

APPROVAL SHEET

Product Name : Tripe High Power Chip Resistor

Part No. : TWR Series (High / Triple Power)

Description : Size 0402~2512

Tripe High Power Chip Resistor - TWR Series

Applications

- Consumer electrical
- Home Appliance
- Computer & relative products
- Power equipment
- Measuring instrument



Features

- Small size and light weight
- High quality, reliability

Part Number Explanation

TWR	0603	J	10R0	T	U
Product	Size (Inch)	Tolerance	Resistance	Packaging	Functional
Tripe High Power Chip Resistor	0402 0603 0805 1206 1210 2010 2512	D : $\pm 0.5\%$ F : $\pm 1.0\%$ G : $\pm 2.0\%$ J : $\pm 5.0\%$	0R00=0 Ω 1R00=1 Ω 1001=1K Ω 1004=1M Ω	T=Tape & Reel	S=Standard U=Ultra High (Triple) Power M=Meet AEC-Q200

Standard Electrical Specifications

Type	Power Rating at 70°C	Max. RCWV	Max Overload Voltage	Temperature Coefficient (TCR; ppm/°C)	Resistance Range	
					F (±1%)	J (±5%)
TWR0402	0.1W	50V	100V	±200	$1\Omega \leq R \leq 9.76\Omega$	$1\Omega \leq R \leq 9.76\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 1M\Omega$
TWR0603	0.125W	50V	100V	±200	$1\Omega \leq R \leq 9.76\Omega$	$1\Omega \leq R \leq 1M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	-
TWR0805	0.25W	150V	300V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±150	$1\Omega \leq R \leq 9.76\Omega$	-
				±100	$10\Omega \leq R \leq 1M\Omega$	-
TWR1206	0.5W	200V	400V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR1210	0.5W	200V	400V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR2010	1W	200V	400V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR2512	2W	300V	600V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-

- Functional code: S
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely

Standard Type	0603	0805	1206	1210	2010	2512
Jumper Resistance Value	20mΩ					
Jumper Rated Current	2A	4A			6A	

Triple Power Electrical Specifications

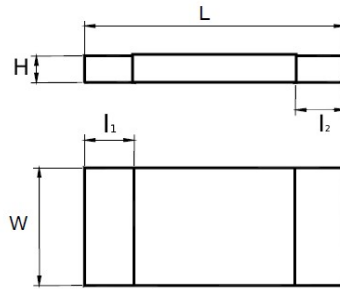
Type	Power Rating at 70°C	Max RCWV	Max Overload Voltage	Temperature Coefficient (TCR; ppm/°C)	Resistance Range	
					F (±1%)	J (±5%)
TWR0402	0.125W	50V	100V	±200	$1\Omega \leq R \leq 9.76\Omega$	$1\Omega \leq R \leq 9.76\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 1M\Omega$
TWR0603	0.33 W	75V	125V	±200	$1\Omega \leq R \leq 9.76\Omega$	$1\Omega \leq R \leq 1M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	-
TWR0805	0.5 W	200V	300V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±150	$1\Omega \leq R \leq 9.76\Omega$	-
				±100	$10\Omega \leq R \leq 1M\Omega$	-
TWR1206	0.75 W	250V	500V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR1210	0.75 W	250V	500V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR2010	1.5 W	250V	500V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-
TWR2512	3 W	250V	500V	±200	-	$1\Omega \leq R \leq 1M\Omega$
				±100	$1\Omega \leq R \leq 1M\Omega$	-

- Functional code: U
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely

Power Type	0603	0805	1206	2010	2512
Jumper Resistance Value	10mΩ				
Jumper Rated Current	6A	7A	9A	12A	14A
Jumper Overload Current	12A	14A	18A	24A	28A

■ Dimension

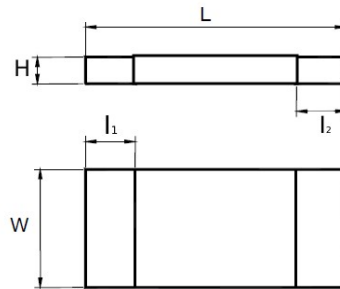
■ Standard Type



Unit: mm

TYPE	L	W	l_1	l_2	H
TWR0402	1.00 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.35 ± 0.05
TWR0603	1.60 ± 0.10	0.80 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	0.45 ± 0.10
TWR0805	2.00 ± 0.10	1.25 ± 0.10	0.40 ± 0.20	0.40 ± 0.20	0.50 ± 0.10
TWR1206	3.10 ± 0.10	1.60 ± 0.10	0.50 ± 0.25	0.50 ± 0.25	0.55 ± 0.10
TWR1210	3.10 ± 0.10	2.60 ± 0.10	0.50 ± 0.25	0.50 ± 0.25	0.55 ± 0.10
TWR2010	5.00 ± 0.20	2.50 ± 0.20	0.65 ± 0.25	0.60 ± 0.25	0.60 ± 0.10
TWR2512	6.40 ± 0.20	3.10 ± 0.20	0.60 ± 0.25	1.80 ± 0.25	0.60 ± 0.15

■ Triple Power Type

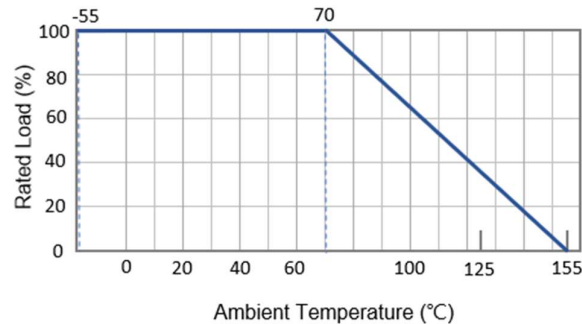


Unit: mm

TYPE	L	W	l_1	l_2	H
TWR0402	1.00 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.35 ± 0.05
TWR0603	1.60 ± 0.10	0.80 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	0.45 ± 0.10
TWR0805	2.00 ± 0.10	1.25 ± 0.10	0.40 ± 0.20	0.40 ± 0.20	0.50 ± 0.10
TWR1206	3.10 ± 0.10	1.60 ± 0.10	0.50 ± 0.25	0.50 ± 0.25	0.55 ± 0.10
TWR1210	3.10 ± 0.10	2.60 ± 0.10	0.50 ± 0.25	0.50 ± 0.25	0.55 ± 0.10
TWR2010	5.00 ± 0.20	2.50 ± 0.20	0.65 ± 0.25	0.60 ± 0.25	0.60 ± 0.10
TWR2512	6.40 ± 0.20	3.20 ± 0.25	0.45 ± 0.25	1.80 ± 0.25	1.10 ± 0.20

Derating Curve

Operating Temperature Range: -55 to +155°C



Voltage Rating or Current Rating

The direct or alternating voltage for the rated power can be calculated from the following formula but must not exceed the maximum voltage.

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

V = Rated Voltage(V)
 P = Rated Power(W)
 R = Rated Resistance(Ω)

Recommended Customer Soldering Parameters

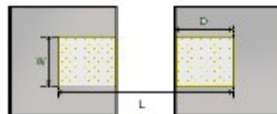
Recommended IR Reflow Soldering Conditions

Preliminary heating: 150°C~180°C, 120s max
 Soldering: 220°C, 60s max
 Peak temperature: 245°C, 15s max

Recommended WAVE Soldering Conditions

Reservoir Temperature: 260°C, 10s max
 Number of times: two times max

Recommend Land Pattern Design



Unit: mm

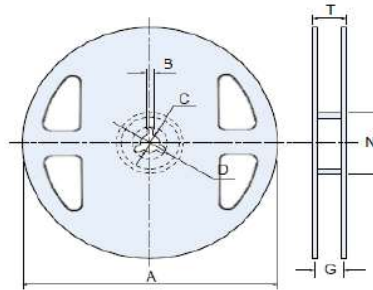
Type	Standard			Triple Power		
	W	D	L	W	D	L
0402	0.60	0.45	1.40	0.60	0.45	1.40
0603	0.90	1.00	3.00	0.90	1.00	3.00
0805	1.30	1.15	3.50	1.30	1.15	3.50
1206	1.80	1.30	4.70	1.80	1.30	4.70
1210	3.00	1.30	4.70	3.00	1.30	4.70
2010	3.00	1.50	6.80	3.00	1.50	6.80
2512	3.70	2.45	7.60	3.70	2.45	7.60

■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
High Temperature Exposure (Storage)	AEC-Q200 7.3	1000 hrs. @ T=125°C. Unpowered. Measurement at 24 ±2 hours after test conclusion.	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$
Temperature Cycling	AEC-Q200 7.4	1000 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion.	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage
Moisture Resistance	AEC-Q200 7.6	Test 65°C/80~100%RH/10Cycles. Measurement at 24±2 hours after test conclusion. (t=24hrs/cycle).	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$
Biased Humidity	AEC-Q200 7.7	1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 ±2 hours after test conclusion.	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$
Operational Life	AEC-Q200 7.8	Test 1000hr @ T=125°C at specified rated power. Measurement at 24±2 hours after test conclusion.	J : $\Delta R \leq \pm(3\%+0.1\Omega)$ F : $\Delta R \leq \pm(1\%+0.05\Omega)$
External Visual	AEC-Q200 7.9	Inspect device construction, marking and workmanship.	No visual damage and refer Ridee marking code.
Physical Dimension	AEC-Q200 7.10	Verify physical dimensions to the applicable device detail specification.	Within the spec.
Mechanical Shock	AEC-Q200 7.13	Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec.	Within product specification tolerance and no visible damage.
Vibration	AEC-Q200 7.14	5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz.	No mechanical damage.
Resistance to Soldering Heat	AEC-Q200 7.15	270°C±5°C for 10sec.±1sec.	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage.
Thermal Shock	AEC-Q200 7.16	-55 to 155°C/ dwell time 15min/ Max transfer time 20sec/ 300cycles.	J : $\Delta R \leq \pm(1\%+0.1\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.05\Omega)$ No mechanical damage
ESD	AEC-Q200-002	Test contact min. 1KV.	$\Delta R \leq \pm(1\%+0.1\Omega)$ No mechanical damage.
Solderability	AEC-Q200 7.18	a) Baking 155°C4H, dipping 235°C5s b) Steam 1H, dipping 215°C5s c) Steam 1H, dipping 260°C7s	Over 95% of termination must be covered with solder.
Flammability	AEC-Q200 7.20	UL-94 V-0 or V-1 are acceptable	Refer UL-94.

Bending Strength	AEC-Q200 7.21	Bending 2mm 2512.2010.1210.1206, 3mm 0805.0603 0402	J : $\Delta R \leq \pm(1\% + 0.1\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage
Terminal Strength	AEC-Q200 7.22	Force 1Kg for 60 seconds	No mechanical damage
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	5 × Rated power for 5 seconds	J : $\Delta R \leq \pm(2\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$
Damp Heat	JIS-C-5201-1 4.24 IEC-60115-1 4.24	Maintain the temperature of the resistor at 40±2°C and 90~95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1~4 hour, measure the resistance value.	J : $\Delta R \leq \pm(3\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	Temperature: (T1. +25°C) ~ (T2. +155°C) TCR(ppm/°C) = $(R2 - R1)/R1 \times 1/(T2 - T1) \times 10^6$	As Spec
Load Life	JIS-C-5201-1 4.25 IEC-60115-1 4.25.	Permanent resistance change after 1000+48/-0 hours (1.5 hours ON , 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70±2°C ambient"	J : $\Delta R \leq \pm(3\% + 0.1\Omega)$ F : $\Delta R \leq \pm(1\% + 0.05\Omega)$
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply the maximum overload voltage (DC) for 1minute	$\Delta R \geq 10G\Omega$

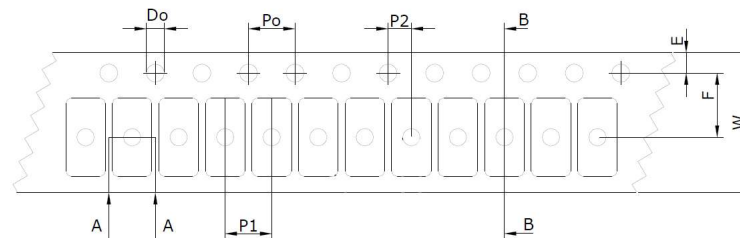
■ Packaging Information



Unit : mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0402	10K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max
0603 0805 1206 1210	5K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max
2010/2512	4K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.

■ Tapping Specification



Unit : mm

Size	A	B	W	E	F	P1	P2	Do	Po
0402	0.70±0.10	1.20±0.10	8.00±0.30	1.75±0.10	3.50±0.05	2.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
0603	1.10±0.20	1.90±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
0805	1.65±0.20	2.40±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
1206	2.00±0.20	3.60±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
1210	3.00±0.20	3.60±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
2010	2.80±0.20	5.50±0.20	12.00±0.30	1.75±0.10	5.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
2512	3.50±0.20	6.70±0.20	12.00±0.30	1.75±0.10	5.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10

■ Marking

E24 $\pm 5\%$: 3 digits marking

0603/0805/1206/1210/2010/2512

Resistance	470 Ω
3 digits code	471

E24/E96 $\pm 1\%$: 4 digits marking

0805/1206/1210/2010/2512

Resistance	1.1K Ω
4 digits code	1101

E24 $\pm 1\%$: 3 digits marking

0603

Resistance	470 Ω
3 digits code	471

E96 $\pm 1\%$: 3 digits marking

0603

Resistance	1K Ω
3 digits code	01B

No marking code for 0402 size