

GaAs monolithic integrated CNC attenuator

DC~4GHz

### key indicator

- Frequency range: DC~4GHz
- Root mean square attenuation accuracy: 0.25dB
- Insertion loss: 0.7dB
- Positive voltage bias
- Chip size: 1.0mm×1.25mm×0.1mm

### typical application

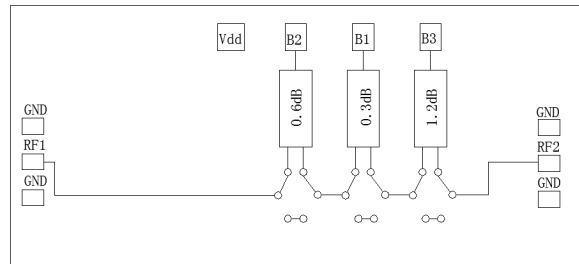
- Radar and electronic countermeasures
- RF/Microwave Circuit
- Military and aerospace
- test instrument
- Instrumentation

### Product Introduction

AY1869 is a GaAs broadband 3-bit digital attenuator Chip, frequency coverage DC~4GHz, insertion loss is less than 0.7dB, basic attenuation is 0.3dB, 0.6dB, 1.2dB, total attenuation The reduction is 2.1dB. The chip uses +5/-5V logic to control the attenuation reduce.

The chip uses an on-chip metallization process to ensure a good connection Ground, easy to use and convenient to use, the back of the chip is metallized, Suitable for eutectic sintering or conductive adhesive bonding process.

### Functional block diagram



### Electrical performance (T<sub>A</sub>=25°C, V<sub>D</sub>=+5V, Control level = -5/+5V, 50Ω system)

index	Minimum	Typical value	Max	unit
frequency	DC 4			GHz
Input standing wave ratio	-	1.15	-	:1
Output standing wave ratio	-	1.15	-	:1
Insertion loss	-	-0.7	-	dB
Phase fluctuation	-3.8	-	0.2	°
Attenuation accuracy	0.2	-	0.4	dB
Root mean square attenuation accuracy	-	0.25	-	dB

### Truth table (0: -5V, 1: +5V)

attenuation	Bit1	Bit2	Bit3
Zero state	1	1	1
0.3dB	0	1	1
0.6dB	1	0	1
1.2dB	1	1	0
2.1dB	0	0	0

### Control voltage

state	Bias condition
Low	-5.5~-4.5V
high	4.5~5.5V

### Bias voltage vs current

V <sub>D</sub>	I <sub>D</sub>
5V	2mA

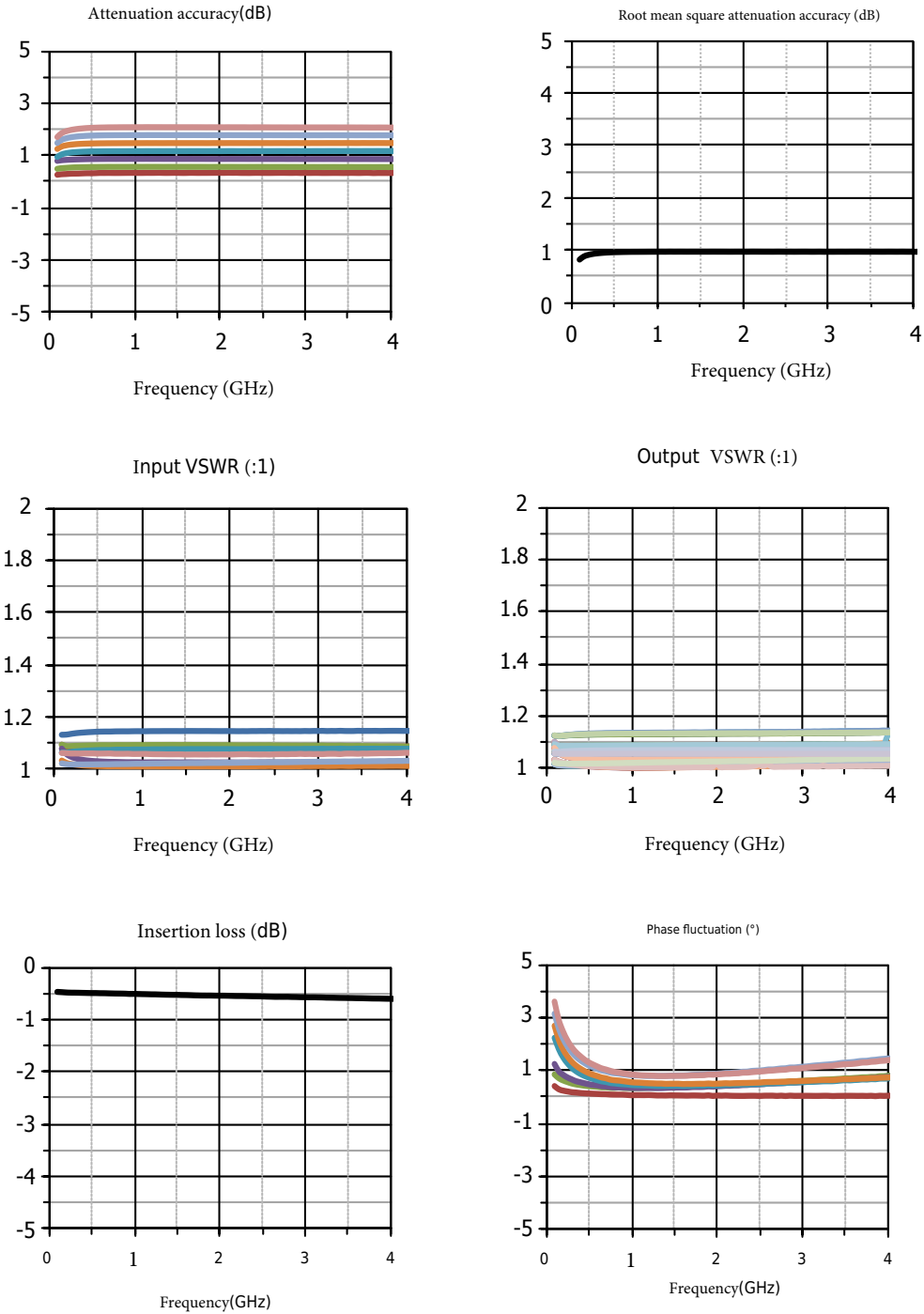
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**Absolute maximum rating**

Maximum input power	+23dBm	Operating temperature	-55 °C ~ + 85 °C
Maximum input voltage	+8V	Storage temperature	-65 °C ~ + 150 °C

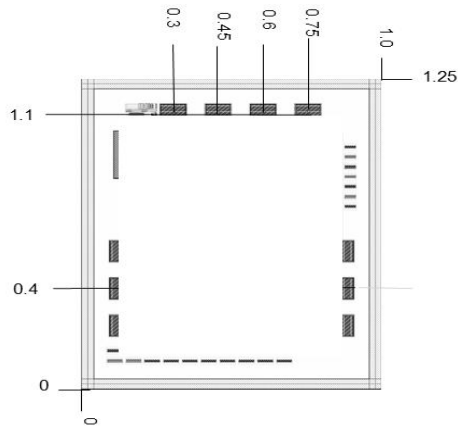
**Typical test curve**



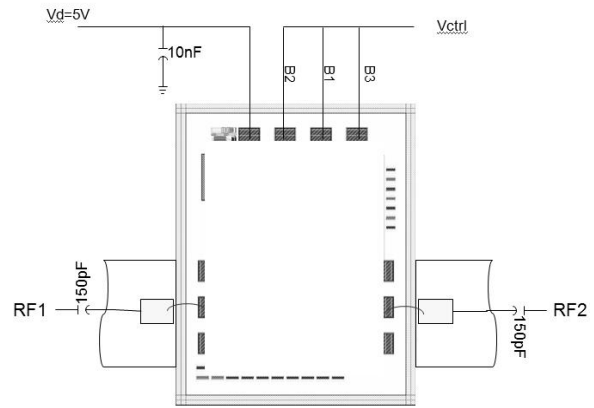
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**Shape and port size (mm)**



**Recommended assembly drawing**



**Precautions**

1. The chip is stored in a dry, nitrogen environment and used in an ultra-clean environment;
2. GaAs material is relatively brittle and cannot touch the surface of the chip, so you must be careful when using it;
3. Chips are sintered with conductive glue or alloy (the alloy temperature cannot exceed 300°C, and the time cannot exceed 30 seconds) to make it fully grounded;
4. The gap between the microwave port of the chip and the substrate should not exceed 0.05mm. Use  $\Phi 25\mu\text{m}$  double gold wire for bonding. The recommended length of gold wire is 250~400 $\mu\text{m}$ ;
5. The chip is sensitive to static electricity, so pay attention to anti-static during storage and use.