



Thin Film Chip Resistors
RBM series Standard (Halogen –Free)
AEC-Q200 qualified

Document No TRBM-XX0S001J

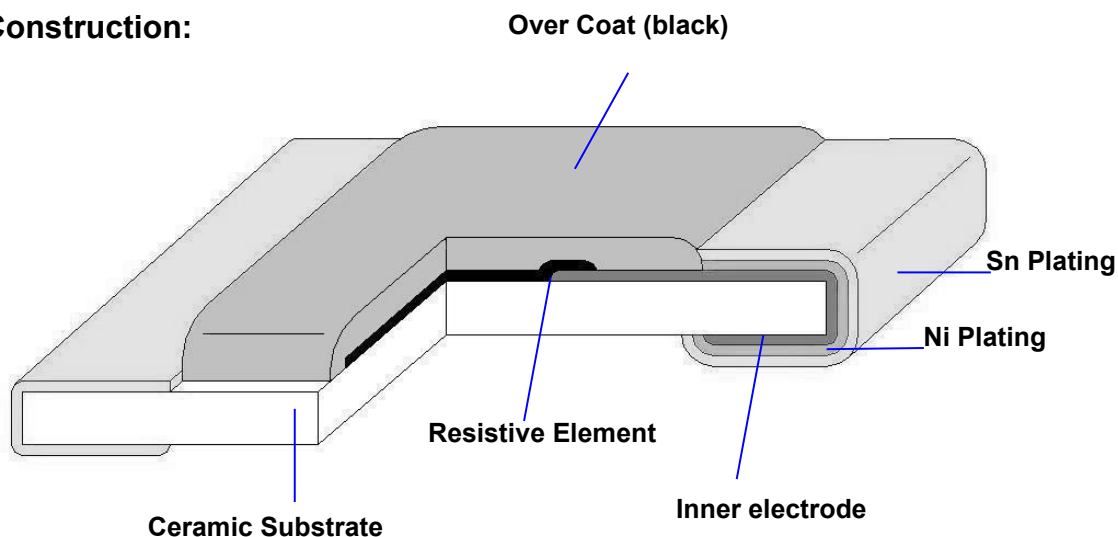
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1. Scope:

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

2. Construction:



3. Type Designation:

RBM

12

D

T

P

1001

Product Code

Size

Tolerance

Packaging

TCR

Nominal

RBM: Thin Film

Power Rating

Resistance

10-0805(2012) 0.3W

12-1206(3216) 0.4W

B- $\pm 0.10\%$

D- $\pm 0.50\%$

F- $\pm 1.00\%$

T- Paper

Tape

E-Emboss

Plastic

M- ± 15 ppm

P- ± 25 ppm

S- ± 50 ppm

e.g.,

1001=1k Ω



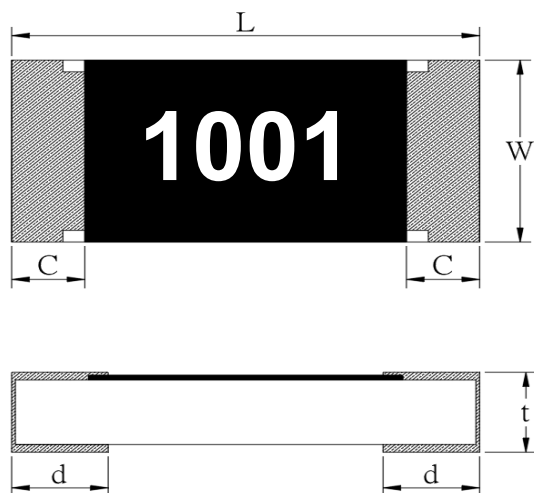
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4. Dimensions:



Type	L	W	C	d	t
RBM10	2.00 ±0.10	1.25 ±0.10	0.40 ±0.20	0.40 ±0.20	0.68 ±0.10
RBM12	3.20 ±0.15	1.55 ±0.15	0.50 ±0.30	0.40 ±0.20	0.68 ±0.10

UNIT: mm



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5. Ratings & Characteristics

Type	Power Rating at 70℃	Rated Voltage	Max. Working Voltage	Max. Over-Load Voltage	T.C.R (PPM/℃)	Resistance Range (Ω)	Resistance tolerance(%)
RBM10	0.3W	Refer 5.2	150V	200V	±15 ±25 ±50	1 ~221K	± 0.5/1.0
						221K~511K	± 0.1/0.5/1.0
RBM12	0.4 W	Refer 5.2	200V	300V	±15 ±25 ±50	1~221K	± 0.5/1.0
						221K~511K	± 0.1/0.5/1.0
Operating Temp (℃): -55℃ ~ +155℃							

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



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5.1 Derating Curve:

For resistors operated at ambient temperature over 70°C, power rating shall be derated according to figure 1.

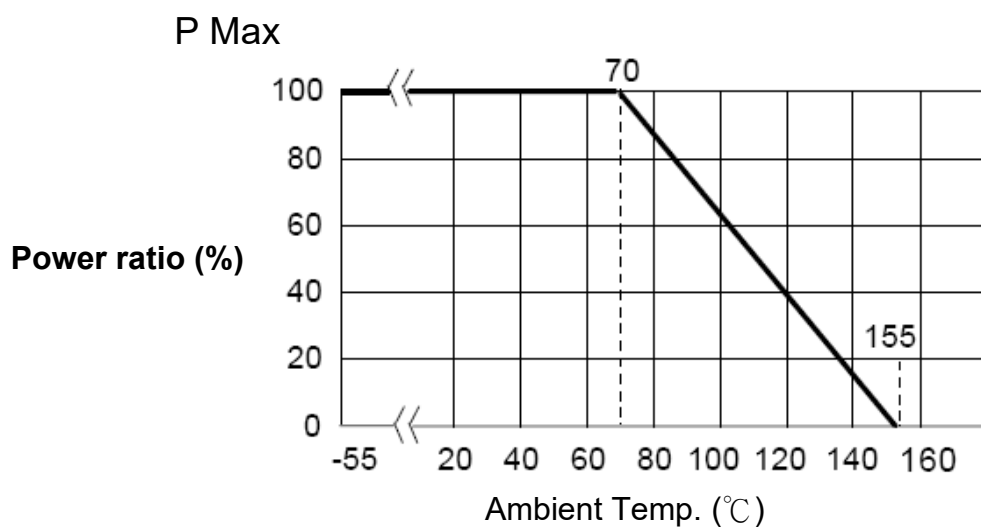


Figure 1.

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)



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6. Reliability Tests: (AEC-Q200)

Test Items	Reference standard	Condition of Test	Test Limits
Flowers of sulfur corrosion (FoS)	ASTM-B-809-95* EIA-977	Sulfur 1000 hours, 105°C Unpowered	±(1%+0.05Ω)
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS C5201-1-4.8	+25 to +125 °C	Refer 5.0
Short Time Overload	IEC60115-1-4.13 JIS C5201-1-4.13	2.5 X rated voltage for 5sec	±(0.05%+0.05Ω)
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=125°C. Unpowered. 1000 hrs. @ T=155°C. Unpowered.	±(0.1%+0.05Ω) ±(0.2%+0.05Ω)
Low Temperature Storage	EC60115-1 4.23.4 JIS C 5201-1 4.23.4	-55°C, 1000hrs	±(0.1%+0.05Ω)
Temperature Cycling	JESD22-A104	-55°C(30 min.) / +155°C(30 min.), 1000 cycles.	±(0.1%+0.05Ω)
Humidity Bias	MIL-STD-202 Method 103	1000 hours 85°C/85%RH. 10% Rated Power.	±(0.1%+0.05Ω)
High Temperature Operating Life	MIL-STD-202 Method 108	1000 hrs. @ T=70°C. rated power (90 min ON and 30 min OFF)	±(0.1%+0.05Ω)
Resistance to Solvent	MIL-STD-202 Method 215	a: Isopropyl Alcohol b: Terpene Defluxer c: Deionized water : Propylene Glycol Monomethyl Ether : monoethanolamine =42 : 1 : 1	Marking and protective layer can't be detached
Mechanical Shock	MIL-STD-202 Method 213	Wave Form: Tolerance for half sine shock pluse. Peak value is 100g's. Normal duration(D) is 6(ms)	±(0.1% +0.05Ω)
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz.	±(0.1% +0.05Ω)
Resistance to Solder Heat	MIL-STD-202 Method 210	Condition K: 250±5°C solder, 30±5 sec dwell. Time above 217 °C, 60~150 sec.	±(0.05% +0.05Ω)
ESD	AEC-Q200-Test 17	Human body model 04/06: 200V & 10/12: 1kV	±(0.5% +0.05Ω)
Solderability	J-STD-002	Aging 4 hours at 155 °C dry heat Lead-free solder bath at: (1) Method B1: 245 ±5°C solder, 5±0.5 sec dwell. (2) Method D: 260 ±5°C solder, 30 ±0.5 sec dwell.	At least 95% of surface area of electrode shall be covered with new solder.
Flammability	UL-94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1
Board Flex (Bending)	AEC- Q200-005	3mm deflection, for 60 seconds	±(0.1% +0.05Ω)
Terminal Strength (SMD)	AEC- Q200-005	04: 1.0kg for 60 seconds 06/10/12: 1.8kg for 60 seconds	No broken
External Visual	MIL-STD-883 Method 2009	Inspect device construction, marking and workmanship. Pre and Post Electrical Test not required.	
Physical Dimensions	JESD22-B100	Verify physical dimensions to the applicable component specification. Pre and Post Electrical Test not required.	

Note: MSL= Level 1.



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7. Marking

7.1 E96: RBM10 / RBM12

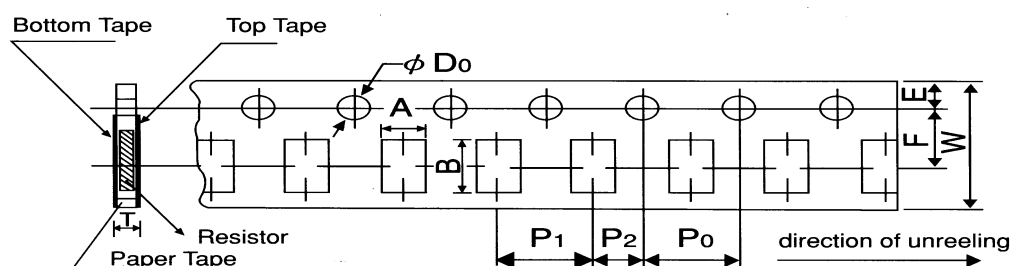
Resistance value is expressed by 4 digits, the first three digits represent the significant figures of nominal resistance value in Ω , and the fourth digit represents exponent for base of 10.

E.G.: $1000 = 100 \times 10^0 = 100\Omega$

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 Tape	RBM10	1.6±0.15	2.4±0.2	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.1	4.0±0.1	Φ1.5 ^{+0.1} ₋₀	0.84±0.1
	RBM12	2.0±0.15	3.6±0.2								0.84±0.1

UNIT: mm

Type / Size		Package
		Paper Tape
		4 mm pitch
RBM	10	180mm/R
RBM	12	5000



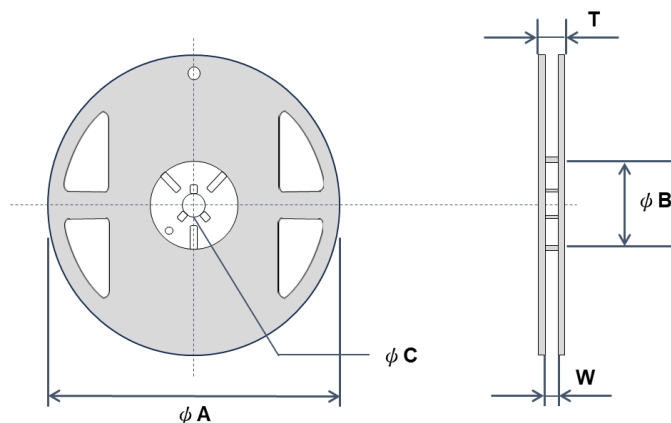
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8.2 Reel Specifications

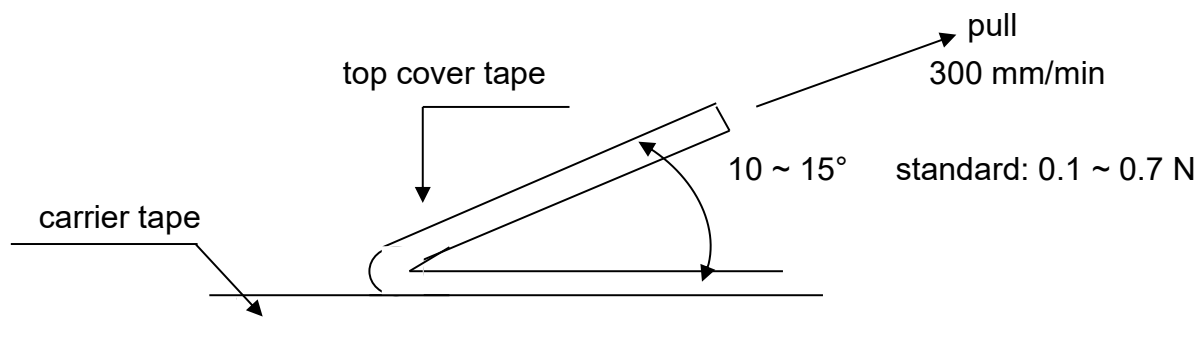


Type	ΦA	ΦB	ΦC	W	T
RBM 10/12	178.0 ±2.0	60.0 ±1.0	13.0 ±1.0	9.0 ±1.0	11.4 ±1.0

UNIT: mm

8.3 Peel – off force:

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



UNIT: mm



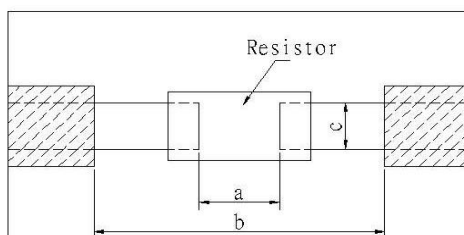
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9. Recommended land patterns



Land pattern Type Size		Dimension (mm)		
		a	b	c
RBM	10 (0805)	1.0 ~ 1.4	3.2 ~ 3.8	1.3 ~1.4
RBM	12 (1206)	2.0 ~ 2.4	4.4 ~ 5.0	1.6 ~1.8

10. 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.

11. Storage Conditions:

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

12. Shelf Life:

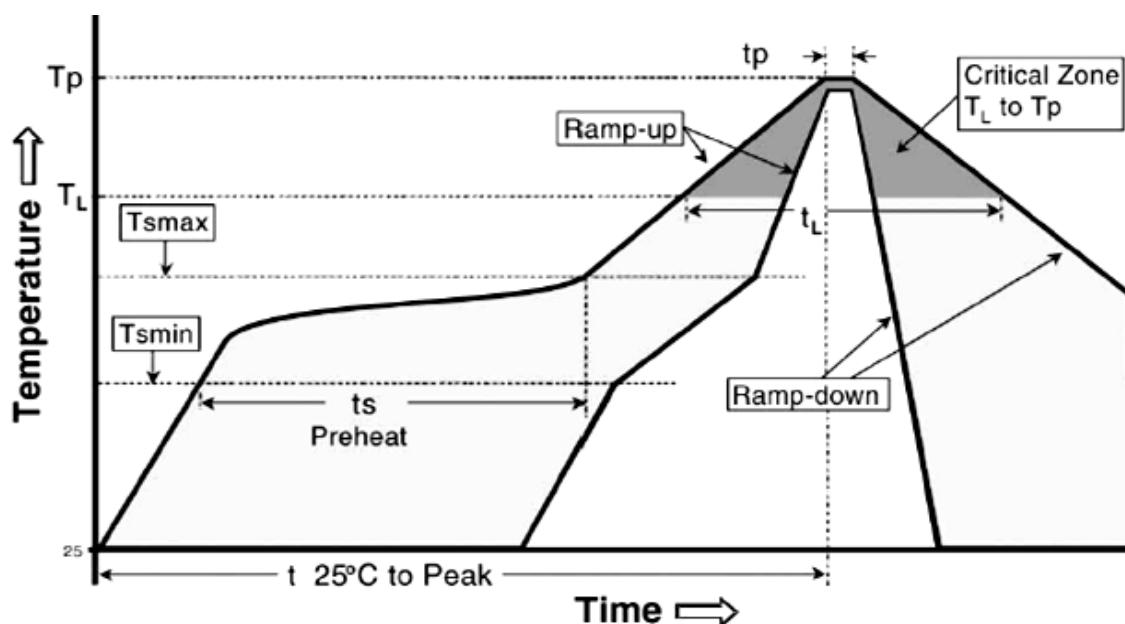
2 years from manufacturing date.



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13. 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°C / second max.
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (T_{smin} to T_{smax}) (t_s)	150°C 200°C 60 -120 seconds
Time maintained above: - Temperature (T_L) - Time (t_L)	217°C 60 -150 seconds
Peak Temperature (T_p)	MAX:260°C
Time within $+0^\circ\text{C}$ to -5°C of actual Peak Temperature (t_p) ²	30 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8minutes max.