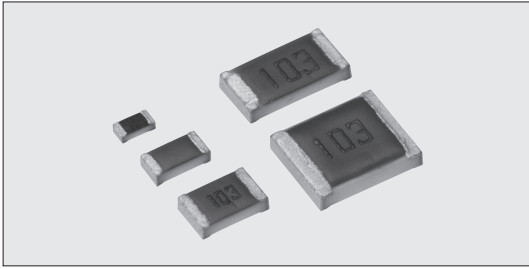


# THICK FILM (ANTI SURGE)



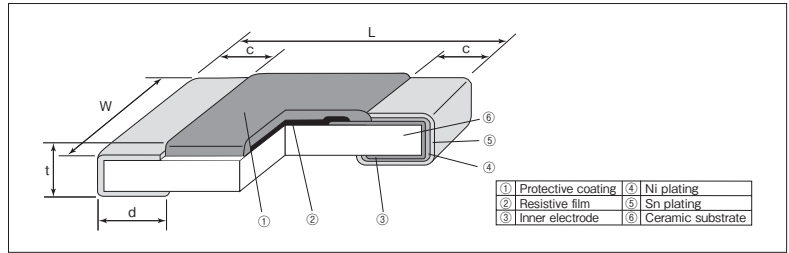
## SG73P Endured Pulse Power Flat Chip Resistors

Flat Chip Resistors



Coating color : Black (1E,1EW)  
Green (1J,2A,2B,2E,2E1)

### Construction



### Dimensions

Type (Inch Size Code)	Dimensions (mm)					Weight (g) (1000pcs)
	L	W	c	d	t	
1E (0402)	1.0 <sup>+0.01</sup> <sub>-0.05</sub>	0.5±0.05	0.15±0.1	0.25 <sup>+0.05</sup> <sub>-0.1</sub>	0.35±0.05	0.68
1EW (0402)						
1J (0603)	1.6±0.2	0.8±0.1	0.3±0.1	0.3±0.1	0.45±0.1	2.14
1J AT (0603)			0.35±0.15	0.5±0.2		
2A (0805)	2.0±0.2	1.25±0.1	0.3 <sup>+0.2</sup> <sub>-0.1</sub>	0.3 <sup>+0.2</sup> <sub>-0.1</sub>	0.5±0.1	4.54
2A AT (0805)			0.45±0.25	0.6±0.2		
2B (1206)	3.2±0.2	1.6±0.2	0.4 <sup>+0.2</sup> <sub>-0.1</sub>	0.4 <sup>+0.2</sup> <sub>-0.1</sub>	0.6±0.1	9.14
2B AT (1206)			0.55±0.35	0.8±0.2		
2E (1210)	3.2±0.2	2.6±0.2	0.4 <sup>+0.2</sup> <sub>-0.1</sub>	0.4 <sup>+0.2</sup> <sub>-0.1</sub>	0.6±0.1	15.5
2E1 (1210)						

### Features

- Superior to RK73 series chip resistors in pulse withstanding voltage and high power.
- Resistance tolerance is available from ±0.5%.
- Suitable for both reflow and flow solderings.
- Products with lead free termination meet EU-RoHS requirements. EU-RoHS regulation is not intended for Pb-glass contained in electrode, resistor element and glass.
- AEC-Q200 Tested.

### Applications

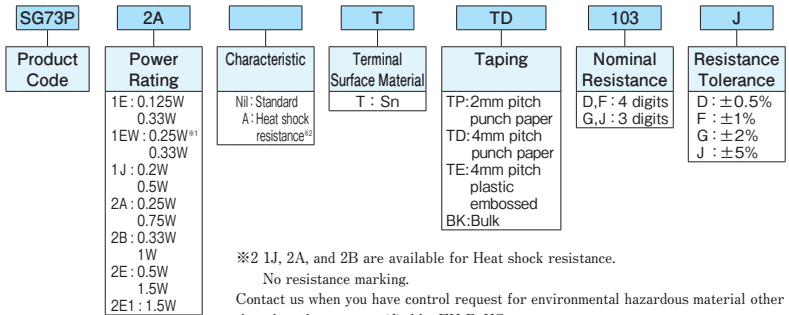
- E.C.U.
- Circuits to catch inductive lighting surge.

### Reference Standards

IEC 60115-8  
JIS C 5201-8  
EIAJ RC-2134C

### Type Designation

Example



### Ratings

Type	Power Rating	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (×10 <sup>-5</sup> /K)	Resistance Range (Ω)			Max. Working Voltage	Max. Overload Voltage	Packaging & Q'ty/Reel (pcs)		
					D: ±0.5% E24 · E96	F: ±1% E24 · E96	G: ±2% J: ±5% E24			TP	TD	TE
1E	0.125W	70°C	125°C	±200	10~1M	1~1M	1~10M	75V	100V	10,000	—	—
	0.33W	—	105°C	±100	10~1M	10~1M	10~1M					
1EW	0.25W <sup>※1</sup>	70°C	125°C	±200	—	1~9.76	1~9.1 1.1M~10M	75V	100V	10,000	—	—
	0.33W	—	105°C	±100	10~1M	10~1M	10~1M					
1J	0.2W	70°C	135°C	±100	510~576k	510~576k	510~560k	150V	200V	10,000 <sup>※5</sup>	5,000	—
	0.5W	—	105°C	±100 <sup>※3</sup>	10~499 590k~1M	1~499 590k~1M	1~470 620k~10M					
2A	0.25W	70°C	125°C	±200	10~97.6 102k~1M	1~97.6 102k~1M	1~91 110k~10M	400V	600V (800V) <sup>※4</sup>	10,000 <sup>※5</sup>	5,000	4,000 <sup>※5</sup>
	0.75W	—	105°C	±100	100~100k	100~100k	100~100k					
2B	0.33W	70°C	125°C	±200	10~294	1~294	1~270 1.2M~10M	200V	400V	—	5,000	4,000 <sup>※5</sup>
	1.0W	—	105°C	±100	300~1M	300~1M	300~1.1M					
2E	0.5W	70°C	125°C	±200	10~1M	1~1M	1~10M	200V	400V	—	5,000	4,000 <sup>※5</sup>
	1.5W	—	105°C	±200	10~1M	1~1M	1~10M					
2E1	1.5W	—	105°C	±200	10~1M	1~1M	1~10M	200V	400V	—	5,000	4,000 <sup>※5</sup>

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

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

※1 If you use at the rated power, please keep the condition that the terminal of the resistor is below the rated terminal part temperature. Please refer to the derating curves based on the terminal temperature of the center graph on the next page.

※3 Cold T.C.R. (-55°C ~ +25°C) is ±150 × 10<sup>-5</sup>/K.

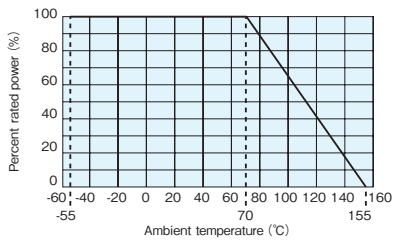
※4 Applies when power rating is 0.4W or lower.

※5 Standard packaging : TD (4mm pitch punch paper)

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.

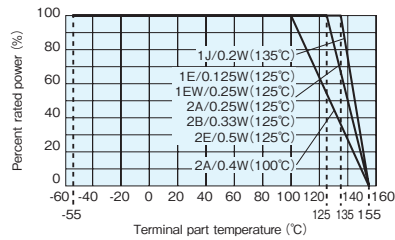
## Derating Curve

Ambient temperature



For resistors operated at an ambient temperature of 70°C or higher, the power shall be derated in accordance with the above derating curve.

Terminal part temperature

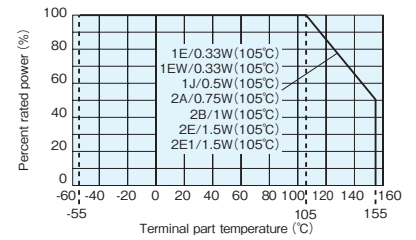


When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve.

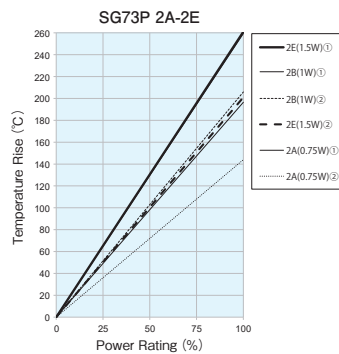
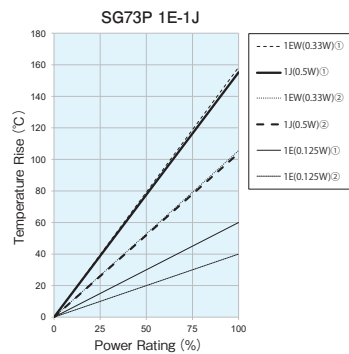
If you want to use at the rated power of ※1 or ※4, please use the derating curves based on the terminal part temperature of the center graph.

※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

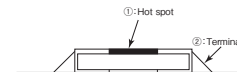


## Temperature Rise

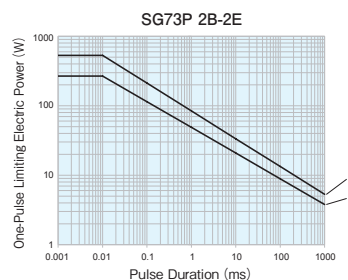
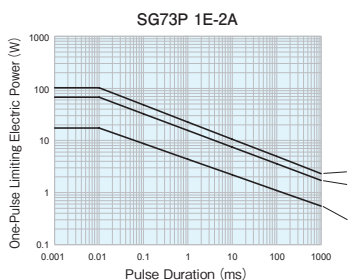


Regarding the temperature rise, the value of the temperature varies per conditions and board for use since the temperature is measured under our measuring conditions.

Measurement condition  
Room temperature: 25°C  
PCB: FR-4 t = 1.6mm  
Cu foil thickness: 35µm



## One-Pulse Limiting Electric Power



The maximum applicable voltage is equal to the max. overload voltage. Please ask us about the resistance characteristic of continuous applied pulse. The pulse endurance values are not assured values, so be sure to check the products on actual equipment when you use them.

## Performance

Test Items	Performance Requirements $\Delta R \pm$ (% +0.1 $\Omega$ )		Test Methods																
	Limit	Typical																	
Resistance	Within specified tolerance	—	25°C																
T.C.R.	Within specified T.C.R.	—	+25°C/-55°C and +25°C/+125°C																
Overload (Short time)	2	0.5	Overload for 5s <table border="1"> <thead> <tr> <th>Type</th> <th>1E</th> <th>1EW</th> <th>1J</th> <th>2A</th> <th>2B</th> <th>2E</th> <th>2E1</th> </tr> </thead> <tbody> <tr> <td>Overload</td> <td>1.25W</td> <td>1.25W</td> <td>2.063W</td> <td>2W (1.6W<sup>(*)</sup>)</td> <td>3W</td> <td>4W</td> <td>4W</td> </tr> </tbody> </table>	Type	1E	1EW	1J	2A	2B	2E	2E1	Overload	1.25W	1.25W	2.063W	2W (1.6W <sup>(*)</sup> )	3W	4W	4W
Type	1E	1EW	1J	2A	2B	2E	2E1												
Overload	1.25W	1.25W	2.063W	2W (1.6W <sup>(*)</sup> )	3W	4W	4W												
Resistance to soldering heat	1	0.75	260°C ± 5°C, 10s ± 1s																
Rapid change of temperature	0.5: Characteristic [Ni] (Standard) 1: Characteristic [A] (Heat shock resistance)	0.3: Characteristic [Ni] (Standard) 0.5: Characteristic [A] (Heat shock resistance)	Characteristic [Ni] (Standard) : -55°C (30min.) / +125°C (30min.) 100 cycles Characteristic [A] (Heat shock resistance) : -55°C (30min.) / +125°C (30min.) 1000 cycles																
Moisture resistance	3	0.75	40°C ± 2°C, 90% ~ 95% RH, 1000h 1.5h ON/0.5h OFF cycle																
Endurance at 70°C or rated terminal part temperature	3	0.75	70°C ± 2°C or rated terminal part temperature ± 2°C 1000h 1.5h ON/0.5h OFF cycle																
High temperature exposure	1	0.3	+155°C, 1000h																

## Precautions for Use

- The substrate of chip resistors is alumina. Cracks may occur at the connection of solder (solder fillet portion) due to the difference of the coefficient of thermal expansion from a mounting board when heat stress like heat cycle, etc. are repeatedly given to them. Care should be taken to the occurrence of the cracks when the change in ambient temperature or ON/OFF of load is repeated. The occurrence of the crack by heat stress may be influenced by the size of a pad, solder volume, heat radiation of mounting board etc., so please pay careful attention to designing when a big change in ambient temperature and conditions for use like ON/OFF of load can be assumed.