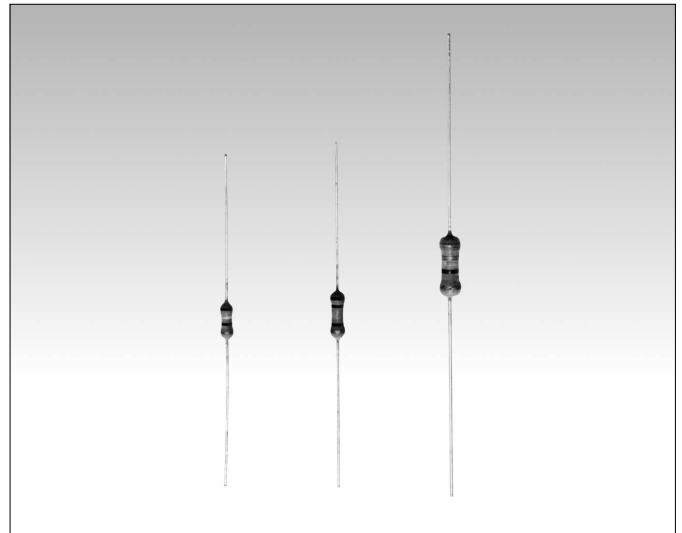


# FRN1/4, 1/2, 1

## ●Features

1. Resistor fuses in overload conditions.
2. Suitable for use with paper-phenol PBC due to small size and light weight.
3. Pre-formed products available by request.
4. Utilization of a metal-film resistor element gives stable characteristics under normal conditions-abnormal overload causes instantaneous fusing to occur.



## ●Dimensions

Style	L	D	H	d	*Unit weight/pc.
FRN1/4	6.5±0.5	2.3±0.5	30±3	0.6±0.05	218mg
FRN1/2	8.5±1.0	3.0±0.5	30±3	0.6±0.05	292mg
FRN1	11.0±1.0	4.0±1.0	35±3	0.7±0.05	655mg

Unit : mm

\*There is a broad space between the second and third color bands.

\*Values for reference

## ●Product Classification

Example

FRN	1/2	A	101	J	B
① Product Type	② Rated Power	③ Fusible Characteristics	④ Rated Resistance	⑤ Tolerance on Rated Resistance	⑥ Packaging
Style					
① Product Type	② Rated Power	③ Fusible Characteristics	④ Rated Resistance	⑤ Tolerance on Rated Resistance	⑥ Packaging
	Code Rated Power	Code Fusible Characteristics	E24 Series e.g : 2R2=2.2 ohm 101=100 ohm	Code Tolerance on Rated Resistance	
	1/4 0.25W	A Characteristics A		J ±5%	
	1/2 0.5 W				
	1 1.0 W				
					*⑥ Packaging
					Code Packaging Application
					B Bulk (Straight) All Styles
					HA Horizontal Forming (Kinked) All Styles
					HB Horizontal Forming (Free-Standing) All Styles
					TB 52mm Width Taping (Fan Fold Box) FRN1/4, 1/2
					TD 52mm Width Taping (Reel) FRN1/4, 1/2

\*Refer to Taping and Packaging information in page 62. 63. 64

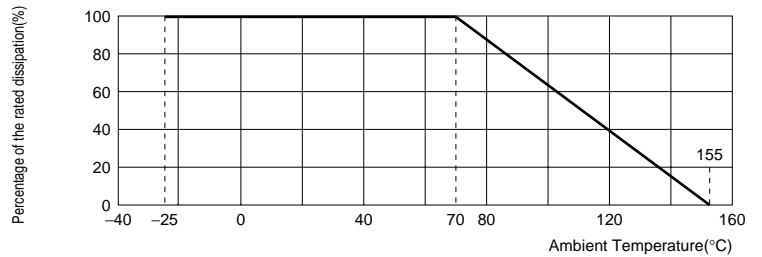
●Ratings

Style	Rated Power at 70°C W	Tolerance on Rated Resistance	Rated Resistance Range	Standard Resistance	Operating Temperature Range °C
FRN 1/4	0.25	J(±5%)	1.0 ohm~1k ohm	E24 Series	-25~+155
FRN 1/2	0.5				
FRN 1	1.0				

\*Rated Voltage =  $\sqrt{\text{Rated Power} \times \text{Nominal Resistance}}$ .

●Derating Curve

The derated values of dissipation at temperature in excess of 70°C shall be as indicated by the following Curve.



●Performance Characteristic

Description	Requirements	Test Method JIS C5202-1990
Resistance	Within specified tolerance	Clause 5.1
Temperature Characteristic of resistance	T.C.R: Within $300 \times 10^{-6}/^{\circ}\text{C}$	Clause 5.2 Room temperature and 100°C above
Overload	Within $\pm(1.5\%+0.05 \text{ ohm})$ No major visible damage	Clause 5.5 Condition A Rated Voltage $\times 2.5, 5\text{s}$
Voltage proof	No flashover, scorching or insulation breakdown	Clause 5.7 FRN1/4 :300Va.c., 60s FRN1/2,1 :350Va.c., 60s
Bond Strength of the face plating	Lead is not cut, Terminal is not loose	Clause 6.1.2(1) FRN1/4,1/2 :10N FRN1 :25N for 10s
		Clause 6.1.2(4) 5N 2 times
Vibration	Within $\pm(1\%+0.05 \text{ ohm})$ No mechanical damage	Clause 6.3 Type A 10~55Hz 3 directions 2h each
Resistance to soldering heat	Within $\pm(1\%+0.05 \text{ ohm})$ No major visible damage	Clause 6.4 350°C 2~2.5mm from the body 3.5s
Solderability	At least 95% of the dipping surface must be covered by new solder	Clause 6.5 235°C 5s
Rapid change of temperature	Within $\pm(1\%+0.05 \text{ ohm})$ No major visible damage Markings legible	Clause 7.4 -25°C/+85°C for 5 cycles
Humidity (Normal Condition)	Within $\pm(5\%+0.1 \text{ ohm})$ No major visible damage Markings legible	Clause 7.5 40°C 90~95%R.H. 500h
Endurance in humidity	Within $\pm(5\%+0.1 \text{ ohm})$ No major visible damage Markings legible	Clause 7.9 Rated voltage 1.5h "ON" 0.5h "OFF" 40°C 95%R.H. 1000h
Endurance at 70°C	Within $\pm(5\%+0.1 \text{ ohm})$ No major visible damage Markings legible	Clause 7.10 Rated Voltage 1.5h "ON", 0.5h "OFF", 70°C 1000h
Fusible characteristics	This must melt and cut within the time indicated below without burning or arcing characteristic A 24s at 15 times rated power. But with FRN1/4 R<4.7 ohm. 30s at 15 times rated power.	Using the resistor without turning on electricity as the testing sample at room temperature with no wind, apply a voltage equivalent to the rated power ratio (keep the voltage fixed while testing), and measure the times until the circuit current decreases drastically.

\*Fusible characteristic of constant current circuit is available on your request.

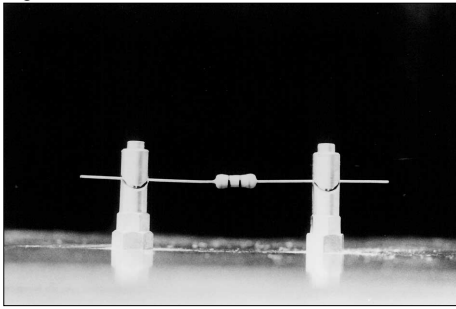
\*Other fusible characteristic products are also available. Contact KAMAYA for further details.

● **Observation for smoke during fusing out**

To illustrate fusing characteristics and flame resistance of KAMAYA OHM FRN type resistors. These pictures were taken of a 10 ohm FRN1/2 subjected to an overload of 15 times rated power at room temperature.

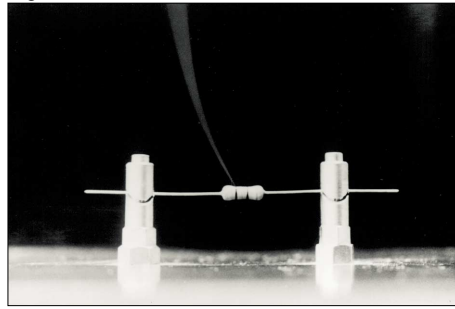
The pictures taken at various time intervals graphically record the ability of the FRN1/2 to withstand severe overload without burning.

Figure-1



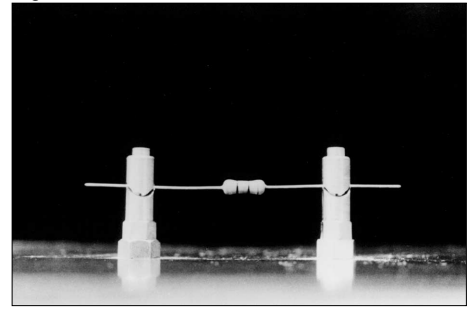
Before the voltage charge

Figure-2



3 seconds after the voltage charge

Figure-3



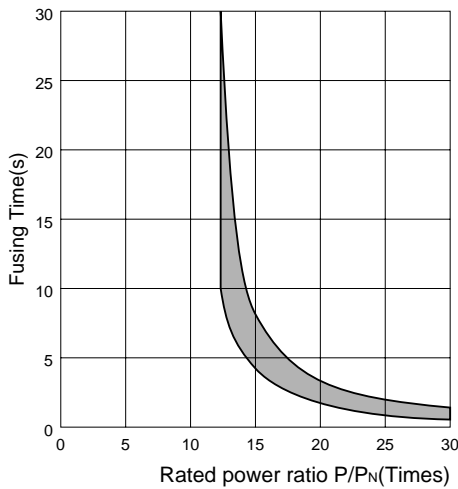
Immediately after fusing

● **Example of Typical Characteristics**

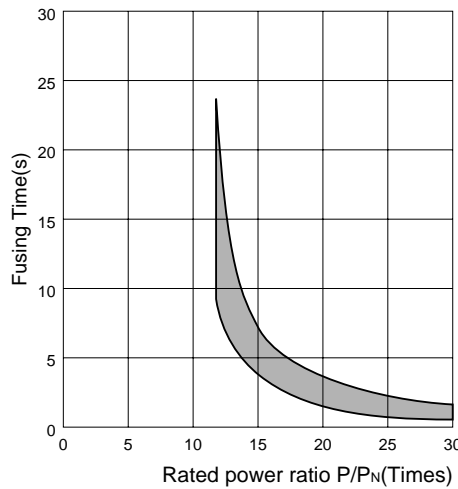
**Fusible Characteristics(A)**

**FRN 1/4**

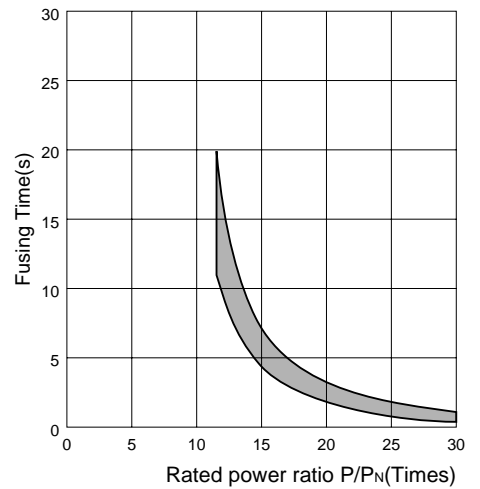
Resistance Value:4.7 ohm



Resistance Value:47 ohm

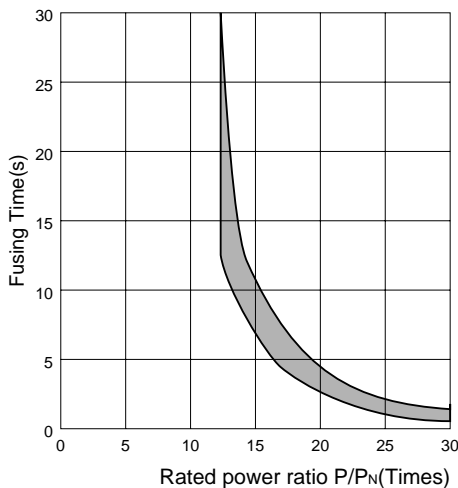


Resistance Value:100 ohm

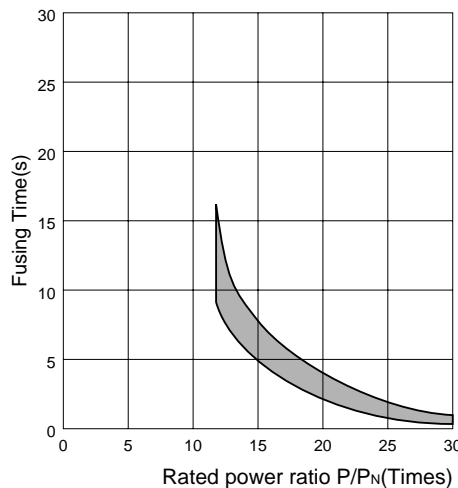


**FRN 1/2**

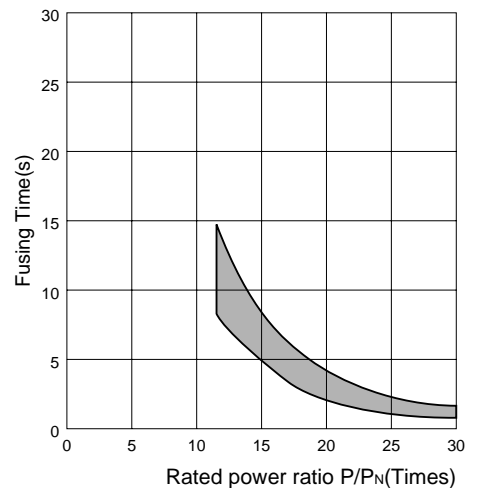
Resistance Value:4.7 ohm



Resistance Value:47 ohm



Resistance Value:100 ohm

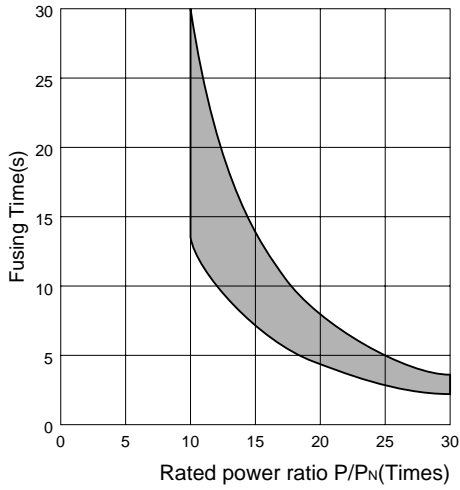


● Example of Typical Characteristics

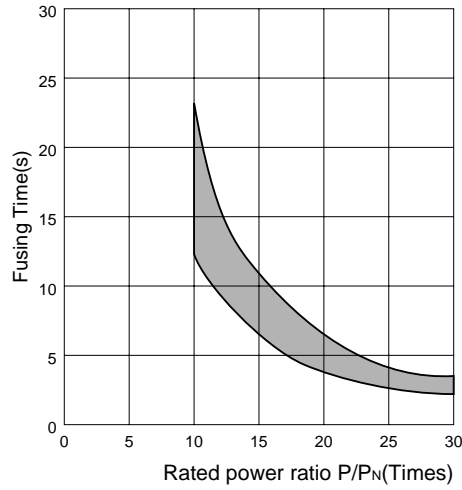
Fusible Characteristics(A)

FRN 1

Resistance Value:4.7 ohm



Resistance Value:47 ohm



Resistance Value:100 ohm

