



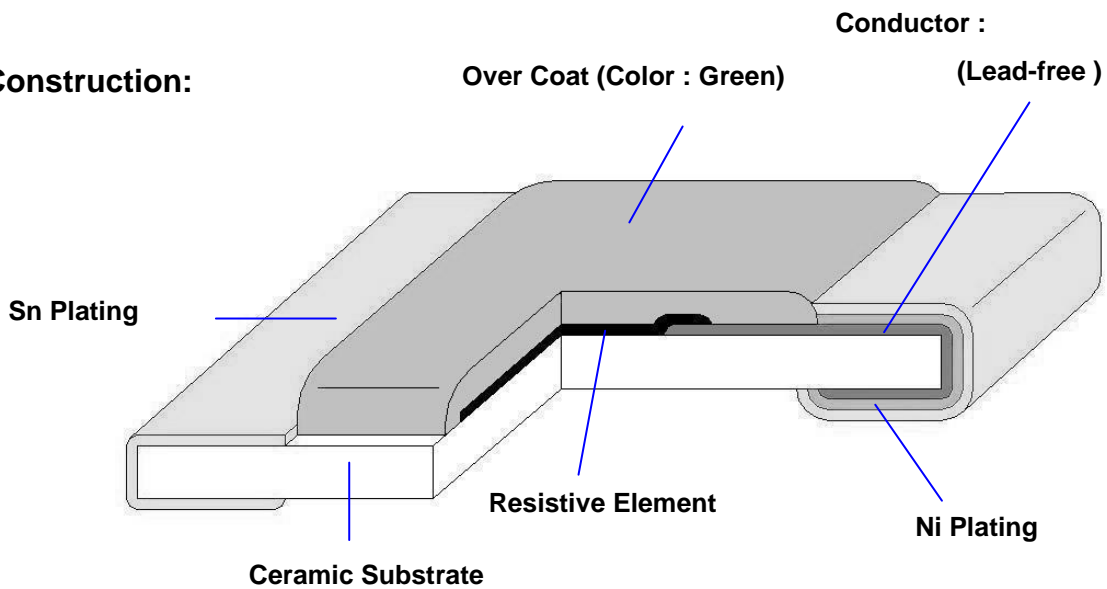
Thick Film High Voltage Lead-Free  
Chip Resistors (for 2010)  
Halogen-Free

Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	1 / 9

**1. Scope :**

This specification applies for thick film high voltage Lead-Free chip resistors made by TA-I.

**2. Construction:**



**3. Type Designation:**

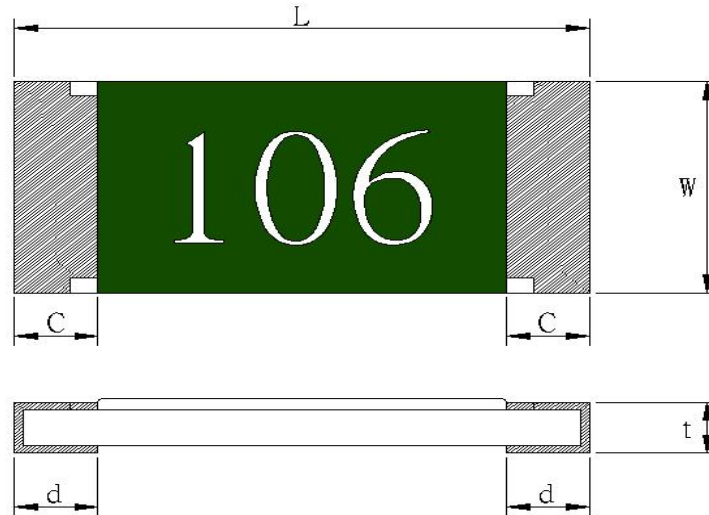
<u>RH</u>	<u>20</u>	<u>J</u>	<u>EN</u>	<u>106</u>
Product Code	Size	Tolerance	Packaging	Nominal Resistance
RH : High voltage	Power Rating			
20-2010(5025) 1/2W	J- ±5%	EN-Lead Free & Emboss Tape	e.g., 106=10MΩ 5%	



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Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	2 / 9

4. Dimensions:



UNIT: mm

Type	L	W	C	d	t
RH20	5.00 ±0.20	2.50 ±0.20	0.40 ±0.25	0.50 ±0.25	0.55 ±0.10

5. Ratings & Characteristics :

Characteristics	Rating Voltage	Feature	Measurement Method
		RH20	
Power Ratings (W)	Refer 5.2	1/2W	JIS Code 3A / JIS Code 3D
Resistance Value ( $\Omega$ )		47 $\Omega$ ~ 22M $\Omega$	Refer to JIS C 5201-1- 4.5
T.C.R (ppm/ $^{\circ}$ C)		±200	Refer to JIS C 5201-1- 4.8
Operation Temperature Range ( $^{\circ}$ C)		-55 ~ +155	
Resistance Tolerance (%)		±5	JIS C 5201-1- 4.2.5
Maximum Working Voltage (V)		1500	
Maximum Overload Voltage (V)		3000	Remark RH20 : DC 3000V , AC 2122V

Note : Except for the above standardized products, we also provide the customized products.



### 5.1 Derating Curve :

For resistors operated at ambient temperature over 70°C , power rating shall be derated in accordance with figure 1.

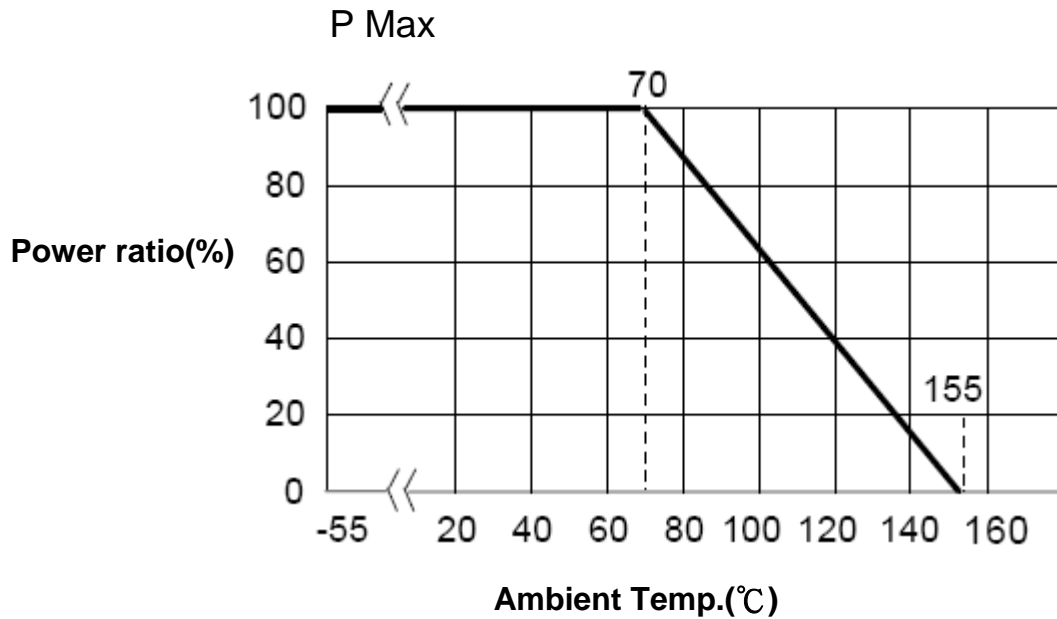


Figure 1

### 5.2 Rated Voltage:

The rated voltage is calculated by the following formula:

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

E=Rated Voltage(V)

P=Rated Power(W)

R=Resistance Value( $\Omega$ )

E.G. : What is RH20JEN304 the rated voltage ?

RH20JEN304 P=1/2W ; R:304=300K $\Omega$ =300,000 $\Omega$

$$E = \sqrt{1/2(W) * 300000 (\Omega)} = 387.29 V$$

**Remark : However , it shall not exceed the maximum rated voltage .**



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Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	4 / 9

**6. Reliability Tests:**

Test Items	Reference standard	Condition of Test	$\frac{\Delta R}{R}$ Test Limits
Visual examination		Checked by visual examination .	The marking shall be legible , as checked by visual examination
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-1-4.8	-55 ~ +125 °C	Refer to paragraph 5
Dielectric Withstanding Voltage ( Voltage Proof )	IEC60115-1-4.7 JIS-C5201-1-4.7	500Va. c., voltage , 1 min .	No abnormalities such as flashover , burning dielectric breakdown shall appear .
Insulation Resistance	IEC60115-1-4.6 JIS-C5201-1-4.6	100V voltage , 1 min .	$\geq 1G$
Solderability	IEC60115-1-4.17 JIS-C5201-1-4.17	245 $\pm 5^{\circ}C$ solder, 2 $\pm 0.5$ sec dwell. Solder : Sn96.5/Ag3/Cu0.5	At least 95% of surface area of electrode shall be covered with new solder.
Short Time Overload	IEC60115-1-4.13 JIS-C5201-1-4.13	2.0 X rated voltage, 2s DC : 3000 V Max , AC (RMS) : 2122V Max Test Substrate : pitch 10.16 mm	$\pm 1\% + 0.05 \Omega$
Resistance to Soldering Heat	IEC60115-1-4.18 JIS-C5201-1-4.18	270 $\pm 5^{\circ}C$ solder , 10 $\pm 1$ sec dwell .	$\pm 1\% + 0.05 \Omega$
Rapid Change of Temperature	IEC60115-1-4.19 JIS-C5201-1-4.19	-55°C (30 min. ) / +155 °C (30 min. ) 5 cycles	$\pm 1\% + 0.05 \Omega$
Load Life	IEC60115-1-4.25.1 JIS-C5201-1-4.25.1	1000 hours at rated power , 70°C , 1.5hours "ON " , 0.5hour "OFF"	$\pm 5\% + 0.1 \Omega$
Load Life with Humidity	IEC60115-1-4.24 JIS-C5201-1-4.24	1000 hours at rated voltage , 40 $\pm 2^{\circ}C$ , 90~95% RH 1.5hours "ON " , 0.5hour "OFF"	$\pm 5\% + 0.1 \Omega$



Thick Film High Voltage Lead-Free  
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Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	5 / 9

7. Marking

7.1 ±5%(E24)

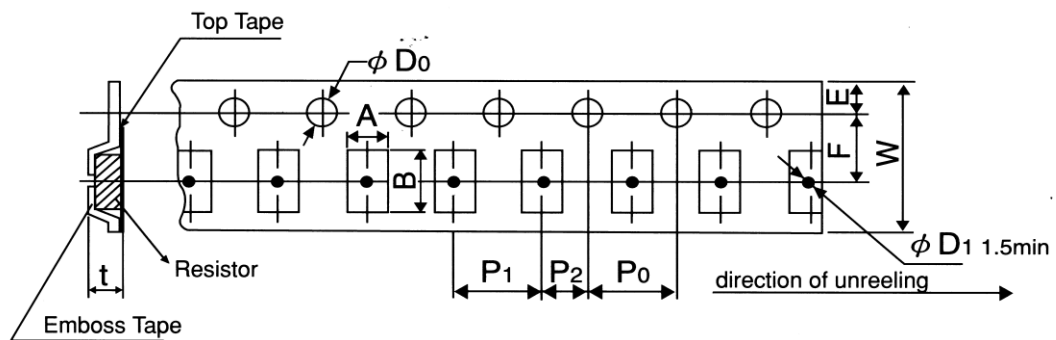
Resistance value is expressed by 3 digits, the first two digits represent the significant figures of nominal resistance value in Ω, and the third digit represents exponent for base of 10.

Ex. 106 =  $10 \times 10^6 = 10000000 \Omega = 10M\Omega$

8. Taping & Reel

8.1 Taping Dimensions

8.1.1 4 mm pitch paper



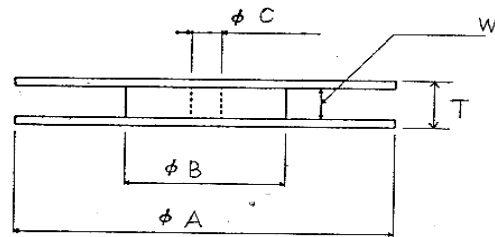
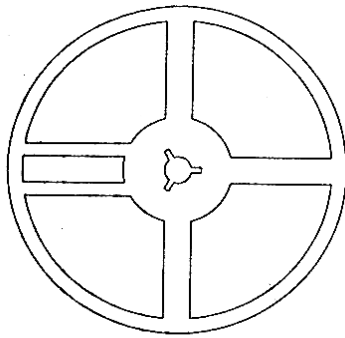
UNIT: mm

Packing	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	D <sub>0</sub>	T
Paper Tape	RH20	2.8 ±0.2	5.3 ±0.2	12.0 ±0.2	5.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.05	φ 1.5 <sup>+0.1</sup> <sub>-0</sub>	0.85 ±0.15

Type series		Emboss Plastic Tape	
		4 mm pitch	
		178mm/R	
RH	20	4000	



### 8.2 Reel Specifications

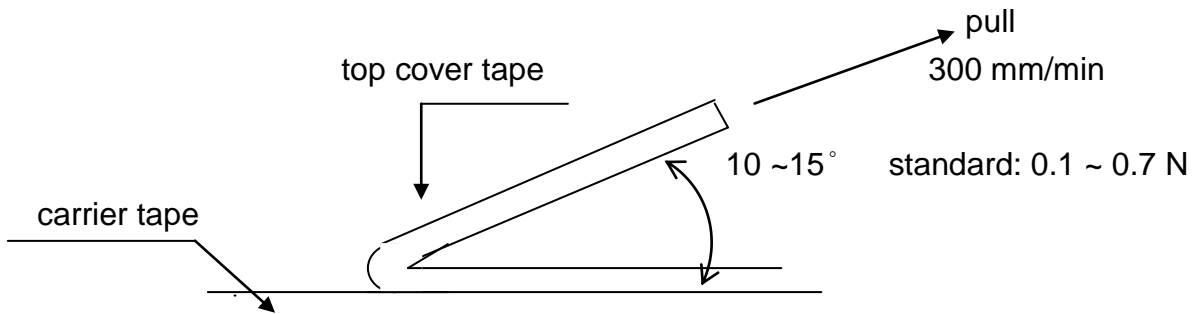


UNIT: mm

Type	$\phi A$	$\phi B$	$\phi C$	W	T
RH20	$178.0 \pm 2.0$	$60.0 \pm 1.0$	$13.0 \pm 1.0$	$13.0 \pm 1.0$	$15.5 \pm 1.0$

### 8.3 Peel –off force :

Peel –off force of paper and blister tape is in accordance with “JIS-C5202 ”  
that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



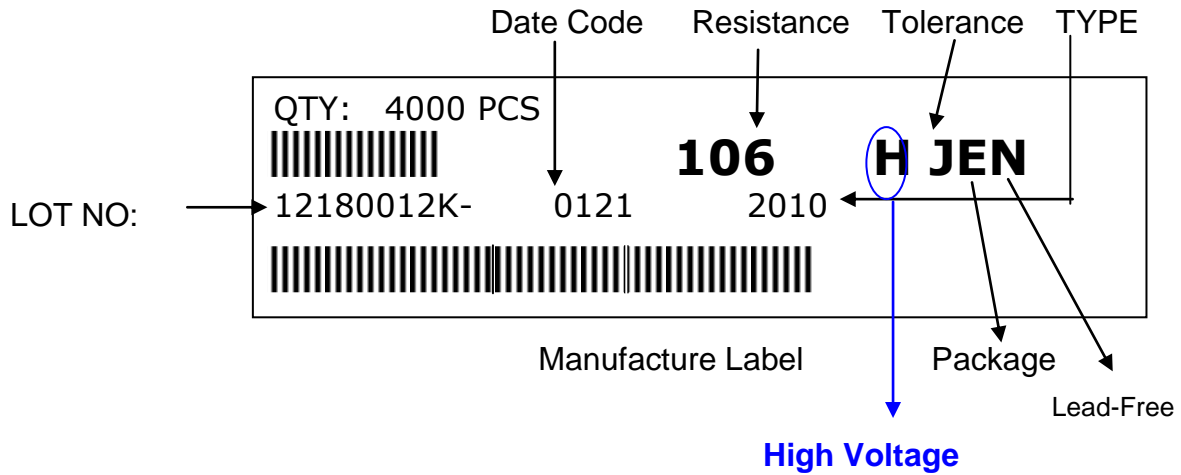


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Halogen-Free

Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	7 / 9

9 Label

9.1 Manufacture Label :

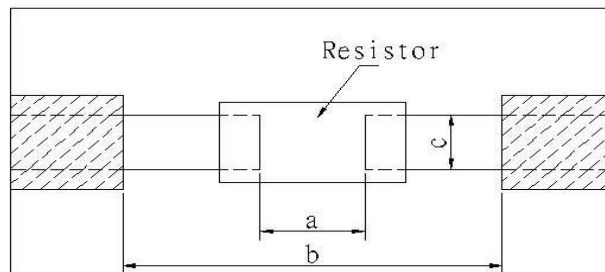


9.2 Customer Label ( By customer request ):

Lead-Free Products



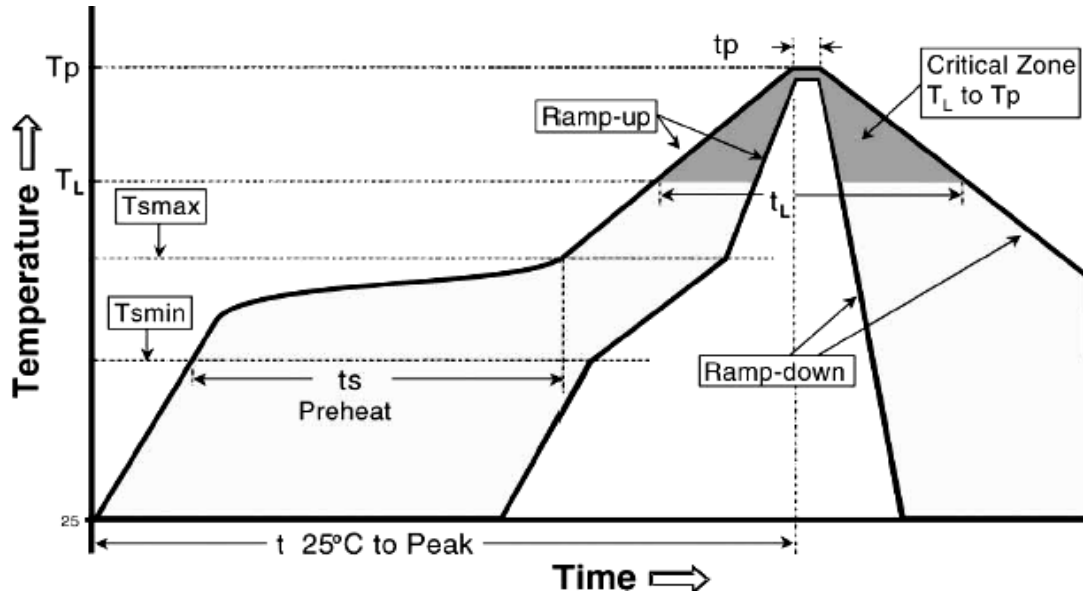
10. Recommended land patterns



Land pattern		Dimension ( mm )		
Type	Size	a	b	c
RH	20 (2010 )	3.3~3.7	5.7~6.5	2.3~3.5



11. Recommend IR – Reflow profile : (solder : Sn96.5 / Ag3 / Cu0.5)



Profile Feature	Lead (Pb )-Free Assembly
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	$3^\circ C / \text{second max.}$
Preheat - Temperature Min ( $T_{smin}$ ) - Temperature Max ( $T_{smax}$ ) - Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	$150^\circ C$ $200^\circ C$ 60 -150 seconds
Time maintained above : - Temperature ( $T_l$ ) - Time ( $T_l$ )	$217^\circ C$ 60-120 seconds
Peak Temperature ( $T_p$ )	$260^\circ C$
Time within $\begin{matrix} +0^\circ C \\ -5^\circ C \end{matrix}$ of actual Peak Temperature ( $t_p$ ) <sup>2</sup>	10 seconds
Ramp-down Rate	$6^\circ C/\text{second max.}$
Time $25^\circ C$ to Peak Temperature	8minutes max.

Alloyed Re-flow times : 3 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes,  
please use N2 Re-flow furnace .





Thick Film High Voltage Lead-Free  
Chip Resistors (for 2010)  
Halogen-Free

Document No.	TRH-200S003E
Revise Date	2021/12/10
page number	9 / 9

**12. Storage Conditions:**

Temperature: 5°C~35°C, Humidity:40%~75%

**13. Shelf Life:**

2 years from manufacturing date.

**14.ECN**

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

**15. Manufacturing Country & City :**

TA-I TECHNOLOGY CO., LTD. ( Taiwan- Tao Yuan )  
Tel: 886-3-3246169 Fax : 886-3-3246167

**Associated companies :**

- (1) FORTUNE TASK RESISTOR FACTORY ( China – Dongguan )  
Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794
- (2) TA-I TECHNOLOGY (DONGGUAN ) CO., LTD. ( China –Dongguan )  
Tel : 86-769-8339-4790~3 Fax : 86-769-8339-4794
- (3) TA-I TECHNOLOGY ( SU ZHOU ) CO., LTD. ( China – Su Zhou)  
Tel :86- 512-63457879 Fax : 86-512-63457869
- (4) TAI OHM ELECTRONICS ( M ) SDN. BHD. ( Malaysia – Pulaupinang )  
Tel :604- 3900480 Fax : 604-3901481
- (5) P.T.TAI ELECTRONICS Indonesia ( Indonesia – Jakarta )  
Tel :62-21-89830123 Fax : 62-21-89830703

单击下面可查看定价，库存，交付和生命周期等信息

[>>TA-I\(大毅\)](#)