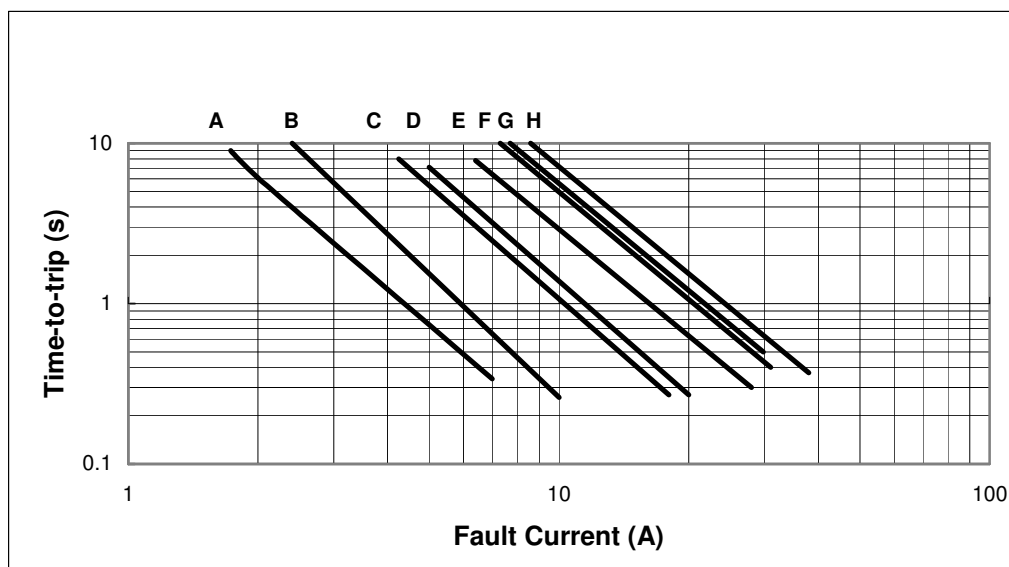
Part Number	A		B		C		D		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FLT070F	19.9	22.1	4.9	5.2	0.7	1.2	5.5	7.5	3.9	4.1
FLT100F	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FLT180F	24.0	26.0	4.9	5.2	0.6	1.0	4.1	5.5	3.9	4.1
FLT190F	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	4.8	5.4
FLT260F	24.0	26.0	10.8	11.9	0.6	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

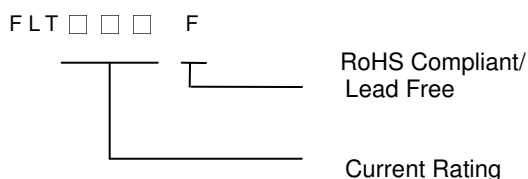


Typical Time-To-Trip at 23°C

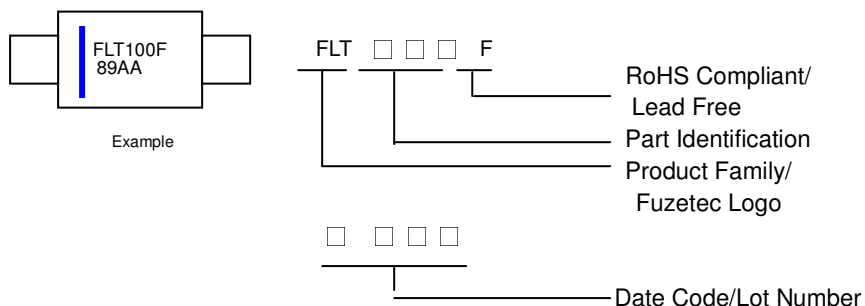
- A=FLT070F
- B=FLT100F
- C=FLT180F
- D=FLT190F
- E=FLT260F
- F=FLT300F
- G=FLT310F
- H=FLT340F



Part Numbering System



Part Marking System



Standard Package

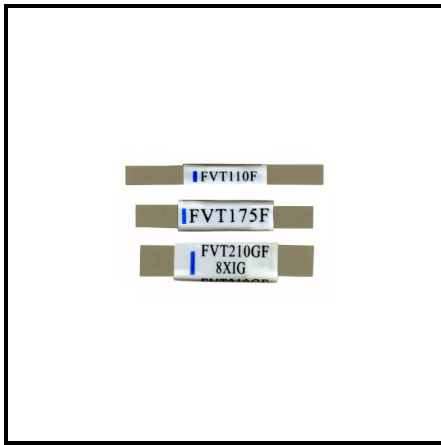
P/N	Pcs /Bag
FLT070F	1K
FLT100F	1K
FLT180F	1K
FLT190F	500

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.



FVT Series



RoHS Compliant & Lead Free

Application:

Laptop Computer, Rechargeable battery packs, Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 1.1~2.4A

Maximum Voltage: 16V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (Pending)

C-UL (Pending)

TÜV (Pending)

Electrical Characteristics (23°C)

Part Number	Hold Current I _H , A	Trip Current I _T , A	Rated Voltage V _{MAX} , VDC	Max. Current I _{MAX} , A	Typical Power Pd, W	Resistance Tolerance		
						R _{MIN} Ohms	R _{MAX} Ohms	R _{1MAX} Ohms
FVT110F	1.10	2.7	16	100	0.7	0.038	0.070	0.140
FVT170F	1.70	3.4	16	100	0.7	0.030	0.052	0.105
FVT175F	1.75	3.6	16	100	0.8	0.029	0.051	0.102
FVT200F	2.00	4.7	16	100	0.9	0.022	0.039	0.078
FVT210GF	2.10	4.7	16	100	1.2	0.018	0.030	0.060
FVT240F	2.40	5.9	16	100	1.0	0.014	0.026	0.052

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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°C still air environment.

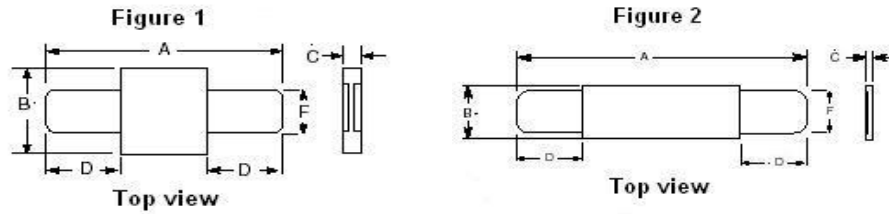
R_{MIN}=Minimum device resistance at 23°C.

R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

Physical specifications: Lead material: 0.10mm nominal thickness, quarter-hard nickel.

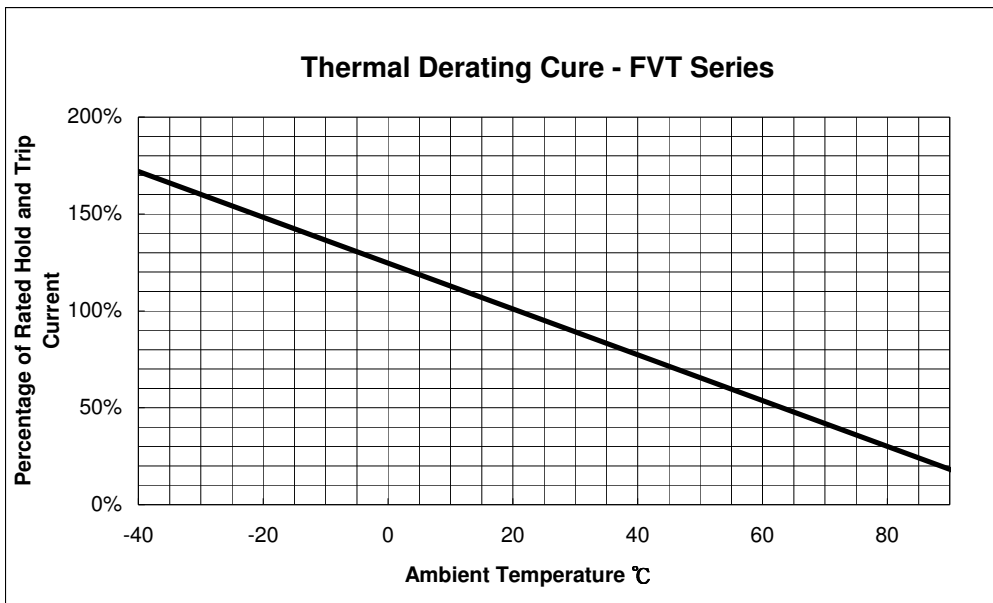
Insulating material: Polyester tape.

FVT Product Dimensions (Millimeter)



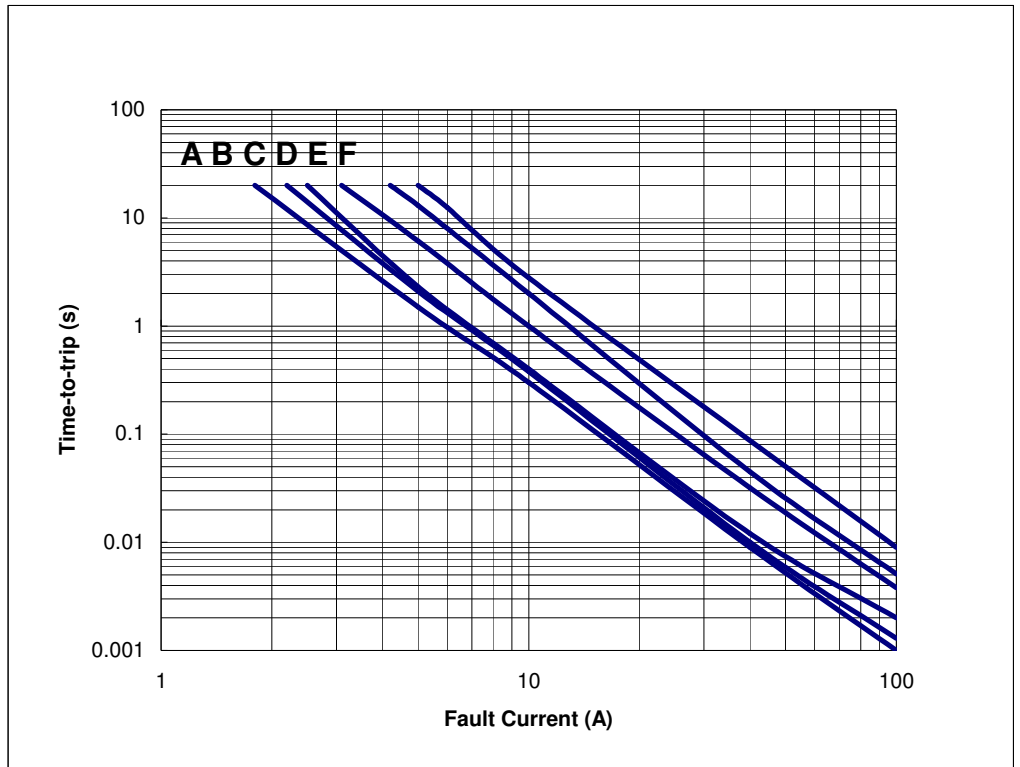
Part Number	Fig	A		B		C		D		F	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FVT110F	2	23.6	25.6	2.6	2.9	0.5	0.9	7.0	8.0	2.3	2.5
FVT170F	1	15.4	17.5	7.0	7.4	0.5	0.9	4.0	6.2	3.9	4.1
FVT175F	2	21.0	23.0	3.4	3.7	0.5	0.9	5.5	6.6	2.9	3.1
FVT200F	2	21.0	23.0	4.1	4.5	0.5	0.9	3.5	4.8	2.9	3.1
FVT210GF	2	21.0	23.0	4.9	5.2	0.5	0.9	4.1	5.5	3.9	4.1
FVT240F	2	23.8	26.0	4.9	5.3	0.5	0.9	4.0	5.5	3.9	4.1

Thermal Derating Curve



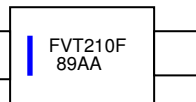
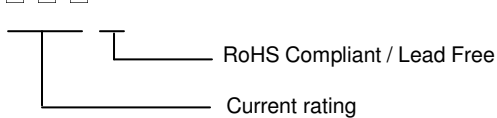
Typical Time-To-Trip at 23°C

- A= FVT 110F
- B= FVT 170F
- C= FVT 175F
- D= FVT 200F
- E= FVT 210F
- F= FVT 240F



Part Numbering System

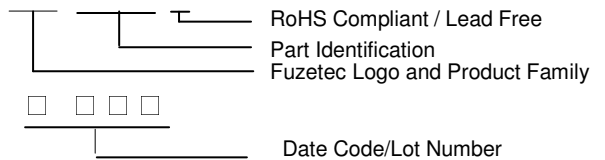
FVT □ □ □ F



Example

Part Marking System

FVT □ □ □ F



Standard Package

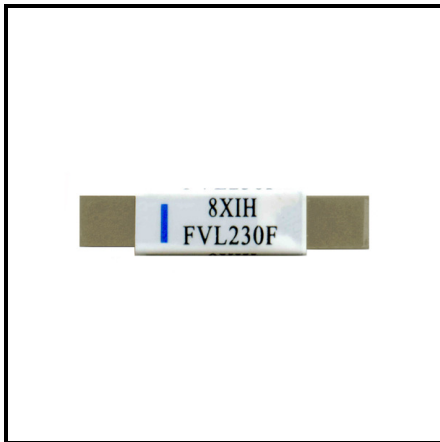
P/N	Pcs /Bag
FVT110F	1K
FVT170F	1K
FVT175F	500

P/N	Pcs /Bag
FVT200F	500
FVT210F	500
FVT240F	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.



FVL Series



RoHS Compliant & Lead Free

Application:

Laptop Computer, Rechargeable battery packs, Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 1.7~2.3A

Maximum Voltage: 12V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (Pending)

C-UL (Pending)

TÜV (Pending)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Resistance Tolerance		
						R _{MIN}	R _{MAX}	R _{1MAX}
	I _H ,A	I _T ,A	V _{MAX} , VDC	I _{MAX} , A	P _d , W	Ohms	Ohms	Ohms
FVL170F	1.7	4.1	12	100	1.4	0.018	0.032	0.064
FVL175F	1.75	4.2	12	100	1.4	0.017	0.031	0.062
FVL230F	2.3	5.0	12	100	1.4	0.012	0.018	0.036

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).

P_d=Maximum power dissipated from device when in tripped state in 23°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

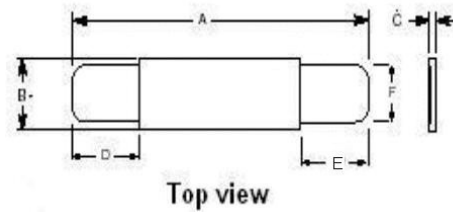
R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

Physical specifications:

Lead material: 0.10mm nominal thickness, quarter-hard nickel.

Insulating material: Polyester tape.

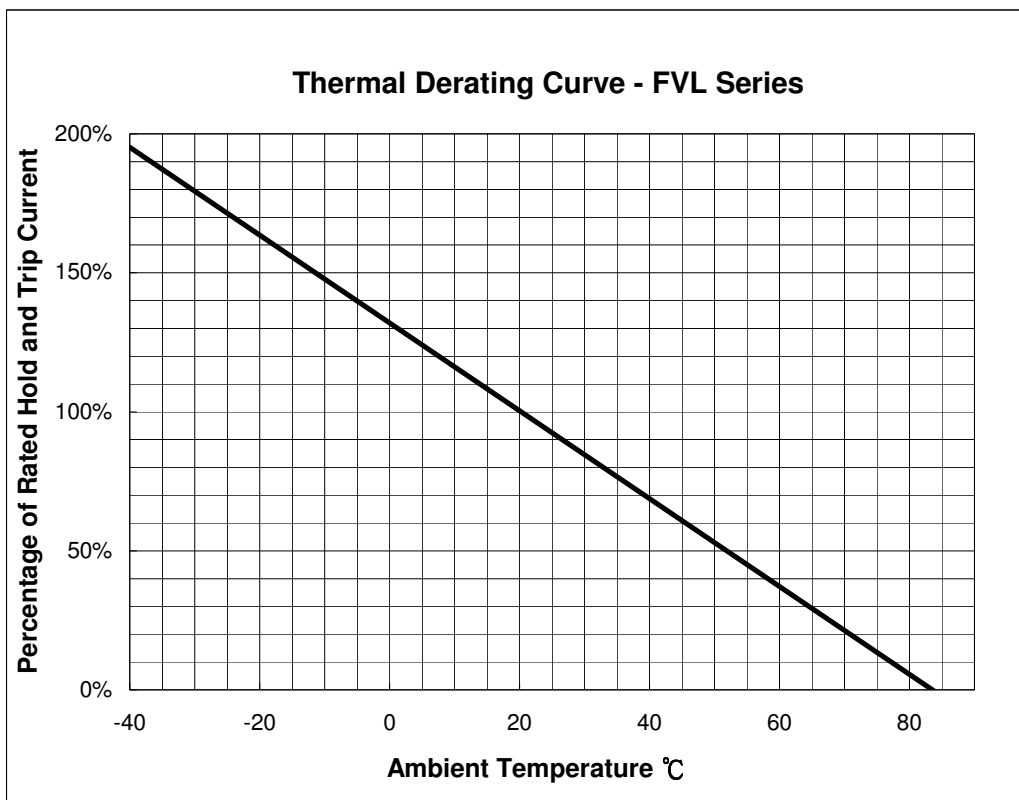
FVL Product Dimensions (Millimeter)



Top view

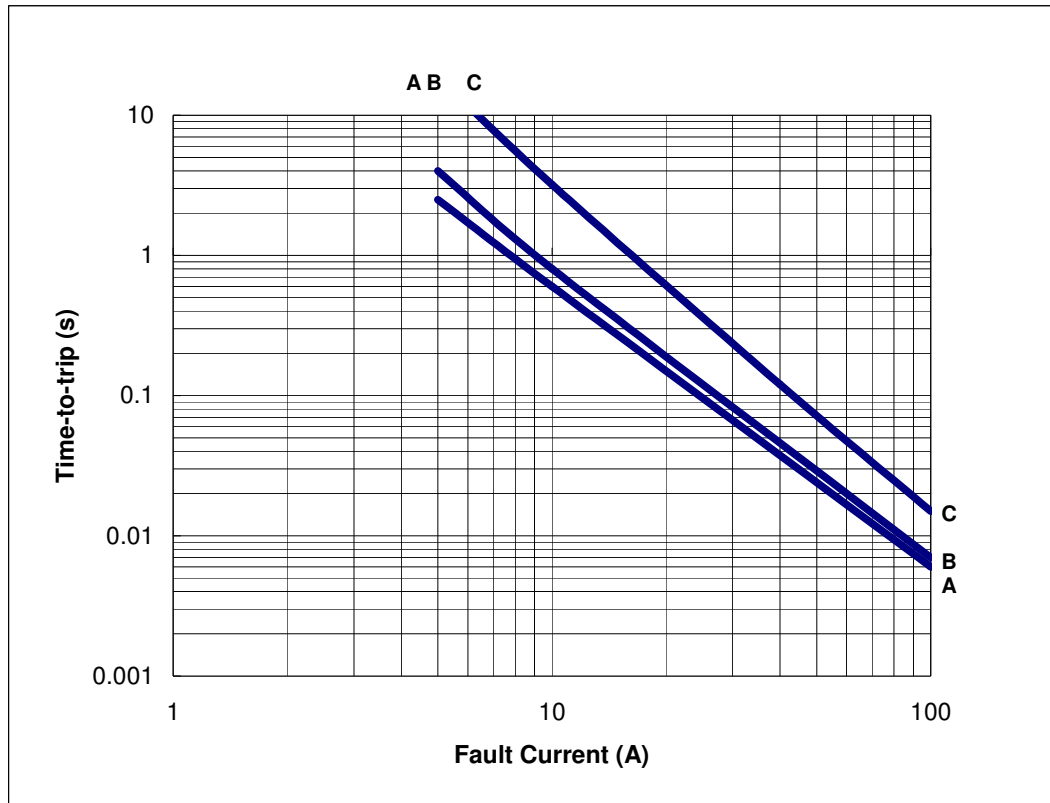
Part Number	A		B		C		D		E		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FVL170F	20.8	23.2	3.5	3.9	0.5	0.8	4.5	6.5	4.5	6.5	2.4	2.6
FVL175F	23.0	24.5	2.9	3.3	0.5	0.8	4.7	7.2	3.8	5.4	2.4	2.6
FVL230F	20.9	23.1	4.9	5.3	0.5	0.8	4.1	5.8	4.1	5.8	2.4	2.6

Thermal Derating Curve

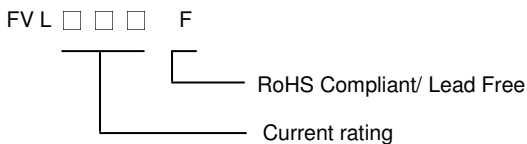


Typical Time-To-Trip at 23°C

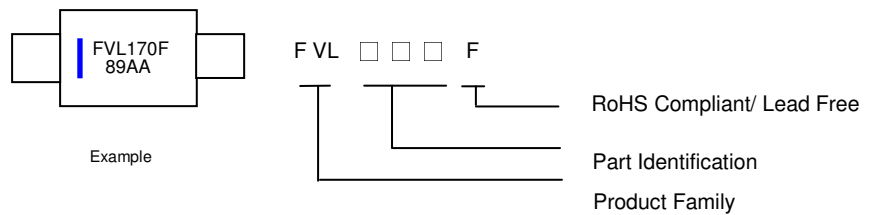
A= FVL 170F
 B= FVL 175F
 C= FVL 230F



Part Numbering System



Part Marking System



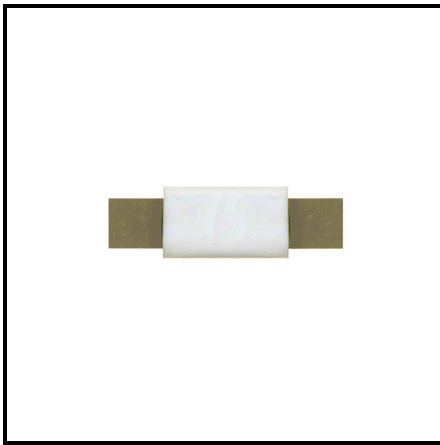
Standard Package

P/N	Pcs /Bag
FVL170F	1K
FVL 175F	1K
FVL230F	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.



FSL Series



RoHS Compliant & Lead Free

Application:

Laptop Computer, Mobile phone battery packs, Rechargeable battery packs, Lithium cell and battery packs

Product Features:

Low profile, Solid state

Operation Current: 1.9A

Maximum Voltage: 6V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (Pending)

C-UL (Pending)

TÜV (Pending)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max. Current	Typical Power	Resistance Tolerance		
						R _{MIN}	R _{MAX}	R _{1MAX}
	I _H ,A	I _T ,A	V _{MAX} , V _{dc}	I _{MAX} , A	P _d , W	Ohms	Ohms	Ohms
FSL190F	1.9	4.9	6	50	1.0	0.006	0.014	0.024

I_H=Hold current-maximum current at which the device will not trip at 23°C still air.

I_T=Trip current-minimum current at which the device will always trip at 23°C 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}).

P_d=Maximum power dissipated from device when in tripped state in 23°C still air environment.

R_{MIN}=Minimum device resistance at 23°C.

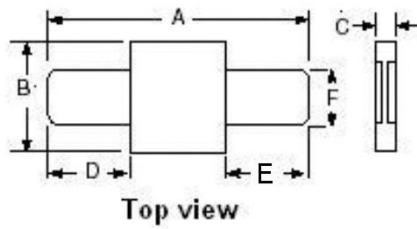
R_{1MAX}=Maximum device resistance at 23°C, 1 hour after tripping.

Physical specifications:

Lead material: 0.10 mm nominal thickness, quarter-hard nickel.

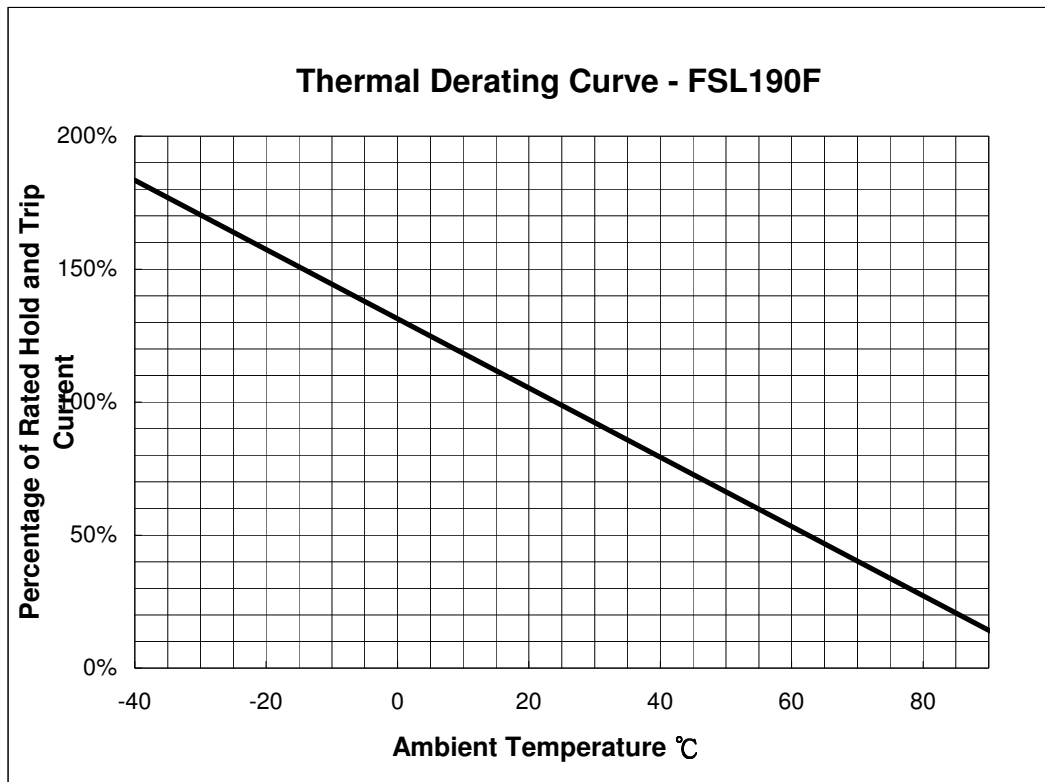
Insulating material: Polyester tape.

FSL Product Dimensions (Millimeter)

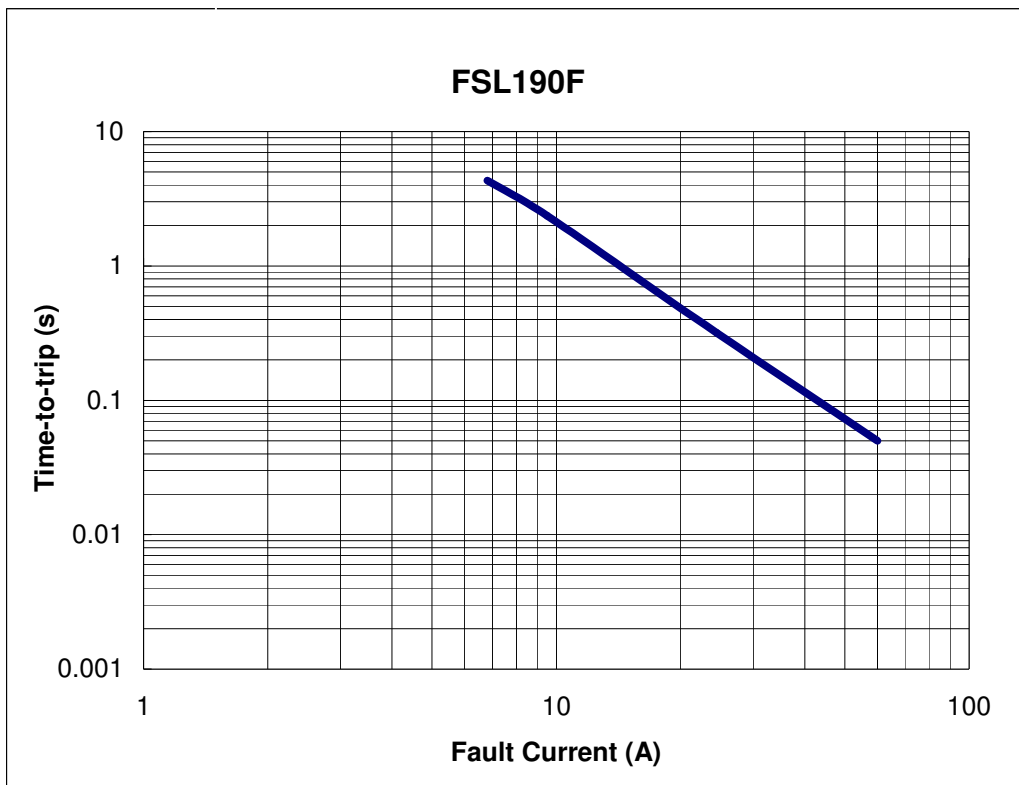


Part Number	A		B		C		D		E		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSL190F	9.20	10.80	3.15	3.45	0.55	0.95	2.15	3.25	2.15	3.25	2.20	2.40

Thermal Derating Curve

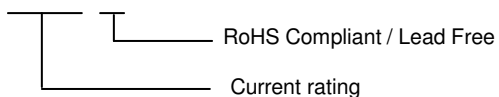


Typical Time-To-Trip at 23°C



Part Numbering System

FSL □ □ □ F



Part Marking System



Example

Standard Package

P/N	Pcs /Bag
FSL190F	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.

<u>Fuzetec</u>		<u>Raychem</u>		<u>Bourns</u>		<u>Littelfuse</u>	
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	--	--	MF-R	020	60R	020
FRX	025-60F	--	--	MF-R	025	60R	025
FRX	030-60F	--	--	MF-R	030	60R	030
FRX	040-60F	--	--	MF-R	040	60R	040
FRX	050-60F	--	--	MF-R	050	60R	050
FRX	065-60F	--	--	MF-R	065	60R	065
FRX	075-60F	--	--	MF-R	075	60R	075
FRX	090-60F	--	--	MF-R	090	60R	090
FRX	110-60F	--	--	MF-RX	110	60R	110
FRX	135-60F	--	--	MF-RX	135	60R	135
FRX	160-60F	--	--	MF-RX	160	60R	160
FRX	185-60F	--	--	MF-RX	185	60R	185
FRX	250-60F	--	--	MF-RX	250	60R	250
FRX	300-60F	--	--	MF-RX	300	60R	300
FRX	375-60F	--	--	MF-RX	375	60R	375
FRX	010-90F	--	--	--	--	--	--
FRX	015-90F	--	--	--	--	--	--
FRX	017-90F	--	--	--	--	--	--
FRX	020-90F	RXEF	020	MF-RX	020/72	72R	020X
FRX	025-90F	RXEF	025	MF-RX	025/72	72R	025X
FRX	030-90F	RXEF	030	MF-RX	030/72	72R	030X
FRX	035-90F	--	--	--	--	--	--
FRX	040-90F	RXEF	040	MF-RX	040/72	72R	040X
FRX	050-90F	RXEF	050	MF-RX	050/72	72R	050X
FRX	055-90F	--	--	--	--	--	--
FRX	065-90F	RXEF	065	MF-RX	065/72	72R	065X
FRX	075-90F	RXEF	075	MF-RX	075/72	72R	075X
FRX	090-90F	RXEF	090	MF-RX	090/72	72R	090X
FRX	110-90F	RXEF	110	MF-RX	110/72	72R	110X
FRX	135-90F	RXEF	135	MF-RX	135/72	72R	135X
FRX	160-90F	RXEF	160	MF-RX	160/72	72R	160X
FRX	185-90F	RXEF	185	MF-RX	185/72	72R	185X
FRX	250-90F	RXEF	250	MF-RX	250/72	72R	250X
FRX	300-90F	RXEF	300	MF-RX	300/72	72R	300X
FRX	375-90F	RXEF	375	MF-RX	375/72	72R	375X
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	055/90(U)	--	--
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

IV - APPENDIX - 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	--	--	06R	075B
FUSB	090F	RUSBF	090	--	--	16R	090B
FUSB	110F	RUSBF	110	--	--	06R	110B
FUSB	120F	RUSBF	120	--	--	06R	120B
FUSB	135F	RUSBF	135	--	--	16R	135B
FUSB	155F	RUSBF	155	--	--	06R	155B
FUSB	160F	RUSBF	160	--	--	16R	160B
FUSB	185F	RUSBF	185	--	--	16R	185B
FUSB	250F	RUSBF	250	--	--	16R	250B
FRG	250-16F	RGEF	250	--	--	16R	250G
FRG	300-16F	RGEF	300	MF-RG	300	16R	300G
FRG	400-16F	RGEF	400	--	--	16R	400G
FRG	500-16F	RGEF	500	MF-RG	500	16R	500G
FRG	600-16F	RGEF	600	--	--	16R	600G
FRG	700-16F	RGEF	700	--	--	16R	700G
FRG	800-16F	RGEF	800	--	--	16R	800G
FRG	900-16F	RGEF	900	--	--	16R	900G
FRG	1000-16F	RGEF	1000	--	--	16R	1000G
FRG	1100-16F	RGEF	1100	MF-R	1100	16R	1100G
FRG	1200-16F	RGEF	1200	--	--	16R	1200G
FRG	1400-16F	RGEF	1400	--	--	16R	1400G
FHT	050-30F	RHEF	050	--	--	--	--
FHT	070-30F	RHEF	070	MF-RHT	070	--	--
FHT	100-30F	RHEF	100	--	--	--	--
FHT	200-16F	RHEF	200	MF-RHT	200	--	--
FHT	300-16F	RHEF	300	--	--	--	--
FHT	400-16F	RHEF	400	--	--	--	--
FHT	450-16F	RHEF	450	MF-RHT	450	--	--
FHT	550-16F	RHEF	550	--	--	--	--
FHT	600-16F	RHEF	600	--	--	--	--
FHT	650-16F	RHEF	650	MF-RHT	650	--	--
FHT	700-16F	RHEF	700	--	--	--	--
FHT	750-16F	RHEF	750	MF-RHT	750	--	--
FHT	800-16F	RHEF	800	--	--	--	--
FHT	900-16F	RHEF	900	--	--	--	--
FHT	1000-16F	RHEF	1000	--	--	--	--
FHT	1100-16F	RHEF	1100	--	--	--	--
FHT	1300-16F	RHEF	1300	MF-RHT	1300	--	--
FHT	1400-16F	RHEF	1400	--	--	--	--
FHT	1500-16F	RHEF	1500	--	--	--	--

IV - APPENDIX - CROSS REFERENCE



<u>Fuzetec</u>		<u>Raychem</u>		<u>Bourns</u>		<u>Littelfuse</u>	
FRH	080-250UVF	--	--	--	--	--	--
FRH	080-250VF	--	--	--	--	--	--
FRH	110-250UVF	--	--	--	--	--	--
FRH	110-250VF	--	--	--	--	--	--
FRH	120-250UVF	--	--	--	--	--	--
FRH	120-250VF	--	--	--	--	--	--
FRH	145-250UVF	--	--	--	--	--	--
FRH	145-250VF	--	--	--	--	--	--
FRH	180-250UVF	--	--	--	--	--	--
FRH	180-250VF	--	--	--	--	--	--
FRH	180-250XF	TRF	250-180	--	--	--	--
FRH	150-600VF	--	--	--	--	--	--
FRH	150-600MF	TRF	600-150	--	--	--	--
FRH	160-600VF	TRF	600-160	--	--	--	--
FRH	080-250UF	TRF250	080U	--	--	250R	080U
FRH	080-250F	--	--	--	--	250R	080C
FRH	110-250UF	TRF250	110U	--	--	250R	110U
FRH	110-250F	--	--	--	--	250R	110C
FRH	120-250UF	TRF250	120U	MF-RX	012/250U	250R	120U
FRH	120-250F	TRF250	120	MF-RX	012/250	250R	120C
FRH	145-250UF	TRF250	145U	MF-RX	014/250U	250R	145U
FRH	145-250F	TRF250	145	MF-RX	014/250	250R	145C
FRH	180-250UF	--	--	MF-RX	018/250U	250R	180U
FRH	180-250F	--	--	MF-RX	018/250	250R	180C
FRH	150-600F	--	--	MF-R	015/600	600R	150
FRH	160-600F	--	--	MF-R	016/600	600R	160
FRV	005-240F	LVR	005S	--	--	--	--
FRV	008-240F	LVR	008S	--	--	--	--
FRV	012-240F	LVR	012S	--	--	--	--
FRV	016-240F	LVR	016S	--	--	--	--
FRV	025-240F	LVR	025S	--	--	--	--
FRV	033-240F	LVR	033S	--	--	--	--
FRV	040-240F	LVR	040S	--	--	--	--
FRV	055-240F	LVR	055S	--	--	--	--
FRV	075-240F	LVR	075S	--	--	--	--
FRV	100-240F	LVR	100S	--	--	--	--
FRV	125-240F	LVR	125S	--	--	--	--
FRV	200-240F	LVR	200S	--	--	--	--
FRVL	010-120F	--	--	--	--	--	--
FRVL	017-120F	--	--	--	--	--	--
FRVL	020-120F	--	--	--	--	--	--
FRVL	025-120F	--	--	--	--	--	--
FRVL	030-120F	--	--	--	--	--	--
FRVL	040-120F	--	--	--	--	--	--
FRVL	050-120F	--	--	--	--	--	--
FRVL	065-120F	--	--	--	--	--	--
FRVL	070-120F	--	--	--	--	--	--
FRVL	075-120F	LVRL	075S	--	--	--	--
FRVL	090-120F	--	--	--	--	--	--
FRVL	100-120F	LVRL	100S	--	--	--	--
FRVL	110-120F	--	--	--	--	--	--
FRVL	125-120F	LVRL	125S	--	--	--	--
FRVL	130-120F	--	--	--	--	--	--
FRVL	135-120F	LVRL	135S	--	--	--	--
FRVL	160-120F	--	--	--	--	--	--
FRVL	185-120F	--	--	--	--	--	--
FRVL	200-120F	LVRL	200S	--	--	--	--
FRVL	250-120F	--	--	--	--	--	--
FRVL	300-120F	--	--	--	--	--	--
FRVL	375-120F	--	--	--	--	--	--

Fuzetec		Raychem		Bourns		Littelfuse	
FVT	110F	VTP	110F	--	--	--	--
FVT	170F	VTP	170F	MF-VS	170	16VT	170
FVT	175F	VTP	175F	--	--	16VT	175
FVT	200F	VTP	200GF	--	--	16VT	200
FVT	210GF	VTP	210GF	MF-VS	210	16VT	210
FVT	240F	VTP	240F	--	--	16VT	240
FVL	170F	VLR	170F	MF-SVS	170	12VL	170
FVL	175F	VLR	175F	MF-SVS	175	12VL	175
FVL	230F	VLR	230F	MF-SVS	230	12VL	230
FSL	190F	MXP	190BB	--	--	--	--
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			15LT	070
FLT	100F	LTP	100F	MF-LS	100	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			--	--	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	010	--	--	MF-MSMF	010	1812L	010
FSMD	014	miniSMDC	014F	MF-MSMF	014	1812L	014
FSMD	020	miniSMDC	020F	MF-MSMF	020	1812L	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	1812L	110/16
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	FSMD200R	MiniSMDC	200F	MF-MSMF	200	1812L	200
FSMD	FSMD260R	MiniSMDC	260F	MF-MSMF	260	1812L	260
FSMD	FSMD300R	--	--	--	--	--	--
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
FSMD**	185-2920	SMD	185F	MF-SM	185/33	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**	300-2920	SMD	300F	MF-SM	300	2920L	300

<u>Fuzetec</u>		<u>Raychem</u>		<u>Bourns</u>		<u>Littelfuse</u>	
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	110-1210R	microSMD	110F	MF-USMF	110	1210L	110
FSMD	150-1210R	microSMD	150F	MF-USMF	150	1210L	150
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
FSMD	075-1206R	nanoSMDC	075F	MF-NSMF	075	1206L	075
FSMD	100-1206R	--	--	--	--	1206L	100
FSMD	110-1206R	nanoSMDC	110F	MF-NSMF	110	1206L	110
FSMD	150-1206R	nanoSMDC	150F	MF-NSMF	150	1206L	150
FSMD	200-1206R	nanoSMDC	200F	MF-NSMF	200	--	--
FSMD	010-0805	--	--	MF-PSMF	010X	0805L	010
FSMD	020-0805	--	--	MF-PSMF	020X	0805L	020
FSMD	035-0805	picoSMD	035F	MF-PSMF	035X	0805L	035
FSMD	050-0805R	--	--	MF-PSMF	050X	0805L	050
FSMD	075-0805R	--	--	MF-PSMF	075X	0805L	075
FSMD	100-0805R	--	--	MF-PSMF	110X	0805L	100

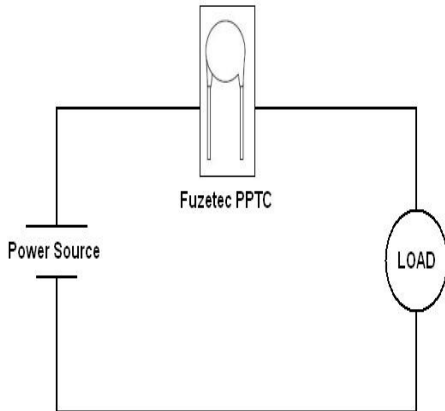
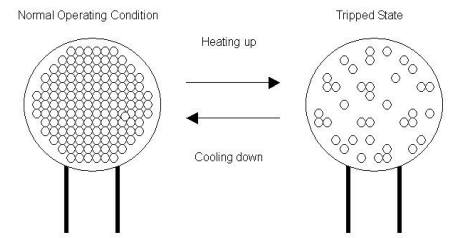
* : Dimensional equivalent. Functional identical.** : Dimensional smaller. Functional identical.

Thermal Derating for PPTC Device at Various Ambient Temperatures.

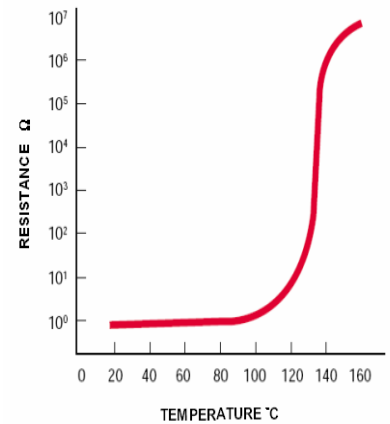
錯誤!

FUZETEC PPTC Family	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
FRX-60/90	136%	119%	100%	90%	81%	72%	63%	54%	40%
FBR	136%	118%	100%	90%	81%	72%	63%	54%	40%
FRU	130%	115%	100%	91%	83%	76%	67%	61%	52%
FRT	135%	120%	100%	98%	90%	85%	78%	70%	64%
FUSB	130%	115%	100%	91%	83%	76%	67%	61%	52%
FRG	132%	120%	100%	95%	88%	80%	71%	61%	47%
FHT	129%	116%	100%	93%	87%	80%	72%	65%	55%
FRHV	138%	119%	100%	92%	83%	73%	64%	55%	42%
FRH	138%	119%	100%	92%	83%	73%	64%	55%	42%
FRVL	138%	119%	100%	90%	80%	70%	60%	50%	38%
FRV	133%	114%	100%	92%	86%	73%	64%	52%	40%
FRA (Obsolete)	137%	122%	100%	95%	88%	79%	70%	65%	50%
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%
FSMD-0805	130%	116%	100%	91%	84%	76%	69%	61%	53%
FSR	135%	118%	100%	92%	85%	77%	69%	62%	50%
FLR	130%	115%	100%	93%	86%	78%	71%	64%	56%
FLT	143%	122%	100%	90%	80%	69%	59%	46%	26%
FVT	149%	127%	100%	90%	77%	65%	53%	41%	23%
FVL	163%	132%	100%	85%	68%	53%	38%	21%	-
FSL	158%	130%	100%	93%	80%	67%	55%	40%	20%

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 through 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 reset 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.

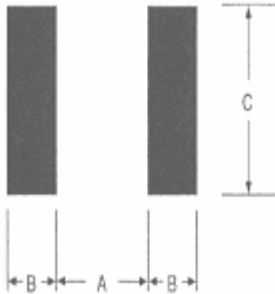


PPTC Applications by Industry

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 & Video Equipment
	Portable Game	GPS Navigation
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	

Pad Layouts · Solder Reflow Recommendations

The dimensions in the table below provide the recommended pad layout for Surface Mount Device in different footprints.



Pad dimensions(Millimeter)			
Device	A Nominal	B Nominal	C Nominal
All 2920 Series	5.10	2.30	5.60
All 1812 Series	3.45	1.78	3.50
All 1210 Series	2.00	1.00	2.80
All 1206 Series	1.20	1.00	1.50
All 0805 Series	1.20	1.00	1.50

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T _{smax} to T _p)	3 °C/second max.
Preheat :	
Temperature Min (T _{smin})	150 °C
Temperature Max (T _{smax})	200 °C
Time (t _{smin} to t _{smax})	60-180 seconds
Time maintained above:	
Temperature(T _L)	217 °C
Time (t _L)	60-150 seconds
Peak/Classification Temperature(T_p) :	260 °C
Time within 5°C of actual Peak :	
Temperature (t _p)	20-40 seconds
Ramp-Down Rate :	6 °C/second max.
Time 25 °C to Peak Temperature :	8 minutes max.

Note 1: All temperatures refer to the package, measured on the package body surface.

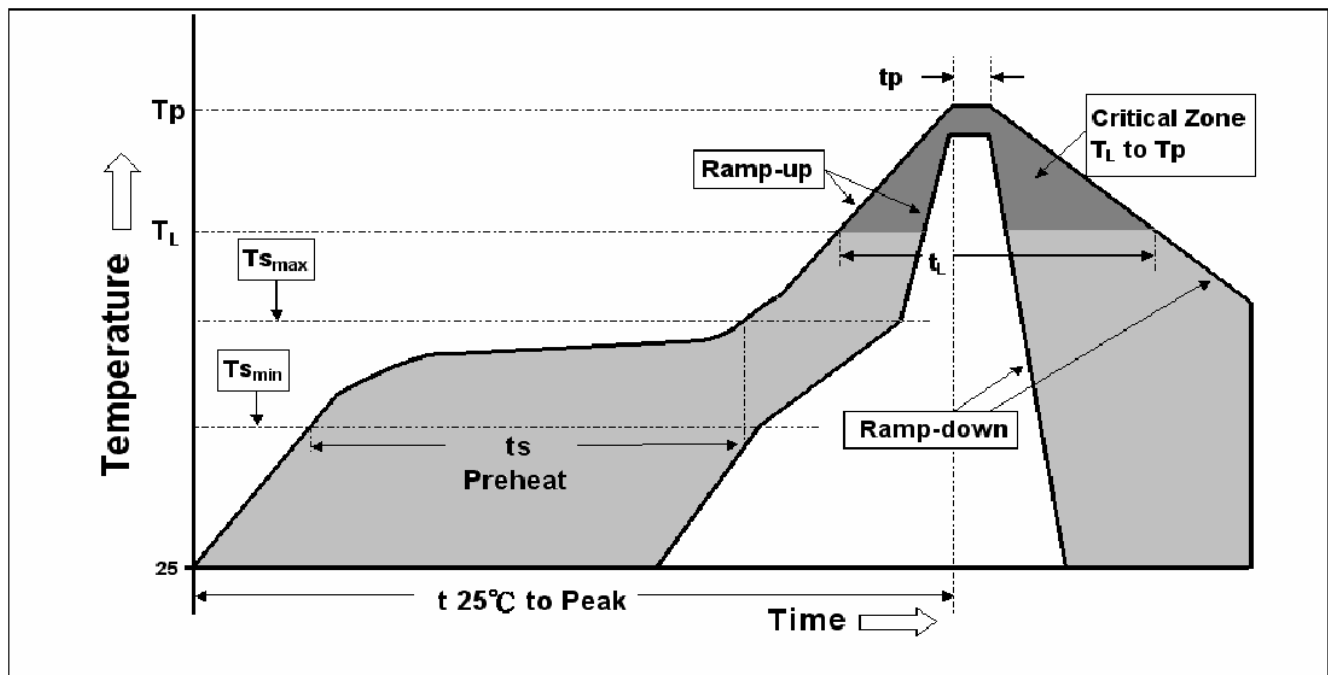
Solder reflow

※ 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 max paste thickness > 0.25mm.
2. Devices can be cleaned using standard methods and aqueous solvent.
3. Rework use standard industry practices.
4. Storage Environment : < 30°C / 60%RH

Caution:

1. If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
2. Devices are not designed to be wave soldered to the bottom side of the board



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 _____ °C and _____ °C

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	Wide Variety of Electronic Equipment
FRX90V	72V/90V	0.10A~3.75A	Radial Leaded	Wide Variety of Electronic Equipment
FBR	90V	0.10A~0.90A	Radial Leaded	Cable/Telephone Electronic
FRU	30 V	0.90A~9.00A	Radial Leaded	Wide Variety of Electronic Equipment
FRT	36V	0.50A~2.50A	Radial Leaded	Wide Variety of Electronic Equipment
FUSB	16V/30V	0.75A~2.50A	Radial Leaded	Low Voltage USB Equipment
FRG	16V	2.5A~14.0A	Radial Leaded	Wide Variety of Electronic Equipment
FHT	16V/30V	0.50A~15.00A	Radial Leaded	Operating temperatures up to 125°C.
FRHV	100V/250V/600V	0.08A~0.18A	Radial Leaded	Wide Variety of Electronic Equipment
FRH	60V/250V/600V	0.08A~0.18A	Radial Leaded	Telecommunication and Net Work
FRVL	120V _{VAC/DC}	0.10A ~3.75A	Radial Leaded	Line Voltage application
FRV	240V _{VAC/DC}	0.50A~2.00A	Radial Leaded	Line Voltage Power Supply, Transformer and Appliances
FRA(Obsolete)	120V _{VAC/DC}	0.10A~3.75A	Radial Leaded	Electrical & Electronic Appliance
FSMD 2920	6V~60V	0.30A~3.00A	Surface Mount	All High-Density Board
FSMD 1812	6V~60V	0.10A~3.00A	Surface Mount	All High-Density Board
FSMD 1210	6V~60V	0.05A ~0.75A	Surface Mount	All High-Density Board
FSMD 1206	6V~60V	0.05A ~1.50A	Surface Mount	All High-Density Board
FSMD 0805	6V~15V	0.10A~1.00A	Surface Mount	All High-Density Board
FSR	15V/30V	1.2A~4.2A	Axial Leaded	Rechargeable Battery Packs
FLR	15V/20V	1.9A~7.3A	Axial Leaded	Rechargeable Battery Packs
FLT	24V	0.7A ~3.4A	Axial Leaded	Rechargeable Battery Packs
FVT	16V	1.10A~2.40 A	Axial Leaded	Rechargeable battery packs, Lithium cell and battery packs
FVL	12V	1.70A~2.30 A	Axial Leaded	Rechargeable battery packs, Lithium cell and battery packs
FSL	6V	1.90A	Axial Leaded	Rechargeable battery packs, Lithium cell and battery packs

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: