

GaAs monolithic integrated single pole double throw switch

DC~20GHz

### key indicator

- Frequency range: DC~20GHz
- Isolation: >40dB@20GHz
- Insertion loss: 2.3dB@20GHz
- Absorptive design
- Nanosecond switch
- Chip size: 1.4mm×1.25mm×0.1mm

### typical application

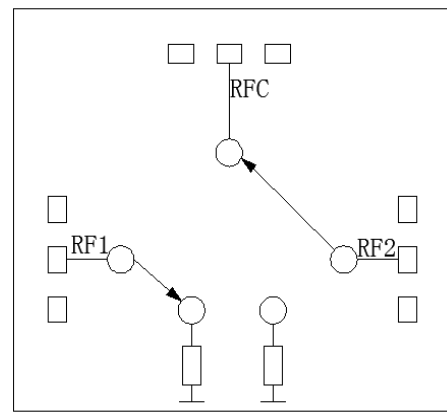
- Wireless communication equipment
- Radar and electronic countermeasures
- Military and aerospace
- Instruments and meters
- Microwave radio
- Test and measure

### Product Introduction

AY1769 is a broadband absorbing gallium arsenide pHEMT single-pole double-throw switch chip, covering the frequency range from DC to 20GHz. The chip provides greater than 40dB isolation and less than 2.3dB insertion loss in the entire operating frequency band. It adopts 0/-5V logic control, no external power supply bias is needed, and no power consumption. It has excellent switching characteristics and port standing wave characteristics in the working frequency band, and is suitable for microwave hybrid integrated circuits, multi-chip modules and low-power systems.

The switch chip uses an on-chip through-hole metallization process to ensure good grounding. The back of the chip is metallized, which is suitable for eutectic sintering or conductive adhesive bonding process.

### Functional block diagram



### Electrical performance (T<sub>A</sub>=25°C, control level=0/-5V, 50Ω system)

index	Test frequency	Minimum	Typical value	Max	unit
Insertion loss	DC~20GHz	-	-2.3	-	dB
Isolation	DC~20GHz	-	-45	-	dB
Return loss RFC(ON)	DC~20GHz	-	-15	-	dB
Return loss RF1, RF2(OFF)	DC~20GHz	-	-15	-	dB
Enter Pd <sub>B-1</sub>	DC~20GHz	-	30	-	dBm
Enter IP <sub>3</sub>	DC~20GHz	-	48	-	dBm
Switching time	DC~20GHz	-	15	-	ns

### Absolute maximum ratings

RF input power	+30dBm	Operating temperature	-55 °C ~ + 85 °C
Control voltage range	-7~0.2V	Storage temperature	-65 °C ~ + 150 °C
Electrostatic protection level (HBM)	Class 1A	Channel temperature	150 °C

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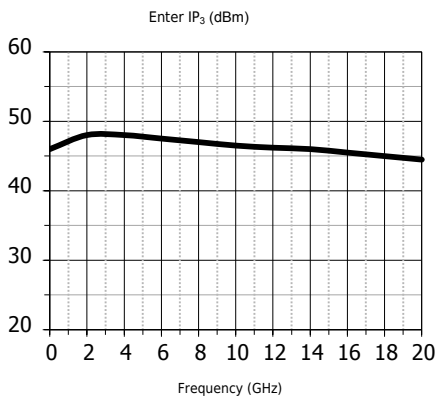
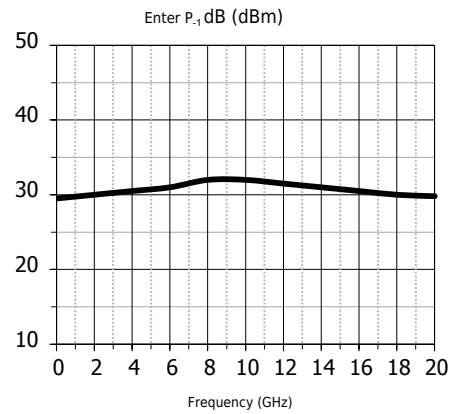
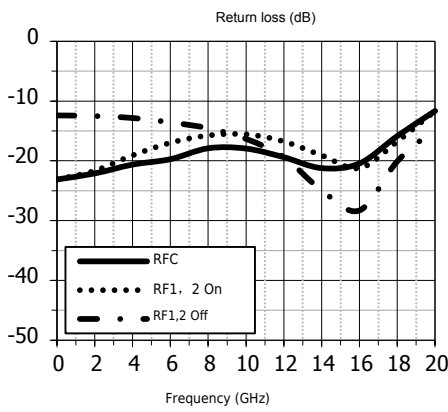
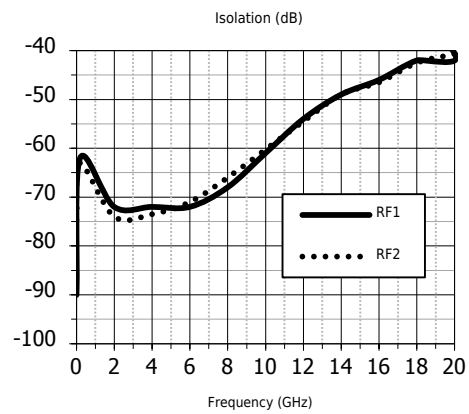
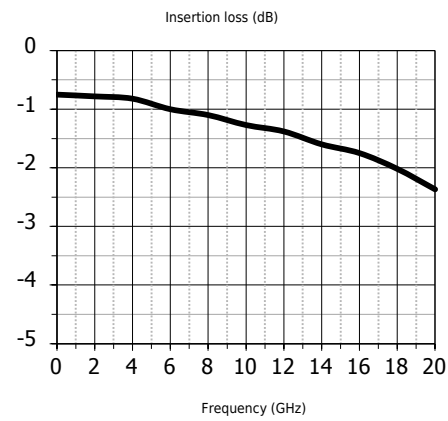
**Control voltage**

state	Bias condition
Low	0~0.2V
high	-3 ~ -7V

**Truth table**

Control input		On-off state	
A	B	RFC-RF1	RFC-RF2
high	Low	ON	OFF
Low	high	OFF	ON

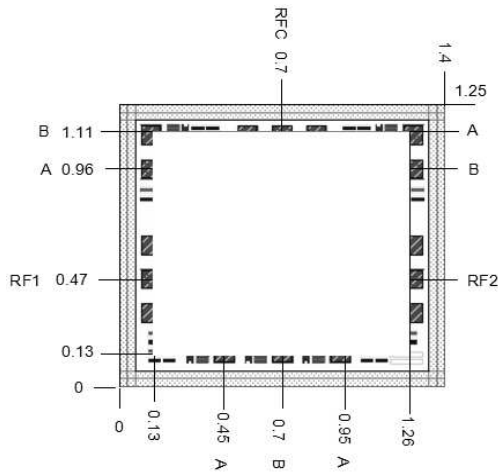
**Typical test curve**



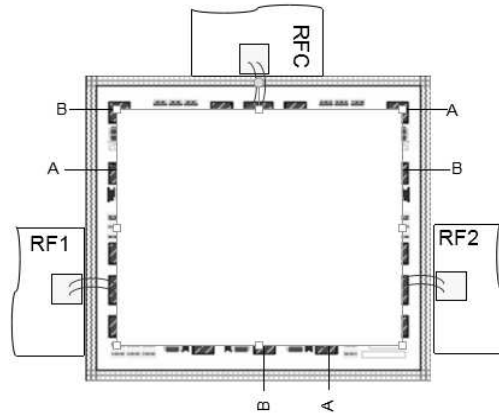
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Shape and port size (mm)



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.