

Specification

(Reference)

Title: CHIP ATTENUATORS

Style: RAC101A

RoHS COMPLIANCE ITEM

Product specification contained in this specification
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If you have any questions or a Purchasing Specification for any quality
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Issue Dept.: Research & Development Department Hokkaido Research Center

1. Scope

1.1 This specification covers the detail requirements for chip attenuators, style of RAC10 1A.

1.2 Country of origin China

2. Classification

Type designation shall be the following form.

(Example)

RAC	10	1	A	1	C	TH
1	2	3	4	5	6	7

Style

1 Chip attenuators

2 Size

Symbol	1
Characteristic impedance	50Ω

4 Circuit

Symbol	A
Circuit	Unbalanced π type

Attenuation factor	Symbol	1	2	3	4	5	6	7	8	9	A
	Attenuation factor	1dB	2dB	3dB	4dB	5dB	6dB	7dB	8dB	9dB	10dB

6 Terminal style

7 Packaging form

3. Rating

3.1 The ratings shall be in accordance with Table-1.

Table-1

Style	Terminations style	Attenuation factor (dB)	Attenuation factor tolerance (dB)	Frequency range	Voltage standing wave ratio VSWR	Rated input power (at 85 °C)
RAC101A	C	1,2,3,4,5	±0.3	DC≤f≤3GHz	1.2 max.	100 mW/package
		6,7,8,9,10	±0.4			

Style	Working temperature range (°C)	Storage temperature range (Single unit) (°C)
RAC101A	-40~+125	-55~+125

4. Packaging form

The standard packaging form shall be in accordance with Table-2.

Table-2

Symbol	Packaging form	Standard packaging quantity / units
B	Bulk (loose package)	1,000 pcs.
TH	Paper taping (8mm width), 2mm pitches	10,000 pcs.

5. Dimensions

5.1 The resistor shall be of the design and physical dimensions in accordance with Figure-1 and Table-3.

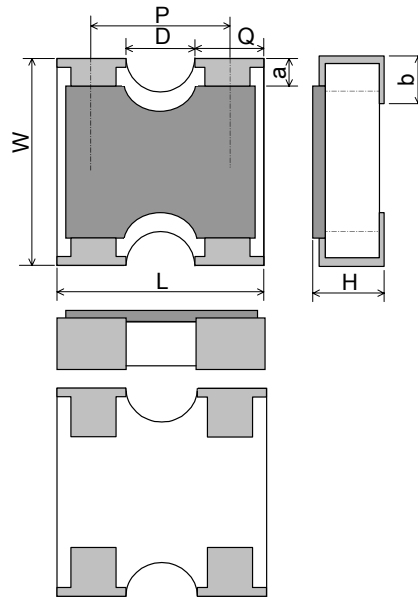


Figure-1
Table-3

Style	L	W	H	Q	a	b	*P
RAC101A	1.0±0.1	1.0 ^{+0.1} ₋₀	0.35±0.10	0.33±0.10	0.15±0.10	0.25±0.10	0.65±0.10

Unit: mm

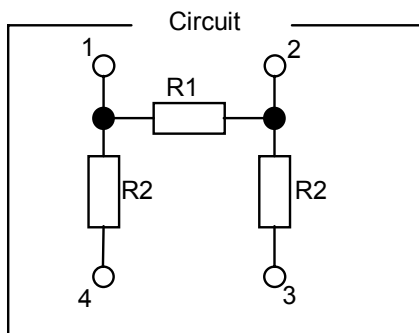
*Reference

5.2 Net weight (Reference)

Style	Net weight(mg)
RAC101A	1.1

6. Circuit and DC resistance value

6.1 Unbalanced π type circuit



6.2 DC resistance value (Reference)

Attenuation factor	R1 (Ω)	R2 (Ω)
1dB	5.769	869.5
2dB	11.62	436.2
3dB	17.62	292.4
4dB	23.85	221.0
5dB	30.40	178.5
6dB	37.35	150.5
7dB	44.80	130.7
8dB	52.84	116.1
9dB	61.59	105.0
10dB	71.15	96.25

7. Marking

The following of marking items shall be marked on over coat side.

Marking items; 1. Dot mark

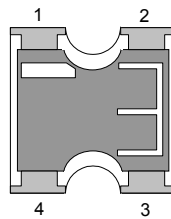
Example)

2. Attenuation factor

"1" → 1dB

"3" → 3dB

"A" → 10dB



8. Performance

8.1 Unless otherwise specified, the standard range of atmospheric conditions for tests is as follows;

Ambient temperature: 5 °C to 35 °C, Relative humidity: 45 % to 85 %, Air pressure: 86 kPa to 106 kPa

If there is any doubt the results, measurements shall be made within the following;

Ambient temperature: 20 °C ± 2 °C, Relative humidity: 60 % to 70 %, Air pressure: 86 kPa to 106 kPa

8.2 The performance shall be satisfied in Table-4.

Table-4(1)

No.	Test items	Condition of test	Performance requirements
1	Characteristic impedance	Test circuit RL: 50 Ω	50 Ω
2	Frequency	The test device: Network analyzer HP8753D Agilent Technologies Inc. (Max. frequency: 6 GHz)	Within the specified tolerance of attenuation factor. VSWR: See Table-1.
3	Insulation resistance	Test condition: Between terminal to over coat. Test potential: 50Vdc Test period: 1min.	100 MΩ min.
4	Substrate bending test	The test substrate: Glass fabric based epoxy resin. t: 1.6 mm Bending value: 3 mm (Among the fulcrums: 90 mm)	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of mechanical damage.
5	Resistance to soldering heat	Test condition: 260 °C ± 5 °C 10 s ± 1 s	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.
6	Solderability	Flax: Rosin-Methanol Test condition: 235 °C ± 5 °C 2 s ± 0.5 s	The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.

Table-4(2)

No.	Test items	Condition of test	Performance requirements		
7	Temperature cycling	Test cycle: 5 cycles for duty cycle as specified below.	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.		
		Step		Temperature (°C)	Time (min)
		1		Room temp.	2~3
		2		-55±3	30
		3		Room temp.	2~3
		4		125±2	30
		Leaving at the room temp. for 30 min. or more, and then measure the attenuation factor.			
8	Dry heat	The test substrate: Glass fabric based epoxy resin. t: 1.6 mm Test temp.: 125 °C ± 2 °C Test period: 1,000 ⁺⁴⁸ ₀ h Leaving at the room temp. for 2h or more, and then measure the attenuation factor.	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.		
9	Cold	The test substrate: Glass fabric based epoxy resin. t: 1.6 mm Test temp.: -55 °C ± 3 °C Test period: 1,000 ⁺⁴⁸ ₀ h Leaving at the room temp. for 2h or more, and then measure the attenuation factor.	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.		
10	Load life in humidity	The test substrate: Glass fabric based epoxy resin. t: 1.6 mm Test circuit: See No. 1. Test temp. & relative humidity: 60 °C ± 2 °C & 90 %~95 % Test voltage: Cycle of 1 h 30 min. "ON" and 30 min. "OFF" at dc rated voltage. Test period: 1,000 ⁺⁴⁸ ₀ h Leaving at the room temp. for 2h or more, and then measure the attenuation factor.	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.		
11	Load life	The test substrate: Glass fabric based epoxy resin. t: 1.6 mm Test circuit: See No. 1. Test temp. : 85 °C ± 2 °C Test voltage: Cycle of 1 h 30 min. "ON" and 30 min. "OFF" at dc rated voltage. Test period: 1,000 ⁺⁴⁸ ₀ h Leaving at the room temp. for 2h or more, and then measure the attenuation factor.	0.5dB ~ 2dB: Within ±0.1% 3dB ~ 5dB: Within ±0.2% 6dB ~ 10dB: Within ±0.3% No evidence of appearance damage.		

9. Taping

9.1 Applicable documents JIS C 0806-3: 1999, EIAJ ET-7200B: 2003

9.2 Taping dimensions

Taping dimensions shall be in accordance with below.

9.2.1 Paper taping, 8mm width, 2mm pitches

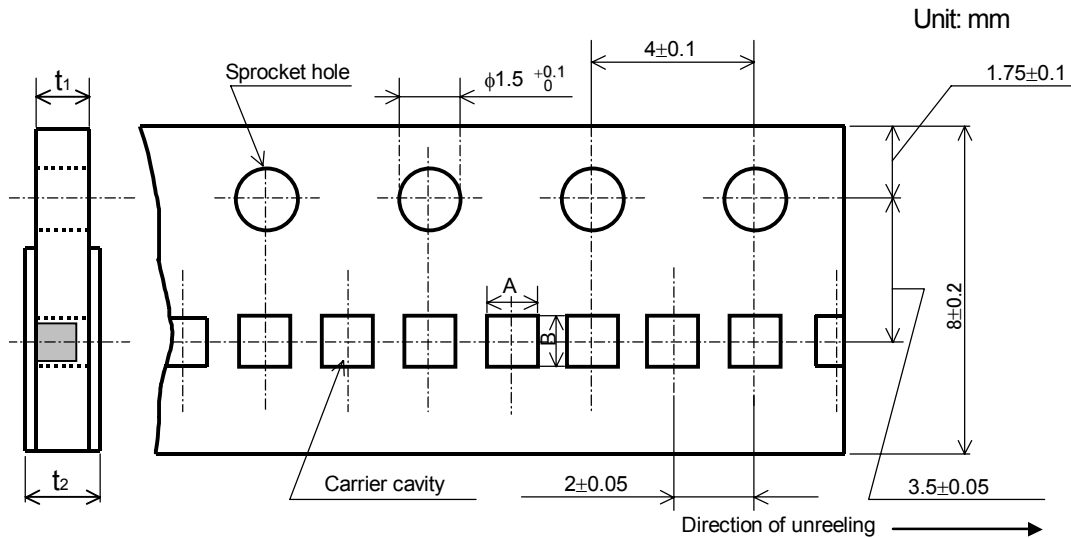


Figure-2

Table-5

Unit: mm

Style	A	B	t_1	t_2
RAC101A	$1.15^{+0.05}_{-0.10}$	$1.15^{+0.05}_{-0.10}$	$0.4^{+0.05}_{-0.10}$	0.55max.

- 1). The cover tapes shall not cover the sprocket holes.
- 2). Tapes in adjacent layers shall not stick together in the packing.
- 3). Components shall not stick to the carrier tape or to the cover tape.
- 4). Pitch tolerance over any 10 pitches ± 0.2 mm.
- 5). The peel strength of the top cover tape shall be within 0.1N to 0.5N on the test method as shown in the following Figure-3.
- 6). When the tape is bent with the minimum radius for 25 mm, the tape shall not be damaged and the components shall maintain their position and orientation in the tape.
- 7). In no case shall there be two or more consecutive components missing.
The maximum number of missing components shall be one or 0.1%, whichever is greater.
- 8). The attenuators shall be faced to upward at the over coating side in the carrier cavity.
- 9). The direction of attenuator shall be taped as Figure-4.

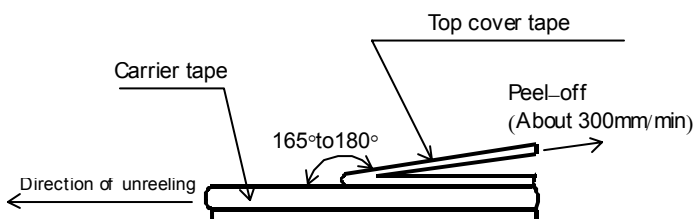


Figure-3

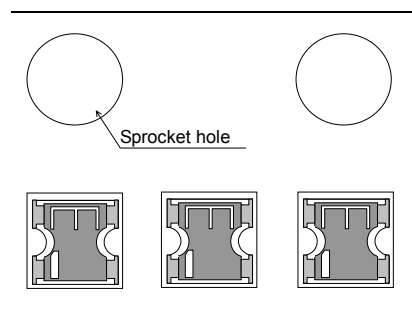


Figure-4

9.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-5 and Table-6.

Plastic reel (Based on EIAJ ET-7200B)

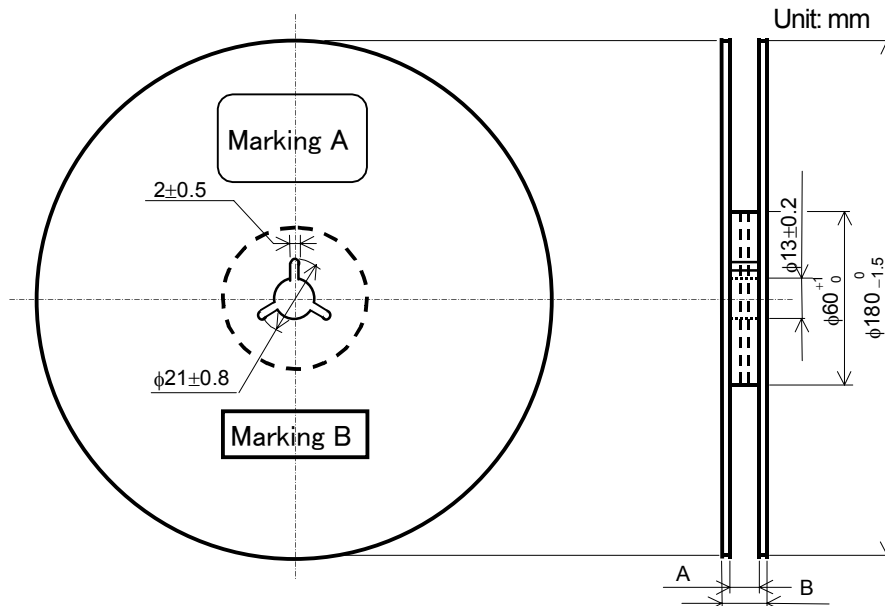


Figure-5

Table-6

Unit: mm

Style	A	B	Note
RAC101A	9 ^{+1.0} ₀	11.4±1.0	Injection molding
		13±1.0	Vacuum forming

Note: Marking label shall be marked on a place of Marking A or two place of marking A and B.

9.4 Leader and trailer tape.

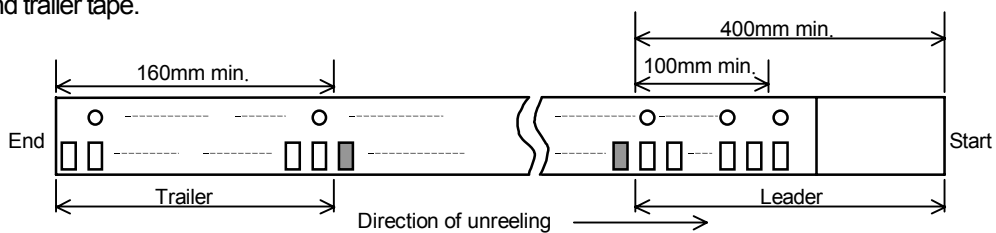


Figure-6

10. Marking on package

The label of a minimum package shall be legibly marked with follows.

10.1 Marking A

(1) Classification (Kind, Size, Style, Characteristic impedance, Circuit, Attenuation factor, Terminal style, Packaging form)

(2) Lot number (3) Quantity (4) Manufacturer's name or trade mark (5) Others

10.2 Marking B(KAMAYA control label)