

APPROVAL SHEET

Product Name : Non-Magnetic Chip Resistor

Part No. : TFR

Description : Size 0603~1206

For more contact information, please refer to our website: www.rideetech.com



Non-Magnetic Chip Resistor — TFR Series

■ Applications

- Automotive industry
- Medical equipment



■ Features

- Non-Magnetic Chip Resistor using Thick Film non-magnetic termination
- Suitable for Flow , Reflow and lead free Soldering
- Meet RoHS and Halogen Free

■ Part Number Explanation

TFR	0603	F	1002	T	S
Product	Size (Inch)	Tolerance	Resistance	Packaging	Functional
Non-Mag netic Chip Resistor	0603 0805 1206	F : $\pm 1.0\%$ J : $\pm 5.0\%$	1R00=1 Ω 10R0=10 Ω 100R=100 Ω 1001=1K Ω 1004=1M Ω	T= Tape & Reel	S= Standard

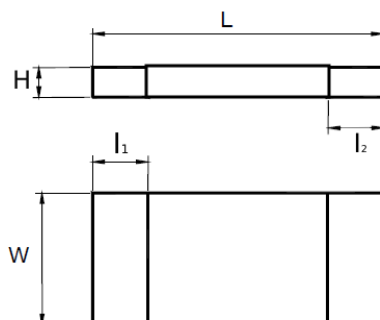
■ Standard Electrical Specifications

Item Type	Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range		Standard Resistance Values
					F(±1%)	J(±5%)	
TFR 0603	0.1 W	50V	100V	±100	$1\Omega \leq R < 10M\Omega$	-	E-96
				±200	-	$0\Omega, 1\Omega \leq R < 10M\Omega$	E-24
TFR 0805	0.125 W	150V	300V	±100	$1\Omega \leq R < 10M\Omega$	-	E-96
				±200	-	$0\Omega, 1\Omega \leq R < 10M\Omega$	E-24
TFR 1206	0.25 W	200V	400V	±100	$1\Omega \leq R < 10M\Omega$	-	E-96
				±200	-	$0\Omega, 1\Omega \leq R < 10M\Omega$	E-24

- Functional code: S
- $1\Omega \sim 10\Omega$: Temperature Coefficient of Resistance for 0603,0805,1206 = -300 ~ +500
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.

Standard Type	0603	0805	1206
Jumper Resistance Value	50mΩ Max		
Jumper Rated Current	1A	2A	

■ Dimension



Unit : mm

Size	L	W	H	l1	l2
0603	1.60 ± 0.1 0	0.80 ± 0.1 0	0.45 ± 0.1 0	0.30 ± 0.2 0	0.30 ± 0.2 0
0805	2.00 ± 0.1 0	1.25 ± 0.1 0	0.50 ± 0.1 0	0.40 ± 0.2 0	0.40 ± 0.2 0
1206	3.10 ± 0.1 0	1.60 ± 0.1 0	0.55 ± 0.1 0	0.50 ± 0.2 0	0.50 ± 0.2 5

■ 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

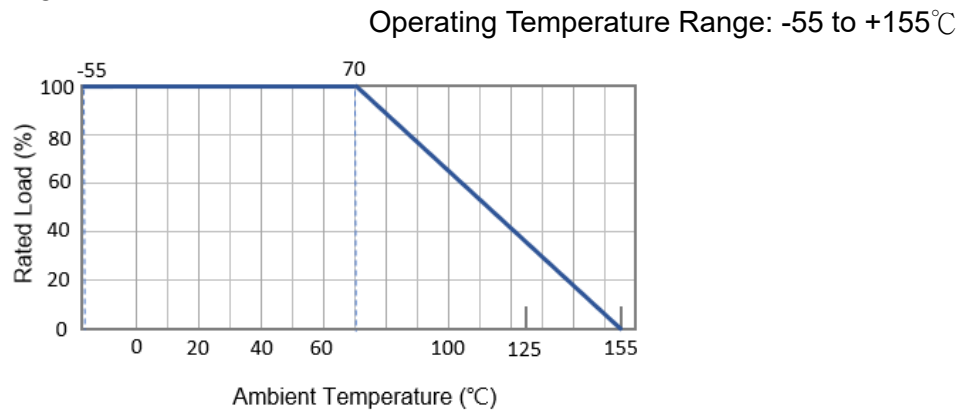
■ Recommended WAVE Soldering Conditions

Reservoir Temperature: 260°C, 10s max

Number of times: two times max

■ Performance Characteristics

■ Power Derating Curve



■ Voltage Rating or Current Rating

Resistance Range: $\geq 1\Omega$

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:

$E = \text{Rated voltage (V)}$

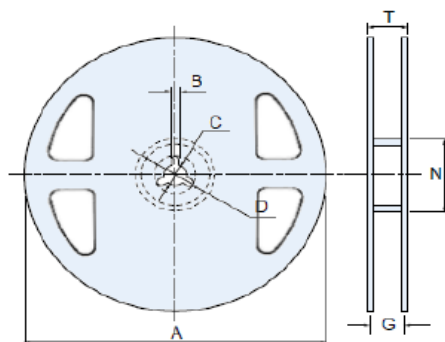
$$E(RCWW) = \sqrt{P \times R}$$

P=Power
rating(W)
R=Nominal
resistance(Ω)

■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	IEC-60115-1 4.8 JIS C 5201-1 4.8	At 25 / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature	As Spec
Short Time Overload	IEC 60115-1 4.13 JIS C 5201-1 4.13	2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes	J: $\Delta R \leq \pm (2\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$
Resistance to Soldering Heat	IEC 60115-1 4.18 JIS C 5201-1 4.18	Solder dipping 260±5℃ for 10 sec. ±1sec.	J: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage
Rapid Change of Temperature	IEC 60115-1 4.19 JIS C 5201-1 4.19	Repeat 5 cycles as follows -55℃ (30 min.) + 25℃ (2~3 min.) +155℃ (30 min.) + 25℃ (2~3 min.)	J: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage
Damp Heat	IEC 60115-1 4.24 JIS C 5201-1 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: $\Delta R \leq \pm (3\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$
Load Life	IEC 60115-1 4.25 JIS C 5201-1 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: $\Delta R \leq \pm (3\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$
Insulation Resistance	IEC 60115-1 4.6 JIS C 5201-1 4.6	Test voltage : 100±15V	Between termination and coating must over 1000MΩ
Bending Strength	IEC 60115-1 4.33 JIS C 5201-1 4.33	Resistance change after bended on the 90mm PCB. Bend: 3mm for 0603,0805, 2mm for 1206	J: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage
Solderability	IEC 60115-1 4.17 JIS C 5201-1 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 (Sn+Ag+Cu)

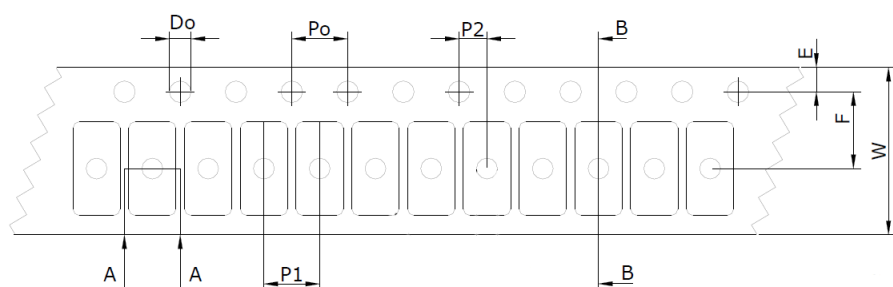
■ Packaging Information



Unit:mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0603 0805 1206	5Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.

■ Tapping Specification



Unit:mm

Size	A	B	W	F	E	P1	P2	P0	D
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

■ Marking

0805/1206 $\pm 1\%$: 4 digits marking

0603 $\pm 1\%$: 3 digits marking

■ E24 $\pm 5\%$: 3 digits marking

Resistance	47K Ω	1.5 Ω
3 digits code	473	1R5

■ E96 4 digits marking – 0805, 1206

Resistance	15K4 Ω	22.1 Ω
4 digits code	1542	22R1

■ E96 3 digits marking – 0603

Resistance	10K2 Ω
3 digits code	02C