

Flame-Proof Fusible Resistors

Type FRN Series

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The resistive element comprises a resistive film sputtered onto a ceramic element. Metal end caps are force fitted to the element prior to spiralling. Tinned copper lead wires are welded to the end caps and the components are then coated with four layers of a flame-proof cement. All resistors are tested for value and tolerance. The technology allows the manufacture of custom fusible characteristics.

Key Features

- Superior quality resistors with fusing characteristics for overload conditions.
- Flame-proof during fusing.
- Ideal for use in safety-critical and circuit protection applications.
- These resistors fuse in less than 60 seconds at 16 times rated power. (See table)

Characteristics - Electrical

| | FRN25 | FRN50S | FRN100S | FRN200S | FRN300S |
|--------------------------------------|-------------|--------|---------|------------------------|---------|
| Rated Power @ 70°C (W) | 0.25 | 0.5 | 1 | 2 | 3 |
| Resistance Range (Ohms) Min | R12 | R12 | R33 | R30 | R30 |
| Max | 12K | 12K | 10K | 1K0 | 1K0 |
| Tolerance (%) | 5 | | | | |
| Code letter | J | | | | |
| Temperature Coefficient (ppm/°C) | ±350 | | | ±200 (-30°C to +150°C) | |
| Selection Series | E12 | | | | |
| Limiting Element Voltage | 250 | 250 | 300 | 300 | 300 |
| Max Permitted Element Voltage | 250 | 250 | 300 | 350 | 350 |
| Max Overload Voltage | 500 | 500 | 600 | 600 | 600 |
| Max Intermittent Overload Voltage | 500 | 500 | 600 | 600 | 600 |
| Max Withstand Voltage After Fusing | 300 | 350 | 450 | 450 | 450 |
| Operating Temp. Range (°C) | -55 to +155 | | | | |
| Climatic Category | 55/155/56 | | | | |
| Insulation Resistance Min Dry (ohms) | 1000M | | | | |

Dimensions



| Style | L | D | d Nom | l |
|---------|-----------|----------|-------|------|
| FRN25 | 6.3 ±0.5 | 2.3 ±0.3 | 0.54 | 25.0 |
| FRN50S | 6.3 ±0.5 | 2.3 ±0.3 | 0.54 | 25.0 |
| FRN100S | 9.0 ±0.5 | 3.2 ±0.5 | 0.54 | 25.0 |
| FRN200S | 11.0 ±1.0 | 4.5 ±1.0 | 0.70 | 25.0 |
| FRN300S | 15.0 ±1.0 | 5.5 ±1.0 | 0.80 | 25.0 |

Derating Curve - FRN25, FRN50S, FRN100S



FRN200S, FRN300S



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Mounting

The resistors are suitable for processing on automatic insertion equipment.

Marking

The resistors are marked with a 3 colour band code indicating the value.
The fourth band indicates the multiplier.
The fifth band indicates the tolerance.

Packaging

FRN25, FRN50S and FRN100S are normally supplied taped in 'ammo' boxes of 4,000 pieces.
FRN200S and FRN300S resistors are normally supplied taped in 'ammo' boxes of 1,000 pieces.
Other package styles available on request.

All tape specifications are in accordance with IEC 286-1.

Fusing Characteristics

| Overload Power | Maximum Fusing Time |
|----------------------|---------------------|
| 16 times rated power | 60 seconds |
| 20 times rated power | 40 seconds |
| 24 times rated power | 30 seconds |
| 28 times rated power | 20 seconds |
| 32 times rated power | 15 seconds |

Performance Characteristics

The evaluation of the performance characteristics is carried out with reference to IECQ specifications QC 400 000 and QC 400 100.

| TEST REF | Long Term Tests $\pm(5\% + 0.5 \text{ ohm})$ |
|----------|--|
| 4.23 | Climatic sequence |
| 4.24 | Damp heat, steady state |
| 4.25.1 | Endurance at 70 °C |
| 4.25.3 | Endurance at 155 °C |
| TEST REF | Short Term Tests $\pm(1\% + 0.05 \text{ ohm})$ |
| 4.13 | Overload |
| 4.16 | Robustness of terminations |
| 4.18 | Resistance to soldering heat |
| 4.19 | Rapid change of temperature |
| 4.22 | Vibration |

How to Order

| FRN | 25 | J | 1K0 |
|-------------------------------|--|------------------|---|
| Common Part | Size | Tolerance | Resistance Value |
| FRN - Fusible Leaded Resistor | 25 - 1/4 Watt 50S - 1/2 Watt 100S - 1 Watt 200S - 2 Watts 300S - 3 Watts | J - 5% | 1 ohm (1 ohm) 1R0 1K ohm (1000 ohms) 1K0 |

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