Power choke coils

Power choke coils
PCMB series

Small power choke coils
PCMB series, PS series



Power choke coils

■PCMB series

Features

- Low profile (3.0 mm max) and small size (7.3mm x 6.6mm)
- Small size allowing space saving on the board
- Low loss and high saturating current.

Applications

- PCs, servers, power sources, mobile devices, flat screen TVs etc.

Lead free　Halogen free　RoHS Compliance

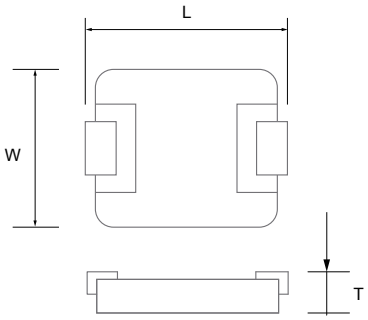
◆Part numbering system

PCMB 13 - *** M N(S,T)**

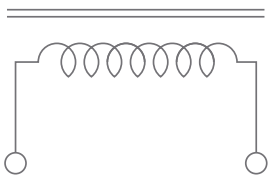
- PCMB: Series code
- 13**: Size : (063T=6.6×7.3×3.0mm, 104T=10×11.5×4.0mm, 133E=12.6×13.8×3.5mm, 135T=12.6×13.8×5.0mm)
- ***: Inductance value (R56=0.56µH, R68=0.68µH)
- M: Inductance tolerance : M=±20%
- N(S,T): Material : refer to the table for electrical characteristics

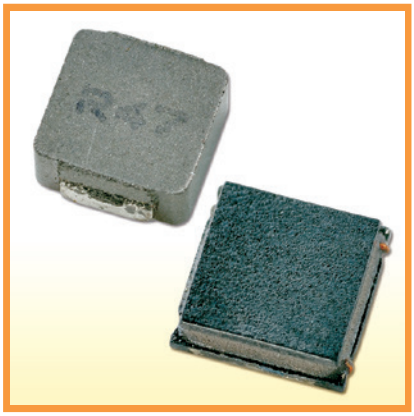
Rated current : the current that increases the temperature by 40°C
Saturating current : The current that reduces inductance by 30% (PCMB/PS/PST/PL).
*Contact us for details.

◆Dimensions, Electrical characteristics



◆Equivalent circuits





Small power choke coils

■PCMB series, PS series

Features

- Low DCR and large current for small sizes
- High efficiency and low loss

Applications

- PCs, servers, power sources, mobile devices, flat screen TVs etc.

Lead free　Halogen free　RoHS Compliance

◆Part numbering system

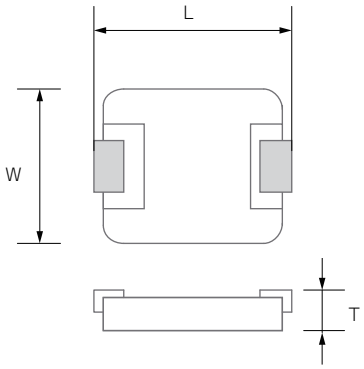
PS 031* - *** M (S)

- PS: Series code
- 031*: Size : B(2.9mm×2.9mm×1.2mm), T(2.9mm×2.9mm×1.0mm)
- ***: Inductance value
- M: Resistance tolerance : M=±20%
- (S): Material : refer to the table for electrical characteristics

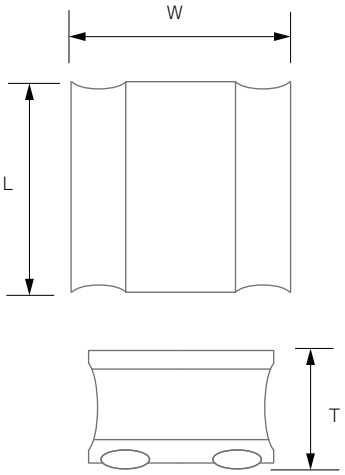
Rated current : the current that increases the temperature by 40°C
Saturating current : The current that reduces inductance by 30% (PCMB/PS/PST/PL)
*Contact us for details.

◆Dimensions, Electrical characteristics

PCMB type



PS*, PS type



MEMO

High frequency surface mount components

High frequency chip resistors
RFD series ★New series

High Precision Chip Attenuators (Up to 55GHz)
ATS-FD series ★New series

High Precision Chip Attenuaters (Up to 30GHz)
ATFseries ★New series

High Precision Chip Attenuators
PAT series

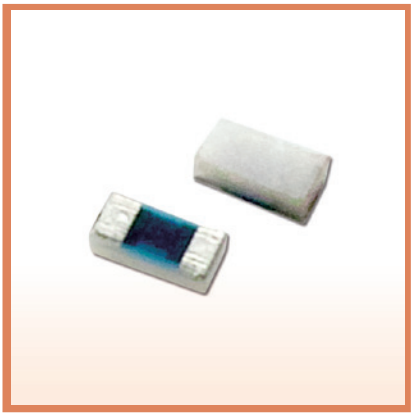
High Precision Chip Attenuators
(W type)
PAT series, W type

Thermo-variable chip attenuators
P＊V series

Power Splitters
PS series

High power chip terminators
PCS series

Super High power chip terminators
HPT series



High Frequency Chip Resistors

■RFD series

Features

- A resistor that takes advantage of the characteristics of thin films, and supports a wide range of frequencies from DC to 67 GHz.
- Small 0603 size
- Face-down mounting type

Lead free　Halogen free　RoHS Compliance

Applications

- Low noise high frequency transmission and reception circuit
- High frequency termination circuit
- High frequency attenuation circuit

◆Part numbering system

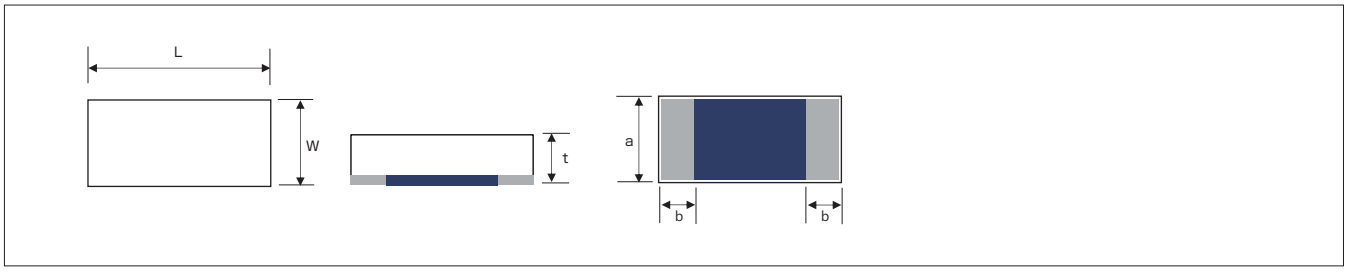
RFD 0603 P - 50R0 - D - T1

- RFD: Series code
- 0603: Size:0603
- P: TCR P:±25ppm
- 50R0: Resistance values：50Ω
- D: Resistance tolerance D : ±0.5%
- T1: Packaging quantity: T5(5,000pcs), T1(1,000pcs)

◆Electrical Specification

Type	RFD0603
Impedance	50Ω
Operating frequency	DC~67GHz
rated power	50mW
Rated operating temperature	70℃
Operating temperature	-40℃~+125℃
Packaging quantity	1,000pcs/reel(T1) 5,000pcs/reel(T5) 10,000pcs./reel (T10)

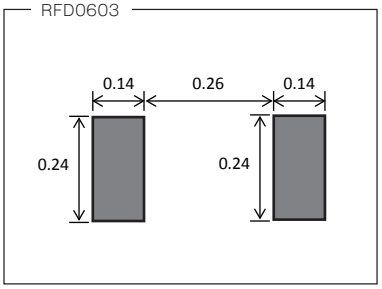
◆Dimensions



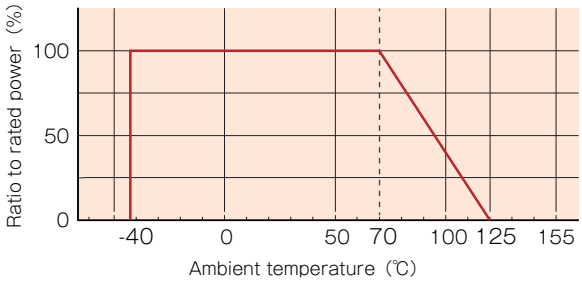
Type (mm)	Size (inch)	L	W	t	a	b
RFD0603	0201	0.60±0.05	0.30±0.05	0.22±0.05	0.24±0.05	0.14±0.05

(unit : mm)

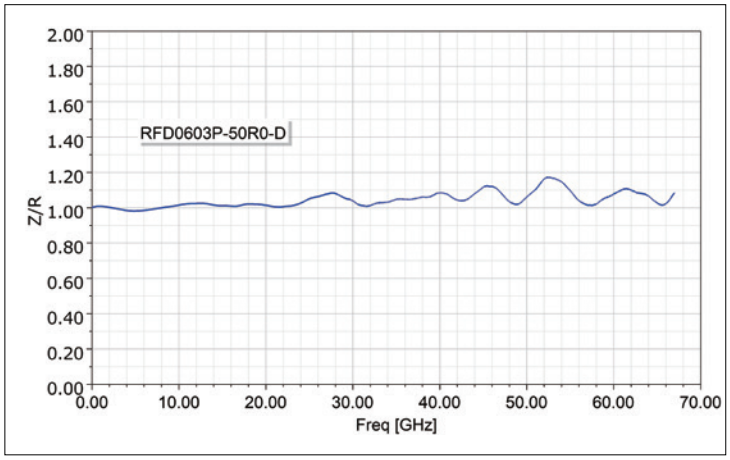
◆Recommended land patterns(soldering footprints)



◆Derating Curve



◆High frequency characteristics





High Precision chip attenuators (Up to 55GHz)

■ATS-FD series

Features

- Attenuation range up to 55GHz
- Internal circuit specially designed for 0-10dB attenuation.
- Miniature surface mount chip attenuator (1005,2012 size)
- Signal line sandwiched by ground – excellent heat dissipation and low noise.

Lead free　Halogen free　RoHS Compliance

Applications

- Wireless communication devices and base stations
- Wireless communication modules

◆Part numbering system

ATS 2012 - 10DB - FD - T1

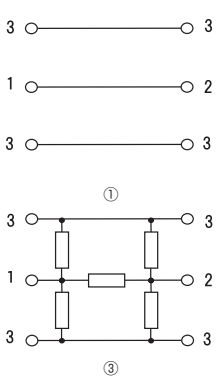
- ATS: Series Code
- 2012: Size：1005, 2012
- 10DB: Attenuation
- FD: Face down mounting
- T1: Packing quantity：T1（1,000pcs）, T05（500pcs）

◆Electrical Specification

Type	ATS1005-FD		ATS2012-FD		
Attenuation	0dB	1~10dB	0dB	1~8dB	9~10dB
Circuit Type	Thru	Pi(π)	Thru	Pi(π)	Dual Pi (Dual π)
Equivalent circuits	①	②	①	②	③
Attenuation tolerance	±0.75(DC ~ 25GHz)、±1.25dB(25 ~ 40GHz)、±2.50dB(40 ~ 55GHz)				
V S W R	≦1.40(DC ~ 25GHz)、≦1.60(25 ~ 40GHz)、≦1.80(40 ~ 55GHz)				
Impedance	50Ω				
Operating frequency	DC~55GHz		DC~55GHz		
Rated power	32mW		100mW		
Rated operating temperature	70℃				
Operating temperature	-40℃~+125℃				
Packaging quantity	500pcs/reel(T05) 1,000pcs/reel(T1)				

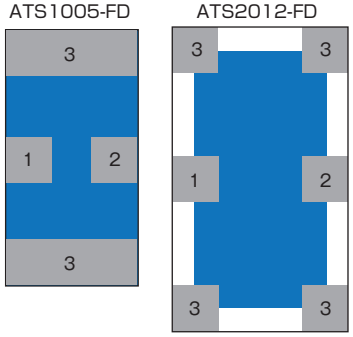
◆Equivalent Circuit and pin arrangement

Equivalent Circuit



1 : Input pin
2 : Output pin
3 : GND

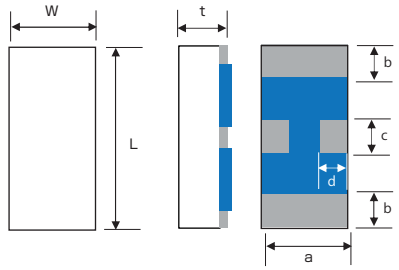
Pin arrangement (bottom side)



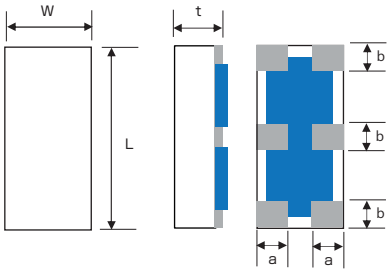
1 : Input pin
2 : Output pin
3 : GND

◆Dimensions

ATS1005-FD



ATS2012-FD



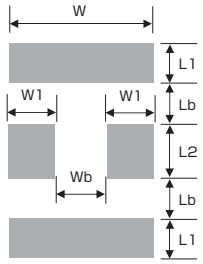
Type	Size (inch)	L	W	t	a	b	c	d
ATS1005-FD	0402	1.00±0.10	0.50±0.10	0.32±0.05	0.44±0.05	0.15±0.05 0.10±0.05*1	0.20±0.05	0.15±0.05
ATS2012-FD	0805	2.00±0.20	1.25±0.20	0.22±0.05	0.35±0.10	0.25±0.10	—	—

(unit : mm)

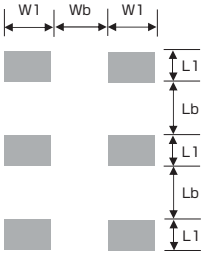
*1: Applies to ATS1005-01DB-FD

◆Recommended land patterns(soldering footprints)

ATS1005-FD



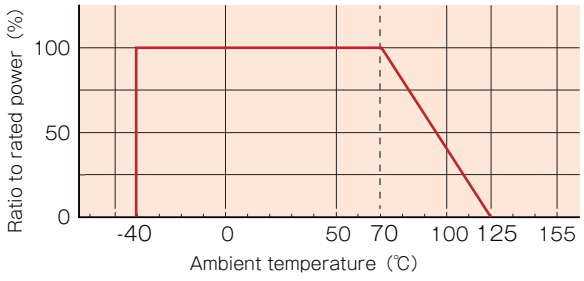
ATS2012-FD



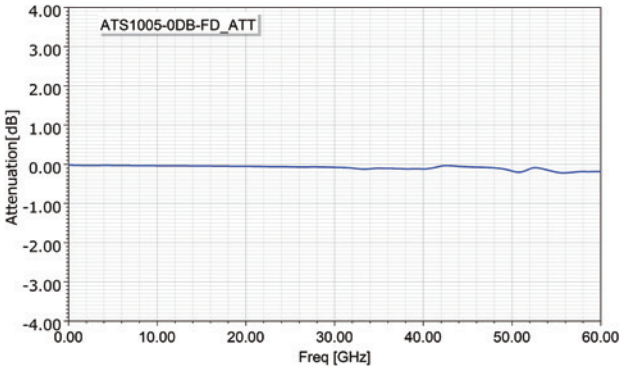
Type	W	W1	Wb	L1	Lb	L2
ATS1005-FD	0.44	0.15	0.14	0.15	0.22	0.20
ATS2012-FD	—	0.35	0.49	0.25	0.60	—

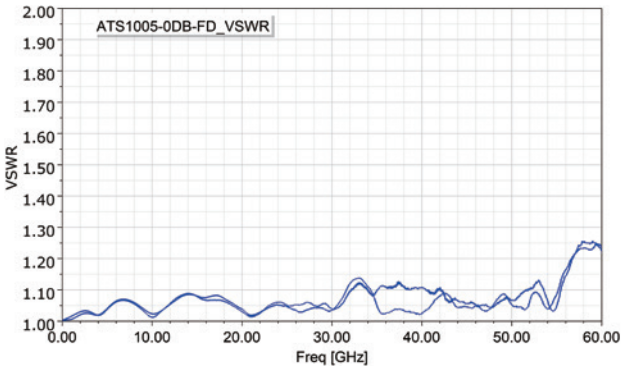
(unit : mm)

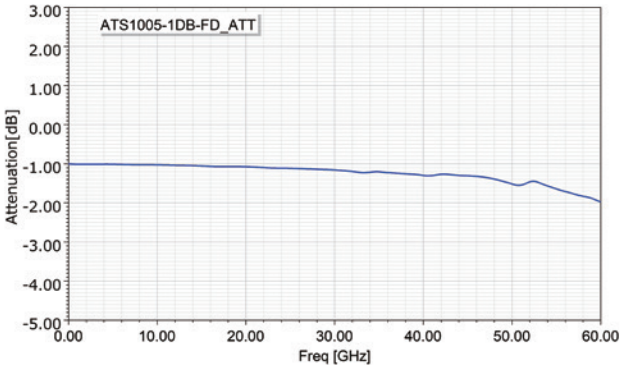
◆Derating Curve

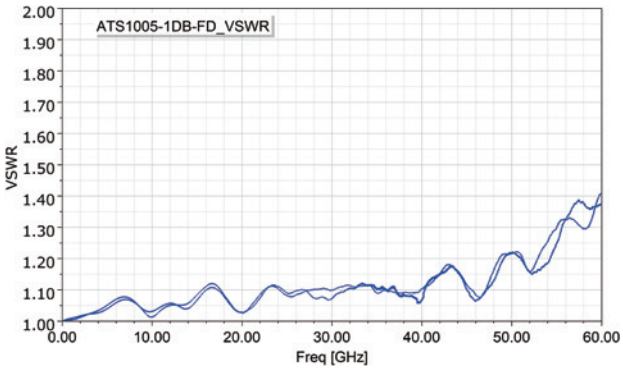


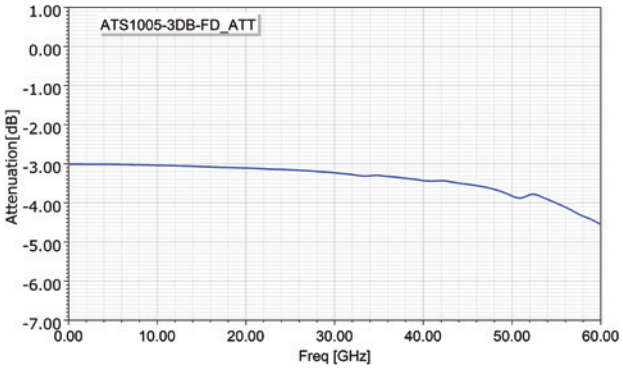
◆High frequency characteristics

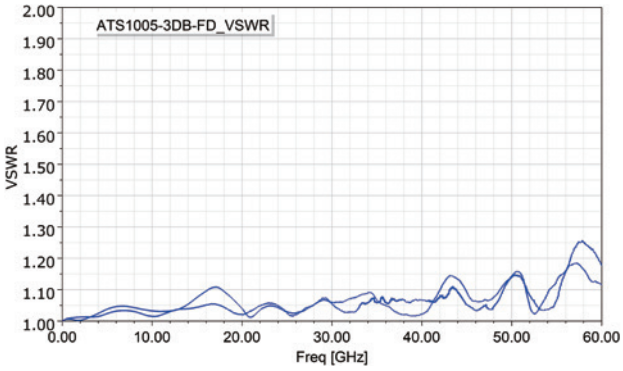


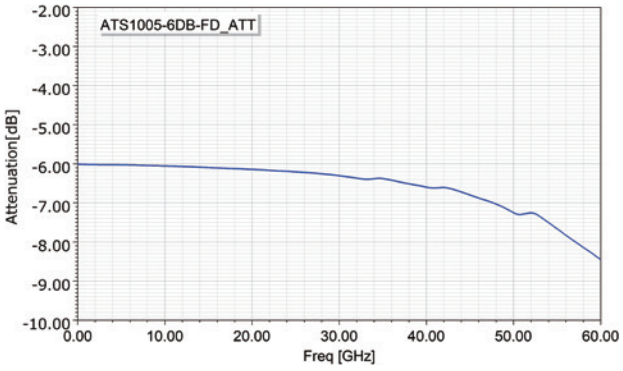


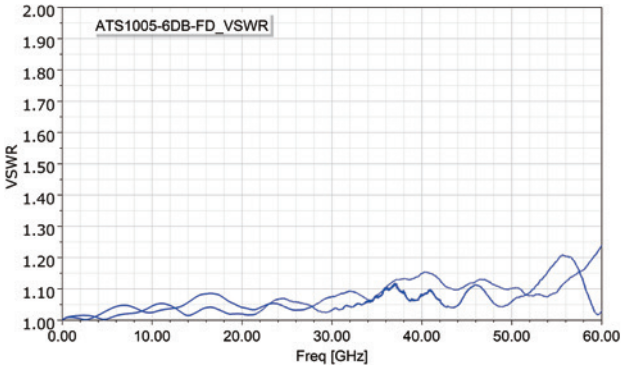


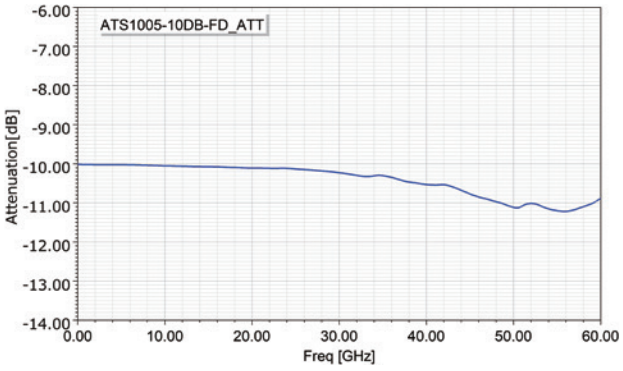


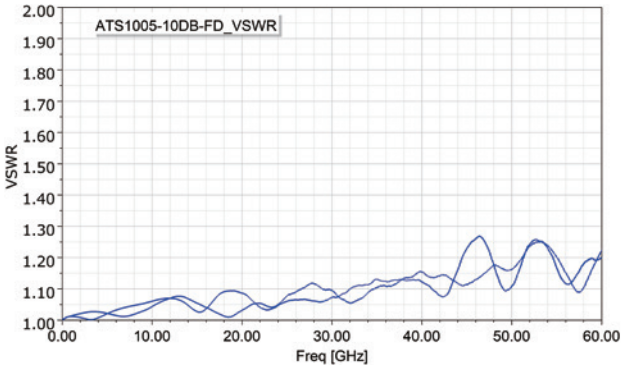




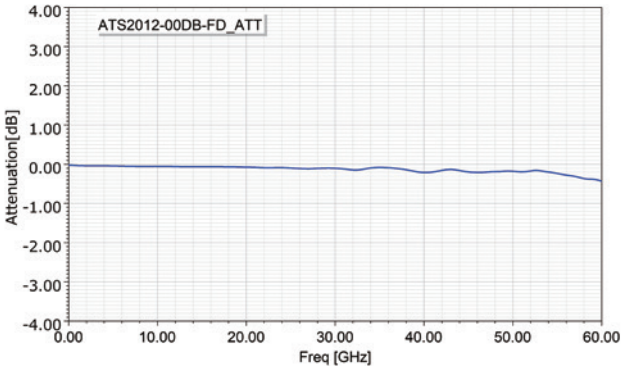


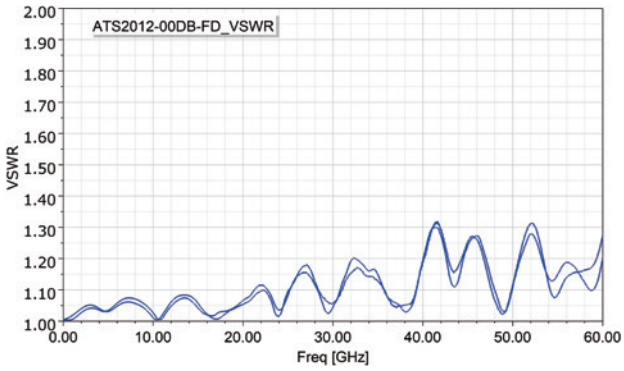


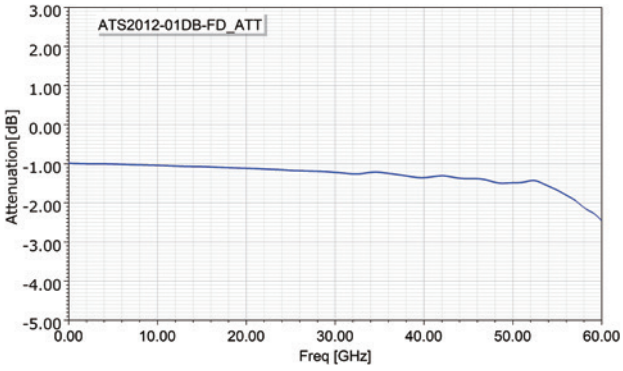


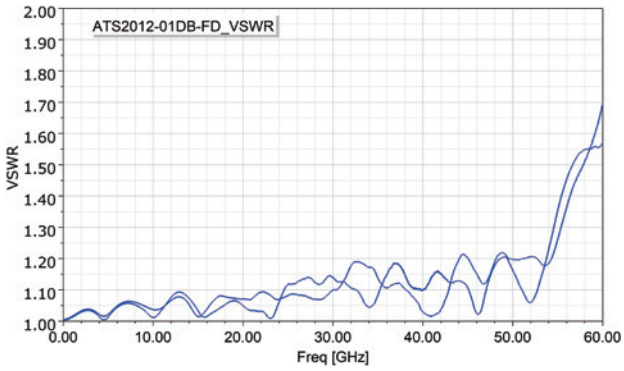


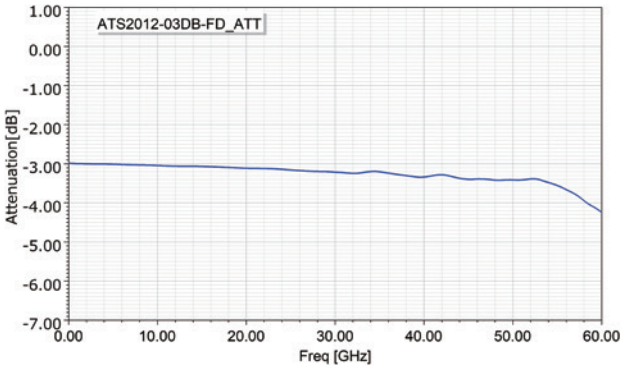
◆High frequency characteristics

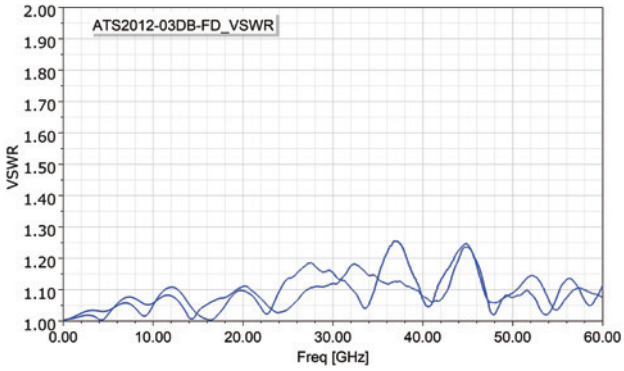


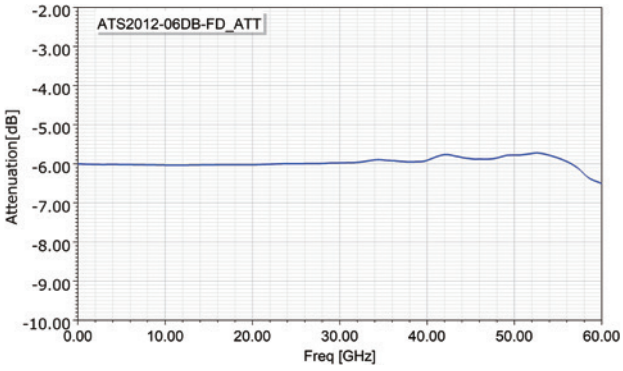


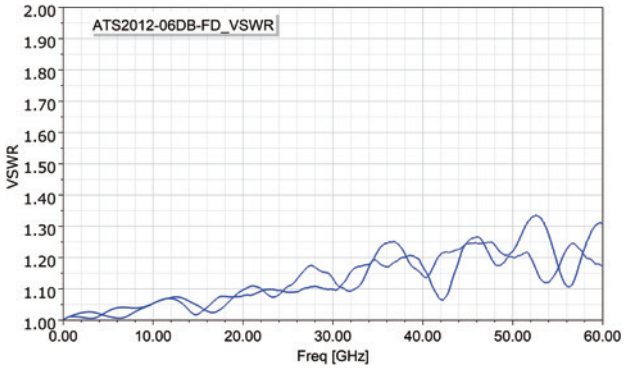


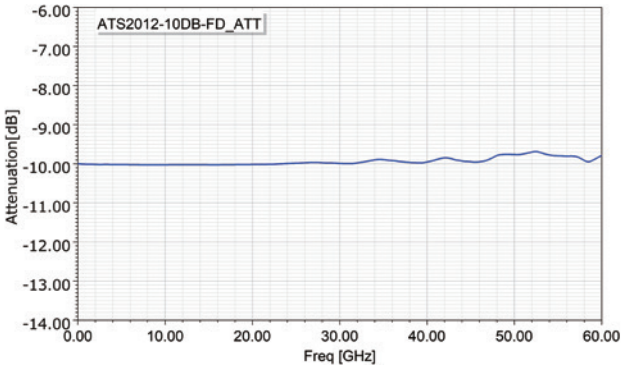


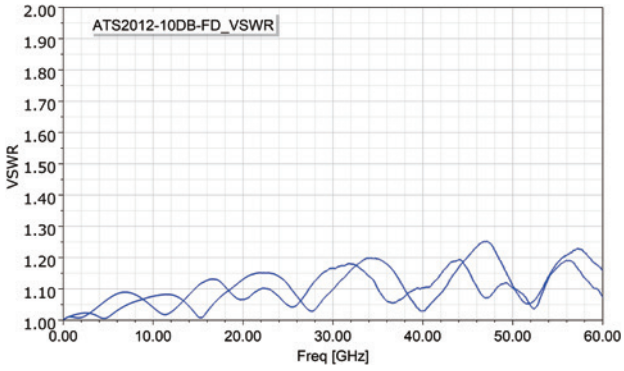


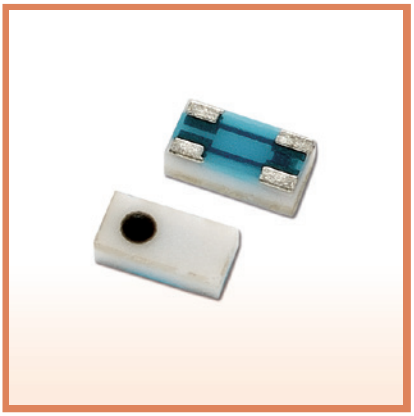












High Precision Chip Attenuaters (Up to 30GHz)

■ATF Series

Features

- Attenuation to high frequency range (up to 30GHz)
- Compatible with PAT series land patterns
- Lineup of various attenuations between 0 and 10 dB (1dB step)
- Compact size and low impedance mounting（1005size、face-down mounting）

Lead free　Halogen free　RoHS Compliance

Applications

- Wireless communication devices and base stations
- Wireless communication modules

◆Part numbering system

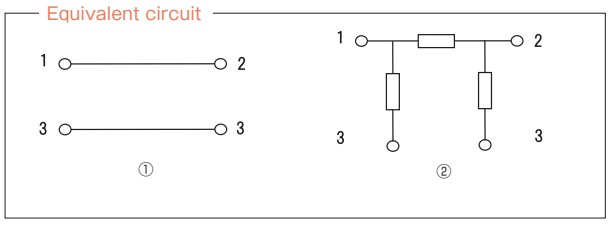
ATF 1005 - 50R0 - 03DB - T1

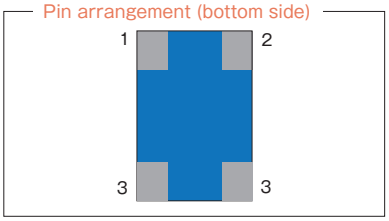
- ATF: Series Code
- 1005: Size：ATF1005
- 50R0: Impedance
- 03DB: Attenuation: 00dB - 10dB（2digit）
- T1: Packing quantity：T05（500pcs） T1（1,000pcs）

◆Electrical Specification

Type	ATF1005			
Attnuation	0dB	01 ~ 03dB	04 ~ 07dB	08 ~ 10dB
CircuitType	Thru	Pi(π)	Pi(π)	Pi(π)
Equivalent circuits	①	②	②	②
Attenuation tolerance	±0.3dB(0 ~ 10GHz), ±0.7dB(10 ~ 20GHz), ±1.0dB(20 ~ 30GHz)		±0.5dB(0 ~ 10GHz), ±0.7dB(10 ~ 20GHz), ±1.0dB(20 ~ 30GHz)	±0.7dB(0 ~ 10GHz), ±1.3dB(10 ~ 20GHz), ±2.0dB(20 ~ 30GHz)
V S W R	≦1.3(0 ~ 10GHz), ≦1.4(10 ~ 20GHz), ≦1.5(20 ~ 30GHz)		≦1.3(0 ~ 10GHz), ≦1.4(10 ~ 20GHz), ≦1.5(20 ~ 30GHz)	≦1.3(0 ~ 10GHz), ≦1.4(10 ~ 20GHz), ≦1.5(20 ~ 30GHz)
Impedance	50Ω			
Operating Frequency	DC ~ 30GHz			
Rated power	32mW			
Rated operating temperature	70℃			
Operating temperature	-40℃~ +125℃			
Packaging quantity	500pcs/reel (T05) 1,000pcs/reel (T1)			

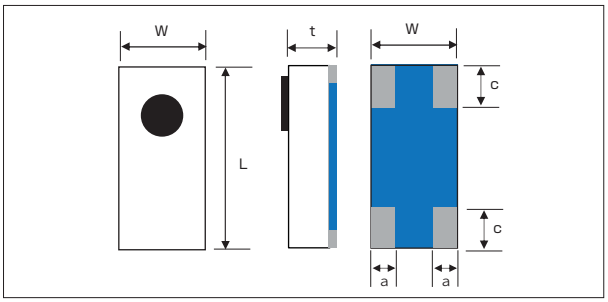
◆Equivalent Circuit and arrangement





1 : Input /output pin
2 : Input /output pin
3 : GND

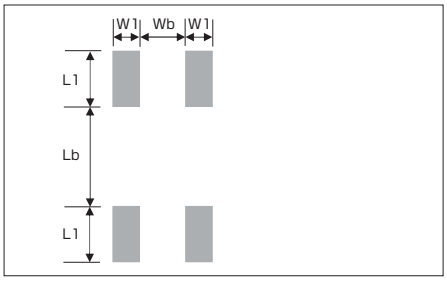
◆Dimensions



Type	Size	L	W	t	a	c
ATF1005	0402	1.00±0.10	0.50±0.10	0.32±0.05	0.12±0.07	0.25±0.07

(unit : mm)

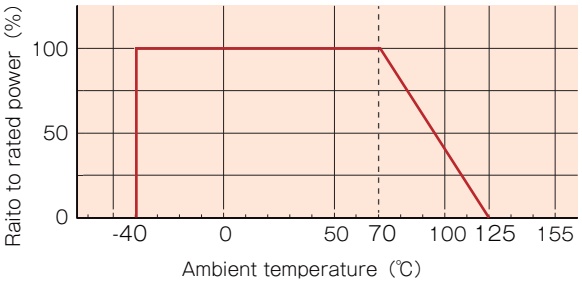
◆Recommended land patterns(soldering footprints)



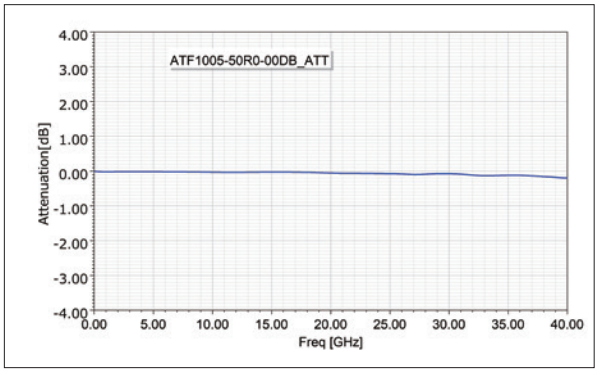
Type	W1	Wb	L1	Lb
ATF1005	0.12	0.20	0.25	0.44

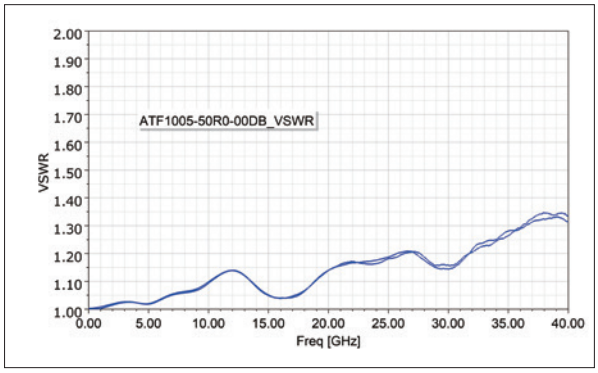
(unit : mm)

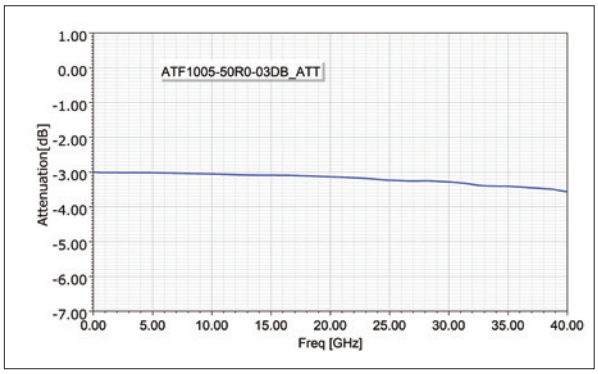
◆Derating Curve

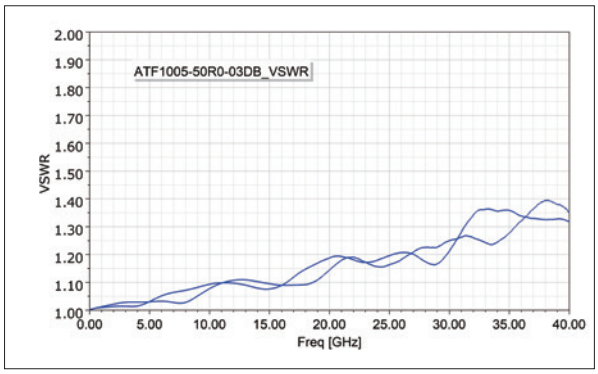


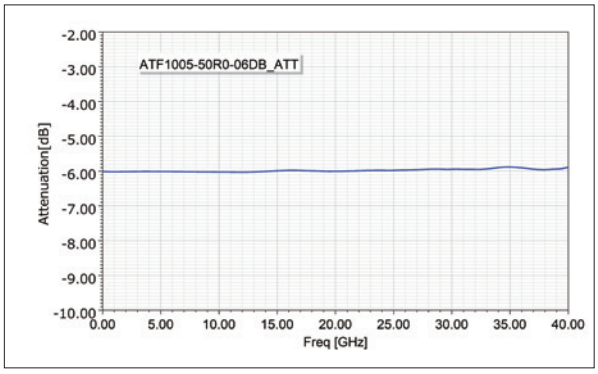
◆High frequency characteristics

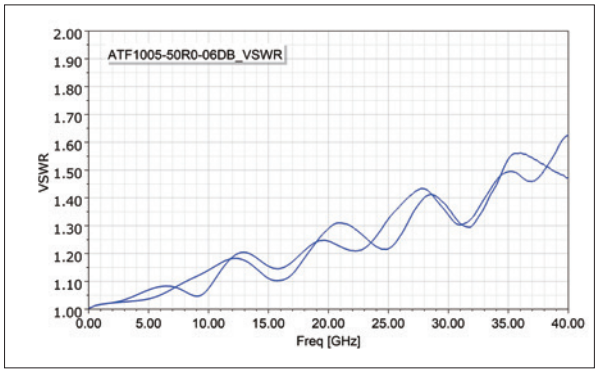


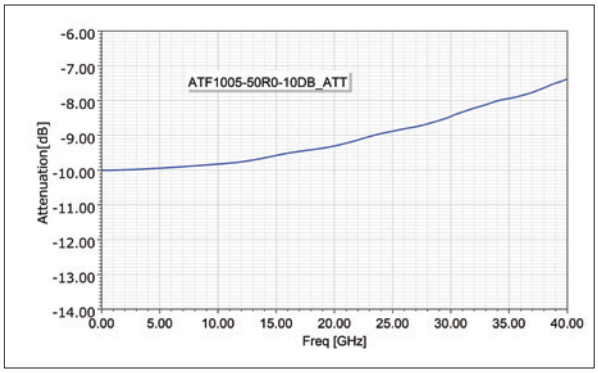


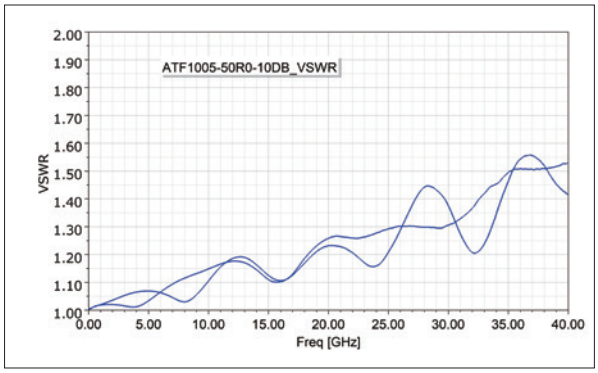














High Precision Chip Attenuators

■PAT series

Features

- One chip attenuator covers wide frequency range.
- Wrap around terminal similar to regular chip resistors makes it easy to mount.
- Sizes from 1005 to 3042 are offered, which contribute to miniaturization of devices.

Lead free　Halogen free　RoHS Compliance

Applications

- Cell phone base stations
- Wireless communication modules
- Wide band measurement instrumentation

◆Part numbering system

PAT 1632 - C - 3dB - T1

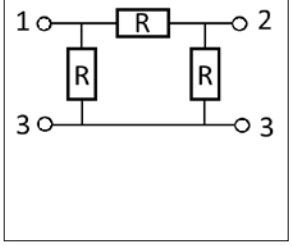
- PAT: Series code
- 1632: Size : PAT0510S,PAT0816 PAT1220,PAT1632,PAT3042S
- C: Impedance: C=50Ω D=75Ω
- 3dB: Attenuation : 2 digit
- T1: Packing quantity: T=Tape (T10/T1/T2/T5), B=Bulk

◆Electrical Specification

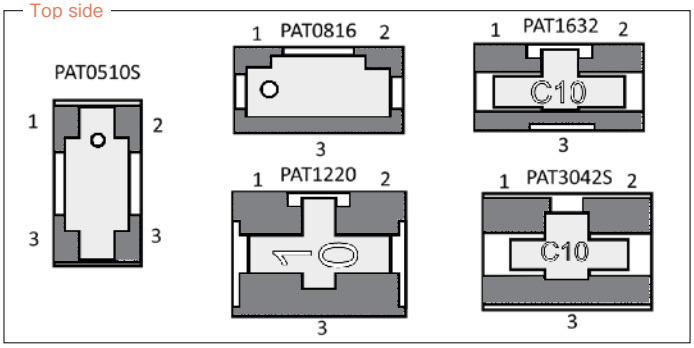
Type	PAT0510S			PAT0816			PAT1220	PAT1632		PAT3042S	
Attenuation	0～3dB (1dB step)	4～7dB (1dB step)	8～10dB (1dB step)	0～3dB (1dB step)	4～7dB (1dB step)	8～10dB (1dB step)	0～10dB (1dB step)	0～10dB (1dB step)	16dB	0～10dB (1dB step)	16,20dB
Attenuation tolerance	±0.3dB	±0.5dB	±0.7dB	±0.3dB	±0.5dB	±0.7dB	±0.3dB	±0.3dB	±0.5dB	±0.3dB	±0.5dB
Impedance	50Ω(C)			50Ω(C)				50Ω(C)		50Ω(C), 75Ω(D)	
VSWR	<1.3			<1.3(～6GHz), <1.5(6～10GHz)			<1.3	<1.3		<1.2(50Ω), <1.3(75Ω)	
Operating frequency	DC～10GHz			DC～10GHz				DC～3GHz		50Ω: DC～3GHz 75Ω: DC～2GHz	
Rated power	32mW			64mW			100mW	125mW		250mW	
Rated operating temperature	70℃										
Operating temperature	−55℃~+125℃										
Packaging quantity	10,000pcs/reel (T10)			100pcs/Bag (B) 1,000pcs/reel (T1) 5,000pcs/reel (T5)						50pcs/Bag (B) 1,000pcs/reel (T1) 2,000pcs/reel (T2)	

◆Equivalent Circuit and pin arrangement

Equivalent circuit

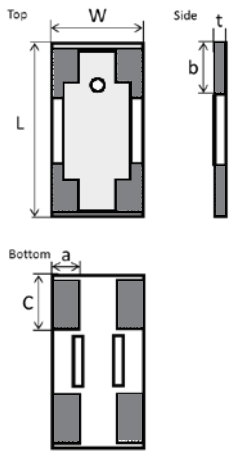


Top side

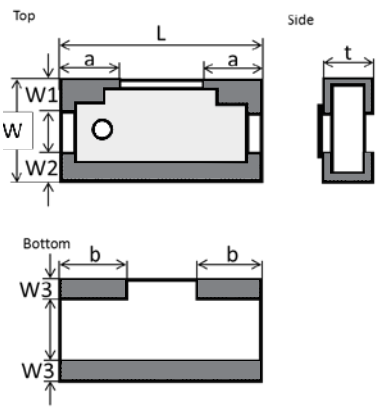


◆Dimensions

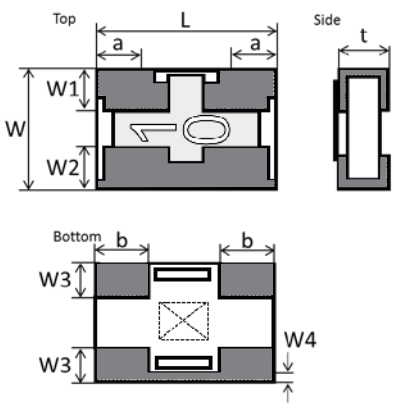
PAT0510S



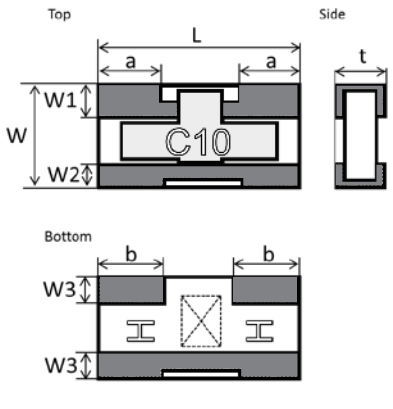
PAT0816



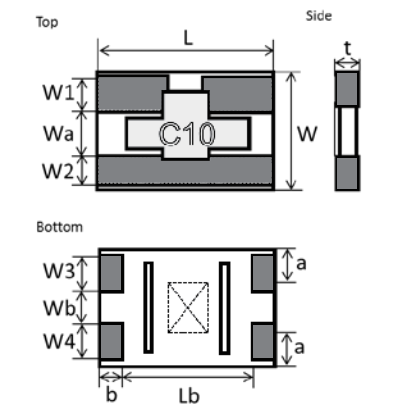
PAT1220



PAT1632



PAT3042S



Type	Size (inch)	L	W	t	a	c	b
PAT0510S	0402	1.00±0.05	0.50±0.05	0.34±0.05	0.12±0.04	0.27±0.05	0.25±0.05

(unit : mm)

Type	Size (inch)	L	W	t	a	b	W1	W2	W3	W4
PAT0816	0603	1.60±0.10	0.80±0.10	0.40±0.10	0.50±0.15	0.50±0.10	0.25±0.10	0.15±0.10	0.20±0.10	—
PAT1220	0805	2.00±0.10	1.25±0.10	0.40±0.10	0.50±0.20	0.60±0.20	0.40±0.20	0.40±0.20	0.35±0.20	< 0.25
PAT1632	1206	3.20±0.20	1.60±0.20	0.40±0.10	1.00±0.25	1.00±0.25	0.55±0.25	0.40±0.25	0.40±0.20	—

(unit : mm)

Type	Size (inch)	L	W	t	a	b	Lb
PAT3042S 50Ω(C)	1612	4.20±0.20	3.00±0.20	0.80±0.15	0.80±0.20	0.50±0.20	3.10±0.20
PAT3042S 75Ω(D)	1612	4.20±0.20	3.00±0.20	0.80±0.15	0.80±0.20	0.30±0.20	3.50±0.20

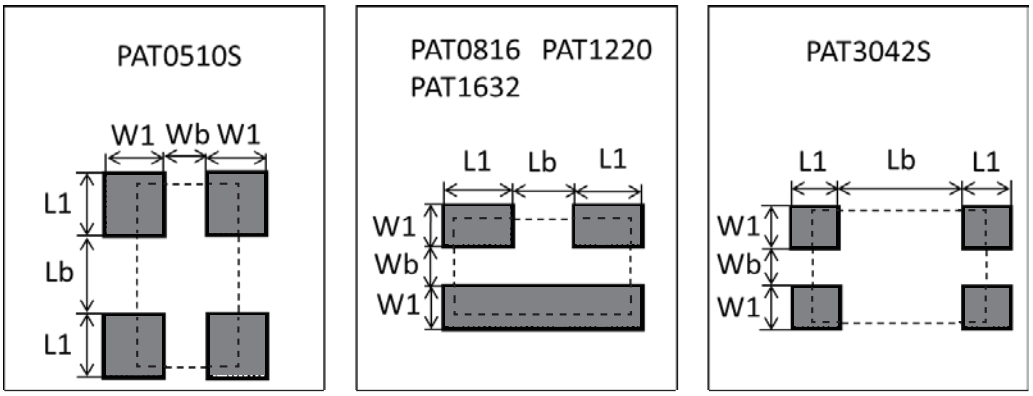
Type	W1	W2	Wa	W3	W4	Wb
PAT3042S 50Ω(C)	0.95±0.20	0.80±0.20	1.05±0.20	0.95±0.20	0.95±0.20	0.95±0.20
PAT3042S 75Ω(D)	0.55±0.20	0.60±0.20	1.55±0.20	0.55±0.20	0.60±0.20	1.55±0.20

(unit : mm)

High Precision Chip Attenuators

■PAT series

◆Recommended land patterns(soldering footprints)



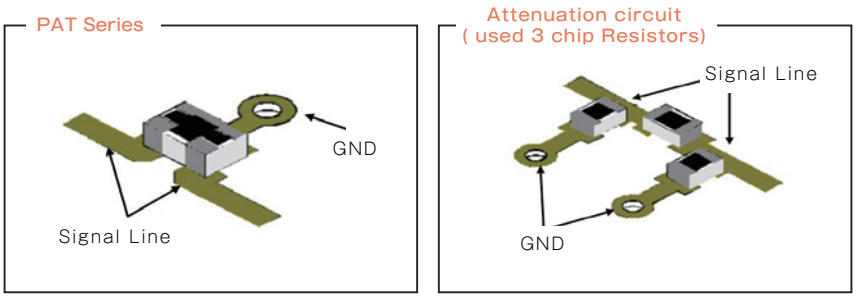
Size	W1	Wb	L1	Lb
PAT0510S	0.30	0.20	0.35	0.37
PAT0816	0.40	0.30	0.60	0.50
PAT1220	0.70	0.50	0.80	0.70
PAT1632	0.80	0.65	1.20	1.00
PAT3042S (50Ω)	1.10	0.90	1.20	2.90
PAT3042S (75Ω)	1.00	1.10	1.00	3.30

(unit : mm)

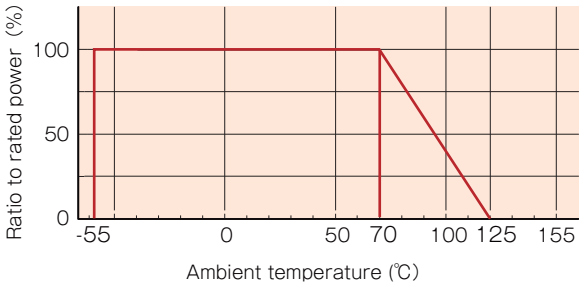
◆Benefits of PAT series

Three resistive elements are integrated inside of this chip attenuator. If you use discrete resistors to construct an attenuator, 3 resistors are needed. The merits of one attenuator displacing 3 resistors are:

1) Three precision resistors are integrated as an attenuator. Therefore, precision attenuation can be easily achieved with this attenuator.
2) Because 3 elements are integrated in a small area, parasitic capacitance and inductance are minimized and desired attenuation can be easily attained.
3) One attenuator can replace 3 discrete resistors, which contributes miniaturizing the circuit and makes the circuit more reliable

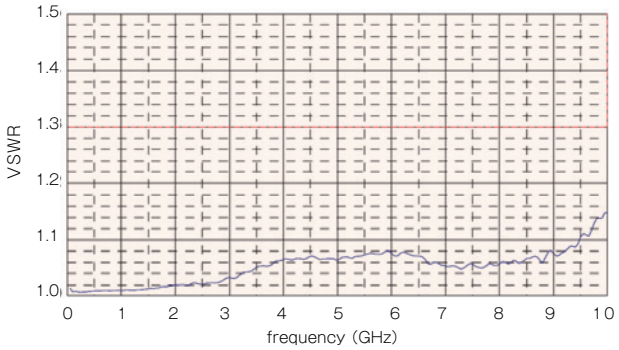


◆Derating Curve

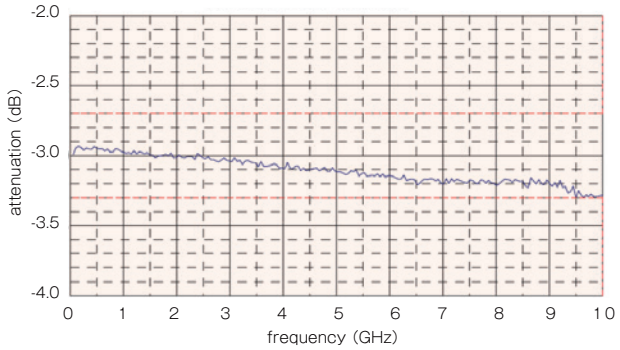


◆High frequency characteristics

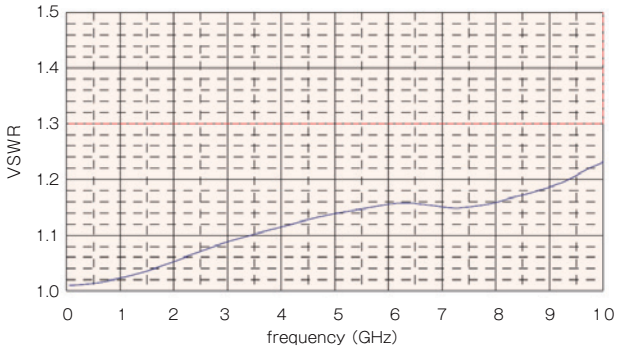
PAT0816 3dB VSWR



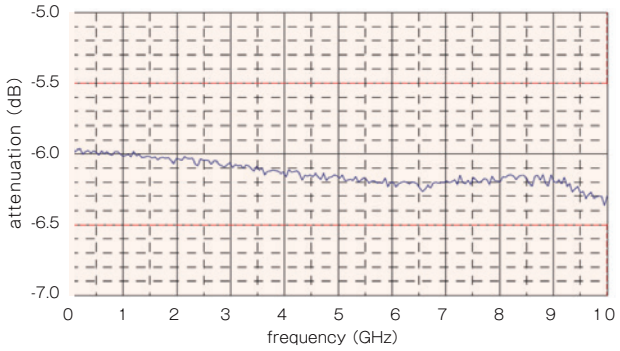
PAT0816 3dB attenuation



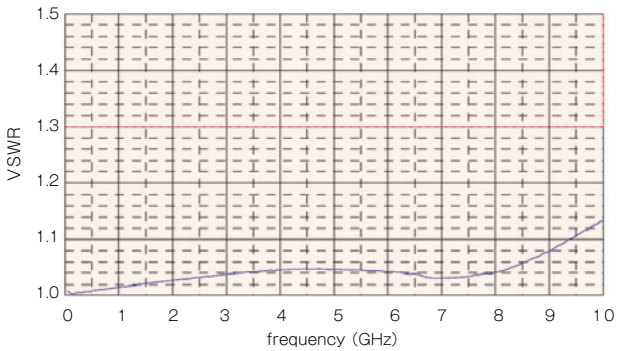
PAT0816 6dB VSWR



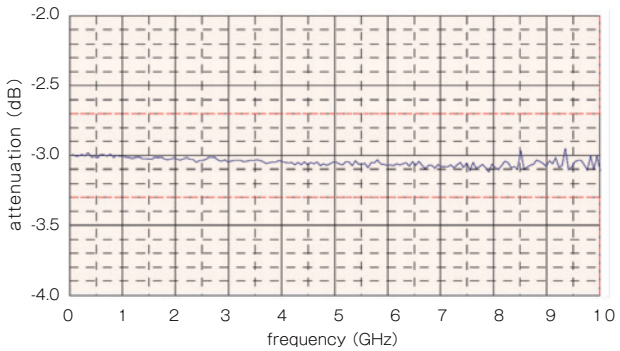
PAT0816 6dB attenuation



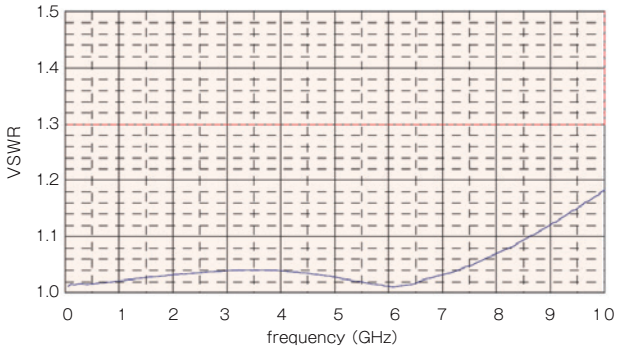
PAT1220 3dB VSWR



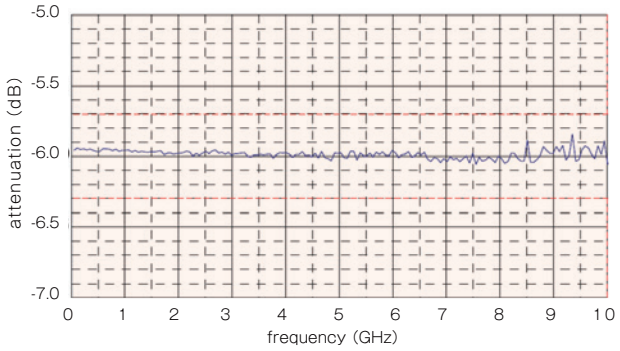
PAT1220 3dB attenuation



PAT1220 6dB VSWR



PAT1220 6dB attenuation





High Precision Chip Attenuators

■PAT Series W type

Features

- Single attenuating element realizes excellent attenuating characteristics
- Wide frequency range makes it possible to handle circuits with different frequency with ease
- The distribution of the terminals, signal terminals in the middle and ground terminal at ends, are designed for easy integration to coaxial connectors

Lead free　Halogen free　RoHS Compliance

Applications

- Attenuator for coaxial lines/circuit
- Attenuator for measuring instrumentation

◆Part numbering system

PAT 3042 - C - 3dB - A - T1

- Series code
- Size：PAT3042,PAT4556,PAT3060H
- Impedance: C=50Ω
- Attenuation
- Attenuation tolerance (PAT3042/4556)
- Packing quantity: T=Tape (T1/T2), B=Bulk

◆Electrical Specification

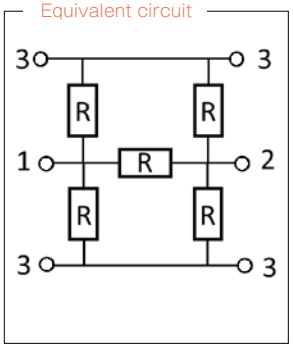
Type	PAT3042	PAT4556	PAT3060H
Attenuation	0-10(1dB step), 16,20dB	0-10(1dB step), 13,16,20dB	1,2,3,5,6,10dB
Attenuation tolerance	Refer table1		±0.5dB
Impedance	50Ω(C)	50Ω(C)	50Ω(C)
VSWR	<1.1 (DC-2GHz) <1.2(2-5GHz), <1.3(5-10GHz)		<1.2
Operating frequency	DC ~ 10GHz		DC ~ 6GHz
Rated power	250mW	500mW	5W
Rated operating temperature	70℃		
Operating temperature	−55℃~+125℃		
Packaging quantity	50pcs/bag (B) 1,000pcs/reel (T1) 2,000pcs/reel (T2)	50pcs/bag (B) 1,000pcs/reel (T1)	100pcs/bag (B) 1,000pcs/reel (T1)

Attenuation tolerance				
Attenuation*	Rank	DC~2GHz	2~5GHz	5~10GHz
0~10dB	A	±0.1dB	±0.2dB	±0.4dB
0~10dB	B	±0.2dB	±0.3dB	±0.5dB
16,20dB (13dB) **	B	±0.2dB	±0.3dB	±0.5dB

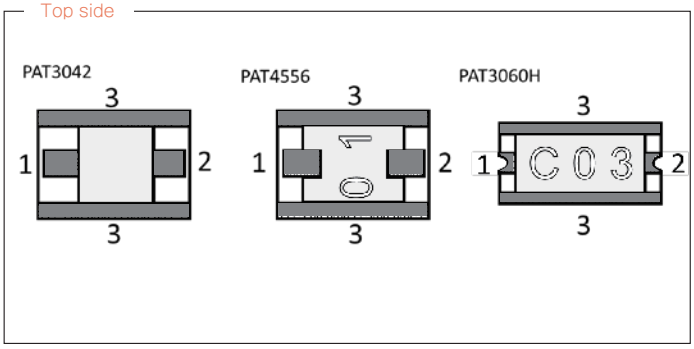
* : Applicable products: PAT3042 and PAT4556
** : Applicable product is only PAT4556

◆Equivalent Circuit and pin arrangement

Equivalent circuit

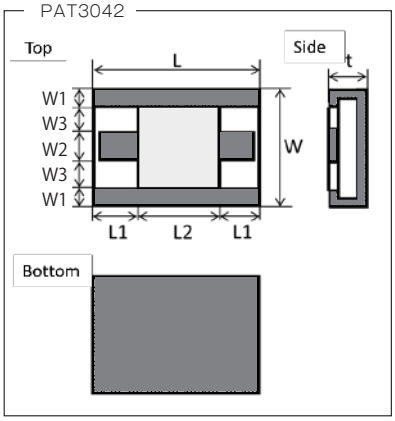


Top side

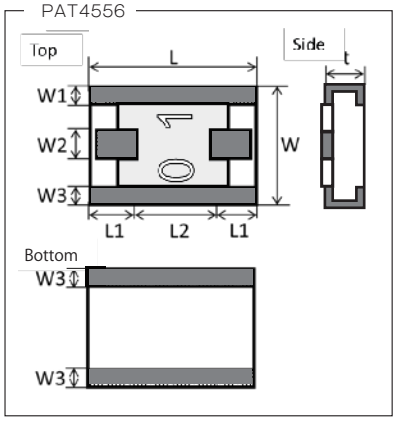


◆Dimensions

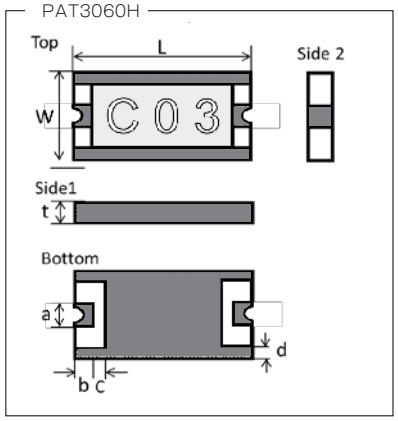
PAT3042



PAT4556



PAT3060H



Type	PAT3042					
Size(inch)	1612					
Symbol	0dB	1dB	2,3dB	4,5,6dB	7,8,9,10dB	16,20dB
L	4.2±0.20					
W	3.0±0.20					
t	0.8±0.15					
W1	0.40±0.15	0.30±0.15	0.40±0.15			
W2	0.66±0.10	0.66±0.10	0.90±0.10			
W3	0.77±0.10	0.85±0.10	0.65±0.10			
L1	—	1.90±0.20	1.90±0.20	1.75±0.20	1.60±0.20	1.15±0.20
L2	4.20±0.20	0.30±0.20	0.30±0.20	0.60±0.20	0.90±0.20	1.80±0.20

(unit : mm)

Type	PAT4556	
Size(inch)	2218	
Symbol	0dB	1 ~ 20dB
L	5.60±0.20	
W	4.50±0.20	
t	0.80±0.15	
W1	0.60±0.10	
W2	0.64±0.10	1.3±0.10
W3	0.60±0.10	

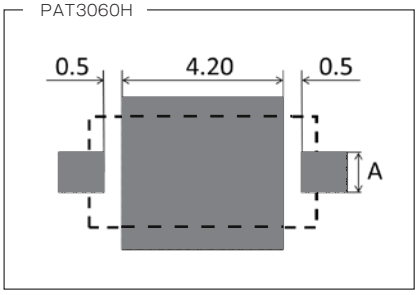
(unit : mm)

Type	PAT3060H
Size(inch)	2412
L	6.00±0.20
W	3.00±0.20
t	0.70±0.15
a	0.80±0.15
b	0.45±0.10
c	0.50±0.10
d	max 0.5

(unit : mm)

◆Recommended land patterns(soldering footprints)

PAT3060H



PCB material	Pattern A size
Glass epoxy t=0.6mm	1.07mm
Teflon t=0.6mm	1.52mm

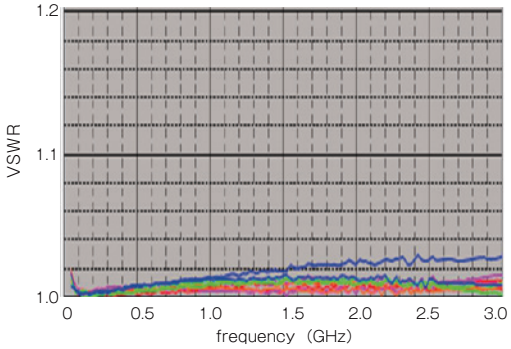
・Refer to the information on the next page on how to use PAT3042/PAT 4556

High Precision Chip Attenuators

■PAT Series W type

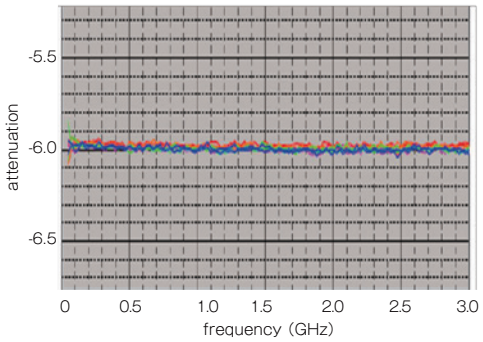
◆High frequency characteristics (measured value)

PAT3060H 6dB VSWR



Measured samples : 5pcs

PAT3060H 6dB attenuation

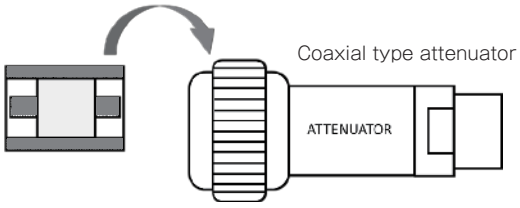


Measured samples : 5pcs

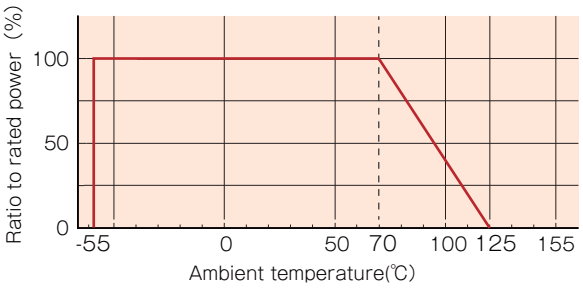
◆Mounting example

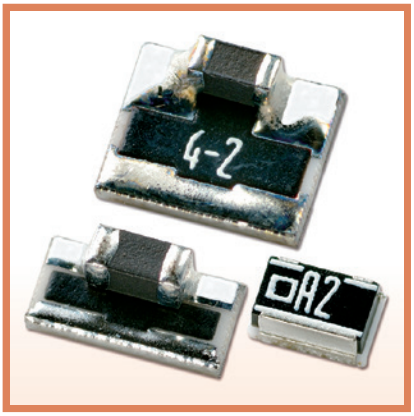
The shape of this attenuator chip is designed to match coaxial connectors' shape so that it can be integrated easily. In this case, the center conductor should be soldered to the signal terminals (the middle terminals) and metallic shield should be soldered to the ground terminals (the end terminals.)

This attenuator chip is designed to match coaxial connectors' shape



◆Derating Curve





Thermo-variable Chip Attenuators

■P*V Series

Features

- Simple solution for compensation for the temperature drift of GaAs amplifier
- Resistive construction allows operation in wide frequency range
- Ten different attenuation x 8 or 9 temperature characteristics: over 80 different offerings to meet any amplifier characteristics.

Lead free　Halogen free　RoHS Compliance

※Except for Chinese RoHS

Applications

- Cell phone base station
- Wireless remote controller

◆Part numbering system

PXV 1220S - 6dB N1 - T

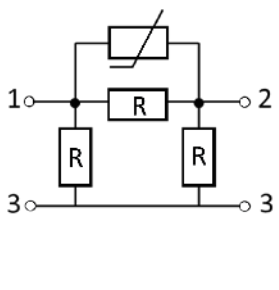
- PXV: Series code
- 1220S: Size : PXV1220S, PBV1632S PAV3137S
- 6dB: Attenuation : 2 digit
- N1: Sensitive characteristic: N1~N9
- T: Packing quantity: T=Tape(T02, T1), B=Bulk

◆Electrical Specification

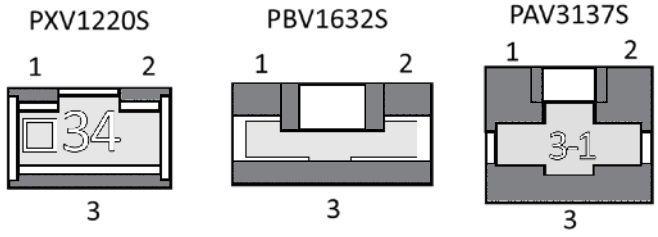
Type	PXV1220S	PBV1632S	PAV3137S
Attenuation	1 ~ 10dB (1dB Step)	1 ~ 10dB, 16dB (1dB Step)	1 ~ 10dB (1dB Step)
Attenuation tolerance	±0.5dB(@25℃, no load)		
Impedance	50Ω		
VSWR	<1.3		
Termo Sensitive characterristic	N1 ~ N9 (1db ~ 3dB) N1 ~ N8 (4db ~ 10dB)	N1 ~ N9 (1db ~ 3dB) N1 ~ N8 (4db ~ 16dB)	N1 ~ N9 (1db ~ 3dB) N1 ~ N8 (4db ~ 10dB)
Operating frequency	DC ~ 3GHz		DC ~ 6GHz
Rated power	63mW	100mW	2W
Operating temperature	−40℃~+100℃		−40℃~+125℃
Packaging quantity	100pcs/bag(B) 200pcs/reel (T02) 1000pcs/reel (T1)	20pcs/bag (B) 1,000pcs/reel (T1)	

◆Equivalent Circuit and pin arrangement

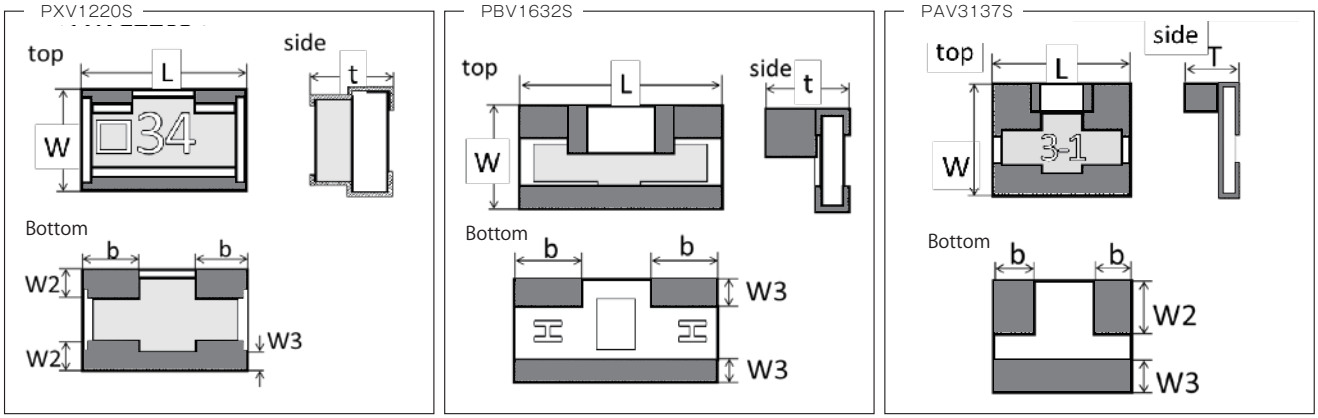
Equivalent circuit



Top side



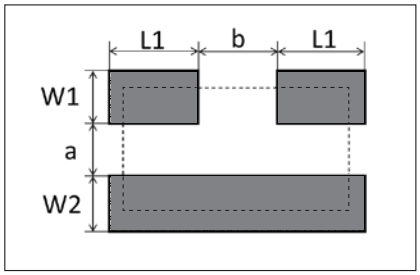
◆Dimensions



Type	Size (inch)	L	W	t	b	W2	W3
PXV1220S	0805	2.00±0.20	1.25±0.20	1.1max	0.65±0.20	0.38±0.20	0.25±0.35
PBV1632S	1206	3.20±0.20	1.60±0.20	1.5max	1.00±0.20	–	0.40±0.35
PAV3137S	1512	3.70±0.20	3.10±0.20	1.5max	1.00±0.20	1.50±0.20	0.85±0.20

(unit : mm)

◆Recommended land patterns(soldering footprints)

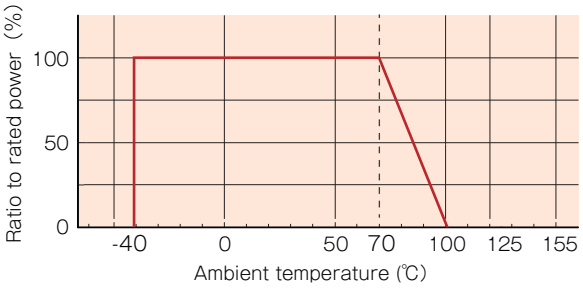


Type	W1	W2	a	L1	b
PXV1220S	0.70	0.70	0.50	0.80	0.70
PBV1632S	0.80	0.80	0.70	1.20	1.00
PAV3137S	1.55	1.15	0.60	1.25	1.50

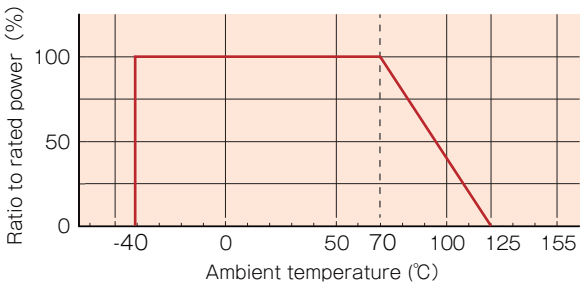
(unit : mm)

◆Derating Curve

○ PXV1220S, PBV1632S



○ PAV3137S

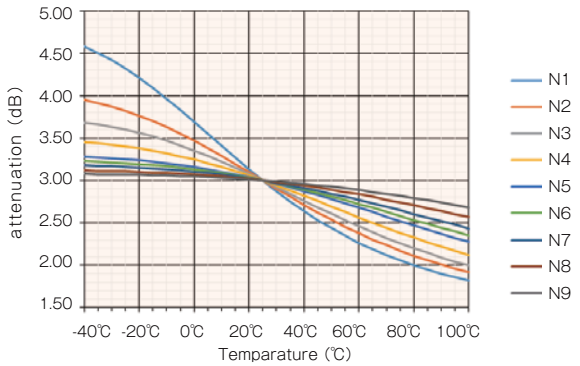


Thermo-variable Chip Attenuators

■P*V Series

◆Attenuation amount temperature characteristic

PXV1220S-3dB attenuation characteristic

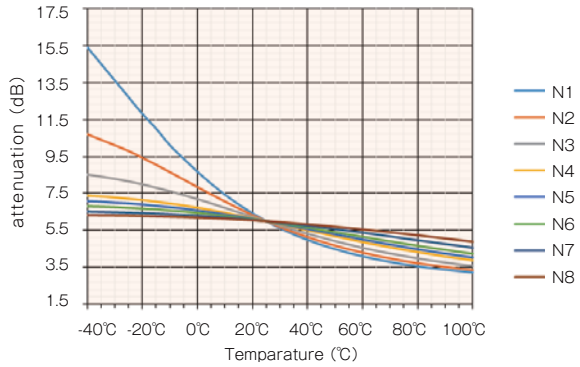


PXV1220S-3dB-N*

Temparature	N1	N2	N3	N4	N5	N6	N7	N8	N9
-40～+25℃	-0.0243	-0.0146	-0.0105	-0.00693	-0.00433	-0.0035	-0.00273	-0.0018	-0.00117
+25～+100℃	-0.0158	-0.0145	-0.0133	-0.0117	-0.00963	-0.00867	-0.00754	-0.00578	-0.00423
-40～+100℃	-0.0197	-0.0145	-0.012	-0.00949	-0.00717	-0.00627	-0.0053	-0.00393	-0.00281
Temp. characteristic tolerance	max ±10%							max ±15%	

(unit : dB/℃)

PXV1220S-6dB attenuation characteristic

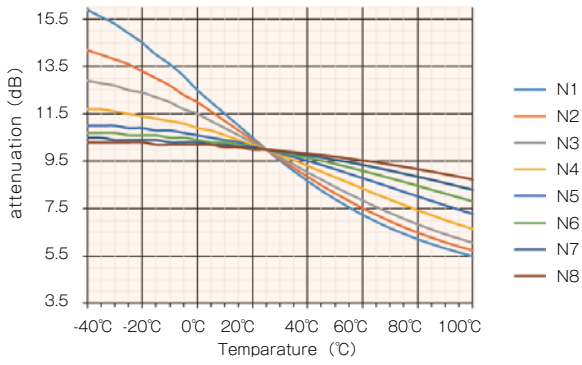


PXV1220S-6dB-N*

Temparature	N1	N2	N3	N4	N5	N6	N7	N8
-40～+25℃	-0.145	-0.0725	-0.0388	-0.0213	-0.0166	-0.0125	-0.00794	-0.00504
+25～+100℃	-0.037	-0.0351	-0.0323	-0.0282	-0.0261	-0.0235	-0.0191	-0.0148
-40～+100℃	-0.0873	-0.0525	-0.0353	-0.025	-0.0217	-0.0184	-0.0139	-0.0102
Temp. characteristic tolerance	max ±10%							max ±15%

(unit : dB/℃)

PXV1220S-10dB attenuation characteristic

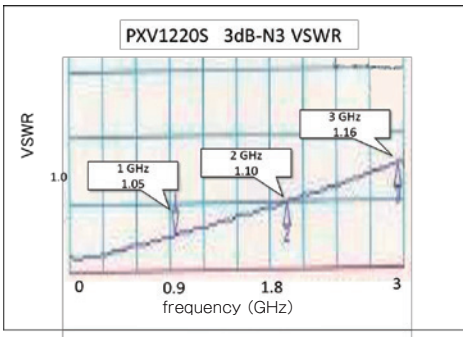


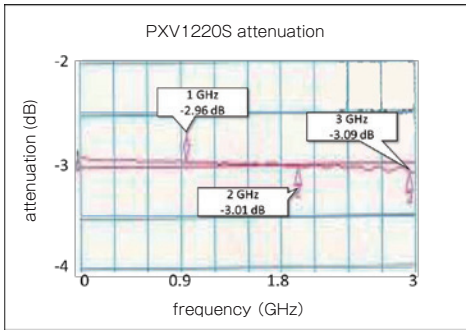
PXV1220S-10dB-N*

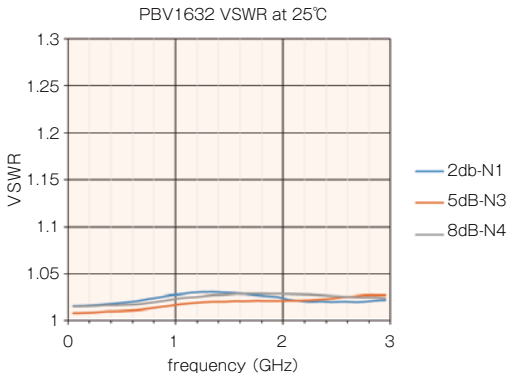
Temparature	N1	N2	N3	N4	N5	N6	N7	N8
-40～+25℃	-0.0908	-0.0643	-0.0449	-0.0264	-0.0161	-0.0107	-0.00716	-0.00475
+25～+100℃	-0.0601	-0.0568	-0.0525	-0.0447	-0.0362	-0.0292	-0.0227	-0.0169
-40～+100℃	-0.0743	-0.0603	-0.049	-0.0362	-0.0269	-0.0206	-0.0155	-0.0113
Temp. characteristic tolerance	max ±10%						max ±15%	

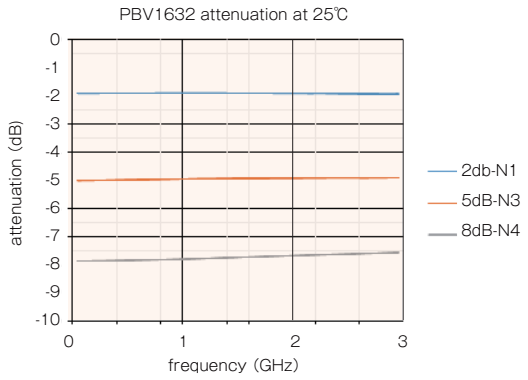
(unit : dB/℃)

◆High frequency characteristics (measured value)





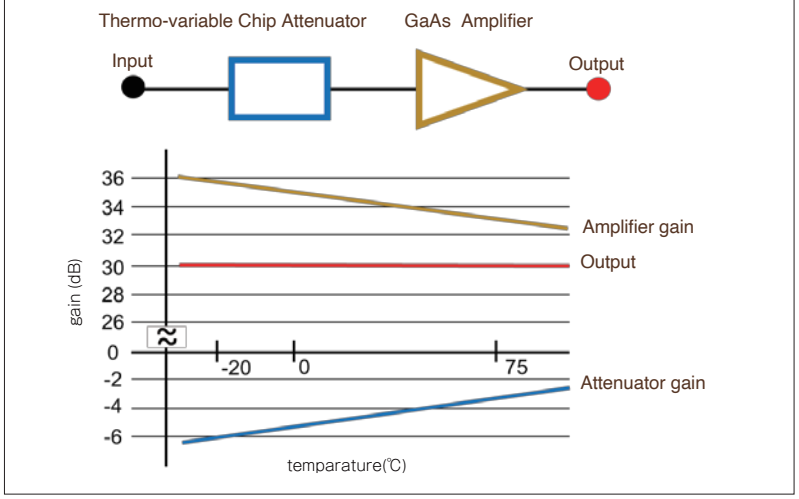


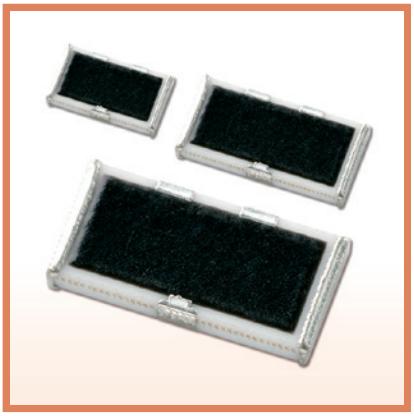


◆Example of use

- High frequency GaAs transistor amplifiers' gain decreases as temperature increases.
- Integrating this attenuator into amplifier circuit compensates the gain loss and keep the gain constant in the circuit. (figure below)
- Replaces complex feedback circuits.

Amplifier circuit with temperature compensation function





Power Splitters

■PS Series

Features

- Resistive type power splitter. Wide frequency range : DC to 20Ghz.
- Wide band provides less distortion of square pulses of digital signals
- Small and easy to mount
- Special design and thin film produce less reflection.

Lead free　Halogen free　RoHS Compliance

Applications

- Communication devices
- Wide band measuring instrumentation

◆Part numbering system

PS 1608 G T2 - R50 - T1

- PS — Series code
- 1608 — Size : PS1608,PS2012 PS3216,PS5025
- G — G : General
- T2 — Number of Output terminals
- R50 — Impedance : 50Ω
- T1 — Packing quantity: T=Tape(T1) B=Bulk

PS 1005 T2 - R50 - FD - T1

- PS — Series code
- 1005 — Size : PS1005
- T2 — Number of Output terminals
- R50 — Impedance : 50Ω
- FD — No GND, Need Face down mounting
- T1 — Packing quantity: T=Tape (T1/T5), B=Bulk

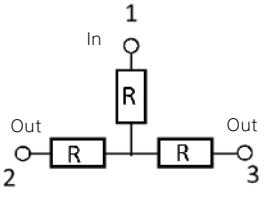
◆Electrical Specification

Type		PS1005 ※1	PS1608G	PS2012G	PS3216G	PS5025G
Operating frequency		DC - 20GHz	DC - 20GHz	DC - 17.5GHz	DC - 15GHz	DC - 10GHz
Rated power		100mW	100mW	125mW	250mW	500mW
Insersion Loss	6dB±0.5dB	< 10GHz				< 7.5GHz
	6dB±1.0dB	< 20GHz		<17.5GHz	<15GHz	<10GHz
Distribution Deviation		< 0.3dB (Max freuency)				
VSWR	≦1.3	< 10GHz				< 7.5GHz
	≦1.5	< 20GHz		<17.5GHz	<15GHz	<10GHz
Operating temperature		-40℃ ~ +125℃				
Packaging quantity		50pcs/bag(B) 1,000pcs/reel(T1) 5,000pcs/reel(T5)	50pcs/bag(B) 1,000pcs/reel(T1)	1,000pcs/reel(T1)		

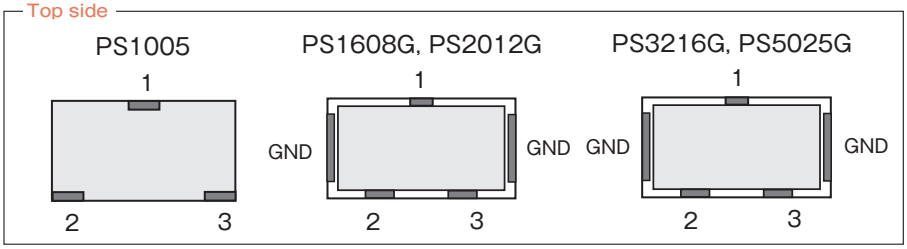
※1　The PS1005 series has no ground plane.

◆Equivalent Circuit and pin arrangement

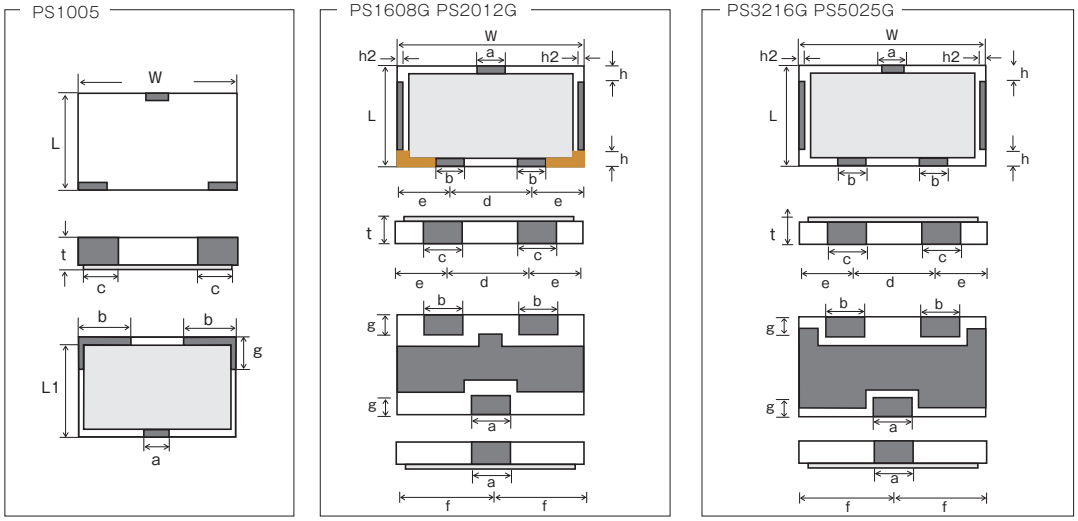
Equivalent circuit



Top side



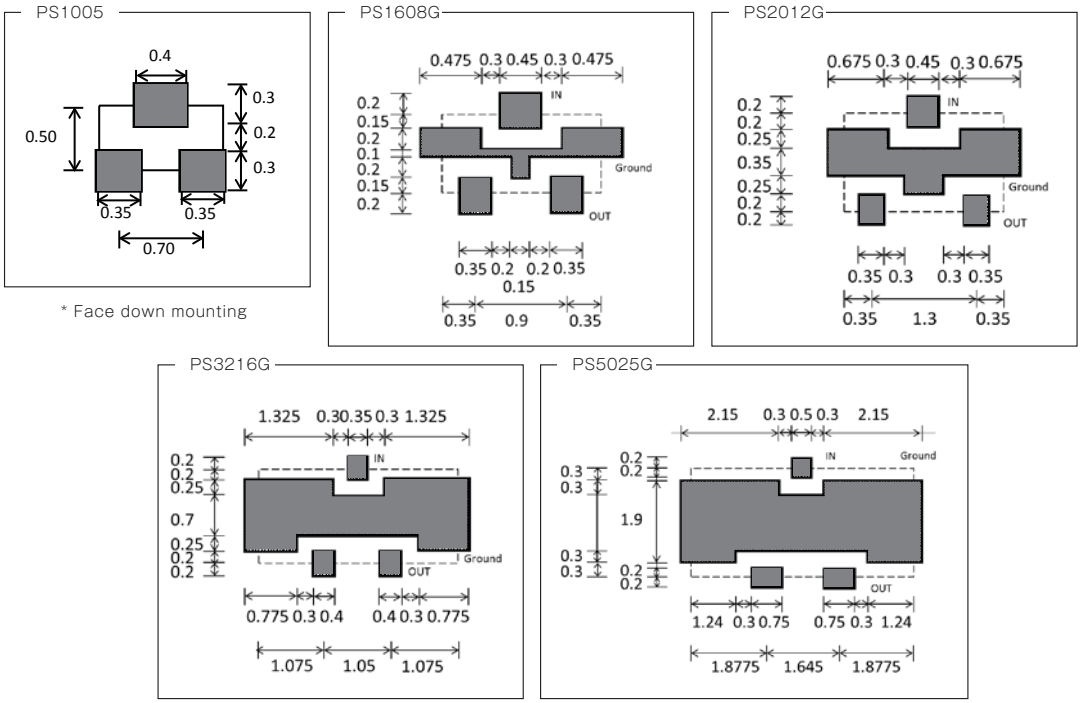
◆Dimensions



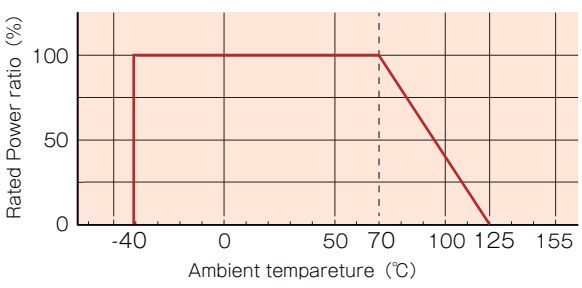
Type	Size (inch)	W	L	L1	t	a	b	c	d	e	f	g	h	h2
PS1005	0402	1.00±0.10	0.50±0.10	0.40±0.10	0.30±0.10	0.40±0.10	0.35±0.10	0.30±0.10	—	—	—	0.20±0.10	—	—
PS1608G	0603	1.60±0.10	0.80±0.10	—	0.40±0.10	0.45±0.10	0.35±0.10	0.35±0.10	0.80±0.10	0.40±0.10	0.80±0.10	0.25±0.15	0.10+0/-0.05	(0.15)
PS2012G	0805	2.00±0.10	1.25±0.10	—	0.40±0.10	0.45±0.15	0.35±0.15	0.35±0.15	1.30±0.20	0.35±0.10	1.00±0.10	0.25±0.15	0.10±0.05	(0.15)
PS3216G	1206	3.20±0.10	1.60±0.10	—	0.40±0.10	0.35±0.10	0.40±0.15	0.45±0.15	1.05±0.20	1.075±0.10	1.60±0.20	0.25±0.15	0.20±0.05	(0.15)
PS5025G	2010	5.00±0.10	2.50±0.10	—	0.80±0.20	0.50±0.20	0.75±0.20	0.85±0.20	1.70±0.40	1.65±0.20	2.50±0.20	0.30±0.15	0.25±0.15	(0.15)

(unit : mm)

◆Recommended land patterns (soldering footprints)



◆Derating Curve





High Power Chip Terminators

■PCS Series

Features

- Efficient heat dissipation provides high power, anti-surge, overload protection.
- Wrap around terminals provide easy and reliable soldering.
- Thin film does not have any innate stress. Therefore, repeated power cycling does not fatigue the element and cause no change in impedance.

Lead free　Halogen free　RoHS Compliance

Applications

- Wireless base station and Wireless communication devices
- High frequency power supply

◆Part numbering system

PCS 2012 - 50 - T1

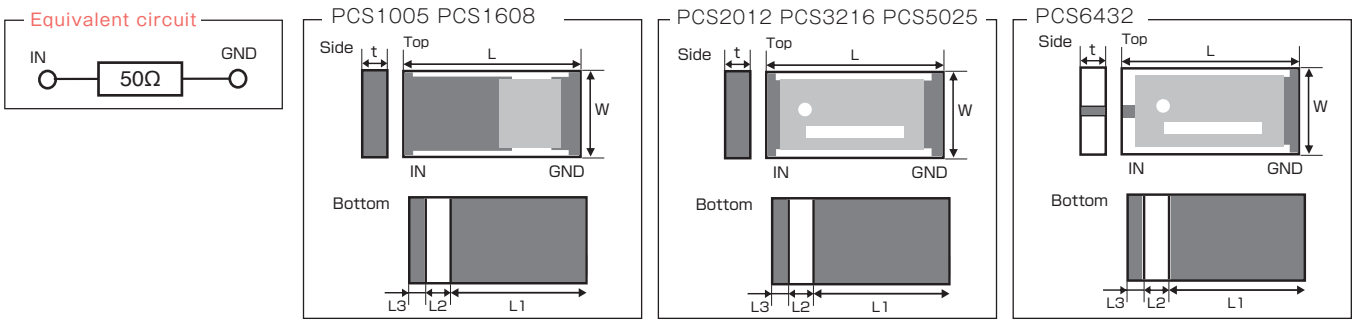
- PCS: Series code
- 2012: Size : 1005,1608,2012,3216,5025,6432
- 50: Impedance
- T1: Packing quantity: T=Tape (T1/T5), B=Bulk

◆Electrical Specification

PCS series (Alumina substrate)

Type		PCS1005	PCS1608	PCS2012	PCS3216	PCS5025	PCS6432
Rated Power		200mW	500mW	1W	2W	5W	10W
VSWR	DC ～ 3GHz	1.2	1.2	1.2	1.2	1.3	1.2
	3.1～5GHz	1.2	1.2	1.3	1.3	1.4	1.5
	5.1～7.5GHz	1.3	1.3	1.3	1.4	1.5	—
	7.6～10GHz	1.3	1.3	1.4	1.5	—	—
	10.1～12.5GHz	1.4	1.4	1.5	—	—	—
	12.6～15GHz	1.5	1.5	—	—	—	—
Operating temperature		-55℃～ +125℃					
Rated operating temperature		+70℃					
Packaging quantity		100pcs/bag (B) 1000pcs/reel (T1) 5000pcs/reel (T5)					

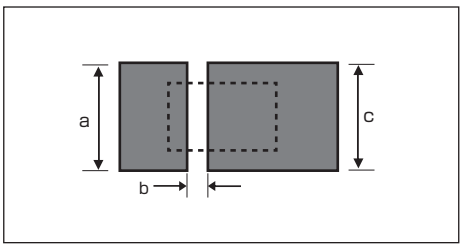
◆Dimension, Equivalent Circuit and pin arrangement



Type	Size(inch)	L	W	t	L1	L2	L3
PCS1005	0402	1.00±0.10	0.50±0.10	0.30±0.10	0.65±0.10	0.20±0.10	0.15±0.10
PCS1608	0603	1.60±0.15	0.80±0.15	0.40±0.10	1.10±0.15	0.30±0.15	0.20±0.15
PCS2012	0805	2.00±0.15	1.25±0.15	0.40±0.10	1.50±0.15	0.30±0.15	0.20±0.15
PCS3216	1206	3.20±0.20	1.60±0.20	0.40±0.10	2.70±0.20	0.30±0.15	0.20±0.15
PCS5025	2010	5.00±0.20	2.50±0.20	0.40±0.10	4.30±0.20	0.40±0.15	0.30±0.15
PCS6432	2512	6.40±0.20	3.20±0.20	0.40±0.10	5.70±0.20	0.40±0.15	0.30±0.15

(unit : mm)

◆Recommended land patterns (soldering footprints)



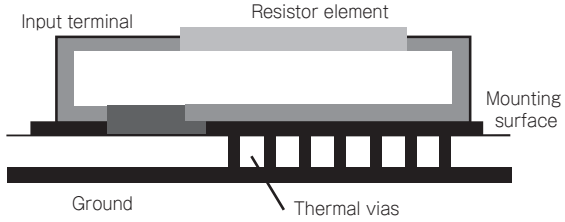
Type	a	b	c
PCS1005	0.70	0.20	0.70
PCS1608	1.20	0.30	1.20
PCS2012	1.20	0.45	1.60
PCS3216	2.00	0.45	2.00
PCS5025	2.90	0.55	2.90
PCS6432	3.60	0.55	3.60

(unit : mm)

◆Mounting example

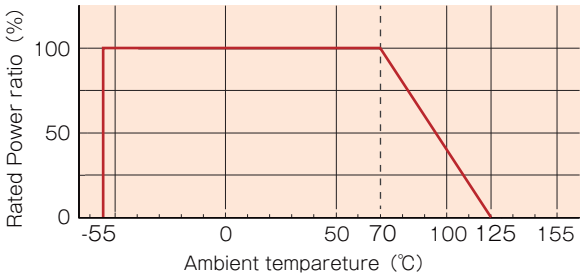
Pay special care to heat dissipation when this product is used at maximum rated power.

Mounting example of these series



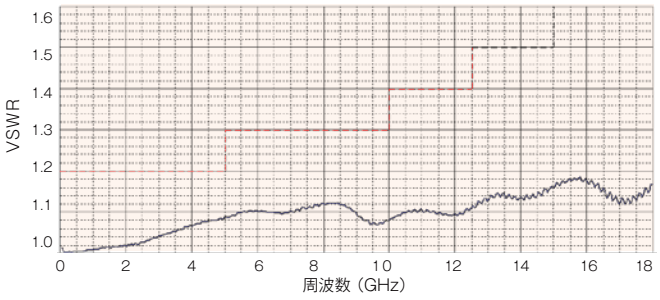
Above diagram shows a mounting example with thermal bias dissipating heat to the ground. Depending on the application, a heat sink might be needed closely contacting to the bottom of the product.

◆Derating Curve

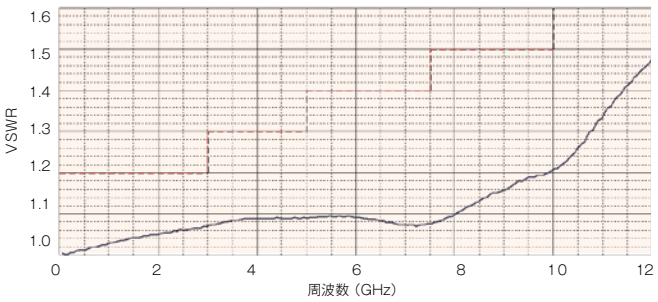


◆High frequency characteristics

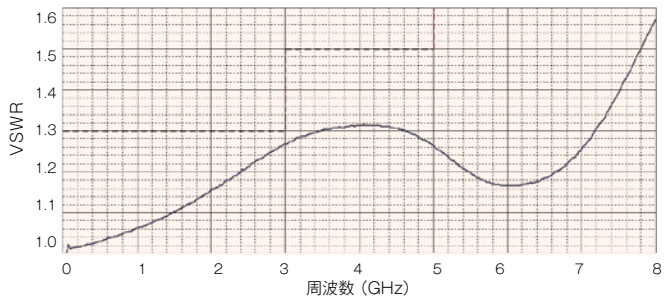
PCS1608 VSWR



PCS3216 VSWR



PCS6432 VSWR





Super High Power Chip Terminators

■HPT Series

Features

- By adopting an aluminum nitride substrate, it has extremely excellent heat dissipation performance and realizes ultra-high power consumption.
- Wrap around terminals provide easy and reliable soldering.
- Thin film does not have any innate stress. Therefore, repeated power cycling does not fatigue the element and cause no change in impedance.

Lead free　Halogen free　RoHS Compliance

Applications

- Wireless base station and Wireless communication devices
- High frequency power supply

◆Part numbering system

HPT 3216 - 50 - T1

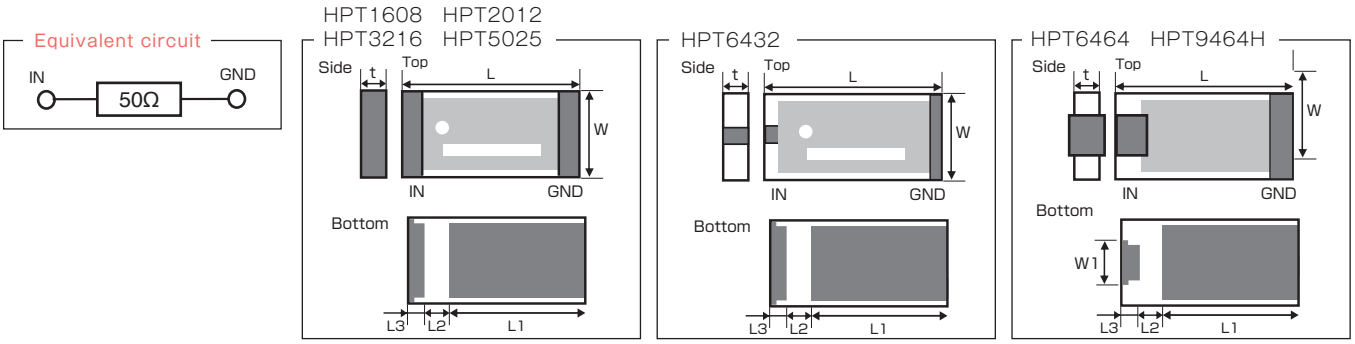
- HPT: Series code
- 3216: Size : 1608, 2012,3216, 5025,6432,6464,9464
- 50: Impedance
- T1: Packing quantity: T=Tape (T1/T5), B=Bulk

◆Electrical Specification

HPT series (ALN substrate)

Type		HPT1608	HPT2012	HPT3216	HPT5025	HPT6432	HPT6464	HPT9464H
Rated Power		2.5W	5W	10W	20W	30W	60W	100W
VSWR	DC ～ 3GHz	1.2	1.2	1.2	1.3	1.3	1.3	1.3
	3.1～5GHz	1.2	1.3	1.3	1.5	1.5	—	—
	5.1～7.5GHz	1.3	1.3	1.4	—	—	—	—
	7.6～10GHz	1.3	1.4	1.5	—	—	—	—
	10.1～12.5GHz	1.4	1.5	—	—	—	—	—
	12.6～15GHz	1.5	—	—	—	—	—	—
Operating temperature		-40℃～+155℃						
Rated operating temperature		+100℃ at Terminal						
Packaging quantity		100pcs/bag (B) 1000pcs/reel (T1) 5000pcs/reel (T5)						100pcs/bag (B) 1000pcs/reel (T1)

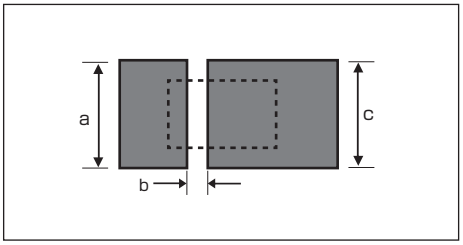
◆Dimension, Equivalent Circuit and pin arrangement



Type	Size(inch)	L	W	t	L1	L2	L3	W1
HPT1608	0603	1.60±0.15	0.80±0.15	0.40±0.10	1.10±0.15	0.30±0.15	0.20±0.15	—
HPT2012	0805	2.00±0.15	1.25±0.15	0.40±0.10	1.50±0.15	0.30±0.15	0.20±0.15	—
HPT3216	1206	3.20±0.20	1.60±0.20	0.40±0.10	2.70±0.20	0.30±0.15	0.20±0.15	—
HPT5025	2010	5.00±0.20	2.50±0.20	0.65±0.10	3.60±0.20	0.90±0.20	0.50±0.15	—
HPT6432	2512	6.40±0.20	3.20±0.20	0.65±0.10	5.50±0.20	0.70±0.15	0.20±0.15	—
HPT6464	2525	6.30±0.20	6.30±0.20	0.65±0.10	4.90±0.20	0.65±0.15	0.75±0.15	3.05±0.20
HPT9464H	3725	9.40±0.20	6.30±0.20	0.65±0.10	7.10±0.20	1.15±0.15	1.15±0.15	3.00±0.20

(unit : mm)

◆Recommended land patterns (soldering footprints)



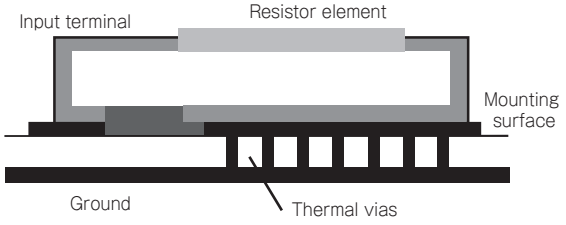
Type	a	b	c
HPT1608	1.20	0.40	1.20
HPT2012	1.60	0.40	1.50
HPT3216	2.00	0.40	2.00
HPT5025	2.90	0.90	2.90
HPT6432	3.60	0.70	3.60
HPT6464	3.30	1.15	6.80
HPT9464H	3.30	1.15	6.80

(unit : mm)

◆Mounting example

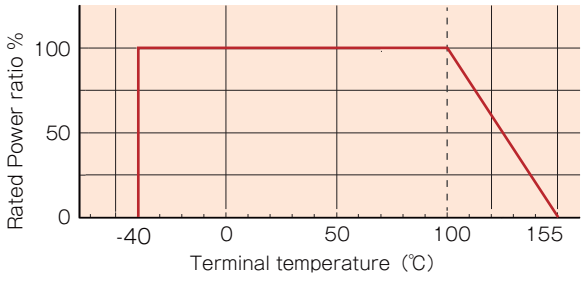
Pay special care to heat dissipation when this product is used at maximum rated power.

Mounting example of these series



Above diagram shows a mounting example with thermal bias dissipating heat to the ground. Depending on the application, a heat sink might be needed closely contacting to the bottom of the product.

◆Derating Curve



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Sample kits

Sample kits



Sample kits

Kits are available for metal thin film chip resistors and low resistance chip resistors.
They are perfect for development, prototype making, testing and experiments.

◆Part numbering system

RG1005PD - KIT - FILE

- RG1005PD — Product series name
- KIT — Sample kits
- FILE — Packaging quantity:BOX(BOXType) / FILE : (Filing book type)

◆Electrical Specification

Surface mount thin film resistors / Metal thin film chip resistors

Electrical characteristics	Rated power(W)						Resistance tolerance(%)			Container type
	1/4	1/6	1/8	1/10	1/16	1/32	±0.05	±0.1	±0.5	FILE
RR0816PD-KIT					●				●	●
RR1220PD-KIT				●					●	●
RG1005PD-KIT			●		●	●			●	●
RG1608PD-KIT		●		●	●				●	●
RG2012PD-KIT	●		●	●					●	●
RG1005PB-KIT			●		●	●		●		●
RG1608PB-KIT		●		●	●			●		●
RG2012PB-KIT	●		●	●				●		●
RG1005NW-KIT			●		●	●	●			●
RG1608NW-KIT		●		●	●		●			●
RG2012NW-KIT	●		●	●			●			●

Current sensing surface mount resistors / Low resistance chip resistors

Electrical characteristics	Rated power(W)										Resistance tolerance(%)		Container type
	6	5	4	3	2	1.5	1	3/4	1/2	1/3	±1	±2	FILE
KRL1220-KIT									●		●	●	●
KRL1632-KIT								●			●	●	●
KRL3264-KIT				●							●	●	●
KRL2012-KIT							●				●	●	●
KRL3216-KIT						●					●	●	●
KRL6432-KIT				●							●	●	●
KRL7638-KIT			●								●	●	●
KRL9045-KIT		●									●	●	●
KRL11050-KIT	●										●	●	●
RL1220-KIT										●	●		●
RL3720W-KIT							●				●		●

MEMO

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Standard Specification for surface mount chip resistors

This standard specification describes shared specifications among surface mount chip resistors regarding placement and packaging.
Custom products and products in development may not be included in these specifications.
Contact our sales office for these products.

These specifications may not be applicable to power choke products and high frequency components. Contact our sales office for these products.

1. Recommended land patterns (soldering footprints)

①For thin film chip resistor

②For current sensing chip resistor

2. Recommended reflow and flow soldering profile

3. Dimensions of the packaging tape

①For thin film chip resistor

②For current sensing chip resistor

4. Dimensions of the packaging reel

Recommended land patterns (soldering footprints)

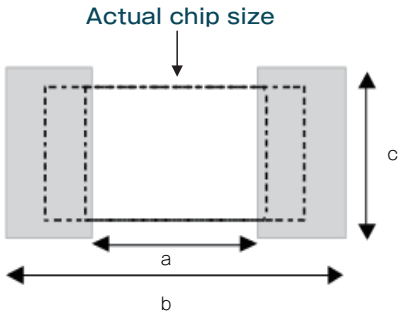
① For thin film chip resistor

【Applicable series】

- URG series
- RG series
- RGT series
- RGV series
- NRG series
- MRG series
- RGA series *1
- RS series
- RR series
- RT series

Recommended land dimensions (mm)			
Sizes	a	b	c
0603	0.28	0.76	0.34
1005	0.5	1.6	0.6
1608	1.0	3.0	1.2
2012	1.2	4.0	1.65
3216	2.2	5.0	2.0
3225	2.2	5.5	2.9
5025	3.8	6.8	2.9
6432	4.8	8.2	3.6

*1 RGA is compatible with conductive epoxies.
Please contact our sales office for details for conductive epoxy usage.

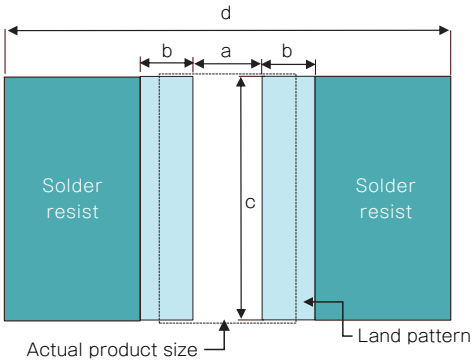


【Applicable series】

- PRG series

Recommended land dimensions (mm)				
Sizes	a	b	c	d (*1) (reference)
3216	0.8	1.1	3.7	≧27
5025	1.2	1.4	5.5	≧27
6432	2	2.1	6.9	≧27

*1 Please design the land pattern considering heat dissipation to the board so that the terminal temperature will not exceed 155°C.

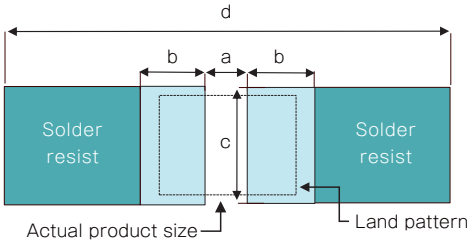


【Applicable series】

- HRG series

Recommended land dimensions (mm)				
Sizes	a	b	c	d (*1) (reference)
3216	0.55	1.9	1.8	≧27

*1 Please design the land pattern considering heat dissipation to the board so that the terminal temperature will not exceed 155°C.

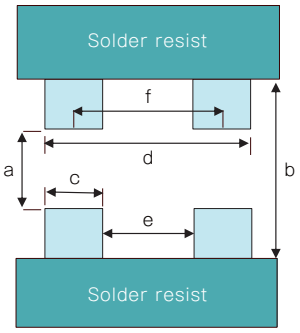


【Applicable series】

・RM series[*1]　・RMA series[*2]

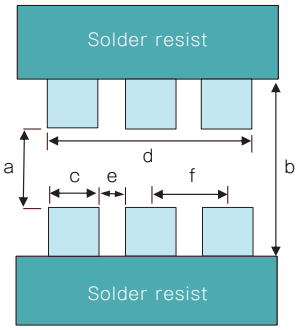
◯ 4 terminal type

Recommended land dimensions (mm)						
Sizes	a	b	c	d	e	f
RM/RMA2012	0.6 ~ 0.7	1.6 ~ 1.8	0.4 ~ 0.6	1.8 ~ 2.0	0.7 ~ 0.9	1.3 ~ 1.5
RM/RMA3216	0.6 ~ 0.8	2.4 ~ 2.7	0.6 ~ 0.8	2.6 ~ 3.2	1.4 ~ 1.6	2.2 ~ 2.4
RM/RMA3225	1.5 ~ 1.7	3.3 ~ 3.6	0.6 ~ 0.8	2.6 ~ 3.2	1.4 ~ 1.6	2.2 ~ 2.4



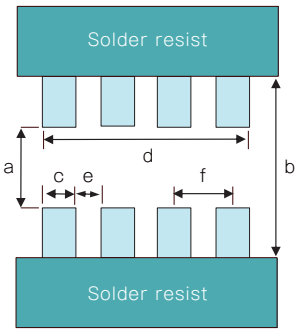
◯ 6 terminal type

Recommended land dimensions (mm)						
Sizes	a	b	c	d	e	f
RM3216	0.5 ~ 0.7	2.4 ~ 2.7	0.6 ~ 0.8	2.5 ~ 2.7	0.2 ~ 0.3	0.9 ~ 1.0
RM3225	1.3 ~ 1.5	3.3 ~ 3.6	0.6 ~ 0.8	2.5 ~ 2.7	0.2 ~ 0.3	0.9 ~ 1.0



◯ 8 terminal type

Recommended land dimensions (mm)						
Sizes	a	b	c	d	e	f
RM3216	0.7 ~ 0.8	2.2 ~ 2.3	0.4 ~ 0.45	2.9 ~ 3.0	0.3 ~ 0.35	0.8 ~ 0.85
RM3225	1.4 ~ 1.5	3.4 ~ 3.5	0.4 ~ 0.45	2.9 ~ 3.0	0.3 ~ 0.35	0.8 ~ 0.85
RM6432	1.9 ~ 2.0	4.0 ~ 4.1	0.85 ~ 0.9	5.7 ~ 5.8	0.7 ~ 0.75	1.6 ~ 1.65



*1 Custom RM requires custom land patterns. Please contact us.
*2 RMA is compatible with conductive epoxies . Please contact our sales office for details for conductive epoxy usage.

Recommended land patterns (soldering footprints)

② For current sensing chip resistor

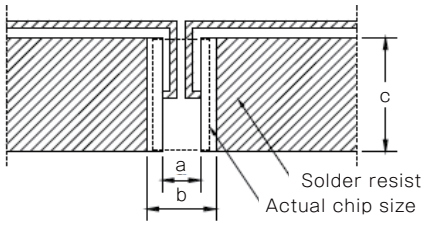
【Applicable series】

・KRL series (long side terminal)

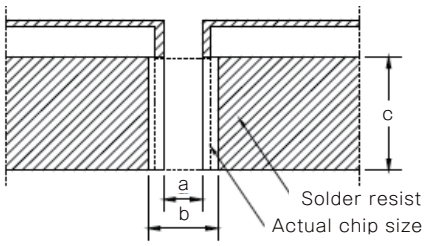
Recommended land dimensions (mm)

Types	Resistance range	Copper foil thickness (um)	a	b	c
KRL1608D	10mΩ~		0.25	1.60	1.70
KRL2012D/E	1mΩ*1	100	0.25	2.00	2.20
	2mΩ~	35	0.60		
KRL3216D/E	1mΩ*1	100	0.40	2.40	3.40
	2mΩ~	35	0.60		
KRL5025D/E	1mΩ*1	35	0.70	4.00	5.20
	2mΩ~	100	1.20		
KRL6432D/E	1mΩ*1		0.70	4.20	6.60
	2mΩ~		2.20		
KRL7638D/E	1mΩ*1		1.10	4.60	7.80
	2mΩ~		2.60		
KRL9045D/E	1mΩ*1		1.30	5.10	9.20
	2mΩ~		3.10		
KRL11050D/E	1mΩ*1		1.80	5.60	11.20
	2mΩ~		3.60		
KRL15075D/E	1mΩ*1		2.00	8.40	15.20
	2mΩ~		5.00		

*1 Refer to the diagram right for the Land pattern of 1mΩ



*1 KRL2012D/E, KRL3216D/E, KRL5025D/E, KRL6432D/E, KRL7638D/E, KRL9045D/E, KRL11050D/E, KRL15075D/E : 1mΩ



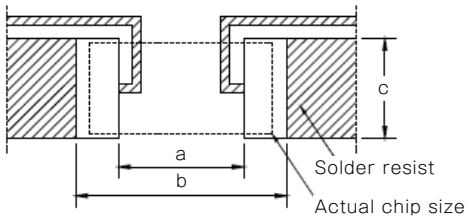
【Applicable series】

・KRL series (Short side terminal)

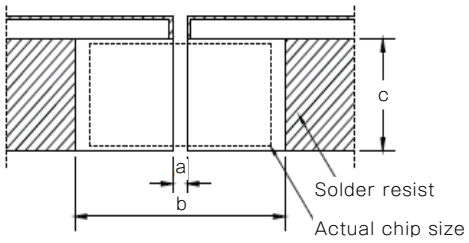
Recommended land dimensions (mm)

Types	Resistance range	Copper foil thickness (um)	a	b	c
KRL0816D/E	10~18mΩ*1	35	0.10	2.20	1.00
	20~39mΩ*1		0.50		
	43mΩ~	100	0.90		
KRL1220D/E	5mΩ~	100	1.20	2.70	1.50
KRL1632D/E	5 ~ 8mΩ		1.00	4.00	1.90
	9mΩ~		2.00		
KRL2550D/E	5 ~ 8mΩ		2.20	6.00	2.80
	9mΩ~		3.80		
KRL3264D/E	5 ~ 8mΩ		2.50	7.40	3.50
	9mΩ~		4.40		
KRL50110D/E	5 ~ 8mΩ		2.80	14.00	5.75
	9mΩ~		5.50		

*1 Refer to the diagram right for the land pattern of KRL0816D/E



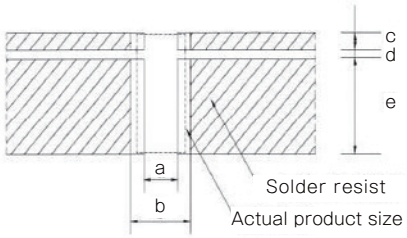
*1 KRL0816D/E : 10 ~ 18mΩ, 20 ~ 39mΩ



【Applicable series】

・KRL series (4terminal type)

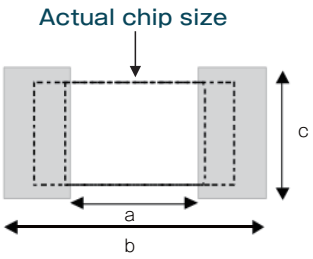
Recommended land dimensions (mm)					
Types	a	b	c	d	e
KRL3216T4	0.40	2.70	0.35	0.30	2.70
KRL3216T4A	0.76	2.76	0.76	0.38	2.29
KRL6432T4	2.00	4.40	0.70	0.50	5.40
KRL7638T4	2.00	4.40	1.00	0.60	6.30
KRL9045T4	2.60	5.00	1.20	0.70	7.50
KRL11050T4	3.20	5.60	1.60	1.10	8.70



【Applicable series】

・RL Series (Short side terminal)

Recommended land dimensions (mm)			
Sizes	a	b	c
0510	0.5	1.9	0.7
0816	0.7	3.0	1.6
1220	1.0	4.0	2.4

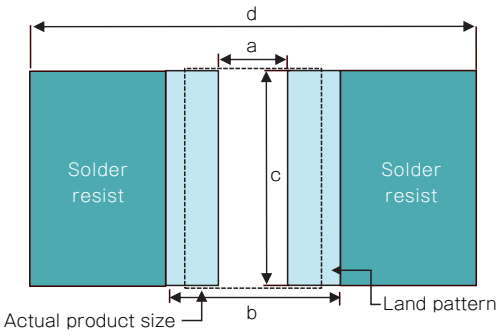


【Applicable series】

・RL Series (Short side terminal)

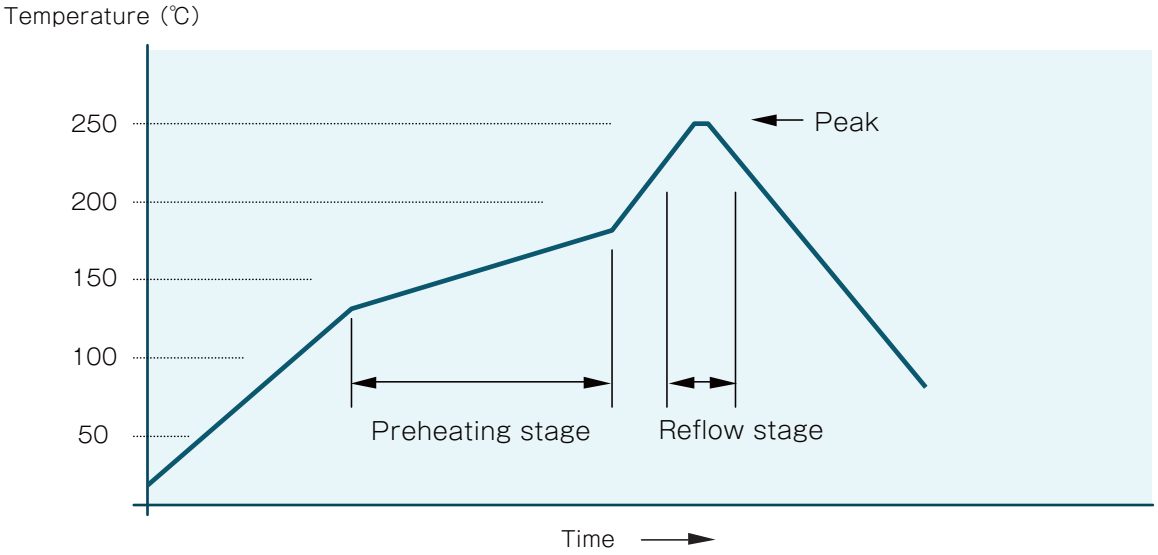
Recommended land dimensions (mm)				
Sizes	a	b	c	d
RL3720W	1.2	7.9	7.9	27.0
RL7520W	1.2	15.8	15.8	27.0

The recommended land dimensions c and d are for reducing surface temperature rise.
They can be changed according to the operating environment.



Recommended reflow and flow soldering profile

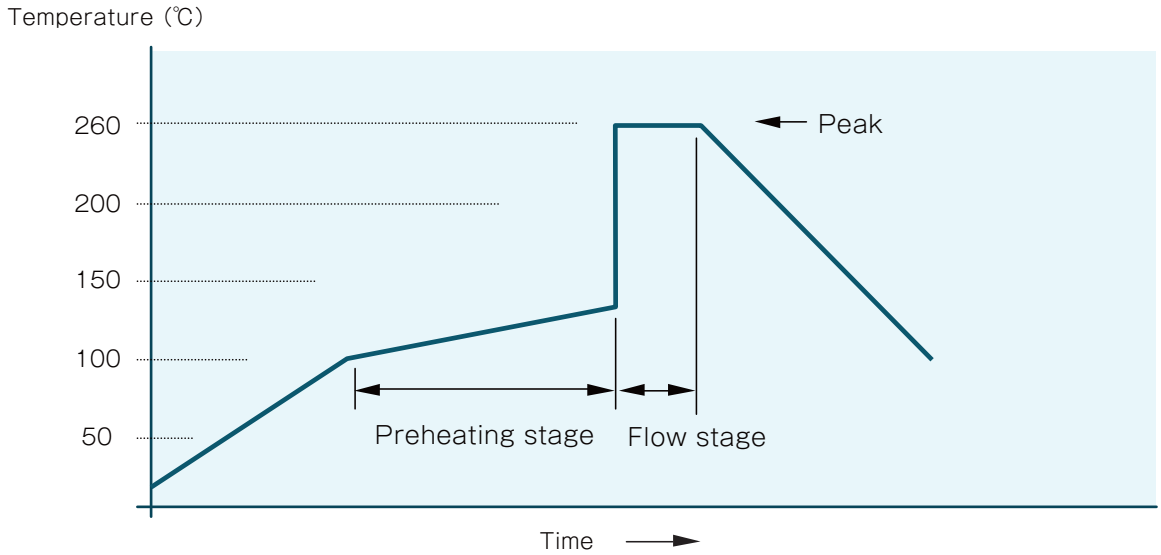
Recommended reflow soldering profile



Product surface temperature

pre-heating	130～180℃ 60～90sec.
Reflow	above 220° 30～90sec.
Peak temperature	240～250℃ aximum 10 seconds · Applicable solder composition : Sn−Ag−Cu solder paste · Cycles : twice (cooling between 1st and 2nd cycles)

Recommended flow soldering profile



Product surface temperature

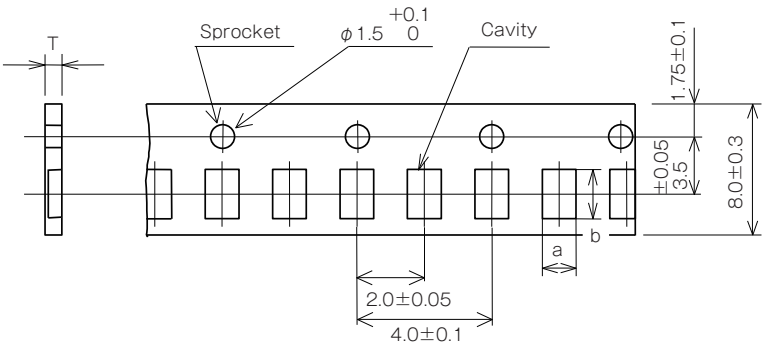
pre-heating	100℃～120℃ 60～80 sec
Peak temperature	255℃～265℃ aximum 5 seconds · Applicable solder composition : Sn−Ag−Cu solder paste · Cycles : twice

Dimensions of the packaging tape

① For thin film chip resistor

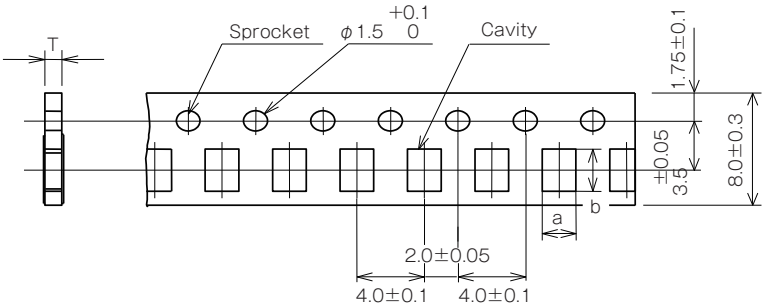
Tape dimensions (paper 2 mm pitch)

Types	a	b	T
RG0603/RR0306/ RT0603	0.38±0.03	0.68±0.03	0.31+0.02
RR/RT0510	0.63±0.05	1.13±0.05	0.43±0.05
RG/RGT/NRG/ RS/RGA1005	0.63±0.05	1.13±0.05	0.43±0.05
RL0510	0.63±0.05	1.13±0.05	0.43±0.05

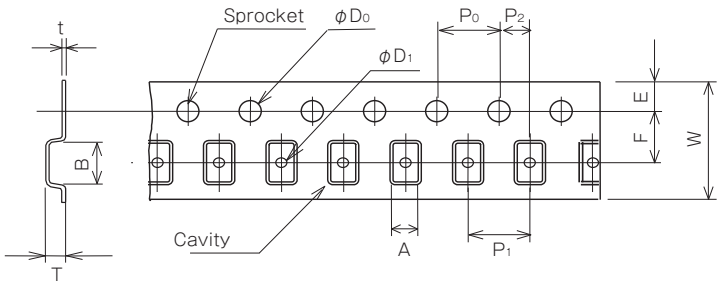


Tape dimensions (paper 4 mm pitch)

Types	a	b	T
RR/RT/0816	1.1±0.1	1.9±0.1	0.6±0.05
URG/RG/RGT NRG/RGA1608	1.1±0.1	1.9±0.1	0.6±0.05
RL0816	1.1±0.1	1.9±0.1	0.6±0.05
RR/RT1220	1.65±0.2	2.4±0.2	0.75±0.05
URG/RG/RGT/MRG/ NRG/RGA2012	1.65±0.2	2.4±0.2	0.75±0.05
RL1220	1.65±0.2	2.4±0.2	0.75±0.05



Tape dimension (embossed tape 4mm pitch)



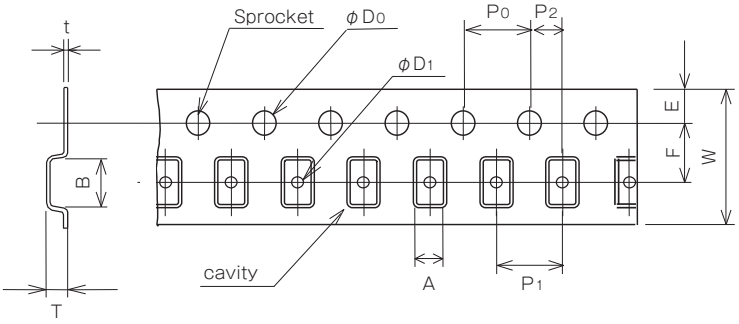
Types	A	B	W	F	E	P_0	P_1	P_2	φD_0	φD_1	T	t
RM2012	1.6±0.2	2.4±0.2	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.05±0.05	1.5 max	0.3max
URG/RG/RGT RGV/NRG 3216	2.0±0.2	3.6±0.2	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.05±0.05	1.5 max	0.3max
PRG/HRG/MRG RM/RMA3216	2.0±0.2	3.6±0.2	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.05±0.05	1.5 max	0.3max
RGV/RM/RMA 3225	2.8±0.1	3.5±0.1	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.1±0.1	1.5 max	0.3max
PRG 5025	2.8±0.1	5.3±0.1	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.1±0.1	1.5 max	0.3max
URG/MRG 5025	2.8±0.1	5.3±0.1	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.1±0.1	1.5 max	0.3max
PRG/RM 6432	3.5±0.2	6.9±0.2	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	1.50+0.1/-0	1.5 max	0.3max

Dimensions of the packaging tape

② For current sensing chip resistor

Tape dimensions (embossed tape)

○ **4 mm pitch , 8 mm pitch,**



Types	A	B	W	F	E	P_0	P_1	P_2	φD_0	φD_1	T	t
KRL0816/1608 YJP1608	0.95±0.05	1.85±0.05	8.0±0.1	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	0.6±0.05	0.55±0.05	0.2±0.05
KRL1220 /2012	1.45±0.05	2.3±0.1	8.0±0.2/-0	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	-	0.65±0.1	0.2±0.05
KRL1632 /3216	1.9±0.1	3.5±0.1	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	1.0+0.2/-0	0.75±0.1	0.2±0.05
KRL2550 /5025	2.9±0.2	5.3±0.2	12.0±0.3	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	1.5+0.2/-0	1.5max	0.3max
KRL3264/6432 KRL6432T4	3.43±0.2	6.63±0.2	12.0±0.3	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	1.5+0.2/-0	0.76±0.1	0.2±0.05
KRL7638 KRL7638T4	4.15±0.1	7.95±0.1	16.0±0.3	7.5±0.1	1.75±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.5±0.1	1.5±0.1	1.2±0.15	0.3±0.05
KRL9045 KRL9045T4	4.85±0.1	9.35±0.1	16.0±0.3	7.5±0.1	1.75±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.5±0.1	1.5±0.1	1.2±0.15	0.3±0.05
KRL50110 /11050 KRL11050T4	5.4±0.1	11.5±0.1	24.0±0.3	11.5±0.1	1.75±0.1	4.0±0.1	8.0±0.1	2.0±0.1	1.5±0.1	1.5±0.1	1.2±0.15	0.3±0.05

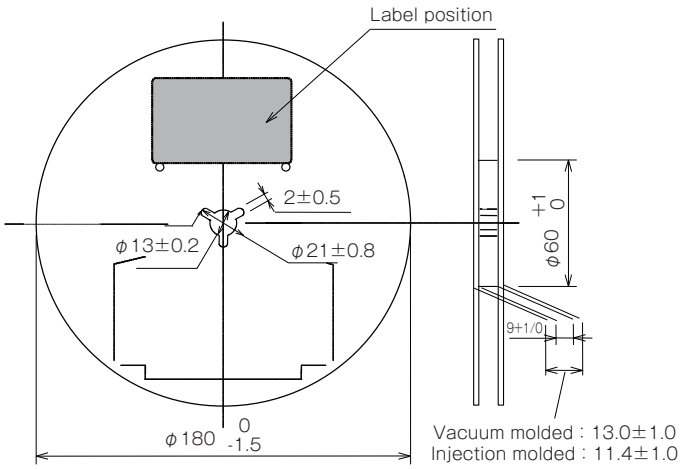
Types	A	B	W	F	E	P_0	P_1	P_2	φD_0	φD_1	T	t
RL3720W	2.6±0.2	4.45±0.2	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.05	1.55±0.05	–	0.7±0.1	0.3±0.05
RL7520W	2.6±0.2	8.2±0.2	16.0±0.3	7.5±0.1	1.75±0.1	4.0±0.1	4.0±0.1	2.0±0.1	1.55±0.05	–	0.7±0.1	0.3±0.05

Dimensions of the packaging reel

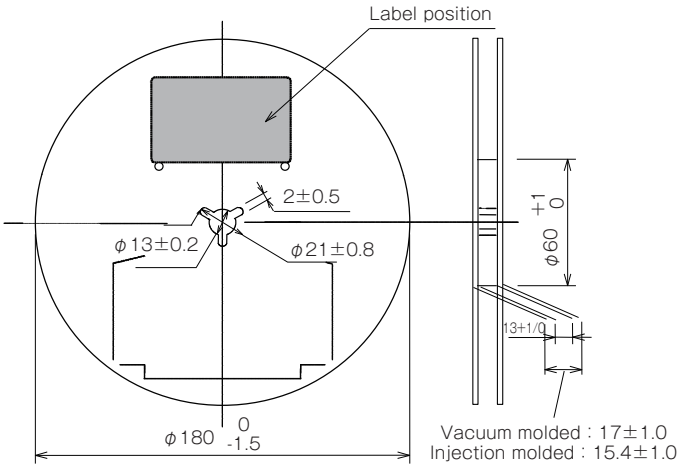
【Applicable series】

・URG series ・RG series ・RGT series ・RGV series ・NRG series ・RS series ・PRG series
・HRG series ・MRG series ・RGA series ・RRseries ・RT series ・RM series ・RMA series

0603, 1005, 1608, 2012, 3216 size

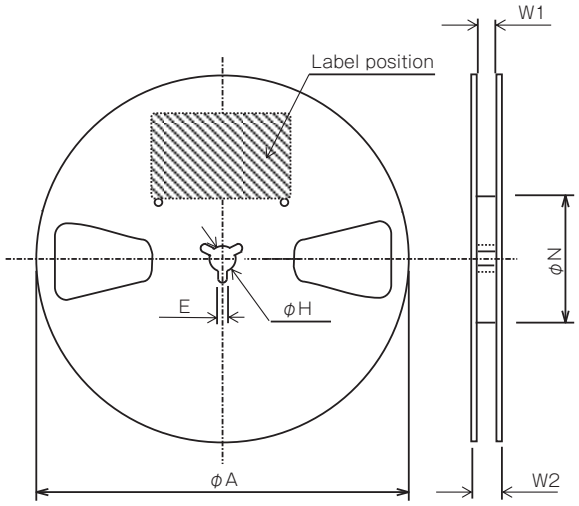


5025, 6432 size



【Applicable series】

・KRL series（long side terminal） ・KRL series（short side terminal） ・KRL series（4 terminals） ・YJP series



Material : plastic

Sizes	pieces / reel	φA	φH	E	φN	W1	W2
0816/1608 1220/2012 1632/3216	1,000/5,000	180+0/-3.0	13±0.2	2±0.5	60+1.0/-0.0	9±0.3	13±1.4
2550/5025 3264/6432	1,000 5,000	180+0/-3.0 255±1.0	13±0.2 13±0.2	2±0.5 2±0.5	60+1.0/-0.0 80±0.5	13±0.3 13.5±1.0	17±1.4 18.4 以下
7638 9045	1,000 5,000	180+0/-3.0 330±2.0	13±0.2 13±0.2	2±0.5 2±0.5	60+1.0/-0.0 80±1.0	17.0±0.3 17.4±1.0	19.4±1.0 21.4±1.0
50110/11050	1,000	180±2.0	13±0.2	2±0.5	80±1.0	25.4±1.0	29.4±1.0
15075	500 1,000	180±2.0 330±2.0	13±0.2 13±0.2	2±0.5 2±0.5	80±1.0 100±1.0	25.4±1.0 25.4±1.0	29.4±1.0 29.4±1.0

MEMO

Standard Specification for High frequency surface mount components

This standard specification describes shared specifications among high frequency surface mout components regarding mounting and packaging. However, since the land pattern differs depending on each series, please refer to the contents of each series description.

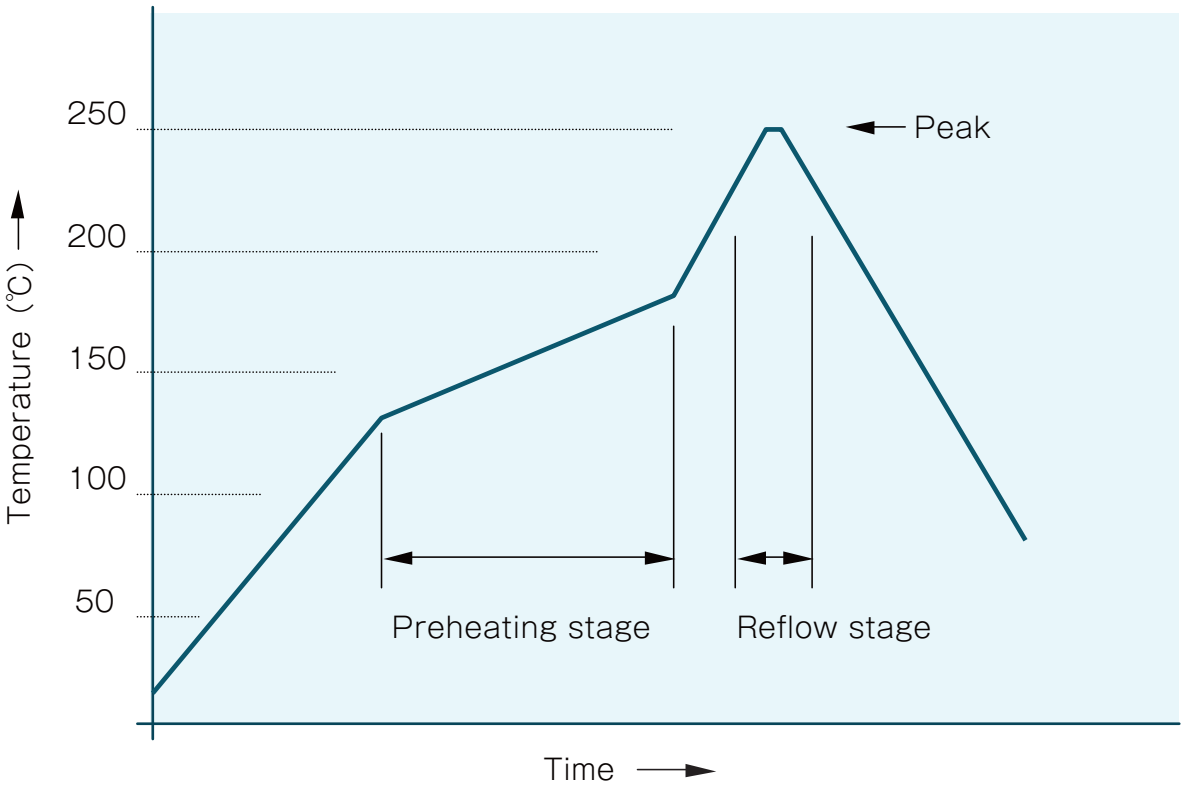
Custom products and products in development may not be included in these specifications.
Please contact our sales office for these products

1. Recommended reflow soldering profile

2. Dimensions of the packaging tape

3. Dimensions of the packaging reel

Recommended reflow soldering profile



Product surface temperature

pre-heating	130 ~ 180℃ 60 ~ 90sec.
Reflow	above 220℃ 30 ~ 90sec.
Peak temperature	240 ~ 250℃ Maximum 10 seconds · Applicable solder composition : Sn - Ag - Cu solder paste · Cycles : twice (cooling between 1st and 2nd cycles)

* Regarding the reflow soldering profiles of PXV series and PBV series, Please contact our sales office.

Dimension of the pakaging tape

For high frequency components

Tape dimensions

Fig.1 Paper 2mm pitch

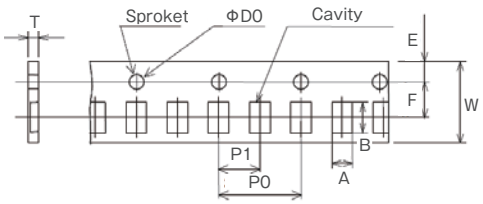


Fig. 2 Embossed tape 4mm

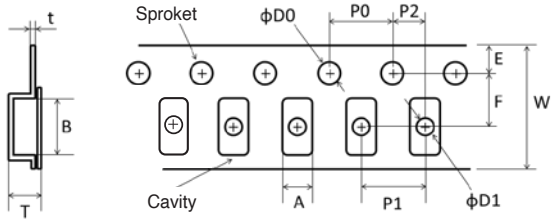
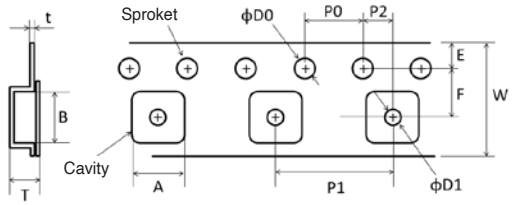


Fig.3 Embossed tape 8mm pitch



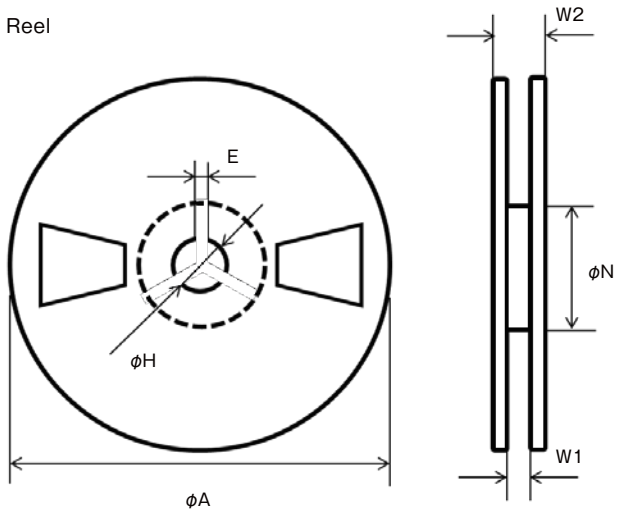
Type	Refer fig.	A	B	W	F	E	P0	P1	P2	D0	D1	T	t
RFD Series													
RFD0603	1	0.38±0.03	0.68±0.03	8.00±0.30	3.50±0.05	1.75±0.10	4.10±0.10	2.00±0.15	–	1.5+0.1/-0	–	0.42±0.02	–
ATS-FD Series													
ATS1005-FD	1	0.63±0.05	1.13±0.05	8.00±0.30	3.50±0.05	1.75±0.10	4.10±0.10	2.00±0.15	–	1.5+0.1/-0	–	0.43±0.05	–
ATS2012-FD	2	1.60±0.20	2.40±0.20				4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	–	1.5max	0.30max
ATF Series													
ATF1005	1	0.63±0.05	1.13±0.05	8.00±0.30	3.50±0.05	1.75±0.10	4.10±0.10	2.00±0.15	–	1.5+0.1/-0	–	0.43±0.05	–
PAT Series													
PAT0510S	1	0.65±0.03	1.15±0.03	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	–	1.5±0.1/-0	–	0.50±0.10	–
PAT0816	2	0.95±0.05	1.85±0.05					4.00±0.10	2.00±0.05		0.60±0.05	0.55±0.05	0.20±0.05
PAT1220	2	1.45±0.10	2.30±0.10								–	0.65±0.01	0.20±0.05
PAT1632	2	2.00±0.20	3.60±0.20								–	2.5max	0.3max
PAT3042S	3	3.5±0.20	4.60±0.20	12.00±0.30	5.50±0.05			8.00±0.10			–	1.6max	0.4max
PAT Series W type													
PAT3042	3	3.50±0.20	4.60±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	8.00±0.10	2.00±0.05	1.5+0.1/-0	–	1.6max	0.3max
PAT4556	3	4.90±0.10	6.10±0.10								1.05±0.05	1.60±0.10	0.30±0.05
PAT3080H	2	3.43±0.20	6.63±0.20					4.00±0.10			1.5+0.2/-0	1.5max	0.20±0.05
P*V Series													
PXV1220S	2	1.45±0.10	2.30±0.10	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.5+0.1/-0	1.0+0.2/-0	1.30±0.20	0.25±0.05
PBV1632S	2	2.00±0.20	3.60±0.20								–	–	0.3max
PAV3137S	3	3.30±0.10	4.30±0.10	12.00±0.30	5.50±0.05			8.00±0.05			1.5±0.1/-0	1.55±0.10	0.20±0.05
PS Series													
PS1005	1	0.65±0.03	1.15±0.03	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	–	1.5+0.1/-0	–	–	0.50±0.10
PS1608	2	0.95±0.05	1.85±0.05					4.00±0.10	2.00±0.05		0.06±0.10	0.55±0.05	0.20±0.05
PS2012	2	1.60±0.20	2.40±0.20								–	1.5max	0.3max
PS3216	2	1.90±0.10	3.50±0.10								1.05±0.05	1.00±0.20	0.20±0.05
PS5025	2	2.90±0.10	5.30±0.10	12.00±0.30	5.50±0.05						1.5+0.2/-0	1.00±0.05	0.20±0.05
PCS Series													
PCS1005	1	0.66±0.03	1.18±0.03	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	–	1.5+0.1/-0	–	–	0.50±0.10
PCS1608	2	0.95±0.05	1.85±0.05					4.00±0.10	2.00±0.05		0.60±0.10	0.55±0.05	0.20±0.05
PCS2012	2	1.45±0.10	2.30±0.10								–	0.65±0.10	0.20±0.05
PCS3216	2	1.90±0.10	3.50±0.10								1.0+0.2/-0	0.80±0.10	0.20±0.05
PCS5025	2	2.90±0.10	5.35±0.10	12.00±0.30	5.50±0.05						1.0+0.2/-0	0.75±0.10	0.20±0.05
PCS6432	2	3.43±0.20	6.63±.0.20								1.0+0.2/-0	1.5max	0.20±0.05
HPT Series													
HPT1608	2	0.95±0.05	1.85±0.05	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	4.00±0.10	2.00±0.05	1.5+0.1/-0	0.60±0.10	0.55±0.05	0.20±0.05
HPT2012	2	1.45±0.10	2.30±0.01								–	0.65±0.10	0.20±0.05
HPT3216	2	1.90±0.10	3.50±0.01								1.0+0.2/-0	0.75±0.10	0.20±0.05
HPT5025	2	2.90±0.2	5.30±0.20	12.00±0.30	5.50±0.05						1.5+0.2/-0	1.5max	0.3max
HPT6432	2	3.43±0.20	6.63±0.20								1.5+0.2/-0	0.76±0.10	0.20±0.05
HPT6464	3	6.60±0.10	6.70±0.10					8.00±0.10	2.0±0.10		1.5+0.2/-0	1.55±0.10	0.30±0.05
HPT9464	3	6.73±0.10	9.80±0.10	16.0+0.3/-0.1	7.50±0.10						1.5+0.2/-0	0.79±0.10	0.279±0.02

(unit : mm)

Dimension of the pakaging reel

For high frequency components

Reel dimensions



Reel size	ϕA	ϕH	E	ϕN	W1	W2
Size 1	180+0/-3	13.0±0.2	2.0±0.5	60+1/-0	9±0.3	13.0±1.4
Size 2	180+0/-3	13.0±0.2	2.0±0.5	60+1/-0	13.0±0.3	17.0±1.4
Size 3	255±1.0	13.0±0.3	2.0±0.2	80±0.5	13.5±1.0	max 18.4
Size 4	330±2.0	13.0±0.2	2.0±0.5	100±0.5	25.4±1.0	29.4±1.0

(unit : mm)

Type	Packaging Q'ty/reel	Reel size
RFD Series		
RFD0603	1,000/5,000	Size 1
ATS-FD Series		
ATS1005-FD	500/1,000	Size 1
ATS2012-FD	500/1,000	Size 1
PAT Series		
PAT0510S	10,000	Size 1
PAT0816	1,000/5,000	Size 1
PAT1220	1,000/5,000	Size 1
PAT1632	1,000/5,000	Size 1
PAT3042S	1,000/2,000	Size 2
PAT Series, W type		
PAT3042	1,000	Size 2
PAT4556	1,000	Size 2
PAT3080H	1,000	Size 2
P*V Series		
PXV1220S	1,000	Size 1
PBV1632S	1,000	Size 1
PAV3137S	1,000	Size 1

Type	Packaging Q'ty/reel	Reel size
PS Series		
PS1005	1,000/5,000	Size 1
PS1608	1,000/5,000	Size 1
PS2012	1,000/5,000	Size 1
PS3216	1,000/5,000	Size 1
PS5025	1,000/5,000	Size 3
PCS Series		
PCS1005	1,000/5,000	Size 1
PCS1608	1,000/5,000	Size 1
PCS2012	1,000/5,000	Size 1
PCS3216	1,000/5,000	Size 1
PCS5025	1,000/5,000	Size 3
PCS6432	1,000/5,000	Size 3
HPT Series		
HPT1608	1,000/5,000	Size 1
HPT2012	1,000/5,000	Size 1
HPT3216	1,000/5,000	Size 1
HPT5025	1,000	Size 2
HPT6432		
HPT6464	5,000	Size 3
HPT9464	1,000	Size 4

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