APPROVAL SHEET

Product Name : General Thick Film Chip Resistor

Part No. : TC Series

Description : Size 0201~2512

General Thick Film Chip Resistor—TC Series

Applications

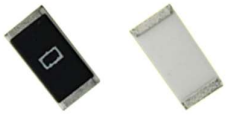
—Consumer electrical

—Home Appliance

—Computer & relative products

—Power equioment

—Measuring instrument



Features

—Small size and light weight

—High quality reliability

—Reduction of assembly costs and matching with placement machines.

Part Number Explanation

TC	0603	J	10R0	T	S	-
Product	Size (Inch)	Tolerance	Resistance	Packaging	Functional	TCR
General Thick Film Chip Resistor	0201 0402 0603 0805 1206 1210 2010 2512	B : ± 0.1% C : ± 0.25% D : ± 0.5% F : ± 1.0% G : ± 2.0% J : ± 5.0%	1R00=1Ω 10R0=10Ω1001= 1KΩ1004=1MΩ	T=Tape & Reel	S=Standard	Null : TCR as rating table P：50ppm N：100ppm

Standard Electrical Specifications

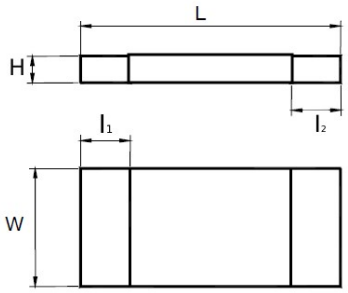
Type	Power Rating at 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/℃)	Resistance Range
TC 0201	0.05W	25V	50V	±1%(F)	±200	10Ω≦R≦10MΩ
					-200 ~ +600	1Ω≦R≦9.76Ω
				±5%(J)	±200	10Ω≦R≦10MΩ
					-200 ~ +600	0Ω, 1Ω≦R≦9.76Ω
TC 0402	0.063W	50V	100V	±0.1%(B)	±100	10Ω≦R≦1MΩ
				±0.5%(D)	±100	10Ω≦R≦1MΩ
				±1%(F)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	1Ω≦R≦10Ω
				±5%(J)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	0Ω, 1Ω≦R≦10Ω
TC 0603	0.1W	75V	100V	±0.1%(B)	±50	20Ω≦R≦510KΩ
				±0.25%(C)		
				±0.5%(D)		
TC 0805	0.125W	150V	300V	±1%(F)		
				±1%(F)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	1Ω≦R≦10Ω
				±5%(J)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	0Ω, 1Ω≦R≦10Ω
TC 1206	0.25W	200V	400V	±0.25%(C)	±50	20Ω≦R≦510KΩ
				±0.5%(D)		
				±1%(F)		
				±1%(F)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	1Ω≦R≦10Ω
				±5%(J)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	0Ω, 1Ω≦R≦10Ω
TC 1210	0.33W	200V	400V	±1%(F)	±100	10.2Ω≦R≦10MΩ
TC 2010	0.75W	200V	400V		±200	1Ω≦R≦10Ω
TC 2512	1W	250V	500V	±5%(J)	±100	10.2Ω≦R≦10MΩ
					-200 ~ +400	0Ω, 1Ω≦R≦10Ω

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

Size	0201	0402	0603	0805	1206	1210	2010	2512
Jumper Resistance Value	50mΩ(max)							
Jumper Rated Current	1A			2A		2.5A	3.8A	4.5A

- ±1% Jumper or 0Ω is available, all size Rmax < 30mΩ.
- Beyond the above specification also can meet the special requirements. For detailed questions, please contact us freely.
- TCR parameter is not applicable to jumper

Dimension



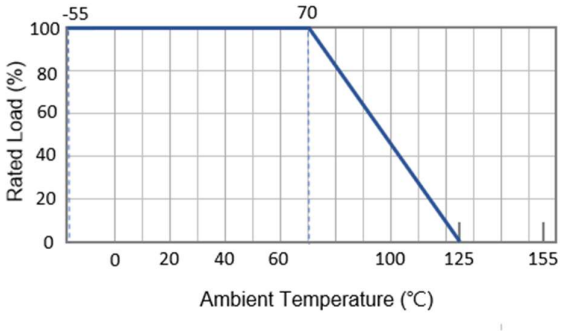
Unit:mm

Type	L	W	l_1	l_2	H
TC0201	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03
TC0402	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
TC0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
TC0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
TC1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
TC1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
TC2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
TC2512	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

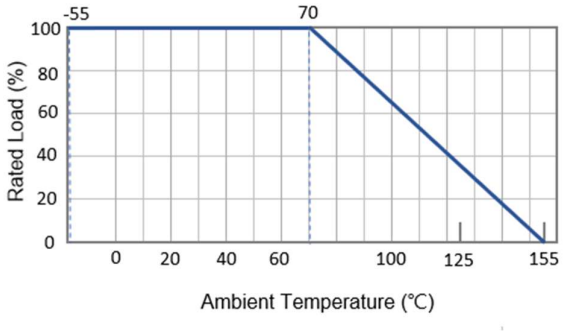
Derating Curve

Operating Temperature Range: -55℃ to +155℃

For 0201



For 0402,0603,0805,1206,1210,2010,2512



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.

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

E=Rated voltage(V)
P=Power rating(W)
R=Nominal resistance(Ω)

Recommended Customer Soldering Parameters

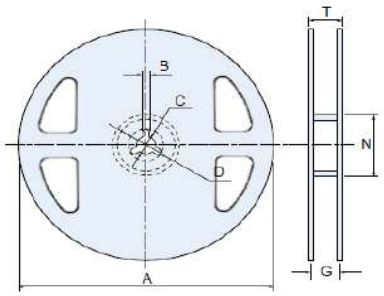
- **Recommended IR Reflow Soldering Conditions**
  Preliminary heating: 150℃~180℃, 120s max
  Soldering: 220℃, 60s max
  Peak temperature: 245℃, 15s max

- **Recommended WAVE Soldering Conditions**
  Reservoir Temperature: 260℃, 10s max
  Number of times: two times max

Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	IEC-60115-1 4.8	At 25 / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds. measure resistance after 30 minutes	J、G: △R ≦ ± (2% + 0.1Ω) F、D: △R ≦ ± (1% + 0.05Ω) C、B: △R ≦ ± (0.5% + 0.05Ω)
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5℃ for 30 seconds.	Individual leaching area ≦5% Total leaching area ≦ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5℃ for 10 seconds.	J、G: △R ≦ ± (1% + 0.1Ω) F、D、C、B: △R ≦ ± (0.5% + 0.05Ω)
Temperature Cycling	JIS-C-5201-1 4.19 IEC-60115-1 4.19	Repeat 5 cycles as follows-55℃(30 min.) + 25℃(2 ~ 3 min.) +155℃(30 min.) + 25℃(2 ~ 3 min.)	J、G: △R ≦ ± (1% + 0.1Ω) F、D、C、B: △R ≦ ± (0.5% + 0.05Ω)
Damp Heat	JIS-C-5201-1 4.24 IEC-60115-1 4.24	Maintain the temperature of the resistor at 40±2℃ 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、G: △R ≦ ± (3% + 0.1Ω) F、D: △R ≦ ± (1% + 0.05Ω) C、B: △R ≦ ± (0.5% + 0.05Ω)
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℃ ambient"	J、G: △R ≦ ± (3% + 0.1Ω) F、D: △R ≦ ± (1% + 0.05Ω) C、B: △R ≦ ± (0.5% + 0.05Ω)
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Test voltage: 100±15V	≥10GΩ
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Resistance change after bended on the 90mm PCB. Bend: 3mm for 01005、0201、0402、0603、0805、1206、1210; 2mm for 2010、2512	J、G: △R ≦ ± (1% + 0.1Ω) F、D、C、B: △R ≦ ± (0.5% + 0.05Ω)
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	After immersing flux, dip in the 245±2℃ molten solder bath for 3±0.5 sec	Over 95% of termination must be covered with Solder

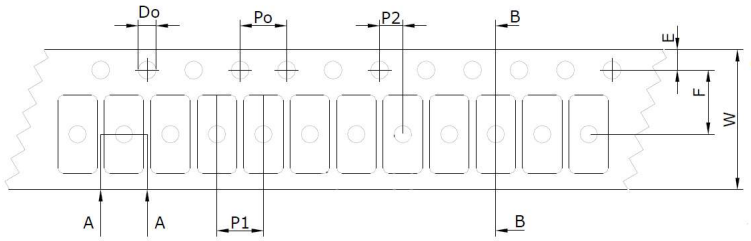
Packaging Information



Unit:mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0201	15Kpcs/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	9.0±0.5	14.9 max
0402	10Kpcs/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	5kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
2010 2512	4kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	16.7max.

Tapping Specification



Unit:mm

Size	A	B	W	F	E	P1	P2	Po	Do
0201	0.37±0.05	0.67±0.05	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50+0.10/-0
0402	0.70±0.10	1.20±0.10	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1210	3.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2010	2.80±0.20	5.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2512	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

Marking

E24 ±5%:

3 digits marking for 0603/0805/1206/1210

Resistance	47KΩ
3 digits code	473

4 digits marking for 2010/2512

Resistance	47KΩ
4 digits code	4702

E96, E24 ±1%: 4 digits marking

Resistance	15K4Ω
4 digits code	1542

E96 ±1%: 3 digits marking for 0603

Resistance	10K2Ω
4 digits code	02C

No marking code for 0402 / 0201 size