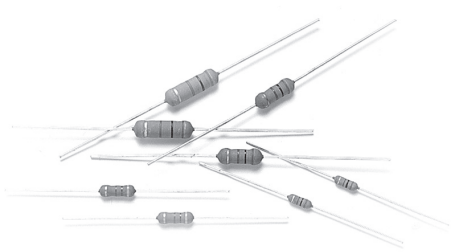
Carbon Film Resistors

Flame-Proof Type

Normal & Miniature Style [FCR Series]



INTRODUCTION

The FCR Series Carbon Film Flame-Proof 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 gray color lacquer.

FEATURES

Power Rating	1/4W, 1/2W, 1W, 2W, 3W
Resistance Tolerance	±2%, ±5%
T.C.R.	see Table 1
Flameproof Multi-layer Coating Meets	UL-94V-0
Flameproof Feature Meets Overload Test	UL-1412

DERATING CURVE

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

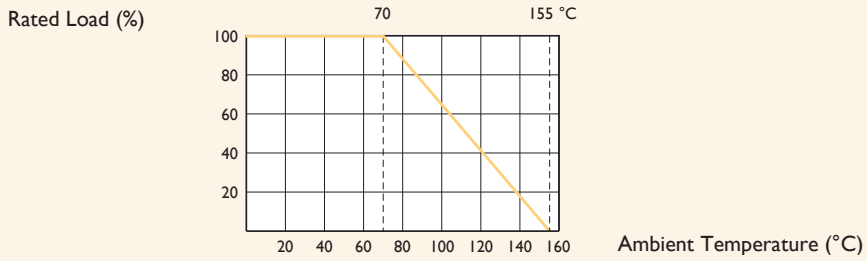
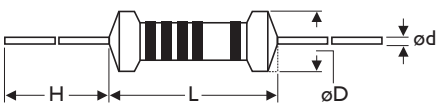


TABLE 1 TEMPERATURE COEFFICIENT

STYLE	TEMP. COEFFICIENT (ppm/°C)		
	under 100KΩ	100KΩ - 1MΩ	1MΩ - 10MΩ
FCR100, FCR200, FCR2WS, FCR3WS	-350~350	-500~0	-1,500~0
FCR-25, FCR-50, FCR50S, FCR1WS	-500~350	-700~0	-1,500~0

DIMENSIONS

Unit: mm



5th color code: black

STYLE		DIMENSION			
Normal	Miniature	L	øD	H	ød
FCR-25	FCR50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05
FCR-50	FCR1WS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05
FCR100	FCR2WS	11.5±1.0	4.5±0.5	35±2.0	0.8±0.05
FCR200	FCR3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05

Note:

ELECTRICAL CHARACTERISTICS

STYLE	FCR-25	FCR50S	FCR-50	FCR1WS	FCR100	FCR2WS	FCR200	FCR3WS
Power Rating at 70°C	1/4W	1/2W		1W		2W		3W
Maximum Working Voltage	250V	300V	350V	400V	500V			
Maximum Overload Voltage	500V	600V	700V	800V	1,000V			
Voltage Proof on Insulation	400V		500V					
Resistance Range	1Ω - 10MΩ & for E24 series value							
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 METHOD		APPRAISE
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 sec. (Not more than maximum Overload Voltage)	±0.75%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	In V-Block for 60 sec., test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-1 4.8	Between -55°C to +155°C	By type
Insulation Resistance	IEC 60115-1 4.6	in V-block for 60 Sec.	>1,000MΩ
Solderability	IEC 60115-1 4.17	245±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	No deterioration of coatings and markings
Robustness of Terminations	IEC 60115-1 4.16	Direct load for 10 Sec. in the direction of the terminal leads	≥2.5kg (24.5N)
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec. off)	±1.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C, 90-95% RH for 56 days, loaded with 0.1 times RCWV	±3.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV (or Umax., Whichever less) for 1,000 Hr. (1.5Hr.on, 0.5Hr. Off)	±3.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C ⇨ Room Temp. ⇨ +155°C ⇨ Room Temp. (5 cycles)	±1.0%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±1.0%+0.05Ω
Accidental Overload Test	IEC 60115-1 4.26	4 times RCWV for 1 Min.	No evidence of flaming or arcing

Note: RCWV (Rated Continuous Working Voltage) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.