Standard Circuit

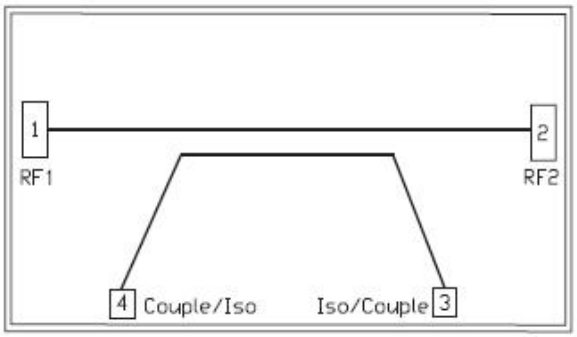
GDC-021815

GaAs MMIC Monolithic Integrated Directional Coupler , 2-18GHz

Performance characteristics

- Frequency range: 2 -18 GHz
- Insertion loss : 0.9 dB (typ.)
- Coupling: 15dB
- Coupling flatness: 3.0dB
- VSWR: 1.1/1.1
- 50Ohm input / output
- 100% on-wafer testing
- Chip size: 2.63 x 2.43 x 0.1mm

Functional Block Diagram



Product Introduction

GDC-021815 single-chip coupler chip covers a frequency range of 2 GHz to 18 GHz , with a coupling degree of 15dB . The chip has an insertion loss of less than 1.2 dB , a coupling flatness of less than 3.0 dB , and a port VSWR of less than 1.2 in the entire operating frequency band. The chip uses an on-chip through-hole metallization process to ensure good grounding, does not require additional grounding measures, and is simple and convenient to use.

Use restriction parameter [1]	
Maximum input power	+40dBm
Operating temperature	-55 ~ +85°C
Storage temperature	-65 ~ +150°C

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

Electrical performance parameters (TA = +25°C)				
Index	Minimum	Typical Value	Maximum	Unit
Frequency Range		2-18		GHz
Insertion loss	-	0.9	1.2	dB
Coupling	14.5	15	17.5	dB
Input return loss	21	23	-	dB
Through output return loss	18	28	-	dB
Coupled output return loss	18	24	-	dB
Isolation		19		dB

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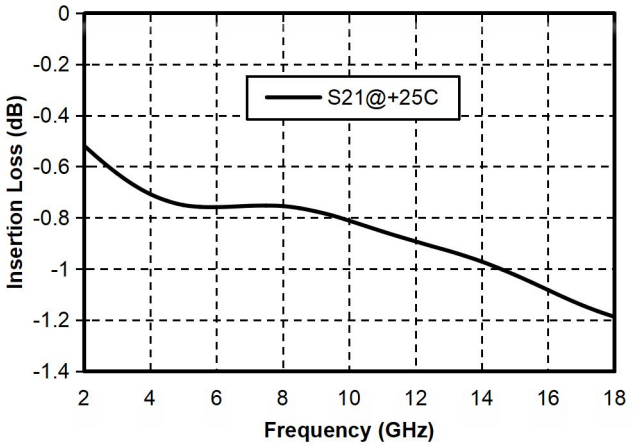
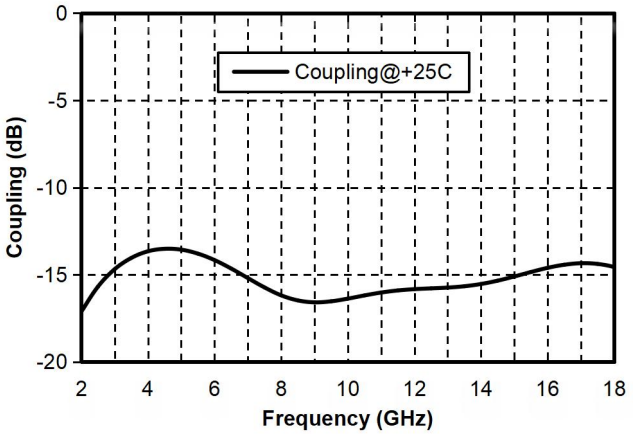
Main index test curve

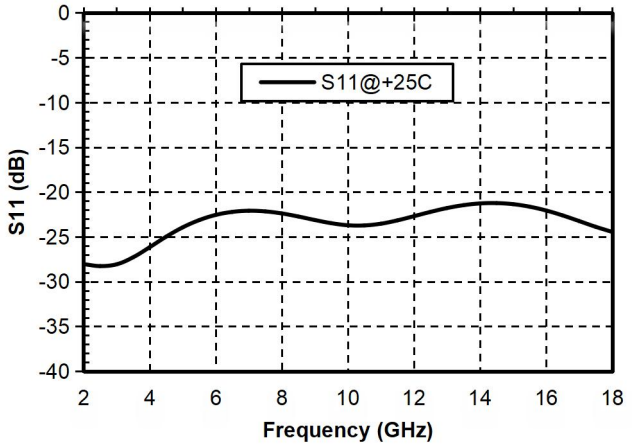
Insertion Loss vs. Operating Frequency



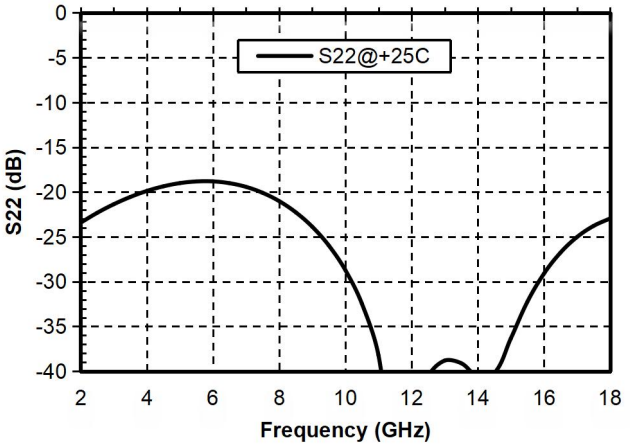
Coupling Degree vs. Operating Frequency



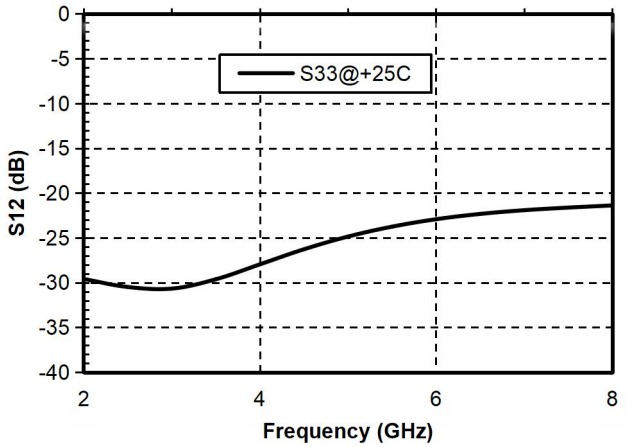
Input Return Loss vs. Operating Frequency



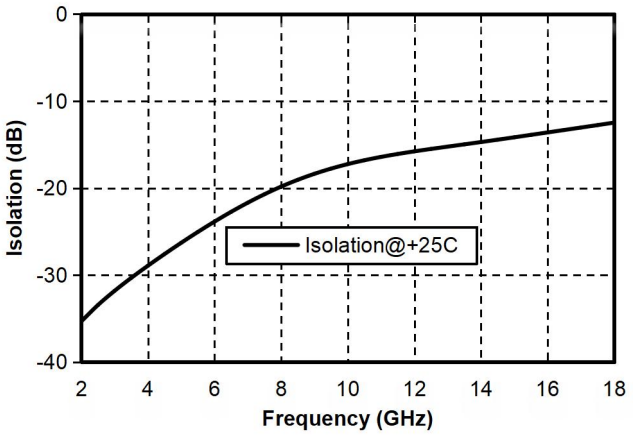
Through Output Return Loss vs. Operating Frequency



Coupled Output Return Loss vs. Operating Frequency



Isolation vs. Operating Frequency



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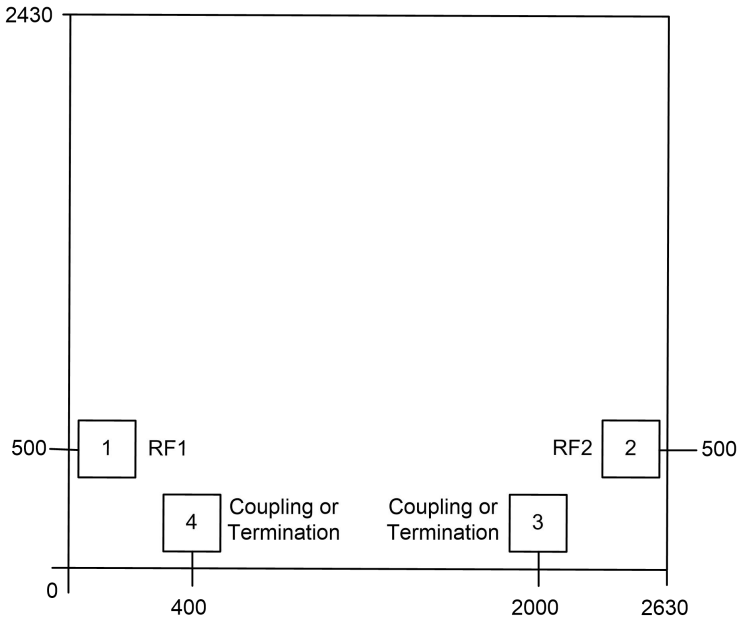
Appearance structure [2]



【 2 】All units in the figure are micrometers

Bonding point definition		
Bonding point number	Function Symbol	Functional Description
1	RF 1	RF signal input terminal
2	RF2	Direct RF signal output
3	Coupling/Termination	Coupled RF signal output and /or load
4	Coupling/Termination	Coupled RF signal output and /or load
Chip bottom	GND	The bottom of the chip needs to be well grounded to RF and DC

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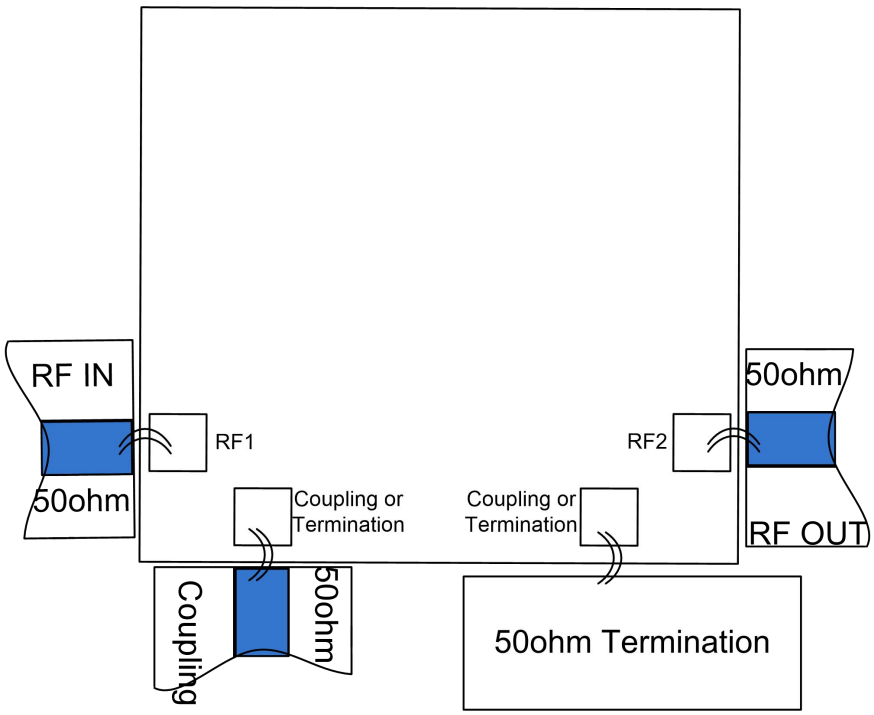
Recommended assembly drawing



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 follow the ESD protection requirements to avoid static damage to the bare chip.
- 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 ℃ and the tool (vacuum chuck) temperature reaches 265 ℃. 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 ℃. Do not let the chip exceed 320 ℃ 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 Φ0.025mm (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) .