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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, Smart Phone, Tablet PC's, Notebook PC's, Computers & Peripherals, Automotives, Instrumentation & Industrial Controls, Power Supplies, Consumer Electronics and Primary & Secondary Batteries etc.

FUZETEC™ PRODUCT FAMILY

FUZETEC™ product families are designed for global demanding electronic and electrical industries. Its resettable feature, compact size, flexible design construction, low thermal output and competitive cost out performed the traditional fuse, Ceramic PTC, Bimetal fuse and Current control IC. They are ideal for wide range voltage DC and AC applications. FUZETEC™ resettable fuses (PTC Thermistor, PTC VARIABLE RESISTOR, Variable Resistance PTC Thermistor, Variable Resistor, Current Limiter) are offered in a variety of constructions, which include: Radial Leaded (16V, 30V, 60V, 90V, 120VAC, 240 VAC, 250V & 600V), Surface Mount (0603, 0805, 1206, 1210, 1812 & 2920 sizes) and Axial Leaded (for all battery pack applications and others). In addition to standard products, FUZETEC™ also offers a variety range of custom design devices (i.e. Disc Type).



SAFETY, QUALITY AND CUSTOMER SATISFACTION

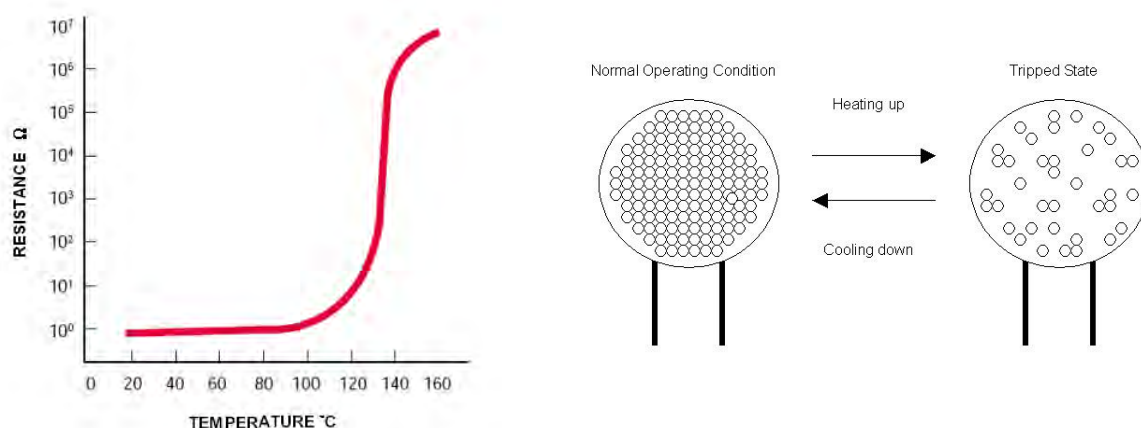
With third party approvals (UL, C-UL and TÜV), FUZETEC™ products are ensured to provide long lasting safety and performance. From product design and development, through manufacturing and quality control to delivery and shipment, Fuzetec Technology strictly implements **ISO/TS16949:2009**, **ISO9001:2008** 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 customers' 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 (**Energy = I*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.

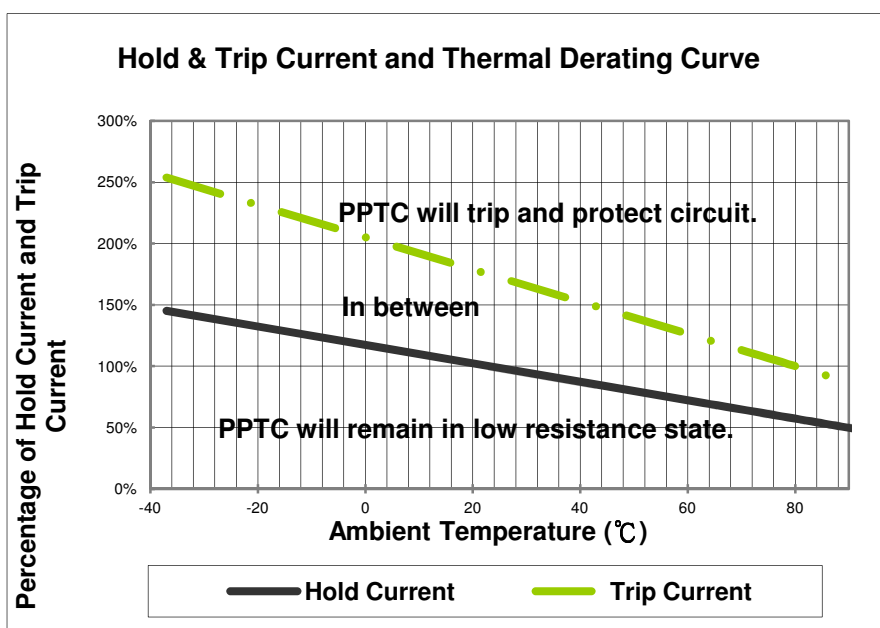
HOW DOES THE RESETTABLE FUSE WORK

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 flow 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 bellow, the currents are reduced nearly 50% at 85 °C and increased to 150% at -40°C.

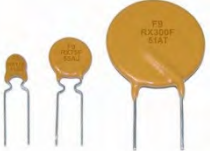
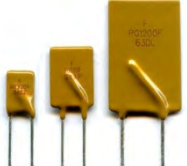
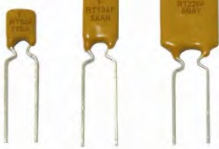
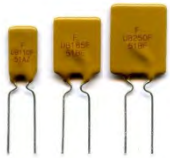
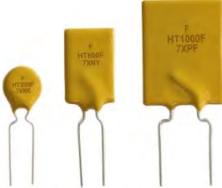
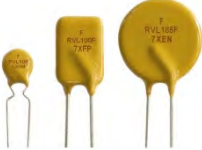


III - PRODUCT

PRODUCT SUMMARY



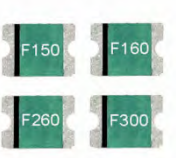
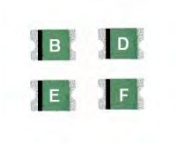
Radial Leaded (For Telecom & Electronic Equipment)

	<u>FRX</u> Operation Current:0.05A ~3.75A VMAX:60V _{DC} , IMAX: 40A. Wide Variety of Electronic Equipment		<u>FRU</u> Operation Current:0.90A ~9.00A VMAX:30V _{DC} , IMAX: 100A. Wide Variety of Electronic Equipment
	<u>FRX90V</u> Operation Current:0.10A ~3.75A VMAX:72V _{DC} /90V _{DC} , IMAX: 40A. Wide Variety of Electronic Equipment		<u>FRG</u> Operation Current:2.50A~14.00A VMAX:16V _{DC} , IMAX: 100A. Wide Variety of Electronic Equipment
	<u>FRT</u> Operation Current:0.50A ~2.50A VMAX:36V _{DC} , IMAX: 40A. IEEE1394 Firewire & Consumer Electronics		<u>FUSB</u> Operation Current:0.75A~2.50A VMAX:16V _{DC} /30V _{DC} , IMAX: 40A. Low Voltage USB Equipment
	<u>FHT</u> Operation Current: 0.50A~15.00A VMAX:16V _{DC} /30V _{DC} , IMAX:40A~100A. Wide operating temperatures up to 125°C.		<u>FRVL</u> Operation Current:0.10A ~3.75A VMAX:120V _{AC/DC} , IMAX: 2A~20A. Max Interrupt Voltage: 135V _{AC/DC} Line Voltage Application
	<u>FRHV</u> Operation Current:0.08A~0.18A VMAX:100V _{DC} /250V _{DC} , IMAX:3A~10A. Max Interrupt Voltage: 250/600V _{AC} Telecommunication and Network		<u>ERV</u> Operation Current: 0.05A~2.00A VMAX: 240V _{AC/DC} , IMAX: 1A~20A. Max Interrupt Voltage: 265V _{AC/DC} Line Voltage Application

PRODUCT SUMMARY

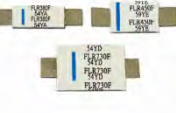


Surface Mount (For High Density Board)

	<u>FSMD2920</u> Operation Current: 0.30A ~3.00A VMAX:6V _{DC} ~60V _{DC} , IMAX: 100A. All High-Density Board		<u>FSMD1812</u> Operation Current: 0.10A ~3.00A VMAX:6V _{DC} ~60V _{DC} , IMAX: 100A. All High-Density Board
	<u>FSMD1210</u> Operation Current:0.05A ~2.00A VMAX:6V _{DC} ~60V _{DC} , IMAX: 100A. All High-Density Board		<u>FSMD1206</u> Operation Current:0.05A ~2.00A VMAX: 6V _{DC} ~60V _{DC} , IMAX: 100A. All High-Density Board
	<u>FSMD0805</u> Operation Current:0.10A~1.00A VMAX:6V _{DC} ~15V _{DC} , IMAX: 100A. All High-Density Board		<u>FSMD0603</u> Operation Current: 0.01A ~0.20A VMAX:9V _{DC} ~60V _{DC} , IMAX: 40A. All High-Density Board

Axial Leaded (For Rechargeable Battery Packs)



	<u>FVL</u> Operation Current: 1.70A~2.30 A VMAX:12V _{DC} , IMAX: 100A. Rechargeable Battery Packs, Lithium Cell and Battery Packs		<u>FVT</u> Operation Current: 1.10A~2.40 A VMAX:16V _{DC} , IMAX: 100A. Rechargeable Battery Packs, Lithium Cell and Battery Packs
	<u>FSR</u> Operation Current: 1.20A~4.20 A VMAX:15V _{DC} /30V _{DC} , IMAX: 100A Rechargeable Battery Packs		<u>FLR</u> Operation Current: 1.90A~7.30 A VMAX:15V _{DC} /20V _{DC} , IMAX: 100A. Rechargeable Battery Packs



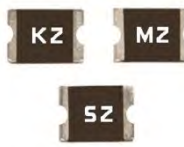
Chip & Disc type (For Motor Protection)

	<u>Chip & Disc</u> Custom Design Battery Cell and Charger Motor Protection
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PRODUCT SUMMARY – Low Rho PPTC RESETTABLE FUSE

Low Rho Surface Mount (For High Density Board)



	<u>Low Rho FSMD1812</u> Operation Current: 1.40A ~6.00A $V_{MAX}: 6V_{DC}, I_{MAX}: 100A.$ All High-Density Board		<u>Low Rho FSMD1210</u> Operation Current: 1.75A ~6.50A $V_{MAX}: 6V_{DC}, I_{MAX}: 100A.$ All High-Density Board
	<u>Low Rho FSMD1206</u> Operation Current: 0.50A ~5.00A $V_{MAX}: 6V_{DC}, I_{MAX}: 100A.$ All High-Density Board		<u>Low Rho FSMD0805</u> Operation Current: 0.75A ~2.00A $V_{MAX}: 6V_{DC}, I_{MAX}: 100A.$ All High-Density Board
	<u>Low Rho FSMD0603</u> Operation Current: 0.25A ~1.00A $V_{MAX}: 6V_{DC} \sim 9V_{DC}, I_{MAX}: 100A.$ All High-Density Board		



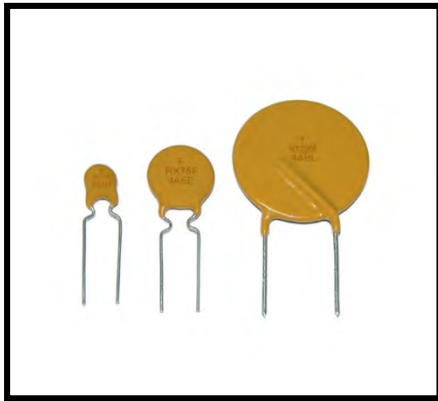
Low Rho Axial Leaded (For Rechargeable Battery Packs)

	<u>Low Rho Strap FSL</u> Operation Current: 1.40A ~7.00A $V_{MAX}: 6V_{DC}, I_{MAX}: 50A.$ Rechargeable Battery Packs, Lithium cell and Battery Packs protection, especially for Smart Phone and Tablet PC.
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GLOSSARY

- 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_{MAX} : Maximum device resistance at 23°C.
 $R1_{MAX}$: 1) Maximum resistance of device at 23°C measured 1 hour, after tripping for all product series;
 2) or after REFLOW soldering of 260°C for 20 seconds for all SMD series;
 3) or after WAVE soldering of 260°C for less than 5 seconds for all DIP series.
 Special Note : - In the event that TWO of the above three conditions were experienced once each, the acceptance criteria will become 1.3 times of $R1_{MAX}$.
 - In the event that ALL of the above three conditions were experienced once each, the acceptance criteria will become 1.5 times of $R1_{MAX}$.

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_{DC}

Operation Current: 0.05A ~ 3.75A

Maximum Voltage: 60V_{DC}

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	Typ. Power	Resistance	
							R _{MIN}	R _{1 MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	Ohms	Ohms
FRX005-60F	0.05	0.10	5.0	40	60	0.26	7.30	20.00
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

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.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	158%	138%	119%	100%	90%	81%	70%	60%	50%	36%

FRX Product Dimensions (mm)

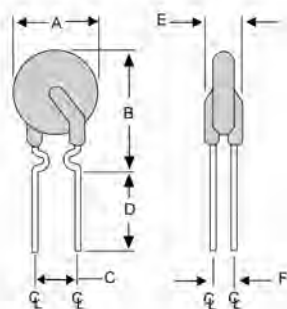


Fig.1
Lead Size: 24AWG
Φ 0.51 mm Diameter

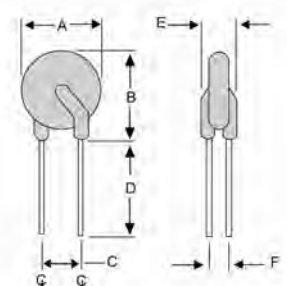
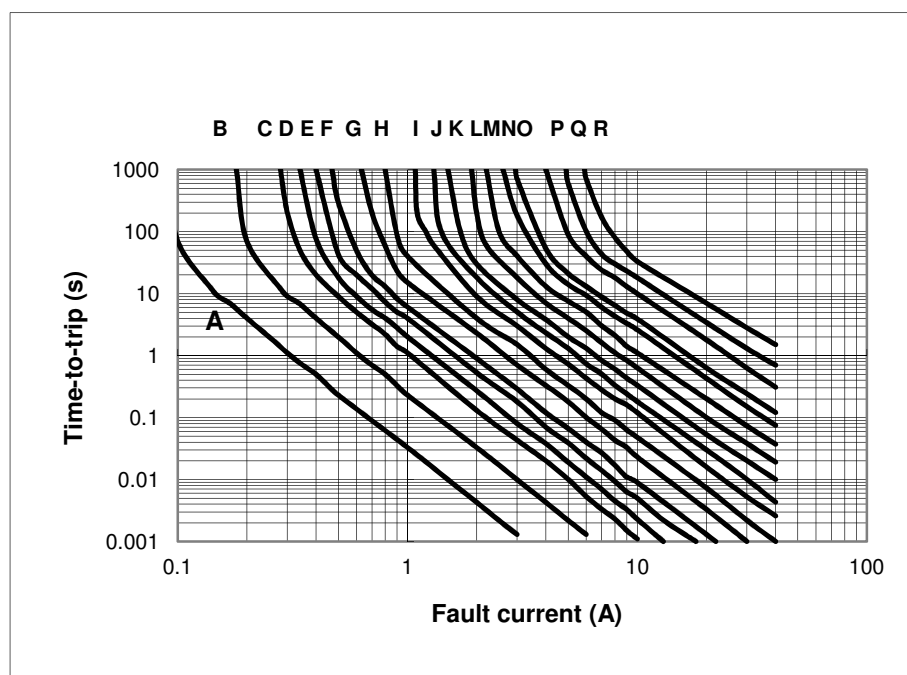


Fig.2
Lead Size: 20AWG
Φ 0.81 mm Diameter

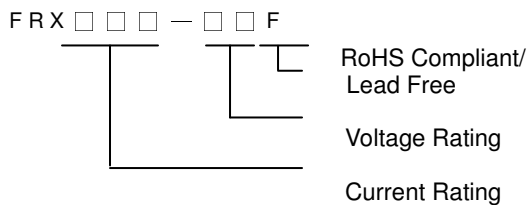
Part Number	Fig.	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ.
FRX005-60F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX010-60F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-60F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-60F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-60F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-60F	1	7.4	13.0	5.1	7.6	3.1	1.1
FRX040-60F	1	7.6	13.5	5.1	7.6	3.1	1.1
FRX050-60F	1	7.9	13.7	5.1	7.6	3.1	1.1
FRX065-60F	1	9.7	14.5	5.1	7.6	3.1	1.1
FRX075-60F	1	10.4	15.2	5.1	7.6	3.1	1.1
FRX090-60F	1	11.7	15.8	5.1	7.6	3.1	1.1
FRX110-60F	2	13.0	18.0	5.1	7.6	3.1	1.4
FRX135-60F	2	14.5	19.6	5.1	7.6	3.1	1.4
FRX160-60F	2	16.3	21.3	5.1	7.6	3.1	1.4
FRX185-60F	2	17.8	22.9	5.1	7.6	3.1	1.4
FRX250-60F	2	21.3	26.4	10.2	7.6	3.1	1.4
FRX300-60F	2	24.9	30.0	10.2	7.6	3.1	1.4
FRX375-60F	2	28.5	33.5	10.2	7.6	3.1	1.4

Typical Time-To-Trip at 23°C

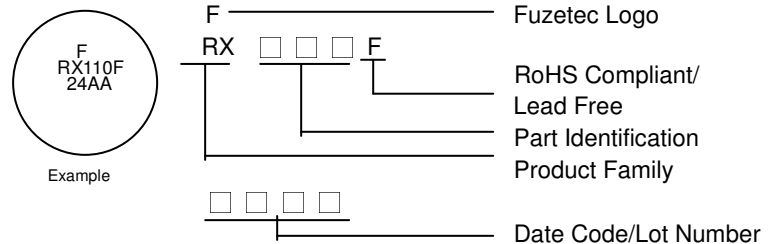
- A = FRX005-60F
- B = FRX010-60F
- C = FRX017-60F
- D = FRX020-60F
- E = FRX025-60F
- F = FRX030-60F
- G = FRX040-60F
- H = FRX050-60F
- I = FRX065-60F
- J = FRX075-60F
- K = FRX090-60F
- L = FRX110-60F
- M = FRX135-60F
- N = FRX160-60F
- O = FRX185-60F
- P = FRX250-60F
- Q = FRX300-60F
- R = FRX375-60F



Part Numbering System



Part Marking System



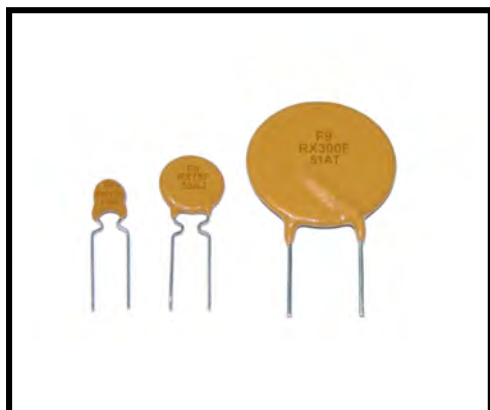
Standard Package

FRX005-60F~FRX050-60F	:	500 Pcs/Bag, 3.0K Reel/Tape
FRX065-60F~FRX090-60F	:	300 Pcs/Bag, 3.0K Reel/Tape
FRX110-60F	:	300 Pcs/Bag, 1.5K Reel/Tape
FRX135-60F~FRX185-60F	:	200 Pcs/Bag, 1.5K Reel/Tape
FRX250-60F~FRX375-60F	:	100 Pcs/Bag, 1.0K Reel/Tape

- 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.

III - Product - Radial Leaded PTC

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_{DC}

Operation Current: 0.10A~3.75A

Maximum Voltage: Up to 90V_{DC}

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	Typ. Power	Resistance	
							R _{MIN}	R _{1 MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	Ohms	Ohms
FRX010-90F	0.10	0.20	4.0	40	72/90	0.38	2.50	7.50
FRX015-90F	0.15	0.35	10.0	40	72/90	0.70	2.40	7.00
FRX017-90F	0.17	0.34	3.0	40	72/90	0.48	2.00	8.00
FRX020-90F	0.20	0.40	2.2	40	72/90	0.41	1.83	4.40
FRX025-90F	0.25	0.50	2.5	40	72/90	0.45	1.25	3.00
FRX030-90F	0.30	0.60	3.0	40	72/90	0.49	0.88	2.10
FRX035-90F	0.35	0.75	10.0	40	72/90	1.30	0.70	2.50
FRX040-90F	0.40	0.80	3.8	40	72/90	0.56	0.55	1.29
FRX050-90F	0.50	1.00	4.0	40	72/90	0.77	0.50	1.17
FRX055-90F	0.55	1.20	10.0	40	72/90	1.50	0.40	1.50
FRX065-90F	0.65	1.30	5.3	40	72/90	0.88	0.31	0.72
FRX075-90F	0.75	1.50	6.3	40	72/90	0.92	0.25	0.60
FRX090-90F	0.90	1.80	7.2	40	72/90	0.99	0.20	0.47
FRX110-90F	1.10	2.20	8.2	40	72/90	1.50	0.15	0.38
FRX135-90F	1.35	2.70	9.6	40	72/90	1.70	0.12	0.30
FRX160-90F	1.60	3.20	11.4	40	72/90	1.90	0.09	0.22
FRX185-90F	1.85	3.70	12.6	40	72/90	2.10	0.08	0.19
FRX250-90F	2.50	5.00	15.6	40	72/90	2.50	0.05	0.13
FRX300-90F	3.00	6.00	19.8	40	72/90	2.80	0.04	0.10
FRX375-90F	3.75	7.50	24.0	40	72/90	3.20	0.03	0.08

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.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	158%	138%	119%	100%	90%	81%	70%	60%	50%	36%

FRX90V Product Dimensions (mm)

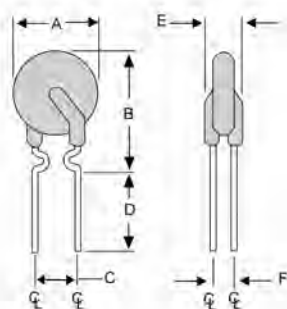


Fig. 1
Lead Size : 24AWG
Φ 0.51 mm Diameter

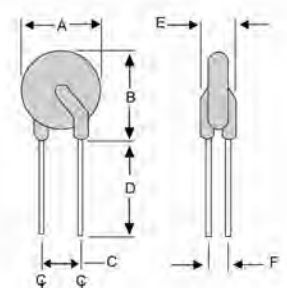
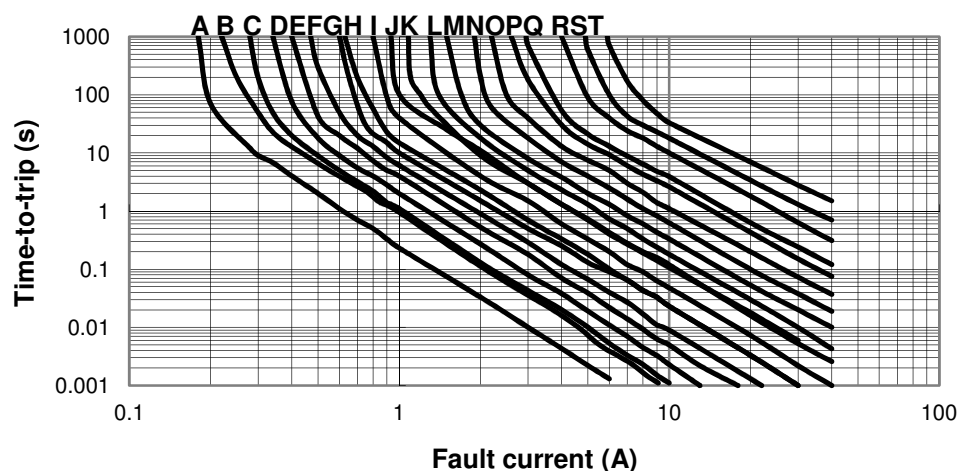


Fig. 2
Lead Size : 20AWG
Φ 0.81 mm Diameter

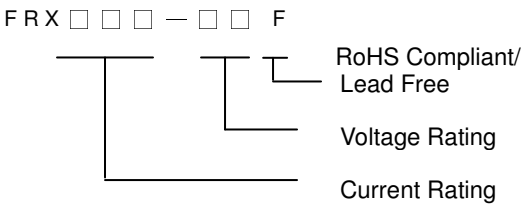
Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
FRX010-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX015-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX017-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX020-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX025-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX030-90F	1	7.4	13.0	5.1	7.6	3.1	1.1
FRX035-90F	1	7.4	12.7	5.1	7.6	3.1	1.1
FRX040-90F	1	7.6	13.5	5.1	7.6	3.1	1.1
FRX050-90F	1	7.9	13.7	5.1	7.6	3.1	1.1
FRX055-90F	1	9.7	14.0	5.1	7.6	3.1	1.1
FRX065-90F	1	9.7	14.5	5.1	7.6	3.1	1.1
FRX075-90F	1	10.4	15.2	5.1	7.6	3.1	1.1
FRX090-90F	1	11.7	15.8	5.1	7.6	3.1	1.1
FRX110-90F	2	13.0	18.0	5.1	7.6	3.1	1.4
FRX135-90F	2	14.5	19.6	5.1	7.6	3.1	1.4
FRX160-90F	2	16.3	21.3	5.1	7.6	3.1	1.4
FRX185-90F	2	17.8	22.9	5.1	7.6	3.1	1.4
FRX250-90F	2	21.3	26.4	10.2	7.6	3.1	1.4
FRX300-90F	2	24.9	30.0	10.2	7.6	3.1	1.4
FRX375-90F	2	28.5	33.5	10.2	7.6	3.1	1.4

Typical Time-To-Trip at 23°C

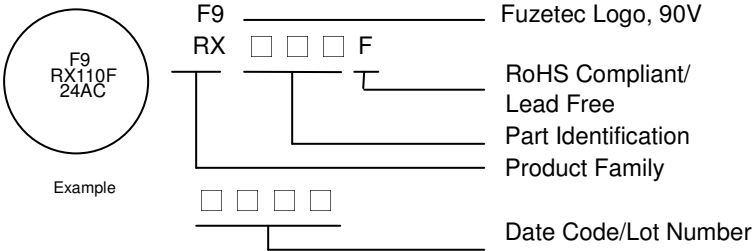
A = FRX010-90F
 B = FRX015-90F
 C = FRX017-90F
 D = FRX020-90F
 E = FRX025-90F
 F = FRX030-90F
 G = FRX035-90F
 H = FRX040-90F
 I = FRX050-90F
 J = FRX055-90F
 K = FRX065-90F
 L = FRX075-90F
 M = FRX090-90F
 N = FRX110-90F
 O = FRX135-90F
 P = FRX160-90F
 Q = FRX185-90F
 R = FRX250-90F
 S = FRX300-90F
 T = FRX375-90F



Part Numbering System



Part Marking System



Standard Package

FRX010-90F~FRX055-90F	:	500Pcs/Bag, 3.0K Reel/Tape
FRX065-90F~FRX090-90F	:	300Pcs/Bag, 3.0K Reel/Tape
FRX110-90F	:	300Pcs/Bag, 1.5K Reel/Tape
FRX135-90F~FRX185-90F	:	200Pcs/Bag, 1.5K Reel/Tape
FRX250-90F~FRX375-90F	:	100Pcs/Bag, 1.0K Reel/Tape

- Warning:

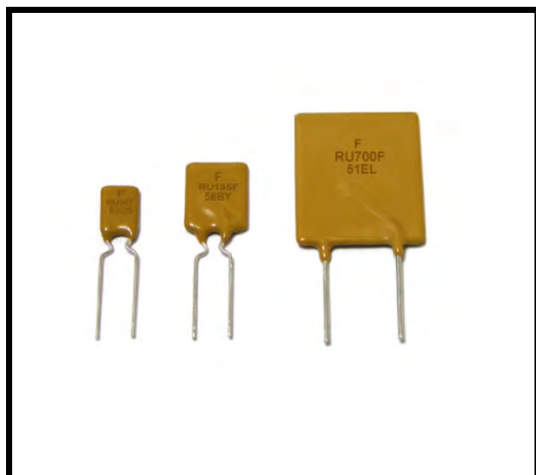
!

- 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_{DC}

Operation Current: 0.9A~9.0A

Maximum Voltage: 30V_{DC}

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	Typ. Power	Resistance	
							R _{MIN}	R _{1 MAX}
	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	100	30	0.6	0.070	0.220
FRU110-30F	1.10	2.20	6.6	100	30	0.7	0.050	0.170
FRU135-30F	1.35	2.70	7.3	100	30	0.8	0.040	0.130
FRU160-30F	1.60	3.20	8.0	100	30	0.9	0.030	0.110
FRU185-30F	1.85	3.70	8.7	100	30	1.0	0.030	0.090
FRU250-30F	2.50	5.00	10.3	100	30	1.2	0.020	0.070
FRU300-30F	3.00	6.00	10.8	100	30	2.0	0.020	0.080
FRU400-30F	4.00	8.00	12.7	100	30	2.5	0.010	0.050
FRU500-30F	5.00	10.00	14.5	100	30	3.0	0.010	0.050
FRU600-30F	6.00	12.00	16.0	100	30	3.5	0.005	0.040
FRU700-30F	7.00	14.00	17.5	100	30	3.8	0.005	0.030
FRU800-30F	8.00	16.00	18.8	100	30	4.0	0.005	0.020
FRU900-30F	9.00	18.00	20.0	100	30	4.2	0.005	0.020

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-94V-0 requirement.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	115%	100%	92%	84%	76%	70%	61%	50%

FRU Product Dimensions (mm)

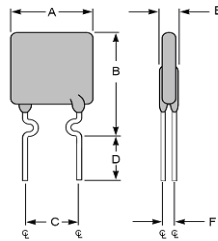


Fig.1
Lead Size: 24AWG,
Φ 0.51 mm Diameter

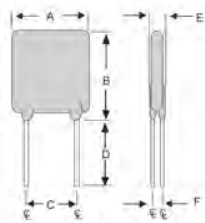
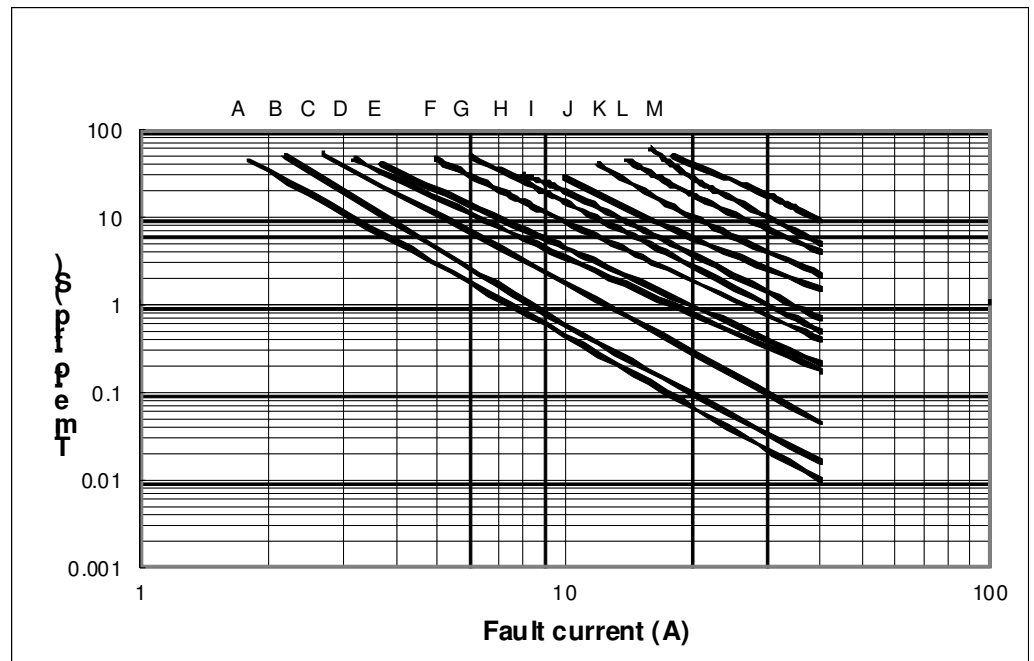


Fig.2
Lead Size: 20AWG
Φ 0.81 mm Diameter

Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
FRU090-30F	1	7.4	12.2	5.1	7.6	3.0	0.9
FRU110-30F	1	7.4	14.2	5.1	7.6	3.0	0.9
FRU135-30F	1	8.9	13.5	5.1	7.6	3.0	0.9
FRU160-30F	1	8.9	15.2	5.1	7.6	3.0	0.9
FRU185-30F	1	10.2	15.7	5.1	7.6	3.0	0.9
FRU250-30F	1	11.4	18.3	5.1	7.6	3.0	0.9
FRU300-30F	2	11.4	17.3	5.1	7.6	3.0	1.2
FRU400-30F	2	14.0	20.1	5.1	7.6	3.0	1.2
FRU500-30F	2	14.0	24.9	10.2	7.6	3.0	1.2
FRU600-30F	2	16.5	24.9	10.2	7.6	3.0	1.2
FRU700-30F	2	19.1	26.7	10.2	7.6	3.0	1.2
FRU800-30F	2	21.6	29.2	10.2	7.6	3.0	1.2
FRU900-30F	2	24.1	29.7	10.2	7.6	3.0	1.2

Typical Time-To-Trip at 23°C

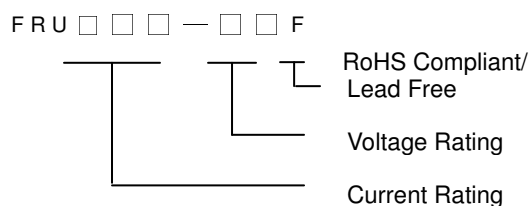
- A = FRU090-30F
- B = FRU110-30F
- C = FRU135-30F
- D = FRU160-30F
- E = FRU185-30F
- F = FRU250-30F
- G = FRU300-30F
- H = FRU400-30F
- I = FRU500-30F
- J = FRU600-30F
- K = FRU700-30F
- L = FRU800-30F
- M = FRU900-30F



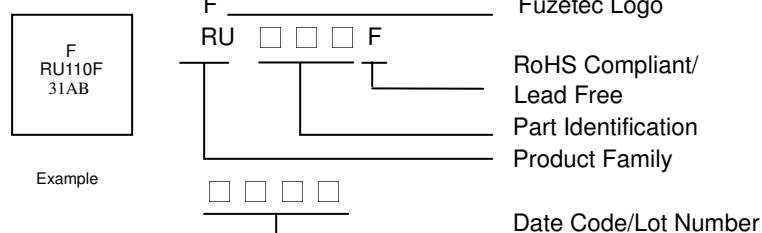
III - Product - Radial Leaded PTC



Part Numbering System



Part Marking System



Standard Package

FRU090-30F~FRU110-30F	:	500 Pcs/Bag, 3.0K Reel/Tape
FRU135-30F~FRU250-30F	:	300 Pcs/Bag, 3.0K Reel/Tape
FRU300-30F~FRU400-30F	:	200 Pcs/Bag, 1.5K Reel/Tape
FRU500-30F	:	200 Pcs/Bag, 1.0K Reel/Tape
FRU600-30F~FRU900-30F	:	100 Pcs/Bag

- 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_{DC}

Operation Current: 0.5A~2.5A

Maximum Voltage: 36V_{DC}

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	Typ. Power	Resistance	
							R _{MIN}	R _{1 MAX}
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	Ohms	Ohms
FRT050-33F	0.50	1.00	5.0	40	36	0.67	0.140	0.448
FRT075-33F	0.75	1.50	4.0	40	36	0.71	0.115	0.368
FRT090-33F	0.90	1.80	3.5	40	36	0.74	0.090	0.288
FRT120-33F	1.20	2.30	3.5	40	36	0.78	0.074	0.180
FRT135-33F	1.35	2.50	4.5	40	36	0.84	0.059	0.143
FRT160-33F	1.60	2.75	4.5	40	36	0.86	0.041	0.131
FRT190-33F	1.90	3.00	3.5	40	36	0.90	0.045	0.092
FRT220-33F	2.20	3.50	6.5	40	36	0.95	0.025	0.080
FRT250-33F	2.50	4.00	8.0	40	36	0.99	0.020	0.064

Physical specifications:

Lead material: Tin plated copper, 24 AWG.

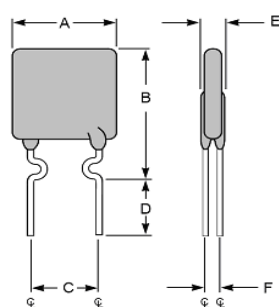
Soldering characteristics: MIL-STD-202, Method 208E.

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

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	148%	134%	120%	100%	98%	90%	84%	78%	70%	59%

FRT Product Dimensions (mm)

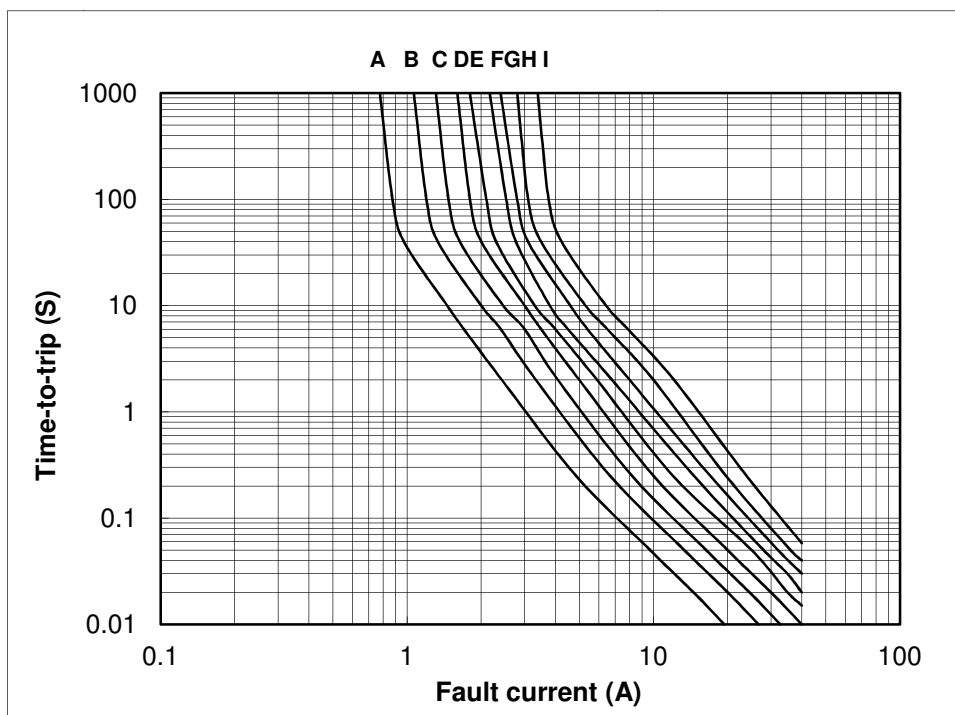


Lead Size: 24AWG,
Φ 0.51 mm Diameter

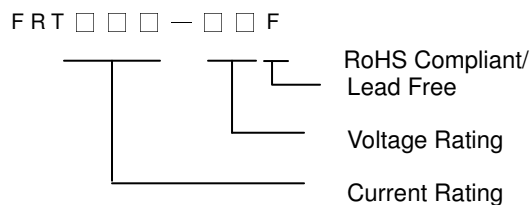
Part Number	A	B	C	D	E	F
	Max	Max	Typ	Min	Max	Typ
FRT050-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT075-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT090-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT120-33F	7.4	12.2	5.1	7.6	3.0	1.1
FRT135-33F	7.4	14.2	5.1	7.6	3.0	1.1
FRT160-33F	7.4	14.0	5.1	7.6	3.0	1.1
FRT190-33F	9.0	13.5	5.1	7.6	3.0	1.1
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

Typical Time-To-Trip at 23°C

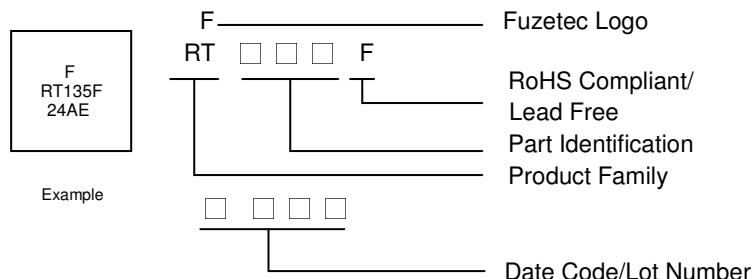
A = FRT 050-33F
B = FRT 075-33F
C = FRT 090-33F
D = FRT 120-33F
E = FRT 135-33F
F = FRT 160-33F
G = FRT 190-33F
H = FRT 220-33F
I = FRT 250-33F



Part Numbering System



Part Marking System



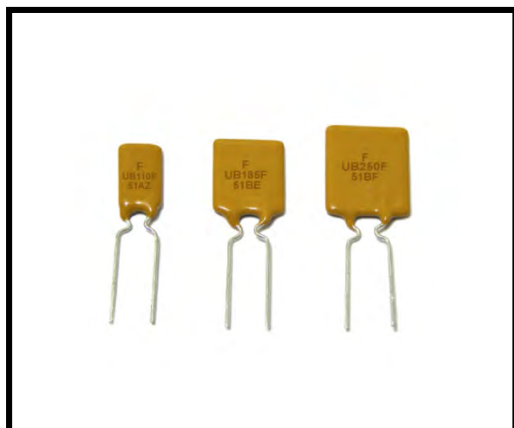
Standard Package

FRT050-33F~FRT250-33F : 500 Pcs/Bag, 3.0K Reel/Tape

- 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.



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_{DC}

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		Maximum Current	Rated Voltage	Typical Power	Resistance	
			Current	Time				R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	A	Sec	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	Ohms	Ohms
FUSB075F	0.75	1.30	8.0	0.4	40	16	0.3	0.08	0.23
FUSB090F	0.90	1.80	8.0	1.2	40	16/30	0.6	0.07	0.18
FUSB110F	1.10	2.20	8.0	2.3	40	16/30	0.7	0.05	0.14
FUSB120F	1.20	2.00	8.0	0.7	40	16	0.6	0.04	0.14
FUSB135F	1.35	2.70	8.0	4.5	40	16/30	0.8	0.04	0.12
FUSB155F	1.55	2.70	7.8	2.2	40	16	0.7	0.03	0.12
FUSB160F	1.60	3.20	8.0	9.0	40	16/30	0.9	0.03	0.11
FUSB185F	1.85	3.70	8.0	10.0	40	16/30	1.0	0.03	0.09
FUSB250F	2.50	5.00	8.0	40.0	40	16/30	1.2	0.02	0.07

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.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	115%	100%	91%	83%	78%	70%	61%	50%

FUSB Product Dimensions (mm)

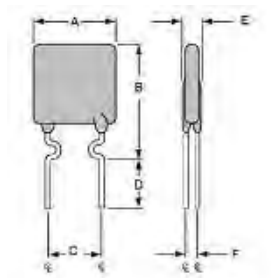


Fig.1
Lead Size: 24AWG,
Φ 0.51 mm Diameter

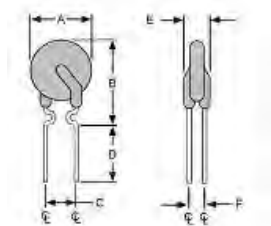
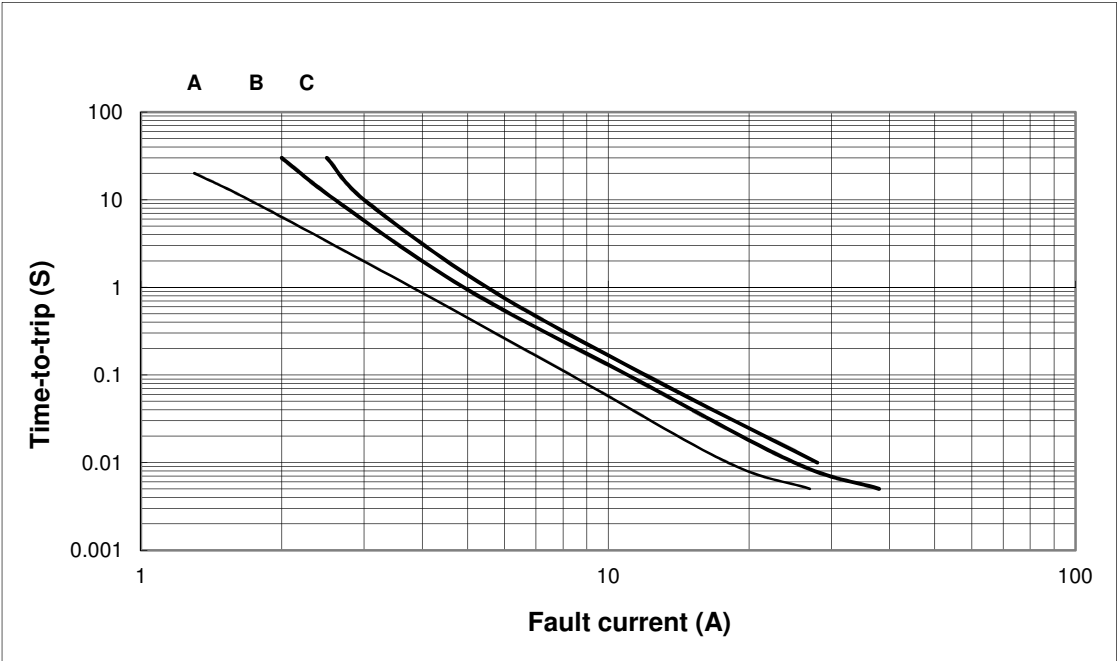


Fig.2
Lead Size: 24AWG
Φ 0.51 mm Diameter

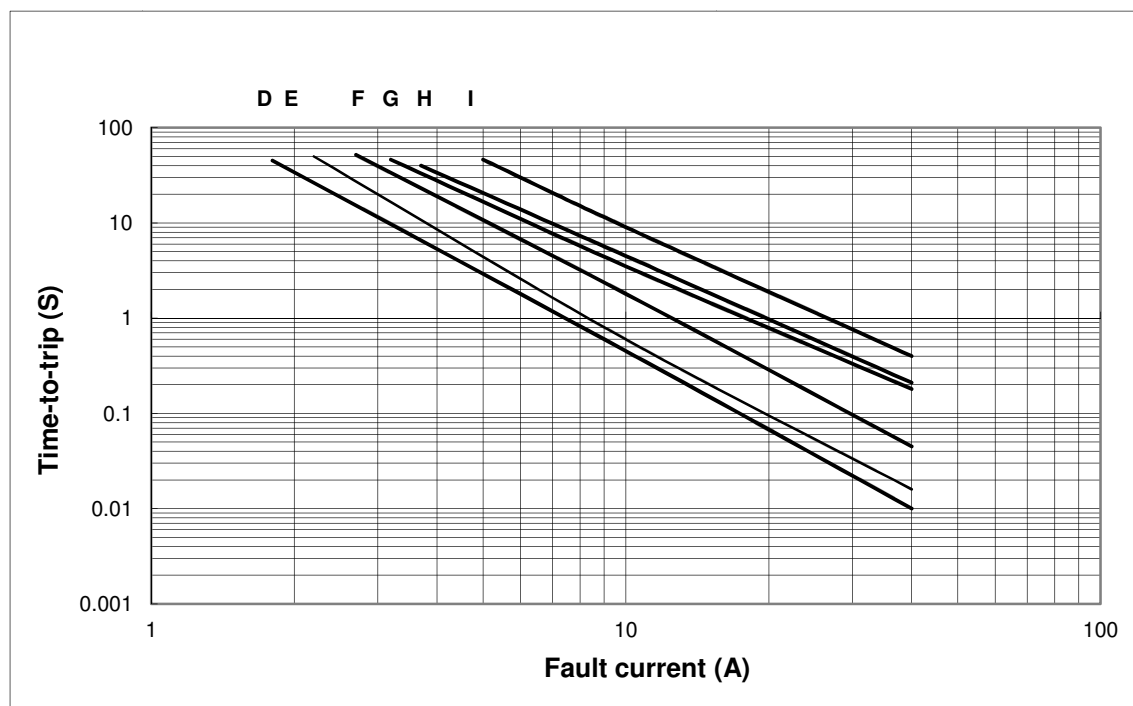
Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
FUSB075F	2	6.9	11.4	5.1	7.6	3.0	0.8
FUSB090F	1	7.4	12.2	5.1	7.6	3.0	0.8
FUSB110F	1	7.4	14.2	5.1	7.6	3.0	0.8
FUSB120F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB135F	1	8.9	13.5	5.1	7.6	3.0	0.8
FUSB155F	2	6.9	11.7	5.1	7.6	3.0	0.8
FUSB160F	1	8.9	15.2	5.1	7.6	3.0	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

Typical Time-To-Trip at 23°C

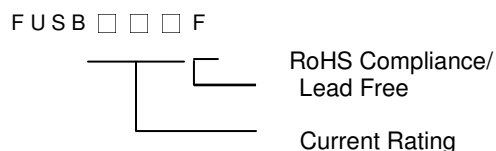
A = FUSB075F
B = FUSB120F
C = FUSB155F



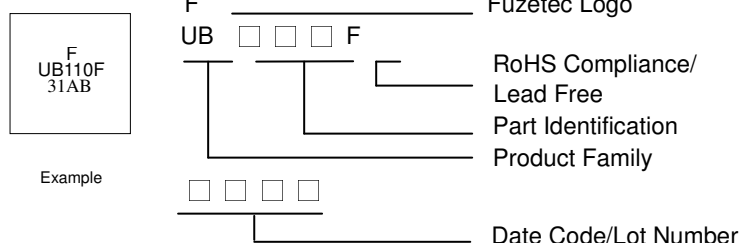
D = FUSB090F
E = FUSB110F
F = FUSB135F
G = FUSB160F
H = FUSB185F
I = FUSB250F



Part Numbering System



Part Marking System



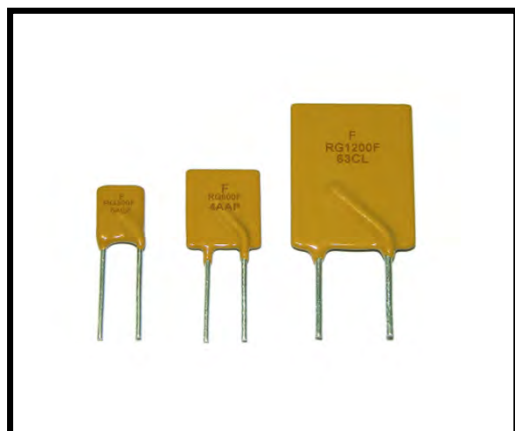
Standard Package

FUSB075F~FUSB250F : 500 Pcs/Bag, 3.0K Reel/Tape

- 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 16V_{DC}

Operation Current: 2.5 A~14.0A

Maximum Voltage: 16V_{DC}

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	Typ. Power	Resistance	
							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

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.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	148%	132%	116%	100%	91%	84%	76%	69%	60%	48%

FRG Product Dimensions (mm)

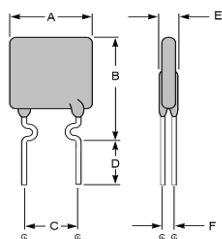


Fig.1
Lead Size: 24AWG
Φ 0.51 mm Diameter

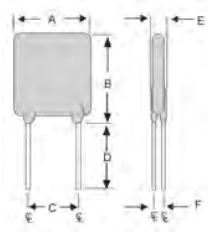


Fig.2
Lead Size: 20AWG
Φ 0.81 mm Diameter

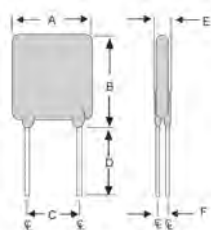
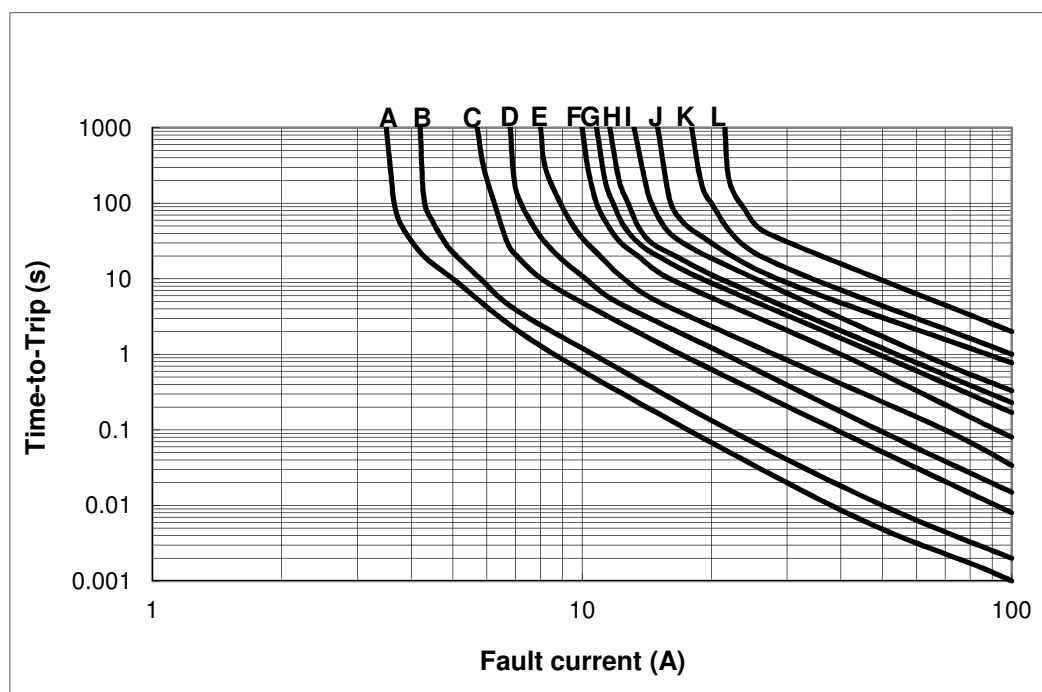


Fig.3
Lead Size: 18AWG
Φ 1.0 mm Diameter

Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
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

Typical Time-To-Trip at 23°C

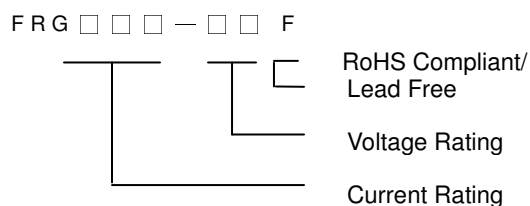
A = FRG250-16F
 B = FRG300-16F
 C = FRG400-16F
 D = FRG500-16F
 E = FRG600-16F
 F = FRG700-16F
 G = FRG800-16F
 H = FRG900-16F
 I = FRG1000-16F
 J = FRG1100-16F
 K = FRG1200-16F
 L = FRG1400-16F



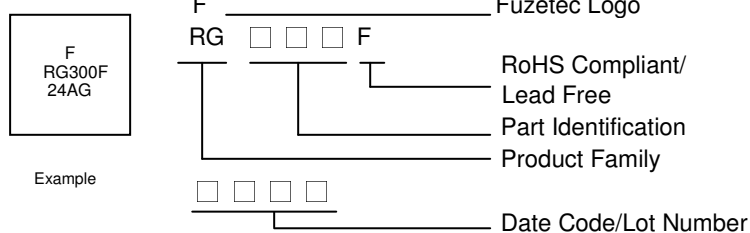
III - Product - Radial Leaded PTC



Part Numbering System



Part Marking System



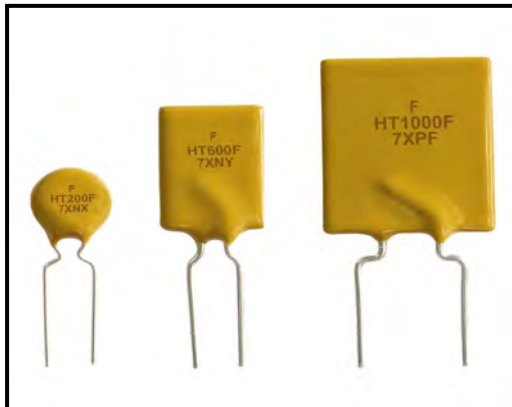
Standard Package

FRG250-16F~FRG300-16F	:	500 Pcs/Bag, 2.5K Reel/Tape
FRG400-16F~FRG600-16F	:	300 Pcs/Bag, 2.5K Reel/Tape
FRG700-16F	:	200 Pcs/Bag, 1.5K Reel/Tape
FRG800-16F~FRG900-16F	:	200 Pcs/Bag
FRG1000-16F~FRG1400-16F	:	100 Pcs/Bag

- 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.

III - Product - Radial Leaded

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/30V_{DC} and operating temperatures up to 125°C.

Operation Current : 0.5A~15.0A

Maximum Voltage : 16V/30V_{DC}

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	
	I _H , A	I _T , A	at 5xI _H , s	I _{MAX} , A	V _{MAX} , V _{DC}	P _d , W	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
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

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-94V-0 requirement.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	143%	129%	116%	100%	93%	87%	80%	72%	65%	55%

FHT Product Dimensions (mm)

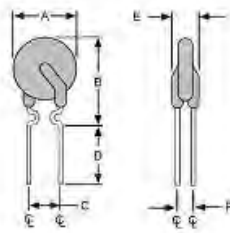


Fig.1
Lead Size :24AWG
Φ0.51 mm Diameter

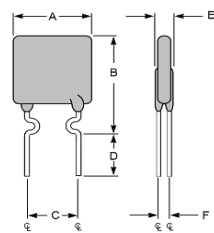


Fig.2
Lead Size :24AWG
Φ0.51 mm Diameter

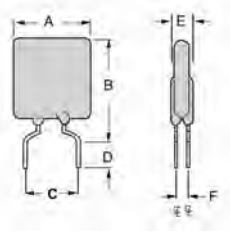


Fig.3
Lead Size : 20AWG
Φ0.81 mm Diameter

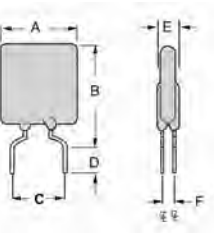
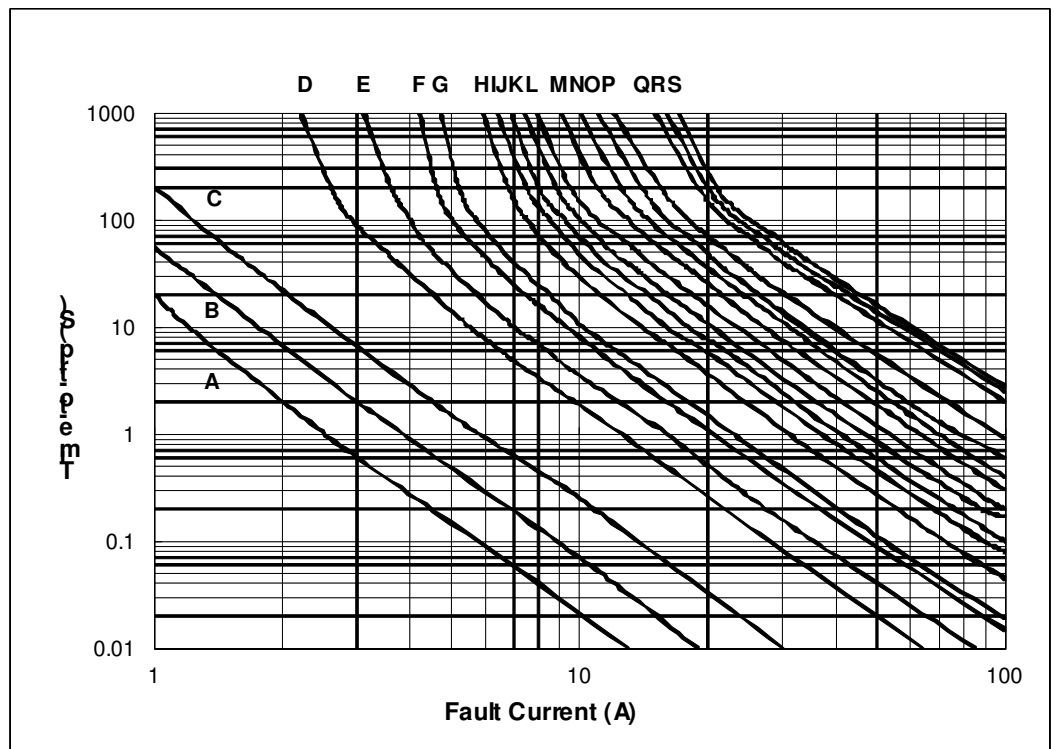


Fig.4
Lead Size : 18AWG
Φ 1.00 mm Diameter

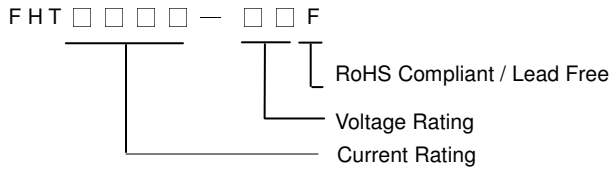
Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
FHT050-30F	1	7.4	12.7	5.1	7.6	3.0	1.2
FHT070-30F	2	6.9	10.8	5.1	7.6	3.0	1.2
FHT100-30F	1	9.7	13.6	5.1	7.6	3.0	1.2
FHT200-16F	1	9.4	14.4	5.1	7.6	3.0	1.2
FHT300-16F	3	8.8	13.8	5.1	7.6	3.0	1.2
FHT400-16F	3	10.0	15.0	5.1	7.6	3.0	1.2
FHT450-16F	3	10.4	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

Typical Time-To-Trip at 23°C

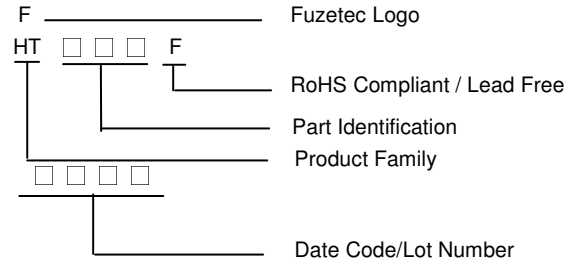
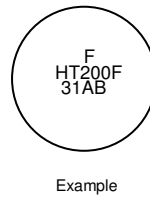
A = FHT050-30F
 B = FHT070-30F
 C = FHT100-30F
 D = FHT200-16F
 E = FHT300-16F
 F = FHT400-16F
 G = FHT450-16F
 H = FHT550-16F
 I = FHT600-16F
 J = FHT650-16F
 K = FHT700-16F
 L = FHT750-16F
 M = FHT800-16F
 N = FHT900-16F
 O = FHT1000-16F
 P = FHT1100-16F
 Q = FHT1300-16F
 R = FHT1400-16F
 S = FHT1500-16F



Part Numbering System



Part Marking System



Standard Package

FHT050-30F~FHT300-16F	:	500 Pcs/Bag, 2.5K Reel/Tape
FHT400-16F	:	300 Pcs/Bag, 2.5K Reel/Tape
FHT450-16F~FHT550-16F	:	300 Pcs/Bag, 1.5K Reel/Tape
FHT600-16F	:	200 Pcs/Bag, 1.5K Reel/Tape
FHT650-16F~FHT700-16F	:	200 Pcs/Bag
FHT750-16F~FHT1500-16F	:	100 Pcs/Bag

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

Operation Current : 0.08 A~0.18A

Max. Operation Voltage : 100V/250V_{DC}

Max. Interrupt Voltage : 250V/600V_{AC}

Temperature Range : -40°C to 85°C

Agency Recognition : UL(E211981), *UL497A

C-UL(E211981)

TÜV (R50138901)

Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Max. Time To Trip		Max. Current	Max. Oper. Voltage	Max. Int. Voltage	Typ. Power	Resistance	
			Current	Time					R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	A	Sec	I _{MAX} , A	V _{MAX} , V _{DC}	V _{I-MAX} , V _{AC}	Pd, W	Ohms	Ohms
FRH080-250VF	0.08	0.16	0.35	4.0	3.0	100	250	1.0	14.0	33.0
FRH110-250VF	0.11	0.22	1.00	2.0	3.0	100	250	1.0	5.0	16.0
FRH120-250VF	0.12	0.24	1.00	2.0	3.0	100	250	1.0	4.0	16.0
FRH145-250VF	0.15	0.29	1.00	2.5	3.0	100	250	1.0	3.0	12.0
FRH180-250XF	0.18	0.65	3.00	2.0	10.0	100	250	1.5	0.8	4.0
FRH150-600MF	0.15	0.30	1.00	4.0	3.0	250	600	1.0	6.0	17.0
FRH160-600MF	0.16	0.32	1.00	7.0	3.0	250	600	1.0	4.0	16.0
FRH160-600VF	0.16	0.32	1.00	7.0	3.0	250	600	1.0	4.0	18.0

Physical specifications:

Lead material: :Tin plated copper, 22 AWG.

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

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

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

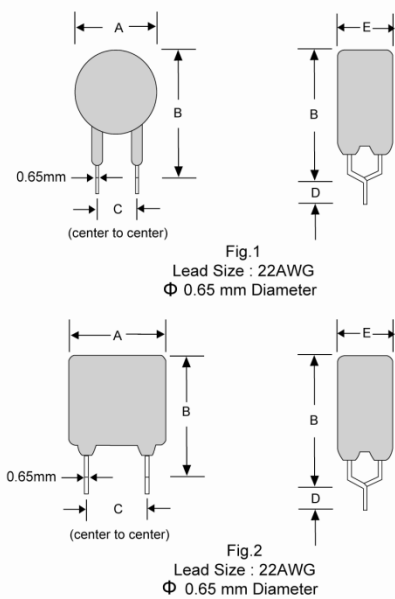
*FRH150-600MF, FRH160-600VF meet UL497A Overvoltage and Endurance Conditioning requirements for Thermistor type component.

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

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	158%	138%	119%	100%	92%	83%	73%	64%	54%	40%

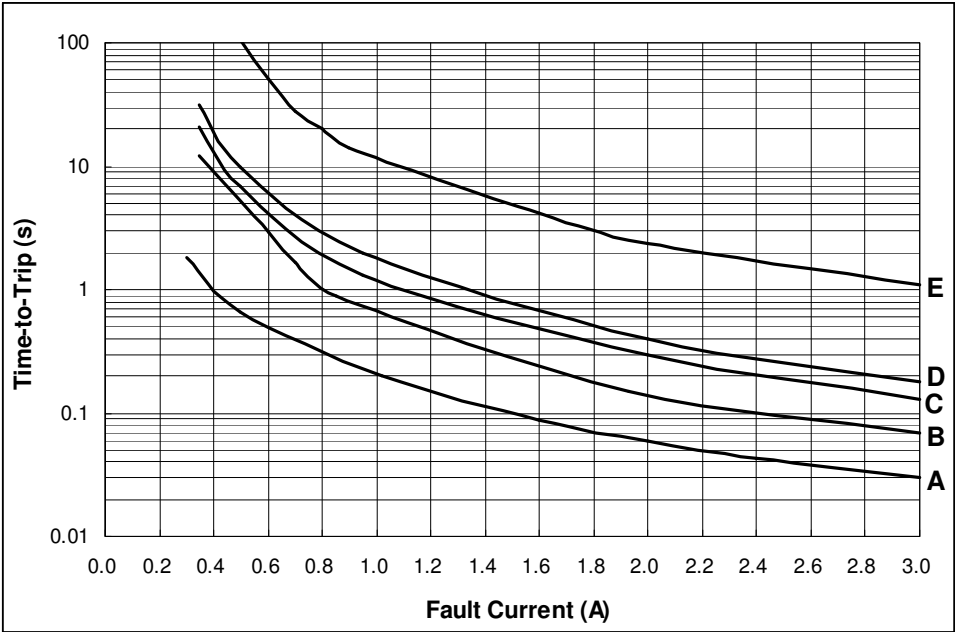
FRHV Product Dimensions (mm)



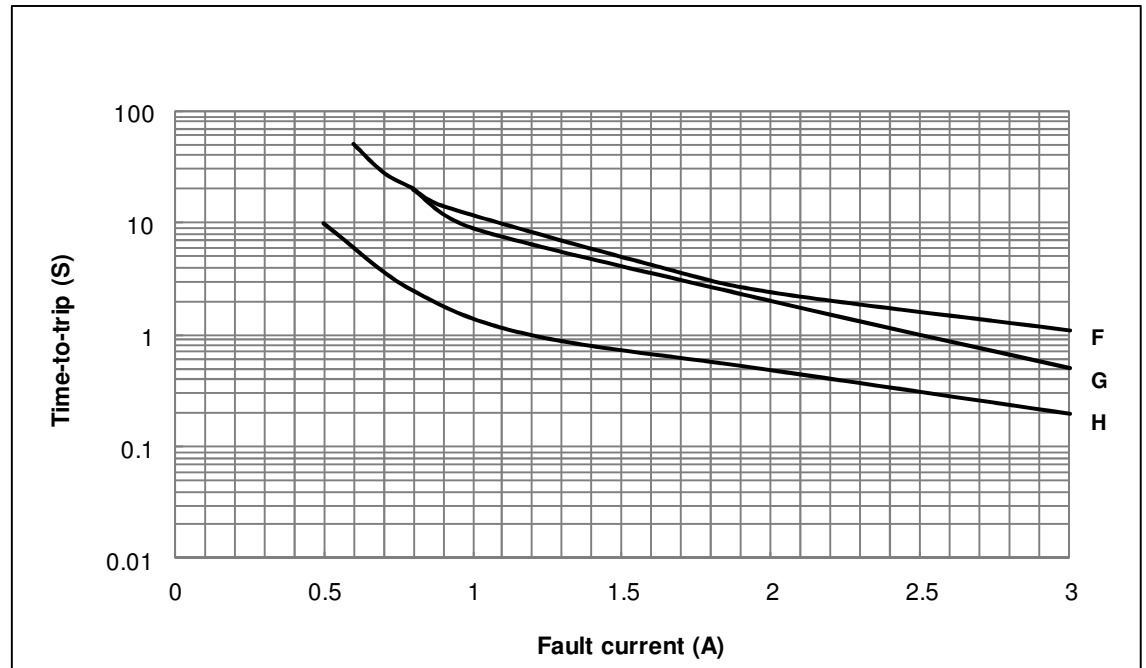
Part Number	Fig.	A	B	C	D	E
		Max	Max	Typ	Min	Max
FRH080-250VF	1	5.8	9.6	5.0	4.7	4.6
FRH110-250VF	1	6.8	9.9	5.0	4.7	4.6
FRH120-250VF	2	6.5	11.0	5.0	4.7	4.6
FRH145-250VF	2	6.5	11.0	5.0	4.7	4.6
FRH180-250XF	1	9.0	12.0	5.0	4.7	3.8
FRH150-600MF	2	9.0	12.5	5.0	4.7	4.6
FRH160-600MF	2	9.0	12.5	5.0	4.7	4.6
FRH160-600VF	2	16.0	12.6	5.0	4.7	6.0

Typical Time-To-Trip at 23°C

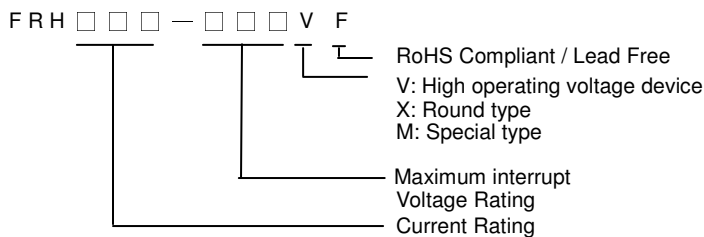
A= FRH080-250VF
B= FRH110-250VF
C= FRH120-250VF
D= FRH145-250VF
E= FRH160-600VF



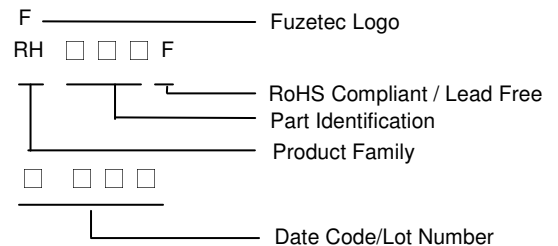
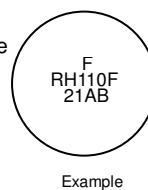
F= FRH160-600MF
G= FRH180-250XF
H= FRH150-600MF



Part Numbering System



Part Marking System



- * FRH150-600MF Marking : RH6150F
- * FRH160-600MF Marking : RH6160F
- * FRH160-600VF Marking : RH6160F

Standard Package

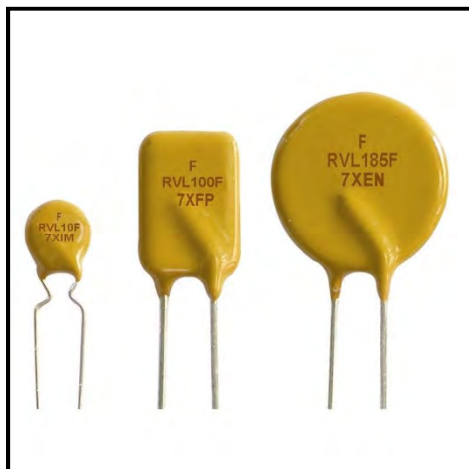
FRH080-250VF~FRH145-250VF	:	300 Pcs/Bag, 1.5K Reel/Tape
FRH180-250XF	:	200 Pcs/Bag, 1.5K Reel/Tape
FRH150-600MF~FRH160-600MF	:	100 Pcs/Bag, 1.2K Reel/Tape
FRH160-600VF	:	100 Pcs/Bag, 0.6K Reel/Tape

- 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.



III - Product - Radial Leaded PTC

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/DC}

Maximum Operation Current : 0.10A~3.75A

Maximum Voltage : 120V_{AC/DC}

Maximum Interrupt Voltage : 135V_{AC/DC}

Temperature Range : -40°C to 85°C

Agency Recognition : UL (E211981)

C-UL (E211981)

TÜV (R50122733)

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	Max. Oper. Voltage V _{MAX} , V _{AC/DC}	Max. Int. Voltage V _{I-MAX} , V _{AC/DC}	Typ. Power Pd, W	Resistance	
								R _{MIN} Ohms	R _{1MAX} 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

Physical specifications:

Lead material: FRVL010-120F~FRVL017-120F Tin plated copper, 24AWG.

FRVL020-120F~FRVL070-120F and FRVL090-120F Tin plated copper, 22AWG.

FRVL075-120F and FRVL100-120F~FRVL375-120F Tin plated copper, 20AWG.

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

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

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	158%	138%	119%	100%	90%	80%	70%	60%	50%	38%

NOTE : All Specifications subject to change without notice.

FRVL Product Dimensions (mm)

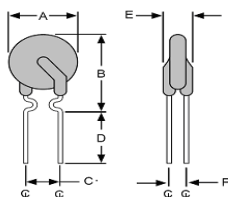


Fig.1
Lead S size :24AWG
Φ 0.51 mm Diameter

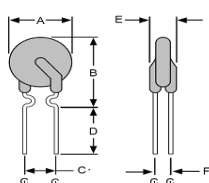


Fig.2
Lead Size :22AWG
Φ 0.65 mm Diameter

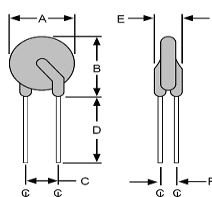


Fig.3
Lead Size :20AWG
Φ 0.81 mm Diameter

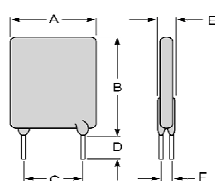
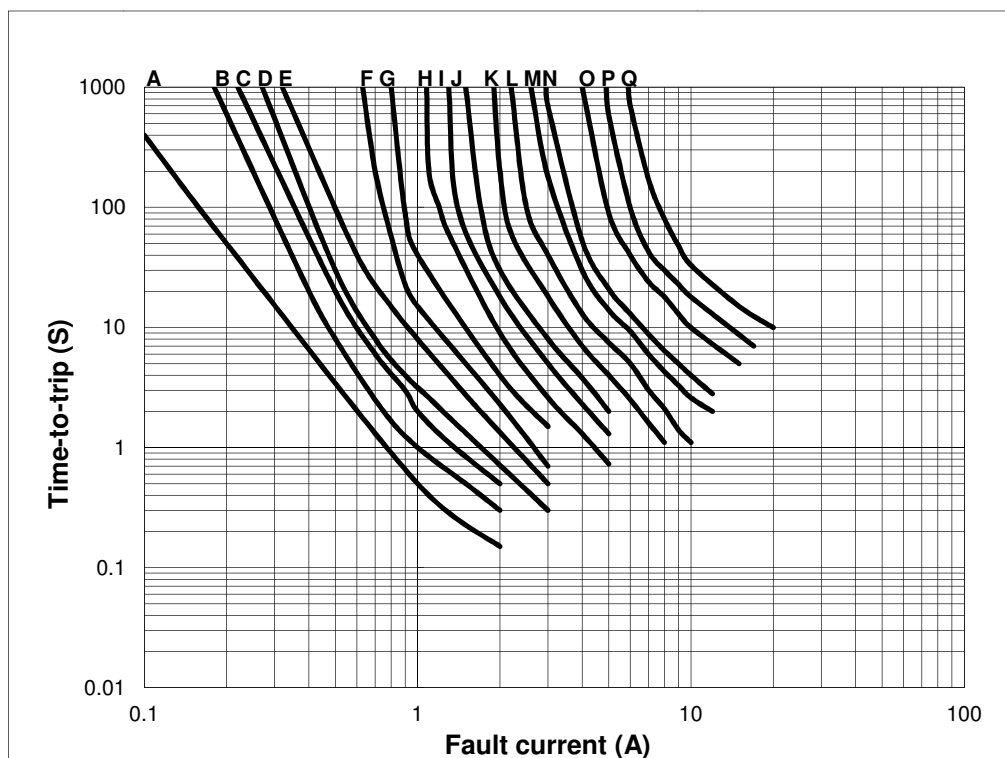


Fig.4
Lead Size : 20AWG
Φ 0.81 mm Diameter

Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
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

Typical Time-To-Trip at 23°C

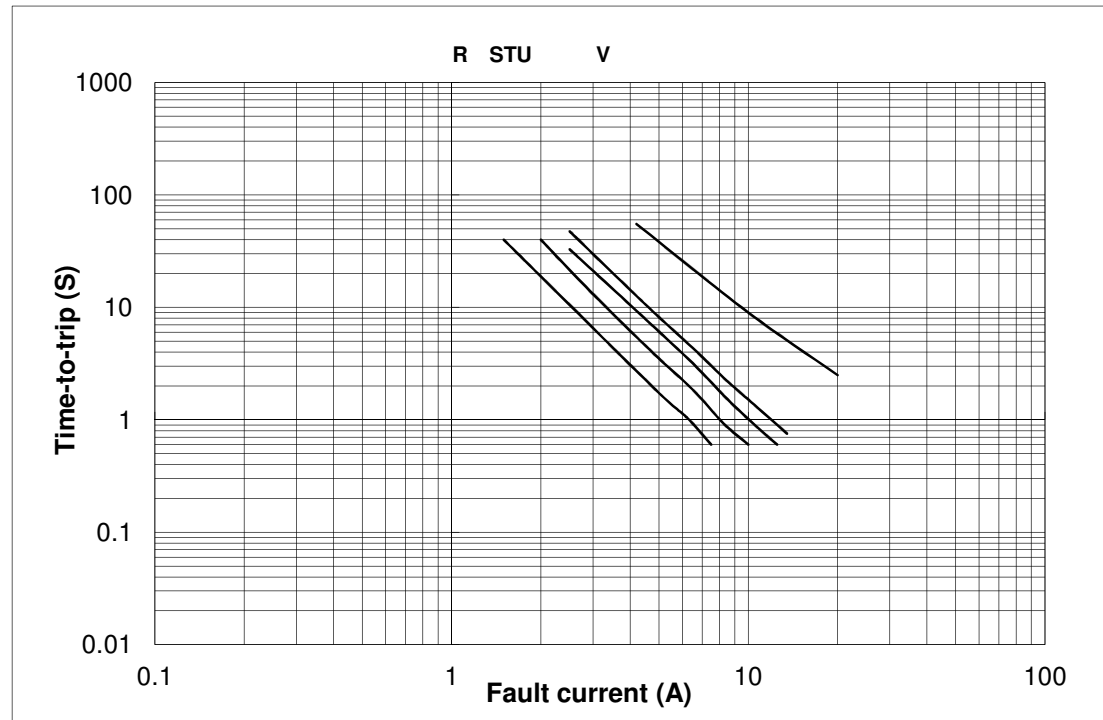
A = FRVL010-120F
 B = FRVL017-120F
 C = FRVL020-120F
 D = FRVL025-120F
 E = FRVL030-120F
 F = FRVL040-120F
 G = FRVL050-120F
 H = FRVL065-120F
 I = FRVL070-120F
 J = FRVL090-120F
 K = FRVL110-120F
 L = FRVL130-120F
 M = FRVL160-120F
 N = FRVL185-120F
 O = FRVL250-120F
 P = FRVL300-120F
 Q = FRVL375-120F



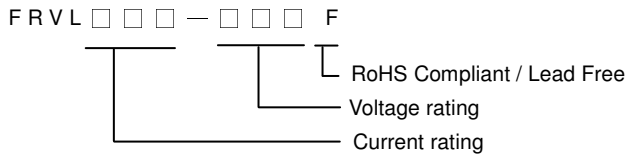
III - Product - Radial Leaded PTC



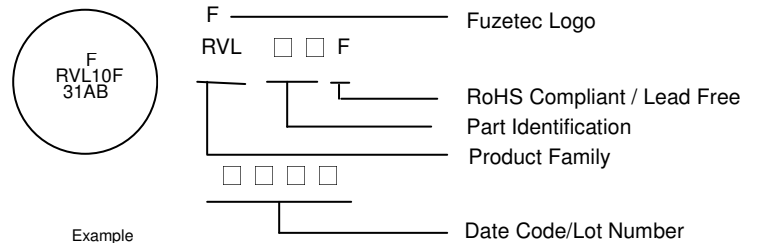
R=FRVL075-120F
S=FRVL100-120F
T=FRVL125-120F
U=FRVL135-120F
V=FRVL200-120F



Part Numbering System



Part Marking System



Standard Package

FRVL010-120F~FRVL050-120F	: 500 Pcs/Bag, 2.0K Reel/Tape
FRVL065-120F~FRVL075-120F	: 300 Pcs/Bag, 1.5K Reel/Tape
FRVL090-120F	: 300 Pcs/Bag, 2.0K Reel/Tape
FRVL100-120F~FRVL110-120F	: 300 Pcs/Bag, 1.5K Reel/Tape
FRVL125-120F~FRVL135-120F	: 200 Pcs/Bag, 1.0K Reel/Tape
FRVL160-120F	: 200 Pcs/Bag
FRVL185-120F~FRVL375-120F	: 100 Pcs/Bag

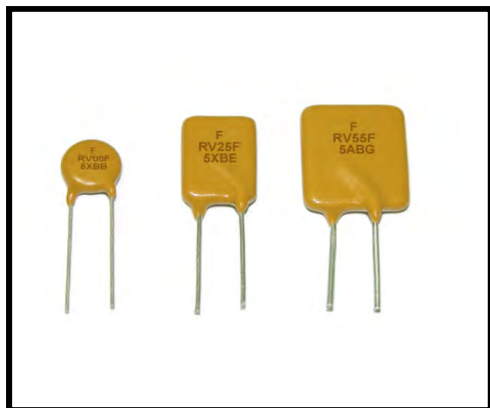
- Warning:**
- Each product should be carefully evaluated and tested for their suitability of application.
 - Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.
 - PPTC device are intended for occasional overcurrent protection. 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.

NOTE : All Specifications subject to change without notice.

III - Product - Radial Leaded PTC



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(R50087018)

Electrical Characteristics (23°C)

Part Number	Hold Current I_H , A	Trip Current I_T , A	Max.Time to Trip at 5x I_H ,s	Max. Current I_{MAX} , A	Rated Voltage V_{MAX} , V _{AC/DC}	Max.Int. Voltage V_{I-MAX} , V _{AC/DC}	Typ. Power Pd, W	Resistance	
								R _{MIN} Ohms	R1 _{MAX} Ohms
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	21.0	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
FRV150-240F	1.50	3.00	23.0	15.0	240	265	3.70	0.12	0.32
FRV200-240F	2.00	4.00	28.0	20.0	240	265	4.50	0.09	0.22

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-94V-0 requirement.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	150%	134%	116%	100%	90%	81%	74%	65%	58%	44%

FRV Product Dimensions (mm)

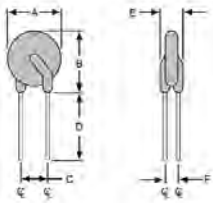


Fig.1

Lead Size: 24AWG
Φ 0.51 mm Diameter

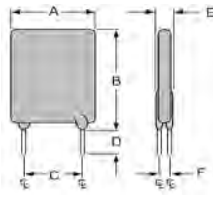


Fig.2

Lead Size: 22AWG
Φ 0.65 mm Diameter

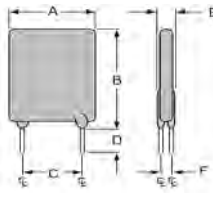


Fig.3

Lead Size: 20AWG
Φ 0.81 mm Diameter

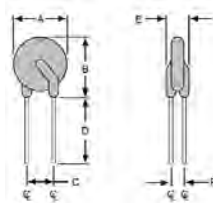


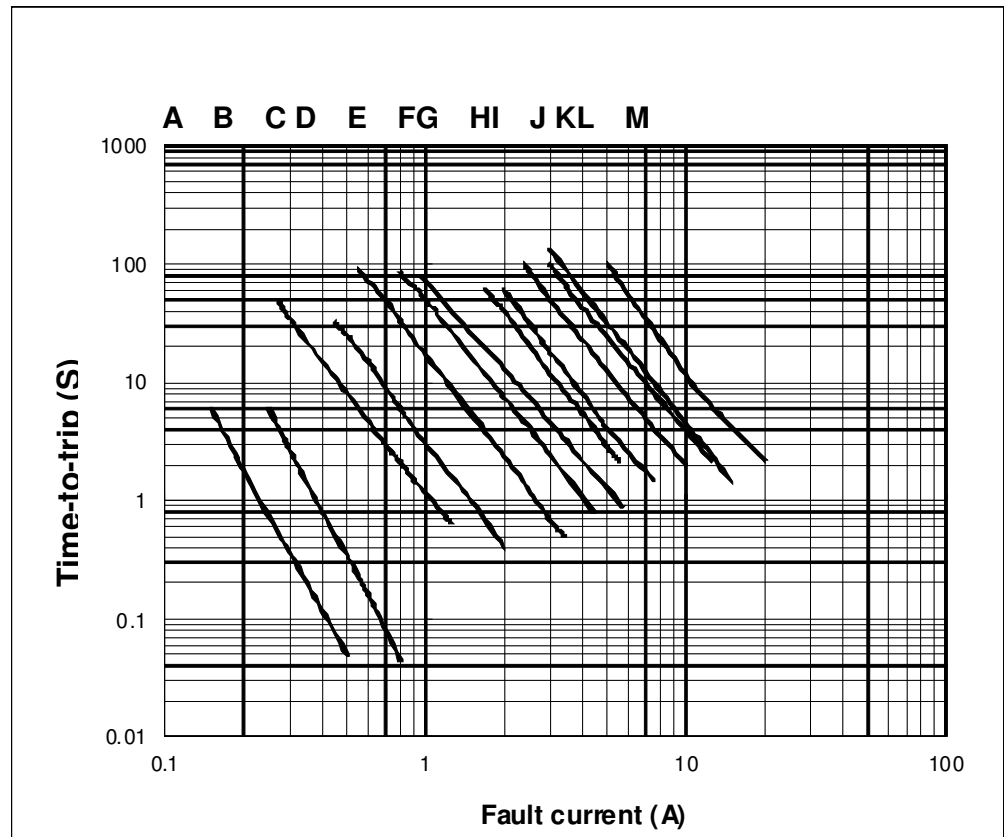
Fig.4

Lead Size: 20AWG
Φ 0.81 mm Diameter

Part Number	Fig	A	B	C	D	E	F
		Max	Max	Typ	Min	Max	Typ
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
FRV150-240F	4	23.4	30.9	10.2	7.6	5.3	1.9
FRV200-240F	3	24.9	33.8	10.2	7.6	6.1	1.9

Typical Time-To-Trip at 23°C

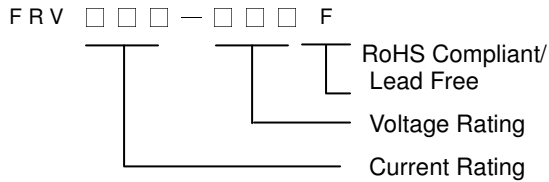
- A = FRV005-240F
- B = FRV008-240F
- C = FRV012-240F
- D = FRV016-240F
- E = FRV025-240F
- F = FRV033-240F
- G = FRV040-240F
- H = FRV055-240F
- I = FRV075-240F
- J = FRV100-240F
- K = FRV125-240F
- L = FRV150-240F
- M = FRV200-240F



III - Product - Radial Leaded PTC



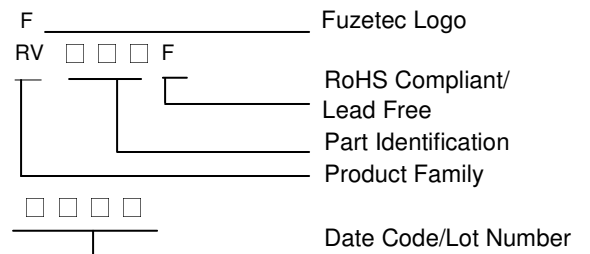
Part Numbering System



Part Marking System



Example

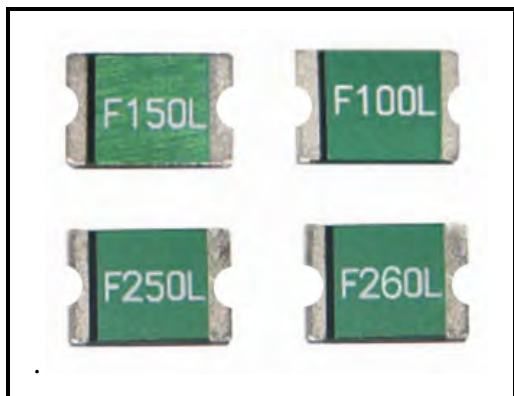


Standard Package

FRV005-240F~FRV016-240F	:	500 Pcs/Bag, 2.0K Reel/Tape
FRV025-240F	:	300 Pcs/Bag, 2.0K Reel/Tape
FRV033-240F~FRV040-240F	:	200 Pcs/Bag, 2.0K Reel/Tape
FRV055-240F	:	200 Pcs/Bag, 1.0K Reel/Tape
FRV075-240F	:	200 Pcs/Bag
FRV100-240F~FRV200-240F	:	100 Pcs/Bag

- 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.

FSMD2920 Series



RoHS Compliant & Halogen 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_{DC}

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	Typ. Power	Max Time to Trip		Resistance	
	I _H , A	I _T , A				Current	Time	R _{MIN}	R1 _{MAX}
FSMD030-2920-R	0.30	0.60	60	100	1.5	1.5	3.0	1.000	4.800
FSMD050-2920-R	0.50	1.00	60	100	1.5	2.5	4.0	0.300	1.400
FSMD075-2920-R	0.75	1.50	33	100	1.5	8.0	0.3	0.180	1.000
FSMD075-60-2920-R	0.75	1.50	60	100	1.5	8.0	0.3	0.180	1.000
FSMD100-2920-R	1.10	2.20	33	100	1.5	8.0	0.5	0.090	0.410
FSMD100-60-2920R	1.10	2.20	60	100	1.5	8.0	0.5	0.090	0.410
FSMD125-2920-R	1.25	2.50	33	100	1.5	8.0	2.0	0.050	0.250
FSMD150-2920-R	1.50	3.00	33	100	1.5	8.0	2.0	0.050	0.230
FSMD185-2920-R	1.85	3.70	33	100	1.5	8.0	2.5	0.040	0.150
FSMD200-2920-R	2.00	4.00	16	100	1.5	8.0	4.5	0.035	0.120
FSMD200-24-2920-R	2.00	4.00	24	100	1.5	8.0	5.0	0.035	0.120
FSMD250-2920-R	2.50	5.00	16	100	1.5	8.0	16.0	0.025	0.085
FSMD260-2920-R	2.60	5.20	6	100	1.5	8.0	20.0	0.020	0.075
FSMD260-24-2920R	2.60	5.20	24	100	1.5	8.0	20.0	0.020	0.075
FSMD300-2920-R	3.00	5.20	6	100	1.5	8.0	25.0	0.010	0.048
FSMD300-15-2920R	3.00	5.20	15	100	1.5	8.0	20.0	0.010	0.048

Termination pad characteristics

Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	158%	138%	119%	100%	90%	81%	72%	60%	50%	36%

FSMD2920 Product Dimensions (mm)

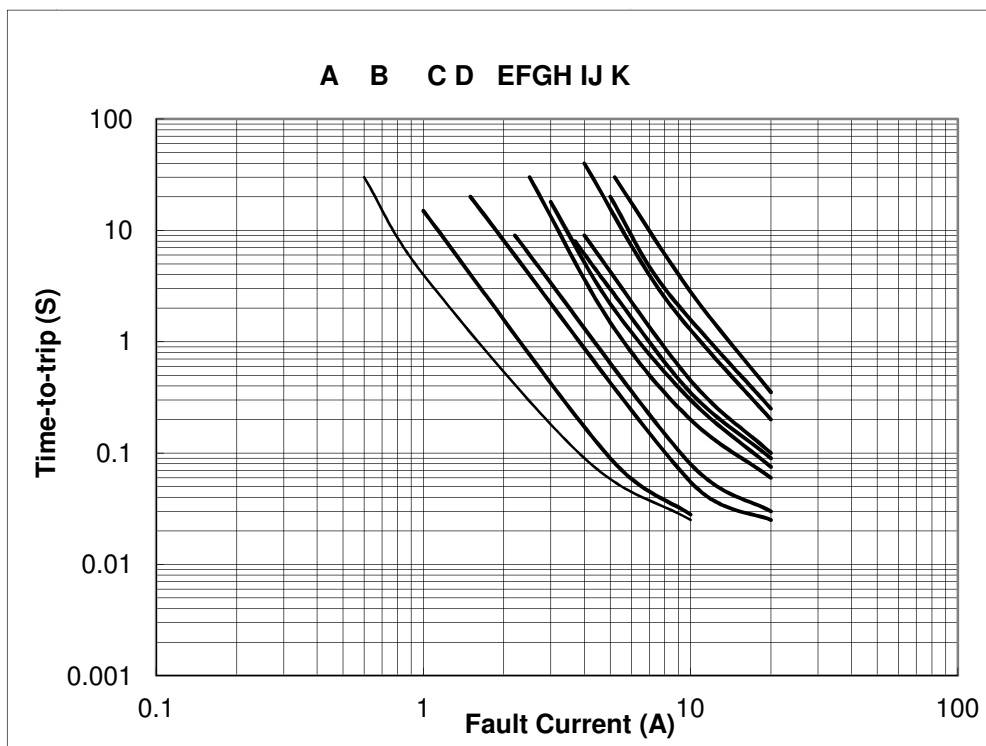


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD030-2920-R	6.73	7.98	4.80	5.44	0.60	1.15	0.50	1.20	0.50	0.90
FSMD050-2920-R	6.73	7.98	4.80	5.44	0.60	1.15	0.50	1.20	0.50	0.90
FSMD075-2920-R	6.73	7.98	4.80	5.44	0.40	1.15	0.50	1.20	0.50	0.90
FSMD075-60-2920-R	6.73	7.98	4.80	5.44	0.60	1.15	0.50	1.20	0.50	0.90
FSMD100-2920-R	6.73	7.98	4.80	5.44	0.40	1.00	0.50	1.20	0.50	0.90
FSMD100-60-2920R	6.73	7.98	4.80	5.44	0.40	1.70	0.50	1.20	0.50	0.90
FSMD125-2920-R	6.73	7.98	4.80	5.44	0.40	0.90	0.50	1.20	0.50	0.90
FSMD150-2920-R	6.73	7.98	4.80	5.44	0.40	0.90	0.50	1.20	0.50	0.90
FSMD185-2920-R	6.73	7.98	4.80	5.44	0.30	0.90	0.50	1.20	0.50	0.90
FSMD200-2920-R	6.73	7.98	4.80	5.44	0.30	0.90	0.50	1.20	0.50	0.90
FSMD200-24-2920-R	6.73	7.98	4.80	5.44	0.20	0.80	0.50	1.20	0.50	0.90
FSMD250-2920-R	6.73	7.98	4.80	5.44	0.30	0.90	0.50	1.20	0.50	0.90
FSMD260-2920-R	6.73	7.98	4.80	5.44	0.30	0.90	0.50	1.20	0.50	0.90
FSMD260-24-2920R	6.73	7.98	4.80	5.44	0.65	1.15	0.50	1.20	0.50	0.90
FSMD300-2920-R	6.73	7.98	4.80	5.44	0.40	0.90	0.50	1.20	0.50	0.90
FSMD300-15-2920R	6.73	7.98	4.80	5.44	0.40	1.15	0.50	1.20	0.50	0.90

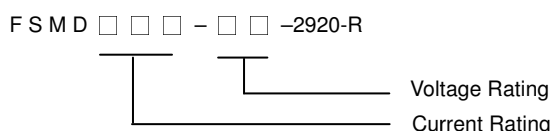
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

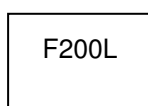
- A = FSMD030-2920-R
- B = FSMD050-2920-R
- C = FSMD075-2920-R/
075-60-2920-R
- D = FSMD100-2920-R/
100-60-2920R
- E = FSMD125-2920-R
- F = FSMD150-2920-R
- G = FSMD185-2920-R
- H = FSMD200-2920-R/
200-24-2920-R
- I = FSMD250-2920-R
- J = FSMD260-2920-R/
260-24-2920R
- K = FSMD300-2920-R/
300-15-2920R



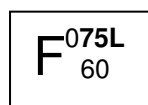
Part Numbering System



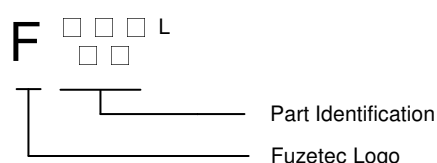
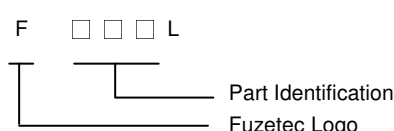
Part Marking System



Example



Example



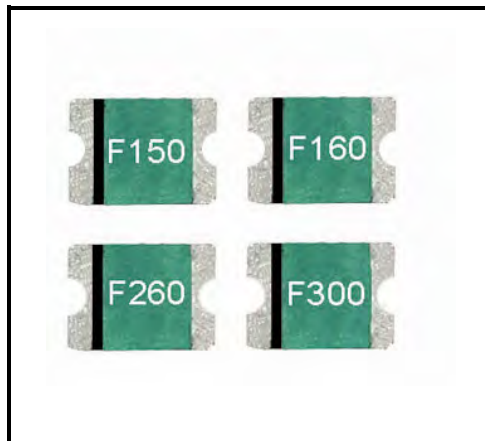
Standard Package

FSMD030-2920-R~FSMD100-2920-R	:	2.0K Reel/Tape
FSMD100-60-2920R	:	1.0K Reel/Tape
FSMD125-2920-R~FSMD300-15-2920R	:	2.0K Reel/Tape

- 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 &
Halogen 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_{DC}

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

TÜV (50004084/R50090556)

Electrical Characteristics(23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typ. Power	Max Time to Trip		Resistance	
	Current	Current	Voltage	Current	Power	Current	Time	R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	A	Sec	Ohms	Ohms
FSMD010-R	0.10	0.30	60	100	0.8	8.0	0.020	1.600	15.000
FSMD014-R	0.14	0.30	60	100	0.8	8.0	0.008	1.200	6.500
FSMD020-R	0.20	0.40	30	100	0.8	8.0	0.020	0.800	5.000
FSMD020-60-R	0.20	0.40	60	100	0.8	8.0	0.020	0.800	5.000
FSMD030-R	0.30	0.60	30	100	0.8	8.0	0.100	0.200	1.750
FSMD035-R	0.35	0.70	16	100	0.8	8.0	0.100	0.320	1.500
FSMD035-30-R	0.35	0.70	30	100	0.8	8.0	0.100	0.320	1.500
FSMD050-R	0.50	1.00	16	100	0.8	8.0	0.150	0.150	1.000
FSMD050-30-R	0.50	1.00	30	100	0.8	8.0	0.150	0.150	1.000
FSMD075-R	0.75	1.50	16	100	0.8	8.0	0.200	0.110	0.450
FSMD075-24R	0.75	1.50	24	100	1.0	8.0	0.200	0.110	0.290
FSMD075-33R	0.75	1.50	33	100	1.0	8.0	0.200	0.110	0.400
FSMD110-R	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
FSMD110-16-R	1.10	2.20	16	100	0.8	8.0	0.500	0.060	0.180
FSMD110-24R	1.10	2.20	24	100	1.0	8.0	0.500	0.060	0.200
FSMD125-R	1.25	2.50	6	100	0.8	8.0	0.400	0.050	0.140
FSMD125-16R	1.25	2.50	16	100	0.8	8.0	0.400	0.050	0.140
FSMD150-R	1.50	3.00	8	100	0.8	8.0	0.500	0.040	0.110
FSMD150-12R	1.50	3.00	12	100	1.0	8.0	0.500	0.040	0.110
FSMD150-24R	1.50	3.00	24	100	1.0	8.0	1.500	0.040	0.120
FSMD160-R	1.60	3.20	8	100	0.8	8.0	0.500	0.030	0.100
FSMD160-12R	1.60	3.20	12	100	1.0	8.0	1.000	0.030	0.100
FSMD160-16R	1.60	3.20	16	100	1.0	8.0	1.000	0.030	0.100
FSMD200R	2.00	3.50	8	100	1.0	8.0	2.000	0.020	0.070
FSMD200-16R	2.00	3.50	16	100	1.0	8.0	5.000	0.020	0.085
FSMD260R	2.60	5.00	8	100	1.0	8.0	2.500	0.015	0.047
FSMD260-13R	2.60	5.00	13.2	100	1.3	8.0	5.000	0.015	0.050
FSMD260-16R	2.60	5.00	16	100	1.3	8.0	5.000	0.015	0.050
FSMD300R	3.00	5.00	6	100	1.0	8.0	4.000	0.012	0.040

Termination pad characteristics

Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	116%	100%	91%	84%	78%	69%	61%	50%

FSMD1812 Product Dimensions (mm)

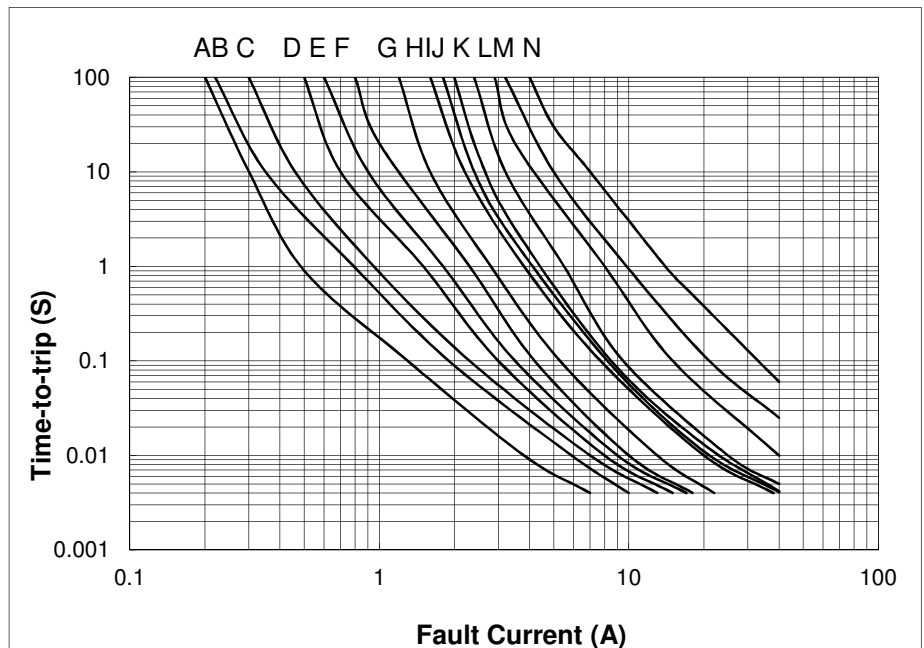


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD010-R	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD014-R	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD020-R	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD020-60-R	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD030-R	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD035-R	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD035-30-R	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD050-R	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
FSMD050-30-R	4.37	4.73	3.07	3.41	0.45	0.75	0.30	0.95	0.25	0.65
FSMD075-R	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
FSMD075-24R	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD075-33R	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD110-R	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD110-16-R	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
FSMD110-24R	4.37	4.73	3.07	3.41	0.80	1.30	0.25	0.95	0.25	0.65
FSMD125-R	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD125-16R	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.95	0.25	0.65
FSMD150-R	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD150-12R	4.37	4.73	3.07	3.41	0.60	1.10	0.25	0.95	0.25	0.65
FSMD150-24R	4.37	4.73	3.07	3.41	0.60	1.55	0.25	0.95	0.25	0.65
FSMD160-R	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
FSMD160-12R	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
FSMD160-16R	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
FSMD200R	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
FSMD200-16R	4.37	4.73	3.07	3.41	0.60	1.55	0.25	0.95	0.25	0.65
FSMD260R	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
FSMD260-13R	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD260-16R	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD300R	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65

*For Reflow Soldering Profile information,
please refer to P.74 " IV APPENDIX - SMD
PRODUCT SOLDER REFLOW
RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

A = FSMD010-R
B = FSMD014-R
C = FSMD020-R / FSMD020-60-R
D = FSMD030-R
E = FSMD035-R / FSMD035-30-R
F = FSMD050-R / FSMD050-30-R
G = FSMD075-R / 075-24R/075-33R
H = FSMD110-R / 110-16-R/110-24R
I = FSMD125-R / 125-16R
J = FSMD150-R / 150-12R /150-24R
K = FSMD160-R / 160-12R/160-16R
L = FSMD200R / 200-16R
M = FSMD260R / 260-13R / 260-16R
N = FSMD300R



NOTE : All Specifications subject to change without notice.

Part Numbering System

FSMD □ □ □ - R
 └──────────┬──────────
 Current Rating

Part Marking System

F110
 Example

F □ □ □
 └──────────┬──────────
 Part Identification
 Fuzetec Logo

OR

FSMD □ □ □ - □ □ R
 └──┬──┬──┬──┬──┬──┬──
 Voltage Rating
 Current Rating

F 110
 16
 Example

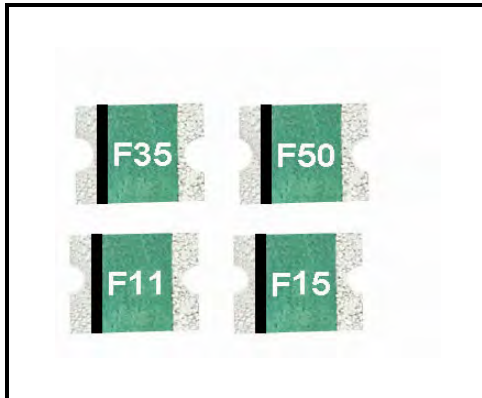
F □ □ □
 └──┬──┬──┬──┬──┬──┬──
 Part Identification
 Fuzetec Logo

Standard Package

FSMD010-R~FSMD075-R	:	2.0K Reel/Tape
FSMD075-24R~FSMD075-33R	:	1.5K Reel/Tape
FSMD110-R~FSMD110-16R	:	2.0K Reel/Tape
FSMD110-24R	:	1.5K Reel/Tape
FSMD125-R	:	2.0K Reel/Tape
FSMD125-16R	:	1.5K Reel/Tape
FSMD150-R~FSMD200R	:	2.0K Reel/Tape
FSMD200-16R	:	1.5K Reel/Tape
FSMD260R	:	2.0K Reel/Tape
FSMD260-13R~FSMD300R	:	1.5K Reel/Tape

- 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 & Halogen 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_{DC}

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	Typ. Power	Max Time to Trip		Resistance	
						Current	Time	R _{MIN}	R1 _{MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	A	Sec	Ohms	Ohms
FSMD005-1210-R	0.05	0.15	60	100	0.60	0.25	1.50	3.600	50.000
FSMD010-1210-R	0.10	0.25	60	100	0.60	0.50	1.50	1.600	15.000
FSMD020-1210-R	0.20	0.40	30	100	0.60	8.00	0.02	0.800	5.000
FSMD035-1210-R	0.35	0.70	16	100	0.60	8.00	0.20	0.320	1.300
FSMD050-1210-R	0.50	1.00	16	100	0.60	8.00	0.10	0.250	0.900
FSMD075-1210-R	0.75	1.50	8	100	0.60	8.00	0.10	0.130	0.400
FSMD075-24-1210R	0.75	1.50	24	100	0.60	8.00	0.10	0.130	0.400
FSMD110-1210R	1.10	2.20	8	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
FSMD175-1210R	1.75	4.00	6	100	0.80	8.00	0.60	0.020	0.080
FSMD200-1210R	2.00	4.00	6	100	0.80	8.00	1.00	0.015	0.070

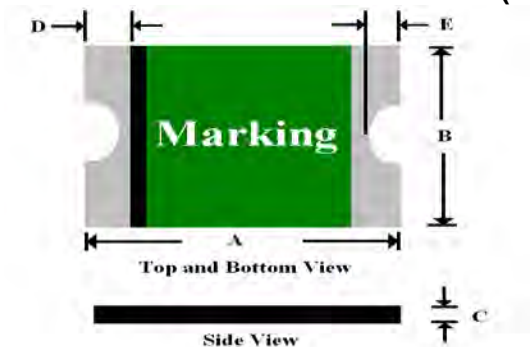
Termination pad characteristics

Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	115%	100%	92%	83%	76%	70%	62%	50%

FSMD1210 Product Dimensions (mm)



Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD005-1210-R	3.00	3.43	2.35	2.80	0.60	1.15	0.25	0.75	0.10	0.45
FSMD010-1210-R	3.00	3.43	2.35	2.80	0.60	1.15	0.25	0.75	0.10	0.45
FSMD020-1210-R	3.00	3.43	2.35	2.80	0.40	0.85	0.25	0.75	0.10	0.45
FSMD035-1210-R	3.00	3.43	2.35	2.80	0.40	0.80	0.25	0.75	0.10	0.45
FSMD050-1210-R	3.00	3.43	2.35	2.80	0.30	0.75	0.25	0.75	0.10	0.45
FSMD075-1210-R	3.00	3.43	2.35	2.80	0.30	0.70	0.25	0.75	0.10	0.45
FSMD075-24-1210R	3.00	3.43	2.35	2.80	0.80	1.20	0.25	0.75	0.10	0.45
FSMD110-1210R	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD150-1210R	3.00	3.43	2.35	2.80	0.50	0.90	0.25	0.75	0.10	0.45
FSMD175-1210R	3.00	3.43	2.35	2.80	0.80	1.40	0.25	0.75	0.10	0.45
FSMD200-1210R	3.00	3.43	2.35	2.80	0.80	1.40	0.25	0.75	0.10	0.45

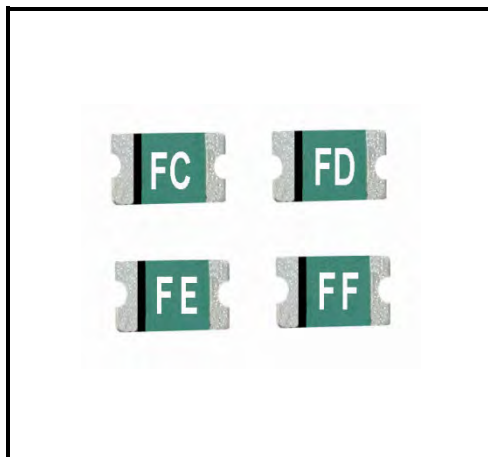
Typical Time-To-Trip at 23°C

The diagram illustrates two examples of PCB layout for Fuzetec components:

- Example 1:** A box labeled "F75" is shown. To its right, the "Fuzetec Logo" (an "F" with two squares) is positioned above the "Part Identification" (the number "75").
- Example 2:** A box labeled "F75" and "F" is shown. To its right, the "Fuzetec Logo" (an "F" with three squares) is positioned above the "Part Identification" (the number "75").

NOTE : All Specifications subject to change without notice. 42

FSMD1206 Series



RoHS Compliant & Halogen 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_{DC}

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	Typ. Power	Max Time to Trip		Resistance	
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	Current	Time	R _{MIN}	R1 _{MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	A	Sec	Ohms	Ohms
FSMD005-1206-R	0.05	0.15	60	100	0.4	0.25	1.50	3.600	50.000
FSMD010-1206-R	0.10	0.25	60	100	0.4	0.50	1.00	1.600	15.000
FSMD012-1206-R	0.12	0.39	48	100	0.6	1.00	0.20	1.400	6.500
FSMD016-1206-R	0.16	0.45	48	100	0.6	1.00	0.30	1.100	5.000
FSMD020-1206-R	0.20	0.40	30	100	0.4	8.00	0.10	0.600	2.500
FSMD025-1206-R	0.25	0.50	16	100	0.6	8.00	0.08	0.550	2.300
FSMD025-24-1206-R	0.25	0.50	24	100	0.6	8.00	0.08	0.550	2.300
FSMD035-1206-R	0.35	0.75	16	100	0.4	8.00	0.10	0.300	1.200
FSMD035-30-1206R	0.35	0.75	30	100	0.6	8.00	0.10	0.300	1.200
FSMD050-1206-R	0.50	1.00	8	100	0.4	8.00	0.10	0.150	0.700
FSMD050-24-1206R	0.50	1.00	24	100	0.6	8.00	0.10	0.150	0.750
FSMD075-1206R	0.75	1.50	8	100	0.6	8.00	0.20	0.090	0.290
FSMD075-16-1206R	0.75	1.50	16	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	8	100	0.8	8.00	0.30	0.040	0.180
FSMD150-1206R	1.50	3.00	8	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

Termination pad characteristics

Termination pad materials : Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	115%	100%	92%	84%	78%	69%	62%	50%

FSMD1206 Product Dimensions (mm)

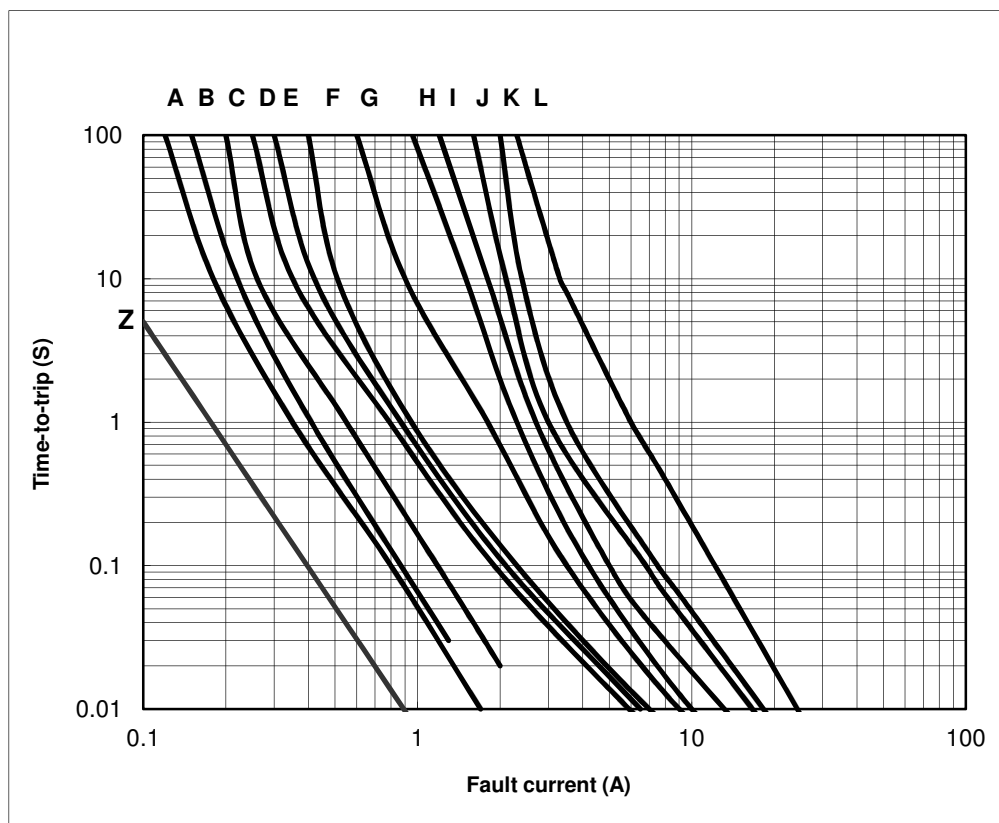


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD005-1206-R	3.00	3.50	1.50	1.80	0.45	0.85	0.10	0.75	0.10	0.45
FSMD010-1206-R	3.00	3.50	1.50	1.80	0.45	0.85	0.10	0.75	0.10	0.45
FSMD012-1206-R	3.00	3.50	1.50	1.80	0.45	0.85	0.10	0.75	0.10	0.45
FSMD016-1206-R	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	0.10	0.45
FSMD020-1206-R	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	0.10	0.45
FSMD025-1206-R	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	0.10	0.45
FSMD025-24-1206-R	3.00	3.50	1.50	1.80	0.45	0.75	0.10	0.75	0.10	0.45
FSMD035-1206-R	3.00	3.50	1.50	1.80	0.30	0.75	0.10	0.75	0.10	0.45
FSMD035-30-1206R	3.00	3.50	1.50	1.80	0.90	1.30	0.25	0.75	0.10	0.45
FSMD050-1206-R	3.00	3.50	1.50	1.80	0.25	0.55	0.10	0.75	0.10	0.45
FSMD050-24-1206R	3.00	3.50	1.50	1.80	0.80	1.20	0.25	0.75	0.10	0.45
FSMD075-1206R	3.00	3.50	1.50	1.80	0.45	1.25	0.25	0.75	0.10	0.45
FSMD075-16-1206R	3.00	3.50	1.50	1.80	0.45	1.25	0.25	0.75	0.10	0.45
FSMD100-1206R	3.00	3.50	1.50	1.80	0.45	1.00	0.25	0.75	0.10	0.45
FSMD110-1206R	3.00	3.50	1.50	1.80	0.45	1.00	0.25	0.75	0.10	0.45
FSMD150-1206R	3.00	3.50	1.50	1.80	0.80	1.40	0.25	0.75	0.10	0.45
FSMD200-1206R	3.00	3.50	1.50	1.80	0.85	1.60	0.25	0.75	0.10	0.45

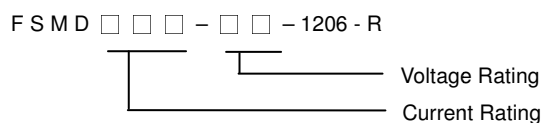
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

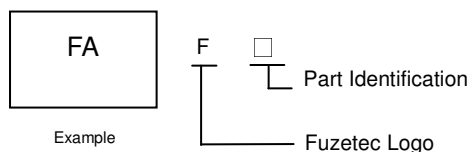
Z= FSMD005-1206-R
 A= FSMD010-1206-R
 B= FSMD012-1206-R
 C= FSMD016-1206-R
 D= FSMD020-1206-R
 E= FSMD025-1206-R/
 025-24-1206-R
 F= FSMD035-1206-R/
 035-60-1206R
 G= FSMD050-1206-R/
 FSMD050-24-1206R
 H= FSMD075-1206R /
 FSMD075-16-1206R
 I= FSMD100-1206R
 J= FSMD110-1206R
 K= FSMD150-1206R
 L= FSMD200-1206R



Part Numbering System



Part Marking System



FZ = FSMD005-1206-R
 FA = FSMD010-1206-R
 FJ = FSMD012-1206-R
 FK = FSMD016-1206-R
 FB = FSMD020-1206-R
 FL = FSMD025-1206-R
 FP = FSMD025-24-1206-R
 FC = FSMD035-1206-R
 FM = FSMD035-30-1206R
 FD = FSMD050-1206-R
 FN = FSMD050-24-1206R
 FE = FSMD075-1206R
 FO = FSMD075-16-1206R
 FF = FSMD100-1206R
 FG = FSMD110-1206R
 FH = FSMD150-1206R
 FI = FSMD200-1206R

Standard Package

FSMD005-1206-R~ FSMD025-24-1206-R	:	3.0K Reel/Tape
FSMD035-1206-R	:	4.0K Reel/Tape
FSMD035-30-1206R	:	3.0K Reel/Tape
FSMD050-1206-R	:	4.0K Reel/Tape
FSMD050-24-1206R~FSMD110-1206R	:	3.0K Reel/Tape
FSMD150-1206R~FSMD200-1206R	:	2.0K Reel/Tape

- 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 & Halogen 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_{DC}

Temperature Range : -40°C to 85°C

Agency Recognition : UL (E211981)

C-UL (E211981)

TÜV (R50090556)

Electrical Characteristics(23°C)

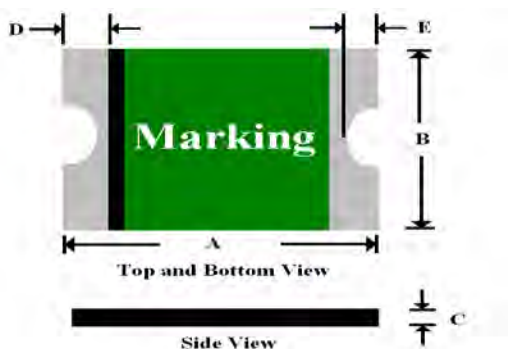
Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typ. Power	Max Time to Trip		Resistance	
						Current	Time	R _{MIN}	R _{1 MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	A	Sec	Ohms	Ohms
FSMD010-0805-R	0.10	0.30	15	100	0.5	0.50	1.50	0.700	6.000
FSMD020-0805-R	0.20	0.50	9	100	0.5	8.00	0.02	0.400	3.500
FSMD035-0805-R	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
FSMD050-9-0805R	0.50	1.00	9	100	0.5	8.00	0.10	0.150	0.850
FSMD075-0805R	0.75	1.50	6	100	0.6	8.00	0.20	0.090	0.350
FSMD100-0805R	1.00	1.95	6	100	0.6	8.00	0.30	0.060	0.210

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	116%	100%	91%	84%	76%	69%	61%	50%

FSMD0805 Product Dimensions (mm)



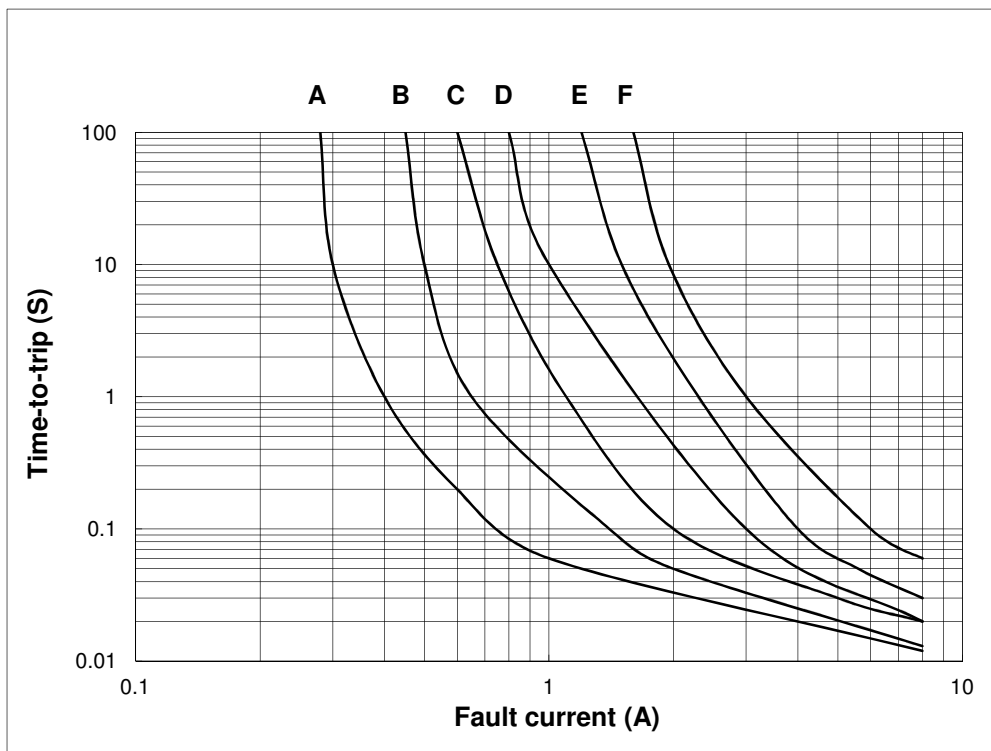
Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD010-0805-R	2.00	2.30	1.20	1.50	0.30	1.00	0.20	0.60	0.10	0.45
FSMD020-0805-R	2.00	2.30	1.20	1.50	0.30	1.00	0.20	0.60	0.10	0.45
FSMD035-0805-R	2.00	2.30	1.20	1.50	0.25	0.75	0.20	0.60	0.10	0.45
FSMD050-0805R	2.00	2.30	1.20	1.50	0.55	1.25	0.20	0.60	0.10	0.45
FSMD050-9-0805R	2.00	2.30	1.20	1.50	0.55	1.25	0.20	0.60	0.10	0.45
FSMD075-0805R	2.00	2.30	1.20	1.50	0.55	1.25	0.20	0.60	0.10	0.45
FSMD100-0805R	2.00	2.30	1.20	1.50	0.75	1.80	0.20	0.60	0.10	0.45

NOTE : All Specifications subject to change without notice.

*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX - SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

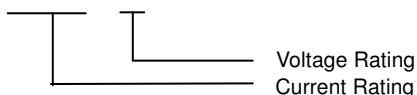
Typical Time-To-Trip at 23°C

A =FSMD010-0805-R
B =FSMD020-0805-R
C =FSMD035-0805-R
D =FSMD050-0805R/
FSMD050-9-0805R
E =FSMD075-0805R
F =FSMD100-0805R

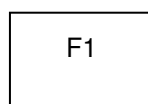


Part Numbering System

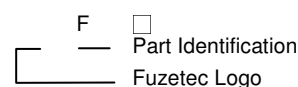
F S M D □ □ □ - □ - 0805 - R



Part Marking System



Example



F1 =FSMD010-0805-R
F2 =FSMD020-0805-R
F3 =FSMD035-0805-R
F5 =FSMD050-0805R
FA =FSMD050-9-0805R
F7 =FSMD075-0805R
F0 =FSMD100-0805R

Standard Package

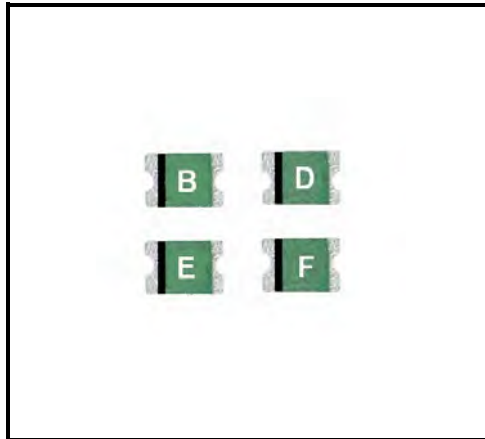
FSMD010-0805-R~FSMD035-0805-R : 4.0K Reel/Tape
FSMD050-0805R~FSMD100-0805R : 3.0K Reel/Tape

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.

FSMD0603 Series



RoHS Compliant & Halogen 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 : 0.01A~0.20A

Maximum Voltage : 9V~60V_{DC}

Temperature Range : -40°C to 85°C

Agency Recognition : UL (E211981)

C-UL (E211981)

TÜV (R50090556)

Electrical Characteristics(23°C)

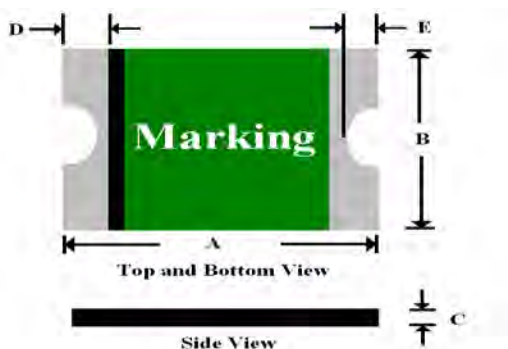
Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance	
	Current	Current	Voltage	Current	Power	Current	Time	RMIN	R1MAX
	I _H , A	I _T , A	V _{MAX} , VDC	I _{MAX} , A	P _d , W	A	Sec	Ω	Ω
FSMD001-0603-R	0.01	0.03	60	40	0.5	0.20	1.00	15.00	100.00
FSMD002-0603-R	0.02	0.06	60	40	0.5	0.20	1.00	12.00	70.00
FSMD003-0603-R	0.03	0.09	30	40	0.5	0.20	1.00	6.00	50.00
FSMD004-0603-R	0.04	0.12	24	40	0.5	0.20	1.00	4.00	40.00
FSMD005-0603-R	0.05	0.15	15	40	0.5	0.50	0.10	3.80	30.00
FSMD010-0603-R	0.10	0.25	15	40	0.5	0.70	0.10	0.90	8.00
FSMD012-0603-R	0.12	0.30	9	40	0.5	0.80	0.10	1.10	5.80
FSMD016-0603-R	0.16	0.40	9	40	0.5	1.00	0.10	1.00	4.20
FSMD020-0603-R	0.20	0.45	9	40	0.5	2.00	0.10	0.55	3.50

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	157%	137%	118%	100%	89%	80%	70%	60%	51%	37%

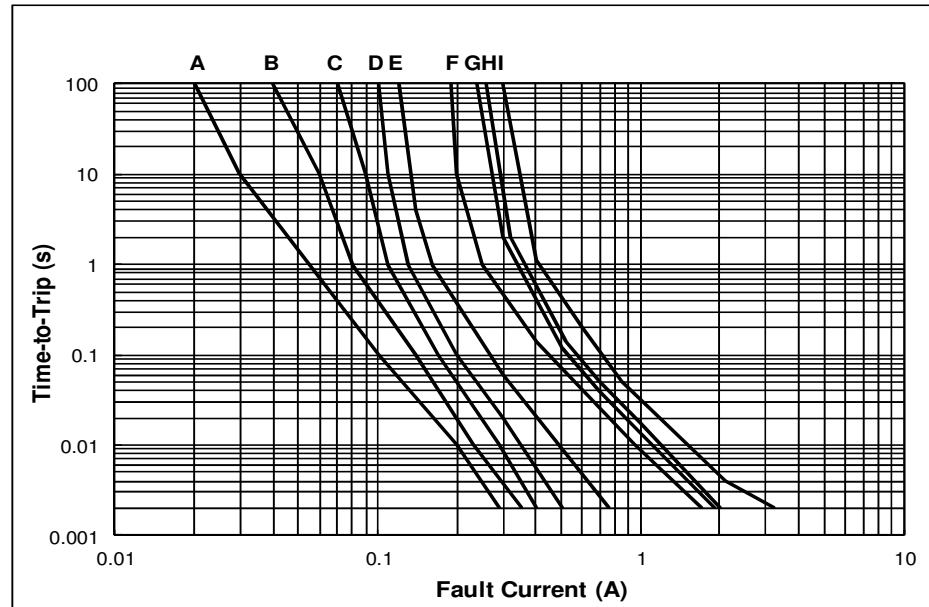
FSMD0603 Product Dimensions (mm)



Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD001-0603-R	1.40	1.80	0.45	1.00	0.35	0.85	0.10	0.50	0.08	0.40
FSMD002-0603-R	1.40	1.80	0.45	1.00	0.35	0.85	0.10	0.50	0.08	0.40
FSMD003-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD004-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD005-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD010-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD012-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD016-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD020-0603-R	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40

NOTE : All Specifications subject to change without notice.

Typical Time-To-Trip at 23°C



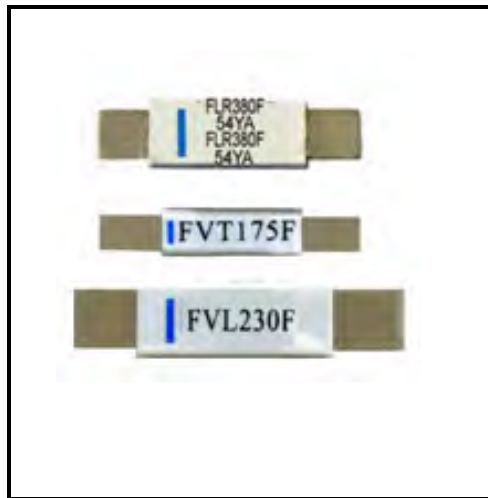
Part Marking System

 Part Identification

Standard Package

- 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.

STRAP Series



RoHS Compliant & Halogen Free



Application: Rechargeable battery packs, Lithium cell and battery packs

Product Features: Low profile, Solid state

Operation Current:

FVL Series 1.7A~2.3A ; FVT Series 1.1A~2.4A

FLR Series 1.9A~7.3A ; FSR Series 1.2A~4.2A

Maximum Voltage: 12V ~ 30V_{DC}

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	Rated Voltage	Max. Current	Typ. Power	Resistance		
	I _H , A	I _T , A	at 5xI _H , S	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	R _{MIN} Ohms	R _{MAX} Ohms	R1 _{MAX} Ohms
FVL170F	1.70	4.10	5.0	12	100	1.4	0.018	0.032	0.064
FVL175F	1.75	4.20	5.0	12	100	1.4	0.017	0.031	0.062
FVL230F	2.30	5.00	5.0	12	100	1.4	0.012	0.018	0.036
FVT110F	1.10	2.70	5.0	16	100	0.7	0.038	0.070	0.140
FVT170F	1.70	3.40	5.0	16	100	0.7	0.030	0.052	0.105
FVT175F	1.75	3.60	5.0	16	100	0.8	0.029	0.051	0.102
FVT200F	2.00	4.70	5.0	16	100	0.9	0.022	0.039	0.078
FVT210GF	2.10	4.70	5.0	16	100	1.2	0.018	0.030	0.060
FVT240F	2.40	5.90	5.0	16	100	1.0	0.014	0.026	0.052
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
FLR190F	1.90	3.90	5.0	15	100	1.2	0.039	0.072	0.102
FLR260F	2.60	5.80	5.0	15	100	2.5	0.020	0.042	0.063
FLR380F	3.80	8.30	5.0	15	100	2.5	0.013	0.026	0.037
FLR450F	4.50	8.90	5.0	20	100	2.5	0.011	0.020	0.028
FLR550F	5.50	10.50	5.0	20	100	2.8	0.009	0.016	0.022
FLR600F	6.00	11.70	5.0	20	100	2.8	0.007	0.014	0.019
FLR730F	7.30	14.10	5.0	20	100	3.3	0.006	0.012	0.015

Physical specifications:

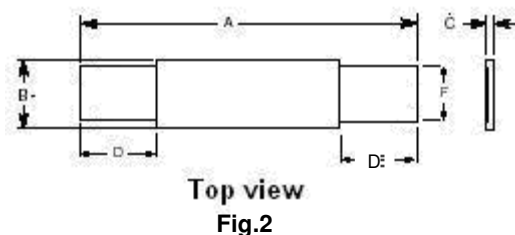
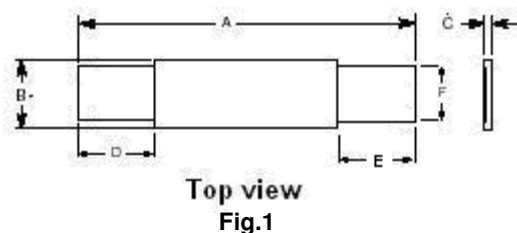
Lead material: 0.13mm nominal thickness, quarter-hard nickel.

Insulating material: Polyester tape.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
FVL Series	195%	163%	132%	100%	85%	68%	53%	38%	21%	-
FVT Series	172%	149%	124%	100%	90%	78%	65%	53%	41%	23%
FSR Series	152%	135%	118%	100%	90%	82%	74%	65%	56%	42%
FLR Series	147%	132%	117%	100%	94%	86%	80%	71%	61%	52%

Production Dimensions (mm)



Part Number	Fig	A		B		C		D		E		F	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FVL170F	1	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	1	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	1	20.9	23.1	4.9	5.3	0.5	0.8	4.1	5.8	4.1	5.8	3.9	4.1
FVT110F	2	23.6	25.6	2.6	2.9	0.5	0.9	7.0	8.0	---	---	2.3	2.5
FVT170F	2	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	3.5	3.9	0.5	0.9	4.6	6.6	---	---	2.9	3.1
FVT200F	2	21.0	23.0	4.1	4.5	0.5	0.9	3.0	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	3.5	5.5	---	---	3.9	4.1
FSR120F	2	19.9	22.1	4.9	5.2	0.6	1.0	5.5	7.5	---	---	3.9	4.1
FSR175F	2	20.9	23.1	4.9	5.2	0.6	1.0	4.1	5.5	---	---	3.9	4.1
FSR200F	2	21.3	23.4	10.2	11.0	0.5	1.1	5.0	7.6	---	---	4.8	5.4
FSR350F	2	28.4	31.8	13.0	13.5	0.5	1.1	6.3	8.9	---	---	5.9	6.1
FSR420F	2	30.6	32.4	12.9	13.6	0.5	1.1	5.0	7.5	---	---	5.9	6.1
FLR190F	2	19.9	22.1	4.9	5.5	0.6	1.0	5.5	7.5	---	---	3.9	4.1
FLR260F	2	20.9	23.1	4.9	5.5	0.6	1.0	4.1	5.5	---	---	3.9	4.1
FLR380F	2	24.0	26.0	6.9	7.5	0.6	1.0	4.1	5.5	---	---	4.9	5.1
FLR450F	2	24.0	26.0	9.9	10.5	0.6	1.0	5.3	6.7	---	---	5.9	6.1
FLR550F	2	35.0	37.0	6.9	7.5	0.6	1.0	5.3	6.7	---	---	4.9	5.1
FLR600F	2	24.0	26.0	13.9	14.5	0.6	1.0	4.1	5.5	---	---	5.9	6.1
FLR730F	2	27.1	29.1	13.9	14.5	0.6	1.0	4.1	5.5	---	---	5.9	6.1

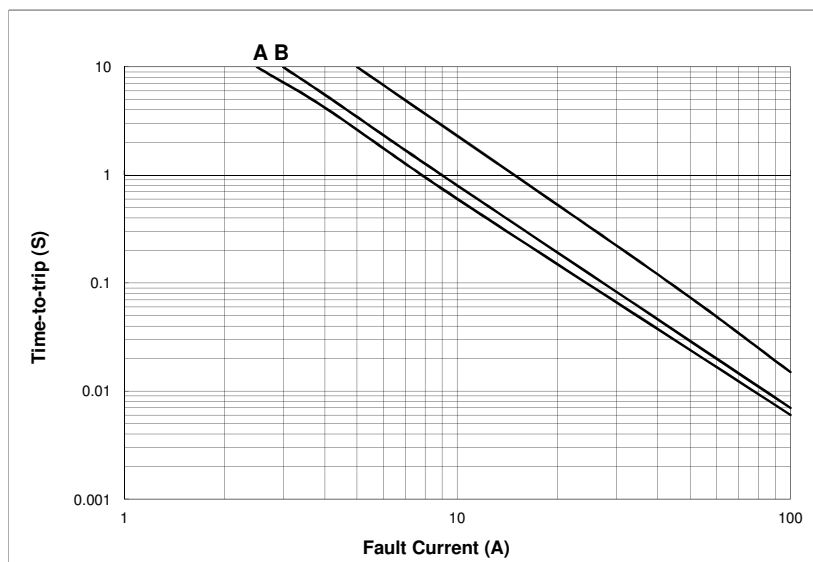
Typical Time-To-Trip at 23°C

FVL Series

A= FVL 170F

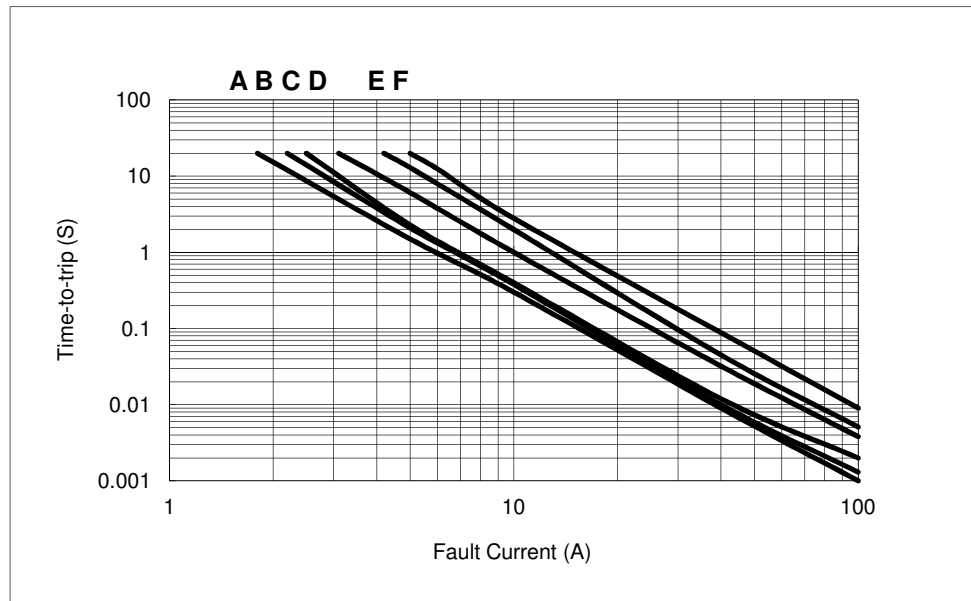
B= FVL 175F

C= FVL 230F



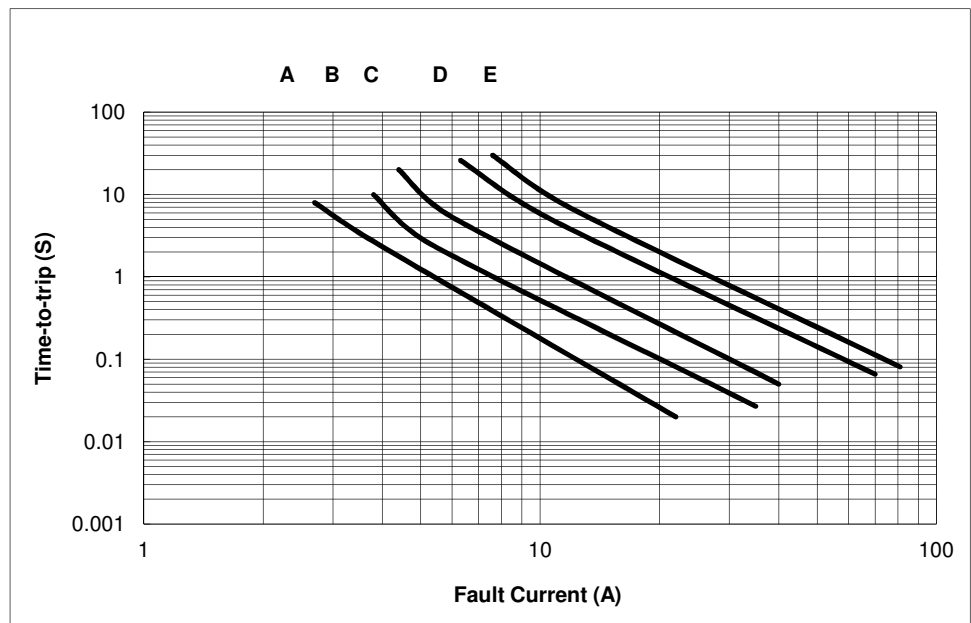
FVT Series

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



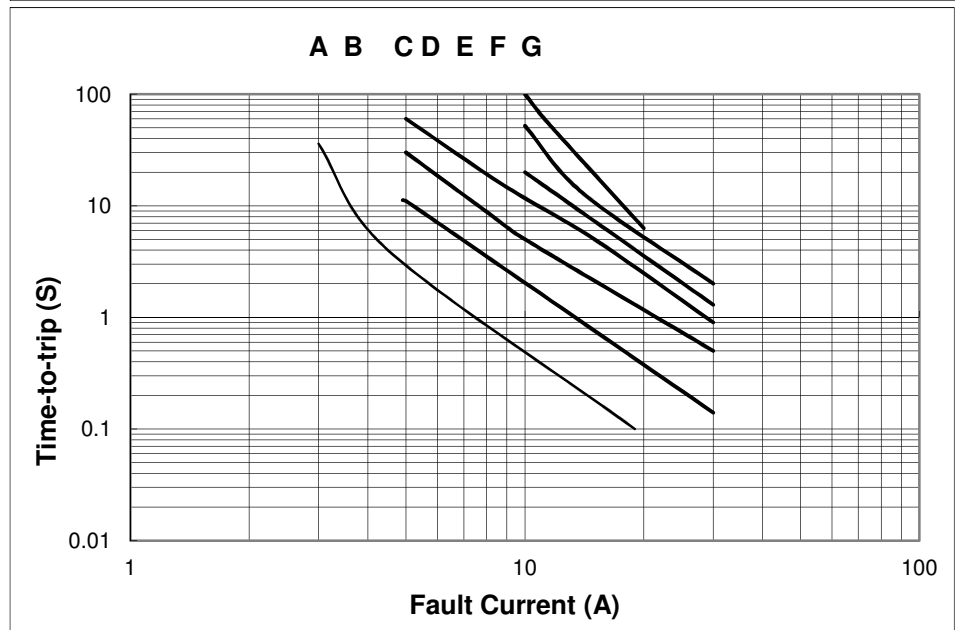
FSR Series

A =FSR 120F
B =FSR 175F
C =FSR 200F
D =FSR 350F
E =FSR 420F



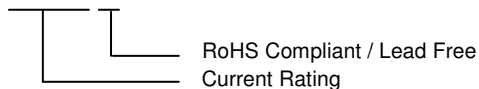
FLR Series

A=FLR 190F
B=FLR 260F
C=FLR 380F
D=FLR 450F
E=FLR 550F
F=FLR 600F
G=FLR 730F



Part Numbering System

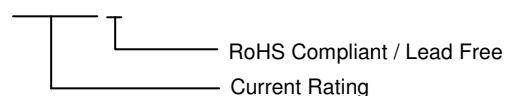
FVL □ □ □ F



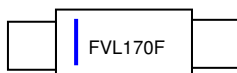
FVT □ □ □ F

FSR □ □ □ F

FLR □ □ □ F

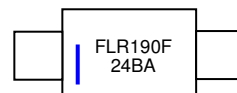
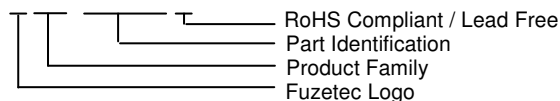


Part Marking System



Example

FVL □ □ □ F

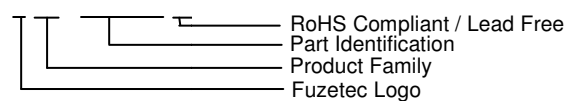


Example

FVT □ □ □ F

FSR □ □ □ F

FLR □ □ □ F



□ □ □ □

Date Code/Lot Number

Standard Package

FVL170F~FVL175F : 1.0K Pcs/Bag

FVT110F~FVT210GF : 1.0K Pcs/Bag

FSR120F~FSR175F : 1.0K Pcs/Bag

FLR190F~FLR380F : 1.0K Pcs/Bag

FVL230F : 500 Pcs/Bag

FVT240F : 500 Pcs/Bag

FSR200F~FSR420F : 500 Pcs/Bag

FLR450F~FLR730F : 500 Pcs/Bag

- 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.



Low Rho INTRODUCTION AND HIGHLIGHT

Low Rho PPTC Resettable Fuse takes advantage of newly developed conductive material technology and manufacturing processing capability; which offer ultra low resistance and miniature device dimension. Fuzetec is pleased to offer Low Rho PPTC device in both SMD and Strap type forms which are ideal for Portable electronics Battery protection/Protection Circuit Module (PCM), high speed data /charging USB 3.0 and other applications where compact space and flexible design are highly required.

FEATURE

- Ultra Low Resistance
- Smaller Dimension, only 1/4 of Std. Carbon PPTC.
- Less Voltage Drop (Lower Resistance)
- Higher Ihold (same dimension)
- Lower Power Consumption (Smaller Pd)

TYPICAL APPLICATION

- Portable Electronics : SMART PHONE and TABLET PC....,etc.
- USB 3.0

HOW Low Rho PPTCs BENEFIT YOUR PORTABLE ELECTRONICS?

- Longer Use/Stand by Time
- Faster Data Transmission rate
- Faster Power Charging Speed
- Low Noise on Signal/Data Transmission
- Lower Power Consumption

Low Rho FSMD1812 Series



RoHS Compliant & Halogen 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: 1.4~6.0A

Maximum Voltage: 6V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

TÜV (R50090556)

Electrical Characteristics (23°C)

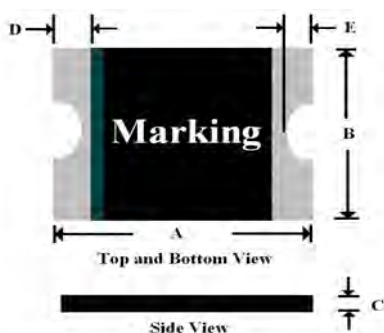
Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typ. Power	Max Time to Trip		Resistance	
	I_H , A	I_T , A	V_{MAX} , V _{DC}	I_{MAX} , A	P_d , W	Current	Time	R_{MIN}	$R1_{MAX}$
	I_H , A	I_T , A	V_{MAX} , V _{DC}	I_{MAX} , A	P_d , W	A	Sec	Ohms	Ohms
FSMD140RZ	1.40	3.60	6	100	1.0	8.0	3.00	0.0100	0.0350
FSMD190RZ	1.90	4.90	6	100	1.0	8.0	5.00	0.0030	0.0250
FSMD270RZ	2.70	6.20	6	100	1.0	13.5	3.00	0.0030	0.0230
FSMD300RZ	3.00	7.00	6	100	1.0	15.0	2.00	0.0030	0.0220
FSMD370RZ	3.70	9.10	6	100	1.0	18.5	2.00	0.0030	0.0180
FSMD500RZ	5.00	10.00	6	100	1.0	25.0	2.00	0.0015	0.0140
FSMD600RZ	6.00	12.00	6	100	1.0	30.0	3.00	0.0010	0.0100

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%

Low Rho FSMD1812 Product Dimensions (mm)

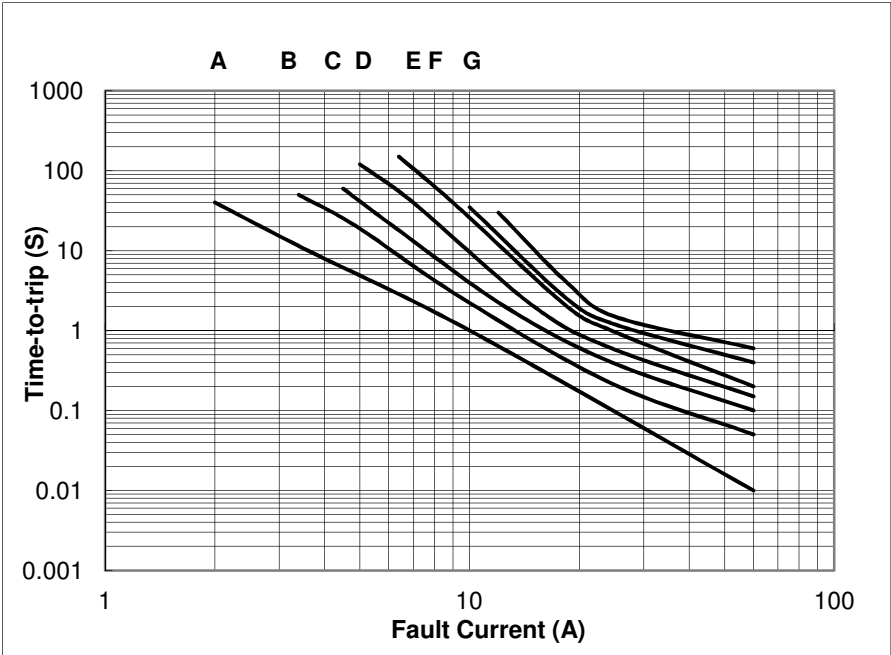


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD140RZ	4.37	4.73	3.07	3.41	0.30	0.70	0.25	0.95	0.25	0.65
FSMD190RZ	4.37	4.73	3.07	3.41	0.30	0.70	0.25	0.95	0.25	0.65
FSMD270RZ	4.37	4.73	3.07	3.41	0.40	0.75	0.25	0.95	0.25	0.65
FSMD300RZ	4.37	4.73	3.07	3.41	0.40	0.75	0.25	0.95	0.25	0.65
FSMD370RZ	4.37	4.73	3.07	3.41	0.40	0.75	0.25	0.95	0.25	0.65
FSMD500RZ	4.37	4.73	3.07	3.41	0.40	0.75	0.25	0.95	0.25	0.65
FSMD600RZ	4.37	4.73	3.07	3.41	0.60	1.00	0.25	0.95	0.25	0.65

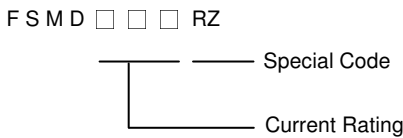
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

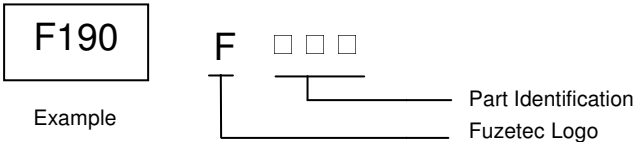
- A = FSMD140RZ
- B = FSMD190RZ
- C = FSMD270RZ
- D = FSMD300RZ
- E = FSMD370RZ
- F = FSMD500RZ
- G = FSMD600RZ



Part Numbering System



Part Marking System



Standard Package

FSMD140RZ~ FSMD600RZ : 2.0K Reel/Tape

- F14Z = FSMD140RZ
- F190 = FSMD190RZ
- F27Z = FSMD270RZ
- F30Z= FSMD300RZ
- F37Z= FSMD370RZ
- F50Z= FSMD500RZ
- F60Z= FSMD600RZ

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.

Low Rho FSMD1210 Series



RoHS Compliant & Halogen 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: 1.75~6.5A

Maximum Voltage: 6V

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	Typ. Power	Max Time to Trip		Resistance	
	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	A	Sec	Ohms	Ohms
FSMD175-1210RZ	1.75	3.50	6	100	1.0	8.00	2.50	0.006	0.040
FSMD200-1210RZ	2.00	4.90	6	100	1.0	8.00	3.00	0.005	0.024
FSMD260-1210RZ	2.60	5.00	6	100	0.8	8.00	4.00	0.003	0.020
FSMD300-1210RZ	3.00	6.00	6	100	0.8	15.00	2.00	0.003	0.020
FSMD350-1210RZ	3.50	7.00	6	100	1.0	17.50	2.00	0.003	0.018
FSMD380-1210RZ	3.80	8.00	6	100	1.0	8.00	5.00	0.002	0.016
FSMD400-1210RZ	4.00	8.00	6	100	1.0	8.00	5.00	0.002	0.016
FSMD450-1210RZ	4.50	9.00	6	100	1.0	22.50	2.00	0.001	0.014
FSMD650-1210RZ	6.50	13.00	6	100	1.2	32.50	2.00	0.001	0.009

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING (%)	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%

Low Rho FSMD1210 Product Dimensions (mm)

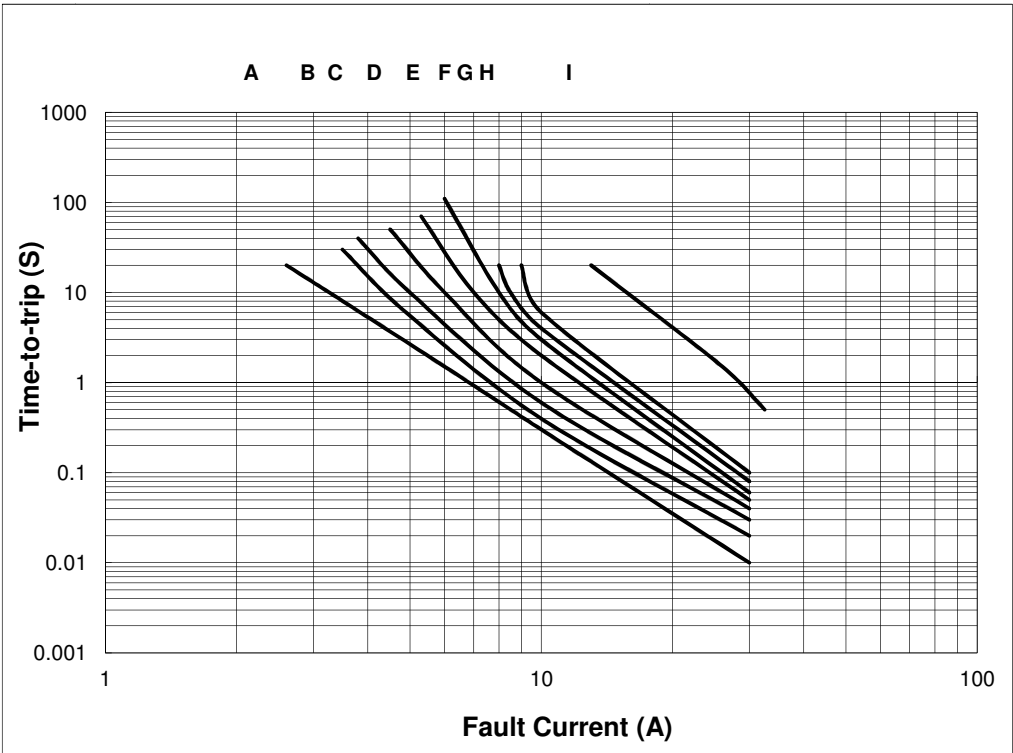


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD175-1210RZ	3.00	3.43	2.35	2.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD200-1210RZ	3.00	3.43	2.35	2.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD260-1210RZ	3.00	3.43	2.35	2.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD300-1210RZ	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD350-1210RZ	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD380-1210RZ	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD400-1210RZ	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD450-1210RZ	3.00	3.43	2.35	2.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD650-1210RZ	3.00	3.43	2.35	2.80	0.60	1.40	0.25	0.75	0.10	0.45

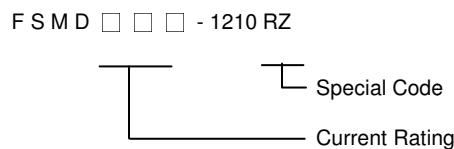
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

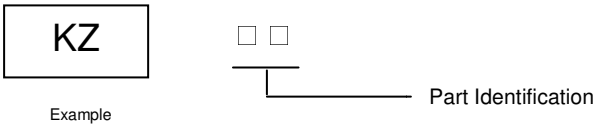
- A=FSMD175-1210RZ
- B=FSMD200-1210RZ
- C=FSMD260-1210RZ
- D=FSMD300-1210RZ
- E=FSMD350-1210RZ
- F=FSMD380-1210RZ
- G=FSMD400-1210RZ
- H=FSMD450-1210RZ
- I=FSMD650 - 1210RZ



Part Numbering System



Part Marking System



- KZ = FSMD175-1210RZ
- MZ = FSMD200-1210RZ
- QZ = FSMD260-1210RZ
- SZ = FSMD300-1210RZ
- VZ = FSMD350-1210RZ
- WZ = FSMD380-1210RZ
- XZ = FSMD400-1210RZ
- YZ = FSMD450-1210RZ
- CZ = FSMD650-1210RZ

Standard Package

- FSMD175-1210RZ~ FSMD260-1210RZ : 4.0K Reel/Tape
- FSMD300-1210RZ~ FSMD450-1210RZ : 3.0K Reel/Tape
- FSMD650-1210RZ : 2.0K Reel/Tape

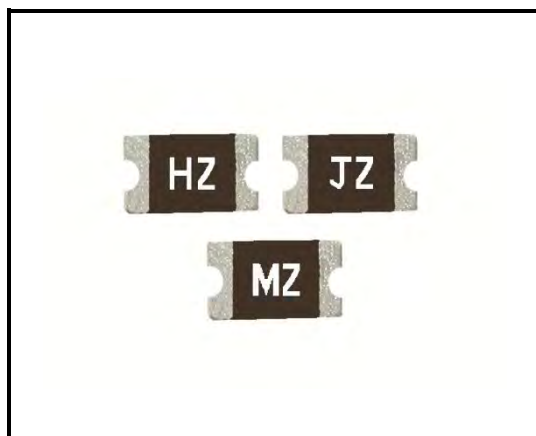
Warning: - Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

 - 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.

Low Rho FSMD1206 Series

RoHS Compliant & Halogen 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: 0.5~5.0A

Maximum Voltage: 6V

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	Typ. Power	Max Time to Trip		Resistance	
	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	A	Sec	Ohms	Ohms
FSMD050-1206RZ	0.50	1.50	6	100	0.8	8.0	0.20	0.025	0.200
FSMD075-1206RZ	0.75	1.80	6	100	0.8	8.0	0.30	0.018	0.180
FSMD110-1206RZ	1.10	2.20	6	100	0.8	8.0	0.30	0.015	0.100
FSMD150-1206RZ	1.50	3.00	6	100	0.8	8.0	0.30	0.010	0.065
FSMD175-1206RZ	1.75	3.50	6	100	0.8	8.0	0.40	0.005	0.030
FSMD200-1206RZ	2.00	4.00	6	100	0.8	8.0	0.50	0.005	0.025
FSMD260-1206RZ	2.60	5.20	6	100	0.8	8.0	4.00	0.003	0.026
FSMD300-1206RZ	3.00	6.00	6	100	0.8	8.0	4.00	0.003	0.020
FSMD350-1206RZ	3.50	7.00	6	100	0.8	8.0	5.00	0.003	0.018
FSMD380-1206RZ	3.80	8.00	6	100	0.8	8.0	5.00	0.002	0.014
FSMD450-1206RZ	4.50	9.00	6	100	0.8	22.5	2.00	0.001	0.014
FSMD500-1206RZ	5.00	10.00	6	100	0.8	25.0	5.00	0.002	0.010

Termination pad characteristics

Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING (%)	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%

Low Rho FSMD1206 Product Dimensions (mm)



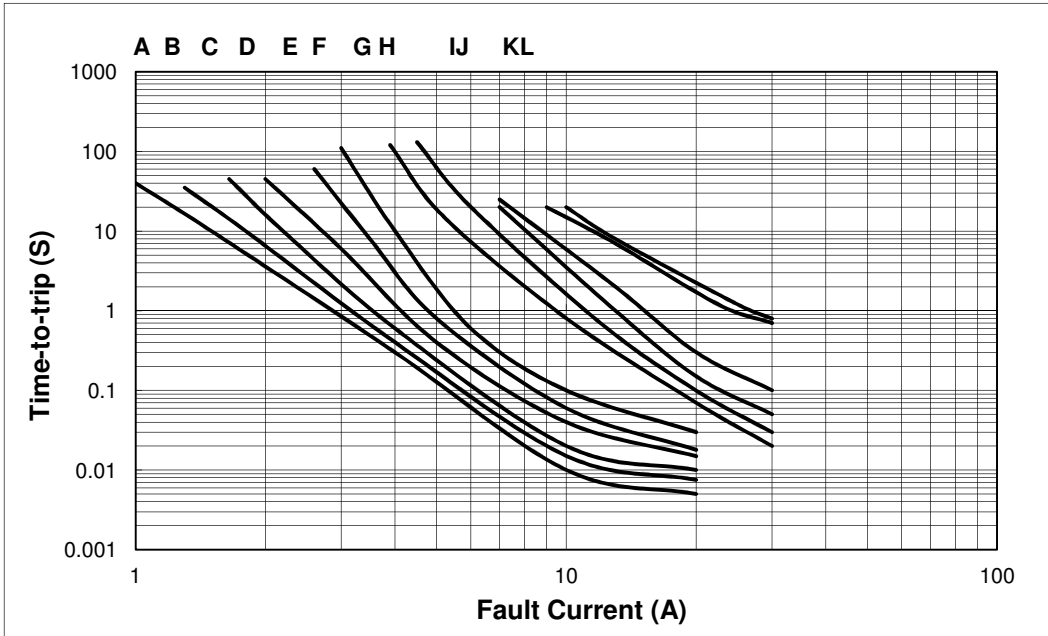
Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD050-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD075-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD110-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD150-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD175-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD200-1206RZ	3.00	3.50	1.50	1.80	0.40	0.75	0.25	0.75	0.10	0.45
FSMD260-1206RZ	3.00	3.50	1.50	1.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD300-1206RZ	3.00	3.50	1.50	1.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD350-1206RZ	3.00	3.50	1.50	1.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD380-1206RZ	3.00	3.50	1.50	1.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD450-1206RZ	3.00	3.50	1.50	1.80	0.60	1.00	0.25	0.75	0.10	0.45
FSMD500-1206RZ	3.00	3.50	1.50	1.80	0.80	1.40	0.25	0.75	0.10	0.45

NOTE : All Specifications subject to change without notice.

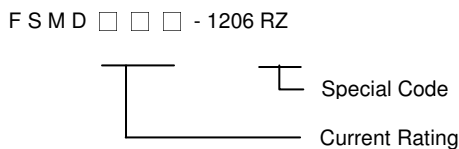
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

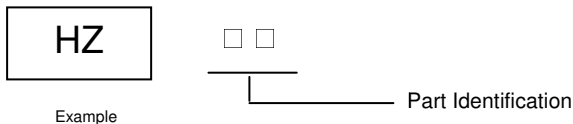
- A=FSMD050-1206RZ
- B=FSMD075-1206RZ
- C=FSMD110-1206RZ
- D=FSMD150-1206RZ
- E=FSMD175-1206RZ
- F=FSMD200-1206RZ
- G=FSMD260-1206RZ
- H=FSMD300-1206RZ
- I=FSMD350-1206RZ
- J=FSMD380-1206RZ
- K=FSMD450-1206RZ
- L = FSMD500-1206RZ



Part Numbering System



Part Marking System



Standard Package

- | | | |
|--------------------------------|---|----------------|
| FSMD050-1206RZ~ FSMD200-1206RZ | : | 4.0K Reel/Tape |
| FSMD260-1206RZ~ FSMD450-1206RZ | : | 3.0K Reel/Tape |
| FSMD500-1206RZ | : | 2.0K Reel/Tape |

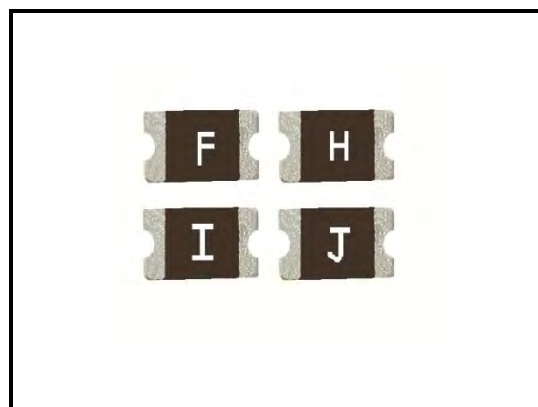
- EZ = FSMD050-1206RZ
- FZ = FSMD075-1206RZ
- HZ = FSMD110-1206RZ
- JZ = FSMD150-1206RZ
- KZ = FSMD175-1206RZ
- MZ = FSMD200-1206RZ
- QZ = FSMD260-1206RZ
- SZ = FSMD300-1206RZ
- VZ = FSMD350-1206RZ
- WZ = FSMD380-1206RZ
- YZ = FSMD450-1206RZ
- ZZ = FSMD500-1206RZ

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.

Low Rho FSMD0805 Series



RoHS Compliant & Halogen 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: 0.75~2.00A

Maximum Voltage: 6V

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

C-UL (E211981)

TÜV (R50090556)

Electrical Characteristics (23°C)

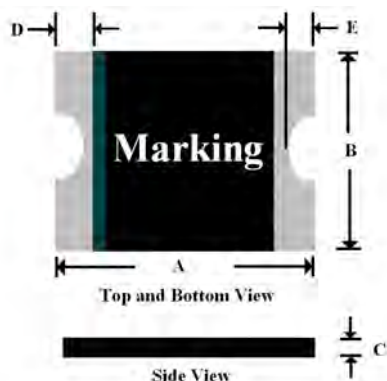
Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typ. Power	Max Time to Trip		Resistance	
	I_H , A	I_T , A	V_{MAX} , V _{DC}	I_{MAX} , A	P_d , W	Current	Time	R_{MIN}	$R1_{MAX}$
	I_H , A	I_T , A	V_{MAX} , V _{DC}	I_{MAX} , A	P_d , W	A	Sec	Ohms	Ohms
FSMD075-0805RZ	0.75	1.50	6	100	0.6	8.0	0.20	0.040	0.160
FSMD110-0805RZ	1.10	1.80	6	100	0.6	8.0	0.30	0.030	0.130
FSMD125-0805RZ	1.25	2.50	6	100	0.6	8.0	0.30	0.025	0.110
FSMD150-0805RZ	1.50	3.00	6	100	0.6	8.0	0.30	0.015	0.065
FSMD175-0805RZ	1.75	3.50	6	100	0.6	8.0	0.60	0.005	0.055
FSMD200-0805RZ	2.00	4.00	6	100	0.6	8.0	1.00	0.005	0.045

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING (%)	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%

Low Rho FSMD0805 Product Dimensions (mm)

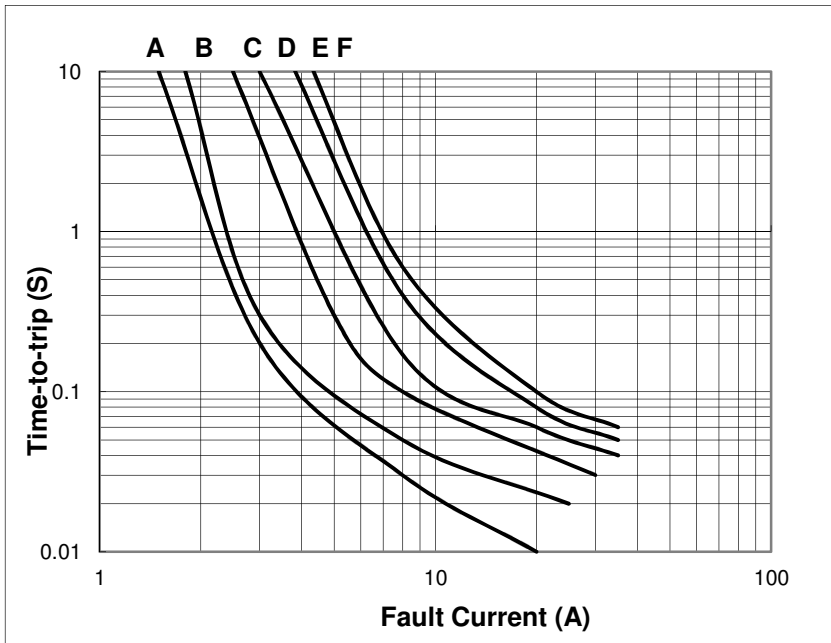


Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD075-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45
FSMD110-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45
FSMD125-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45
FSMD150-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45
FSMD175-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45
FSMD200-0805RZ	2.00	2.20	1.20	1.50	0.40	0.75	0.20	0.60	0.10	0.45

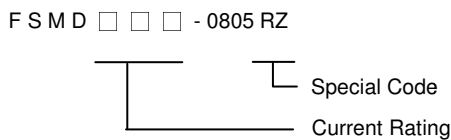
*For Reflow Soldering Profile information, please refer to P.74 ” IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS “

Typical Time-To-Trip at 23°C

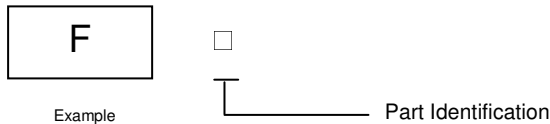
- A=FSMD075-0805RZ
- B=FSMD110-0805RZ
- C=FSMD125-0805RZ
- D=FSMD150-0805RZ
- E=FSMD175-0805RZ
- F=FSMD200-0805RZ



Part Numbering System



Part Marking System



- F = FSMD075-0805RZ
- H = FSMD110-0805RZ
- I = FSMD125-0805RZ
- J = FSMD150-0805RZ
- K = FSMD175-0805RZ
- M = FSMD200-0805RZ

Standard Package

FSMD075-0805RZ~ FSMD200-0805RZ : 4.0K Reel/Tape

- 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.

Low Rho FSMD0603 Series



RoHS Compliant & Halogen 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: 0.25~1.00A

Maximum Voltage: 6V~9 V_{DC}

Temperature Range: -40°C to 85°C

Agency Recognition: UL (E211981)

Electrical Characteristics (23°C)

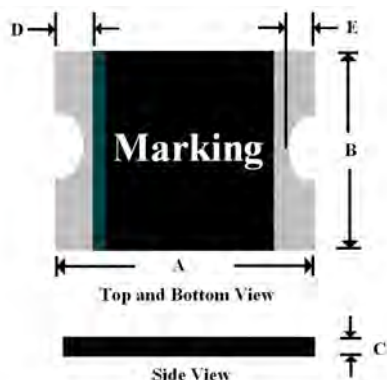
Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typ. Power	Max Time to Trip		Resistance	
						Current	Time	R _{MIN}	R1 _{MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	Pd, W	A	Sec	Ohms	Ohms
FSMD025-0603RZ	0.25	0.55	9	100	0.5	8.0	0.08	0.500	3.000
FSMD035-0603RZ	0.35	0.75	6	100	0.5	8.0	0.10	0.200	1.000
FSMD050-0603RZ	0.50	1.00	6	100	0.6	8.0	0.10	0.070	0.350
FSMD075-0603RZ	0.75	1.50	6	100	0.6	8.0	0.20	0.050	0.250
FSMD100-0603RZ	1.00	1.80	6	100	0.6	8.0	0.30	0.040	0.120

Termination pad characteristics
Termination pad materials: Pure Tin

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING (%)	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%

Low Rho FSMD0603 Product Dimensions (mm)



Part Number	A		B		C		D		E	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD025-0603RZ	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD035-0603RZ	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD050-0603RZ	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD075-0603RZ	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40
FSMD100-0603RZ	1.40	1.80	0.45	1.00	0.35	0.75	0.10	0.50	0.08	0.40

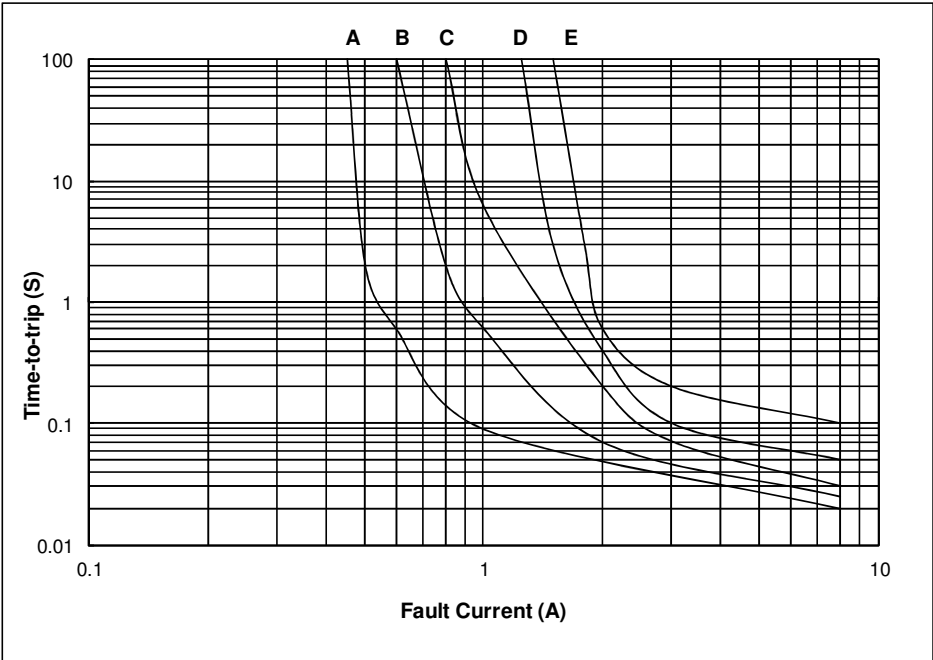
III - Product – Low Rho PPTC



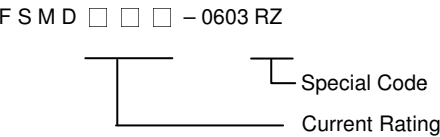
*For Reflow Soldering Profile information, please refer to P.74 " IV APPENDIX – SMD PRODUCT SOLDER REFLOW RECOMMENDATIONS "

Typical Time-To-Trip at 23°C

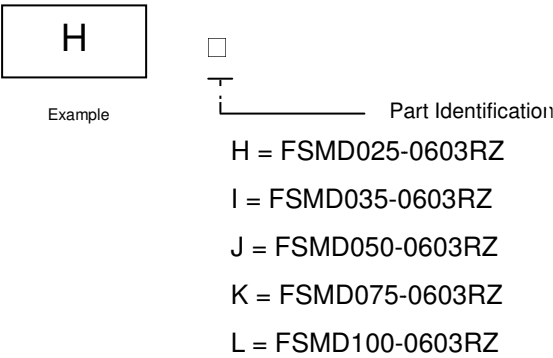
- A = FSMD025-0603RZ
- B = FSMD035-0603RZ
- C = FSMD050-0603RZ
- D = FSMD075-0603RZ
- E = FSMD100-0603RZ



Part Numbering System



Part Marking System



Standard Package

FSMD025-0603RZ~ FSMD100-0603RZ : 4.0K Reel/Tape

- 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.

Low Rho STRAP FSL Series



RoHS Compliant & Halogen Free



Application: Rechargeable battery packs protection, especially for Smart Phone and Tablet PC.

Product Features: Low resistance, Solid state

Operation Current: 1.4~7.0A

Maximum Voltage: 6V_{DC}

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	Typ. Power	Max Time to Trip		Resistance		
						Current	Time	R _{MIN}	R _{MAX}	R1 _{MAX}
	I _H , A	I _T , A	V _{MAX} , V _{DC}	I _{MAX} , A	P _d , W	A	Sec	Ohms	Ohms	Ohms
FSL140F-N	1.4	3.6	6	50	1.0	7.0	3.0	0.0100	0.0200	0.0350
FSL190F-N	1.9	4.9	6	50	1.0	9.5	3.0	0.0060	0.0140	0.0240
FSL250F-N	2.5	8.0	6	50	1.0	12.5	3.0	0.0060	0.0120	0.0200
FSL270F-N	2.7	8.1	6	50	1.0	13.5	2.0	0.0060	0.0120	0.0180
FSL310F-N	3.1	8.8	6	50	1.0	15.5	3.0	0.0040	0.0100	0.0160
FSL370F-N	3.7	9.0	6	50	1.0	18.5	5.0	0.0030	0.0080	0.0140
FSL450LF-N	4.5	9.5	6	50	1.0	22.5	3.0	0.0025	0.0055	0.0100
FSL500F-N	5.0	10.0	6	50	1.0	25.0	3.0	0.0015	0.0050	0.0090
FSL700F-N	7.0	14.0	6	50	1.0	25.0	3.0	0.0010	0.0045	0.0080

Physical specifications:

Lead material: 0.1 mm nominal thickness, quarter-hard nickel.

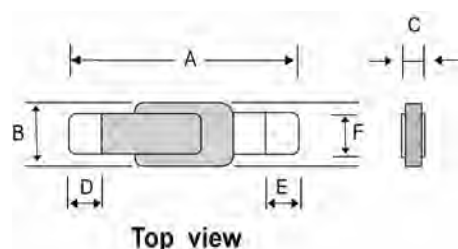
Insulating material: Epoxy.

*Remark : Polyester Tape is also available for this series.

Thermal Derating for PPTC Device at Various Ambient Temperatures

TEMPERATURE	-40°C	-20°C	0°C	23°C	30°C	40°C	50°C	60°C	70°C	85°C
DERATING %	184%	158%	131%	100%	93%	79%	67%	54%	40%	20%

Low Rho Production Dimensions (mm)



Part Number	A		B		C		D		E		F	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSL140F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL190F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL250F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL270F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL310F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL370F-N	9.20	10.80	3.15	3.45	0.55	1.10	2.15	3.25	2.15	3.25	2.20	2.40
FSL450LF-N	20.50	21.50	3.50	3.90	0.55	1.10	7.00	8.00	7.00	8.00	2.40	2.60
FSL500F-N	20.50	21.50	3.50	3.90	0.55	1.10	7.00	8.00	7.00	8.00	2.40	2.60
FSL700F-N	21.00	23.00	3.50	3.90	0.55	1.10	4.60	6.60	4.60	6.60	2.90	3.10

A = FSL140F-N
B = FSL190F-N
C = FSL250F-N /
FSL270F-N
D = FSL310F-N
E = FSL370F-N
F = FSL450LF-N
G = FSL500F-N
H = FSL700F-N



IV - APPENDIX - CROSS REFERENCE



Fuzetec		Tyco (Raychem)		Bourns		Littelfuse		Polytronics	
FRX	005-60F	RXEF	005	MF-R	005	--	--	--	--
FRX	010-60F	RXEF	010	MF-R	010	60R	010	RLD60P	010XF
FRX	017-60F	RXEF	017	MF-R	017	60R	017	RLD60P	017XF
FRX	020-60F	--	--	MF-R	020	60R	020	RLD60P	020XF
FRX	025-60F	--	--	MF-R	025	60R	025	RLD60P	025XF
FRX	030-60F	--	--	MF-R	030	60R	030	RLD60P	030XF
FRX	040-60F	--	--	MF-R	040	60R	040	RLD60P	040XF
FRX	050-60F	--	--	MF-R	050	60R	050	RLD60P	050XF
FRX	065-60F	--	--	MF-R	065	60R	065	RLD60P	065XF
FRX	075-60F	--	--	MF-R	075	60R	075	RLD60P	075XF
FRX	090-60F	--	--	MF-R	090	60R	090	RLD60P	090XF
FRX	110-60F	--	--	MF-RX	110	60R	110	RLD60P	110XF
FRX	135-60F	--	--	MF-RX	135	60R	135	RLD60P	135XF
FRX	160-60F	--	--	MF-RX	160	60R	160	RLD60P	160XF
FRX	185-60F	--	--	MF-RX	185	60R	185	RLD60P	185XF
FRX	250-60F	--	--	MF-RX	250	60R	250	RLD60P	250XF
FRX	300-60F	--	--	MF-RX	300	60R	300	RLD60P	300XF
FRX	375-60F	--	--	MF-RX	375	60R	375	RLD60P	375XF
FRX	010-90F	--	--	--	--	--	--	--	--
FRX	015-90F	--	--	--	--	--	--	--	--
FRX	017-90F	--	--	--	--	--	--	--	--
FRX	020-90F	RXEF	020	MF-RX	020/72	72R	020X	RLD72P	020XF
FRX	025-90F	RXEF	025	MF-RX	025/72	72R	025X	RLD72P	025XF
FRX	030-90F	RXEF	030	MF-RX	030/72	72R	030X	RLD72P	030XF
FRX	035-90F	--	--	--	--	--	--	--	--
FRX	040-90F	RXEF	040	MF-RX	040/72	72R	040X	RLD72P	040XF
FRX	050-90F	RXEF	050	MF-RX	050/72	72R	050X	RLD72P	050XF
FRX	055-90F	--	--	--	--	--	--	--	--
FRX	065-90F	RXEF	065	MF-RX	065/72	72R	065X	RLD72P	065XF
FRX	075-90F	RXEF	075	MF-RX	075/72	72R	075X	RLD72P	075XF
FRX	090-90F	RXEF	090	MF-RX	090/72	72R	090X	RLD72P	090XF
FRX	110-90F	RXEF	110	MF-RX	110/72	72R	110X	RLD72P	110XF
FRX	135-90F	RXEF	135	MF-RX	135/72	72R	135X	RLD72P	135XF
FRX	160-90F	RXEF	160	MF-RX	160/72	72R	160X	RLD72P	160XF
FRX	185-90F	RXEF	185	MF-RX	185/72	72R	185X	RLD72P	185XF
FRX	250-90F	RXEF	250	MF-RX	250/72	72R	250X	RLD72P	250XF
FRX	300-90F	RXEF	300	MF-RX	300/72	72R	300X	RLD72P	300XF
FRX	375-90F	RXEF	375	MF-RX	375/72	72R	375X	RLD72P	375XF
FUSB	075F	RUSBF	075	--	--	06R	075B	RLD06P	075BF
FUSB	090F	RUSBF	090	--	--	16R	090B	RLD16P	090BF
FUSB	110F	RUSBF	110	--	--	16R	110B	RLD16P	110BF
FUSB	120F	RUSBF	120	--	--	06R	120B	RLD06P	120BF
FUSB	135F	RUSBF	135	--	--	16R	135B	RLD16P	135BF
FUSB	155F	RUSBF	155	--	--	06R	155B	RLD06P	155BF
FUSB	160F	RUSBF	160	--	--	16R	160B	RLD16P	160BF
FUSB	185F	RUSBF	185	--	--	16R	185B	RLD16P	185BF
FUSB	250F	RUSBF	250	--	--	16R	250B	RLD16P	250BF

IV - APPENDIX - COSS REFERENCE



Fuzetec		Tyco (Raychem)		Bourns		Littelfuse		Polytronics	
FRU	090-30F	RUEF	090	MF-R	090-0-9	30R	090	RLD30P	090UF
FRU	110-30F	RUEF	110	MF-R	110	30R	110	RLD30P	110UF
FRU	135-30F	RUEF	135	MF-R	135	30R	135	RLD30P	135UF
FRU	160-30F	RUEF	160	MF-R	160	30R	160	RLD30P	160UF
FRU	185-30F	RUEF	185	MF-R	185	30R	185	RLD30P	185UF
FRU	250-30F	RUEF	250	MF-R	250	30R	250	RLD30P	250UF
FRU	300-30F	RUEF	300	MF-R	300	30R	300	RLD30P	300UF
FRU	400-30F	RUEF	400	MF-R	400	30R	400	RLD30P	400UF
FRU	500-30F	RUEF	500	MF-R	500	30R	500	RLD30P	500UF
FRU	600-30F	RUEF	600	MF-R	600	30R	600	RLD30P	600UF
FRU	700-30F	RUEF	700	MF-R	700	30R	700	RLD30P	700UF
FRU	800-30F	RUEF	800	MF-R	800	30R	800	RLD30P	800UF
FRU	900-30F	RUEF	900	MF-R	900	30R	900	RLD30P	900UF
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	--	--	--	--	--	--	--	--
FRG	250-16F	RGEF	250	--	--	16R	250G	RLD16P	250GF
FRG	300-16F	RGEF	300	MF-RG	300	16R	300G	RLD16P	300GF
FRG	400-16F	RGEF	400	--	--	16R	400G	RLD16P	400GF
FRG	500-16F	RGEF	500	MF-RG	500	16R	500G	RLD16P	500GF
FRG	600-16F	RGEF	600	--	--	16R	600G	RLD16P	600GF
FRG	700-16F	RGEF	700	--	--	16R	700G	RLD16P	700GF
FRG	800-16F	RGEF	800	--	--	16R	800G	RLD16P	800GF
FRG	900-16F	RGEF	900	--	--	16R	900G	RLD16P	900GF
FRG	1000-16F	RGEF	1000	--	--	16R	1000G	RLD16P	1000GF
FRG	1100-16F	RGEF	1100	--	--	16R	1100G	RLD16P	1100GF
FRG	1200-16F	RGEF	1200	--	--	16R	1200G	RLD16P	1200GF
FRG	1400-16F	RGEF	1400	--	--	16R	1400G	RLD16P	1400GF
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



Fuzetec		Tyco (Raychem)		Bourns		Littelfuse		Polytronics	
FRH	080-250VF	TRF	250-080	--	--	250R	080	HVR250P	080CF
FRH	110-250VF	--	--	--	--	--	--	--	--
FRH	120-250VF	TRF	250-120	MF-RX	012/250	250R	120	HVR250P	120CF
FRH	145-250VF	TRF	250-145	MF-RX	014/250	250R	145	HVR250P	145CF
FRH	180-250XF	TRF	250-184	--	--	--	--	--	--
FRH	150-600MF	TRF	600-150	--	--	600R	150	HVR600P	150CF
FRH	160-600MF	--	--	--	--	--	--	--	--
FRH	160-600VF	TRF	600-160	MF-R	016/600	600R	160	HVR600P	160CF
FRV	005-240F	LVR	005S	MF-RM	005/240	--	--	--	--
FRV	008-240F	LVR	008S	MF-RM	008/240	--	--	--	--
FRV	012-240F	LVR	012S	MF-RM	012/240	--	--	--	--
FRV	016-240F	LVR	016S	MF-RM	016/240	--	--	--	--
FRV	025-240F	LVR	025S	MF-RM	025/240	--	--	--	--
FRV	033-240F	LVR	033S	MF-RM	033/240	--	--	--	--
FRV	040-240F	LVR	040S	MF-RM	040/240	--	--	--	--
FRV	055-240F	LVR	055S	MF-RM	055/240	--	--	--	--
FRV	075-240F	LVR	075S	--	--	--	--	--	--
FRV	100-240F	LVR	100S	--	--	--	--	--	--
FRV	125-240F	LVR	125S	--	--	--	--	--	--
FRV	150-240F	LVR	150S	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--
FSR	120F	SRP	120F	MF-S	120	15ST	120	STD	120F
FSR	175F	SRP	175F	MF-S	175	15ST	175	STD	175F
FSR	200F	SRP	200F	MF-S	200	30ST	200	STD	200F
FSR	350F	SRP	350F	MF-S	350	30ST	350	STD	350F
FSR	420F	SRP	420F	MF-S	420	30ST	420	STD	420F
FLR	190F	LR4	190F	MF-LR	190	15LR	190	LRD	190F
FLR	260F	LR4	260F	MF-LR	260	15LR	260	LRD	260F
FLR	380F	LR4	380F	MF-LR	380	15LR	380	LRD	380F
FLR	450F	LR4	450F	MF-LR	450	20LR	450	LRD	450F
FLR	550F	LR4	550F	MF-LR	550	20LR	550	LRD	550F
FLR	600F	LR4	600F	MF-LR	600	20LR	600	LRD	600F
FLR	730F	LR4	730F	MF-LR	730	20LR	730	LRD	730F
FVT	110F	VTP	110F	MF-VS	170	16VT	170	VTD	170F
FVT	170F	VTP	170F			16VT	175	VTD	175F
FVT	175F	VTP	175F			16VT	200	VTD	200F
FVT	200F	--	--	--	--	16VT	210	VTD	210F
FVT	210GF	VTP	210GF	MF-VS	210	16VT	210	VTD	210F
FVT	240F	--	--	--	--	16VT	240	VTD	240F

NOTE : All Specifications subject to change without notice.

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Fuzetec		Tyco (Raychem)		Bourns		Littelfuse		Polytronics	
FVL	170F	VLR	170F	MF-SVS	170	12VL	170	VLD	170F
FVL	175F	VLR	175F	MF-SVS	175	12VL	175	VLD	175F
FVL	230F	VLR	230F	MF-SVS	230	12VL	230	VLD	230F
FSL	140F-N	--	--	--	--	--	--	SLD	140GF
FSL	190F-N	MXP	190BB	MF-LL	190	06SL	190G	SLD	190GF
FSL	250F-N	--	--	--	--	--	--	SLD	250F
FSL	270F-N	--	--	--	--	--	--	SLD	270UF
FSL	310F-N	--	--	--	--	--	--	SLD	310F
FSL	370F-N	MXP	370	--	--	06SL	370G	SLD	370GF-D
FSL	450LF-N	--	--	--	--	--	--	SLD	450LF
FSL	500F-N	--	--	--	--	--	--	--	--
FSL	700F-N	--	--	--	--	--	--	--	--
FSMD*	030-2920-R	SMD	030F	MF-SM	030	2920L	030	SMD2920P	030TF
FSMD*	050-2920-R	SMD	050F	MF-SM	050	2920L	050	SMD2920P	050TF
FSMD*	075-2920-R	SMD	075F	MF-SM	075	2920L	075	SMD2920P	075TF
FSMD*	075-60-2920-R	SMD	075F/60	MF-SM	075/60	2920L	075/60	SMD2920P	075TF/60
FSMD*	100-2920-R	SMD	100F	MF-SM	100/33	2920L	100/33	SMD2920P	100TF
FSMD	100-60-2920R	--	--	--	--	--	--	--	--
FSMD*	125-2920-R	SMD	125F	MF-SM	125	2920L	125	SMD2920P	125TF
FSMD**	150-2920-R	SMD	150F	MF-SM	150/33	2920L	150/33	SMD2920P	150TF
FSMD**	185-2920-R	SMD	185F	MF-SM	185/33	2920L	185/33	SMD2920P	185TF
FSMD**	200-2920-R	SMD	200F	MF-SM	200	2920L	200	--	--
FSMD**	200-24-2920-R	--	--	--	--	2920L	200/24	SMD2920P	200TF/24
FSMD**	250-2920-R	SMD	250F	MF-SM	250	2920L	250	SMD2920P	250TF
FSMD**	260-2920-R	SMD	260F	MF-SM	260	2920L	260	SMD2920P	260TF
FSMD*	260-24-2920R	--	--	--	--	--	--	SMD2920P	260TF/24
FSMD**	300-2920-R	SMD	300F	MF-SM	300	2920L	300	SMD2920P	300TF
FSMD**	300-15-2920R	SMD	300F/15	--	--	2920L	300/15	SMD2920P	300TF/15
FSMD	010-R	miniSMDC	010F	MF-MSMF	010	1812L	010	SMD1812P	010TF
FSMD	014-R	miniSMDC	014F	MF-MSMF	014	1812L	014	SMD1812P	014TF
FSMD	020-R	miniSMDC	020F	MF-MSMF	020	1812L	020	SMD1812P	020TF
FSMD	020-60-R	--	--	MF-MSMF	020/60	--	--	SMD1812P	020TF-J
FSMD	030-R	miniSMDC	030F	MF-MSMF	030	--	--	--	--
FSMD	035-R	--	--	--	--	--	--	SMD1812P	035TF
FSMD	035-30-R	--	--	--	--	1812L	035/30DR	SMD1812P	035TF/30
FSMD	050-R	miniSMDC	050F	MF-MSMF	050	1812L	050	SMD1812P	050TF
FSMD	050-30-R	--	--	--	--	1812L	050/30	SMD1812P	050TF/30
FSMD	075-R	miniSMDC	075F	MF-MSMF	075	1812L	075	SMD1812P	075TF
FSMD	075-24R	miniSMDC	075F/24	MF-MSMF	075/24	1812L	075/24	SMD1812P	075TF/24
FSMD	075-33R	--	--	--	--	1812L	075/33	SMD1812P	075TF/33
FSMD	110-R	miniSMDC	110F	MF-MSMF	110	1812L	110	SMD1812P	110TF
FSMD	110-16-R	miniSMDC	110F/16	MF-MSMF	110/16	1812L	110/16	SMD1812P	110TF/16
FSMD	110-24R	miniSMDC	110F/24	MF-MSMF	110/24X	1812L	110/24	SMD1812P	110TF/24
FSMD	125-R	miniSMDC	125F	MF-MSMF	125	1812L	125	SMD1812P	125TF/6
FSMD	150-R	miniSMDC	150F	MF-MSMF	150	1812L	150	SMD1812P	150TF/8
FSMD	150-12R	miniSMDC	150F/12	--	--	1812L	150/12	SMD1812P	150TF/12
FSMD	150-24R	miniSMDC	150F/24	MF-MSMF	150/24	1812L	150/24	SMD1812P	150TF/24
FSMD	160-R	miniSMDC	160F	MF-MSMF	160	1812L	160	SMD1812P	160TF/8
FSMD	160-12R	--	--	--	--	1812L	160/12	SMD1812P	160TF/12
FSMD	160-16R	--	--	--	--	--	--	SMD1812P	160TF/16
FSMD	200R	miniSMDC	200F	MF-MSMF	200	1812L	200	SMD1812P	200TFT
FSMD	200-16R	--	--	--	--	--	--	SMD1812P	200TF/16
FSMD	260R	miniSMDC	260F	MF-MSMF	260	1812L	260	SMD1812P	260TFT
FSMD	260-13R	miniSMDC	260F/13.2	--	--	1812L	260/12	SMD1812P	260TF/12
FSMD	260-16R	miniSMDC	260F/16	--	--	--	--	SMD1812P	260TF/16
FSMD	300R	miniSMDC	300F	--	--	1812L	300	SMD1812P	300TFT

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

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<u>Fuzetec</u>		<u>Tyco (Raychem)</u>		<u>Bourns</u>		<u>Littelfuse</u>		<u>Polytronics</u>	
FSMD	005-1210-R	microSMD	005F	MF-USMF	005	1210L	005	SMD1210P	005TF
FSMD	010-1210-R	microSMD	010F	MF-USMF	010	1210L	010	SMD1210P	010TF
FSMD	020-1210-R	--	--	MF-USMF	020	1210L	020	SMD1210P	020TF
FSMD	035-1210-R	microSMD	035F	MF-USMF	035	1210L	035	SMD1210P	035TF
FSMD	050-1210-R	microSMD	050F	MF-USMF	050	1210L	050	SMD1210P	050TF
FSMD	075-1210-R	microSMD	075F	MF-USMF	075	1210L	075	SMD1210P	075TF
FSMD	075-24-1210R	--	--	--	--	1210L	075/24	SMD1210P	075TF/24
FSMD	110-1210R	microSMD	110F	MF-USMF	110	1210L	110	SMD1210P	110TFT
FSMD	150-1210R	microSMD	150F	MF-USMF	150	1210L	150	SMD1210P	150TFT
FSMD	175-1210R	microSMD	175F	MF-USMF	175X	1210L	175X	SMD1210P	175TF
FSMD	200-1210R	microSMD	200F	--	--	1210L	200	SMD1210P	200TF
FSMD	005-1206-R	--	--	--	--	--	--	--	--
FSMD	010-1206-R	--	--	--	--	--	--	--	--
FSMD	012-1206-R	nanoSMDC	012F	MF-NSMF	012	1206L	012	SMD1206P	012TF
FSMD	016-1206-R	nanoSMDC	016F	--	--	1206L	016	SMD1206P	016TF
FSMD	020-1206-R	nanoSMDC	020F	MF-NSMF	020X	1206L	020	SMD1206P	020TF/24
FSMD	025-1206-R	nanoSMDC	025F	--	--	1206L	025	SMD1206P	025TF
FSMD	025-24-1206-R	--	--	--	--	--	--	SMD1206P	025TF/24
FSMD	035-1206-R	nanoSMDC	035F	MF-NSMF	035	1206L	035/16	SMD1206P	035TF/16
FSMD	035-30-1206R	--	--	MF-NSMF	035X	--	--	SMD1206P	035TF/30
FSMD	050-1206-R	--	--	--	--	1206L	050	SMD1206P	050TF
FSMD	050-24-1206R	nanoSMDC	050F/13.2	MF-NSMF	050	1206L	050/15	SMD1206P	050TF/15
FSMD	075-1206R	nanoSMDC	075F	MF-NSMF	075	1206L	075	SMD1206P	075TFT
FSMD	075-16-1206R	--	--	--	--	1206L	075/13.2	SMD1206P	075TF/13.2
FSMD	100-1206R	--	--	--	--	--	--	SMD1206P	110TF
FSMD	110-1206R	nanoSMDC	110F	MF-NSMF	110	1206L	110	SMD1206P	110TFT
FSMD	150-1206R	nanoSMDC	150F	MF-NSMF	150	1206L	150	SMD1206P	150TFT
FSMD	200-1206R	nanoSMDC	200F	MF-NSMF	200	1206L	200	SMD1206P	200TF
FSMD	010-0805-R	picoSMDC	010S	MF-PSMF	010X	0805L	010	SMD0805P	010TF
FSMD	020-0805-R	picoSMDC	020S	MF-PSMF	020X	0805L	020	SMD0805P	020TF
FSMD	035-0805-R	picoSMDC	035S	MF-PSMF	035X	0805L	035	SMD0805P	035TF
FSMD	050-0805R	picoSMDC	050S	MF-PSMF	050X	0805L	050	SMD0805P	050TF
FSMD	050-9-0805R	--	--	--	--	--	--	SMD0805P	050TF/9
FSMD	075-0805R	picoSMDC	075S	MF-PSMF	075X	0805L	075	SMD0805P	075TF
FSMD	100-0805R	picoSMDC	110S	MF-PSMF	110X	0805L	100	SMD0805P	100TF
FSMD	001-0603-R	--	--	--	--	--	--	--	--
FSMD	002-0603-R	--	--	--	--	--	--	--	--
FSMD	003-0603-R	--	--	--	--	--	--	--	--
FSMD	004-0603-R	--	--	--	--	--	--	SMD0603P	004TF
FSMD	005-0603-R	femtoSMDC	005F	--	--	--	--	SMD0603P	005TF
FSMD	008-0603-R	femtoSMDC	008F	--	--	--	--	SMD0603P	008TF
FSMD	010-0603-R	femtoSMDC	010F	MF-FSMF	010X	0603L	010	SMD0603P	010TF
FSMD	012-0603-R	femtoSMDC	012F	--	--	--	--	--	--
FSMD	016-0603-R	femtoSMDC	016F	--	--	--	--	--	--
FSMD	020-0603-R	femtoSMDC	020F	MF-FSMF	020X	0603L	020	SMD0603P	020TF

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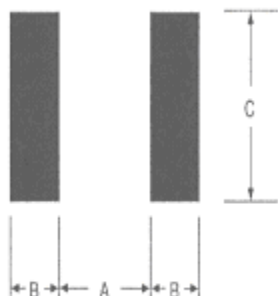
Fuzetec		Tyco (Raychem)		Bourns		Littelfuse		Polytronics	
FSMD	140RZ	--	--	MF-MSML	140	--	--	--	--
FSMD	190RZ	--	--	MF-MSML	190	1812L	190SL	SMD1812P	190SLR
FSMD	270RZ	--	--	MF-MSML	270	1812L	270SL	SMD1812P	270SLR
FSMD	300RZ	--	--	MF-MSML	300	1812L	300SL	SMD1812P	300SLR
FSMD	370RZ	--	--	MF-MSML	370	1812L	370SL	SMD1812P	370SLR
FSMD	500RZ	--	--	MF-MSML	500	--	--	SMD1812P	500SLR
FSMD	600RZ	--	--	MF-MSML	600	--	--	SMD1812P	600SLR
FSMD	175-1210RZ	--	--	MF-USML	175	1210L	175SL	SMD1210P	175SLR
FSMD	200-1210RZ	microSMD	200LR	MF-USML	200	1210L	200SL	SMD1210P	200SLR
FSMD	260-1210RZ	--	--	--	--	1210L	260SL	SMD1210P	260SLR
FSMD	300-1210RZ	--	--	MF-USML	300	1210L	300SL	SMD1210P	300SLR
FSMD	350-1210RZ	microSMD	350LR	MF-USML	350	1210L	350SL	SMD1210P	350SLR
FSMD	380-1210RZ	microSMD	380LR	MF-USML	380	1210L	380SL	SMD1210P	380SLR
FSMD	400-1210RZ	--	--	MF-USML	400	1210L	400SL	SMD1210P	400SLR
FSMD	500-1210RZ	--	--	--	--	1210L	500SL	SMD1210P	500SLR
FSMD	650-1210RZ	--	--	--	--	1210L	650SL	SMD1210P	650SLR
FSMD	050-1206RZ	--	--	--	--	1206L	050SL	SMD1206P	050SLR
FSMD	075-1206RZ	--	--	--	--	1206L	075SL	SMD1206P	075SLR
FSMD	110-1206RZ	--	--	--	--	1206L	110SL	SMD1206P	110SLR
FSMD	150-1206RZ	--	--	MF-NSML	150	1206L	150SL	SMD1206P	150SLR
FSMD	175-1206RZ	nanoSMD	175LR	MF-NSML	175	1206L	175SL	SMD1206P	175SLR
FSMD	200-1206RZ	nanoSMD	200LR	MF-NSML	200	1206L	200SL	SMD1206P	200SLR
FSMD	260-1206RZ	--	--	MF-NSML	260	1206L	260SLTH	SMD1206P	260SLR
FSMD	300-1206RZ	--	--	MF-NSML	300	1206L	300SLTH	SMD1206P	300SLR
FSMD	350-1206RZ	nanoSMD	350LR	MF-NSML	350	1206L	350SLTH	SMD1206P	350SLR
FSMD	380-1206RZ	nanoSMD	380LR	MF-NSML	380	1206L	380SLTH	SMD1206P	380SLR
FSMD	450-1206RZ	--	--	MF-NSML	450	1206L	450SL	SMD1206P	450SLR
FSMD	500-1206RZ	nanoSMD	500LR	--	--	1206L	500SL	SMD1206P	500SLR
FSMD	075-0805RZ	--	--	MF-PSML	075	0805L	075SL	SMD0805P	075SLR
FSMD	110-0805RZ	--	--	MF-PSML	110	0805L	110SL	SMD0805P	110SLR
FSMD	125-0805RZ	--	--	--	--	0805L	125SL	SMD0805P	125SLR
FSMD	150-0805RZ	--	--	MF-PSML	150	0805L	150SL	SMD0805P	150SLR
FSMD	175-0805RZ	--	--	MF-PSML	175	0805L	175SL	SMD0805P	175SLR
FSMD	200-0805RZ	--	--	MF-PSML	200	0805L	200SLTH	SMD0805P	200SLR
FSMD	025-0603RZ	--	--	MF-FSMF	025X	0603L	025	SMD0603P	025TF
FSMD	035-0603RZ	--	--	MF-FSMF	035X	0603L	035	SMD0603P	035TF
FSMD	050-0603RZ	--	--	MF-FSMF	050X	0603L	050SL	SMD0603P	050SLR
FSMD	075-0603RZ	--	--	--	--	0603L	075SL	SMD0603P	075SLR
FSMD	100-0603RZ	--	--	--	--	0603L	100SL	SMD0603P	100SLR

Thermal Derating for PPTC Device at Various Ambient Temperatures.

FUZETEC PPTC Family	-40℃	-20℃	0℃	23℃	30℃	40℃	50℃	60℃	70℃	85℃
FRX-60/90	158%	138%	119%	100%	90%	81%	70%	60%	50%	36%
FRU	145%	130%	115%	100%	92%	84%	76%	70%	61%	50%
FRT	148%	134%	120%	100%	98%	90%	84%	78%	70%	59%
FUSB	145%	130%	115%	100%	91%	83%	78%	70%	61%	50%
FRG	148%	132%	116%	100%	91%	84%	76%	69%	60%	48%
FHT	143%	129%	116%	100%	93%	87%	80%	72%	65%	55%
FRHV	158%	138%	119%	100%	92%	83%	73%	64%	54%	40%
FRVL	158%	138%	119%	100%	90%	80%	70%	60%	50%	38%
FRV	150%	134%	116%	100%	90%	81%	74%	65%	58%	44%
FSMD-2920	158%	138%	119%	100%	90%	81%	72%	60%	50%	36%
FSMD-1812	145%	130%	116%	100%	91%	84%	78%	69%	61%	50%
FSMD-1210	145%	130%	115%	100%	92%	83%	76%	70%	62%	50%
FSMD-1206	145%	130%	115%	100%	92%	84%	78%	69%	62%	50%
FSMD-0805	145%	130%	116%	100%	91%	84%	76%	69%	61%	50%
FSMD-0603	157%	137%	118%	100%	89%	80%	70%	60%	51%	37%
FVL	195%	163%	132%	100%	85%	68%	53%	38%	21%	-
FVT	172%	149%	124%	100%	90%	78%	65%	53%	41%	23%
FSR	152%	135%	118%	100%	90%	82%	74%	65%	56%	42%
FLR	147%	132%	117%	100%	94%	86%	80%	71%	61%	52%
Low Rho FSMD-1812/1210/1206/0805/0603	145%	130%	115%	100%	92%	84%	77%	69%	61%	50%
FSL	184%	158%	131%	100%	93%	79%	67%	54%	40%	20%

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	2.00	1.00	1.90
All 0805 Series	1.20	1.00	1.50
All 0603 Series	0.80	0.60	0.80

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T_{max} to T_p)	3 °C/second max.
Preheat :	
Temperature Min (T _{min})	150 °C
Temperature Max (T _{max})	200 °C
Time (t _{min} to t _{max})	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.

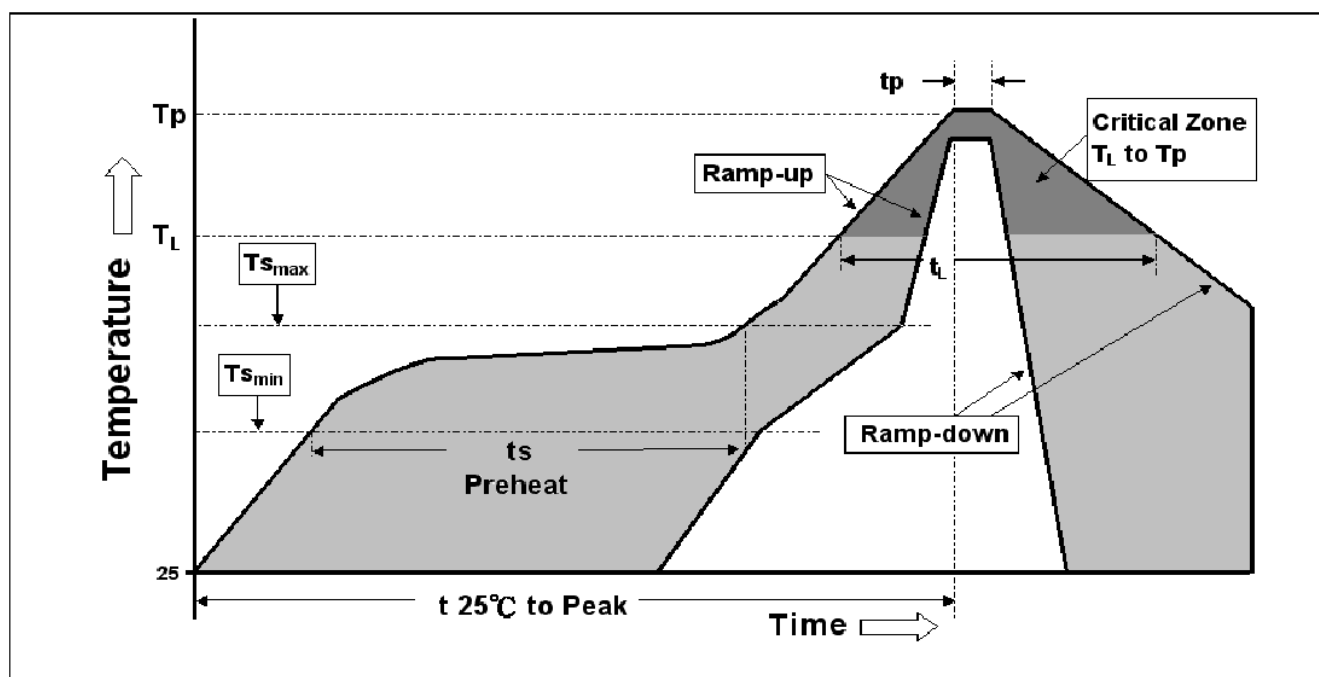
Solder reflow

※ 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:

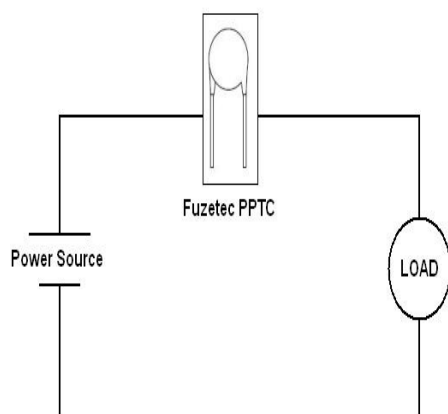
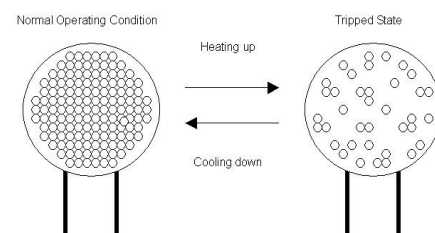
1. If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
2. Devices are not designed to be wave soldered to the bottom side of the board



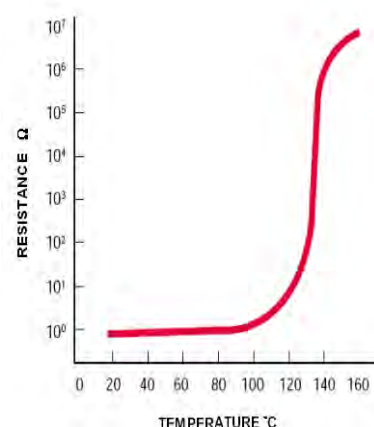
IV - APPENDIX - Fuzetec PPTC Resettable Fuses Technology



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
Industrial, Power Supply & Other Electronics	Portable Game	GPS Navigation
	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	Door Locks, Power Sunroofs, Power Seats, Door Mirrors	
	PCM Module; Battery Cell & Battery Packs	
	Battery Chargers	
	Notebook, PDA, smart Phone & Tablet PC Batteries	