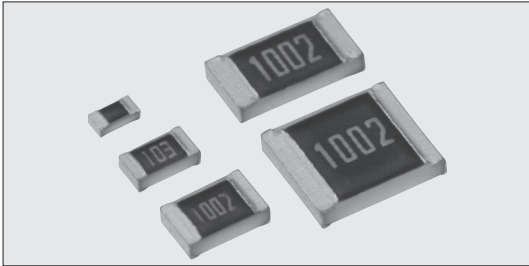


RN73H Metal Film Flat Chip Resistors (For Automotive, High reliability)



Coating color : Black

Features

- SMD metal film resistors.
- High precision type $\pm 0.05\%$ is also available as standard.
- High performance T.C.R. $\pm 5 \times 10^{-6}/K$ is also available as standard.
- Low current noise.
- Operating temperature range $\sim 155^\circ C$.
- Rated ambient temperature : $85^\circ C$
- High reliability with ΔR of $\pm 0.1\%$ in the long-term reliability test.
- Endurance at $85^\circ C$ (3,000h) : ΔR of $\pm 0.1\%$
- Improved moisture resistance by special protective coating.
- High precision resistor solution for tough environments, especially in high reliable automotive, medical and industrial applications.
- Suitable for both flow and reflow solderings.
- Products meet EU-RoHS requirements.
- AEC-Q200 Qualified.
- Sulfur resistance verified according to ASTM B 809-95.

Applications

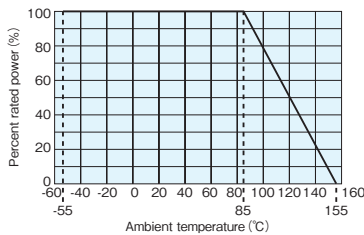
- Automotive electronics (Power Train, Body Control)
- Industrial equipment
- Medical equipment
- Measurement equipment

Reference Standards

IEC 60115-8
JIS C 5201-8
EIAJ RC-2133A

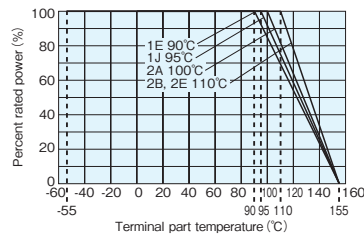
Derating Curve

Ambient temperature



For resistors operated at an ambient temperature of $85^\circ C$ or higher, the power shall be derated in accordance with the above derating curve.

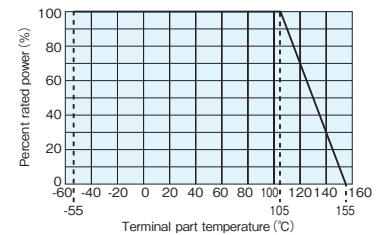
Terminal part temperature (Standard mode)



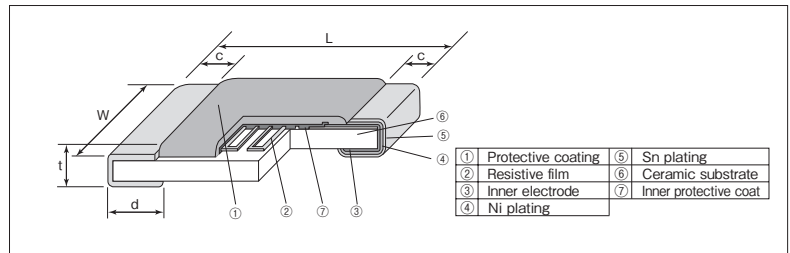
When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve.

※Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

Terminal part temperature (Power mode)



Construction



Dimensions

Type (Inch Size Code)	Dimensions (mm)					Weight (g) (1000pcs)
	L	W	c	d	t	
1E (0402)	$1.0^{+0.1}_{-0.05}$	0.5 ± 0.05	0.25 ± 0.1	$0.25^{+0.05}_{-0.1}$	0.35 ± 0.05	0.68
1J (0603)	1.6 ± 0.2	0.8 ± 0.1	0.3 ± 0.1	0.3 ± 0.1	0.45 ± 0.1	2.14
2A (0805)	2.0 ± 0.2	1.25 ± 0.2	0.4 ± 0.2	$0.3^{+0.2}_{-0.1}$	0.5 ± 0.1	4.54
2B (1206)	3.2 ± 0.2	1.6 ± 0.2	0.5 ± 0.3	$0.4^{+0.2}_{-0.1}$	0.6 ± 0.1	9.14
2E (1210)		2.5 ± 0.2				14.5

Type Designation

Example

RN73H	2B	T	TD	1002	B	25
Product Code	Power Rating	Terminal Surface Material	Taping	Nominal Resistance	Resistance Tolerance	T.C.R. ($\times 10^{-6}/K$)
	1E:0.063W 0.1W 1J:0.1W 0.125W 2A:0.125W 0.25W 2B:0.25W 0.4W 2E:0.25W 0.5W	T:Sn G:Au ^{※1}	TP:2mm pitch punch paper TD:4mm pitch paper TE:4mm pitch plastic embossed BK:Bulk	4 digits	A: $\pm 0.05\%$ B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$	05 10 25 50 100

※1 Products with gold plated electrodes are also available with 1E and 1J type, so please consult with us.

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.

For further information on taping, please refer to APPENDIX C on the back pages.

Ratings

Type	Power Rating ^{※2}		Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (×10 ⁻⁵ /K)	Resistance Range (Ω) E24 · E96 · E192					Max. Working Voltage	Max. Overload Voltage	Taping & Q' ty/Reel (pcs)											
	Standard Mode	Power Mode				A:±0.05%	B:±0.1%	C:±0.25%	D:±0.5%	F:±1%			TP	TD	TE									
1E	0.063W	—	85°C	90°C	±5	—	220~10k	—	—	—	50V	100V	10,000	—	—									
					±10	—	47~100k	47~100k	47~100k	47~100k														
					±25	—	47~300k	47~300k	47~300k	47~300k														
	±50	—	47~300k	47~300k	10~300k	10~300k																		
	—	0.1W ^{※3}	85°C	105°C	±5	—	220~10k	—	—	—														
					±10	—	47~100k	47~100k	47~100k	47~100k														
±25					—	47~300k	47~300k	47~300k	47~300k															
1J	0.1W	—	85°C	95°C	±5	100~59k	100~59k	—	—	—	75V	150V	—	5,000	—									
					±10	47~59k	47~360k	47~360k	47~360k	47~360k														
					±25	47~59k	15~1M	15~1M	10~1M	10~1M														
					±50	—	15~1M	15~1M	10~1M	10~1M														
					±100	—	—	—	10~1M	10~1M														
					±5	100~59k	100~59k	—	—	—														
	—	0.125W ^{※3}	85°C	105°C	±5	47~59k	47~360k	47~360k	47~360k	47~360k	75V	150V	—	5,000	—									
					±10	47~59k	47~1M	47~1M	47~1M	47~1M														
					±25	47~59k	47~1M	47~1M	47~1M	47~1M														
					±50	—	47~1M	47~1M	47~1M	47~1M														
					±100	—	—	—	47~1M	47~1M														
					±5	100~100k	100~100k	—	—	—														
2A	0.125W	—	85°C	100°C	±5	47~100k	47~1M	47~1M	47~1M	47~1M	150V	300V	—	5,000	4,000									
					±10	47~100k	15~1.5M	15~1.5M	10~1.5M	10~1.5M														
					±25	—	15~1.5M	15~1.5M	10~1.5M	10~1.5M														
					±50	—	—	—	10~1.5M	10~1.5M														
					±100	—	—	—	10~1.5M	10~1.5M														
					±5	100~100k	100~100k	—	—	—														
	—	0.25W ^{※3}	85°C	105°C	±5	47~100k	47~1M	47~1M	47~1M	47~1M	150V	300V	—	5,000	4,000									
					±10	47~100k	47~1.5M	47~1.5M	47~1.5M	47~1.5M														
					±25	—	47~1.5M	47~1.5M	47~1.5M	47~1.5M														
					±50	—	—	—	47~1.5M	47~1.5M														
					±100	—	—	—	47~1.5M	47~1.5M														
					±5	100~300k	100~300k	—	—	—														
2B	0.25W	—	85°C	110°C	±5	47~300k	47~1M	47~1M	47~1M	47~1M	200V	400V	—	5,000	4,000									
					±10	47~300k	15~1M	15~1M	10~1M	10~1M														
					±25	—	15~1M	15~1M	10~1M	10~1M														
					±50	—	—	—	10~1M	10~1M														
					±100	—	—	—	10~1M	10~1M														
					±5	100~300k	100~300k	—	—	—														
	—	0.4W ^{※3}	85°C	105°C	±5	47~300k	47~1M	47~1M	47~1M	47~1M	200V	400V	—	5,000	4,000									
					±10	47~300k	47~1M	47~1M	47~1M	47~1M														
					±25	—	47~1M	47~1M	47~1M	47~1M														
					±50	—	47~1M	47~1M	47~1M	47~1M														
					±100	—	—	—	47~1M	47~1M														
					±5	100~510k	100~510k	100~510k	100~510k	100~510k														
2E	0.25W	—	85°C	110°C	±25	51~510k	15~1M	15~1M	10~1M	10~1M	200V	400V	—	5,000	4,000									
					±50	—	15~1M	15~1M	10~1M	10~1M														
					±100	—	—	—	10~1M	10~1M														
					±5	100~510k	100~510k	100~510k	100~510k	100~510k														
					—	0.5W ^{※3}	85°C	105°C	±25	51~510k						47~1M	47~1M	47~1M	47~1M	200V	400V	—	5,000	4,000
									±50	—						47~1M	47~1M	47~1M	47~1M					
	±100	—	—	—					47~1M	47~1M														

Operating Temperature Range : -55°C ~ +155°C

Rated voltage = √ Power Rating × Resistance value or Max. working voltage, whichever is lower.

※2 Performance varies depending on the power used. Refer to the Performance section for details.

※3 If you use at the rated power, please keep the condition that the terminal of the resistor is below the rated terminal part temperature.

If any questions arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature" in your usage conditions, please give priority to the "Rated Terminal Part Temperature".

For more details, please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog.

Performance

Test Items	Performance Requirements $\Delta R \pm (\% + 0.05 \Omega)$		Test Methods
	Limit	Typical	
Resistance	Within specified tolerance	—	25°C
T.C.R.	Within specified T.C.R.	—	+25°C/+125°C : T.C.R.= $\pm 5 (\times 10^{-6}/K)$ +25°C/-55°C and +25°C/+155°C : others
Overload (Short time)	Standard mode : 0.05	0.01	Rated voltage $\times 2.5$ or Max. overload., whichever is less, for 5s
	Power mode : 0.05	0.01	1E, 1J : Rated voltage $\times 2.0$ or Max overload voltage , whichever is less, for 5s 2A, 2B, 2E : Rated voltage $\times 1.5$ or Max overload voltage, whichever is less, for 5s
Resistance to soldering heat	0.05 ^{※4}	0.01	260°C $\pm 5^\circ\text{C}$, 10s ± 1 s
Rapid change of temperature	0.1 ^{※4}	0.02	1E, 1J, 2A : -55°C (30min.)/+155°C (30min.) 1000 cycles 2B, 2E : -55°C (30min.)/+155°C (30min.) 500 cycles
Moisture resistance	Standard mode : 0.1 ^{※4}	0.05	85°C $\pm 2^\circ\text{C}$, 85% $\pm 5\%$ RH, 1000h. Rated voltage or Max working voltage, whichever is less. 1.5h ON/0.5h OFF cycle
	Power mode : 0.1 ^{※4}	0.04	85°C $\pm 2^\circ\text{C}$, 85% $\pm 5\%$ RH, 1000h. Rated power $\times 0.1$ or Max working voltage, whichever is less.
Endurance at 85°C	Standard mode : 0.1	0.03	Rated terminal part temp. $\pm 2^\circ\text{C}$ or Rated ambient temp. 85°C $\pm 2^\circ\text{C}$, 3000h 1.5h ON/0.5h OFF cycle
	Power mode : 0.2	0.04	Rated terminal part temp. $\pm 2^\circ\text{C}$ or Rated ambient temp. 85°C $\pm 2^\circ\text{C}$, 3000h 1.5h ON/0.5h OFF cycle
High temperature exposure	0.1 ^{※4}	0.05	+155°C, 1000h

※4 Depends on resistance value.

Precautions for Use

- The properly and electrostatically measured taping materials are used for the components, but attention should be paid to the fact that there is some danger the parts absorb on the top tapes to cause a failure in the mounting and the parts are destructed by static electricity (1J, 2A, 2B, 2E: 1kV and more, 1E: 0.5kV and more at Human Body Model 100pF, 1.5k Ω) to change the resistance in the conditions of an excessive dryness or after the parts are given vibration for a long time as they are packaged on the tapes. Similarly, care should be given not to apply the excessive static electricity when mounting on the boards.
- Ionic impurities such as flux etc. that are attached to these products or those mounted onto a PCB, negatively affect their moisture resistance, corrosion resistance, etc. The flux may contain ionic substances like chlorine, acid, etc. while perspiration and saliva include ionic impurities like sodium (Na⁺), chlorine (Cl⁻) etc. Therefore these kinds of ionic substances may induce electrolytic corrosion when they invade into the products. Either thorough washing or using RMA solder and flux are necessary since lead free solder contains ionic substances. Washing process is needed, before putting on moisture proof material in order to prevent electrolytic corrosion.
- When heat-resistant masking tapes are attached to the chip resistors at the time of mounting and then detached, there is a possibility of exfoliation of the top electrodes. It is known that the heat applied in the mounting process will enhance the adhesion strength of the tape adhesive so please avoid the use. If the use of masking tapes are unavoidable, then please be sure not to attach the tape adhesives directly on the products.
When high-pressure shower cleaning is implemented, there is a possibility of exfoliation of the top electrodes caused by the water pressure stress so please avoid the implementation.
If the implementation is unavoidable, then please evaluate the products beforehand.