Radial Leaded PTC Resettable Fuse : FRVL Series

1. Summary

(a) **RoHS Compliant (Lead Free) product**

(b) **Applications : Wide variety of electronic equipment**

(c) **Product Features : Solid state, Radial leaded product ideal for up to 120$V_{AC/DC}$**

(d) **Operation Current : 0.10A~3.75A**

(e) **Maximum Operating Voltage : 120$V_{AC/DC}$**

(f) **Maximum Interrupt Voltage : 135$V_{AC/DC}$**

(g) **Temperature Range : -40℃ to 85℃**

2. Agency Recognition

UL : File No. E211981

C-UL: *File No. E211981

TÜV : File No. R50122733

***FRVL040-120F~FRVL070-120F and FRVL090-120F~FRVL130-120F C-UL In Process.**

3. Electrical Characteristics (23℃)

Part Number	Hold Current	Trip Current	Max.Time to Trip	Max. Current	Max. Oper. Voltage	Max. Int. Voltage	Typ Power	Resistance	
								R_{MIN}	$R1_{MAX}$
	I_H, A	I_T, A	at 5xI_H,S	I_{MAX}, A	V_{MAX}, $V_{AC/DC}$	V_{I-MAX}, $V_{AC/DC}$	Pd, W	Ohms	Ohms
FRVL010-120F	0.10	0.20	10.0	2.0	120	135	0.84	3.00	7.50
FRVL017-120F	0.17	0.34	10.0	2.0	120	135	0.84	2.00	7.00
FRVL020-120F	0.20	0.40	9.0	2.0	120	135	1.08	1.83	4.40
FRVL025-120F	0.25	0.50	7.5	3.0	120	135	1.08	1.25	3.00
FRVL030-120F	0.30	0.60	8.5	3.0	120	135	1.44	0.88	2.10
FRVL040-120F	0.40	0.80	6.5	3.0	120	135	1.44	0.55	1.29
FRVL050-120F	0.50	1.00	6.0	3.0	120	135	1.56	0.50	1.17
FRVL065-120F	0.65	1.30	5.7	5.0	120	135	1.68	0.31	0.72
FRVL070-120F	0.75	1.50	6.3	5.0	120	135	1.80	0.25	0.60
FRVL075-120F	0.75	1.50	15.0	7.5	120	135	2.64	0.25	0.69
FRVL090-120F	0.90	1.80	7.2	5.0	120	135	1.80	0.20	0.47
FRVL100-120F	1.00	2.00	15.0	10.0	120	135	2.64	0.18	0.47
FRVL110-120F	1.10	2.20	8.2	8.0	120	135	2.28	0.15	0.38
FRVL125-120F	1.25	2.50	20.0	12.5	120	135	2.88	0.11	0.33
FRVL130-120F	1.35	2.70	9.6	10.0	120	135	2.64	0.12	0.30
FRVL135-120F	1.35	2.70	20.0	13.5	120	135	3.12	0.11	0.30
FRVL160-120F	1.60	3.20	11.4	12.0	120	135	3.12	0.09	0.22
FRVL185-120F	1.85	3.70	12.6	12.0	120	135	3.36	0.08	0.19
FRVL200-120F	2.00	4.20	36.0	20.0	120	135	4.32	0.08	0.21
FRVL250-120F	2.50	5.00	15.6	15.0	120	135	4.44	0.05	0.13
FRVL300-120F	3.00	6.00	19.8	17.0	120	135	4.56	0.04	0.10
FRVL375-120F	3.75	7.50	24.0	20.0	120	135	4.80	0.03	0.08

NOTE : Specification subject to change without notice.

IH=Hold current-maximum current at which the device will not trip at 23℃ still air.
IT=Trip current-minimum current at which the device will always trip at 23℃ still air.
V MAX=Maximum voltage device can withstand without damage at its rated current.
I MAX= Maximum fault current device can withstand without damage at rated voltage (V MAX).
Pd=Typical power dissipated from device when in tripped state in 23℃ still air environment.
RMIN=Minimum device resistance at 23℃.
R1MAX=Maximum device resistance at 23℃, 1 hour after tripping .
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.

4. Production Dimensions (millimeter)

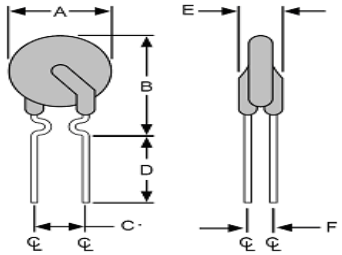


Fig.1
FRVL010-120F~FRVL017-120F
Lead S ize :24AWG
Φ 0.51 mm Diameter

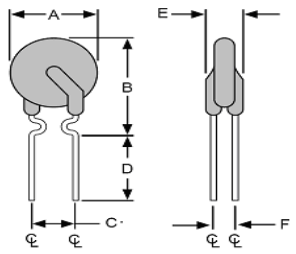


Fig.2
FRVL020-120F~FRVL090-120F
Lead Size :22AWG
Φ 0.65 mm Diameter

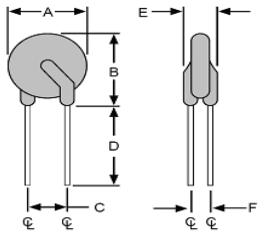


Fig.3
FRVL110-120F~FRVL375-120F
Lead Size :20AWG
Φ 0.81 mm Diameter

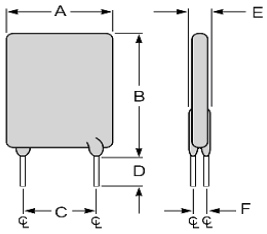


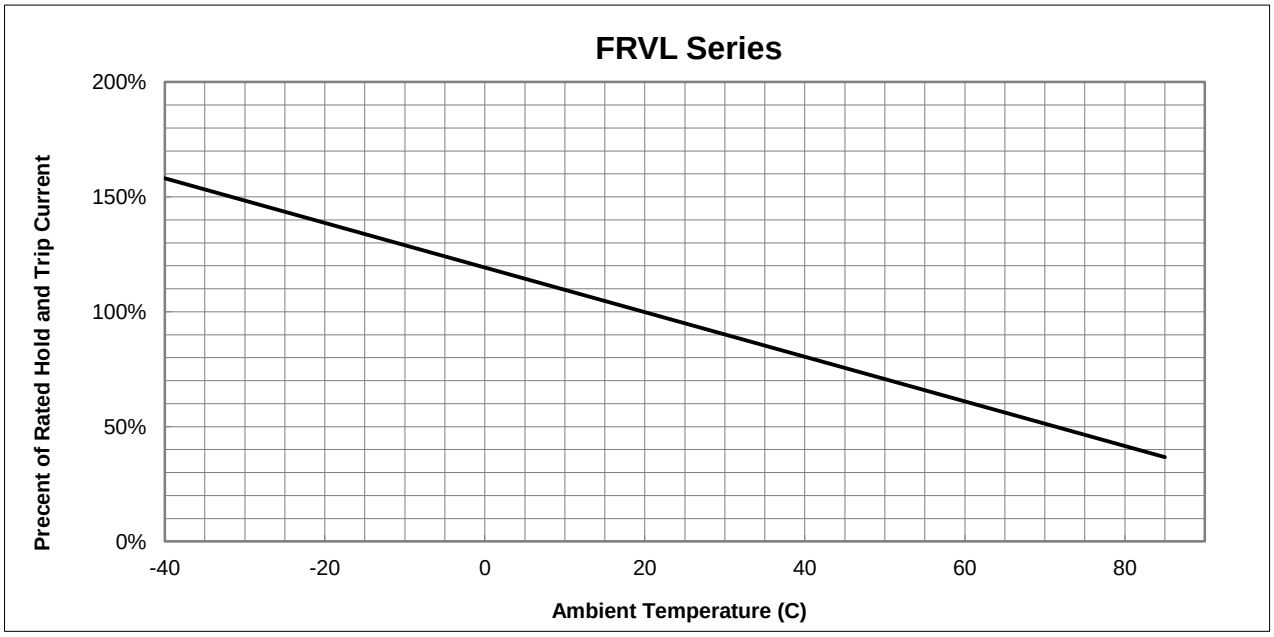
Fig.4
FRVL075-120F ~FRVL200-120F
Lead Size : 20AWG
Φ 0.81 mm Diameter

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

NOTE : Specification subject to change without notice.

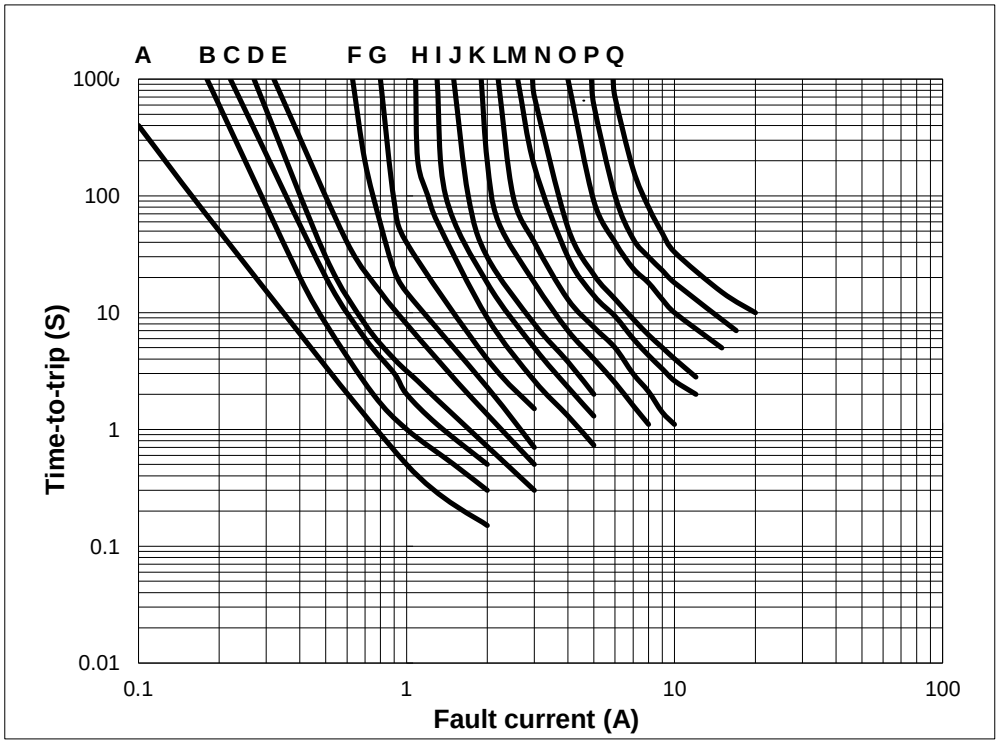
FRVL200-120F	4	23.5	27.9	10.2	7.6	4.1	2.2
FRVL250-120F	3	22.5	27.5	10.2	7.6	4.1	2.2
FRVL300-120F	3	25.5	30.0	10.2	7.6	4.1	2.2
FRVL375-120F	3	29.5	34.0	10.2	7.6	4.1	2.2

5. Thermal Derating Curve



6. Typical Time-To-Trip at 23℃

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



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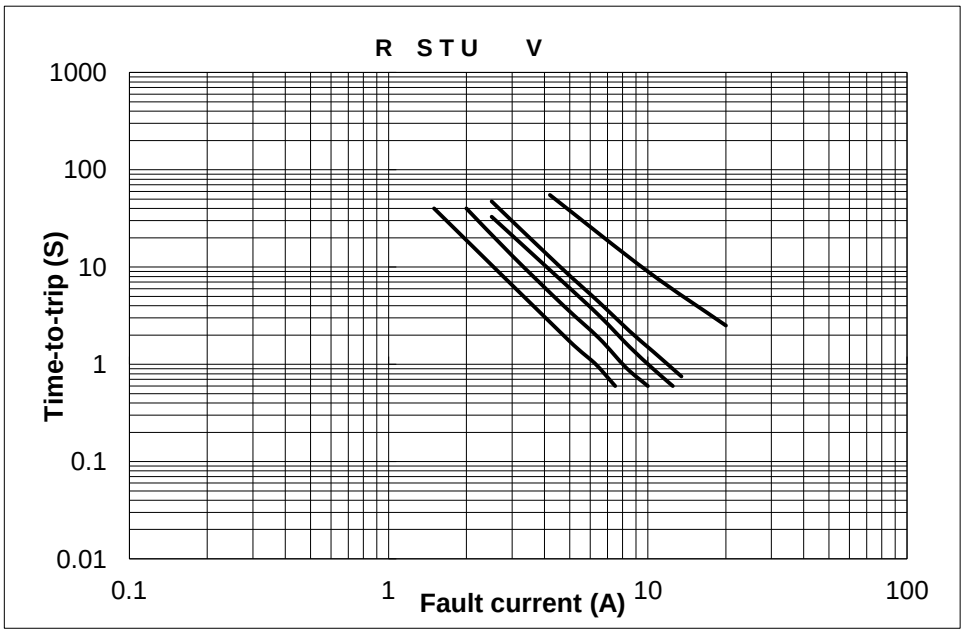
R=FRVL075-120F

S=FRVL100-120F

T=FRVL125-120F

U=FRVL135-120F

V=FRVL200-120F



7. Material Specification

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

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

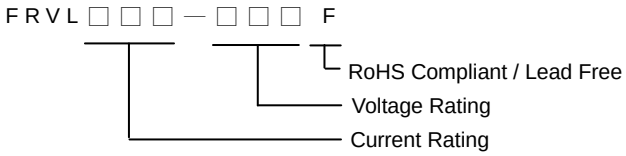
FRVL075-120F~FRVL375-120F Tin plated copper, 20 AWG.

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

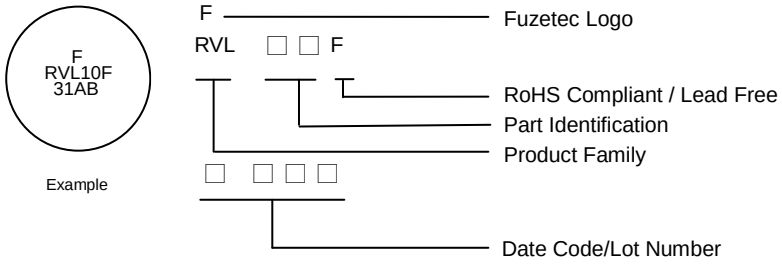
Insulating coating:Flame retardant epoxy, meets UL-94V-0 requirement

8. Part Numbering and Marking System

Part Numbering System



Part Marking System



Note: Font on Marking may look slightly different due to fine turnings of each Marking printer.

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

- Operation beyond the specified maximum rating or improper use may result in damage and possible electrical arcing and/or flame.
- PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.
- Avoid contact of PPTC device with chemical solvent, including some inert material such as silicone based oil, lubricant and etc. Prolonged contact will damage the device performance.
- Additional protection mechanism are strongly recommended to be used in conjunction with the PPTC device for protection against abnormal or failure conditions.
- Avoid use of PPTC device in a constrained space such as potting material, housing and containers where have limited space to accommodate device thermal expansion and/or contraction.

NOTE : Specification subject to change without notice.

2014/9/19