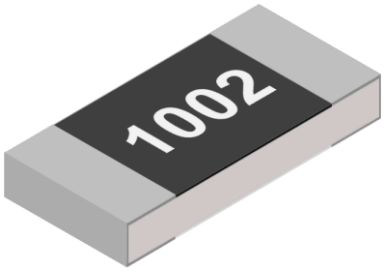
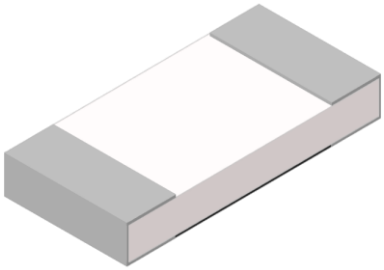
■ Thin Film Chip Resistor Product Specifications — TR Series



Top view



Bottom view

■ Applications

— Consumer electronics
— Computer
— Telecom
— Measuring instrument
— Printing equipment
— Converter

■ Features

— Tolerance to ±0.1 %
— Low TCR to ±10 ppm/℃
— Halogen free and lead free
— RoHS compliant

■ Parts Number Explanation

■ Example:

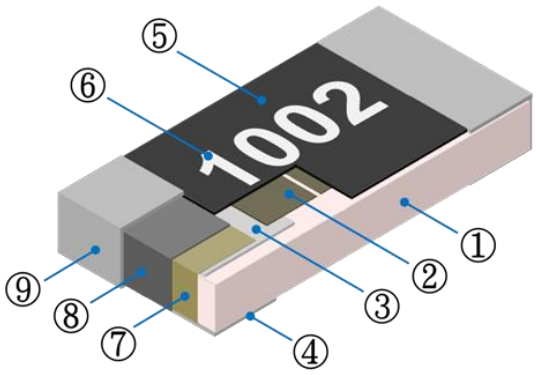
TR	1206	B	10K0	P	05	25	Z
Product Type	**Size (Inch)**	**Tolerance**	**Resistance**	**Package**	**Quantity (PCS)**	**TCR (ppm/℃)**	**Optional**
TR Series Thin Film Chip Resistor	0402 0603 0805 1206 1210 2010 2512	B：±0.1% C：±0.25% D：±0.5% F：±1%	4 digits EX. 1R00 = 1 Ω 10R0 = 10 Ω 100R = 100 Ω 2K20 = 2.2 KΩ 332K = 332 KΩ 1M00 = 1 MΩ	P、Q：Paper Taping E：Embossed Taping B：Bulk	04：4000 05：5000 10：10000 20：20000 40：40000 50：50000	10：±10 15：±15 25：±25 50：±50	Z：default code

■ Standard Electrical Specifications

項目 Item / 型別 Type	額定功率 Rated Power at 70℃	最大工作電壓 Max Working Voltage	最大過負載電壓 Max Overload Voltage	溫度係數 T.C.R. (PPM/℃)	阻值範圍 Resistance Range			
					B (±0.1%)	C (±0.25%)	D (±0.5%)	F (±1%)
TR0402	0.063W	25V	50V	±10	10Ω ~ 10KΩ (10.1KΩ~68KΩ developing)			
				±15				
				±25	4.7Ω ~ 10KΩ (10.1KΩ~220KΩ developing)		1Ω ~ 10KΩ (10.1KΩ~220KΩ developing)	
				±50				
TR0603	0.1W	75V	150V	±10	10Ω ~ 100KΩ (101KΩ~332KΩ developing)			
				±15				
				±25	4.7Ω ~ 100KΩ (101KΩ~680KΩ developing)		1Ω ~ 100KΩ (101KΩ~680KΩ developing)	
				±50				
TR0805	0.125W	150V	300V	±10	10Ω ~ 100KΩ (101KΩ~680KΩ developing)			
				±15				
				±25	4.7Ω ~ 100KΩ (101KΩ~1MΩ developing)		1Ω ~ 100KΩ (101KΩ~1MΩ developing)	
				±50				
TR1206	0.25W	200V	400V	±10	10Ω ~ 100KΩ (101KΩ~1MΩ developing)			
				±15				
				±25	4.7Ω ~ 100KΩ (101KΩ~1.5MΩ developing)		1Ω ~ 100KΩ (101KΩ~1.5MΩ developing)	
				±50				
TR1210	0.25W			±10	10Ω ~ 100KΩ			
				±15				
				±25	4.7Ω ~ 100KΩ		1Ω ~ 100KΩ	
				±50				
TR2010	0.5W			±10	10Ω ~ 100KΩ			
				±15				
				±25	4.7Ω ~ 100KΩ		1Ω ~ 100KΩ	
				±50				
TR2512	0.75W			±10	10Ω ~ 100KΩ			
				±15				
				±25	4.7Ω ~ 100KΩ		1Ω ~ 100KΩ	
				±50				

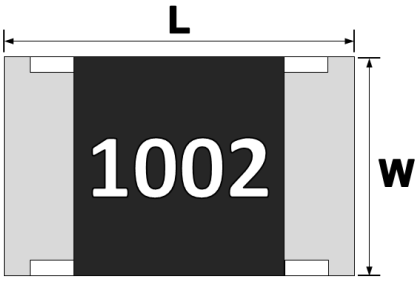
- For non-standard parts, please contact our sales dept.
- Operating Temperature Range ：−55℃～＋155℃.

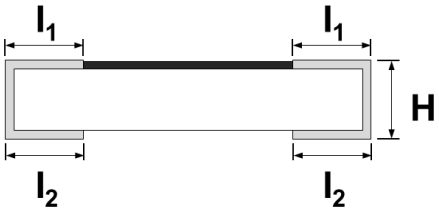
■ Construction



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

■ Dimensions





Unit : mm

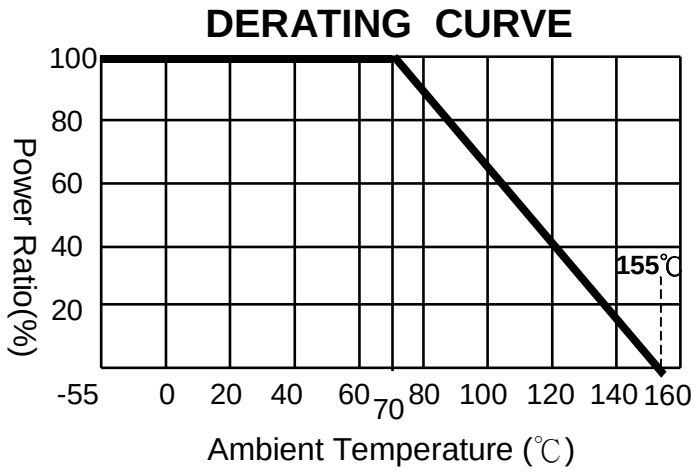
TYPE	L	W	H	l_1	l_2
TR0402	1.00 ± 0.10	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
TR0603	1.60 ± 0.20	0.80 ± 0.15	0.40 ± 0.10	0.20 ± 0.15	0.30 ± 0.10
TR0805	2.00 ± 0.20	1.25 ± 0.15	0.50 ± 0.15	0.20 ± 0.15	0.40 ± 0.15
TR1206	3.05 ± 0.10	1.60 ± 0.20	0.55 ± 0.15	0.30 ± 0.20	0.50 ± 0.20
TR1210	3.05 ± 0.10	2.50 ± 0.20	0.55 ± 0.15	0.30 ± 0.20	0.50 ± 0.20
TR2010	5.00 ± 0.20	2.50 ± 0.20	0.55 ± 0.10	0.30 ± 0.15	0.60 ± 0.20
TR2512	6.30 ± 0.20	3.20 ± 0.20	0.55 ± 0.10	0.40 ± 0.20	0.60 ± 0.20

■ Performance Characteristics

■ Power Derating Curve

The Operating Temperature Range: -55°C ~+155°C.

Power 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 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:

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

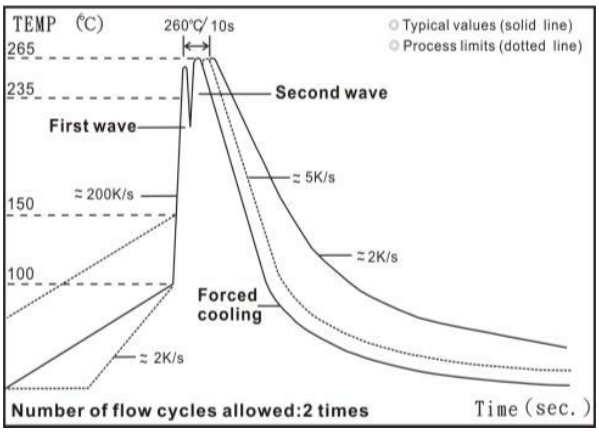
V = Rated voltage (V)
P = Rated power (W)
R = Nominal resistance (Ω)

■ Reliability Tests and Requirements

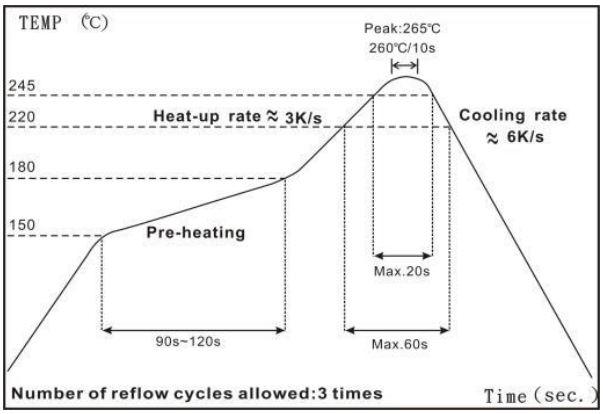
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	At +25℃/-55℃ and +25℃/+125℃.	Refer to Standard Electrical Specifications
Short Time Overload	JIS C 5201-1 clause 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	±(0.5%+0.05Ω) No Visual damage
Insulation Resistance	JIS C 5201-1 clause 4.6	100V for 1 minute.	≧10GΩ
Solderability	JIS C 5201-1 clause 4.17	245±5°C for 3±0.5secs.	>95% Coverage No Visual damage
Resistance to Soldering Heat	JIS-C5201-1 clause 4.18	260±5℃ for 10 seconds.	±(0.5%+0.05Ω) No Visual damage
Leaching	JIS-C5201-1 clause 4.18	260±5℃ for 30 seconds.	>95% Coverage No Visual damage
Temperature Cycling	JIS C 5201-1 clause 4.19	-55℃ to +155℃, 300 cycles	±(0.5%+0.05Ω) No Visual damage
High Temperature Exposure	JIS-C5201-1 4.25	155±5℃ for 1000 +48/-0 hours.	±(0.5%+0.05Ω)
Resistance to Solvent	JIS C 5201-1 clause 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.	±(0.5%+0.05Ω) No Visual damage
Load Life in Humidity	JIS C 5201-1 clause 4.24	40±2℃, 90~95% R.H. , Rated power or Max. working current whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	±(0.5%+0.05Ω)
Load Life (Endurance)	JIS C 5201-1 clause 4.25	70±2℃, Rated power, or Max. working current whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	±(0.5%+0.05Ω)
Terminal Bending Strength	JIS C 5201-1 clause 4.33	Bending once for 5 seconds D： 0402、0603、0805=5mm 1206、1210 =3mm 2010、2512 = 2mm	±(0.5%+0.05Ω) No Visual damage

Recommended Customer Soldering Parameters

Wave solder Temperature condition



Solder reflow Temperature condition



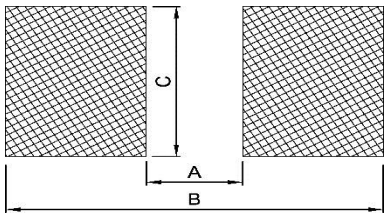
Rework temperature（hot air equipment）：350℃, 3~5seconds

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 (For Reflow Soldering)



Unit: mm

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

Marking