# THICK FILM (ANTI SURGE)



## **SG73S** Endured Surge Voltage Flat Chip Resistors



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

## Features

-lat Chip Resistors

- Superior to RK73 series chip resistors in surge withstanding voltage and high power.
- $\bullet$  Resistance tolerance is available from  $\pm 0.5\,\%.$
- 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 qualified.

#### Applications

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

#### Reference Standards

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

## Construction



## Dimensions

Туре		Weight(g)				
(Inch Size Code)	L	W	с	d	t	(1000pcs)
1E (0402)	1.0 <sup>+0.1</sup>	0.5±0.05	0.15±0.1	0.25+0.05	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±0.1	0.3 <sup>+0.2</sup>	0.3 <sup>+0.2</sup>	0.5±0.1	4.54
2B (1206)		1.6±0.2		$0.4^{+0.2}_{-0.1}$	0.6±0.1	9.14
2E (1210)	3.2±0.2	2.6±0.2	$0.4^{+0.2}_{-0.1}$			15.5
2E1 (1210)						

## Type Designation

Example



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

		Rated Ra	Rated	T.C.R.	Resis	Resistance Range (Ω)		Max.	Max.			
Type Power Rating		ower Ambient	Terminal Part Temp.	(×10 <sup>-6</sup> / K)	D:±0.5%	F:±1%	G:±2% J:±5%	Working Voltage	Overload	Packaging & Q' ty/Reel (pcs)		
					E24 · E96	E24 · E96	E24		Voltage	TP	TD	TE
1E	0.125W	70°C	125℃	±200	10~1M 1~1M	11 M	IM 1~10M	75V	100V	10,000	_	-
16	0.2W**2	70°C	105°C			1~ Tivi						
				±100	510~576k	510~576k	510~560k	150V	/ 200V	10,000	5,000	_
		70°C	135℃	±100*1	10~499 590k~1M	1~499 590k~1M	1~470 620k~10M					
IJ	1J			±100	510~576k	510~576k	510~560k					
0.33W**2	70℃	125℃	±100*1	10~499 590k~1M	1~499 590k~1M	1~470 620k~10M						
2A	0.25W	70°C	125℃	±200	10~1M 1~1M	1. 1.1.1	1~10M	400V	600V	10,000	5,000	4,000**4
24	0.5W**2	70°C	100°C			1~10M	4000	(800V) **3	10,000	5,000	4,000**	
2B	0.33W	70°C	125°C	±200	10~1M	1~1M	1~10M	200V	400V	_	5,000	4,000**4
20	0.75W <sup>®2</sup>	70°C	105℃									
2E	0.5W	70°C	125°C	±200	10~1M	1~1M	1~10M	200V	400V	_	5,000	4,000**4
2E	0.75W <sup>**2</sup>	70°C	110°C									
2E1	1.0W <sup>®2</sup>	70°C	95°C	±200	10~1M	1~1M	1~10M	200V	400V	—	5,000	4,000**4

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

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

%1 Cold T.C.R.  $(-55^\circ\!\!C\!\sim\!+25^\circ\!\!C)$  is  $\pm 150\!\times\!10^{_{-6}}/K.$ 

#2 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 Applies when power rating is 0.4W or lower.

%4 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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Iat Chip Resistor

## Derating Curve

#### Ambient temperature



For resistors operated at an ambient temperature of 70  $\!\!\!^{\circ} C$  or higher, the power shall be derated in accordance with the above derating curve.

## ESD Limiting Voltage





Terminal part temperature 100 2E1/1V 80 Percent rated power 2A/0.5W(100° W,2B/0.75W(105° 60 1F/ 2E/0.75W(110°C 40 J/0.33W(125°C 20 0 80 100 120 140 160 -60: -40 0 40 60 -20 20 -55 95 105 110 125 155 Terminal part temperature (°C)

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 %2 or %3, 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



## Performance

Test Items	Performance Requirements	$\Delta R \pm (\% \pm 0.1 \Omega)$	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 $\times$ 2.5 for 5s $$ (2A : 0.4W, 0.5W, 2B : 0.75W, 2E : 0.75W, 2E1 : 1W Rated voltage $\times$ 2 for 5s)			
Resistance to soldering heat	1	0.75	260℃±5℃, 10s±1s			
Rapid change of temperature	0.5	0.3	-55°C (30min.) /+125°C (30min.) 100 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℃, 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.

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