

0404 Thick Film Chip Attenuator

1. Application

This specification applies to 1.0mm x 1.0mm (0404) size thick film chip attenuators.

2. Type Designation

PAT1010 — X — \*\*dB — C — C N  
 (1) (2) (3) (4) (5) (6)

Where (1) Series No :

(2) Circuit :  $\pi$  Type

(3) Attenuation Value

For example --

03dB = 3dB

10dB = 10dB

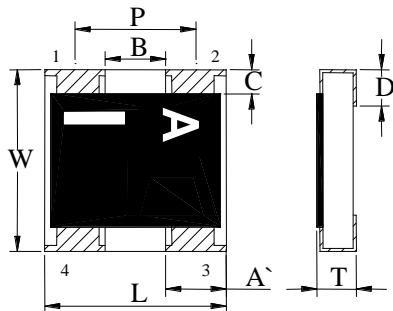
(4) Impedance (C=50 $\Omega$ )

(5) Outline Type

C = Flat Type

(6) N = Sn plating ( Lead free , RoHS compliant)

3. Outline Dimensions and Marking



W	1.00 ± 0.05	B	0.34 ± 0.10
L	1.00 ± 0.05	C	0.15 ± 0.10
T	0.42 ± 0.05	D	0.25 <sup>+0.05</sup> <sub>-0.10</sub>
A'	0.33 ± 0.10	P	0.65 typical

Unit : mm

3-1 Marking

A rated resistance shall be marked on the protecting coat with one digits of number.

Marking Code	Attenuation	Marking Code	Attenuation	Marking Code	Attenuation
1	1dB	7	7dB	D	13dB
2	2dB	8	8dB	E	14dB
3	3dB	9	9dB	F	15dB
4	4dB	A	10dB	G	16dB
5	5dB	B	11dB	L	20dB
6	6dB	C	12dB		

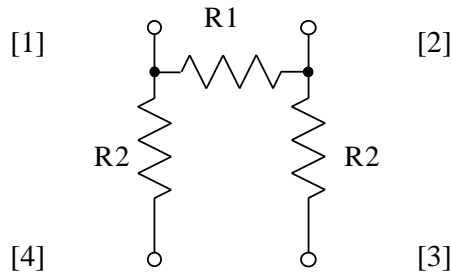
4. Specifications

Item	Impedance	Attenuation ( dB )	Attenuation Tolerance ( dB )	Frequency range	Voltage Standing Wave Ratio VSWR
PAT1010	50Ω (Symbol : C)	1,2,3,4,5	± 0.3	DC≤f≤2.5GHz	1.3 max.
		6,7,8,9	± 0.5		
		10	± 0.75	1.5G<f≤3GHz	1.3 max.
		11,12,13,14,15,16	± 0.8		
		20	± 2.5	DC≤f≤3GHz	1.3 max.

Item	Rated Input Power ( at 85 )	Temperature Range	Rated Ambient Temperature
PAT1010	40mW / package	-55 to 125	70

5. Circuit and DC resistance value

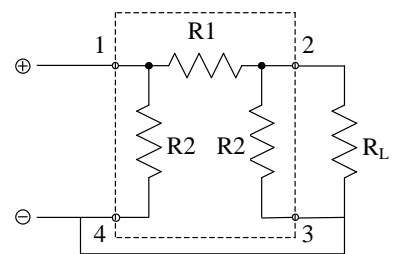
5.1  $\pi$  type Circuit



5.2 DC resistance value ( Reference )

Attenuator factor	R1 ( $\Omega$ )	R2 ( $\Omega$ )	Attenuator factor	R1 ( $\Omega$ )	R2 ( $\Omega$ )
1dB	5.769	869.5	10dB	71.15	96.25
2dB	11.62	436.2	11dB	81.66	89.24
3dB	17.62	292.4	12dB	93.25	83.54
4dB	23.85	221.0	13dB	106.07	78.84
5dB	30.4	178.5	14dB	120.31	74.93
6dB	37.35	150.5	15dB	136.14	71.63
7dB	44.8	130.7	16dB	153.78	68.83
8dB	52.84	116.1	20dB	247.50	61.11
9dB	61.59	105.0			

6. Characteristics

Item	Specification and Requirement	Test Method
Characteristic impedance	50Ω	Test circuit :  : Attenuator $R_L : 50\Omega$
Frequency	Within the specified tolerance of attenuation factor. VSWR : Refer to paragraph 4	(1) The test device : Network analyzer HP8753D Agilent Technologies Inc. ( Max. frequency : 6GHz )
Insulation Resistance	100MΩ or over.	(1) Test condition : Between terminal to over coat. (2) Test voltage : 50Vdc (3) Test time : 1 minute.
Substrate Bending	1 ~ 2dB : ±0.1dB 3 ~ 5dB : ±0.2dB 6 ~ 20dB : ±0.3dB Without distinct deformation in appearance	(1) Distance between the fulcrums: 90mm. Bending width: 3mm. (2) Substrate: Glass-Epoxy thickness=1.6mm.
Resistance to Soldering Heat	1 ~ 2dB : ±0.1dB 3 ~ 5dB : ±0.2dB 6 ~ 20dB : ±0.3dB Without distinct deformation in appearance	The attenuator shall be immersed into the solder of $270 \pm 5$ for $10 \pm 1$ seconds.
Solderability	A new uniform coating of solder shall cover 95% or more of surface being immersed.	(1) Flux : Rosin – Methanol (2) Test condition : $245 \pm 5$ $2 \pm 0.5$ seconds

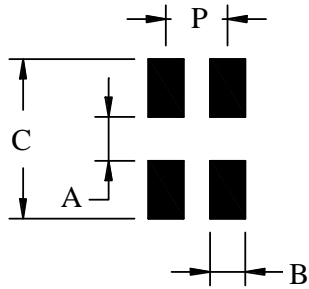
6. Characteristics

Item	Specification and Requirement	Test Method
Temperature Cycle	1 ~ 2dB : $\pm 0.1\text{dB}$ 3 ~ 5dB : $\pm 0.2\text{dB}$ 6 ~ 20dB : $\pm 0.3\text{dB}$ Without distinct deformation in appearance	(1) Repeat 5 cycle as follow : -55 $\pm$ 3 ,30minutes) $\rightarrow$ (Room temperature, 2~3 minutes) $\rightarrow$ (+125 $\pm$ 2 ,30minutes) $\rightarrow$ (Room temperature, 2~3 minutes) (2) Measuring the attenuator factor 1 hour after test
Moisture Load Life	1 ~ 2dB : $\pm 0.1\text{dB}$ 3 ~ 5dB : $\pm 0.2\text{dB}$ 6 ~ 20dB : $\pm 0.3\text{dB}$ Without distinct deformation in appearance	(1) Environment condition : 60 $\pm$ 2 ,90~95% RH (2) Applied Voltage : Rated voltage (3) Test period : (1.5 hour ON) $\rightarrow$ (0.5 hour OFF) cycled for total 1,000 + 48 / - 0 hours (4) Measuring the attenuator factor 2 hour after test
Load Life	1 ~ 2dB : $\pm 0.1\text{dB}$ 3 ~ 5dB : $\pm 0.2\text{dB}$ 6 ~ 20dB : $\pm 0.3\text{dB}$ Without distinct deformation in appearance	(1) Test temperature : 85 $\pm$ 2 (2) Applied Voltage : rated voltage (3) Test period : (1.5 hour ON) $\rightarrow$ (0.5 hour OFF) cycled for total 1,000 + 48 / - 0 hours (4) Measuring the attenuator factor 2 hour after test

6. Characteristics

Item	Specification and Requirement	Test Method
Low Temperature Store	1 ~ 2dB : $\pm 0.1\text{dB}$ 3 ~ 5dB : $\pm 0.2\text{dB}$ 6 ~ 20dB : $\pm 0.3\text{dB}$ Without distinct deformation in appearance	(1) Store temperature : $-55 \pm 3$ for total 1,000 + 48 / - 0 hours (2) Measuring the attenuator factor 2 hour after test
High Temperature Store	1 ~ 2dB : $\pm 0.1\text{dB}$ 3 ~ 5dB : $\pm 0.2\text{dB}$ 6 ~ 20dB : $\pm 0.3\text{dB}$ Without distinct deformation in appearance	(1) Store temperature : $+125 \pm 2$ for total 1,000 + 48 / - 0 hours (2) Measuring the attenuator factor 2 hour after test

7. Recommend Land Pattern Dimensions



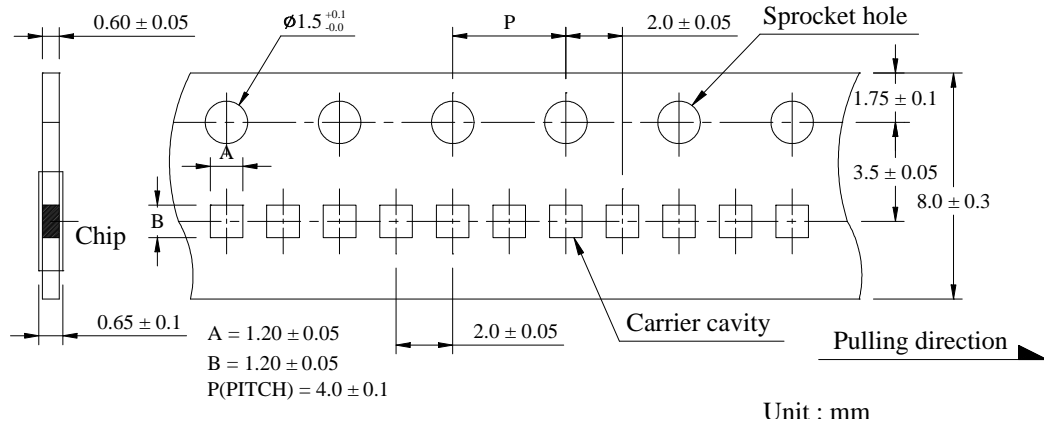
A	0.5
B	0.25
P	0.65
C	1.8

Unit : mm

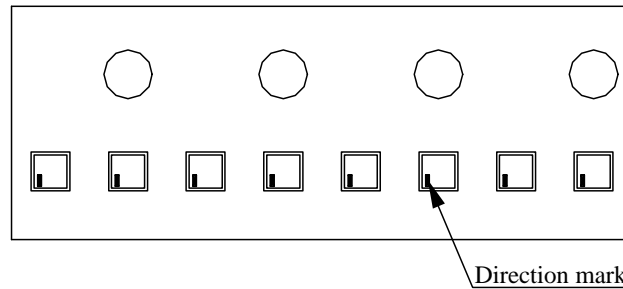
8. Packaging

8-1 Dimensions

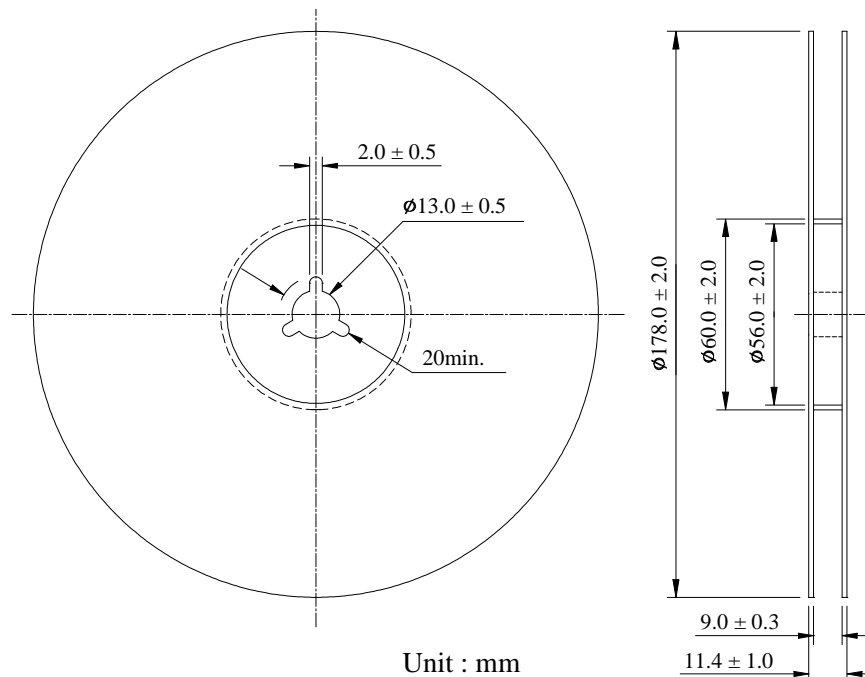
8-1-1 Tape packaging dimensions



Material : Paper



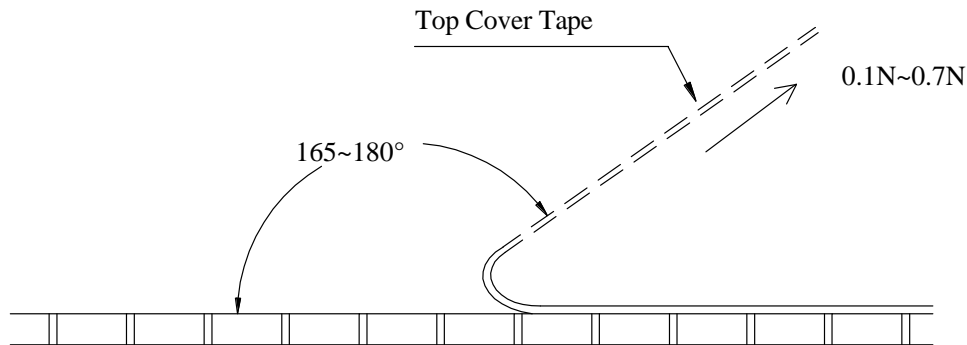
8-1-2 Reel dimensions



#### 8-2 Peel force of top cover tape

The peel speed shall be about 300 mm/minute

The peel force of top cover tape shall be between 0.1 to 0.7 N



#### 8-3 Numbers of taping

10,000 pieces/reel

#### 8-4 Label marking

The following items shall be marked on the production and shipping Label on the reel.

##### 8-4-1 Production Label

- (1) Part No.
- (2) Description
- (3) Quantity
- (4) Taping No.

##### 8-4-2 Shipping Label

- (1) \* Customer's name
- (2) \* Customer's part No.
- (3) Manufacturer's part No.
- (4) Manufacturer's name
- (5) Manufacturer's country

\* Note : Item (1) and (2) are listed by request