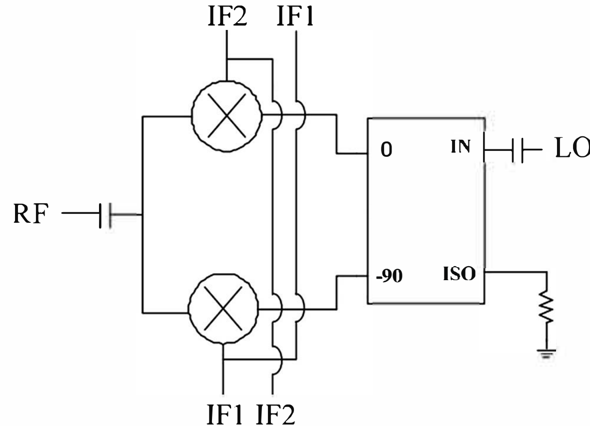
GX-3066-0008
GaAs MMIC I/Q Mixer chip

Performance Characteristics

- RF/LO frequency range: 30GHz~66GHz
- IF frequency range: DC~8GHz
- Conversion loss: 8dB
- Image Rejection Ratio : 25dBc
- Input 1dB compression point: 15dBm
- LO-RF isolation: 40dB
- LO-IF isolation: 35dB
- RF-IF isolation: 35dB
- Local oscillator power: 16dBm
- Chip size: 1.15mm x 1.60mm x 0.07mm

Functional Block Diagram



Product Introduction

The chip integrates two passive double balanced mixers and a 90 ° orthogonal bridge. The 1/Q ports of the product output intermediate frequency signals with the same amplitude and a phase difference of 90 °. By using a low-frequency orthogonal coupler outside the chip, the product's image suppression function can be achieved. The chip is manufactured using GaAs Schottky diode technology and grounded through a back through-hole, without the need for additional grounding measures. This chip is mainly used in microwave transceiver frequency conversion components, QPSK modulators, microwave frequency and phase detectors, etc.

Microwave electrical parameters (TA = +25 °C, f_{IF} =100MHz, PLO=+16dBm, 50 Ω system)

Parameters	Symbol	Min	Typ	Max	Unit
LO Frequency Range	*LO*		30-66		GHz
RF Frequency Range	*RF*		30-66		GHz
IF Frequency Range	*IF*		0.01-8		GHz
Conversion Loss	*IL*	-	10	12	dB
Image Rejection Ratio	*IMR*	15	25	35	dBc
Isolation from Local Oscillator to RF	*ISO(L-R)*	30	40	-	dB
Isolation from Local Oscillator to IF	*ISO(L-I)*	15	25	-	dB
RF to IF Isolation	*ISO(R-I)*	15	35	-	dB
Input ldB Compression Point	$P_{-1(in)}$	-	+15	-	dBm

Note:
1) All chips have undergone 100% microwave testing on chip;
2) Unless otherwise specified, the above parameters were measured in the upper sideband signal down conversion mode, with an intermediate frequency of 100MHz and a local oscillator power of +16dBm.
3) For the intermodulation and spurious indicators of interest frequency points, you can contact our company for testing.

Use Restriction Parameters

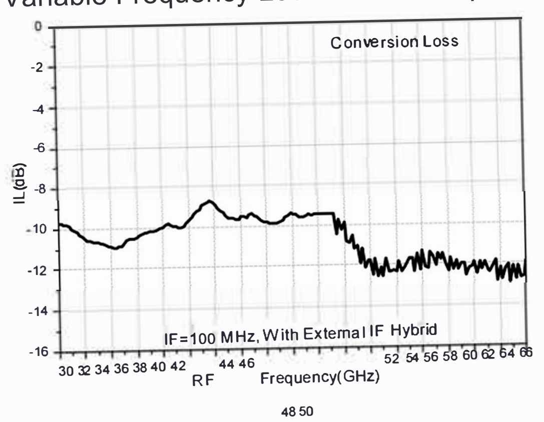
Parameters	Symbol	Limit value
Max Port Input Power	P_{in}	24 dBm
Max IF Input Current	I_{IF}	±2 mA
Storage Temperature	T_{stg}	-65℃～+150℃
Max Channel Temperature	T_{ch}	+175℃

Suggested Operating Conditions

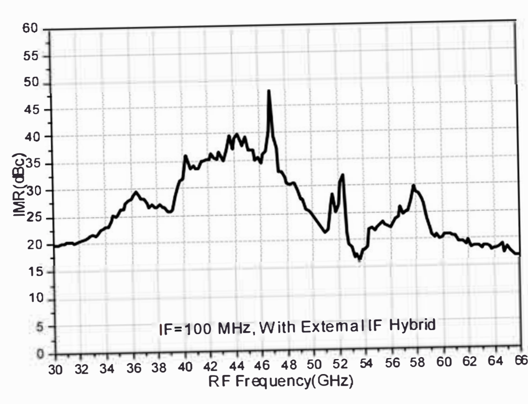
Parameters	Symbol	Limit value
Local Oscillator Driving Power	P_{LO}	15dBm～18dBm
RF input power	P_{RF}	≤7dBm
Operating Temperature Range	T_A	-55℃～+125℃

Typical Curve

Variable Frequency Loss vs. RF Frequency

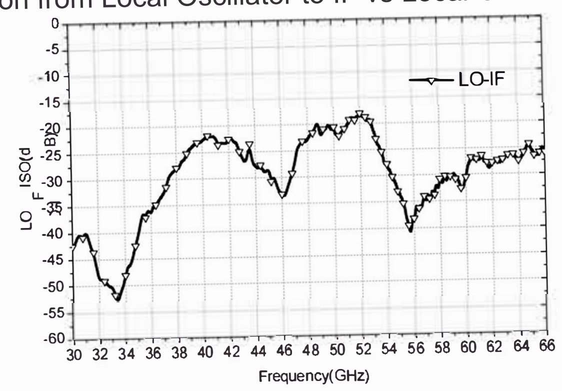


Down Conversion Mirror Suppression System vs. RF Frequency

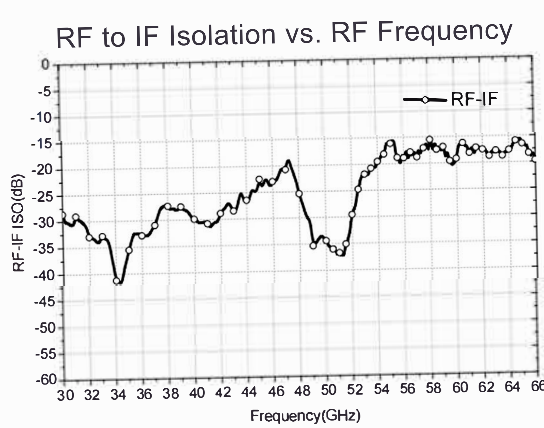


LO to RF Isolation vs LO Frequency

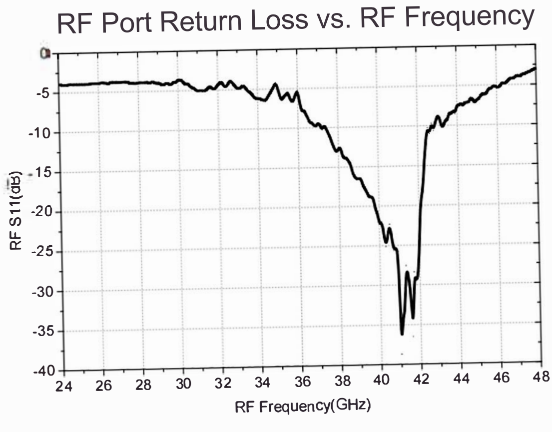
Isolation from Local Oscillator to IF vs Local Oscillator Frequency



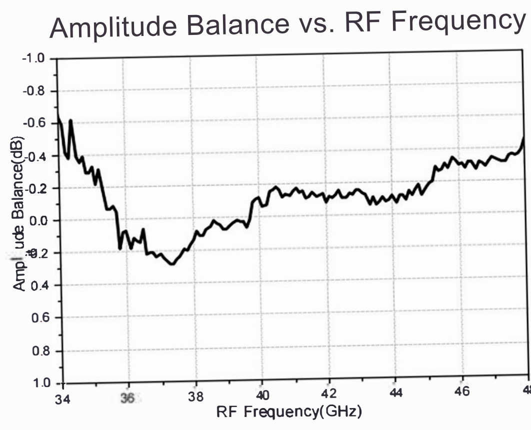
RF to IF Isolation vs. RF Frequency



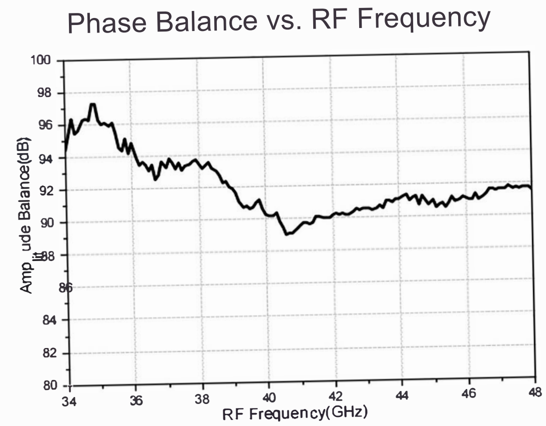
RF Port Return Loss vs. RF Frequency



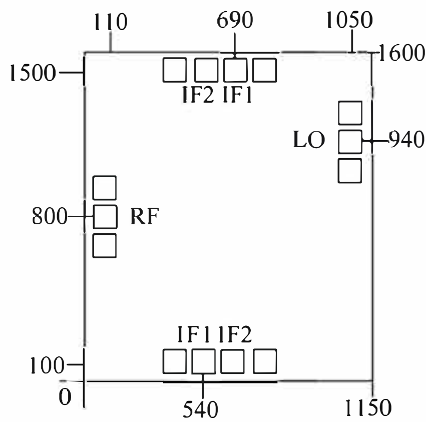
Amplitude Balance vs. RF Frequency



Phase Balance vs. RF Frequency



Outline Dimensions and Pressure Point Arrangement Diagram



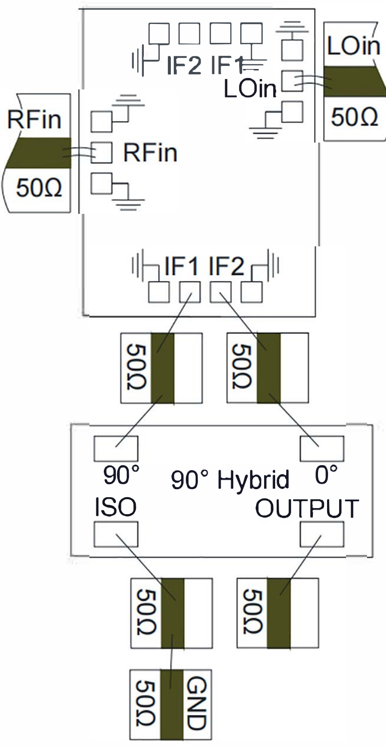
Note: The units in the figure are all micrometers (μrn); The tolerance of the external dimensions is ± 100 μm.

Pressure point arrangement diagram

No.	Symbol	Function	Dimensions
I	RF	RF input pressure point	100×100μm²
4	LO	Local oscillator input pressure point	100×100μm²
2，5	IF1	Intermediate frequency IF1 output	100×100μm²
3，6	IF2	Intermediate frequency IF2 output	100×100μm²

No.	Symbol	Function	Port Description	Port Equivalent Circuit Diagram
1	RF	RF input terminal	AC coupling, impedance 50 ohms	RF
2	LO	Local oscillator input terminal	DC short circuit, impedance 50 ohms	LO
3	IF1/IF2	If output terminal	DC coupling, impedance of 50 ohms. It is prohibited to use a digital multimeter in the ohm range to measure the impedance of the intermediate frequency port.	IF
4	GND	Grounding terminal	Connecting the back metal through the dielectric through-hole	GND

Suggested Assembly Diagram



Note: The bonding wire should be as short as possible, not longer than 500 μ m. When the bonding wire is too long, it is recommended to use double wire bonding. When the substrate thickness exceeds 200 μ m, it is recommended to place aluminum copper pads of appropriate thickness underneath the chip.

Note:

1) Single chip circuits need to be stored in a dry and clean N_2 environment;
2) There is no insulation protection layer on the surface of the chip, so attention should be paid to the cleanliness of the assembly environment to avoid excessive surface contamination;
3) The thermal expansion coefficient of the carrier should be close to that of 6H SiC, with a linear thermal expansion coefficient of 4.2xl0-6/°C. It is recommended to use CuMoCu, CuMo, or CuW as the carrier material;
4) During assembly, holes should be avoided between the chip and the carrier, while ensuring good heat dissipation between the box and the carrier;
5) Suggest sintering with gold tin solder, Au: Sn=80%: 20%, sintering temperature not exceeding 300°C, time not longer than 30 seconds. The sintering process should avoid rapid temperature changes and gradually increase and decrease the temperature;
6) It is recommended to use gold wire with a diameter of 25 μ m~30 μ m, with a bonding table chassis temperature not exceeding 250°C, a bonding time as short as possible, and a bonding process that avoids rapid temperature changes;
7) During the use and assembly of chips, attention should be paid to anti-static measures. Grounding and anti-static soldering should be worn, and the sintering and bonding stations should be well grounded;
8) We can provide various types of tube and shell packaging products;
9) Please contact the supplier if you have any questions.