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THICK FILM (ANTI SURGE)

EU RoHS

Flat Chip Resistors

SG73P▌ Endured Pulse Power Flat Chip Resistors



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

■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.

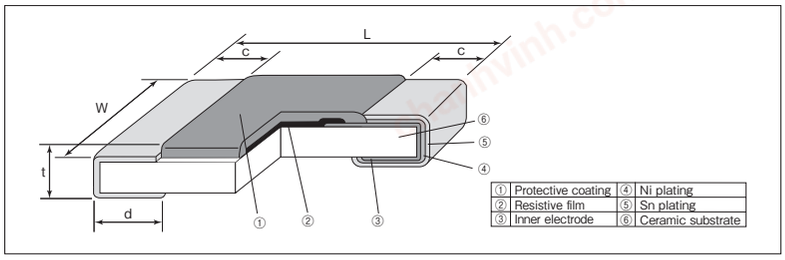
■Applications

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

■Reference Standards

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

■Construction



①	Protective coating	④	Ni plating
②	Resistive film	⑤	Sn plating
③	Inner electrode	⑥	Ceramic substrate

■Dimensions

Type (Inch Size Code)	Dimensions (mm) L	W	c	d	t	Weight (g) (1000pcs)
1E (0402)	$1.0^{+0.1}_{-0.05}$	0.5±0.05	0.15±0.1	$0.25^{+0.05}_{-0.1}$	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	$0.3^{+0.2}_{-0.1}$	$0.3^{+0.2}_{-0.1}$	0.5±0.1	4.54
2A AT (0805)			0.45±0.25	0.6±0.2	0.55±0.1	
2B (1206)	3.2±0.2	1.6±0.2	$0.4^{+0.2}_{-0.1}$	$0.4^{+0.2}_{-0.1}$	0.6±0.1	9.14
2B AT (1206)			0.55±0.35	0.8±0.2		
2E (1210)		2.6±0.2	$0.4^{+0.2}_{-0.1}$	$0.4^{+0.2}_{-0.1}$		15.5
2E1 (1210)						

■Type Designation

Example

SG73P	2A		T	TD	103	J
Product Code	Power Rating	Characteristic	Terminal Surface Material	Taping	Nominal Resistance	Resistance Tolerance
	1E : 0.125W 0.2W※1 1J : 0.2W 0.33W※1 2A : 0.25W 0.5W※1 2B : 0.33W 0.75W※1 2E : 0.5W 0.75W※1 2E1 : 1W※1	Nil : Standard A : Heat shock resistance※2	T : Sn	TP : 2mm pitch punch paper TD : 4mm pitch punch paper TE : 4mm pitch plastic embossed BK : Bulk	D,F : 4 digits G,J : 3 digits	D : ±0.5% F : ±1% G : ±2% J : ±5%

※2 1J, 2A, and 2B are available for Heat shock resistance.
No resistance marking.

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	Rated Ambient Temp.	Rated Terminal Part Temp.	T.C.R. (×10⁻⁶/K)	Resistance Range (Ω) D:±0.5% E24・E96	F:±1% E24・E96	G:±2% J:±5% E24	Max. Working Voltage	Max. Overload Voltage	Packaging & Q'ty/Reel (pcs) TP	TD	TE
1E	0.125W	70℃	125℃	±200	10~1M	1~1M	1~10M	75V	100V	10,000	—	—
	0.2W※1	70℃	105℃									
1EW	0.25W※1	70℃	125℃	±100	10~1M	10~1M	10~1M	75V	100V	10,000	—	—
				±200	—	1~9.76	1~9.1 1.1M~10M					
1J	0.2W	70℃	135℃	±100	510~576k	510~576k	510~560k	150V	200V	10,000※5	5,000	—
				±100※3	10~499 590k~1M	1~499 590k~1M	1~470 620k~10M					
	0.33W※1	70℃	125℃	±100	510~576k	510~576k	510~560k					
				±100※3	10~499 590k~1M	1~499 590k~1M	1~470 620k~10M					
2A	0.25W	70℃	125℃	±100	100~100k	100~100k	100~100k	400V	600V (800V)※4	10,000※5	5,000	4,000※5
				±200	10~97.6 102k~1M	1~97.6 102k~1M	1~91 110k~10M					
	0.5W※1	70℃	100℃	±100	100~100k	100~100k	100~100k					
				±200	10~97.6 102k~1M	1~97.6 102k~1M	1~91 110k~10M					
2B	0.33W	70℃	125℃	±100	300~1M	300~1M	300~1.1M	200V	400V	—	5,000	4,000※5
				±200	10~294	1~294	1~270 1.2M~10M					
	0.75W※1	70℃	105℃	±100	300~1M	300~1M	300~1.1M					
				±200	10~294	1~294	1~270 1.2M~10M					
2E	0.5W	70℃	125℃	±200	10~1M	1~1M	1~10M	200V	400V	—	5,000	4,000※5
	0.75W※1	70℃	110℃									
2E1	1.0W※1	70℃	95℃	±200	10~1M	1~1M	1~10M	200V	400V	—	5,000	4,000※5

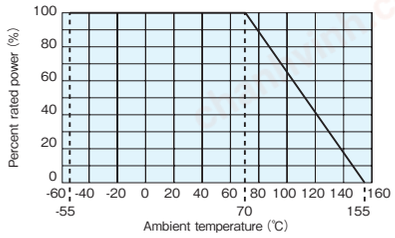
Operating Temperature Range：−55℃~+155℃
Rated voltage=$\sqrt{\text{Power Rating}\times\text{Resistance value}}$ or Max. working voltage, whichever is lower.
※1 If you use at the rated power, please keep the condition that the terminal of the resistor is below the rated terminal part temperature. Please refer to the derating curves based on the terminal temperature of right side on the next page.
※3 Cold T.C.R.(−55℃~+25℃) is ±150×10⁻⁶/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.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.
Contact our sales representatives before you use our products for applications including automotives, medical equipment and aerospace equipment.
Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

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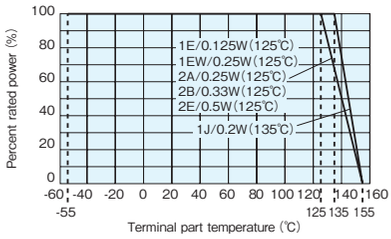
■Derating Curve

Ambient temperature

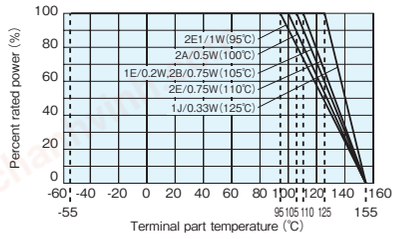


For resistors operated at an ambient temperature of 70℃ or higher, the power shall be derated in accordance with the above derating curve.

Terminal part temperature



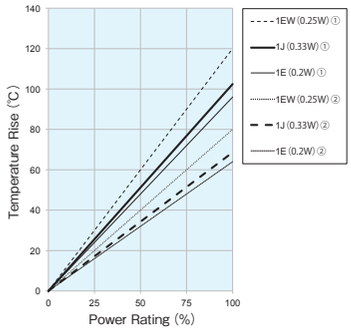
Terminal part temperature



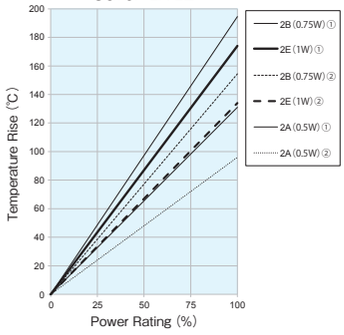
When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve.
If you want to use at the rated power of ※1 or ※4, please use the derating curves based on the terminal part temperature of right side.
※Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

■Temperature Rise

SG73P 1E-1J

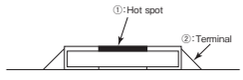


SG73P 2A-2E



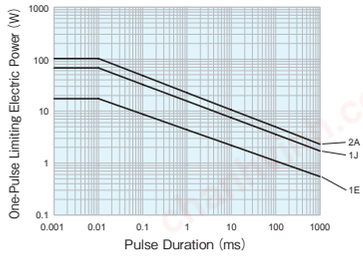
Regarding the temperature rise, the value of the temperature varies per conditions and board for use since the temperature is measured under our measuring conditions.

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

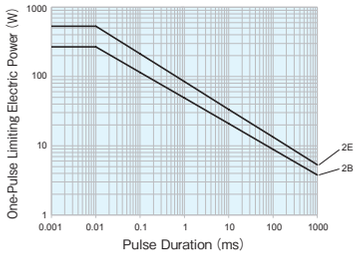


■One-Pulse Limiting Electric Power

SG73P 1E-2A



SG73P 2B-2E



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 ΔR± (%+0.1Ω)		Test Methods
	Limit	Typical	
Resistance	Within specified tolerance	—	25℃
T.C.R.	Within specified T.C.R.	—	+25℃/−55℃ and +25℃/+125℃
Overload (Short time)	2	0.5	Rated voltage×2.5 for 5s(1EW:0.25W, 2A:0.4W, 0.5W, 2B:0.75W, 2E:0.75W, 2E1:1W Rated voltage×2 for 5s)
Resistance to soldering heat	1	0.75	260℃±5℃, 10s±1s
Rapid change of temperature	0.5:Characteristic [Nil] (Standard) 1:Characteristic [A] (Heat shock resistance)	0.3:Characteristic [Nil] (Standard) 0.5:Characteristic [A] (Heat shock resistance)	Characteristic [Nil] (Standard):−55℃ (30min.)/+125℃ (30min.) 100 cycles Characteristic [A] (Heat shock resistance):−55℃ (30min.)/+125℃ (30min.) 1000 cycles
Moisture resistance	3	0.75	40℃±2℃, 90%~95%RH, 1000h 1.5h ON/0.5h OFF cycle
Endurance at 70℃ or rated terminal part temperature	3	0.75	70℃±2℃ or rated terminal part temperature ±2℃ 1000h 1.5h ON/0.5h OFF cycle
High temperature exposure	1	0.3	+155℃, 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.