Data Sheet

Customer：	
Product :	Automotive Grade High Voltage Thin Film Flat Chip Resistor– ARHV..A Series
Size:	0805 /1206 /1210
Issued Date:	27-Dec-24
Edition :	REV. A6

RoHS Compliant

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27-Dec-24	27-Dec-24	27-Dec-24	27-Dec-24	
Chun	***Ben Chang***	***Ben Chang***		

Automotive Grade High Voltage Thin Film Flat Chip Resistor



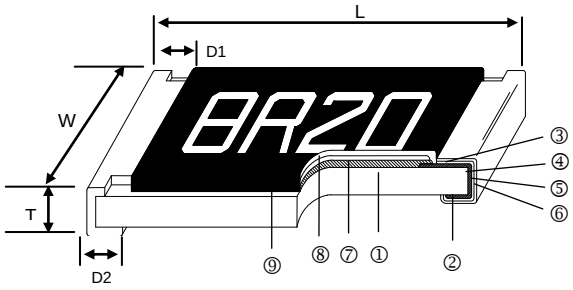
Features

- High operating voltage Umax. up to 1000 V
- Low voltage coefficient <1.5 ppm/V
- Superior moisture resistivity (85℃;85% RH)
- AEC-Q200 Qualified
- Test proven immunity to humidity, moisture, and sulfur

Applications

- Industrial and automotive inverters
- Battery management system
- Testing / Measurement Equipment
- Automatic Equipment Controller

Construction



①	Alumina Substrate	④	Edge Electrode	⑦	Resistor Layer
②	Bottom Electrode	⑤	Barrier Layer	⑧	Overcoat
③	Top Electrode	⑥	External Electrode	⑨	Marking

Dimensions

Unit: mm

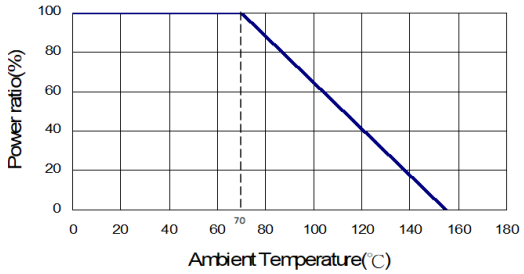
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
ARHV05	0805	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25	5.3
ARHV06	1206	3.05±0.15	1.55±0.15	0.55±0.10	0.42±0.20	0.35±0.25	10.8
ARHV13	1210	3.10±0.15	2.40±0.15	0.55±0.10	0.40±0.20	0.55±0.25	15.7

Part Numbering

ARHV	13	B	T	C		1001	A
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking Code
	05:0805 06:1206 13:1210	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	B: ±10 N: ±15 C: ±25 D: ±50	:Standard* (See Remark)	0100: 10Ω 10R2: 10.2Ω 1000:100Ω 1001: 1KΩ 1004: 1MΩ	A: Automotive Grade NA: No Making Automotive Grade

*Remark: Standard part no need for power rating code.

■Derating Curve



■Standard Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range				TCR (PPM/℃)	VCR (PPM/V)
					±0.1%	±0.25%	±0.5%	±1%		
ARHV05 (0805)	1/5W	-55 ~ +155°C	450V	900V	180K~1MΩ				±10 ±15 ±25 ±50	<1.5
ARHV06 (1206)	1/4W	-55 ~ +155°C	700V	1400V	160K~2MΩ				±10 ±15 ±25 ±50	<1.5
ARHV13 (1210)	1/3W	-55 ~ +155°C	1000V	2000V	121K~3.01MΩ				±10 ±15 ±25 ±50	<1.5

Operating Voltage=$\sqrt{}$(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2*$\sqrt{}$(P*R) or Max. overload voltage listed above, whichever is lower.

■Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** -55℃~+125℃, 25℃ is the reference temperature
Short Time Overload	ΔR±0.05%	**JIS-C-5201-1 4.13** U=2*$\sqrt{}$(P*R) or Max. overload voltage whichever is lower for 5 seconds
Endurance	ΔR±0.1%	**MIL-STD-202 Method 108** U = $\sqrt{}$(P*R) 1.5 h on; 0.5 h off; 70 °C; 1000 h
Damp Heat with Load	ΔR±0.1%	**MIL-STD-202 Method 103** U =0.1* $\sqrt{}$(P*R) 40±2°C, 90~95% R.H. 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Biased Humidity	ΔR±0.25%	**MIL-STD-202 Method 103** U =0.3* $\sqrt{}$(P*R) 1000 hrs 85°C/85%RH Voltage isn’t exceeding 100V

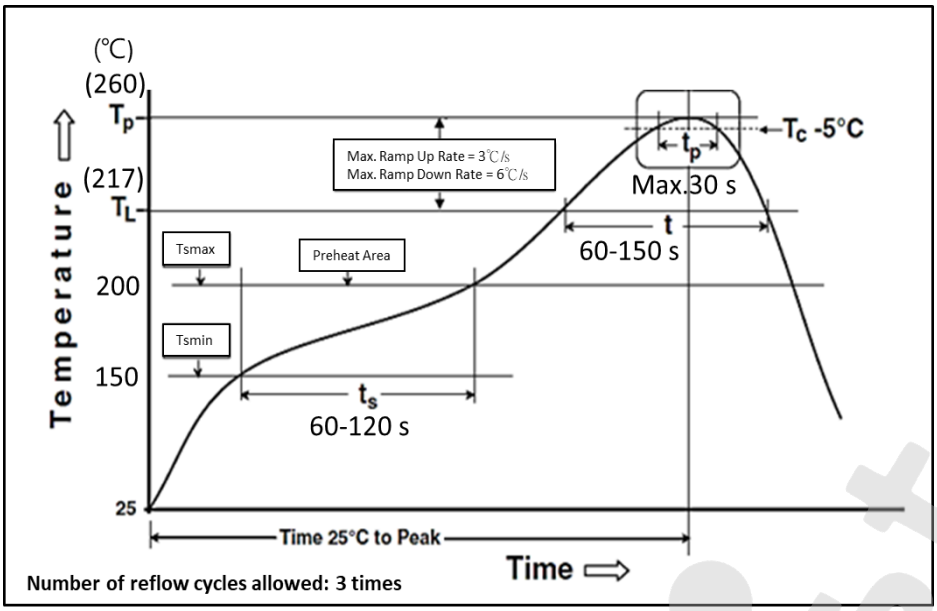
Temperature Cycling	ΔR±0.1%	**JESD22 Method JA-104** -55℃ to +125℃,1000 cycles
High Temperature Exposure	ΔR±0.2%	**MIL-STD-202 Method 108** at +155°C for 1000 hrs
Single pulse high voltage overload	ΔR±0.1%	**IEC61000-4-5** U = 2 * Max. Operating Voltage 10pulses 10us / 700us
Periodic electric overload	ΔR±0.1%	**IEC 60115-1 4.39** U = 2 * Max. Operating Voltage 0.1 s on; 2.5 s off; 1000 cycles
Bending Strength (Board Flex)	ΔR±0.05%	**JIS-C-5201-1 4.33** Bending amplitude 3mm for 60 seconds
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** 245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.02%	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
Terminal strength	No broken	**AEC-Q200-006** Force of 1.8 kg for 60 seconds.
Vibration	ΔR±0.05%	**MIL-STD-202 Method 204** 5g's for 20min,12 cycles each of 3 orientations,10-2000Hz
ESD	ΔR±0.5%	**AEC-Q200-002** Human body model 0805 : 2KV 1206.1210 : 6KV
Dielectric Withstand Voltage	By Type	**MIL-STD-202 Method 301** Max. Operating voltage for 1 minute
Resistance to solvents	Marking Unsmeared	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	**UL-94** V-0 or V-1 are acceptable. Electrical test not required.
Sulfur Test	ΔR±1%	**ASTM-B-809-95 Modified** 105±2 ℃ no power rating for 1000 hrs.

RCWV(Rated continuous working voltage)= √(P*R) or Max. Operating voltage whichever is lower

■ **Storage Temperature: 15~28℃; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

■Soldering Condition(IPC/JEDEC J-STD-020)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (T_{smin}) Max Temperature (T_{smax}) Preheating time (t_s) from (T_{smin} to T_{smax})	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Marking

0805/1206/1210 4digit marking

Example

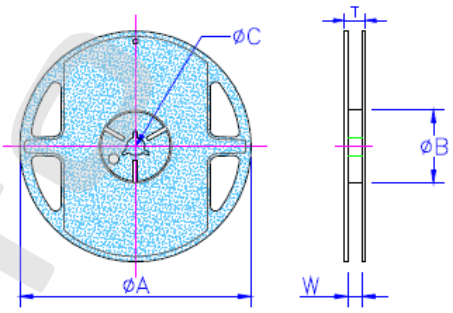
Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

■Packaging

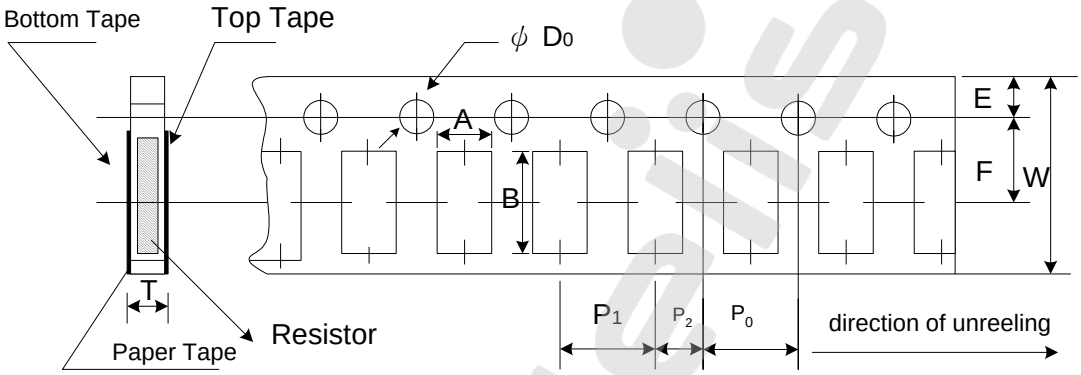
Packing Quantity & Reel Specifications

Unit :mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
ARHV05	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARHV06	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARHV13	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-



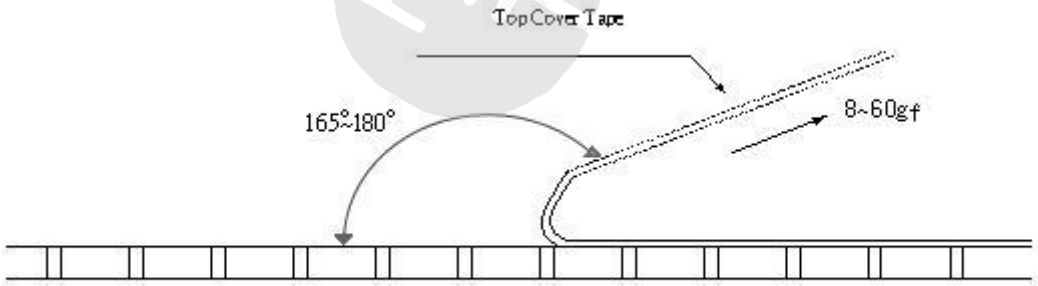
Paper Tape Specifications



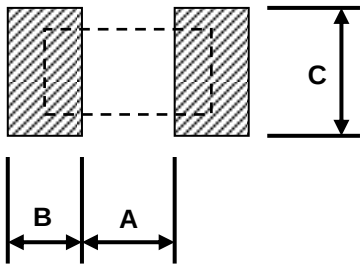
Unit: mm

Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
ARHV05	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
ARHV06	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.55±0.05	0.75±0.05
ARHV13	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.60±0.10	0.75±0.05

■ Peel force of top cover tape
■ The peel speed shall be about 300mm/min±5%
■ The peel force of top cover tape shall be between 8gf to 60gf



■Recommend Land Pattern



Unit: mm

Type	A	B	C
ARHV05	1.00	1.00	1.35±0.2
ARHV06	2.00	1.15	1.70±0.2
ARHV13	2.00	1.15	2.50±0.2