

## Fusible Resistors

**Fusible Resistors - FRN, FKN, FSQ Series**

### Fusible Resistor Features Best of Both Worlds

#### ▶ Preview

Designers of small power supplies and battery chargers for consumer products can benefit from a fusible resistor with superior lightning strike and pulse abilities in a cost effective package.

Token Electronics offers a combination resistor/fuses series of metal/carbon film fusible resistor (FRN), wirewound fusible resistor (FKN) and cement encased fusible resistors (FSQ). Token offers fusible FRN series a low-cost alternative to traditional solutions for applications that require surge protection.



The robust cement-coated wire-wound FSQ resistors and wirewound fusible FKN resistors are ideal for power supply applications across the telecomms, military and industrial markets which require a replacement for carbon composition resistors within the circuit design.

As part of the Token input protection range, this resistor provides a key fusible solution and is completely customisable to suit the individual application design requirements. Key design engineers with a need for a robust resistor, will find the FRN, FKN and FSQ series are a multifaceted product, providing comparable pulse performance with added fusing capabilities.

Our custom solutions are designed to address your need for technical and economic success in a timely manner. Contact us with your specific needs.

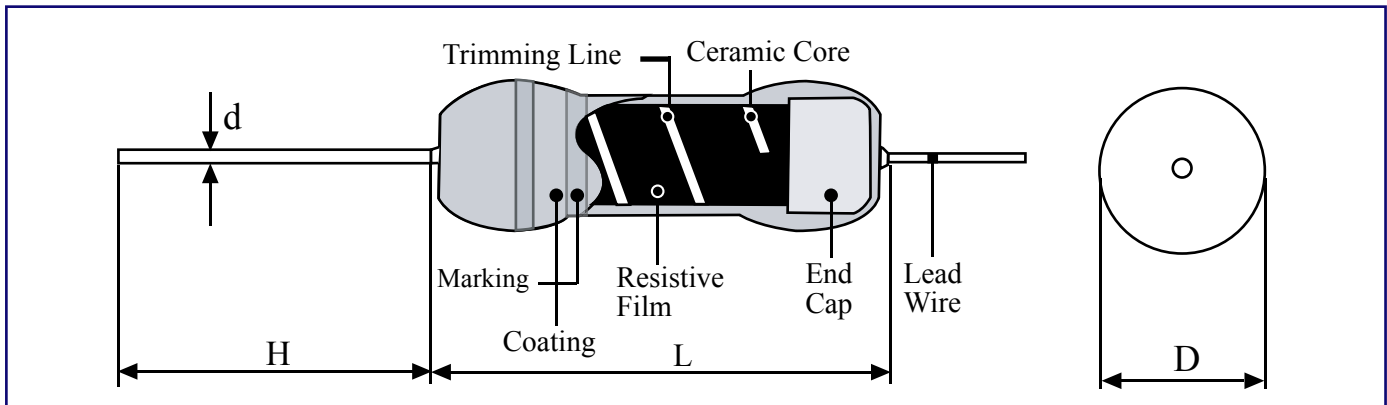
#### ▶ Features

- Low Cost
- Low Noise
- Reduced numbers of parts used in circuits
- Products with Pb-free Terminations and RoHS compliant

#### ▶ Applications

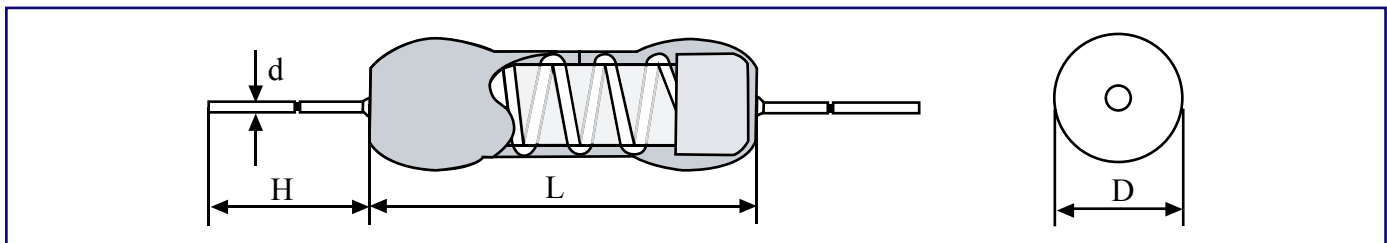
- Telecommunications
- Household appliances
- Inrush Pulse protection
- Lightning strike protection
- Input protection for small power supplies and battery chargers

## ▶ Metal Film Fusible (FRN) - Specifications & Dimensions (Unit: mm)



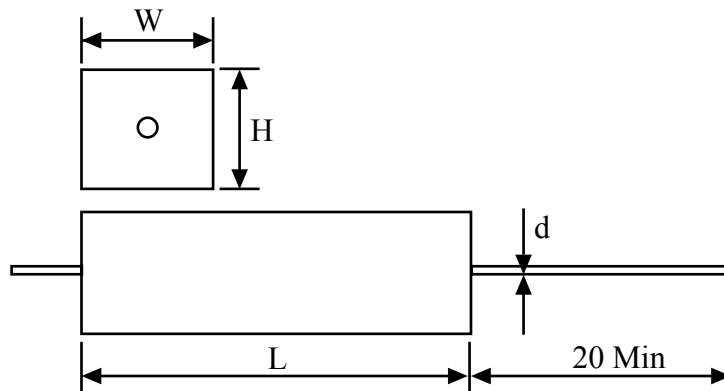
Type	Rated Wattage	Dimension (mm)						Resistance Range	Dielectric Withstanding Voltage
		$L \pm 1.5$	$D \pm 1$	$H \pm 0.5$	$W \pm 0.5$	$H \pm 3$	$d \pm 0.05$		
FRN	1/4W	6	2.3			26	0.40~0.50	0.22Ω~100KΩ	300V
	1/2W	6	2.3			26	0.50~0.55	0.22Ω~100KΩ	300V
	1W	9	3.0			26	0.50~0.55	0.22Ω~100KΩ	350V
	2W	11	4.0			26	0.75~0.80	0.3Ω~100KΩ	500V
	3W	15	5.0			35	0.75~0.80	0.3Ω~100KΩ	500V

## ▶ Wirewound Fusible (FKN) - Specifications & Dimensions (Unit: mm)



Type	Rated Wattage	Dimension (mm)						Resistance Range	Dielectric Withstanding Voltage
		$L \pm 1.5$	$D \pm 1$	$H \pm 0.5$	$W \pm 0.5$	$H \pm 3$	$d \pm 0.05$		
FKN	1W	9	4.5			26	0.50~0.55	0.1Ω~22Ω	500V
	2W	11	5.0			26	0.75~0.80	0.1Ω~60Ω	500V
	3W	15	5.5			35	0.75~0.80	0.1Ω~100Ω	500V
	5W	17	6.5			35	0.75~0.80	0.2Ω~200Ω	500V
	6W	24	8.5			38	0.75~0.80	0.3Ω~250Ω	500V

## ► Ceramic Cement Fusible (FSQ) - Specifications & Dimensions (Unit: mm)



Type	Rated Wattage	Dimension (mm)						Resistance Range	Dielectric Withstanding Voltage
		$L \pm 1.5$	$D \pm 1$	$H \pm 0.5$	$W \pm 0.5$	$H \pm 3$	$d \pm 0.05$		
FSQ	2W	18		7	7	35	0.50~0.55	0.1Ω~22Ω	1000V
	3W	22		8	8	35	0.75~0.80	0.1Ω~120Ω	1000V
	5W	22		9	10	35	0.75~0.80	0.2Ω~120Ω	1000V
	7W	35		9	10	35	0.75~0.80	0.3Ω~250Ω	1000V
	10W	48		9	10	35	0.75~0.80	0.3Ω~500Ω	1000V

## ► FRN, FKN, FSQ - Electrical Characteristics

Test Items	Condition	Spec.
Operating Temp.	-30°C~155°C	
Resistance Temp. Coeff.	-30°C~150°C	± 200PPM / °C
Short Time Overload	2 times of rated voltage for 5 sec.	± 2 %
Temp. Cycle	-30°C~85°C for 5 cycles	± 1 %
Load Life	25°C on-off cycle 1,000 hrs.	± 5 %
Moisture-Proof Load Life	40°C 95°C RH on-off cycle 1,000 hrs.	± 5 %
Solder Pot	270°C for 3 sec.	± 1 %
Incombustibility	16 times of rated wattage for 5 min.	not flamed

## ► FRN, FKN, FSQ - Electrical Characteristics

POWER WATTAGE	FUSING TIME
16 X Rated Wattage	Within 2 min
24 X Rated Wattage	Within 1 min
32 X Rated Wattage	Within 30 sec.

# FRN, FKN, FSQ Fusible Resistors

## FRN, FKN, FSQ - Application Notes

For fusible resistors, unlike fuses, fusing performance is given in terms of power rather than current. The power can be calculated:

$$\text{Power} = \text{Amperes}^2 \times \text{Ohms}$$

### Fusing Device Application Notes

- When using, it shall be made sure that the overload conditions at unusual moments lie within the fusing territory.
- Consult with Token in advance when overloaded higher than the rated voltage under an ordinary situation since such an overload may store up damages on resistors.
- Use at the maximum open-circuit voltage or lower as an arc phenomenon may arise when high voltage is applied again after fusing by an over current.
- Consult with us for the maximum open- circuit voltage because it varies with applications.

## How to Order

FRN

❶

1/2W

❷

0.47R

❸

J

❹

TB

❺

❶ Part Number: FRN, FKN, FSQ

❷ Rated Power (W)

❸ Resistance Value ( $\Omega$ )

Code	Resistance Value
R47	0.47 $\Omega$
47R	47 $\Omega$
470R	470 $\Omega$
4K7	4.7K $\Omega$
47K	47K $\Omega$

❹ Resistance Tolerance (%)

Code	Resistance Tolerance
J	$\pm 5\%$

❺ Package

Code	Package
TB	Taping Box
P	Bulk

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