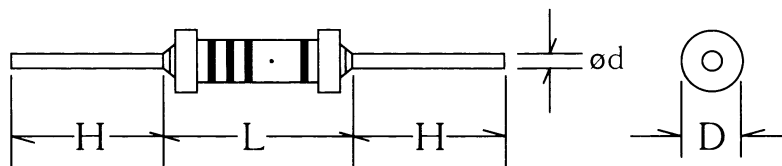


# Carbon Film Fixed Resistors

## Features

- High quality performance
- Great economy
- Flame retardant type available
- Automatically insertable
- Too low or too high ohmic value can be supplied on a case to case basis

## Dimension



### Normal Size

	Dimension (mm)				
	Rating	L Max.	D Max.	d $\begin{smallmatrix} +0.02 \\ -0.05 \end{smallmatrix}$	H $\pm 3$
	0.125W	3.5	1.85	0.5	28
<b>1/974</b>	0.25W	6.8	2.50	0.6	28
	0.5W	10.0	3.50	0.6	28
	1W	16.0	5.50	0.8	28
	2W	17.5	6.50	0.8	28

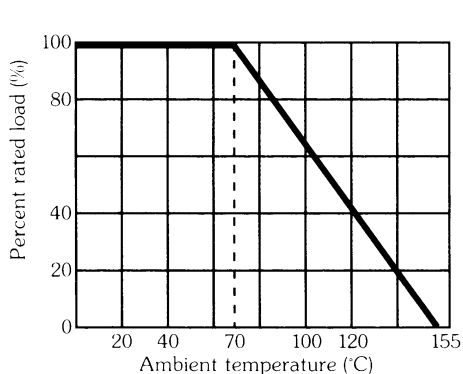
### Small Size

	Dimension (mm)				
	Rating	L Max.	D Max.	d $\begin{smallmatrix} +0.02 \\ -0.05 \end{smallmatrix}$	H $\pm 3$
	0.25W	3.5	1.85	0.5	28
<b>1/1462</b>	0.5W	9.0	3.00	0.6	28
	0.5W	6.8	2.50	0.6	28
	1W	12.0	5.00	0.7	28
<b>1/5138</b>	2W	16.0	5.50	0.8	28
	3W	17.5	6.50	0.8	28

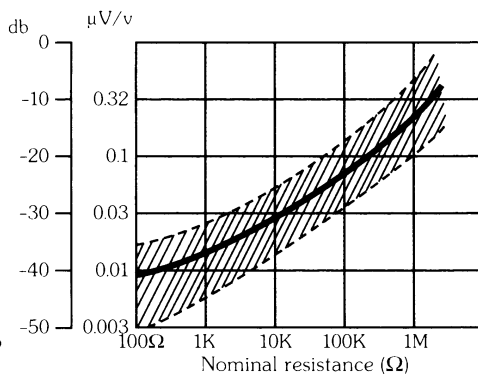
## Rating

Rating Wattage	Max. Working V.	Max. Overload V.	Resistance Range
0.125W	200V	400V	1Ω - 1MegΩ
0.25W	250V	500V	1Ω - 10MegΩ
0.5W	350V	700V	1Ω - 10MegΩ
1W	500V	1,000V	1Ω - 10MegΩ
2W	500V	1,000V	1Ω - 10MegΩ
3W	500V	1,000V	1Ω - 10MegΩ

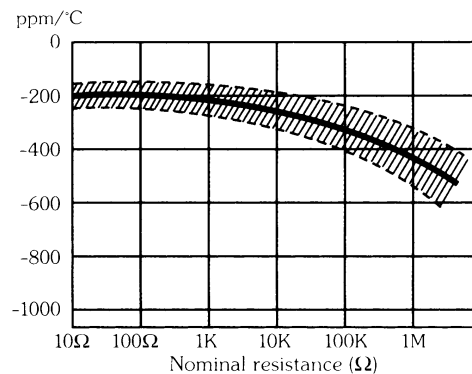
## Derating Curve



## Current Noise



## Temp Coefficient



## Performance Specifications

Characteristics	Limits		Test Methods															
	RANGE	T.C.R.																
Temperature coefficient JIS-C-5202 5.2	$\leq 10\Omega$ $11\Omega\sim 91K$ $100K\sim 1M$ $1.1M\sim 10M$	$0 \sim \pm 350PPM/^{\circ}C$ $0 \sim \pm 450PPM/^{\circ}C$ $0 \sim \pm 700PPM/^{\circ}C$ $0 \sim \pm 1500PPM/^{\circ}C$	Natural resistance change per temp. degree centigrade. $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6 \text{ (ppm/^{\circ}C)}$ R <sub>1</sub> : Resistance value at room temperature (t <sub>1</sub> ) R <sub>2</sub> : Resistance value at room temp. plus 100°C (t <sub>2</sub> ) Test Pattern: Room temp., Room temp. + 100°C															
Dielectric withstanding voltage JIS-C-5202 5.7	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 60 + 10/-0 seconds.															
Temperature cycling JIS-C-5202 7.4	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage.		Resistance change after continuous five cycles for duty cycle specified below. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C±3°C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10-15 minutes</td> </tr> <tr> <td>3</td> <td>+155°C±2°C</td> <td>30 minutes</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10-15 minutes</td> </tr> </tbody> </table>	Step	Temperature	Time	1	-55°C±3°C	30 minutes	2	Room temp.	10-15 minutes	3	+155°C±2°C	30 minutes	4	Room temp.	10-15 minutes
Step	Temperature	Time																
1	-55°C±3°C	30 minutes																
2	Room temp.	10-15 minutes																
3	+155°C±2°C	30 minutes																
4	Room temp.	10-15 minutes																
Short-time overload JIS-C-5202 5.5	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage.		Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.															
Load life in humidity JIS-C-5202 5.9	Resistance value		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°C ±2°C and 90 to 95% relative humidity.															
	Normal type	$\Delta R/R$																
Load life JIS-C-5202 7.10	Resistance value		Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours "on", 0.5 hour "off" at 70°C ±2°C ambient.															
	Normal type	$\Delta R/R$																
Insulation resistance JIS-C-5202 5.6	Resistance value		Resistors shall be clamped in the trough a 90° metallic V-block and shall be tested at DC. potential respectively specified in the above list for 60 + 10/-0 seconds.															
	Normal type	$\Delta R/R$																
Terminal strength JIS-C-5202 6.1	Resistance value		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.															
	Normal type	$\Delta R/R$																
Resistance to soldering heat JIS-C-5202 6.4	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage.		Permanent resistance change when leads immersed to 3.2-4.8mm from the body in 350°C ±10°C solder for 3 ± 0.5 seconds.															
Solderability JIS-C-5202 6.5	95% coverage Min.		The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder: 235°C ± 5°C Dwell time in solder: 3 +0.5 / -0 seconds															