FEATURE

- High accuracy up to ±0.05%
- Narrow TCR to ±5 PPM/℃
- Total Lead-free without RoHS exemptions (7C-1)
- RoHS and Halogen-free compliance
- High stability and reliability
- Superior anti-sulfur performance
- Compatible with reflow and wave soldering type
- Applications:
  - Communication devices, Smart wears
  - Computer, notebook, workstation, tablet, and peripherals
  - Medical devices
  - Industrial control system
  - etc.

MANUFACTURER PART NO.

For example: TF0805F62RT5E25 - TF0805 ±1% 62Ω T/R-5000 1/8W 25PPM/℃

Series	Size	Tol.	Nominal Resistance Value	PKG	SPQ	Power	TCR
2 codes	4 codes	1 code	2~5 codes	1 code	1 code	1 code	2 codes
TF	0805	F	62R	T	5	E	25
Thin Film High Accuracy Chip Resistors	0402 0603 0805 1206 1210 2010 2512	A=0.05% B=0.1% C=0.25% D=0.5% F=1%	1R①=1Ω 4R7=4.7Ω 4K7②=4.7KΩ 100K=100KΩ 2M7③=2.7MΩ	T=T/R④	4=4K 5=5K A=10K	C=1/16W D=1/10W E=1/8W J=1/5W K=1/4W L=1/3W N=1/2W P=3/4W	05=5PPM/℃ 10=10PPM/℃ 25=25PPM/℃ 50=50PPM/℃ 00=Refer to table as below.

Note: ① R=Radix, 10^0, Ω ② K=Kilo, 10^3, KΩ ③ M=Mega, 10^6, MΩ
④ T/R=Taping in Reel package type ⑤ P.C.=Personal and Customized.

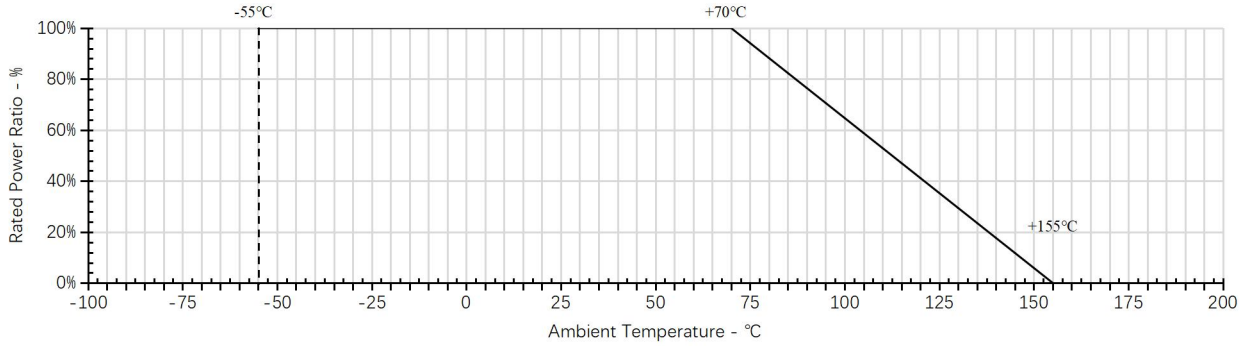
CHARACTERISTICS

Type	Rated Power	MWV①	MOV②	TCR (PPM/℃)	Resistance Range		
					±0.05%	±0.1%, ±0.25%	±0.5%,±1%
TF0402	1/16W	50V	100V	±5	100Ω-2KΩ	100Ω-2KΩ	100Ω-2KΩ
				±10	10Ω-12KΩ	10Ω-12KΩ	10Ω-12KΩ
				±25, ±50	10Ω-330KΩ	10Ω-330KΩ	10Ω-330KΩ
TF0603	1/10W	75V	150V	±5	100Ω-4KΩ	100Ω-4KΩ	100Ω-4KΩ
				±10	10Ω-50KΩ	10Ω-50KΩ	10Ω-50KΩ
				±25, ±50	10Ω-1MΩ	1Ω-1MΩ	1Ω-1MΩ
TF0805	1/8W	150V	300V	±5	100Ω-15KΩ	100Ω-15KΩ	100Ω-15KΩ
				±10	10Ω-100KΩ	10Ω-100KΩ	10Ω-100KΩ
				±25, ±50	4.7Ω-511KΩ	1Ω-2MΩ	1Ω-2MΩ
TF1206	1/4W	200V	400V	±5	100Ω-15KΩ	100Ω-15KΩ	100Ω-15KΩ
				±10	10Ω-200KΩ	10Ω-200KΩ	10Ω-200KΩ
				±25, ±50	4.7Ω-1MΩ	1Ω-3MΩ	1Ω-3MΩ
TF1210	1/3W	200V	500V	±5	100Ω-15KΩ	100Ω-15KΩ	100Ω-15KΩ
				±10	10Ω-200KΩ	10Ω-200KΩ	10Ω-200KΩ
				±25, ±50	4.7Ω-1MΩ	1Ω-3MΩ	1Ω-3MΩ
TF2010	1/2W	200V	500V	±5	100Ω-25KΩ	100Ω-25KΩ	100Ω-25KΩ
				±10	10Ω-200KΩ	10Ω-200KΩ	10Ω-200KΩ
				±25, ±50	4.7Ω-3MΩ	1Ω-3MΩ	1Ω-3MΩ
TF2512	3/4W	200V	500V	±5	100Ω-25KΩ	100Ω-25KΩ	100Ω-25KΩ
				±10	10Ω-200KΩ	10Ω-200KΩ	10Ω-200KΩ
				±25, ±50	4.7Ω-3MΩ	1Ω-3MΩ	1Ω-3MΩ

Note: ① MWV=Max. Working Voltage; ② MOV=Max. Overload Voltage.

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POWER DERATING CURVE



Note: Working Temperature within -55℃ ~ +155℃.

RATED VOLTAGE

Resistors should have a Rated Voltage DC or AC corresponding to Rated Power which can be calculated by formula as below.

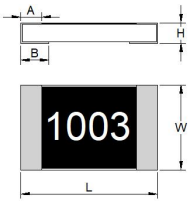
The Rated Voltage of certain resistance value should be the calculated result or Max. Working Voltage of product series whichever lower.

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

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

DIMENSIONS

Unit: mm

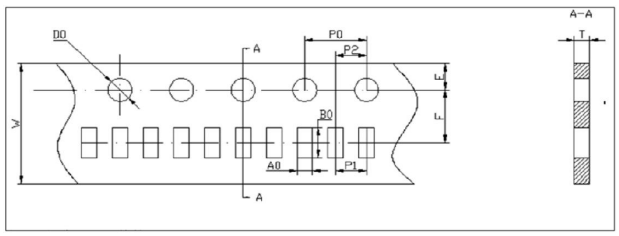
Figure	Type	L	W	H	A	B
	TF0402	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
	TF0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
	TF0805	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.20
	TF1206	3.10±0.15	1.55±0.15	0.55±0.10	0.40±0.20	0.45±0.20
	TF1210	3.10±0.10	2.60±0.20	0.55±0.10	0.40±0.20	0.45±0.20
	TF2010	5.00±0.10	2.50±0.20	0.55±0.10	0.50±0.25	0.50±0.20
	TF2512	6.35±0.10	3.20±0.20	0.55±0.10	0.50±0.25	0.50±0.20

PACKING

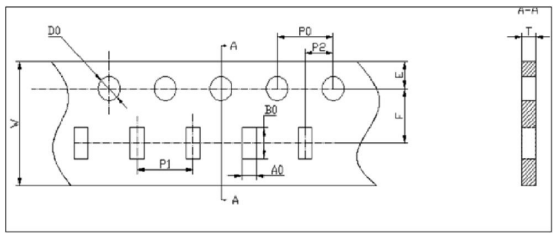
- Taping

Unit: mm

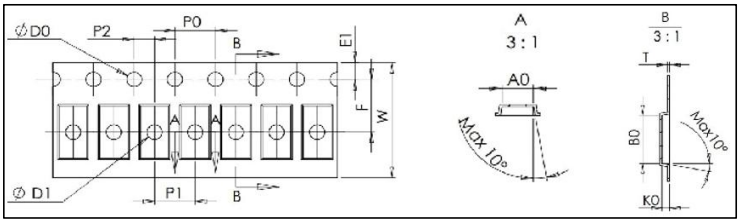
Carrier Taping A



Carrier Taping B



Embossed Taping



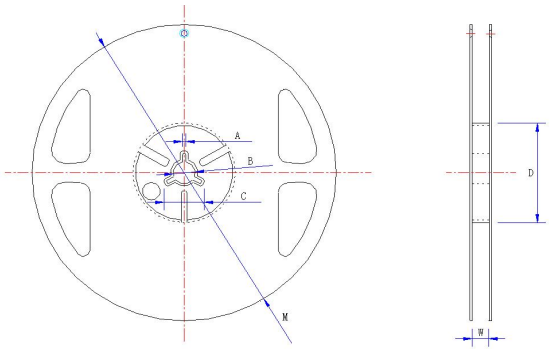
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- Taping Dimensions

Type or Size		A_O	B_O	W	F	E	P_1	P_2	P_O	D_O	T	$10P_O$
Carrier Taping A	0402	0.67±0.03	1.17±0.03	8.00±0.10	3.50±0.05	1.75±0.075	2.00±0.05	2.00±0.05	4.00±0.10	1.55±0.05	0.43±0.03	40±0.20
	0603	1.05±0.05	1.85±0.05	8.00±0.10	3.50±0.05	1.75±0.075	2.00±0.10	2.00±0.05	4.00±0.10	1.55±0.05	$0.60^{+0.030}_{-0.045}$	40±0.20
Carrier Taping B	0603	1.05±0.05	1.85±0.05	8.00±0.10	3.50±0.05	1.75±0.075	4.00±0.10	2.00±0.05	4.00±0.10	1.55±0.05	$0.60^{+0.030}_{-0.045}$	40±0.20
	0805	1.65±0.05	2.40±0.05	8.00±0.10	3.50±0.05	1.75±0.075	4.00±0.10	2.00±0.05	4.00±0.10	1.55±0.05	0.75±0.05	40±0.20
	1206	1.90±0.05	3.45±0.10	8.00±0.10	3.50±0.05	1.75±0.075	4.00±0.10	2.00±0.05	4.00±0.10	1.55±0.05	0.75±0.05	40±0.20
	1210	2.85±0.05	3.50±0.10	8.00±0.10	3.50±0.05	1.75±0.075	4.00±0.10	2.00±0.05	4.00±0.10	1.55±0.05	0.75±0.05	40±0.20

Type or Size		W	P_1	E_1	F	D_O	D_1	P_O	P_O10	P_2	A_O	B_O	K_O	T
Embossed Taping	1812	12.00±0.20	4.00±0.10	1.75±0.10	5.50±0.05	$1.50^{+0.10}_{+0.00}$	$1.50^{+0.25}_{+0.00}$	4.00±0.10	40±0.20	2.00±0.05	3.45±0.10	4.90±0.10	0.75±0.05	0.23±0.02
	2010	12.00±0.20	4.00±0.10	1.75±0.10	5.50±0.05	$1.50^{+0.10}_{+0.00}$	$1.50^{+0.25}_{+0.00}$	4.00±0.10	40±0.20	2.00±0.05	2.77±0.10	5.45±0.10	0.81±0.10	0.23±0.02
	2512	12.00±0.20	4.00±0.10	1.75±0.10	5.50±0.05	$1.50^{+0.10}_{+0.00}$	$1.50^{+0.25}_{+0.00}$	4.00±0.10	40±0.20	2.00±0.05	3.40±0.10	6.73±0.10	0.81±0.10	0.23±0.02

- Reel



Type	SPQ PCS/Rl.	A±0.5	B±0.5	C±0.5	D±1	M±2	W±1
0402	10,000	2.0	13.0	21.0	60.0	178.0	10.0
0603	5,000	2.0	13.0	21.0	60.0	178.0	10.0
	10,000	2.0	13.0	21.0	60.0	178.0	10.0
0805	5,000	2.0	13.0	21.0	60.0	178.0	10.0
1206	5,000	2.0	13.0	21.0	60.0	178.0	10.0
1210	5,000	2.0	13.0	21.0	60.0	178.0	10.0
1812	4,000	2.0	13.0	21.0	60.0	178.0	13.8
2010	4,000	2.0	13.0	21.0	60.0	178.0	13.8
2512	4,000	2.0	13.0	21.0	60.0	178.0	13.8

RELIABILITY

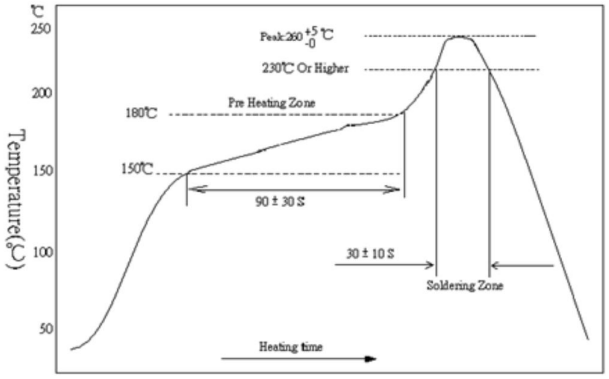
Item	Test Method	Acceptable Criterion
Temperature Coefficient of Resistance (T.C.R.)	TCR(ppm/℃)=$\frac{(R_2-R_1)}{R_1(T_2-T_1)}\times10^6$ R_1: Resistance value tested at room temperature (Ω) R_2: Resistance value tested at-55℃ or +125℃ T_1: Temperature at room temperature (℃) T_2: Temperature at-55℃ or +125℃ Reference: IEC 60115-1 6.2	Details in table CHARACTERISTICS
Short Time Overload	Apply 2.5 times of rated voltage or maximum overload voltage (whichever is the smallest) for 5 seconds Reference: IEC 60115-1 8.1.4.2	△R/R=±(0.1%+0.05Ω)

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Item	Test Method	Acceptable Criterion
Solderability	Pretreatment: dry heat 155℃, 4H, after take out, stand at room temperature for 2 hours. Test method B1: Dip the resistance in a tin furnace at 245±5℃ for 5 seconds, then take it out and observe the solder area under a microscope; Method D: 260±5℃, T=30+5/-0s. Reference: J-STD-002 & IEC 60115-1 11.1.4.3	Soldering coverage over 95% At the edge of terminal, the object underneath (e.g., white ceramic) shall not expose.
Resistance to Soldering Heat	Reflow test, time above 217 °C is 60s-150s, time above 250 ± 5°C is 30±5s. Reference: IEC 60115-1 11.2.4.3& MIL-STD-202 Method 210	△R/R=±(0.1%+0.05Ω)
Solder Joint Endurance Test	The SMD resistance was welded to the test board and bent with the standard pressure block. After standing for 60 sec. under the corresponding deformation condition, the change rate of resistance value of the part was tested Size | 0402, 0603, 0805 | 1206, 1210 | 2010, 2512 Depth | 5mm | 3mm | 2mm Reference: IEC 60115-1 9.8.4	△R/R=±(0.2%+0.05Ω)
Resistance to Dry Heat	Put it in an oven at 155±5℃ for 1000^{+48}_{-0}hrs., take it out and let it stand for more than 1hr., then measure the change rate of resistance value Reference: IEC 60115-1 7.3	△R/R=±(0.2%+0.05Ω)
Thermal Shock	High and low temperature test is carried out according to the upper and lower limits of the application temperature of the parts, the residence time of the upper and lower limits of the temperature is 30min, and the temperature conversion time is less than 30s, lasting 500 cycles Reference: IEC 60115-1 10.1.4	△R/R=±(0.2%+0.05Ω)
Loading Life in Moisture	Place it in a constant temperature and humidity box with 40±2℃ and 90~96%RH and apply the voltage (IEC 60115-1 10.4 Table 22) for 1000 hrs. Take it out and stand for 30 minutes before applying rated voltage for 1 minute, and then measure the change rate. Reference: IEC 60115-1 10.4	△R/R=±(0.2%+0.05Ω)
Load Life	Put in an oven at 70±2℃, apply rated voltage, 90 min ON, 30 min OFF, 1000 hrs., take out and stand for more than 60 min, then measure the resistance change rate. Reference: IEC 60115-1 7.1	△R/R=±(0.2%+0.05Ω)
Sulfide test 1	Put the test sample resistor in sulfur vapor, at a temperature of 105±2℃ for 750hrs Reference: ASTM-B-809-95&EIA977	△R/R=±(1%+0.05Ω)
Sulfide test 2	Cutting oil with sulfur powder with a specific gravity of 96.5:3.5,105℃, 500 hours. Customer requirements	△R/R=±(2%+0.05Ω)

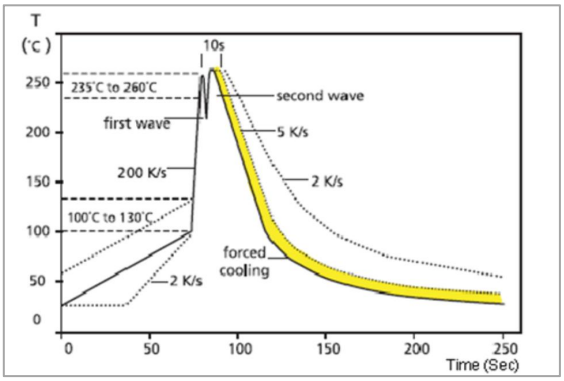
SOLDERING

Lead Free IR Reflow Soldering Profile



• Top temperature should be under 260^{+5}_{-0}℃ for 10 seconds.

Lead Free Double-Wave Soldering Profile



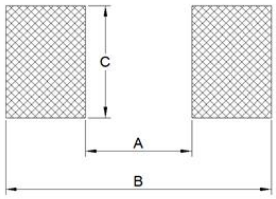
• Suitable for 0603 above size products

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- Reference: J-STD-020D
- 350±10℃ for 3 seconds. by soldering iron.

SOLDERING PAD

Unit: mm

Figure	Type	A	B	C
	TF0402	0.5	1.5	0.6
	TF0603	0.8	2.1	0.9
	TF0805	1.2	3.0	1.3
	TF1206	2.2	4.2	1.6
	TF1210	2.2	4.2	2.8
	TF2010	3.5	6.1	2.8
	TF2512	3.8	8.0	3.5

WORKING ENVIRONMENT

If user intends to use products in special environments or states (including but not limited to the following), it is necessary to approve special characteristics and reliability for the following or other application environments.

A. High temperature.
B. Near the sea, or corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2, etc.
C. Unverified liquids, such as water, oil, chemical or organic solvent.
D. Unverified resin or paint to cover products.
E. Products should be washed with water soluble cleaner even if non cleaning flux.

STORAGE / CARRY CONDITIONS

A. Temperature: 25±5℃
B. Humidity: 60±15%RH
C. Storage life: 2 years. FIFO
D. Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall or squeeze the box, otherwise the product electrode or body may be damaged.

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   - The updated Terms shall prevail over previous versions and shall be subject to the latest version published on the official website (http://www.giantohm.com/download/cid/22.html), except for transactions concluded prior to the effective date of the amendments.
   - Continued use of the products by the user after the Terms update shall constitute deemed acceptance of the new Terms.
6. **Effectiveness:**

This disclaimer does not exclude liability for personal injury caused by intentional misconduct or gross negligence, or other liabilities prohibited from exclusion by law.

VERSION HISTORY

Version	Date	Change Item(s)	Description
A	2024/08/29	-	First version
B	2022/10/31	Reliability	Update test items, test method and acceptable criterion.
C	2022/11/24	Characteristics	Update items, Add Packing
D	2023/11/20	Reliability	Update test items, test method and acceptable criterion.
E	2024/8/30	Characteristics	Revise 0402 Operating Voltage
F	2024/10/24	Reliability	Update Sulfide test method
G	2025/7/22	Legal Disclaimer	Update Legal Disclaimer
H	2025/10/22	Taping Dimensions	Increase the packaging quantity of 10K 0603 size

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