

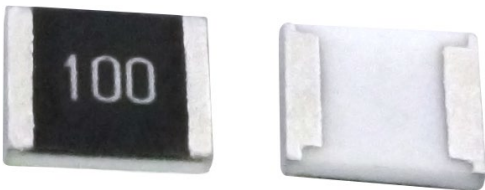
TSHQ

APPLICATION

Automotive electronics
Navigation equipment, TPMS
Heating, Ventilating and Air conditioning
Indoor lighting, Central door locking, Wiper module

FEATURES

Small size and light weight
Reliability, high quality
CCD visual quality inspection
Comply with AEC-Q200 standard
Against sulfur

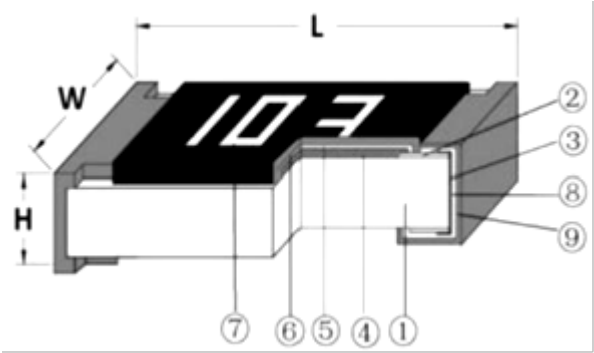


Dimension

Dimension	 (unit):mm				
(Type)	L	W	H	T1	T2
0201	0.60±0.03	0.30±0.03	0.23±0.03	0.10±0.05	0.15±0.05
0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20
1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.45±0.20
1210	3.10±0.10	2.50±0.15	0.55±0.10	0.45±0.15	0.50±0.20
2010	5.00±0.10	2.50±0.15	0.55±0.10	0.45±0.15	0.50±0.20
1812	4.50±0.20	3.10±0.20	0.55±0.10	0.55±0.20	0.70±0.20
2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20	0.90±0.20

TSHQ

Construction



NO.	construction	Major material
1	Ceramic substrate	Al ₂ O ₃
2	Conductive layer	Ag
3	Side conductive layer	NiCr
4	Resistive layer	RuO ₂ +glass
5	Inner protective layer	Glass
6	Outer Protective layer	Epoxy
7	Marking	Epoxy
8	Ni plating layer	Ni
9	Sn plating layer	Matte Tin

Derating Curve

Temperature usage range	-55°C~+125°C (0201)	-55°C~+155°C (other)
Describe	If the ambient temperature exceeds 70°C to 125°C, the power can be revised according to the curve in the following figure.	If the ambient temperature exceeds 70°C to 155°C, the power can be revised according to the curve in the following figure.
Power Attenuation curve	Percent rated load (%) Ambient temperature (°C)	Percent rated load (%) Ambient temperature (°C)

TSHQ

Resistance range

Type	Resistance Range			
	0.5%, 0.1%	1%	2%	5%
0201	-	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
0402	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
0603	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
0805	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
1206	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
1210	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
2010	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
1812	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ
2512	100Ω~1MΩ	1Ω~10MΩ	1Ω~22MΩ	1Ω~22MΩ

Electrical characteristics

Type	0201	0402	0603	0805	1206	1210	2010	2512
Dielectric Withstanding Voltage	75V	100V	100V	300V	500V	500V	500V	500V
Resistance Value of Jumper±5%	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ
Rated Current of Jumper	0.5A	1A	1A	2A	2A	2A	2A	2A
Max Current of Jumper	1A	2A	2A	5A	10A	10A	10A	10A

Standard Electrical Specifications

Type	(Power Rating at 70°C)	Max. RCWV	Max. Overload Voltage	T.C.R. (PPM°C)	Resistance Range
0201	1/20W	25V	50V	-100~+300	1Ω~10Ω
					10MΩ~22MΩ
				±200	10Ω~10MΩ
0402	1/16W	50V	100V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ
0603	1/10W	75V	150V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ
0805	1/8W	150V	300V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ

TSHQ

Standard Electrical Specifications

Type	(Power Rating at 70°C)	Max. RCWV	Max. Overload Voltage	T.C.R. (PPM/°C)	Resistance Range
1206	1/4W	200V	400V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ
1210	1/2W	200V	500V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ
2010	3/4W	200V	500V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ
2512	1W	200V	500V	±200	1Ω~10Ω
					10MΩ~22MΩ
				±100	10Ω~10MΩ

Performance Specifications

Item	Test Methods	Test Conditions	Specification
Short-time overload	JIS C 5201 4.13	Applied 2.5 times of rated voltage for 5 seconds. Measure the variation of resistance.	± (1.00% +0.05Ω)
Temperature Coefficient	JIS C 5201 4.8	$TCR = \frac{(R - R_0)}{(t - t_0)} \times 10^6 \text{ (ppm)}$ R ₀ : Resistance at room temperature R : Resistance at 125°C or -55°C t ₀ : Room temperature t : Test temperature 125°C or -55°C	0201 Type: 1Ω ≤ R ≤ 10Ω: -100~+300PPM/°C 10Ω < R ≤ 10MΩ: ±200 PPM/°C 0402~2512 Type: 1Ω ≤ R ≤ 10Ω: ±200 PPM/°C 10Ω < R ≤ 10MΩ: ±100 PPM/°C 10MΩ < R ≤ 22MΩ: ±200PPM/°C
Solderability	JIS C 5201 4.17	Dip the terminal in a flux and then dip into a soldering bath at 245±5°C for 3±0.5sec.	> 95% coverage

TSHQ

Performance Specifications

Item	Test Methods	Test Conditions	Specification
Resist to soldering heat	MIL-STD-202 METHOD 210	Dip the terminal in a flux and then dip into a soldering bath at $260\pm 5^{\circ}\text{C}$ for $10\pm 0.5\text{sec}$. Measure the variation of resistance.	$\pm (1.00\% + 0.05\Omega)$
Insulation resistance	JIS C 5201 4.6	Applied the dielectric withstanding voltage on the center of body for $60\pm 5\text{seconds}$. Then measure insulation resistance.	$>10\text{G}\Omega$
Dielectric withstanding voltage	JIS C 5201 4.7	Applied the dielectric withstanding voltage on the center of body for $60\pm 5\text{ seconds}$.	No evidence of flashover, mechanical damage arcing or insulation breakdown
Terminal bending	AEC-Q200-005	Specimen shall be mounted on test board, then bend the board and maintained for $20\pm 1\text{s}$. the distance of bending is $5+0.2/0\text{ mm}$ for resistors which size no larger than 1206 or $2+0.2/0\text{ mm}$ which size larger than 1206. Measure the variation of resistance.	$\pm (1.00\% + 0.05\Omega)$
Temperature Cycling	JESD22 METHOD JA-104	1000 Cycles (-55°C to $+155^{\circ}\text{C}$) Measurement at $24\pm 4\text{ hours}$ after test conclusion. 30min maximum dwell time at each temperature extreme. 1min. maximum transition time.	$\pm (2.00\% + 0.05\Omega)$
Humidity	MIL-STD-202 METHOD 103	1000 hours $85^{\circ}\text{C}/85\%\text{RH}$. Note: Specified conditions: 10% of operating power. Measurement at $24\pm 4\text{ hours}$ after test conclusion.	$\pm (2.00\% + 0.05\Omega)$
Load life	MIL-STD-202 METHOD 108	Put the specimen in a chamber at $125\pm 2^{\circ}\text{C}$ temperature, ON TIME:1.5H, OFF TIME:0.5H, and applied rated voltage for 1000^{+24}_{-0}H . Measure the variation of resistance.	$\pm (2.00\% + 0.05\Omega)$

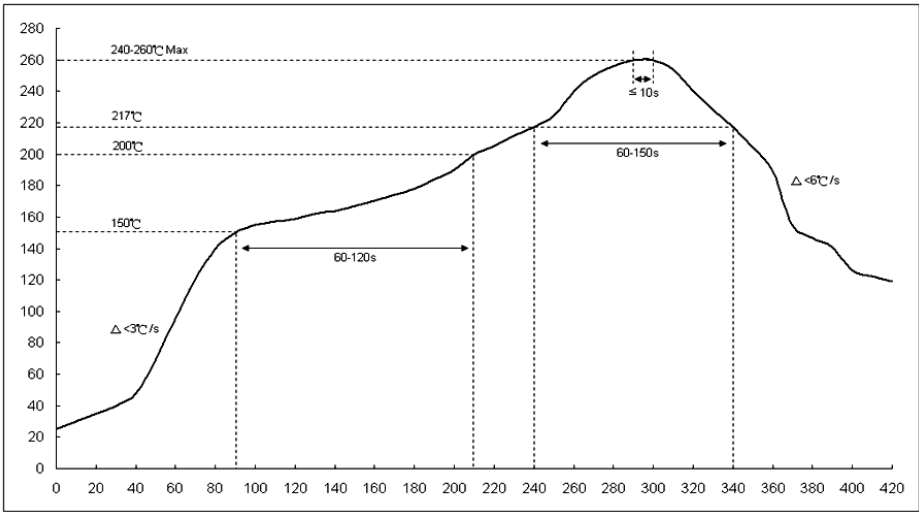
TSHQ

Performance Specifications

Item	Test Methods	Test Conditions	Specification
Moisture resistance	MIL-STD-202 METHOD 106	25°C~65°C,90~100%RH, 2.5H; 65°C 90~100%RH, 3H; 65°C~25°C 80~100%RH, 2.5H, 10 cycles, Measurement at 24±4 hours after test conclusion.	± (2.00% +0.05Ω)
High Temperature Exposure (Storage)	MIL-STD-202 METHOD 108	1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion	± (1.00%+0.05Ω)
ESD test	AEC-Q200-002	0201/0402: 0.5KV, 0603: 1.0KV, Other:2KV, 2times/1s	± (3.0%+0.05Ω)
Sulfuration test	ASTM-B-809-95	Method 1: steam sulfur powder test (with saturated potassium nitrate) at 60°C with humidity and heat (750hrs) Method 2: cutting oil: sulfur powder =96.5:3.5, temperature 60°C, 100 hrs; Pretreatment: before and after three reflow soldering +100 thermal shock	± (1.0% +0.05Ω)

Soldering

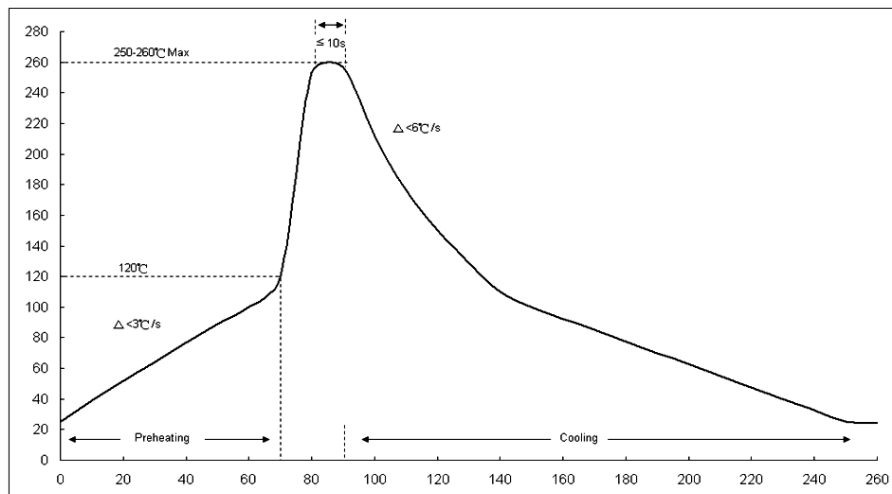
Recommend reflow soldering profile



TSHQ

Soldering

Recommend wave soldering profile



Hand soldering temperature

The iron temperature is $350 \pm 10^{\circ}\text{C}$, hand soldering time less than 3S. Avoid solder iron tip direct touch the components body.

Note: Specifications are subject to change without notice. For more detail and update, please visit our website.