

Carbon Film Fixed Resistors



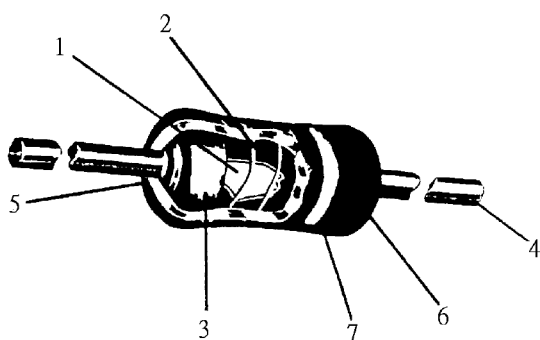
**RoHS
Compliant**



Specifications

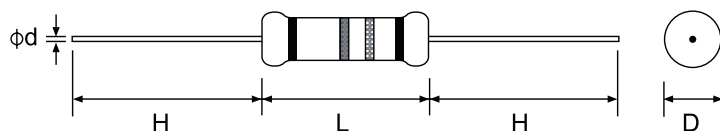
Rated Power	: 0.25W at 70°C
Max. Working Voltage	: 250V
Max. Overload Voltage	: 500V
Dielectric Withstanding Voltage	: 500V
Rated Ambient Temp.	: 70°C
Operating Temp. Range.	: -55°C to +155°C
Resistance Tolerance	: ±5%
Resistance Range	: 1Ω ~ 10MΩ

Construction



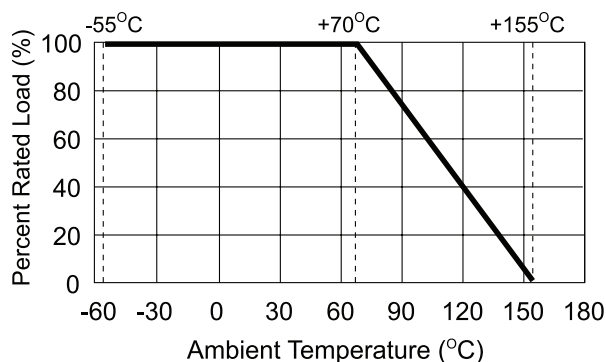
No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance Film	Carbon Film
3	End Cap	Steel (Tin plated iron surface)
4	Lead Wire	Annealed copper wire coated with tin
5	Joint	By welding
6	Coating	Insulated epoxy resin (Colour : Beige)
7	Colour Code	Epoxy Resin

Dimension



Type	Power Rating	Dimension			
		D Max.	L Max.	d ±0.05	H ±3
MCCFR0W4J	1/4W	2.5mm	6.8mm	0.54mm	28mm

Derating Curve



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Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)
DC resistance	Must be within the specified tolerance	The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance
Insulation Resistance	Insulation resistance is 10,000MΩ Min	Resistors shall be clamped in the trough of a 90° metallic V-block or foil method use a metal foil shall be wrapped closely around the body of the resistor. After that shall be tested at DC potential respectively specified in the above list for 60 +10/-0 secs.
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Resistors shall be clamped in the trough of a 90° metallic V-block or foil method use a metal foil shall be wrapped closely around the body of the resistor. After that shall be tested at AC potential respectively specified in the table 1. for 60 +10/-0 secs.
Temperature coefficient	Resistance Range	Natural resistance change per temperature degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R1: Resistance value at room temperature (t1) R2: Resistance value at room temperature plus 100°C (t2)
	≤10Ω	
	11Ω to 99K	
	100K to 1M	
	TCR (PPM/°C)	
	0 to ±350	
	0 to -450	
	0 to -700	
	0 to -1500	
Short time overload	Resistance change rate is ±(1% + 0.05Ω) max. with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Terminal strength	No evidence of mechanical damage	Direct load: Resistance to a 2.5kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test: Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations
Solderability	95% coverage minimum	The area covered with a new, smooth clean, shiny and continuous surface free from concentrated pinholes. Test temperature of solder : 245°C ±3°C Dwell time in solder : 2 to 3 seconds
Soldering temp. reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	The leads immersed into solder bath to 3.2 to 4.8 mm. from the body. Permanent resistance change shall be checked. Wave soldering condition: (2 cycles Max.) Pre-heat : 100 ~ 120°C, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255°C, 10 sec. (Max.) Peak temp.: 260°C Hand soldering condition: Hand Soldering bit temp. : 380 ±10°C Dwell time in solder : 3 +1/-0 sec.
Resistance to soldering heat	Resistance change rate is ±(1% +0.05Ω) Max. with no evidence of mechanical damage.	Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350°C ±10°C solder for 3 ±0.5 seconds

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Characteristics	Limits	Test Methods (JIS C 5201-1)															
Temperature cycling	Resistance change rate is $\pm(1\% + 0.05\Omega)$ max. with no evidence of mechanical damage	Resistance change after continuous 5 cycles for duty shown below: <table border="1"> <thead> <tr> <th>Step</th><th>Temperature</th><th>Time</th></tr> </thead> <tbody> <tr> <td>1</td><td>$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$</td><td>30 minutes</td></tr> <tr> <td>2</td><td>Room temperature</td><td>10 to 15 minutes</td></tr> <tr> <td>3</td><td>$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td><td>30 minutes</td></tr> <tr> <td>4</td><td>Room temperature</td><td>10 to 15 minutes</td></tr> </tbody> </table>	Step	Temperature	Time	1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30 minutes	2	Room temperature	10 to 15 minutes	3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 minutes	4	Room temperature	10 to 15 minutes
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3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 minutes															
4	Room temperature	10 to 15 minutes															
Vibration	Resistance change rate is $\pm(1\% + 0.05\Omega)$ Max.	55Hz, 3 planes 2hrs each Total amplitude = 1.5mm															
Load life in humidity	<table border="1"> <thead> <tr> <th colspan="2">Resistance value</th><th>$\Delta R/R$</th></tr> </thead> <tbody> <tr> <td>Normal Type</td><td>$<100\text{k}\Omega$</td><td>$\pm 3\%$</td></tr> <tr> <td></td><td></td><td>$\pm 5\%$</td></tr> </tbody> </table>	Resistance value		$\Delta R/R$	Normal Type	$<100\text{k}\Omega$	$\pm 3\%$			$\pm 5\%$	Resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 90 to 95 % relative humidity						
Resistance value		$\Delta R/R$															
Normal Type	$<100\text{k}\Omega$	$\pm 3\%$															
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Load life	<table border="1"> <thead> <tr> <th colspan="2">Resistance value</th><th>$\Delta R/R$</th></tr> </thead> <tbody> <tr> <td>Normal Type</td><td>$<56\text{k}\Omega$</td><td>$\pm 2\%$</td></tr> <tr> <td></td><td></td><td>$\pm 3\%$</td></tr> </tbody> </table>	Resistance value		$\Delta R/R$	Normal Type	$<56\text{k}\Omega$	$\pm 2\%$			$\pm 3\%$	Permanent resistance change after 1000 hours operating at RCWV with duty cycle of (1.5 hours "ON", 0.5 hour "OFF") at $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ambient						
Resistance value		$\Delta R/R$															
Normal Type	$<56\text{k}\Omega$	$\pm 2\%$															
		$\pm 3\%$															
Resistance to solvent	No deterioration of protective coatings and markings	Specimens shall be immersed in a bath of trichroethane completely for 3 minutes with ultrasonic															

RCWV = Rated continuous working Voltage = $\sqrt{\text{Rated Power} \times \text{Resistance Value}}$

Part Number Table

Description	Resistance	Part Number	Description	Resistance	Part Number
Carbon Film Fixed Resistors	0 Ω	MCZOT0W400000A50	Carbon Film Fixed Resistors	3.9 Ω	MCCFR0W4J039JA50
	0.5 Ω	MCCFR0W4J050KA50		4.3 Ω	MCCFR0W4J0435A50
	1 Ω	MCCFR0W4J010JA50		4.3 Ω	MCCFR0W4J043JA50
	1.1 Ω	MCCFR0W4J011JA50		4.7 Ω	MCCFR0W4J047JA50
	1.2 Ω	MCCFR0W4J012JA50		5.1 Ω	MCCFR0W4J051JA50
	1.3 Ω	MCCFR0W4J013JA50		5.6 Ω	MCCFR0W4J056JA50
	1.4 Ω	MCCFR0W4J016JA50		6.2 Ω	MCCFR0W4J062JA50
	1.5 Ω	MCCFR0W4J015JA50		6.8 Ω	MCCFR0W4J068JA50
	1.8 Ω	MCCFR0W4J018JA50		7.5 Ω	MCCFR0W4J075JA50
	2 Ω	MCCFR0W4J020JA50		8.2 Ω	MCCFR0W4J082JA50
	2.2 Ω	MCCFR0W4J022JA50		9.1 Ω	MCCFR0W4J091JA50
	2.4 Ω	MCCFR0W4J024JA50		10 Ω	MCCFR0W4J0100A50
	2.7 Ω	MCCFR0W4J027JA50		11 Ω	MCCFR0W4J0110A50
	3 Ω	MCCFR0W4J030JA50		12 Ω	MCCFR0W4J0120A50
	3.3 Ω	MCCFR0W4J033JA50		13 Ω	MCCFR0W4J0130A50
	3.6 Ω	MCCFR0W4J036JA50		15 Ω	MCCFR0W4J0150A50

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Carbon Film Fixed Resistors



Description	Resistance	Part Number	Description	Resistance	Part Number
Carbon Film Fixed Resistors	16Ω	MCCFR0W4J0160A50	Carbon Film Fixed Resistors	680Ω	MCCFR0W4J0681A50
	18Ω	MCCFR0W4J0180A50		750Ω	MCCFR0W4J0751A50
	20Ω	MCCFR0W4J0200A50		820Ω	MCCFR0W4J0821A50
	22Ω	MCCFR0W4J0220A50		910Ω	MCCFR0W4J0911A50
	24Ω	MCCFR0W4J0240A50		1kΩ	MCCFR0W4J01 02A50
	27Ω	MCCFR0W4J0270A50		1.1kΩ	MCCFR0W4J0112A50
	30Ω	MCCFR0W4J0300A50		1.2kΩ	MCCFR0W4J0122A50
	33Ω	MCCFR0W4J0330A50		1.3kΩ	MCCFR0W4J0132A50
	36Ω	MCCFR0W4J0360A50		1.5kΩ	MCCFR0W4J0152A50
	39Ω	MCCFR0W4J0390A50		1.6kΩ	MCCFR0W4J0162A50
	43Ω	MCCFR0W4J0430A50		1.8kΩ	MCCFR0W4J0182A50
	47Ω	MCCFR0W4J0470A50		2kΩ	MCCFR0W4J0202A50
	51 Ω	MCCFR0W4J0510A50		2.2kΩ	MCCFR0W4J0222A50
	56 Ω	MCCFR0W4J0560A50		2.4kΩ	MCCFR0W4J0242A50
	62 Ω	MCCFR0W4J0620A50		2.7kΩ	MCCFR0W4J0272A50
	68 Ω	MCCFR0W4J0680A50		3kΩ	MCCFR0W4J0302A50
	75Ω	MCCFR0W4J0750A50		3.3kΩ	MCCFR0W4J0332A50
	82Ω	MCCFR0W4J0820A50		3.6kΩ	MCCFR0W4J0362A50
	91Ω	MCCFR0W4J0910A50		3.9kΩ	MCCFR0W4J0392A50
	100Ω	MCCFR0W4J0101A50		4.3kΩ	MCCFR0W4J0432A50
	110Ω	MCCFR0W4J0111A50		4.7kΩ	MCCFR0W4J0472A50
	120Ω	MCCFR0W4J0121A50		5.1kΩ	MCCFR0W4J0512A50
	130Ω	MCCFR0W4J0131A50		5.6kΩ	MCCFR0W4J0562A50
	150Ω	MCCFR0W4J0151A50		6.2kΩ	MCCFR0W4J0622A50
	160Ω	MCCFR0W4J0161A50		6.8kΩ	MCCFR0W4J0682A50
	180Ω	MCCFR0W4J0181A50		7.5kΩ	MCCFR0W4J0752A50
	200Ω	MCCFR0W4J0201A50		8.2kΩ	MCCFR0W4J0822A50
	220Ω	MCCFR0W4J0221A50		9.1kΩ	MCCFR0W4J0912A50
	240Ω	MCCFR0W4J0241A50		10kΩ	MCCFR0W4J01 03A50
	270Ω	MCCFR0W4J0271A50		11kΩ	MCCFR0W4J0113A50
	300Ω	MCCFR0W4J0301A50		12kΩ	MCCFR0W4J0123A50
	330Ω	MCCFR0W4J0331A50		13kΩ	MCCFR0W4J0133A50
	360Ω	MCCFR0W4J0361A50		15kΩ	MCCFR0W4J0153A50
	390Ω	MCCFR0W4J0391A50		16kΩ	MCCFR0W4J0163A50
	430Ω	MCCFR0W4J0431A50		18kΩ	MCCFR0W4J0183A50
	470Ω	MCCFR0W4J0471A50		20kΩ	MCCFR0W4J0203A50
	510 Ω	MCCFR0W4J0511A50		22kΩ	MCCFR0W4J0223A50
	560Ω	MCCFR0W4J0561A50		24kΩ	MCCFR0W4J0243A50
	620Ω	MCCFR0W4J0621A50		27kΩ	MCCFR0W4J0273A50

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Carbon Film Fixed Resistors



Description	Resistance	Part Number	Description	Resistance	Part Number
Carbon Film Fixed Resistors	30 kΩ	MCCFR0W4J0303A50	Carbon Film Fixed Resistors	560 kΩ	MCCFR0W4J0564A50
	33 kΩ	MCCFR0W4J0333A50		620 kΩ	MCCFR0W4J0624A50
	36 kΩ	MCCFR0W4J0363A50		680 kΩ	MCCFR0W4J0684A50
	39 kΩ	MCCFR0W4J0393A50		750 kΩ	MCCFR0W4J0754A50
	43 kΩ	MCCFR0W4J0433A50		820 kΩ	MCCFR0W4J0824A50
	47 kΩ	MCCFR0W4J0473A50		910 kΩ	MCCFR0W4J0914A50
	51 kΩ	MCCFR0W4J0513A50		1 MΩ	MCCFR0W4J01 05A50
	56 kΩ	MCCFR0W4J0563A50		1.1 MΩ	MCCFR0W4J0115A50
	62 kΩ	MCCFR0W4J0623A50		1.2 MΩ	MCCFR0W4J0125A50
	68 kΩ	MCCFR0W4J0683A50		1.3 MΩ	MCCFR0W4J0135A50
	75 kΩ	MCCFR0W4J0753A50		1.5 MΩ	MCCFR0W4J0155A50
	82 kΩ	MCCFR0W4J0823A50		1.6 MΩ	MCCFR0W4J0165A50
	91 kΩ	MCCFR0W4J0913A50		1.8 MΩ	MCCFR0W4J0185A50
	100 kΩ	MCCFR0W4J01 04A50		2MΩ	MCCFR0W4J0205A50
	110 kΩ	MCCFR0W4J0114A50		2.2MΩ	MCCFR0W4J0225A50
	120 kΩ	MCCFR0W4J0124A50		2.4 MΩ	MCCFR0W4J0245A50
	130 kΩ	MCCFR0W4J0134A50		2.7MΩ	MCCFR0W4J0275A50
	150 kΩ	MCCFR0W4J0154A50		3MΩ	MCCFR0W4J0305A50
	160 kΩ	MCCFR0W4J0164A50		3.3MΩ	MCCFR0W4J0335A50
	180 kΩ	MCCFR0W4J0184A50		3.6MΩ	MCCFR0W4J0365A50
	200 kΩ	MCCFR0W4J0204A50		3.9MΩ	MCCFR0W4J0395A50
	220 kΩ	MCCFR0W4J0224A50		4.7MΩ	MCCFR0W4J0475A50
	240 kΩ	MCCFR0W4J0244A50		5.1 MΩ	MCCFR0W4J0515A50
	270 kΩ	MCCFR0W4J0274A50		5.6MΩ	MCCFR0W4J0565A50
	300 kΩ	MCCFR0W4J0304A50		6.2MΩ	MCCFR0W4J0625A50
	330 kΩ	MCCFR0W4J0334A50		6.8MΩ	MCCFR0W4J0685A50
	360 kΩ	MCCFR0W4J0364A50		7.5MΩ	MCCFR0W4J0755A50
	390 kΩ	MCCFR0W4J0394A50		8.2MΩ	MCCFR0W4J0825A50
	430 kΩ	MCCFR0W4J0434A50		9.1 MΩ	MCCFR0W4J0915A50
	470 kΩ	MCCFR0W4J0474A50		10 MΩ	MCCFR0W4J01 06A50
	510 kΩ	MCCFR0W4J0514A50			

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