

GaAs MMIC Absorptive SP3T Switch Chip, DC-19GHz

Performance characteristics

- Frequency range: DC -19GHz
- Insertion loss : 1.1 dB typ.
- Isolation: 55 dB
- On-state input/output standing wave ratio : 1. 2/ 1. 1
- 50Ohm input / output
- 100% on-wafer testing
- Chip size: 1.77 x 1.71 x 0.1mm

Product Introduction

GSW-00193T is a GaAs MMIC absorptive single-pole triple-throw switch chip with 50Ω matching at the input/output ends, a frequency range covering DC~19GHz , and 0V/-5V power supply. The switching speed is 10ns. The chip uses on-chip through-hole metallization technology to ensure good grounding, no additional grounding measures are required, and it is simple and convenient to use. The back of the chip is metallized and is suitable for eutectic sintering or conductive adhesive bonding processes.

| Use restriction parameter ¹ | |
|--|--------------|
| Control voltage range | -8V ~ +0.5V |
| Maximum input power | +30dBm |
| Operating temperature | -55 ~ +85°C |
| storage temperature | -65 ~ +150°C |

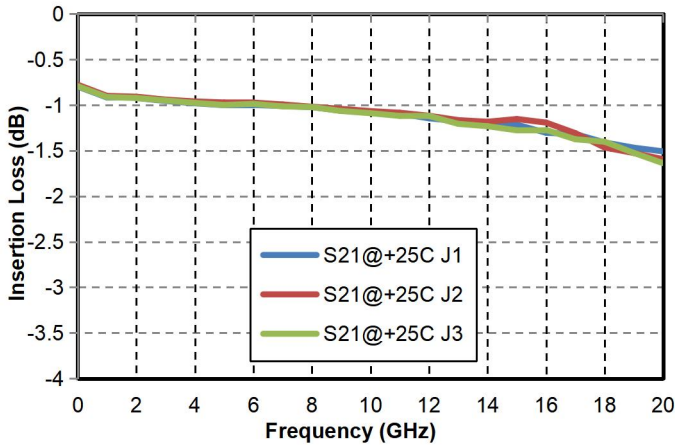
【1】 Exceeding any of these maximum limits may cause permanent damage.

| Electrical Parameters (TA = +25°C) | | | | |
|--|---------|---------------|---------|------|
| index | Minimum | Typical Value | Maximum | unit |
| Frequency Range | DC-19 | | | GHz |
| Insertion loss | - | 1.1 | 1.5 | dB |
| Isolation | 51 | 55 | - | dB |
| On-state input/output return loss (ON) | 18/20 | 22/24 | - | dB |
| P-1dB@18GHz | - | 23 | - | dBm |
| Switching speed | - | 10 | - | ns |

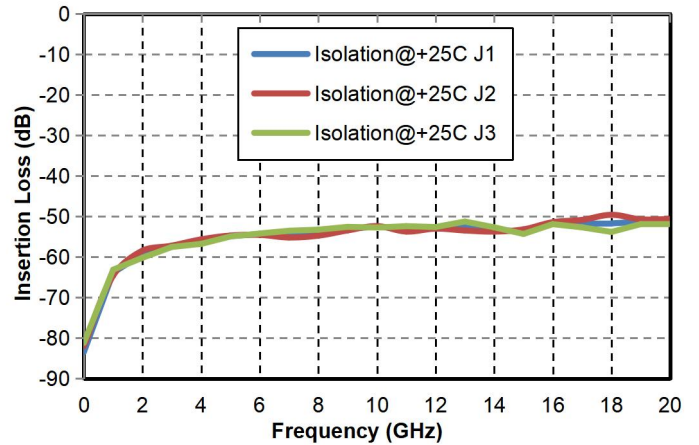
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Main index test curve

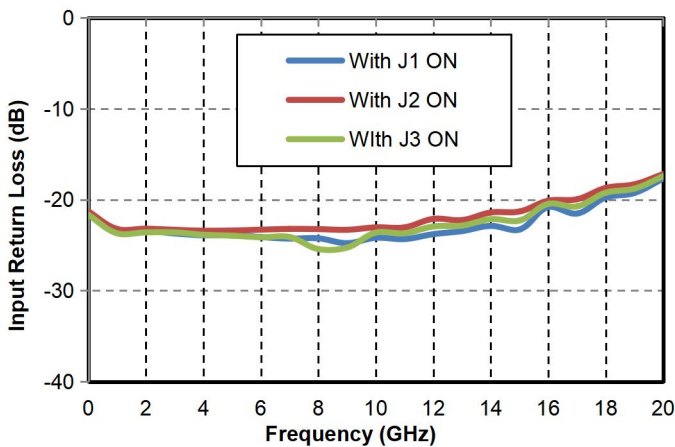
Insertion Loss vs. Operating Frequency



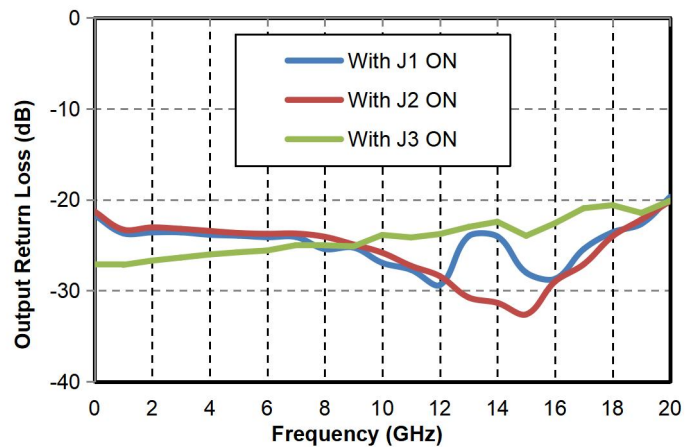
Isolation vs. Operating Frequency



Input Return Loss vs. Operating Frequency (On State)

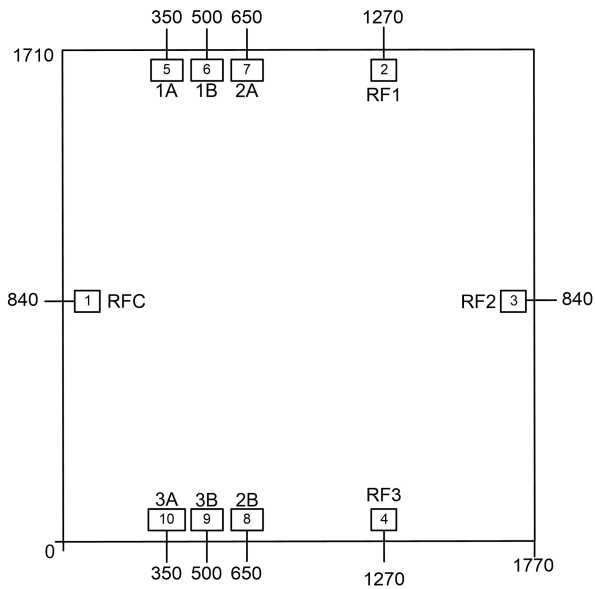


Output Return Loss vs. Operating Frequency (On State)



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Appearance structure ²



【 2 】 All units in the figure are micrometers

Bonding point definition

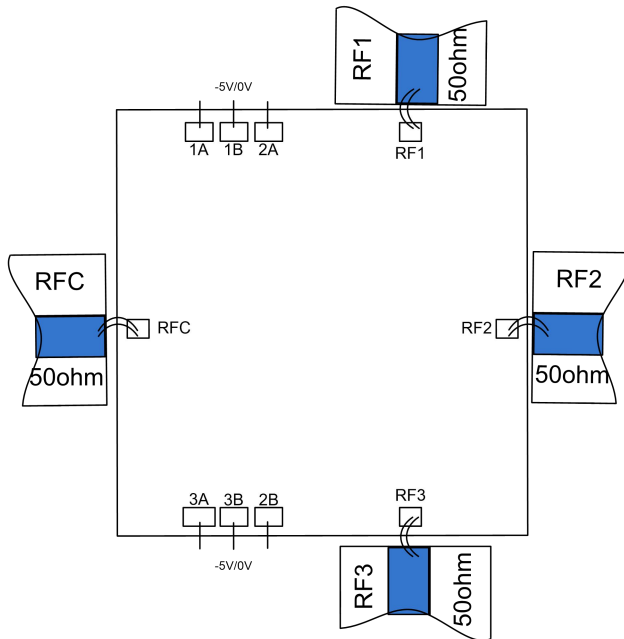
| Bonding point number | Function Symbol | Functional Description |
|----------------------|-----------------|--|
| 1 | RF COMM | RF signal input terminal , external DC blocking capacitor is required |
| 2, 3, 4 | RF OUTPUT | RF signal output terminal , external DC blocking capacitor is required |
| 5, 6, 7, 8, 9, 10 | Voltage Control | On/off control |
| Chip bottom | GND | The bottom of the chip needs to be well grounded to RF and DC |

Truth table :

| 1A | 1B | 2A | 2B | 3A | 3B | state |
|------|------|------|------|------|------|--------------------|
| 0 V | -5 V | -5 V | 0 V | -5 V | 0 V | RFC-RF1 is on |
| -5 V | 0 V | 0 V | -5 V | -5 V | 0 V | RFC-RF2 conduction |
| -5 V | 0 V | -5 V | 0 V | 0 V | -5 V | RFC-RF3 conduction |

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Recommended assembly drawing



Precautions for use

- The chip needs to be stored in an anti-static container and kept in a nitrogen environment.
- Do not attempt to clean the bare die surface using wet chemical methods.
- Please strictly comply with ESD protection requirements to avoid electrostatic damage to bare chips.
- General operation: Please use precision pointed tweezers to pick up bare chips. Avoid touching the chip surface with tools or fingers during operation.
- Rack mounting operation suggestions: Bare chip mounting can be done by AuSn solder eutectic sintering or conductive adhesive bonding. The mounting surface must be clean and flat.
- Sintering process: It is recommended to use AuSn solder sheets with a gold-tin ratio of 80/20 . The working surface temperature reaches 255 °C and the tool (vacuum chuck) temperature reaches 265 °C . When the high-temperature mixed gas (nitrogen-hydrogen ratio of 90/10) is blown to the chip, the temperature at the top of the tool should be raised to 290 °C . Do not let the chip exceed 320 °C for more than 20 seconds. The friction time should not exceed 3 seconds.
- Bonding process: The amount of conductive glue dispensed should be as small as possible. After the chip is placed in the installation position , the conductive glue should be vaguely visible around it . For curing conditions, please follow the information provided by the conductive glue manufacturer.
- Bonding operation suggestions: Use $\Phi 0.025\text{mm}$ (1mil) gold wire for both ball and wedge bonding. Thermo-ultrasonic bonding temperature is 150 °C. The pressure of the wedge for ball bonding is 40~50gf , and the pressure of the wedge bonding is 18~22gf . Use the smallest possible ultrasonic energy. The bonding starts at the pressure point on the chip and ends at the package (or substrate) .