

## FRX Series



### Application

Wide variety of electronic equipment

### Product Features

Low hold current, Solid state Radial-leaded product ideal for up to 60V<sub>DC</sub>



### Operation Current

0.05A ~ 3.75A

### Maximum Voltage

60V<sub>DC</sub>



### Temperature Range

-40°C to 85°C

### Agency Recognition

| AGENCY                                                                            | AGENCY FILE NUMBER |
|-----------------------------------------------------------------------------------|--------------------|
|  | UL(E211981)        |
|  | C-UL(E211981)      |
|  | TÜV (R50004084)    |



SVHC Compliant

## Electrical Characteristics (23°C)

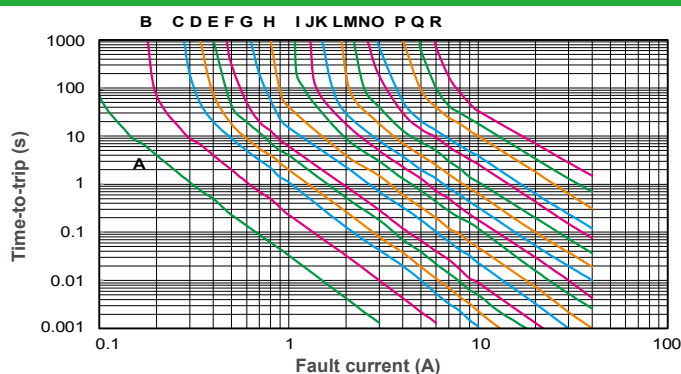
| Part Number | Hold Current       | Trip Current       | Max. Time to trip       | Max. Current         | Rated Voltage                      | Typ. Power         | Resistance       |                   |
|-------------|--------------------|--------------------|-------------------------|----------------------|------------------------------------|--------------------|------------------|-------------------|
|             |                    |                    |                         |                      |                                    |                    | R <sub>MIN</sub> | R <sub>1MAX</sub> |
|             | I <sub>H</sub> , A | I <sub>T</sub> , A | at 5xI <sub>H</sub> , s | I <sub>MAX</sub> , A | V <sub>MAX</sub> , V <sub>DC</sub> | P <sub>d</sub> , 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              |

## Thermal Derating for PPTC Device at Various Ambient Temperatures

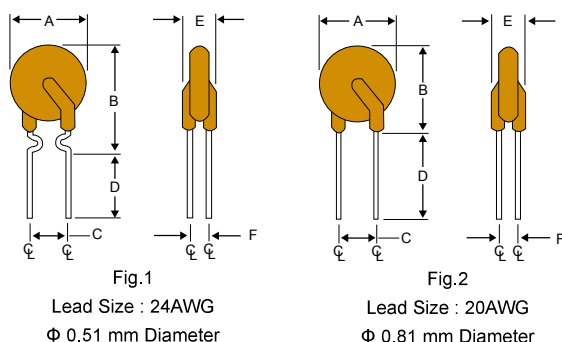
| TEMPERATURE | -40°C | -20°C | 0°C  | 23°C | 30°C | 40°C | 50°C | 60°C | 70°C | 85°C |
|-------------|-------|-------|------|------|------|------|------|------|------|------|
| DERATING %  | 158%  | 138%  | 119% | 100% | 90%  | 81%  | 70%  | 60%  | 50%  | 36%  |

## Typical Time-To-Trip at 23°C

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

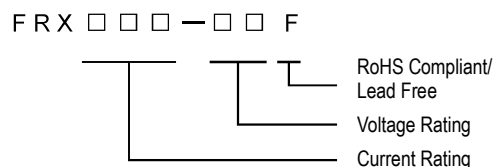


## FRX Product Dimensions (mm)

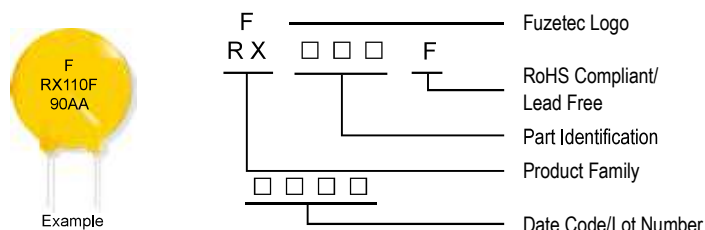


| Part Number | Fig. | A    | B    | C    | D    | E    | F    |
|-------------|------|------|------|------|------|------|------|
|             |      | Max. | Max. | Typ. | Min. | Max. | Typ. |
| FRX005-60F  | 1    | 7.4  | 12.7 | 5.1  | 7.6  | 3.1  | 1.1  |
| FRX010-60F  | 1    | 7.4  | 12.7 | 5.1  | 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  | 12.7 | 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  |

## Part Numbering System



## Part Marking System



## Package Information

| Part Number           | 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 |

## Physical specifications

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| Lead material             | FRX005-60F~FRX040-60F Tin plated copper clad steel, 24 AWG. |
|                           | FRX050-60F~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-94V-0 requirement.          |

### 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.