FEATURE

- AEC-Q200 qualified.
- Superior anti-surge voltage performance
- Superior high-power performance
- High accuracy and stability
- RoHS and Halogen-free compliance
- Superior anti-sulfur performance
- Compatible with reflow and wave soldering type
- MSL class: MSL 1
- Applications:
  - Automotive electronics
  - Communication devices
  - Computer, notebook, workstation, tablet, and peripherals
  - Home appliances
  - Medical devices
  - Industrial control system
  - etc.

MANUFACTURER PART NO.

For example: AU1206F100KT5G00-AU1206 ±1% 100KΩ T/R-5000

Series	Size	Tol.	Nominal Resistance Value	PKG	SPQ	Feature	TCR
2 codes	4 codes	1 code	2~5 codes	1 code	1 code	1 code	2 codes
AU	1206	F	100K	T	5	G	00
Automotive Grade Anti-Surge High Accuracy Thick Film Chip Resistors	0402 0603 0805 1206 1210 2010 2512	D=0.5% F=1% J=5%	1R①=1Ω 4R7=4.7Ω 4K7②=4.7KΩ 100K=100KΩ 4M7③=4.7MΩ	T=T/R④	4=4K 5=5K A=10K	G=Std. S=P.C.⑤ High Power: L=1/3W N=1/2W P=3/4W 1=1W Q=1.5W	00=Refer to table as below.

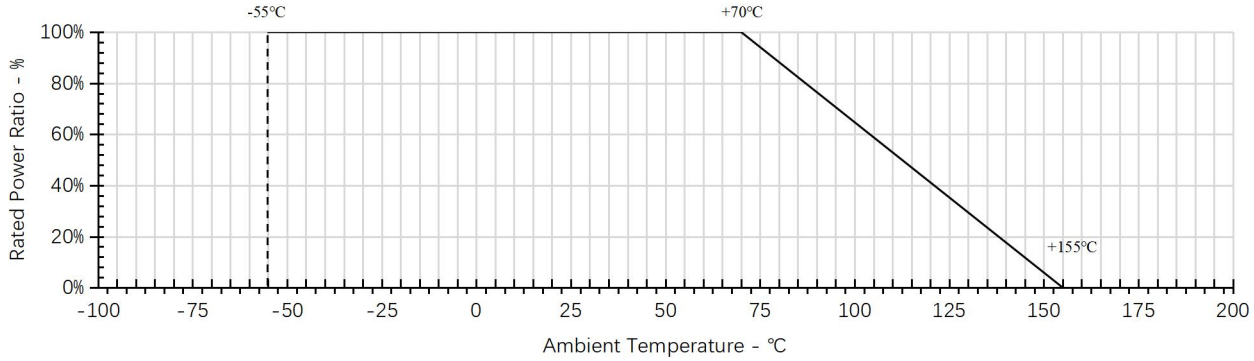
Note: ① R=Radix, 10^0, Ω ② K=Kilo, 10^3, KΩ ③ M=Mega, 10^6, MΩ
④ T/R=Taping in Reel packing type ⑤ P.C.=Personal and Customized.

CHARACTERISTICS

Type	Rated Power		Max. Working Voltage	Max. Overload Voltage	Tolerance	Value Range	Jumper(0Ω)		
	Std.	High Power					Max Value	Max. Rated Current	Max. Overload Current
AU0402	1/8W	/	50V	100V	0.5%, ±1%, ±5%	1Ω~10M	10mΩ	3A	6A
AU0603	1/4W	1/3W	75V	150V	0.5%, ±1%, ±5%	1Ω~10M	8mΩ	5A	10A
AU0805	1/3W	1/2W	150V	300V	0.5%, ±1%, ±5%	1Ω~10M	5mΩ	6A	12A
AU1206	1/2W	3/4W	200V	400V	0.5%, ±1%, ±5%	1Ω~10M	5mΩ	10A	20A
AU1210	3/4W	1W	200V	500V	0.5%, ±1%, ±5%	1Ω~10M	4mΩ	12A	24A
AU2010	1.25W	/	400V	800V	0.5%, ±1%, ±5%	1Ω~10M	5mΩ	12A	24A
AU2512	2W	/	500V	1000V	0.5%, ±1%, ±5%	1Ω~10M	5mΩ	16A	32A

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POWER DERATING CURVE



Note: Operating Temperature Range: -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 less.

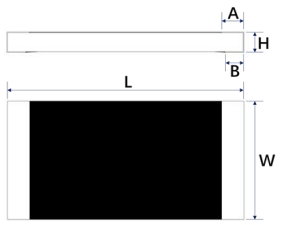
Formula:

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

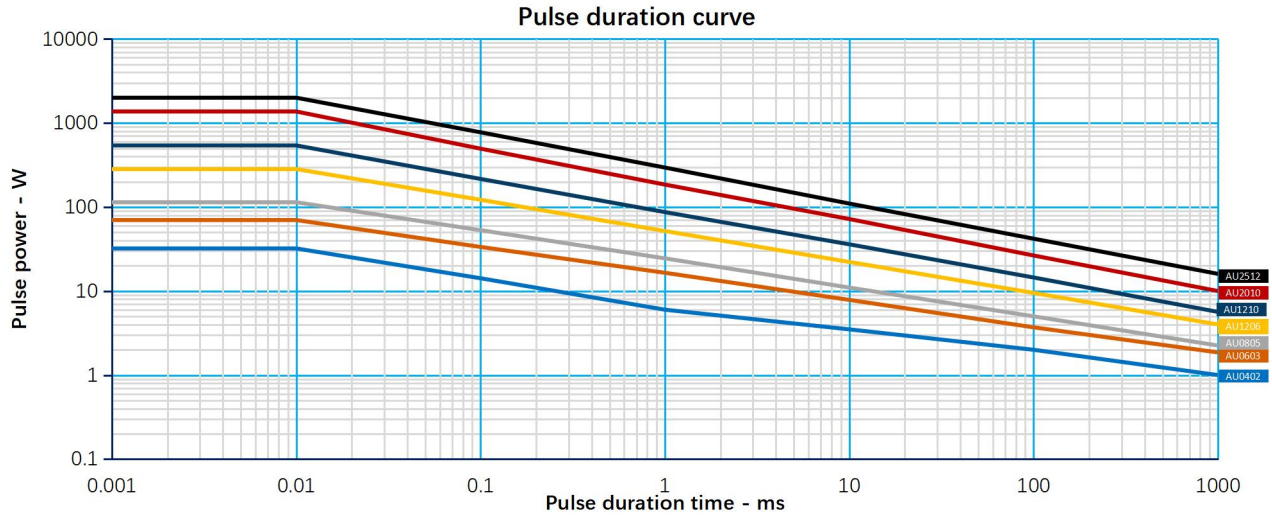
E=Rated voltage(V)
P=Rated power(W)
R=Nominal resistance(Ω)

DIMENSIONS

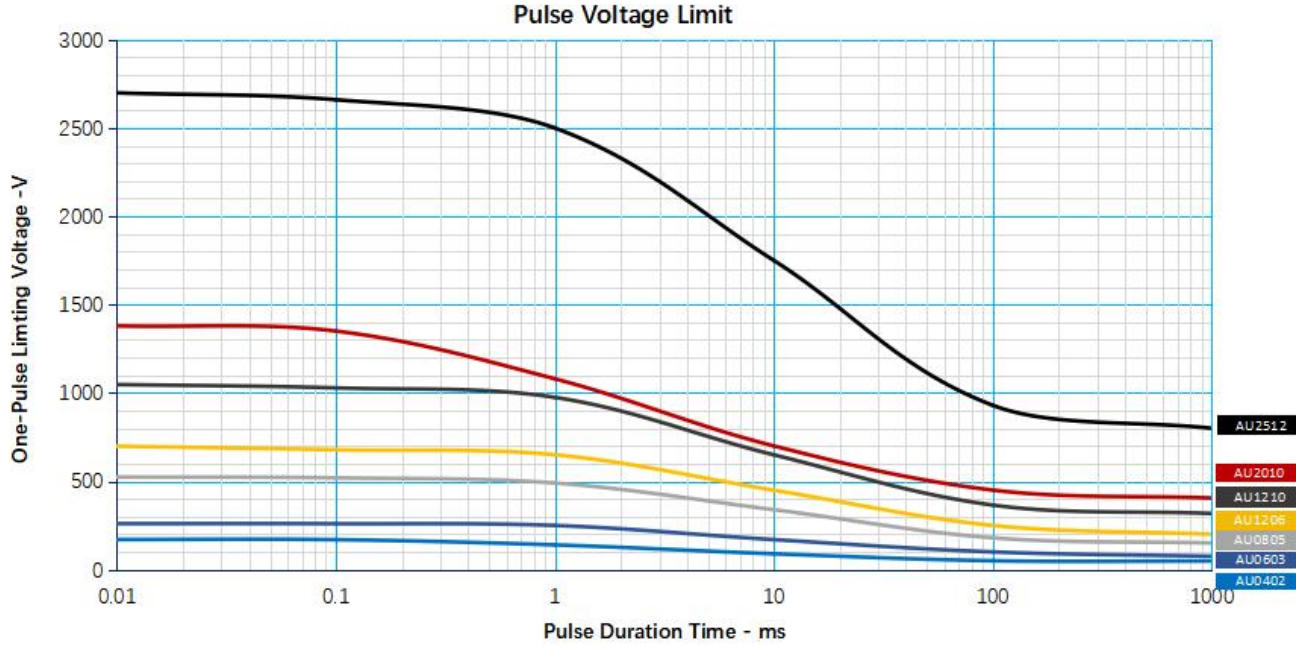
Unit: mm

Figure	Type	L	W	H	A	B
	AU0402	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
	AU0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
	AU0805	2.00±0.15	1.25±0.15	0.55±0.10	0.40±0.20	0.40±0.20
	AU1206	3.10±0.15	1.55±0.15	0.55±0.10	0.45±0.20	0.45±0.20
	AU1210	3.10±0.10	2.60±0.20	0.55±0.10	0.50±0.25	0.50±0.20
	AU2010	5.00±0.10	2.50±0.20	0.55±0.10	0.60±0.25	0.50±0.20
	AU2512	6.35±0.10	3.20±0.20	0.55±0.10	0.60±0.25	0.50±0.20

SINGLE PULSE DURATION CURVE



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RELIABILITY

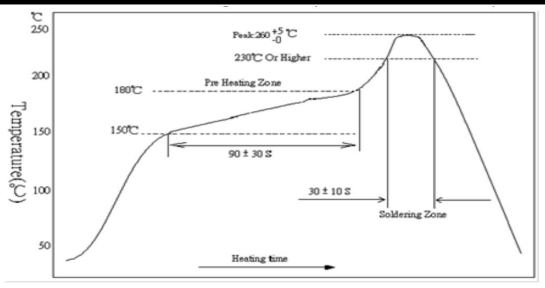
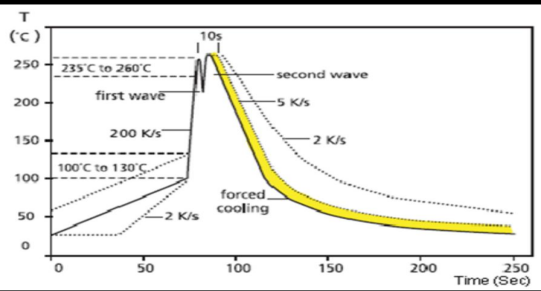
Item	Test Method	Acceptable Criterion
High Temperature Exposure	+155℃, 1000 hrs., unpowered, measure the resistance change rate after test.. **Reference: AEC-Q200 Test 3, MIL-STD-202 Method 108**	0.5%, 1% Series: △R/R= ±(1.0%+0.05Ω) 5% Series: △R/R= ±(2.0%+0.05Ω) Jumper: < 50mΩ
Temperature Cycling	-55~+155℃, soak time 30min, Transition Time :1minute, 1000 cycles . **Reference: AEC-Q200 Test 4, JESD22 Method JA-104**	△R/R=±(2.0%+0.05Ω) Jumper: < 50mΩ
Biased Humidity	85℃, 85%, 10% rated power, 1000H, after the test and stand 24H to measure the change rate of resistance value for components with specified operating voltages higher or equal to500V, 10% of operating voltage. **Reference: AEC-Q200 TEST 7, MIL-STD-202 Method 103**	0.5%, 1% Series: △R/R=±(2.0%+0.05Ω) 5% Series: △R/R=±(3.0%+0.05Ω Jumper: < 100mΩ
High Temperature Operating Life	maximum specified operating temperature at 100% rated power without derating, 1000H, 90 min ON,30 min OFF **Reference: AEC-Q200 Test 8, MIL-STD -202 Method 108**	0.5%, 1% Series: △R/R=±(2.0%+0.05Ω) 5% Series: △R/R=±(3.0%+0.05Ω Jumper: < 100mΩ
Resistance to Solvent	Immerse in isopropanol solvent at room temperature (23±5℃) for 5min, wipe 10 times with a hard toothbrush, repeat 3 times, take out and blow dry for examination **Reference: AEC-Q200 Test 12, MIL-STD-202 Method 215**	No visible damage
Resistance to Soldering Heat	Reflow test, time above 217 °C is 60s-150s, time above 250 ± 5°C is 30±5s. **Reference: AEC-Q200 TEST 15, MIL-STD-202 Method 210**	△R/R=±(1.0%+0.05Ω) Jumper: < 50mΩ
ESD	Human body mode, two discharges, positive and negative polarity once each Size: 0402, 0603 | 0805 and above Test Voltage: 1000V | 2000V **Reference: AEC-Q200 Test 17, AEC-Q200-002**	△R/R=±(2.0%+0.05Ω) Jumper: < 50mΩ
Solderability	Pretreatment: dry heat 155℃, 4 hrs. or PCT aging for 4 hrs. (equivalent), after take out, stand at room temperature for 2 hrs. Test method: 1. Dip the resistance in a tin furnace at 245±3℃ for 3 seconds, then take it out and observe the solder area under a microscope; 2. Reflow soldering test, Peak Temperature: 235℃, T=40± 5 seconds. **Reference: AEC-Q200 Test 18, J-STD-002 & IEC 60115-1 11.1.4.3**	Soldering coverage must be 95% minimum. At the edge of terminal, the object underneath (e.g., white ceramic) shall not expose.

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Item	Test Method	Acceptable Criterion
Electrical Characterization	$\mathrm{TCR(PPM/℃)} = \frac{(R_2 - R_1)}{R_1 \times (T_2 - T_1)} \times 10^6$ 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: AEC-Q200 Test 19,IEC 60115-1 6.2**	1Ω≤ R≤10Ω: ±200PPM/°C ＞10Ω: ±100PPM/°C
Board Flex	The SMD resistance was welded to the test board and bent with the standard pressure block. After standing for 60s 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: AEC-Q200 TEST 21, AEC-Q200-005**	△R/R=±(1.0%+0.05Ω) Jumper: ＜50mΩ
Terminal Strength	Apply 1.8Kgf. external force (0402,1 Kgf.) on the side of the part to test the solder joint adhesion of the part **Reference: AEC Q200-005**	No mechanical damage or peel-off of side end
Short Time Overload	Apply 2.5 times rated voltage or maximum overload voltage (whichever is the smallest) for 5 seconds. **Reference: IEC 60115-1 8.1.4.2**	0.5%, 1% Series: △R/R=±(1.0%+0.05Ω) 5% Series: △R/R=±(2.0%+0.05Ω Jumper: ＜50mΩ
Mechanical shock	Half sine wave, acceleration 100g's, each three times in X, Y and Z directions, pulse width 6ms. **Reference: AEC-Q200 Test 13, MIL-STD -202 Method 213**	△R/R=±(1.0%+0.05Ω) Jumper: ＜50mΩ
Vibration	Frequency: 10Hz~2000Hz, acceleration: 5g's, X, Y, Z three directions, 12 cycles in each direction, a total of 36 cycles, a single cycle test for 20min. **Reference: AEC-Q200 Test 14, MIL-STD -202 Method 204**	△R/R=±(1.0%+0.05Ω) Jumper: ＜50mΩ
Flammability	Protective layer flammability report or component needle flame test report **Reference: AEC-Q200 Test 20, UL-94，IEC 60695-11-5**	Do not burn and cotton below do not ignite
Flame retardancy	9V_{DC} to 32V_{DC} (clamp current 500A) in each increment 1V_{DC} for 1 hr. **Reference: AEC-Q200 Test 24, AEC-Q200-001**	1. Nonflammable 2. Do not explode 3. The temperature cannot be higher than 350℃ for 10 seconds
Sulfide test	Put the test sample resistor in sulfur vapor, at a temperature of 105±2℃ for 750hrs **Reference: ASTM-B-809-95&EIA977**	△R/R=±(4.0%+0.05Ω) Jumper: ＜100mΩ

SOLDERING

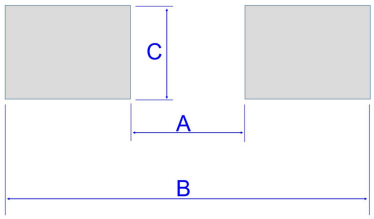
Recommendation only. Please adjust it according to the actual application

Lead-free IR Reflow Soldering Profile	Lead-free Double-Wave Soldering Profile
	
Note: ・ The Max. Temp. is 260^{+5}_{-0}℃ within 10 sec ・ Reference: J-STD-020D	Note: ・ Suit for ⩾ 0603 size ・ Manual soldering in 350±10℃ within 3 sec.

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SOLDERING PAD

Unit: mm

Figure	Type	A	B	C
	AU0402	0.5	1.5	0.6
	AU0603	0.8	2.1	0.9
	AU0805	1.2	3.0	1.3
	AU1206	2.2	4.2	1.6
	AU1210	2.2	4.2	2.8
	AU2010	3.5	6.1	2.8
	AU2512	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.

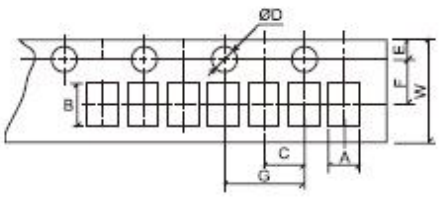
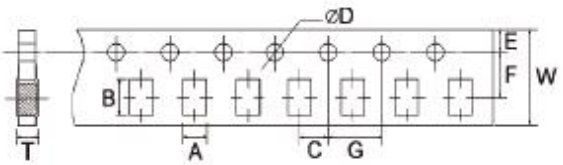
A. High temperature.
B. Near the sea, or corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2, etc.
C. Unverified liquids, such as water, oil, chemical or organic solvent.
D. Unverified resin or paint to cover products.
E. Products should be washed with water soluble cleaner even if non cleaning flux.

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.

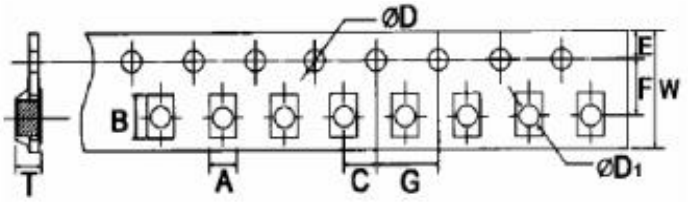
TAPING SPECIFICATIONS

A. Taping drawing

Carrier Taping A	Carrier Taping B
	

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Embossed Taping



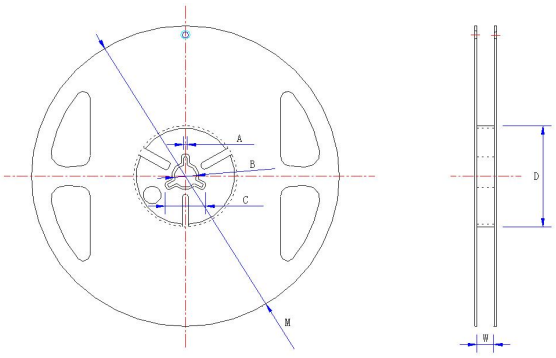
B. Taping Dimensions Unit: mm

Type or Size		A±0.2	B±0.2	C±0.05	$ØD^{+0.1}_{-0}$	E±0.1	F±0.05	G±0.1	W±0.2	T±0.1
Carrier Taping A	0402	0.67±0.1	1.17±0.1	2.0	1.5	1.75	3.5	4.0	8.0	0.47
	0603	1.10	1.90	2.0	1.5	1.75	3.5	4.0	8.0	0.67
Carrier Taping B	0603	1.10	1.90	2.0	1.5	1.75	3.5	4.0	8.0	0.67
	0805	1.65	2.40	2.0	1.5	1.75	3.5	4.0	8.0	0.81
	1206	1.90	3.45	2.0	1.5	1.75	3.5	4.0	8.0	0.81
	1210	2.85	3.50	2.0	1.5	1.75	3.5	4.0	8.0	0.81

Type or Size		A±0.2	B±0.2	C±0.05	$ØD^{+0.1}_{-0}$	$ØD^{+0.25}_{-0}$	E±0.1	F±0.05	G±0.1	W±0.2	T±0.1
Embossed Taping	2010	2.90	5.60	2.00	1.50	1.50	1.75	5.50	4.00	12.00	1.00
	2512	3.50	6.70	2.00	1.50	1.50	1.75	5.50	4.00	12.00	1.00

REEL SPECIFICATION

A. Reel drawing

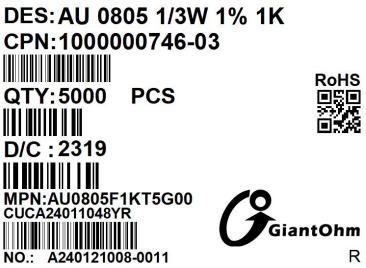


B. Reel dimension Unit: mm

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
	15,000	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
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

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LABEL SPECIFICATION

Produce Label	Customer Label
	

PACKING BOX

A. Packing Type

Taping in reel / Bulk in plastic bag.

B. Inner box

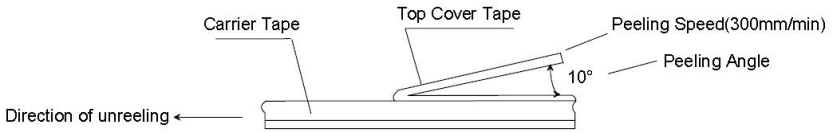
The inner box has several capacities hold 1 reel, 2 reels, 3 reels, 4 reels, 5 reels and 10 reels.

C. Out box

The out box has two capacities hold 6- or 8-pieces inner box.

NOTE OF COVER TAPE PEEL OFF

A. Figure of cover tape peel off.



B. Please keep peeling speed under 300mm per minute.

C. Please keep the angle between cover tape and direction of unreeling narrower than 10 degree.

D. There is limit of adhesive force between cover tape and carrier tape or embossed tape shown as following table.

Size of chip resistors	0402	0603 and above
Adhesive force limit	10~40gf	10~70gf

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- Statements regarding the suitability of products for certain types of applications are based on GiantOhm knowledge of typical requirements that are often placed on GiantOhm products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the user's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.
- Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each user application by the user's technical experts for the application, with the user assuming full responsibility.
- Except as expressly indicated in writing, GiantOhm products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the GiantOhm product could result in personal injury or death. users using or selling GiantOhm products not expressly indicated for use in such applications do so at their own risk.

4. Combined Use Risk

- When the product is used in combination with other materials or processes, the Buyer assumes all risks and liabilities. GiantOhm does not warrant the suitability of the combination and shall not be liable for any responsibilities.

5. Disclaimer Updates

- 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	2022/11/22	-	First version
B	2024/02/01	Full	Add Packing Specifications.
C	2024/06/13	Full	Update"Max. Working Voltage&Max. Overload Voltage" Add Moisture sensitivity level description.
D	2024/07/16	Full	Updated test acceptable criterion.
E	2024/08/27	Full	Add Rated Power(High Power)
F	2026/01/26	Full	Update RoHS,Revise the entire text, Update Format; Increase the reel parameters of:0402 15Kpcs and 0603 10Kpcs
G	2026/02/09	MPN CHARACTERISTICS	Add 1210 Rated Power(High Power)
H	2026/08/20	Characteristics	Add Jumper(0Ω)

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