# **Carbon Film Resistors**

# CFR Type Normal & Miniature Style [ CFR Series ]



Power Rating	1/6W, 1/4W, 1/2W, 1W, 2W, 3W
Resistance Tolerance	±2%, ±5%
T.C.R.	see Table 1

#### **DERATING CURVE**

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below.

Rated Load (%) 70 155 °C

20 40 60 80 100 120 140 160

Ambient Temperature (°C)

#### TABLE | TEMPERATURE COEFFICIENT

60

40

20

STYLE	MAX. VALUE OF TEMP. COEFFICIENT PPM/°C					
	under I00K Ω	<b>Ι00Κ</b> Ω - Ι <b>Μ</b> Ω	ΙΜΩ-Ι0ΜΩ			
CFR100, CFR200, CFR2WS, CFR3WS	±350	-500	-1,500			
CFR-12, CFR-25, CFR-50, CFR25S, CFR50S, CFR1WS	+350 / -500	-700	-1,500			

Unit: mm

	ł
← H → ← L → øD	

DIMENSIONS

STYLE		DIMENSION						
Normal	Miniature	L	øD	н	ød			
CFR-12	CFR25S	3.4±0.3	1.9±0.2	28±2.0	0.45±0.05			
CFR-25	CFR50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05			
CFR-50	CFRIWS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05			
CFR100	CFR2WS	.5± .0	4.5±0.5	35±2.0	0.8±0.05			
CFR200	CFR3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05			

#### INTRODUCTION

The CFR Series Carbon Film Resistors are manufactured by coating a homogeneous film of pure carbon on high grade ceramic rods. After a helical groove has been cut in the resistive layer, tinned connecting leads of electrolytic copper are welded to the end-caps. The resistors are coated with layers of tan color lacquer.



Note:			

(**\***)<sup>29</sup>

## **ELECTRICAL CHARACTERISTICS**

STYLE	CFR-12	CFR25S	CFR-25	CFR50S	CFR-50	CFRIWS	CFRI00	CFR2WS CFR200	CFR3WS
Power Rating at 70°C	1/6W	1/4W		1/2W		IW		2W	3W
Maximum Working Voltage	150V	200V	250V	300V	350V	400V	500V		
Maximum Overload Voltage	300V	400V	500V	600V	700∨	800V	1,000∨		
Dielectric Withstanding Voltage	300V	400V	500V			700∨	1,000∨		
Resistance Range	ΙΩ-ΙΟΜ	$\Omega \& 0 \Omega$ for	E24 series v	alue					
Operating Temp. Range	-55°C to +	-155°C							
Temperature Coefficient	see Table 1								

Note: Special value is available on request

### **ENVIRONMENTAL CHARACTERISTICS**

PERFORMANCE TEST	TEST METHO	APPRAISE	
hort Time Overload JIS-C-5202 5.5 2.5 times RCWV for 5 Sec.		2.5 times RCWV for 5 Sec.	±0.75%+0.05 Ω
Dielectric Withstanding Voltage	JIS-C-5202 5.7	in V-Block for 60 Sec.	By type
Temperature Coefficient	JIS-C-5202 5.2	-55°C to +155°C	By type
Insulation Resistance	JIS-C-5202 5.6	in V-Block	>1,000ΜΩ
Solderability	JIS-C-5202 6.5	260±5°C for 5±0.5 Sec.	95% Min. coverage
Resistance to Solvent	JIS-C-5202 6.9	IPA for 1 Min. with ultrasonic	No deterioration of coatings and markings
Terminal Strength	JIS-C-5202 6.1	Direct load for 10 Sec. in the direction of the terminal leads	≥2.5kg (24.5N)
Pulse Overload	JIS-C-5202 5.8	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec. off)	±1.0%+0.05 Ω
Load Life in Humidity	JIS-C-5202 7.9	40±2°C, 90-95% RH at RCWV for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)	±3%+0.05 Ω
Load Life	JIS-C-5202 7.10	70°C at RCVVV for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)	±3%+0.05 Ω
Temperature Cycling	JIS-C-5202 7.4	-55°C ⇔ Room Temp. ⇔ +155°C ⇔ Room Temp. (5 cycles)	±1%+0.05 Ω
Resistance to Soldering Heat	JIS-C-5202 6.4	350±10℃ for 3±0.5 Sec.	±1%+0.05 Ω

Note: Rated Continuous Working Voltage (RCWV) =  $\sqrt{Power Rating \times Resistance Value}$