

## Type CFR Series

### Key Features

- Low cost, combined with high reliability, make these components suitable for use in most types of circuits, including audio, communications, measurement and computer applications.
- Premium quality carbon film resistors whose ceramic core has a high alumina content offering power to size ratios not normally associated with carbon film product.
- Available in 5 power ratings from 1 ohm to 10 Mohm. The smallest case size (CFR16) has a full 0.25 W power rating.



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

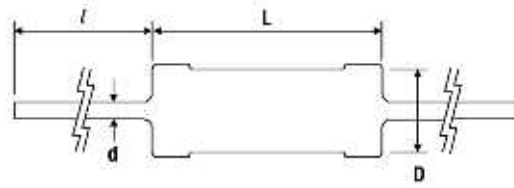
	CFR16	CFR25	CFR50	CFR100	CFR200
<b>Rated Power @ 70 °C (W)</b>	0.25	0.33	0.5	1	2
<b>Resistance Range (Ohms)</b>					
<b>Min</b>	1R0	1R0	1R0	1R0	1R0
<b>Max</b>	4M7	10M	10M	10M	10M
<b>Tolerance (%)</b>			2	5	
<b>Code letter</b>			G	J	
<b>Temp. Coefficient (ppm/°C)</b>					
<b>up to 10R</b>	±350	±350	±350	±350	±350
<b>11R - 99K</b>	0 to -450	0 to -450	0 to -450	0 to -450	0 to -450
<b>100K - 1M0</b>	0 to -700	0 to -700	0 to -700	0 to -700	0 to -700
<b>1M1 - 10M</b>	0 to -1500	0 to -1500	0 to -1500	0 to -1500	0 to -1500
<b>Selection Series</b>			E24		
<b>Limiting Element Voltage (V)</b>	200	250	350	500	500
<b>Max Overload Voltage<sup>1</sup> (V)</b>	400	500	700	1000	1000
<b>Max Intermittent Overload Voltage<sup>2</sup> (V)</b>	500	700	750	750	750
<b>Operating Temp. Range (°C)</b>			-55 to +155		
<b>Climatic Category (°C)</b>			55/155/56		
<b>Dielectric Strength (V)</b>	400	500	700	1000	1000
<b>Insulation Resistance (Mohms)</b>			1000		

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

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

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### Dimensions



Style	L* max.	D max.	d $\pm 0.05$	l
CFR16	3.5	1.85	0.45	28 $\pm$ 3
CFR25	6.8	2.5	0.54	28 $\pm$ 3
CFR50	9.0	3.0	0.54	28 $\pm$ 3
CFR100	12.0	5.0	0.70	25 $\pm$ 3
CFR200	16.0	5.5	0.70	28 $\pm$ 3

\* Length is measured in accordance with IEC 294

### Derating Curve



### Surface Temperature Rise vs Load



### Marking

The resistors are marked with a four colour band code in accordance with IEC 62 on greyish green base color.

### 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	500	64	10

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### 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 $\pm(5\% + 0.1 \text{ ohm})$
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

CFR	16	J	100R
Common Part	Size	Tolerance	Value
CFR - Carbon Film Resistor	16 - 0.25 W 25 - 0.33 W 50 - 0.50 W 100 - 1.00 W 200 - 2.00 W	G - 2%  J - 5%	1 ohm (1 ohms) 1R0 1K ohm (1000 ohms) 1K0 100K ohm (100000 ohms) 100K 1M ohm (1000000 ohms) 1M0