FEATURE

- AEC-Q200 qualified.
- Achieve maximum category temperature 175℃ and rated category temperature 125℃
- High reliability and stability with metal glaze thick film resistive element
- High temperature structure.
- Superior anti-sulfur performance
- RoHS complaint.
- Compatible with reflow and wave soldering
- MSL class: MSL 1
- Applications:
  - Automotive electronics
  - Medical devices
  - Industrial control system
  - etc.

MANUFACTURER PART NO.

For example: AH0805J100KT5G00-AH0805 ±5% 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
AH	0805	J	100K	T	5	G	00
Automotive Grade High Temperature Thick Film Chip Resistors	0402 0603 0805 1206 1210 2010 2512	D=±0.5% F=±1% J=±5%	0R=Jumper(<50mΩ) 1R①=1Ω 4R7=4.7Ω 4K7②=4.7KΩ 100K=100KΩ 4M7③=4.7MΩ	T=T/R④	4=4K 5=5K A=10K B=15K	G=Std. S=P.C.⑤	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.

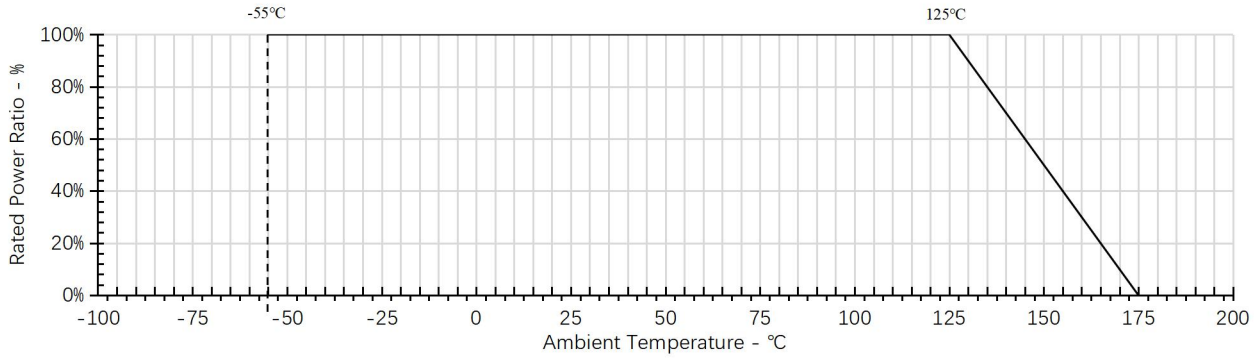
CHARACTERISTICS③

Type	Rated Power	MWV①	MOV②	Tolerance	TCR PPM/℃	Value Range	Jumper(0Ω)		
							Rated Current	MOC③	Range
AH0402	1/10W	50V	100V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	1A	2A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
AH0603	1/8W	75V	150V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	1A	2A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
	1/4W	-	-	±0.5%, ±1%, ±5%	±200	1Ω≤R < 10Ω			
AH0805	1/2W	400V	600V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	2A	5A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
AH1206	3/5W	400V	600V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	2A	10A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
AH1210	3/4W	400V	600V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	2A	10A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
AH2010	1W	400V	600V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	2A	10A	50mΩ Max.
					±100	10Ω<R≤300KΩ			
AH2512	2W	400V	600V	±0.5%, ±1%, ±5%	±200	1Ω≤R≤10Ω	2A	10A	50mΩ Max.
					±100	10Ω<R≤300KΩ			

Note: ① MWV=Max. Working Voltage ② MOV=Max. Overload Voltage ③ MOC=Max. Overload Current

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POWER DERATING CURVE



Note: Operating Temperature Range: -55℃~+175℃

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.

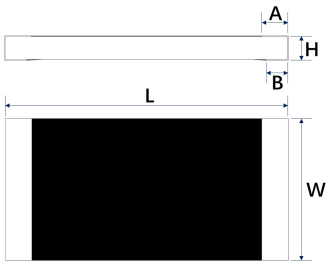
Formula:

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

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

DIMENSION

Unit: mm

Figure	Type	L	W	H	A	B
	AH0402	1.00±0.10	0.50±0.05	0.35±0.10	0.20±0.10	0.25±0.10
	AH0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.15	0.30±0.15
	AH0805	2.00±0.10	1.25±0.10	0.50±0.20	0.35±0.20	0.35±0.15
	AH1206	3.05±0.10	1.55±0.10	0.50±0.20	0.45±0.20	0.35±0.15
	AH1210	3.05±0.10	2.55±0.10	0.55±0.20	0.50±0.20	0.50±0.20
	AH2010	5.00±0.20	2.50±0.20	0.55±0.20	0.60±0.20	0.60±0.20
	AH2512	6.30±0.20	3.20±0.20	0.55±0.20	0.60±0.20	0.60±0.20

RELIABILITY

Item	Test Method	Acceptable Criterion
High Temperature Exposure	+155℃, 1000hrs., unpowered, measure the resistance change rate after test. **Reference: AEC-Q200 Test 3, MIL-STD-202 Method 108**	△R/R=±(1.0%+0.05Ω) Jumper: ＜50mΩ
Temperature Cycling	-55~+125℃, slope 10~20℃/min, dwell time 15min, 1000 cycles **Reference: AEC-Q200 Test 4, JESD22 Method JA-104**	△R/R=±(1.0%+0.05Ω) Jumper: ＜50mΩ
Biased Humidity	85℃, 85%RH, load 10% rated power, 1000hrs., take it out and stabilized 24 hrs. then measure the change rate of resistance value **Reference: AEC-Q200 TEST 7, MIL-STD-202 Method 103**	△R/R=±(3.0%+0.05Ω) Jumper: ＜100mΩ
Operational Life	125℃, rated voltage (calculated according to derating curve), 1000 hrs., with cycle 90 min ON, 30 min OFF **Reference: AEC-Q200 Test 8, MIL-STD -202 Method 108**	△R/R=±(3.0%+0.05Ω) Jumper: ＜100mΩ

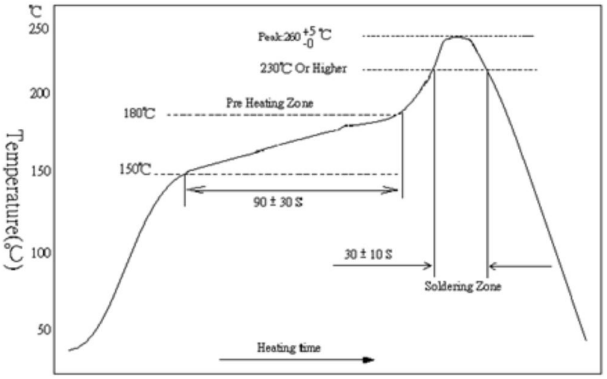
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Item	Test Method	Acceptable Criterion
Resistance to Solvent	Immerse in isopropanol solvent at room temperature (23±5℃) for 5min, wipe 10 times with a hard toothbrush, repeat 3 times, take out and blow dry for examination **Reference: AEC-Q200 Test 12, MIL-STD-202 Method 215**	No visible damage
Resistance to Soldering Heat	Soak in a tin furnace at 260^{+5}_{-0}℃ for 10^{+1}_{-0} seconds, take out and stand for more than 60 minutes, then measure the change rate of resistance value. **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**	Solderi Soldering coverage over 95%At the edge of terminal, the object underneath (e.g., white ceramic) shall not expose.ng coverage must be 95% minimum.
Electrical Characterization	$\mathrm{TCR(PPM/℃)} = \frac{(R_2 - R_1)}{R1 \times (T_2 - T_1)} \times 10^6$ 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<R≤300KΩ: ±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	AH0402, AH0603 series: Applied 2.5 times rated voltage for 5 seconds. AH0805~AH2512 series: Applied 1.77 times rated voltage for 5 seconds. Jumper: Applied Max. Overload Current for 5 seconds. Release the load for about 30 minutes, then measure its resistance variance ate. (Rated voltage refer to characteristic) **Reference: JIS-C5201-1 4.13**	△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	V-0 **Reference: AEC-Q200 Test 20, UL-94**	Do not burn and cotton below do not ignite
Flame retardancy	9VDC to 32VDC (clamp current 500A) in each increment 1VDC 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
FOS	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

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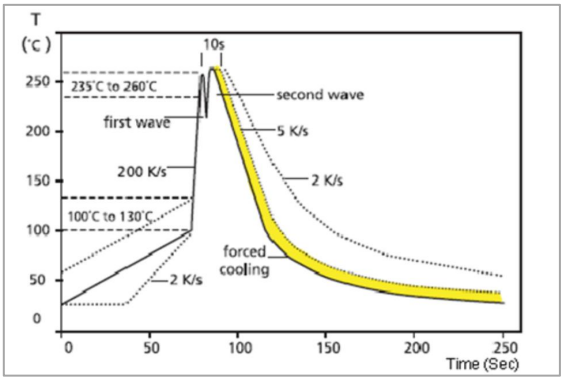
SOLDERING

Lead Free IR Reflow Soldering Profile



- Top temperature should be under 260 +5/-0 ℃ ,10Sec.
- Reference: J-STD-020D

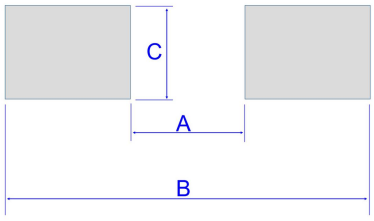
Lead Free Double-Wave Soldering Profile



- Suitable for 0603 and above size products
- 350±10℃ within 3 Sec. if soldering iron.

SOLDERING PAD

Unit: mm

Figure	Type	A	B	C
	AH0402	0.5	1.5	0.6
	AH0603	0.8	2.1	0.9
	AH0805	1.2	3.0	1.3
	AH1206	2.2	4.2	1.6
	AH1210	2.2	4.2	2.8
	AH2010	3.5	6.1	2.8
	AH2512	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.

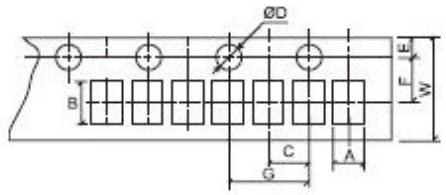
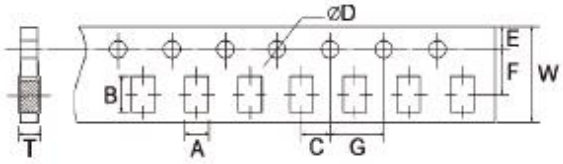
A. High temperature.
B. Near the sea, or corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2, etc.
C. Unverified liquids, such as water, oil, chemical or organic solvent.
D. Unverified resin or paint to cover products.
E. Products should be washed with water soluble cleaner even if non cleaning flux.

STORAGE / CARRY CONDITIONS

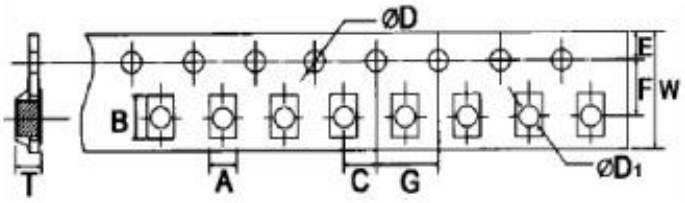
A. Temperature: 25±5℃
B. Humidity: 60±15%RH
C. Storage life: 2 years. FIFO.
D. Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall or squeeze the box, otherwise the product electrode or body may be damaged.

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TAPING SPECIFICATIONS Taping drawing

Carrier Taping A	Carrier Taping B
	

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
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

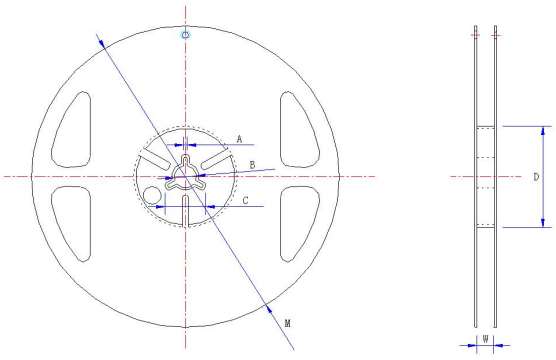
STANDARD PACKING

Series	0402	0603	0805	1206	1210	2010	2512
SPQ, PCS/Reel	10,000	5,000	5,000	5,000	5,000	4,000	4,000
Taping material	Carrier	Carrier	Carrier	Carrier	Carrier	Embossed	Embossed

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REEL SPECIFICATION

A. Reel drawing



B. Reel dimension unit: mm

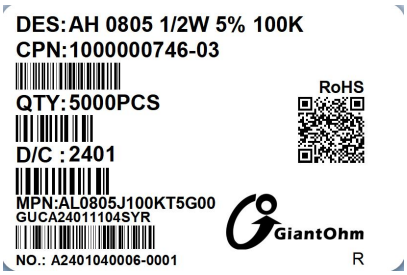
Type	SPQ PCS/Rl.	A±0.5	B±0.5	C±0.5	D±1	M±2	W±1
0402	10,000	2.0	13.0	21.0	60.0	178.0	10.0
0603	5,000	2.0	13.0	21.0	60.0	178.0	10.0
0805	5,000	2.0	13.0	21.0	60.0	178.0	10.0
1206	5,000	2.0	13.0	21.0	60.0	178.0	10.0
1210	5,000	2.0	13.0	21.0	60.0	178.0	10.0
2010	4,000	2.0	13.0	21.0	60.0	178.0	13.8
2512	4,000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

LABEL SPECIFICATION

A. Produce Label



B. 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.

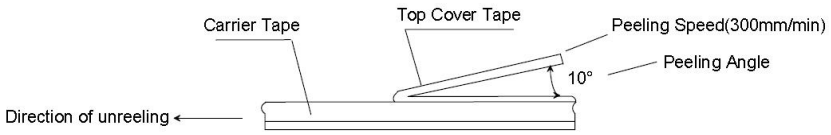
C. Out box

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

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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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VERSION HISTORY

Version	Date	Change Item(s)	Description
A	2022/10/22	-	First version
B	2022/11/09	-	Updated test item, method and acceptable criterion.
C	2024/07/16	Full	Add Packing Specifications. Add Jumper Description in MPN Add Jumper test acceptable criterion. Add Moisture sensitivity level description.

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