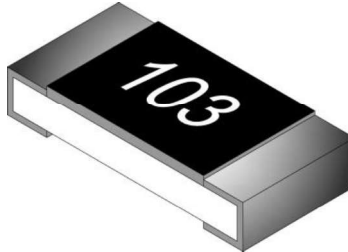




# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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## ■ Anti-Sulfur High Power Chip Resistor — STH Series



### ■ Application

- Industrial Control, System Sensor, Netcom Station
- Navigation Equipment
- Measuring Instrument
- Telecommunication Equipment, Railway Semaphore System

### ■ Features

- Small Size and Light Weight
- Reliability, High Quality
- Excellent Resistance to Vulcanization (ASTM-B-809-95 & EIA-977 Specification)

## ■ Parts Number Explanation

Example:

STH	0603	J	10R0	P	05	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
STH	0402 0603 0805 1206 1210 1812 2010 2512	D : ±0.5% F : ±1% J : ±5%	0R=0R00 1R=1R00 10R=10R0 100R=100R 1K=1K00 1M=1M00	P : Paper Taping (0603~1210) Q : Paper Taping (0402) E : Embossed Taping	04 : 4000PCS 05 : 5000PCS 10 : 10000PCS 20 : 20000PCS 40 : 40000PCS 50 : 50000PCS	Z : 60°C A : 105°C (With AEC-Q200 compatible)



# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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## High Power Electrical Specification

Type	Item	Rated Power at 70°C	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/°C)	Resistance Range		
	High					D(±0.5%)	F(±1%)	J(±5%)
STH0402	0.1 W	50V	100V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH0603	0.125 W	75V	150V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH0805	0.25 W	150V	300V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH1206	0.5 W	200V	400V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH1210	0.66 W	200V	400V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH1812	1 W	200V	400V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH2010	1 W	200V	400V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		
STH2512	2w	200V	400V	±400	-	1Ω ≤ R < 10Ω		
				±100	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 10MΩ		

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55°C ~ +155°C.

Type	0402	0603	0805	1206	1210	1812	2010	2512
Jumper Resistance Value	20mΩ Max							
Jumper Rated Current	2A	2.5A	3.5A	5A	6A	7A	7A	10A
Max.Over Load Current < 1 second and 1 times	6A	9A	13A	16A	19A	22A	22A	30A



# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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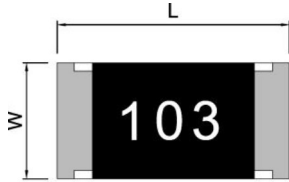
## ● High Ohm Chip Resistor

### ■ Standard Electrical Specifications

Type	Item	Rated Power at 70 °C	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/ °C)	Resistance Range	
						F(±1%)	J(±5%)
STH0402		0.1 W	50V	100V	±200	10.1 MΩ ~ 30 MΩ	10.1 MΩ ~ 30 MΩ
STH0603		0.125 W	75V	150V			
STH0805		0.25 W	150V	300V			
STH1206		0.5 W	200V	400V			
STH1210		0.66 W					
STH2010		1 W					
STH2512		2 W					

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55°C ~ +155°C.

### ■ Type Dimension



STH0402 / STH0603 / STH0805 / STH1206 / STH1210 / STH1812 / STH2010 / STH2512



TYPE	L	W	H	l <sub>1</sub>	l <sub>2</sub>
STH0402	1.00 ± 0.10	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
STH0603	1.60 ± 0.20	0.80 ± 0.15	0.40 ± 0.10	0.30 ± 0.20	0.30 ± 0.10
STH0805	2.00 ± 0.20	1.25 ± 0.15	0.50 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
STH1206	3.05 ± 0.10	1.60 ± 0.20	0.55 ± 0.15	0.40 ± 0.20	0.50 ± 0.20
STH1210	3.05 ± 0.10	2.50 ± 0.20	0.55 ± 0.15	0.50 ± 0.20	0.50 ± 0.20
STH1812	4.50 ± 0.10	3.10 ± 0.20	0.55 ± 0.05	0.55 ± 0.20	0.70 ± 0.20
STH2010	5.00 ± 0.20	2.50 ± 0.20	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
STH2512	6.30 ± 0.20	3.20 ± 0.20	0.65 ± 0.15	0.60 ± 0.30	0.60 ± 0.30

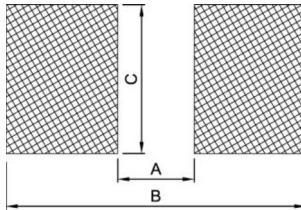


# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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## ● General Information

### ■ Recommend Land Pattern Design



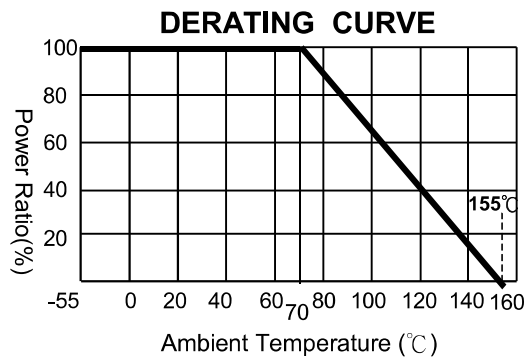
### ■ Dimension

Unit:mm

Item \ Type	0402	0603	0805	1206	1210	1812	2010	2512
A	0.60	0.80	1.30	2.20	2.00	3.11	3.80	4.90
B	1.60	2.40	2.90	4.20	4.40	5.91	6.60	8.10
C	0.70	1.00	1.40	1.70	2.70	3.00	2.70	3.40

## ■ Performance Characteristics

### ■ Power Derating Curve



Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70°C. For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with figure of derating Curve.

### ■ Voltage Rating or Current Rating

Resistance Range:  $\geq 1\Omega$

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E(RCWV) = \sqrt{P \times R}$$

E=Rated voltage(V)  
P=Power rating(W)  
R=Nominal resistance( $\Omega$ )



# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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## ● Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25 / -55°C and 25°C /+155°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	High Power : 2.5 times RCWV or Max. Overload voltage whichever is less for 2 seconds. Jumper: Over Load Current for 5 seconds 0402/0603/0805=2.5A 1206/1210/1812/2010/2512=5A	1% and below : $\pm(1.0\%+0.05\Omega)$ 2%、5% : $\pm(2.0\%+0.10\Omega)$ Jumper : Max 0.05 $\Omega$ after test
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 $\pm$ 5°C for 30 seconds.	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260 $\pm$ 5°C for 10 seconds.	1% and below : $\pm(0.5\%+0.05\Omega)$ 2%、5% : $\pm(1.0\%+0.05\Omega)$
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C,5 cycles	1% and below : $\pm(0.5\%+0.05\Omega)$ 2%、5% : $\pm(1.0\%+0.10\Omega)$
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	1% and below : $\pm(0.5\%+0.05\Omega)$ 2%、5% : $\pm(0.5\%+0.05\Omega)$ Jumper : Max 0.05 $\Omega$ after test
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40 $\pm$ 2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" .	1% and below : $\pm(1.0\%+0.05\Omega)$ 2%、5% : $\pm(2.0\%+0.05\Omega)$ Value <1 $\Omega$ : $\pm(2.0\%+0.05\Omega)$ Jumper : Max 0.1 $\Omega$ after test
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70 $\pm$ 2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF".	1% and below : $\pm(1.0\%+0.05\Omega)$ 2%、5% : $\pm(3.0\%+0.10\Omega)$ Value <1 $\Omega$ : $\pm(3.0\%+0.10\Omega)$ Jumper : Max 0.1 $\Omega$ after test
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	$\geq$ 10G $\Omega$
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D : 0402、0603、0805=5mm 1206、1210、1812=3mm 1218、2010、2512、2030=2mm	1% and below : $\pm(1.0\%+0.05\Omega)$ 2%、5% : $\pm(1.0\%+0.05\Omega)$
Sulfur Test	ASTM-B-809-95 EIA-977	60 $\pm$ 2°C, no rating power for 1000 hrs	$\Delta$ R : $\pm(1.0\%+0.05\Omega)$
		105 $\pm$ 2°C, no rating power for 1000 hrs	$\Delta$ R : $\pm(2.0\%+0.05\Omega)$

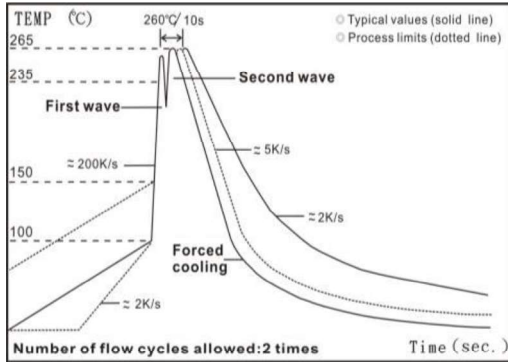


# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

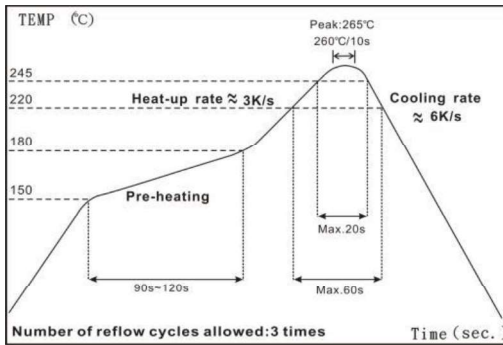
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## Recommended Customer Soldering Parameters

### Wave solder Temperature condition



### Solder reflow Temperature condition



### Rework temperature (hot air equipment) : 350°C, 3~5seconds

### Recommended reflow methods

IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements

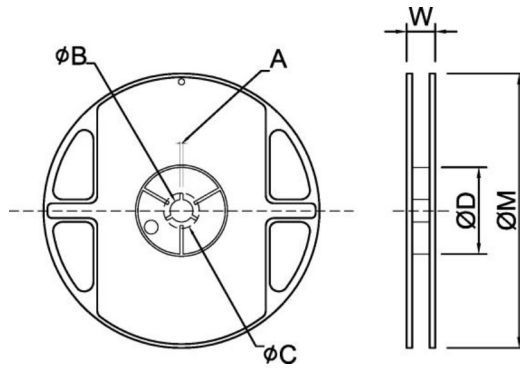


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## ■ Appendix For SMD Chip Resistor

### ● Packaging Information



### ■ Dimension

Unit: mm

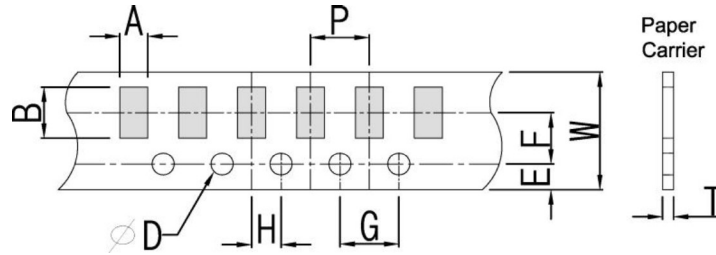
TYPE	SIZE	A	φB	φC	φD	W	φM	
0402	7"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
0402	13"	40K/50K Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
0603/0805 1206/1210	7"	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
0603/0805 /1206	10"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	254±2.0
	13"	20K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
1812 2010/2512	7"	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0



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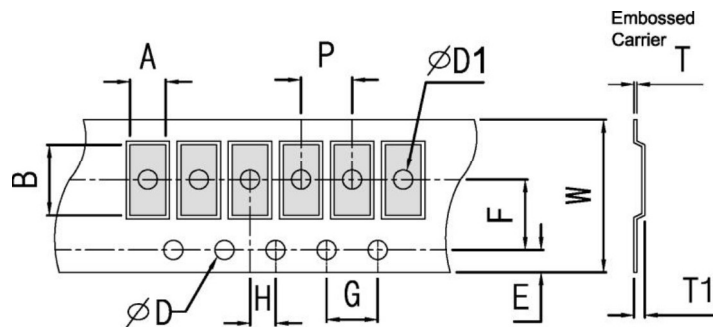
## ■ Tapping Specification



## ■ Dimension

Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	$\phi D$	P
Paper Type	0402	0.70±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.45±0.1	1.50 +0.10 -0	2.0±0.1
	0603	1.05±0.2	1.80±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.60±0.1		4.0±0.1
	0805	1.55±0.2	2.30±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		
	1206	1.90±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		
	1210	2.85±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		



## ■ Dimension

Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	$\phi D$	$\psi D1$	T1	P
Embossed Type	2010	2.80±0.20	5.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10	1.50 +0.10 -0	1.50±0.10	0.85±0.15	4.0±0.1
	2512	3.40±0.20	6.70±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10		1.50±0.10	0.85±0.15	
	1812	3.30±0.20	4.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10		1.50±0.10	0.85±0.15	



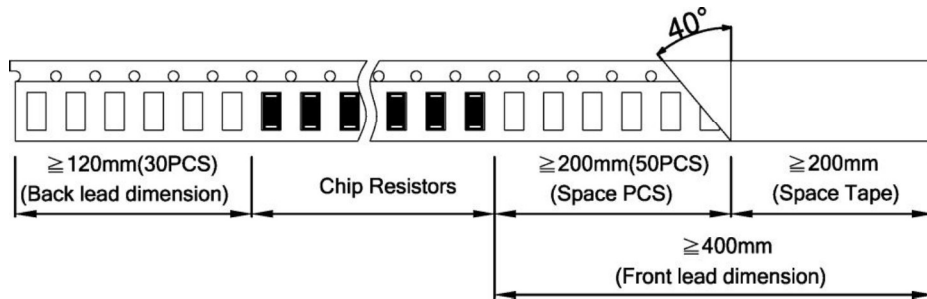


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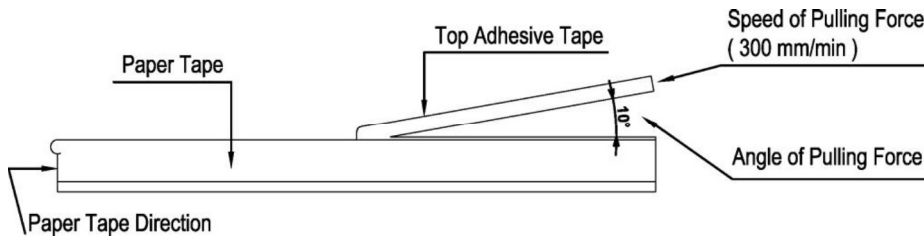
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## ■ Packing Material Data/Storage Data

### ■ Front & Back Lead Dimension

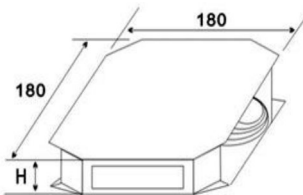


### ■ Top Adhesive Peel Off Strength : 10~70g

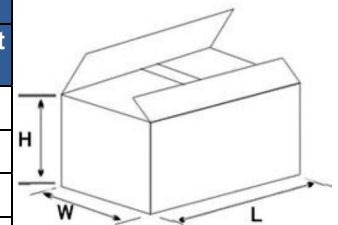


### ■ Package

Inner Box Size	
Reel	Size H(mm)
1	13
2	24
3	36
5	60
10	113



External Box Size			
Contain (Kpcs)	Length (mm)	Width (mm)	Height (mm)
25K	180	180	60
50K	180	180	110
150K	430	200	200
300K	400	400	200



### ■ Storage Data :

Storage time at the environment temp:  $25\pm 5^\circ\text{C}$  & humidity:  $60\pm 20\%$  is valid for one year from the date of delivery.





# STH Series Anti Sulfur High Power Chip Resistor Product Specifications

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## ■ Standard Resistance Values in a Decade

Marking code:

- 1%: marking code, please refer to E96 and E24 data form as below  
 Ex: 120K, The marking code is 1203 in E24  
 121K, The marking code is 1213 in E96
- 5%: marking code, please refer to E24 data form as below  
 Ex: 120K, The marking code is 124 in E24
- Note: 0402 series resistor has no marking code.
- Type: 0603 1% marking code, please refer to E-96 multiplier code.
- Note: jumper zero ohm resistor marking code is one 「0」 (except type below 0402).

E96	E48	E96	E48	E96	E48	E96	E48	E96	E48				
100	100	169	169	287	287	487	487	825	825				
102		174		294		499		845					
105	105	178	178	301	301	511	511	866	866				
107		182		309		523		887					
110	110	187	187	316	316	536	536	909	909				
113		191		324		549		931					
115	115	196	196	332	332	562	562	953	953				
118		200		340		576		976					
121	121	205	205	348	348	590	590						
124		210		357		604				E24	E12	E6	E3
127	127	215	215	365	365	619	619	10		10	10	10	
130		221		374		634		11		12			
133	133	226	226	383	383	649	649	12		13			
137		232		392		665		15		15	15		
140	140	237	237	402	402	681	681	16		18			
143		243		412		698		18		20			
147	147	249	249	422	422	715	715	22		22	22	22	
150		255		432		732		24		27			
154	154	261	261	442	442	750	750	27		30			
158		267		453		768		33		33	33		
162	162	274	274	464	464	787	787	36		39			
165		280		475		806		43		43			
								47		47	47	47	
								51		56			
								56		62			
								62		68	68		
								68		82			
								75		82			
								82		91			
								91					

According to IEC publication 63