

Type CFR Series

Key Features

Low Cost –
High Reliability

High power to
size ratio

5 power
ratings –
0.25W ~ 2W

Applications

Audio

Communications

Measurement

Computing



The resistive element comprises a thin film of carbon, deposited onto a high thermal conductivity ceramic core. Metal end caps are force fitted to the element prior to spiralling to value. Tinned copper lead wires are welded to the end caps and the components are then coated. One coat of phenolic resin is followed by three coats of epoxy resin. All resistors are tested for value and tolerance.

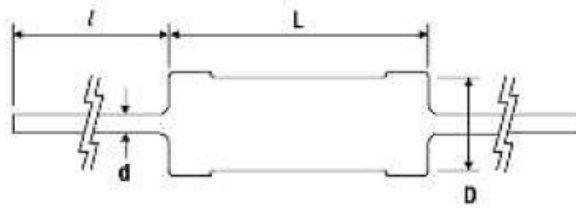
Characteristics – Electrical

| | | CFR16 | CFR25 | CFR50 | CFR100 | CFR200 |
|--|------------|------------|-------|-------|--------|--------|
| Rated power @ 70°C (W) | | 0.25 | 0.33 | 0.5 | 1 | 2 |
| Resistance Range Ω | Min | 1R0 | 1R0 | 1R0 | 1R0 | 1R0 |
| | Max | 4M7 | 10M | 10M | 10M | 10M |
| Tolerance (%) | | 2 | | 5 | | |
| Code Letter | | G | | J | | |
| T.C.R. (PPM/°C) | $\leq 10R$ | ± 350 | | | | |
| | 11R-99K | 0 ~ -450 | | | | |
| | 100K-1M0 | 0 ~ -700 | | | | |
| | $\geq 1M1$ | 0 ~ -1500 | | | | |
| Selection Series | | E24 | | | | |
| Limiting Element Voltage (V) | | 200 | 250 | 350 | 500 | 500 |
| Max. Overload Voltage ¹ (V) | | 400 | 500 | 700 | 1000 | 1000 |
| Max Intermittent Overload Voltage ² (V) | | 500 | 700 | 750 | 750 | 750 |
| Operating temperature range | | -55 ~ +155 | | | | |
| Climatic Category | | 55/155/56 | | | | |
| Dielectric strength (V) | | 400 | 500 | 700 | 1000 | 1000 |
| Insulation Resistance (M Ω) Min. | | 10000 | | | | |

¹Maximum Overload Voltage is 2.5 times rated voltage up to the specified voltage for 5 seconds.

²Maximum Intermittent Overload Voltage is 4 times rated voltage up to the specified voltage for 1 second ON and 25 seconds OFF. >100R ONLY

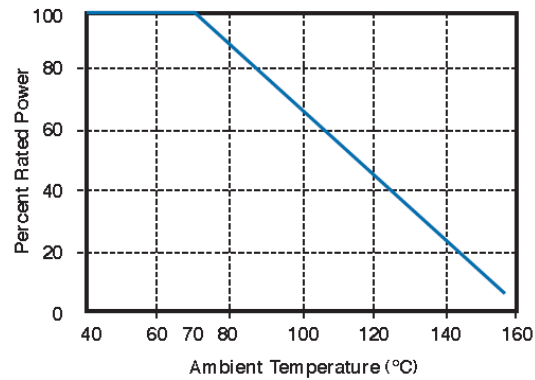
Dimensions



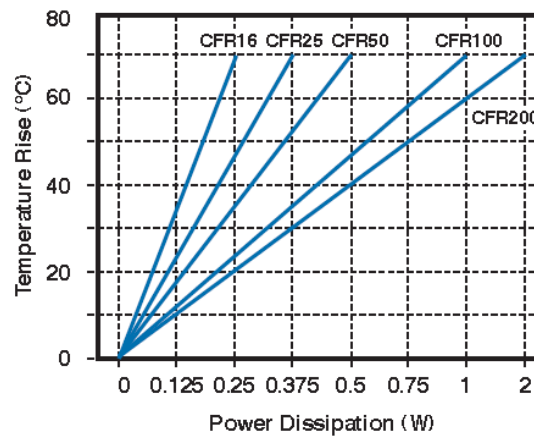
| Type | L ¹ max. | D Max. | D ±0.05 | l ±3 |
|--------|---------------------|--------|---------|------|
| CFR16 | 3.5 | 1.85 | 0.45 | 28 |
| CFR25 | 6.8 | 2.5 | 0.54 | 28 |
| CFR50 | 9.0 | 3.0 | 0.54 | 28 |
| CFR100 | 12.0 | 5.0 | 0.70 | 25 |
| CFR200 | 16.0 | 5.5 | 0.70 | 28 |

¹Length is measured in accordance with IEC 294

Derating curve

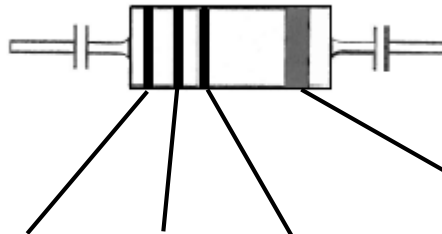


Surface Temperature vs Load



Marking

Resistors are marked with a four colour band code in accordance with IEC 62 on a beige base colour



| Color | 1 st Figure | 2 nd Figure | Multiplier | Tolerance | |
|--------|------------------------|------------------------|---------------|-----------|---------|
| | | | | Letter | Percent |
| Black | 0 | 0 | 1 | | |
| Brown | 1 | 1 | 10 | F | ±1% |
| Red | 2 | 2 | 100 | G | ±2% |
| Orange | 3 | 3 | 1,000 | | |
| Yellow | 4 | 4 | 10,000 | | |
| Green | 5 | 5 | 100,000 | D | ±0.5% |
| Blue | 6 | 6 | 1,000,000 | C | ±0.25% |
| Violet | 7 | 7 | 10,000,000 | B | ±0.1% |
| Grey | 8 | 8 | 100,000,000 | | |
| White | 9 | 9 | 1,000,000,000 | | |
| Gold | | | 0.1 | J | ±5% |
| Silver | | | 0.01 | K | ±10% |
| None | | | | M | ±20% |

Mounting

The resistors are suitable for processing on automatic insertion equipment and cutting and bending machines.

Packaging

Carbon film resistors are normally supplied taped in 'ammo' boxes. Other styles may be supplied on request. All tape specifications are in accordance with IEC 286-1.

| Type | Box Quantity | Std. Tape Spacing | Component Spacing |
|--------|--------------|-------------------|-------------------|
| CFR16 | 5000 | 52 | 5 |
| CFR25 | 4000 | 52 | 5 |
| CFR50 | 3000 | 52 | 5 |
| CFR100 | 1000 | 52 | 10 |
| CFR200 | 1000 | 64 | 10 |

Performance Characteristics

Ref QC 400 000 and QC 400 100

| Test Ref | Long term tests $\pm(5\% +0.1\Omega)$ |
|-----------|---|
| 4.23 | Climatic Sequence |
| 4.24 | Damp heat, steady state |
| 4.25.1 | Endurance @ 70°C |
| 4.25.3 | Endurance @ 155°C |
| Test Ref. | Short term Tests $\pm(1\% +0.05\Omega)$ |
| 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

| CFR | 16 | J | 100R |
|----------------------------|-------------|-----------|--|
| Common Part | Size | Tolerance | Value |
| CFR – Carbon Film Resistor | 16 – 0.25W | G – 2% | 1 Ω - 1R0 |
| | 25 – 0.33W | | 1K Ω (1,000 Ω) - 1K0 |
| | 50 – 0.50W | J – 5% | 100K Ω (100,000 Ω) – 100K |
| | 100 – 1.00W | | 1M Ω (1,000,000 Ω) – 1M0 |
| | 200 – 2.00W | | |