

# FAILSAFE FUSE RESISTORS

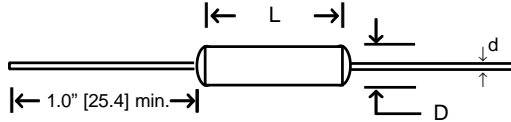
## 1/2 WATT to 50 WATT

# FR SERIES



Term.W is  
RoHS  
compliant  
& 260°C  
compatible

- Precision performance, flameproof design per UL94V-0
- Fusing-to-Operating current ratios as low as 3:1!
- Fusing times available from 1 millisecond to 30 seconds
- Available on exclusive *SWIFT™* delivery program
- Custom design available for increased surge capability (specify Option P)
- Also available: Hi-Rel screening, burn-in, custom marking, etc.



### SPECIFICATIONS

RCD Type*	Wattage @25°C(W <sub>25</sub> )	Resistance Range	L ±.04 [1]	D±.02 [.5]	d typ
FR1/2	0.5	.06Ω to 500Ω	.29 [7.4]	.125 [3.2]	.020 [.5]
FR1	1.0	0.1Ω to 1.5K	.60 [15.2]	.130 [3.3]	.020 [.5]
FR2	2.0	0.1Ω to 2K	.69 [17.5]	.170 [4.3]	.032 [.8]
FR3	3.5	0.1Ω to 3K	.58 [14.7]	.230 [5.8]	.032 [.8]
FR5	5.5	0.1Ω to 5K	.984 [25]	.323 [8.2]	.032 [.8]

\* Other sizes available up to 50 Watt on a custom basis.

### Precision Grade Fuse Resistors!

RCD's FR Series was designed to obtain the best from two devices. It combines the performance of a precision grade resistor with precisely controlled fusing characteristics. Typical applications include protection for zener diodes and other semiconductor components, emitter resistors for current sharing transistors, Squib circuits, and/or other circuits that require precision fusing characteristics unobtainable with traditional fuses.

Please note that due to the inherent compromise involved between resistive vs. fusing performance it is recommended that prior consultation be made with RCD's engineering department to obtain the optimum design. Parts intended for high-reliability applications are available with burn-in (opt. ER) and/or military screening.

### PERFORMANCE CHARACTERISTICS

Tolerance	5% standard, 0.1-10% available
Temperature Coefficient (typ)	±100ppm 0.1-9Ω, ±50ppm 1Ω & up, available to ±10ppm
Dielectric Strength	750 VAC
Insulation Resistance	1,000 megohms min. (dry)
Derating	Derate linearly from full rated power @ 25°C to zero power @ 175°C (.67%/°C)

**FUSING CHARACTERISTICS:** Standard FR resistors are designed to fuse within 10 seconds as follows:

FR1/2 to FR2 ≥1Ω = 20 x W<sub>25</sub> (20 times the 25°C wattage rating), <1Ω = 40 x W<sub>25</sub>. FR3 & FR5 ≥5Ω = 25 x W<sub>25</sub>, <5Ω = 50 x W<sub>25</sub>.

Faster fusing is available. Max. fault condition not to exceed 300x W<sub>25</sub>. Following chart depicts custom design capabilities.

Fusing Current (Amperes)	Minimum Resistance Value to Fuse in 1 Sec. or Less					Minimum Resistance Value to Fuse in 5 Sec. or Less				
	FR1/2	FR1	FR2	FR3	FR5	FR1/2	FR1	FR2	FR3	FR5
0.15	360Ω	720Ω	1.44K	2.88K	5.76K	180Ω	360Ω	720Ω	1.44K	2.88K
0.25	120Ω	240Ω	480Ω	960Ω	1920Ω	60Ω	120Ω	240Ω	480Ω	960Ω
0.5	30Ω	60Ω	120Ω	240Ω	480Ω	15Ω	30Ω	60Ω	120Ω	240Ω
1.0	7.5Ω	15Ω	30Ω	60Ω	120Ω	3.8Ω	7.5Ω	15Ω	30Ω	60Ω
1.5	3.3Ω	7Ω	13Ω	26Ω	53Ω	1.7Ω	3.3Ω	7Ω	13Ω	26Ω
2.0	2.0Ω	4Ω	8Ω	16Ω	32Ω	1.0Ω	2Ω	4Ω	8Ω	16Ω
3.0	1.0Ω	2Ω	4Ω	8Ω	16Ω	0.5Ω	1Ω	2Ω	4Ω	8Ω
5.0	0.5Ω	1Ω	2Ω	4Ω	8Ω	.25Ω	.5Ω	1Ω	2Ω	4Ω
10	0.25Ω	.5Ω	1Ω	2Ω	4Ω	.13Ω	.25Ω	.5Ω	1Ω	2Ω
15	0.15Ω	.3Ω	.6Ω	1.2Ω	2.4Ω	.08Ω	.15Ω	.3Ω	.6Ω	1.2Ω
20	0.1Ω	.2Ω	.4Ω	.8Ω	1.6Ω	.06Ω	.10Ω	.2Ω	.4Ω	.8Ω

### APPLICATION & DESIGN NOTES:

- Fusing current should be ≥ 4 times the continuous current for best performance.
- Resistors reach elevated temperatures prior to opening- elevate body above the PCB.
- Exercise care when testing fuse resistors.
- RCD can custom manufacture fuse resistors from 1/8W to 50W per customer req't. Design objectives are achieved by element material (wirewound or film), insulation (silicone, ceramic, epoxy), and process (alloy & resistor geometry).
- Thermal fuses are also available and are designed to "blow" when the resistor body or the ambient temperature reaches preset temperature (110°C to 240°C).
- Custom surge-tolerant fuses are designed not to "blow" due to short term voltage transients, lightning surges, or capacitor discharges, but will fuse under longer term overloads. Consult factory for details.
- Please include the following information when customized design is required:  
Continuous wattage or current; ambient temperature; fusing wattage or current; minimum and maximum "blow" times; resistance value & tolerance; max. size; voltage level, AC or DC, wave form, & frequency; and a general description of the application. Include info as to any pulse or overload conditions that the resistor must withstand.

### P/N DESIGNATION:

FR1 - 101 - J B W

RCD Type \_\_\_\_\_

Options: P, ER (additional options to be assigned by RCD, leave blank if std)

Resis. Code: ≤1%: 3 signif. figures & multiplier, e.g. R100= 0.1Ω, 1R00= 1Ω, 1000= 100Ω, 1001= 1KΩ.

Resis. Code 2% - 10%: 2 signif. figures & multiplier, e.g. R10= 0.1Ω, 1R0= 1Ω, 100= 10Ω, 102= 1KΩ.

Tolerance: K=10%, J=5% (std), H=3%, G=2%, F=1%, D=0.5%, C=0.25%, B=0.1%

Packaging: B= Bulk, T= T&R

Optional Temp. Coef: (leave blank if standard)  
10 = 10ppm, 25 = 25ppm, 50 = 50ppm, 101 = 100ppm

Termination: W= Lead-free, Q= Tin/Lead (leave blank if either is acceptable)