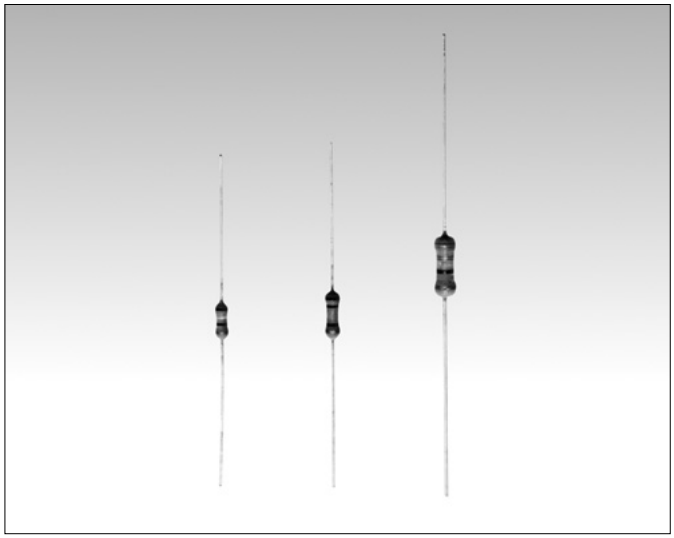
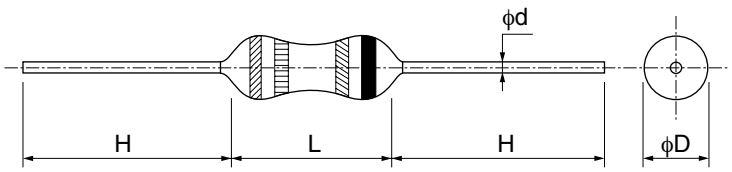
FRN

●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. Metal-film resistor element gives stable characteristics under normal conditions.
5. Fusing immediately under abnormal overload.



●Dimensions



Unit : mm

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

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

*Values for reference

●Part Number Description

Example

Style

FRN	1/2	A	101	J	B

Product Type

FRN

Rated Dissipation

1/4	0.25W
1/2	0.5W
1	1.0W

Rated Resistance

E24 Series
e.g.: 2R2=2.2 ohm
101=100 ohm

Fusible Characteristic

A	Characteristic A

Tolerance on Rated Resistance

J	±5%

***Packaging**

B	Bulk (Straight)	All Styles
HA	Horizontal Forming (Kinked)	
HB	Horizontal Forming (Free-Standing)	
TB	52 mm Width Tape (Ammo Box)	FRN1/4 FRN1/2
TD	52 mm Width Tape (Reel)	

*Refer to Tape and Packaging information on pages 64 and 65.

FIXED FUSIBLE RESISTORS FRN

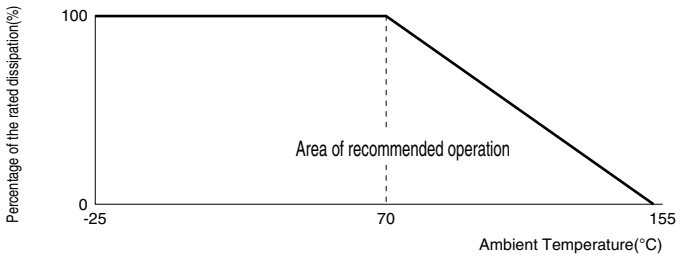
●Ratings

Style	Rated Dissipation at 70°C W	Temperature Coefficient of Resistance 10^{-6}/°C	Rated Resistance Range	Tolerance on Rated Resistance	Perferred Number Series for Resistors	Category Temperature Range °C
FRN 1/4	0.25	±300	1.0 ohm~1k ohm	J (±5%)	E24	–25~+155
FRN 1/2	0.5					
FRN 1	1.0					

Note1. Rated Voltage = $\sqrt{(\text{Rated Dissipation}) \times (\text{Nominal Resistance})}$. (d.c. or a.c. r.m.s. Voltage)

●Derating Curve

The derated values of dissipation for temperatures in excess of 70°C shall be indicated by the following Curve.



●Performance Characteristics

Description	Requirements	Test Method JIS C5202-1990	
Resistance	Within specified tolerance	Clause 5.1	
Temperature characteristic of resistance	See Ratings Table	Clause 5.2	Room temperature and 100°C above.
Overload	Within ±(1.5%+0.05 ohm) No major visible damage	Clause 5.5	Condition A Rated Voltage × 2.5, 5s
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 — Pulling	Lead is not cut, Terminal is not loose	Clause 6.1.2 (1)	FRN1/4,1/2 :10N for 5~10s FRN1 :25N for 5~10s
Bond strength of the face plating — Bending		Clause 6.1.2 (4)	5N, 2 times
Vibration	Within ±(1%+0.05 ohm) No mechanical damage	Clause 6.3	Type A 10~55Hz, 3 directions, 2h each
Resistance to soldering heat	Within ±(1%+0.05 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 ±(1%+0.05 ohm) No major visible damage Markings legible	Clause 7.4	–25°C/+85°C for 5 cycles.
Humidity (Normal Condition)	Within ±(5%+0.1 ohm) No major visible damage Markings legible	Clause 7.5	40°C 90~95%R.H. 500h.
Endurance in humidity	Within ±(5%+0.1 ohm) No major visible damage Markings legible	Clause 7.9	Rated voltage, 1.5h "ON", 0.5h "OFF", 40°C, 95%R.H., 1,000h.
Endurance at 70°C	Within ±(5%+0.1 ohm) No major visible damage Markings legible	Clause 7.10	Rated Voltage, 1.5h "ON", 0.5h "OFF", 70°C, 1,000h.
Fusing characteristic	This must melt and cut within the time indicated below without burning or arcing characteristic A 24s at 15 times rated dissipation. But with FRN1/4 R<4.7 ohm. 30s at 15 times rated dissipation.	Using the resistor without turning on electricity as the testing sample at room temperature with no wind, apply a voltage equivalent to the rated dissipation ratio (keep the voltage fixed while testing), and measure the times until the circuit current decreases drastically.	

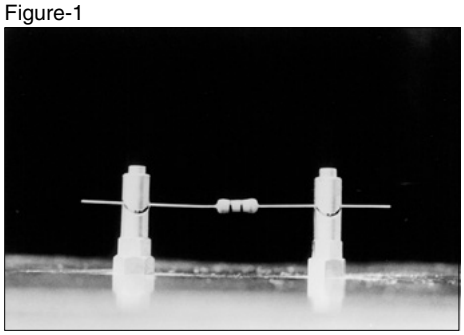
Note2. Fusing characteristic of constant current circuit is available on your request.
Note3. Other fusing characteristic products are also available. Contact KAMAYA for further details.

●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.

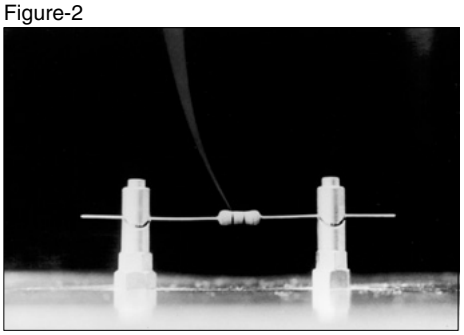
The pictures taken at various time intervals graphically record the ability of the FRN1/2 to withstand severe overload without smoke.

Figure-1



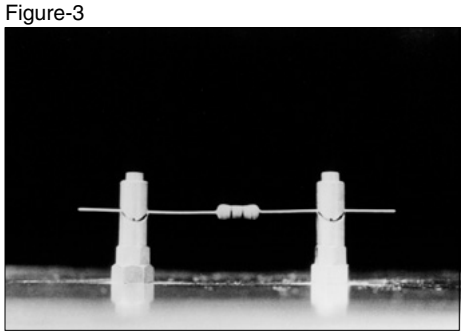
Before the voltage charge

Figure-2



3 seconds after the voltage charge

Figure-3

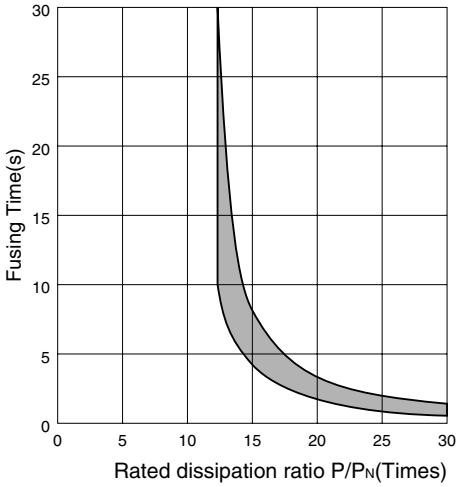


Immediately after fusing

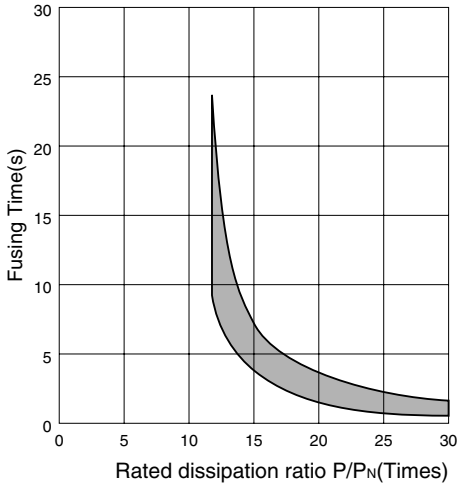
●Example of Typical Fusing Characteristics

FRN 1/4

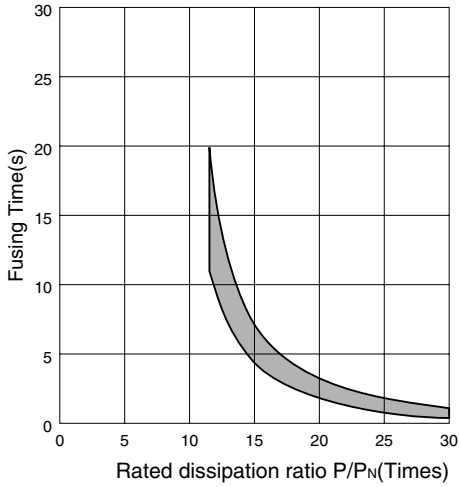
Rated Resistance:4.7 ohm



Rated Resistance:47 ohm

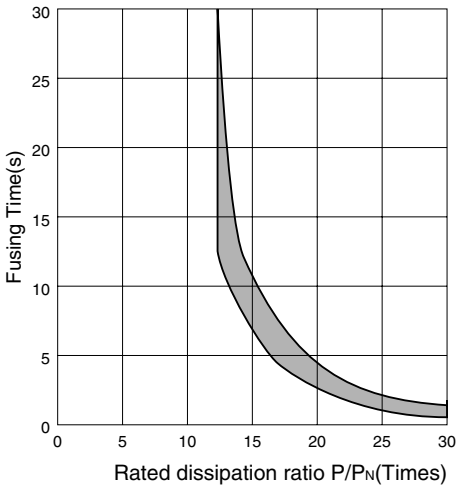


Rated Resistance:100 ohm

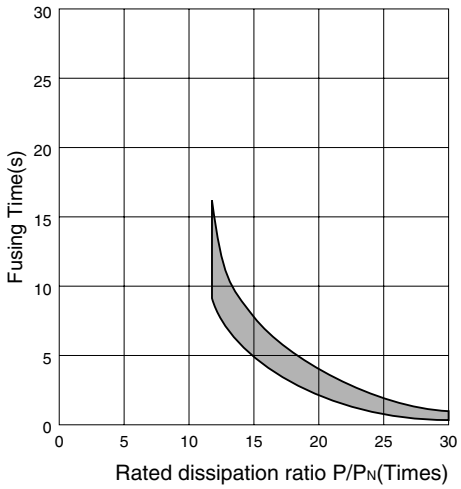


FRN 1/2

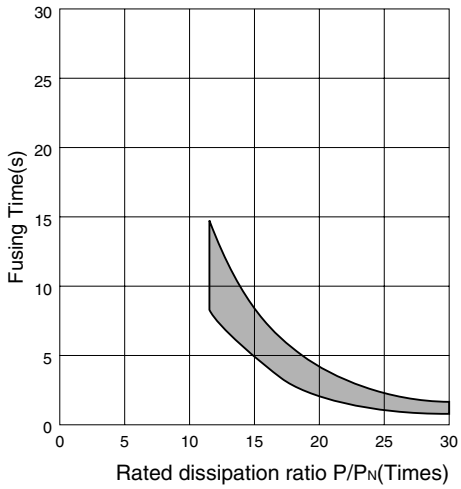
Rated Resistance:4.7 ohm



Rated Resistance:47 ohm

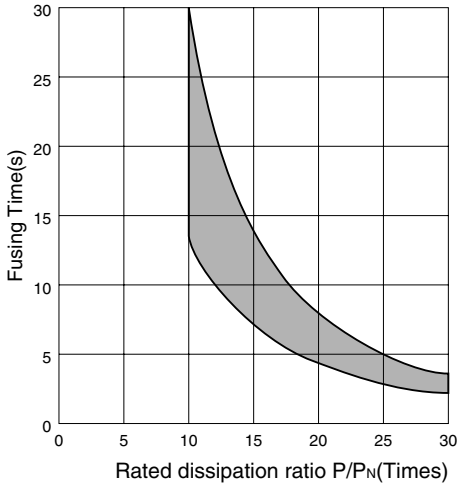


Rated Resistance:100 ohm

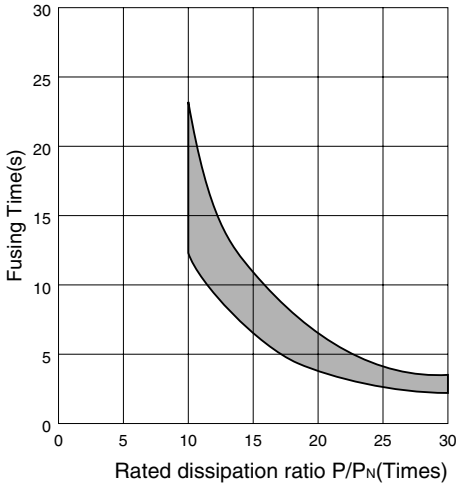


FRN 1

Rated Resistance:4.7 ohm



Rated Resistance:47 ohm



Rated Resistance:100 ohm