

1/4 Watt to 1 Watt

JCC Series

FEATURES

- Improved pulse endurance characteristics compared to carbon-film devices.
- Wide resistance range is available, 1 ohm ~ 22M ohm.
- Stability Class: 10%
- Excellent pulse endurance characteristics.
- Predictable and reliable performance.
- Uniform quality from the hot-molded production process.

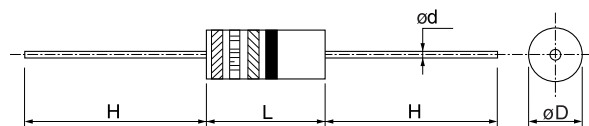


DIMENSIONS

Unit: mm

Style	L	D	H	d	*Unit weight/pc.
JCC1/4	6.3±0.7	2.4±0.1	30±3	0.6±0.05	222 mg
JCC1/2	9.5 ^{+0.9} _{-0.7}	3.6±0.2	28±3	0.7 ^{+0.07} _{-0.05}	422 mg
JCC1	14.3±0.7	5.7±0.3	26±3	0.9±0.05	1.2 g

*Values for reference



PART NUMBER DESCRIPTION

Example	Style		102	J	B
	JCC	1/4			
	Product Type	Rated Dissipation	Rated Resistance	Tolerance on Rated Resistance	*Packaging
		1/4 0.25W	E24, 12, 6 Series e.g. : 2R2=2.2 ohm 102=1k ohm	J ±5%	Bulk (Straight)
		1/2 0.5W		K ±10%	T 52 mm Width Tape (Reel)
		1 1.0W		M ±20%	

RATINGS

Style	Rated Dissipation at 70°C W	Limiting Element Voltage V	Rated Resistance Range	Combination of Resistance Range and Temperature Coefficient of Resistance			Tolerance on Rated Resistance and Preferred Number Series for Resistors	Isolation Voltage V	Category Range °C
				Temp Coefficient of Resistance %		Rated Resistance Range			
				at -55°C	at +125°C				
JCC1/4	0.25	250	1 ohm-5.6M ohm	+6.5 -0	+1 -5	1 ohm~ 1k ohm	J (±5%): E24 Series K (±10%): E12 Series M (±20%): E6 Series	100	-55~ +125
				+10 -0	0 -6	1.1k ohm~ 10k ohm			
				+13 -0	0 -7.5	11k ohm~ 100k ohm			
JCC1/2	0.5	350	1 ohm-22M ohm	+15 -0	0 -10	110k ohm~ 1M ohm	K (±10%): E12 Series	500	
				+20 -0	0 -15	1.1M ohm~ 22M ohm			
JCC1	1.0	500	2.2 ohm~1.0M ohm	+6.5 to -3	+5 to -4	2.2 ohm~ 1k ohm	K (±10%): E12 Series	1000	-55 +100
				+10 to -3	+6 to -5	1.2k ohm~ 10k ohm			
				+13 to -3	+7.5 to -6	12k ohm~ 100k ohm			
				+15 to -3	+10 to -7	120k ohm~ 1M ohm			

Note 1. Rated Voltage = $\sqrt{(\text{Rated Dissipation}) \times (\text{Rated Resistance})}$. (d.c. or a.c. r.m.s. Voltage)

Note 2. Limiting Element Voltage can only be applied to resistors when the resistance value is equal to or higher than the critical resistance value.

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STORAGE

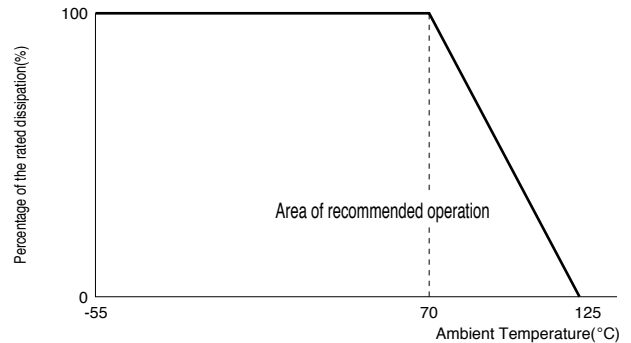
Temperature 20±15°C, Humidity 60%R.H. Max, Storing Term 6 months.

DERATING CURVE

The derated values of dissipation for temperatures in excess of 70°C shall be indicated by the following Curve.

CLIMATIC CATEGORY

55/125/56	
Lower Category Temperature	-55°C
Upper Category Temperature	+125°C
Duration of the Damp heat, Steady-State Test	JCC1/4 and JCC1/2 = 56 days JCC1 = 500 hours



PERFORMANCE CHARACTERISTICS JIS C 5201-1: 1998

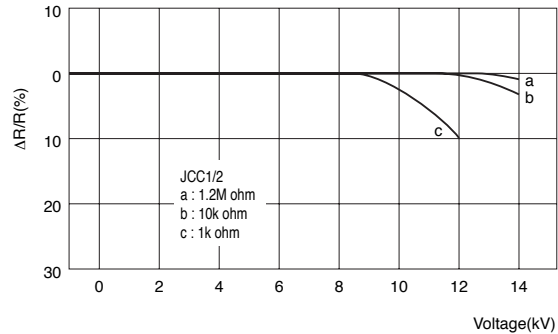
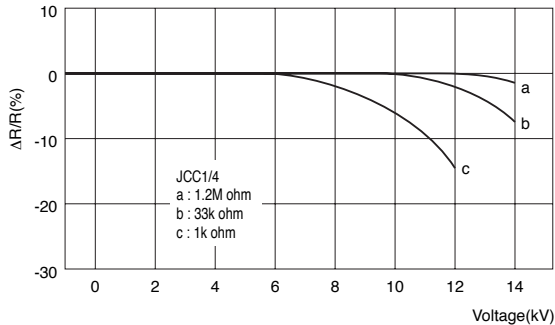
Description		Requirements	Test Methods
Voltage proof		No breakdown or flashover	Clause 4.7 V block method JCC1/4 100Va.c., 60s JCC1/2 500Va.c., 60s JCC1 100Va.c., 60s
Variation of resistance		See Ratings Table	Clause 4.8 Measuring temperature: JCC1/4 +20°C/-55°C/+20°C/+125°C/+20°C JCC1/2 +20°C/-55°C/+20°C/+125°C/+20°C JCC1 +20°C/-55°C/+20°C/+100°C/+20°C
Overload	JCC1/4, JCC1/2	$\Delta R_{\leq \pm}(2\%+0.1 \text{ ohm})$ No visible damage, legible marking	Clause 4.13 The applied voltage shall be 2.5 times the rated voltage or twice the limiting element voltage, whichever is the less severe, 5s
	JCC1	$\Delta R_{\leq \pm}(2.5\%+0.1 \text{ ohm})$ No visible damage, legible marking	
Robustness of terminations	Tensile	$\Delta R_{\leq \pm}(2\%+0.1 \text{ ohm})$ No visible damage	Clause 4.16.2 JCC1/4, JCC1/2 - 10N for 5~10s JCC1 - 20N for 5~10s
	Bending	$\Delta R_{\leq \pm}(2\%+0.1 \text{ ohm})$ No visible damage	Clause 4.16.3 JCC1/4, JCC1/2 - 5N twice JCC1 - 10N
	Torsion	$\Delta R_{\leq \pm}(2\%+0.1 \text{ ohm})$ No visible damage	Clause 4.16.4 180°C, 2 rotation
Solderability	JCC1/4, JCC1/2 JCC1	In accordance with Clause 4.17.4.5 95% Coverage	Clause 4.17 235°C, 5s
Resistance to soldering heat	JCC1/4, JCC1/2	$\Delta R_{\leq \pm}(3\%+0.1 \text{ ohm})$ No visible damage, legible marking	Clause 4.18 After immersion into the flux, the immersion into solder shall be carried out 4mm from the body at 350°C for 3.5s
	JCC1	$\Delta R_{\leq \pm}(5\%+0.1 \text{ ohm})$ No visible damage	Clause 4.18 After immersion into the flux, the immersion into solder shall be carried out 4mm from the body at 350°C for 3.0s
Rapid change of temp.	JCC1/4, JCC1/2 JCC1	$\Delta R_{\leq \pm}(2\%+0.1 \text{ ohm})$ No visible damage $\Delta R_{\leq \pm}(4\%+0.1 \text{ ohm})$ No visible damage	Clause 4.19 5 cycles between -55°C and +125°C. 5 cycles between -55°C and +85°C.
Climatic sequence		$\Delta R_{\leq \pm}(10\%+0.5 \text{ ohm})$ Insulation resistance: $R_{\geq 100M} \text{ ohm}$ No visible damage	Clause 4.23 Dry/Damp heat (12+12h cycle), first cycle./ Cold/Damp heat (12+12h cycle), remaining cycle./D.C. Load
Damp test, steady state		$\Delta R_{\leq \pm}(10\%+0.5 \text{ ohm})$ Insulation resistance: $R_{\geq 100M} \text{ ohm}$ No visible damage, legible marking	Clause 4.24 40°C, 95% R.H., 56 days, test a), b) and c) of Clause 4.24.2.1
Endurance at 70°C		$\Delta R_{\leq \pm}(10\%+0.5 \text{ ohm})$ No visible damage Insulation resistance: $R_{\geq 1G} \text{ ohm}$	Clause 4.25.1 Rated voltage, 1.5h "ON", 0.5h "OFF", 70°C, 1,000h
Endurance at the upper category temperature		$\Delta R_{\leq \pm}(10\%+0.5 \text{ ohm})$ No visible damage Insulation resistance: $R_{\geq 1G} \text{ ohm}$	Clause 4.25.3 125°C, no-load, 1,000h

1/4 Watt to 1 Watt

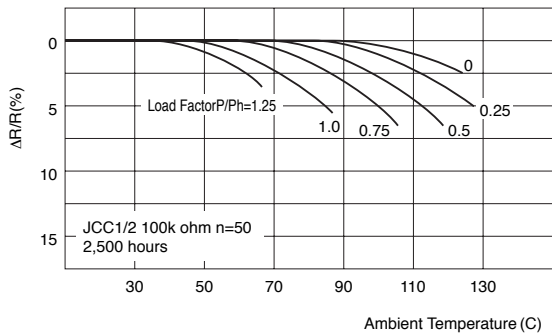
TYPICAL CHARACTERISTICS

Surge Resistance Characteristics

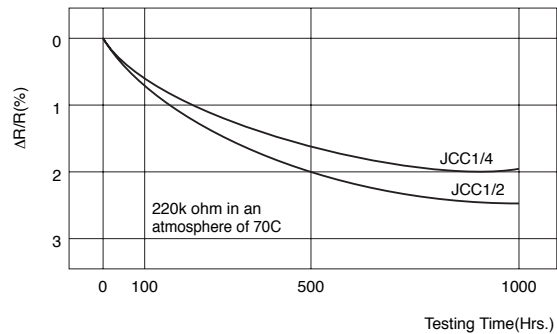
Charging and discharging a 2,000 pF capacitor for 100 cycles.



Relationship between Load Ratio and Category Temperature

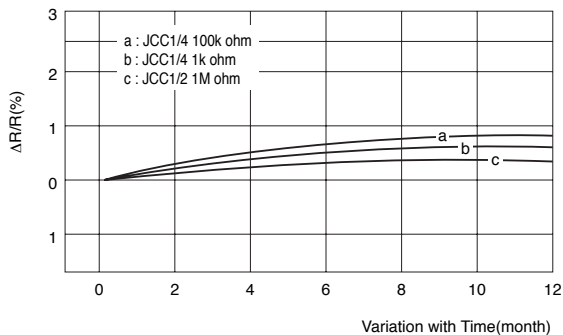


Endurance at 70°C

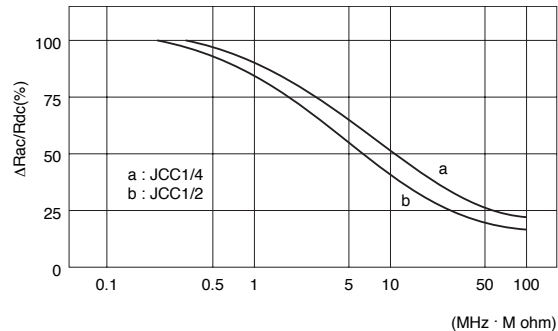


Variation with Time

Condition: 5~35°C, 45~85% R.H.



Frequency Characteristics



RELIABILITY TEST

"Typical characteristics indicate the mean values of ΔR/R etc."

Endurance in humidity

Samples: JCC1/4J, 100 ohm, 1k ohm, 10k ohm, 100k ohm x 150 each. Total 2,400.

Conditions: Direct current voltage equivalent to the following load ratings in cycles on "ON" for 1.5h and "OFF" for 0.5h for a total of 5,000h in an atmosphere of 40°C, 90 to 95%R.H.

Criterion (%)	Load Ratio P/Pn (%)	Total Testing Time T(Hrs.)	Number of Failures r(pcs.)	Failure Ratio		Average Lifetime (60% reliability level) (Hrs.)	
				λ	λCL(60%)		
ΔR/R	±5	0	2.984x10 ⁶	6	0.201	0.244	4.098x10 ⁵
ΔR/R	±5	20	2.990x10 ⁶	4	0.134	0.176	5.682x10 ⁵
ΔR/R	±5	60	2.997x10 ⁶	2	0.067	0.104	9.615x10 ⁵
ΔR/R	±5	100	2.992x10 ⁶	3	0.100	0.139	7.194x10 ⁵
ΔR/R	±5	Total	1.196x10 ⁷	15	0.125	0.138	7.209x10 ⁵
ΔR/R	±10	Total	1.20x10 ⁷	0	0.0055	0.007	1.299x10 ⁷