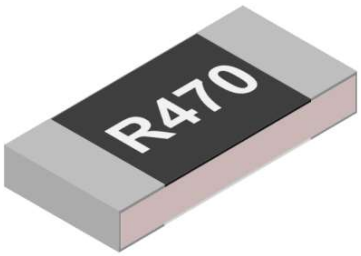
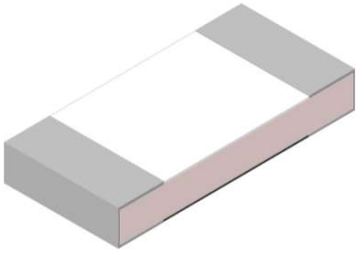
Metal Film Anti-Surge Low-Resistance Chip Resistor — TGL Series



Top view



Bottom view

Application

- Consumer electronics
- Computer & relative products
- Communication devices
- Measuring instrument
- Industrial / Power supply
- Battery management system

Features

- Low Resistance / TCR / Inductance(≦5nH)
- Excellent long-term stability
- High precision current sensing
- High rated power capability and excellent Anti-Surge
- Halogen free and lead free
- RoHs compliant

Parts Number Explanation

Example:

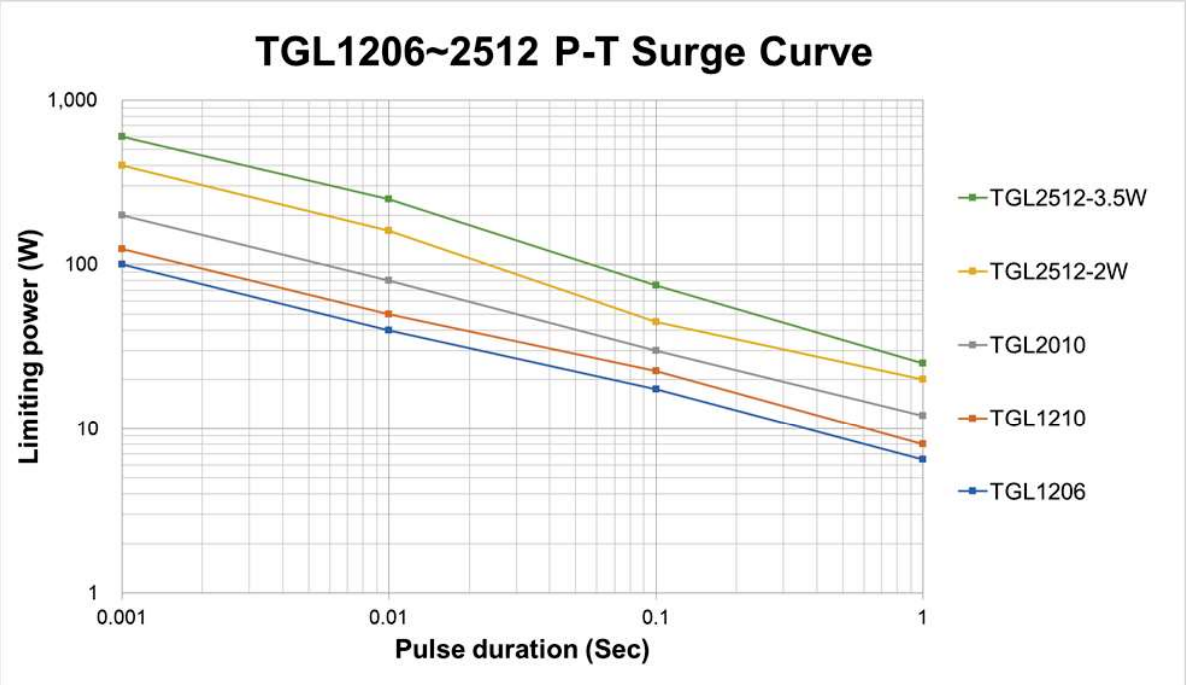
TGL	1206	10	F	R470	P	05	Z
Product Type	**Size (Inch)**	**Rated Power**	**Tolerance**	**Resistance**	**Package**	**Quantity (PCS)**	**Optional**
Metal Film Anti-Surge Low-Resistance Chip Resistors	1206 1210 2010 2512	10 : 1.0W 15 : 1.5W 20 : 2.0W 35 : 3.5W	D : ±0.5% F : ±1% G : ±2% J : ±5%	EX. R050 = 0.05Ω R470 = 0.47Ω 4R70 = 4.7Ω 33R0 = 33Ω	P : Paper Taping E : Embossed Taping	04 : 4000 05 : 5000	Z : Normal U : Ultra Power

Standard Electrical Specifications

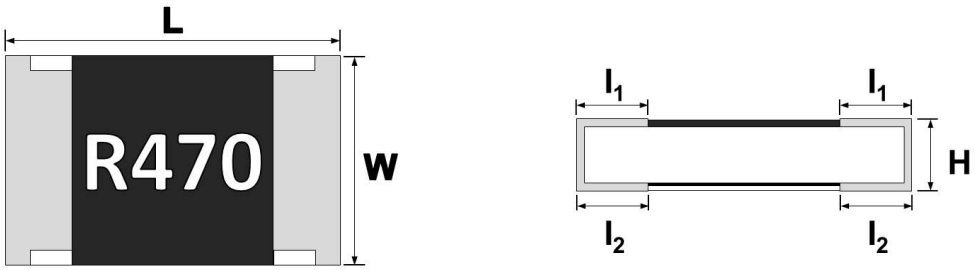
Type	Rated Power at 70℃	Max. Rated Current	Max. Overload Current	T.C.R. (ppm/℃)	Resistance Range D(0.5%), F(1.0%), G(2.0%), J(5.0%)
TGL1206	1W	4.47A	10.00A	±100	50 mΩ ≦ R < 100 mΩ
TGL1210	1W	4.47A	10.00A	±50	100 mΩ ≦ R ≦ 33 Ω
TGL2010	1.5W	5.48A	12.25A	±50	50 mΩ ≦ R ≦ 50 Ω
TGL2512	2W	6.32A	14.14A		
	3.5W(U)	8.37A	18.71A		

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range ：−55℃～＋170℃.

Anti-Surge Ability:



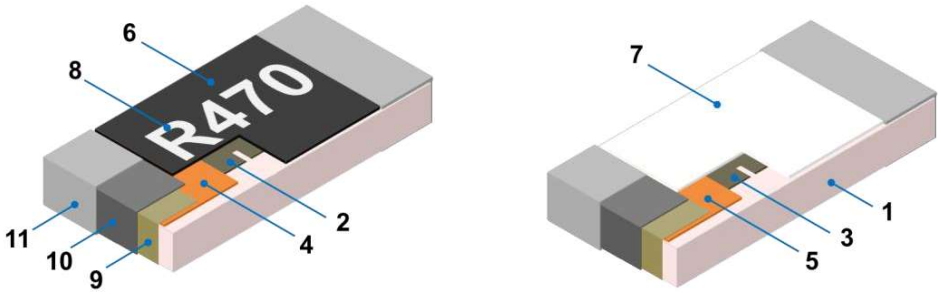
Type Dimension



Unit：mm

TYPE	L	W	H	I_1	I_2
TGL1206	3.10±0.10	1.60±0.10	0.55±0.10	0.40±0.20	0.45±0.20
TGL1210	3.10±0.10	2.50±0.15	0.55±0.10	0.50±0.20	0.50±0.20
TGL2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.60±0.25
TGL2512	6.30±0.20	3.20±0.20	0.55±0.10	0.65±0.25	0.65±0.25
TGL2512(U)	6.30±0.20	3.20±0.20	0.70±0.15	0.65±0.25	0.65±0.25

Construction

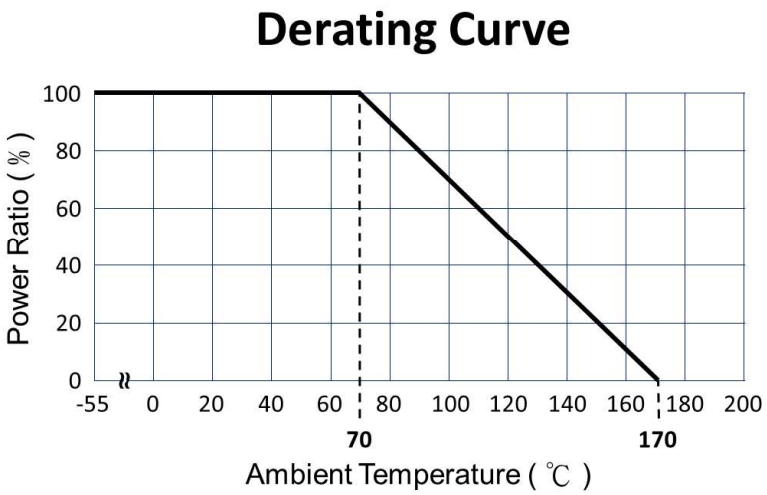


1	Alumina Substrate	7	Bottom Protective Overcoat
2	Top Resistive Layer	8	Marking
3	Bottom Resistive Layer	9	Side Inner Electrode
4	Top Inner Electrode (Cu)	10	Barrier Layer (Ni)
5	Bottom Inner Electrode (Cu)	11	Solder coating (Sn)
6	Top Protective Overcoat		

Performance Characteristics

Power Derating Curve

The Operating Temperature Range: -55°C ~+170°C.
Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70℃.
For operation at ambient temperature in excess of 70℃, the load should be derated in accordance with figure of derating Curve.



Rated Current

Resistance Range: < 1Ω
Rated Current: The resistor shall have a DC continuous working current or a AC (rms) continuous working current at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$I = \sqrt{P/R}$$

I = Rated current (A)
P = Rated power (W)
R = Nominal resistance (Ω)

Rated Voltage

Resistance Range: ≧ 1Ω
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:

$$V = \sqrt{P \times R}$$

V = Rated voltage (V)
P = Rated power (W)
R = Nominal resistance (Ω)

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℃ / +125℃, 25℃ is the reference temperature	Refer to Standard Electrical Specifications
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	5 times rated power whichever is less for 5 seconds.	±(1.0%+0.001Ω)
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Applied 100VDC for 1 minute.	≧10GΩ
Dielectric Withstanding Voltage	JIS-C5201-1 4.7	Applied 500VAC for 1 minute.	No short or burned on the appearance.
Core Body Strength	JIS-C5201-1 4.15	Central part pressurizing force：10N , 10 seconds	No broken
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5℃ for 3 seconds.	>95% Coverage No Visual damage
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5℃ for 10 seconds.	±(1.0%+0.001Ω) No Visual damage
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5℃ for 30 seconds.	>95% Coverage No Visual damage
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55℃ to +155℃, 300 cycles	±(1.0%+0.001Ω) No Visual damage
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2℃, 90~95% R.H. RCWV or Max. working current whichever is less for 1000 hrs with 1.5 hrs 〝ON〞 and 0.5 hr 〝OFF〞	±(1.0%+0.001Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±(1.0%+0.05Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2℃, Rated power, or Max. working current whichever is less for 1000 hrs with 1.5 hrs 〝ON〞 and 0.5 hr 〝OFF〞 .	±(1.0%+0.001Ω)
High Temperature Exposure	JIS-C-5201-1 4.23.2 IEC 60068-2-2	At +170±5℃ for 1000 +48/-0 hours.	±(1.0%+0.001Ω)
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 60 secs. Then the resistor is left in the room for 48 hrs.	±(1.0%+0.001Ω) No Visual damage
Terminal Strength (SMD)	JIS-C5201-1 4.32 AEC Q200-006	Pressurizing force for 60 seconds 1206 and above：17.7N	No broken
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D： 1206、1210 = 3mm 2010、2512 = 2mm	±(1.0%+0.001Ω) No Visual damage

- Temperature Coefficient of Resistance test to - 55 ℃ is available on request
- We can also provide AEC-Q200 test reports if required by customers.

Marking

TGL1206 ~ TGL2512 : 4 digit marking

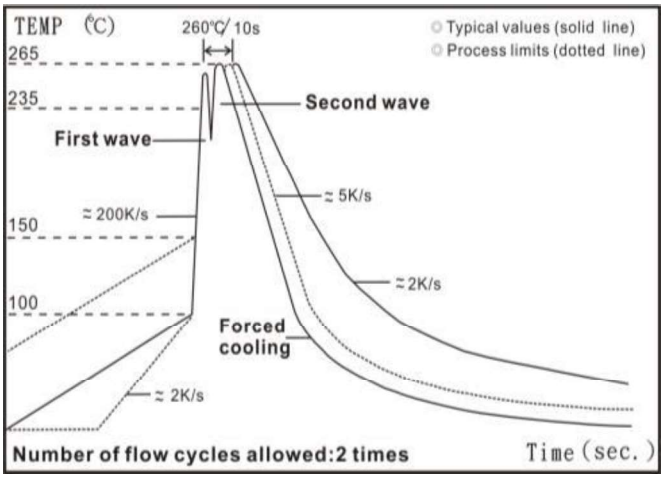
First 3 digits are the significant figures, the 4th digit is the multiplier. "R"= decimal point.

Examples:

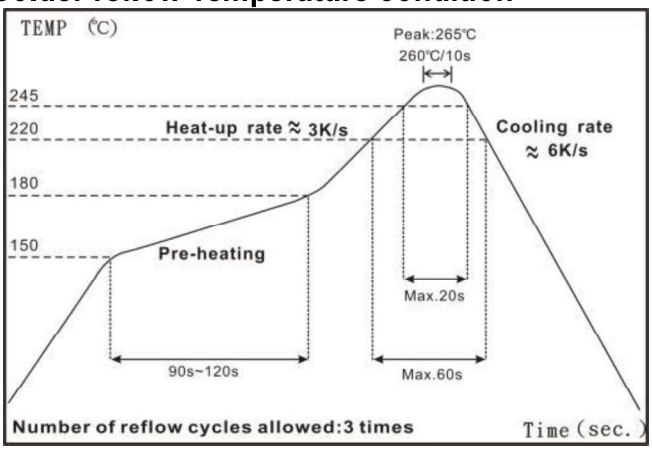
Resistance value	Code	Example
50 mΩ ~ 99 mΩ	**R0XX**	R050 = 0.05 Ω
100 mΩ ~ 999 mΩ	**RXXX**	R470 = 0.47 Ω
1 Ω ~ 9.9 Ω	**XRXX**	4R70 = 4.7 Ω
10 Ω ~ 50 Ω	**XXRX**	50R0 = 50 Ω

Recommended Customer Soldering Parameters

Wave solder Temperature condition



Solder reflow Temperature condition



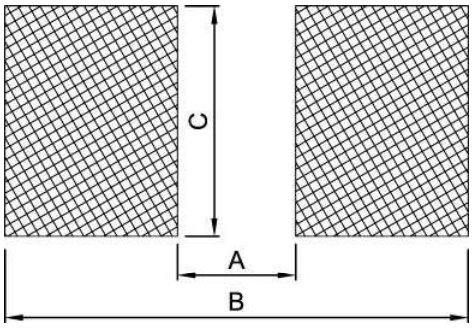
■ **Rework temperature（hot air equipment）: 350℃, 3~5seconds**

■ **Recommended reflow methods**

IR, vapor phase oven, hot air oven

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

■ Recommend Land Pattern Design



Unit: mm

TYPE	A	B	C
TGL1206	2.20	4.20	1.80
TGL1210	2.00	4.40	2.70
TGL2010	3.80	6.60	2.70
TGL2512	4.90	8.10	3.40

■ Plating Thickness

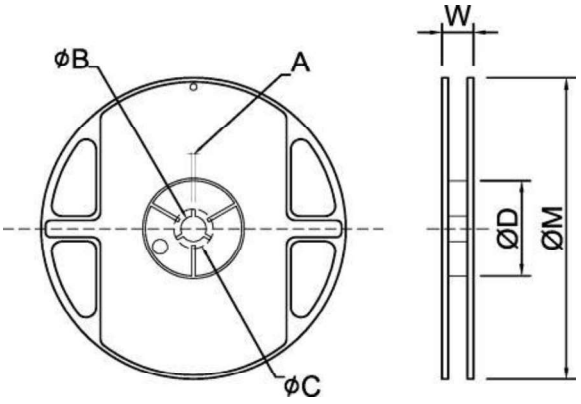
Ni: ≧ 3μm

Sn(Tin): ≧ 3μm

Appendix For SMD Chip Resistor

Packaging Information

Reel Dimensions

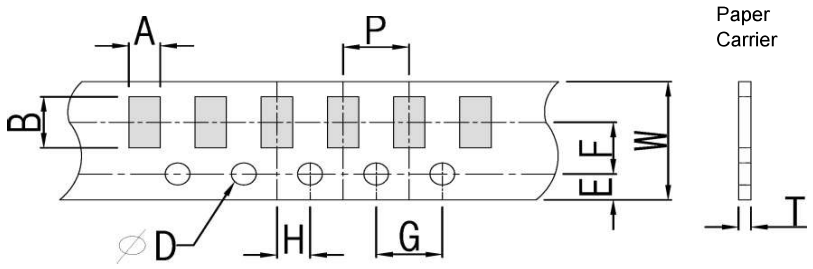


Unit: mm

TYPE	SIZE		A	ΦB	ΦC	ΦD	W	ΦM
TGL1206	7”	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
TGL1210	7”	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0
TGL2010	7”	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0
TGL2512	7”	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0

Packaging Information

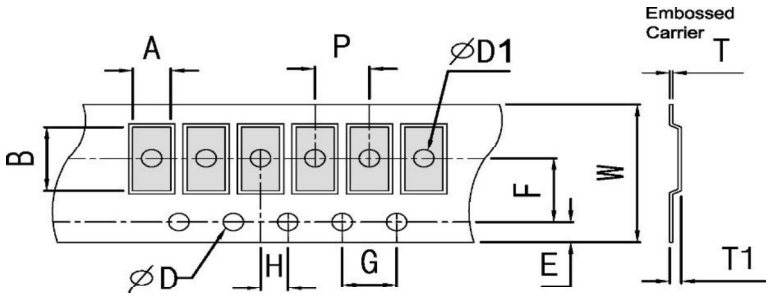
Tapping Specifications



Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	ΦD	P
Paper Type	1206	1.90±0.2	3.05±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	$1.50^{+0.1}_{-0}$	4.0±0.1
	1210	2.85±0.2	3.05±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		4.0±0.1

Embossed Dimensions

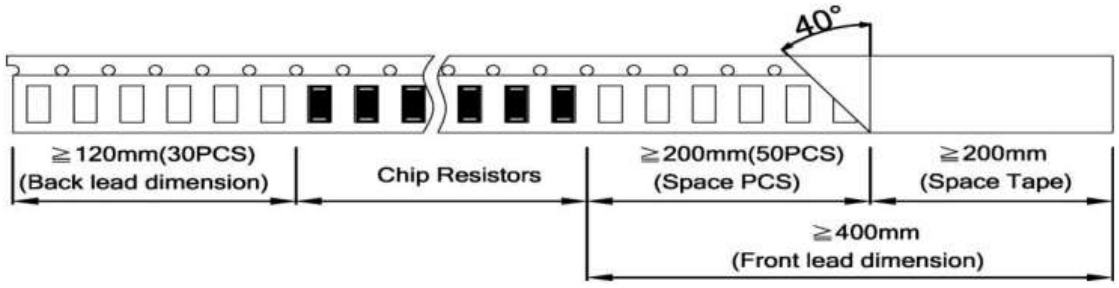


Unit: mm

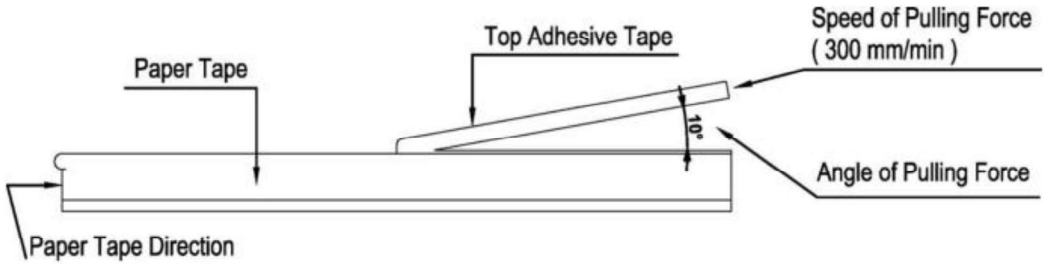
Packaging	Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
Embossed Type	2010	2.80±0.2	5.60±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1	$1.50^{+0.1}_{-0}$	1.50±0.1	0.85±0.15	4.0±0.1
	2512	3.40±0.2	6.70±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.50±0.1	0.85±0.15	4.0±0.1

Packing Material Data / Storage Data

Front & Back Lead Dimensions

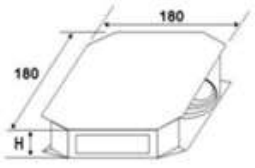


Top Adhesive Peel Off Strength：10~70g

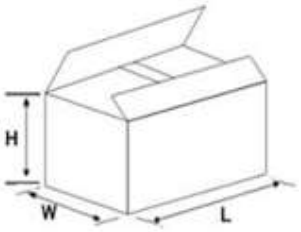


Package

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)	Width (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±5℃& humidity: 60±20% is valid for one year from the date of delivery.

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