

# APPROVAL SHEET

## **WA04P**

### **$\pi$ type chip attenuator**

50 $\Omega$ , 1dB to 10dB

Size 0402x2

Customer : \_\_\_\_\_  
Approval No : \_\_\_\_\_  
Issue Date : \_\_\_\_\_

Customer Approval :

## FEATURE

1. Unbalanced  $\pi$  type attenuator circuit in one chip (1.0mm x 1.0mm)
2. Mounting occupation area reduction
3. Mounting assembly costs saving

## APPLICATION

- Attenuation, level control, impedance matching of high frequency signals of communication equipment;
- Mobile phone (GSM, CDMA, PDC, etc,...)
- Telecom

## DESCRIPTION

The attenuator is constructed in a high grade ceramic body (aluminum oxide). Internal circuit is applied to the top surface of the substrate, and its design determines the required attenuation value. The attenuation layer is covered with a protective coating and a rectangular marker indicates input pin1 as shown in circuit configuration.

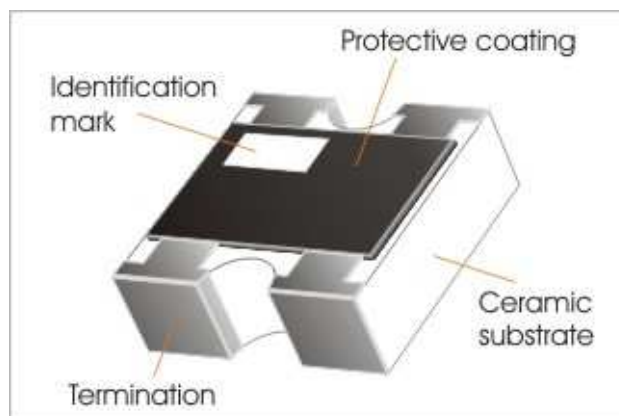
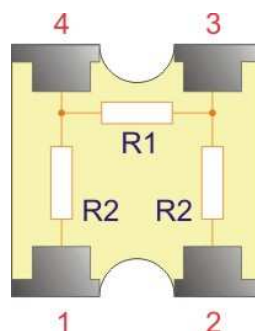


Fig 1. Outline of WA04P Chip attenuator

## CIRCUIT CONFIGURATION

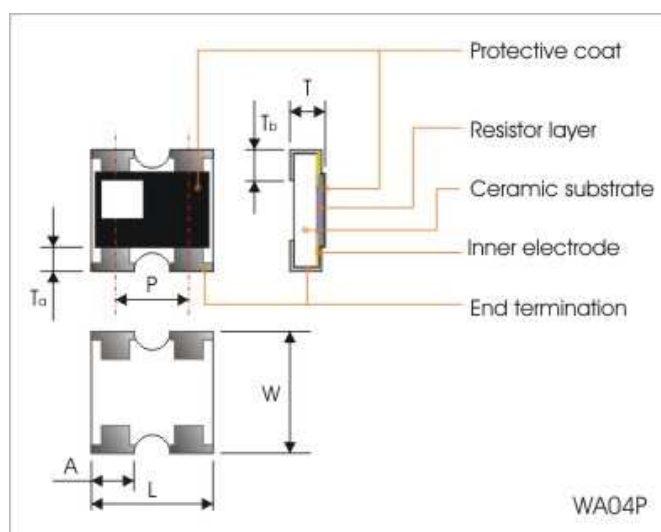


## QUICK REFERENCE DATA

Item	General Specification
Series No.	WA04P(Convex type)
Size	0402x2 (1005x2)
Attenuation Range	1dB, 2dB, 3dB, 4dB, 5dB, 6dB, 10dB
Attenuation Tolerance	
1dB ~ 5dB	±0.3dB
6dB ~ 10dB	±0.5dB
Characteristic impedance	50Ω
Rated power at T <sub>amb</sub> =70°C	0.04 W / package
Limiting voltage (DC)	50V
Frequency range (DC)	Max. 2GHz
VSWR (Voltage Standing Wave Ratio)	Max. 1.3
Number of Resistors	3 resistors
Number of Terminals	4 terminals
Climatic category (IEC60068)	55/155/56

## Dimensions

	WA04P
<b>L</b>	1.00 ± 0.10
<b>W</b>	1.00 +0.10 / -0
<b>T</b>	0.35 ± 0.10
<b>P</b>	0.65 ± 0.10
<b>A</b>	0.33 ± 0.10
<b>Ta</b>	0.15 ± 0.10
<b>Tb</b>	0.25 ± 0.10



## Marking

**No marking for WA04P chip attenuator**

## FUNCTIONAL DESCRIPTION

### Product characterization

Standard attenuation values include 1dB to 5dB with a tolerance of ±0.3dB, 6dB to 10dB with a tolerance of ±0.5dB.



## CATALOGUE NUMBERS AND PACKAGING

The attenuators have a catalogue number starting with .

WA04	P	001	X	B	T	L
<b>Size code</b> WA04 : 0402 per element	<b>Type code</b> P : convex, $\pi$ type attenuator	<b>Attenuation code</b> 001 = 1dB 002 = 2dB 003 = 3dB 004 = 4dB 005 = 5dB 006 = 6dB 010 = 10dB	<b>Impedance</b> X : 50 $\Omega$	<b>Tolerance</b> A : $\pm 0.2$ dB B : $\pm 0.3$ dB C : $\pm 0.5$ dB D : $\pm 1.0$ dB	<b>Packaging code</b> T : 7" reel taped	<b>Termination code</b> L = Sn base (lead free)

Packaging : 8mm width paper taping 10,000pcs per reel.

## MOUNTING

Due to their rectangular shapes and small tolerances, Surface Mountable Resistors are suitable for handling by automatic placement systems.

Chip placement can be on ceramic substrates and printed-circuit boards (PCBs).

Electrical connection to the circuit is by individual soldering condition.

The end terminations guarantee a reliable contact.

## SOLDERING CONDITION

The robust construction of chip resistors allows them to be completely immersed in a solder bath of 260°C for 10 seconds. Therefore, it is possible to mount Surface Mount Resistors on one side of a PCB and other discrete components on the reverse (mixed PCBs).

Surface Mount Resistors are tested for solderability at 245°C during 3 seconds. The test condition for no leaching is 260°C for 30 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 3.

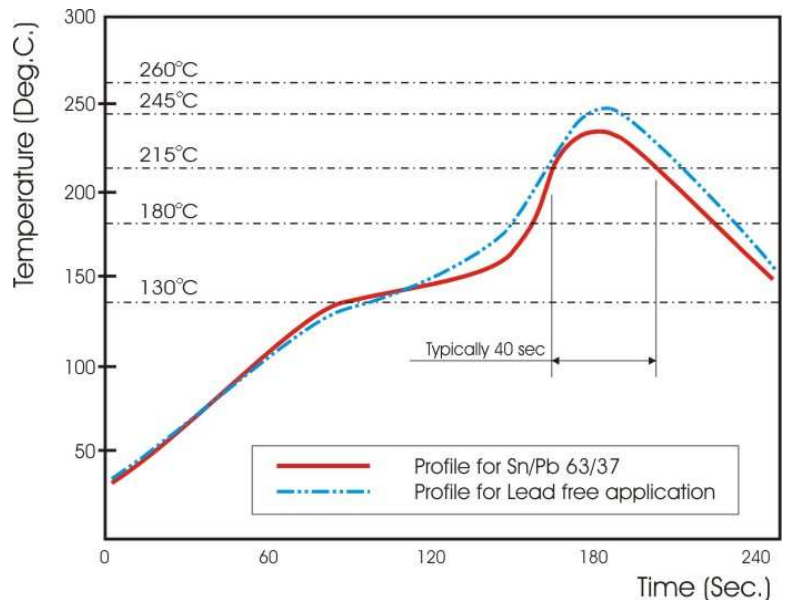
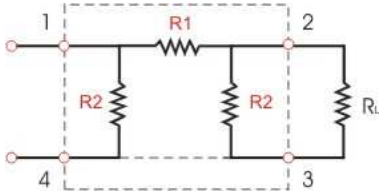


Fig 3. Infrared soldering profile



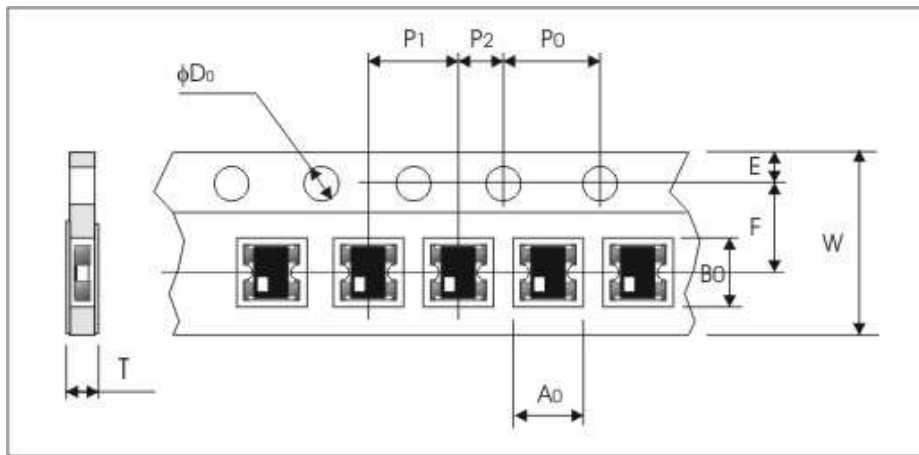
## TEST AND REQUIREMENTS (JIS C 5201-1 : 1998)

TEST	PROCEDURE	REQUIREMENT
Characteristic Impedance	Measuring circuit 	50Ω
Insulation resistance <b>JISC5201-1:1998</b> <b>Clause 4.6</b>	Apply the 50VDC for 1minute	At least 100MΩ
Solderability <b>IEC 60068-2-58:2004</b>	Un-mounted chips completely immersed for 3±0.3 second in a SAC solder bath at 245°C±5°C	good tinning (>95% covered) no visible damage
Resistance to soldering heat(R.S.H) <b>IEC 60068-2-58:2004</b>	Un-mounted chips completely immersed for 10±1 second in a SAC solder bath at 255°C±5°C	no visible damage Attenuation 1~ 2dB : within ±0.1dB Attenuation 3~ 5dB : within ±0.2dB Attenuation 6~ 10dB : within ±0.3dB
Temperature cycling <b>Clause 4.19</b>	30 minutes at -55°C±3°C, 2~3 minutes at 20°C+5°C-1°C, 30 minutes at +155°C±3°C, 2~3 minutes at 20°C+5°C-1°C, total 5 continuous cycles	Ditto
Load life (endurance) <b>Clause 4.25</b>	1000 +48/-0 hours, loaded with RCWV or Vmax in chamber controller 70±2°C, 1.5 hours on and 0.5 hours off	Ditto
Dielectric Withstand Voltage <b>JISC5201-1:1998</b> <b>Clause 4.7</b>	Apply the maximum overload voltage (AC) for 1 minute	No breakdown or flashover



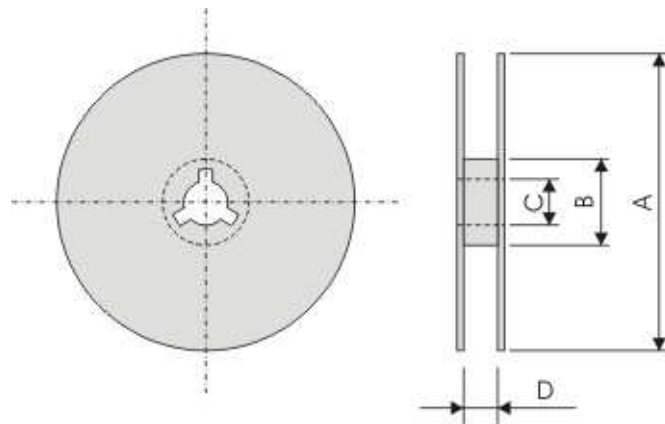
PACKAGING

Paper Tape specifications (unit :mm)



	A0	B0	W	F	E
(mm)	1.20±0.05	1.20±0.05	8.00±0.20	3.50±0.05	1.75±0.10
	P1	P2	P0	ØD0	T
(mm)	2.00±0.10	2.00±0.05	4.00±0.10	1.50 <sup>+0.10</sup> <sub>-0</sub>	0.45±0.10

Reel dimensions



Symbol	A	B	C	D
(unit : mm)	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	9.0±0.5