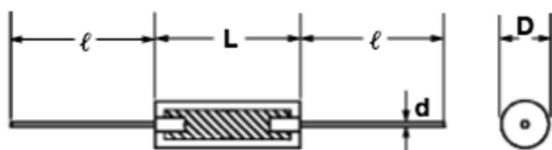
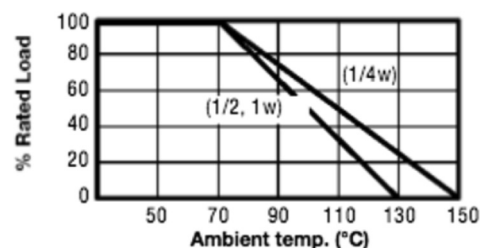




Dimensions



Derating Curve



Ratings and Dimensions

Type	Rated Power (W)	Dimensions in mm				Max. Rated Voltage (v)	Max. Overload Voltage (v)	Resistance range(Ω)	Resistance Tolerance (%)
		L	D	I	d				
MPRC 1/4 G	0.25	6.3±0.7	2.4±0.1	30±3	± ^{0.6} _{0.02}	250	400	2.2Ω 22MΩ	±5/±10
MPRC 1/2 G	0.5	9.5 ^{+0.8} _{-0.7}	3.6±0.2	25±1	± ^{0.7} _{0.02}	350	700	2.2Ω 22MΩ	±5/±10

Specification Limit and Performance

Test procedures, sequence of test, etc., refer to MIL-STD 2020 and JIS-C -5202.

Mechanical Characteristics

Spec. & Performance Items		Spec. Limit		Performance	
		RC _{1/4}	RC _{1/2}	RC _{1/4}	RC _{1/2}
Terminal strength	Pull	1kg	2.5kg	5kg and Over	7kg and Over
		No damage			
	Bending	0.5kg	1kg	No damage	
		No damage			
Vibration		No damage + (1% + 0.05 Ω)		+ 0.5%	
Resistance to soldering heat		300°C	350°C	±1.5%	
		+ 3%			
Solderability		230°C, 3 sec.		95% and over	
		75% and over			

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Electrical Characteristics

Spec. & Performance Items		Spec. Limit			Performance	
		RC _{1/4}		RC _{1/2}	RC _{1/4}	RC _{1/2}
Resistance temperature characteristics	R range	at -55°C (%)		at 100°C (%)	at -55°C (%)	at 100°C (%)
	1kΩ and under	± 6.5 to 0		+1 to -5	+ 3.5 to +4.5	-3 to -4
	1.1 kΩ to 10kΩ	± 10 to 0		0 to -6	+ 4.5 to +5.5	- 4 to -5
	11kΩ to 100kΩ	± 13 to 0		0 to -7.5	+ 9 to +10	-5 to -6
	110kΩ to 1MΩ	± 15 to 0		0 to -10	+10 to +11	-6 to -7
	1.1MΩ to 10MΩ	± 20 to 0		0 to -10		
	11MΩ and over	± 20 to 0		0 to -15		
Voltage coefficient		±0.05 %/V		± 0.035%/V	-0.02% and under	
Short time overload		±2.5%			±0.7%	±0.5%
Insulation resistance		100V		500V	10,000MΩ and over	
		1,000MΩ and over				
Dielectric withstanding voltage		300V	500V	700V	No breakdown & No damage	
		No breakdown & No damage				

Environmental Characteristics

Spec. & Performance		Spec. Limit		Performance	
Items		RC _{1/4}	RC _{1/2}	RC _{1/4}	RC _{1/2}
Temperature cycling		+ 2%		+ 0.5%	
Humidity (Steady state)		+ 3%		+ 1%	
Damp heat (Long term)		+ 5%	+ 8%	+ 1%	
Load life		+ 6%	+ 8%	+ 3%	

Reliability Test (Damp Heat)

Samples: RC1/4, RC1/2 100Q, 1k, 10KQ, 100kQ, J, n= 150PCS. Each Total 2,400PCS.

Condition: 5,000 Hrs. Operating at interval rated load at 40°C, 95% RH.

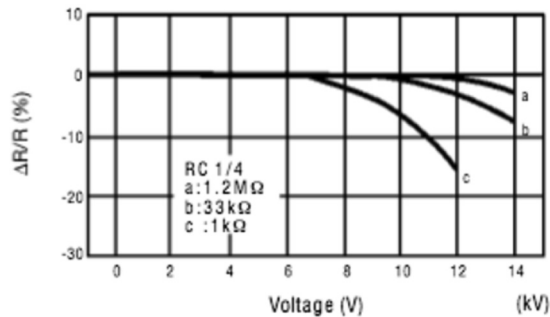
Failure rate level determination (%)		P/P _N (%)	Component hour T (Hrs)	Number of failure r (P.C.S.)	Failure rate (% /1,000Hr)		MTTF _{CL} (60%) (Hrs)
					λ	λ _{CL} (60%)	
ΔR/R	±5	0	2.984 × 10 ⁵	6	0.201	0.244	4.09 8 × 10 ⁵
		20	2.990 × 10 ⁵	4	0.134	0.176	5.68 2 × 10 ⁵
		60	2.997 × 10 ⁵	2	0.067	0.104	9.615 × 10 ⁵
		100	2.992 × 10 ⁵	3	0.100	0.139	7.194 × 10 ⁵
		Total	1.196 × 10 ⁷	15	0.125	0.138	7.209 × 10 ⁵
	± 10	Total	1.20 × 10 ⁷	0	0.0055	0.0077	1.299 × 10 ⁷

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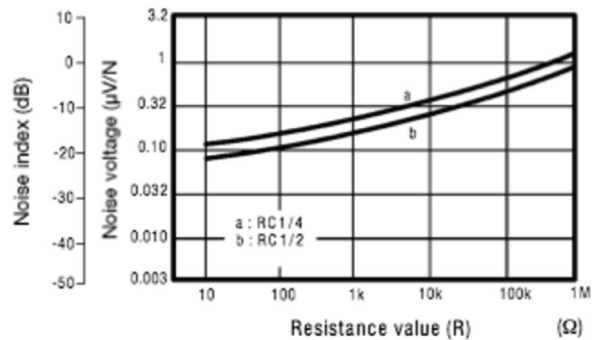
Typical Characteristics (Average value)

Pulse Characteristic

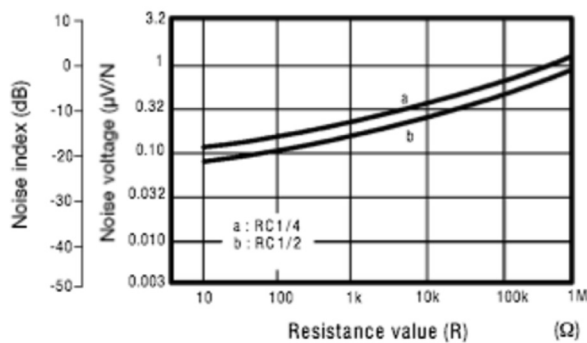
2000PF discharge pulse, 100 times



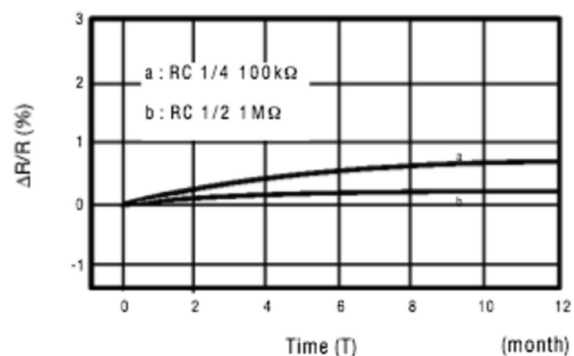
Current Noise



Current Noise

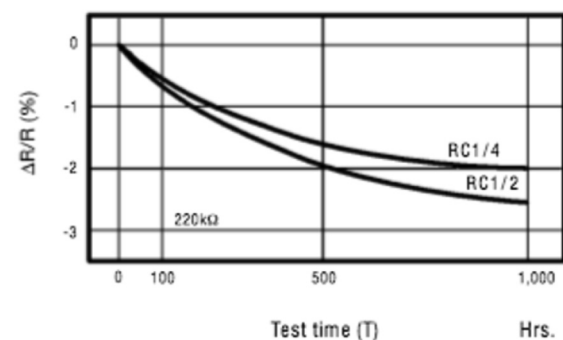


Aging Drift

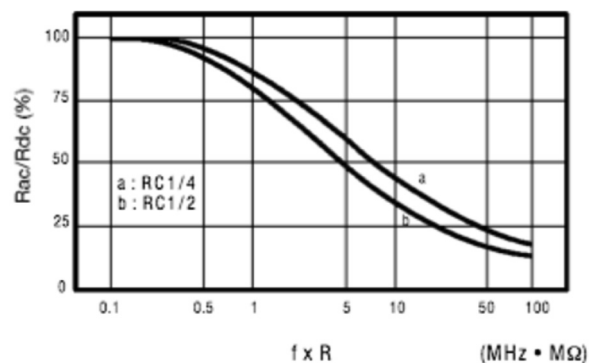


Load Life

At 70°C, Interval, Rated Load

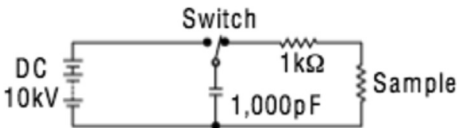


High Frequency Characteristic

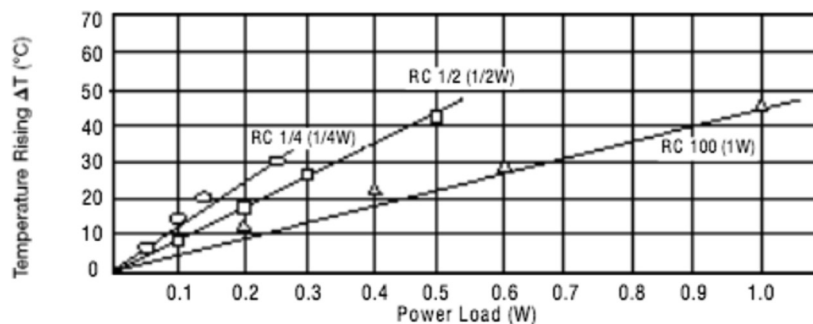


DC Resistance	DC resistance value must be within the specified tolerance.	DC resistance value measured at the test voltage specified below: <table><tr><th>Nominal Resistance</th><th>DC test voltage</th></tr><tr><td>99Ω and lower</td><td>0.5V to 1V</td></tr><tr><td>10Ω to 999Ω</td><td>2.5V to 3V</td></tr><tr><td>1,000Ω to 9,999Ω</td><td>8V to 10V</td></tr><tr><td>10,000Ω to 99,999Ω</td><td>24V to 30V</td></tr><tr><td>100,000Ω and higher</td><td>80V to 100V</td></tr></table>		Nominal Resistance	DC test voltage	99Ω and lower	0.5V to 1V	10Ω to 999Ω	2.5V to 3V	1,000Ω to 9,999Ω	8V to 10V	10,000Ω to 99,999Ω	24V to 30V	100,000Ω and higher	80V to 100V									
Nominal Resistance	DC test voltage																							
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100,000Ω and higher	80V to 100V																							
Resistance Temperature Characteristics	<table><tr><th>Nominal Resistance</th><th>TestTemp. @ -55°C</th><th>TestTemp. @ 100°C</th></tr><tr><td>1.0KΩ and under</td><td>6.5 to -3%</td><td>5 to 4%</td></tr><tr><td>1.1KΩ to 10KΩ</td><td>10 to 0-3%</td><td>6 to 5%</td></tr><tr><td>11KΩ to 100KΩ</td><td>13 to -3%</td><td>7.5 to 6%</td></tr><tr><td>110KΩ to 1MΩ</td><td>15 to -3%</td><td>10 to 7%</td></tr><tr><td>1.1MΩ to 10MΩ</td><td>20 to -3%</td><td>10 to 7%</td></tr><tr><td>11M% and over</td><td>25 to -3%</td><td>10 to 7%</td></tr></table>	Nominal Resistance	TestTemp. @ -55°C	TestTemp. @ 100°C	1.0KΩ and under	6.5 to -3%	5 to 4%	1.1KΩ to 10KΩ	10 to 0-3%	6 to 5%	11KΩ to 100KΩ	13 to -3%	7.5 to 6%	110KΩ to 1MΩ	15 to -3%	10 to 7%	1.1MΩ to 10MΩ	20 to -3%	10 to 7%	11M% and over	25 to -3%	10 to 7%	R2- R1 × 100(%) R1 R1: Resistance value at reference temp. R2: Resistance value at test temp. Sequence o f temp: -25°C , -15°C, -55°C, 25°C, 60°C, 100°C	
Nominal Resistance	TestTemp. @ -55°C	TestTemp. @ 100°C																						
1.0KΩ and under	6.5 to -3%	5 to 4%																						
1.1KΩ to 10KΩ	10 to 0-3%	6 to 5%																						
11KΩ to 100KΩ	13 to -3%	7.5 to 6%																						
110KΩ to 1MΩ	15 to -3%	10 to 7%																						
1.1MΩ to 10MΩ	20 to -3%	10 to 7%																						
11M% and over	25 to -3%	10 to 7%																						
Voltage Coefficient (Application for 1KΩ min.)	A total resistance change of 2% maximum or chart below. <table><tr><th>Rated Power</th><th>Coefficient Voltage</th></tr><tr><td>1 Watt</td><td>-0.020%/V</td></tr></table>	Rated Power	Coefficient Voltage	1 Watt	-0.020%/V	Instantaneous change in resistance per volt based on: $\frac{R - r}{r} \times \frac{100}{0.9 \times RCWV} \quad (\% / V)$																		
Rated Power	Coefficient Voltage																							
1 Watt	-0.020%/V																							
Dielectric Withstanding Voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown.	Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively specified in the above list for 5 seconds.																						
Insulation Resistance	10,000MΩ Min.	Resistors shall be clamped in the trough of a 90° metallic V-block and shall be measured at DC 100V for 1/4W and DC 500V for 1/2W and 1W.																						
Temperature Cycling	+4% Max. with no evidence of mechanical damage.	Resistance change after continuous five cycles for duty cycle specified below. <table><tr><th>Step</th><th>Temperature</th><th>Time (minute)</th></tr><tr><td>1</td><td>-55°C</td><td>30</td></tr><tr><td>2</td><td>25°C</td><td>10 to 15</td></tr><tr><td>3</td><td>85°C</td><td>30</td></tr><tr><td>4</td><td>25°C</td><td>10 to 15</td></tr></table>		Step	Temperature	Time (minute)	1	-55°C	30	2	25°C	10 to 15	3	85°C	30	4	25°C	10 to 15						
Step	Temperature	Time (minute)																						
1	-55°C	30																						
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3	85°C	30																						
4	25°C	10 to 15																						

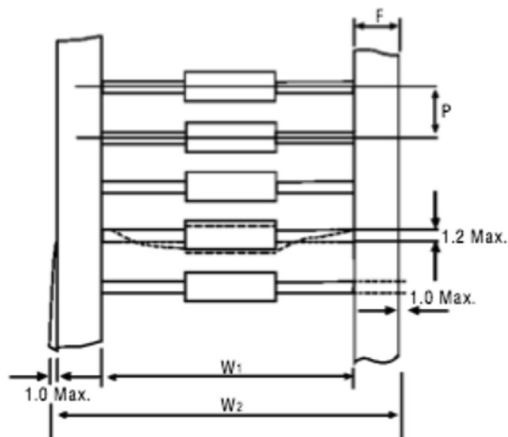
Humidity (Steady State)	+10% Max. with no evidence of arcing, burning, or charring.	Permanent resistance change after the application of a potential of 2.5 times RCWV, or the maximum overload voltage respectively specified in the above list, whichever is less for 5 seconds.				
Short Time Overload	+(2.5% + 0.059) Max. with no evidence of arcing, burning, or charring.	Permanent resistance change after the application of a potential of 2.5 time RCWV, or the maximum overload voltage respectively specified in the above list, whichever is less for 5 seconds.				
Load Life in Humidity	+20% Max. with no evidence of mechanical damage.	500 hours exposure in a humidity test chamber controlled at 40° + 2°C and 90 to 95 relative humidity.				
Load Life	<div>Resistance Change</div> <table><tr><td>Average</td><td>±6%</td></tr><tr><td>Max.</td><td>±10%</td></tr></table>	Average	±6%	Max.	±10%	Permanent resistance change after 1,000 hours operating at RCWV, or max. RCWV, whichever is less with a duty cycle of 1.5 hours “ON”, 0.5 hours “OFF” at 70° + 2°C ambient.
Average	±6%					
Max.	±10%					
Terminal Strength	+ (1% + 0.0592) Max. with no evidence of mechanical damage.	Direct load: Resistance to a 2.5 kgf (25N) direct load for 5 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 6.35mm 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.				
Resistance to Soldering Heat	+ (3% + 0.052) Max. with no evidence of mechanical damage.	Permanent resistance change when leads immersed 4.0 + 0.8 mm from the body in 350° + 10°C, solder for 3 + 0.5 seconds.				
Vibration	+ (1% + 0.05Ω) Max. with no evidence of mechanical, electrical damage and electrical discontinuity.	A single vibration having an amplitude for 1.6 mm. for 2 hours in each X, Y, Z, direction. One minute between 10 and 55 Hz.				
Low Temperature Operation	+ 3% Max. with no evidence of mechanical damage.	Resistor shall be placed in a cold chamber at room temperature, the temperature shall be gradually decreased to -65 +10/-5°C. After 1 hour of stabilization at this temperature, RCWV or maximum RCWV, whichever less shall be applied for 45 minutes. Return to room temperature. Resistance change measured 24q hours after the test.				
Solderability	95% coverage Min.	Test temperature of solder: 230 + 5°C, Dwell time in solder: 3 + 0.5 seconds.				
Resistance to Solvents	No deterioration of colour code paints.	Colour code paints must resist the solvent test per MIL-STD-202 Method 215				

Overload Test	+ 10% Max. with no evidence of mechanical damage.	In room temperature, 1350V AC in 1 second or 1000V AC in 1 minute shall be applied.
High Voltage Pulse	+ 50% Max. with no evidence of mechanical damage.	<p>The resistors are subjected to 50 discharges at a maximum rate of 12 per minute, from a 1000 pF capacitor charged to 10kV, in test circuit as shown below.</p> 

Hot-Spot Temperature Due to Rate of Power Dissipation



Taping Specifications



Part Number	Taping Dimensions (mm)				
	P	50XP	W1	W2	F
MPRC1/4	5±0.5	254±2	52±1	66Max.	6±1
MPRC1/2					

Carbon Composition Resistor

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Part Number Table

Description	Part Number
Carbon Resistor, 1/2W, 10%, 10Ω, TC	MCRC1/2G100KTC
Carbon Resistor, 1/2W, 10%, 2.2K, Ammo Pack	MCRC1/2G122KA
Carbon Resistor, 1/2W, 10%, 15K, Ammo Pack	MCRC1/2G153KA
Carbon Resistor, 1/2W, 5%, 330Ω, EA	MCRC1/2G331JTB
Carbon Resistor, 1/2W, 10%, 51K, Ammo Pack	MCRC1/2G513KA
Carbon Resistor, 1/2W, 10%, 82K, ammo pack	MCRC1/2G823KA
Carbon Resistor, 1/4W, 10%, 33K, TC	MCRC1/4G333KTC

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