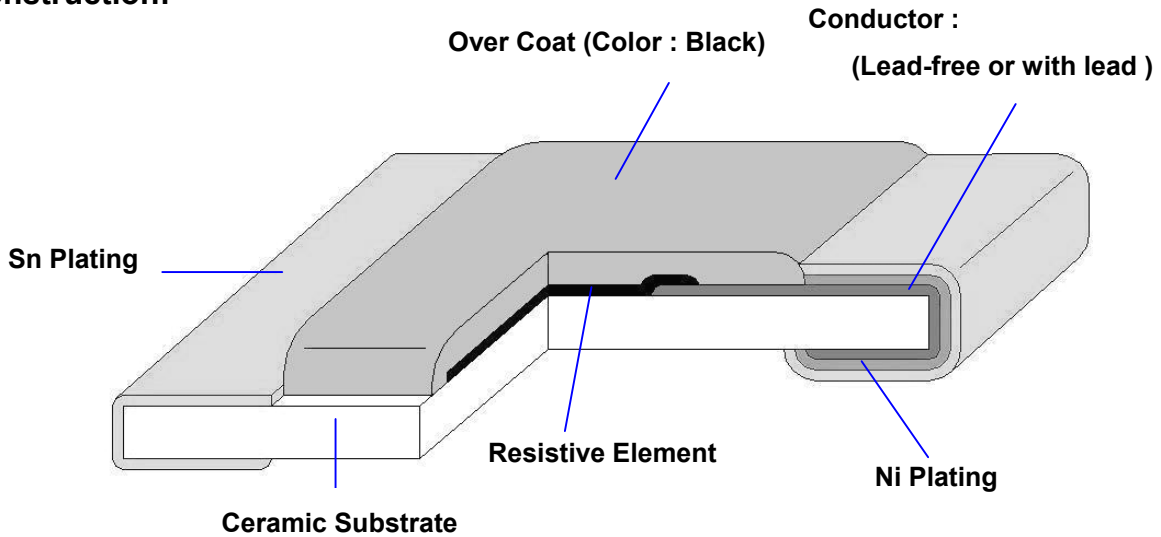


TA-I	Thick Film Chip Resistors (Lead-Free for RM12 Series)	No	TRM-120S006F
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1. Scope :

This specification applies for the RM12 series of thick film chip resistors made by TA-I.

2. Construction:



3. Type Designation:

<u>RM</u>	<u>12</u>	<u>J</u>	<u>TN</u>	<u>470</u>
Product Code	Size	Tolerance	Packaging	Nominal Resistance
RM : Chip Resistor	Power Rating			

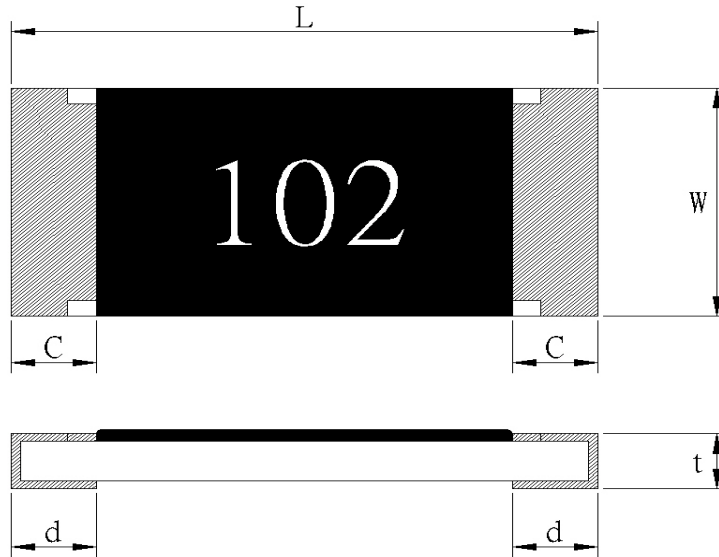
12-1206(3216) 1/4W

J - ±5%
 G - ±2%
 F - ±1%
 D - ±0.5%
 B - ±0.1%

T-Paper Tape
 +N: Lead-Free

3 digits, e.g.,:
 (E-24) 103 = 10kΩ
 0 = 0Ω
 4 digits, e.g.,:
 (E-96) 1540 = 154Ω
 43R2 = 43.2Ω

4. Dimensions:



UNIT: mm

Type	L	W	C	d	t
RM12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.60±0.10

5. Ratings & Characteristics :

Type	Power Rating at 70°C	Rated Voltage	Max. Working Voltage	Max. Over-Load Voltage	T.C.R (PPM/°C)	Resistance Range(Ω)				
						B(±0.1%) E-96	D(±0.5%) E-96	F(±1%) E-96	G(±2%) E-24	J(±5%) E-24
RM12	1/4W	Refer 5.2	200V	400V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
					±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10M<R≤20MΩ

Ω THICK FILM CHIP RESISTORS

Type	Rated Current	Max Overload Current	Resistance Range
RM12	2A	5A	50mΩ MAX

2. Operating Temp(°C): : -55°C ~ +155°C

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.

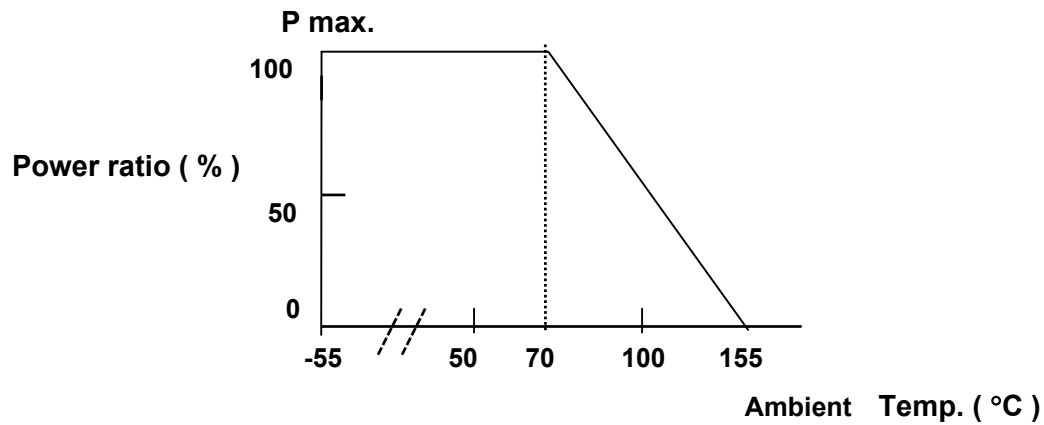


Figure 1

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(Ω)

E.G. : What is RM12JTN102 the rated voltage ?

RM12JTN102 P:1/4W ; R:102 = 1K Ω = 1000 Ω

$$E = \sqrt{0.25(W) * 1000(\Omega)} = 15.8 (V)$$

6. Reliability Tests: (As specified in JIS C 5202)

Test Items	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	JIS-C5202-5.2	-55~ +125 °C	Refer 5.0
Short Time Overload	JIS-C5202-5.5	2.5 X rated voltage for 5 sec	± (1% + 0.05 Ω) 0 Ω : 50mΩ or less
Intermittent Overload	JIS-C5202-5.8	3.0 X rated voltage or Max Overloading voltage ,1sec "ON" , 25sec "OFF" , 10000 cycles	± (5.0% + 0.1 Ω) 0 Ω : 50mΩ or less
Load Life	JIS-C5202-7.10	1000 hours at rated voltage , 70°C , 1.5hours "ON " , 0.5hour "OFF"	0.5%,1%:±(1.0%+0.05 Ω) 2%,5%:±(3.0%+0.1 Ω) 0 Ω : 100mΩ or less
Load Life with Humidity	JIS-C5202-7.9	1000 hours at rated voltage , 40±2°C , 90~95% RH 1.5hours "ON " , 0.5hour "OFF"	0.5%,1%:±(1.0%+0.05 Ω) 2% , 5%:±(3.0%+0.1 Ω) 0 Ω : 100mΩ or less Without mechanical damage
Rapid Change of Temperature	JIS-C5202-7.4	-55°C (30 min.) / +155 °C (30 min.) 5 cycles	0.5%,1% : ±(0.5%+0.05 Ω) 2% , 5% : ±(1.0%+0.05 Ω) 0 Ω : 50mΩ or less
Solderability	JIS-C5202-6.11	245±5°C solder, 2±0.5 sec dwell. Solder : Sn96.5 / Ag3.0 / Cu0.5	At least 95% of surface area of electrode shall be covered with new solder.
Robustness of Termination (Bending)	JIS-C5202—6.1	3mm deflection	0.5%,1%:±(0.5%+0.05 Ω) 2%,5%:±(1.0%+0.05 Ω) 0 Ω : 50mΩ or less
Dielectric Withstanding Voltage (Voltage Proof)	JIS-C5202-5.7	Applying voltage : 500V for a minute .	No abnormalities such as flashover, burning dielectric breakdown shall appear.
Insulation Resistance	JIS-C5202-5.6	Applying voltage 100V for 1 minute.	≥ 1G Ω
Resistance to Dry Heat	JIS-C5202-7.2	155±5°C for 96±4Hrs	0.5%,1% : ±(1.0%+0.05 Ω) 2%,5% : ±(2.0%+0.1 Ω) 0 Ω : 50mΩ or less
Resistance to Solder Heat	JIS-C5202-6.10	270 ±5°C solder , 10 ±1 sec dwell .	0.5%,1%:±(0.5%+0.05 Ω) 2% , 5%:±(1.0%+0.05 Ω) 0 Ω : 50mΩ or less

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Whisker	SONY SS-00254-8	<p>Component , Lead-Free Soldering part 8 : Solder Heat Resistance Test for SMD. Lead-Free Soldering “</p> <p>Temp. Cycles : -35 ± 5°C / 125 ± 5°C , Keep 7 min Testing duration : 500±4 hours</p> <p>Temp. Humidity Chambers: Temperature : 85°C Humidity : 85% RH Testing duration : 500±4 hours .</p>	Whisker formation : 50 um or less .
Resistance to Solder Heat	SONY SS-00254-5	<p>Component , Lead-Free Soldering part 5 : Solder Heat Resistance Test for SMD. Lead-Free Soldering “</p> <p>Flow Solder : Pre – heat : 100 to 105 °C 30±5 sec Temperature : 260±3°C 10 +1/- 0 sec The entire sample shall be dipped in solder. The specimen shall be stored at standard atmospheric conditions for 1 hour .</p> <p>Iron Solder : Bit temperature : 350 ±10°C Application time of soldering iron : 3 +1/- 0sec Apply the soldering iron to the electrode . The specimen shall be stored at standard atmospheric conditions for 1 hour , after which the measurements shall be made</p>	Electrical characteristics shall be Satisfied . Without distinct deformation in appearance

Note* : RCWV : Rated continuous working voltage .

7. Marking :

7.1 ±2% & ±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.

E.G. :, 472 = $47 \times 10^2 = 4700 \Omega = 4.7K\Omega$

7.2 ±1% (E96)

Resistance value is expressed by 4 digits or 3digits , the first three digits represent the significant figures of nominal resistance value in Ω , and the fourth digit represents exponent for base of 10.

E.G. : 4701 = $470 \times 10^1 = 4700 \Omega = 4.7K$

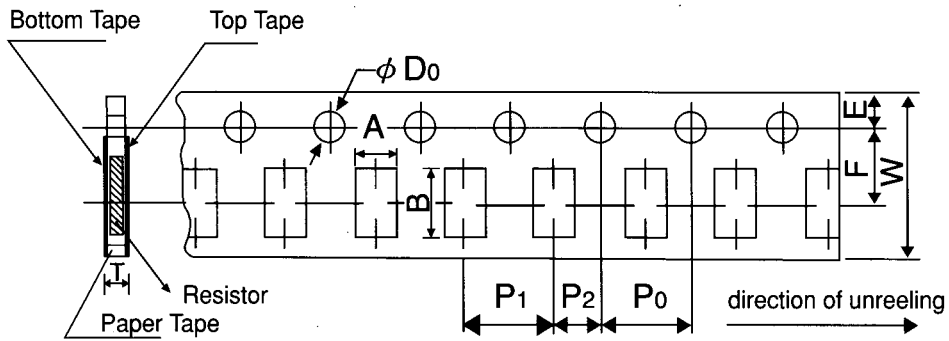
7.3 ±1%(E96/3digital)

The resistance value by 3 digits is requirement for customer.

8. Taping & Reel :

8.1 Taping Dimensions

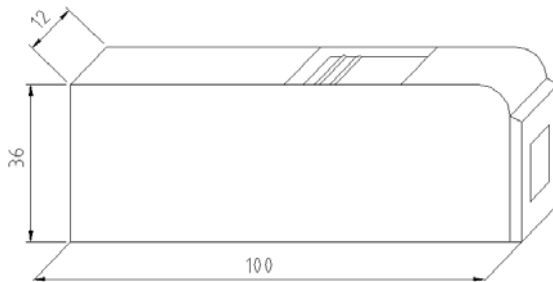
8.1.1 4 mm pitch paper :



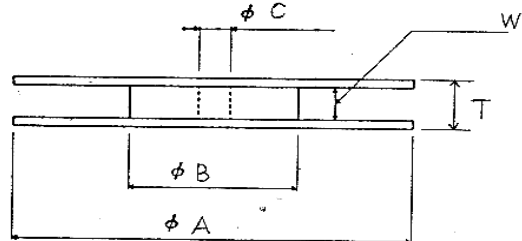
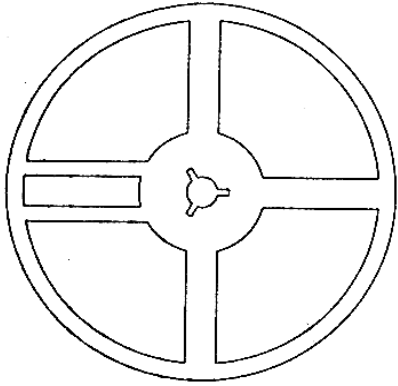
Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Paper	RM12	2.0±0.15	3.6±0.2	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	φ 1.5 +0.1 -0	0.84±0.1

Type	Package Size	Paper Tape		Bulk
		4 mm pitch		
		178mm/R	250mm/R	
RM	12	5000	10000	5000

8.1.2 Bulk Case Specifications:



8.2 Reel Specifications:

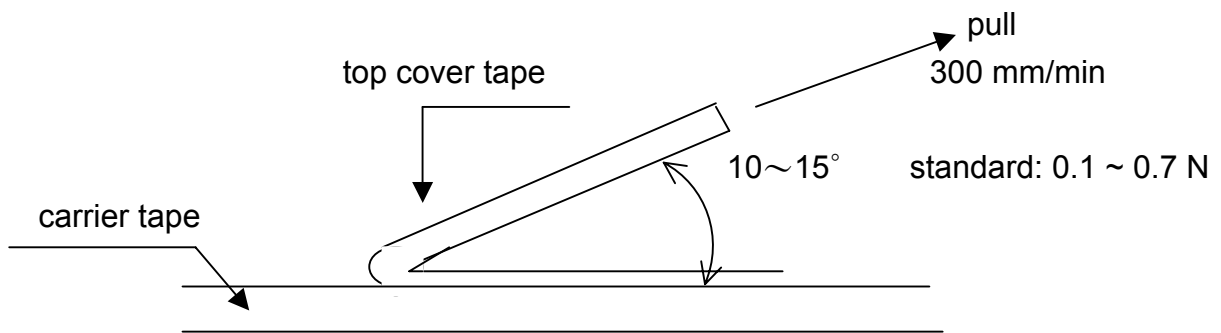


UNIT: mm

Type	ϕA	ϕB	ϕC	W	T
RM12	178.0 ± 2.0	60.0 ± 1.0	13.0 ± 1.0	9.0 ± 1.0	11.5 ± 1.0

8.3. Peel –off force :

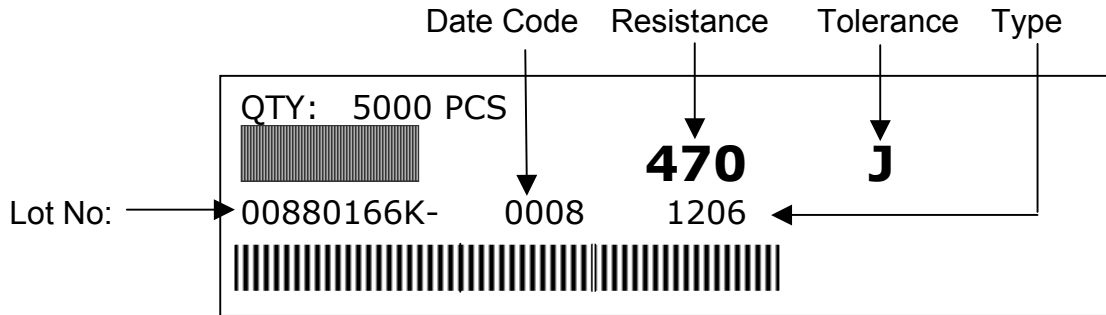
Peel –off force of paper and blister tape is in accordance with “JIS-C5202 ”
that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



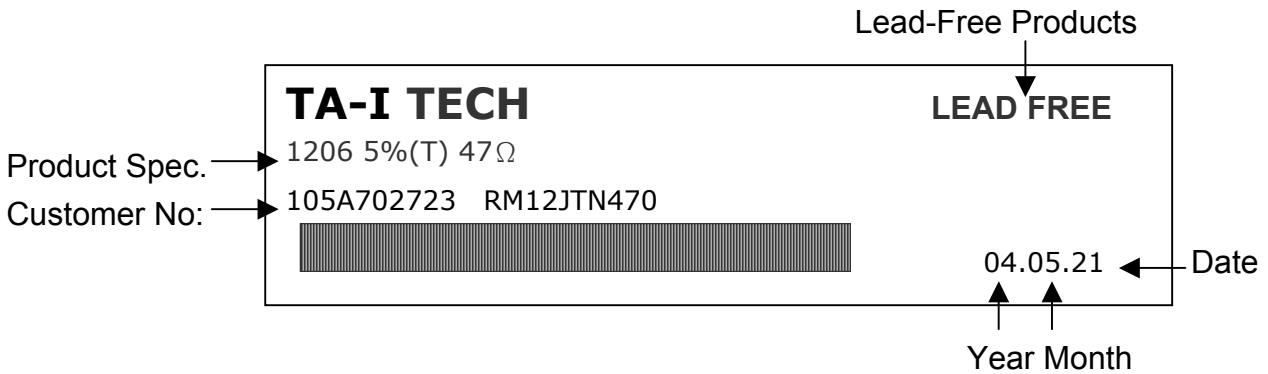
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9. Label :

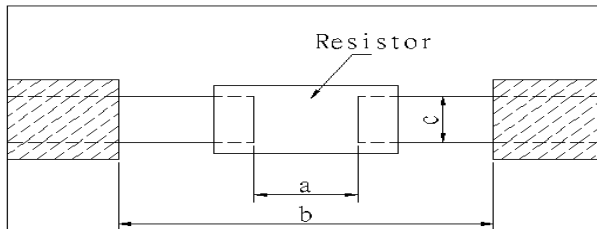
9.1 Manufacture Label :



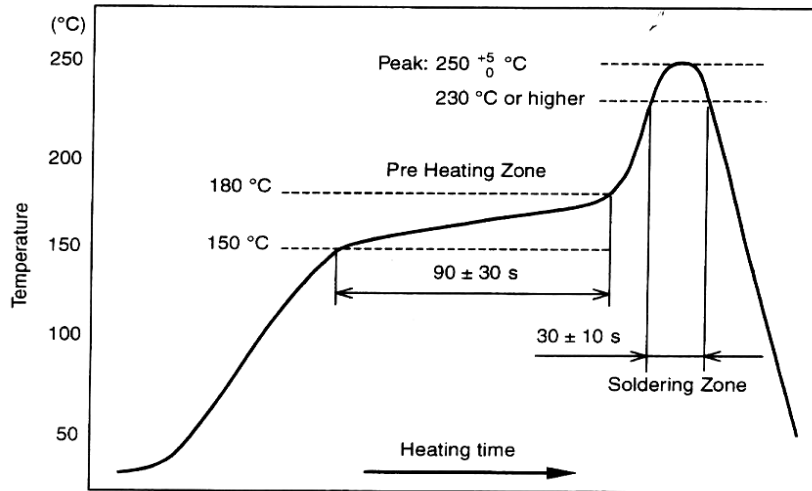
9.2 Customer Label (By customer request):



10. Recommended land patterns :



Land pattern		Dimension (mm)		
		a	b	c
Type	Size			
RM	12 (1206)	2.0~2.4	4.4~5.0	1.2~1.8

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

Peak : $250 \begin{matrix} +5 \\ -0 \end{matrix} ^\circ\text{C}$, 5 sec

Pre – heat Zone : 150 to 180 °C , 90±30 sec

Soldering Zone : 230°C or higher , 30±10 sec

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 :002-62-21-44820254 Fax : 002-62-21-44820256