

GaAs MMIC Mixer Chip, 2GHz-22GHz

Performance characteristics

- RF/LO frequency range: 2-22GHz
- IF frequency range: DC-3.5GHz
- Conversion Loss: 9.0dB
- LO-RF isolation degree: 51dB
- LO-IF isolation degree: 33dB
- RF-IF isolation degree: 33dB
- Local oscillator power:+11dBm~+15dBm
- Chip size: QFN4x4mm

Product Introduction

GMX-0222-CQ4 is a GaAs MMIC dual balanced mixer with a frequency range of 2GHz~22GHz and an intermediate frequency range of DC~3.5GHz. The frequency conversion loss is 7.0dB, and the local oscillator/radio frequency isolation is 51dB, 33dB, and 33dB, respectively. The typical local oscillator input power is +13dBm. RF, LO, and IF ports have no DC blocking capacitors. This mixer adopts a 4X4mm surface mount lead-free ceramic tube shell, and the surface of the pin solder pads is treated with a gold plating process, suitable for reflow soldering installation process.

Use restriction parameters¹

Maximum RF input power	+22dBm
Maximum local oscillator input power	+22dBm
Maximum intermediate frequency input power	+22dBm
Working temperature	-55 ~ +85°C
Storage temperature	-65 ~ +150°C

【1】 Exceeding any of the above maximum limits may result in permanent damage.

Electrical performance parameters (TA=+25 ° C, IF=100MHz, LO=+13dBm)

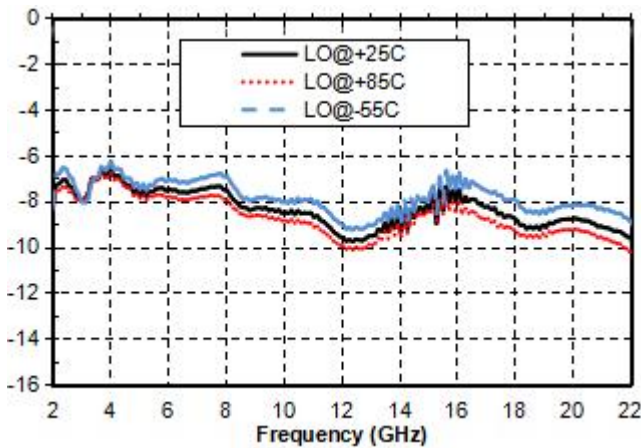
Index	Minimum value	Typical value	Maximum value	Unit
RF frequency range	2-22			GHz
Local oscillator frequency range	2-22			GHz
Intermediate frequency	DC-3.5			GHz
Variable frequency loss	-	9.0	-	dB
LO-RF isolation degree	-	51	-	dB
LO-IF isolation degree	-	33	-	dB

RF-IF isolation degree	-	33	-	dB
RF input P-1dB		10		dBm
IIP3		19		dBm
The above parameters are all tested in down conversion mode, with an intermediate frequency of 0.1GHz and a local oscillator power of +13dBm.				

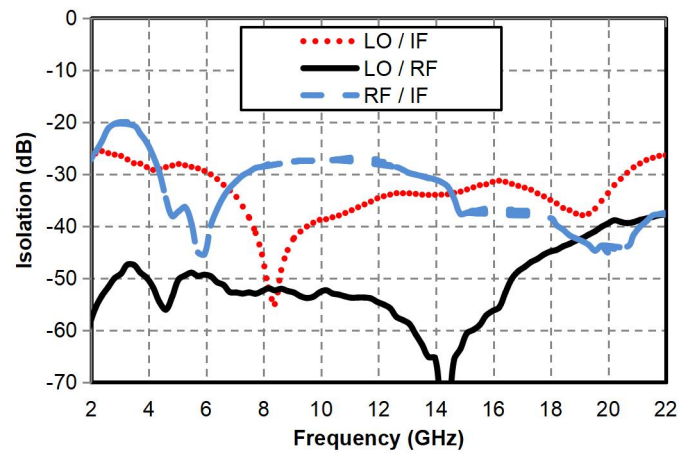
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Main indicator testing curve

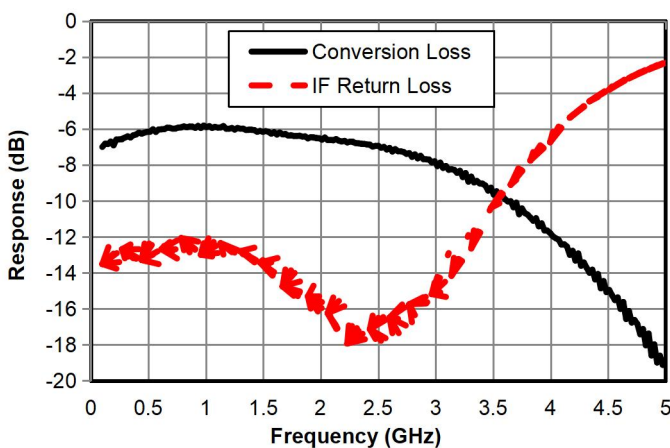
Downconversion loss vs. temperature @
LO=+13dBm



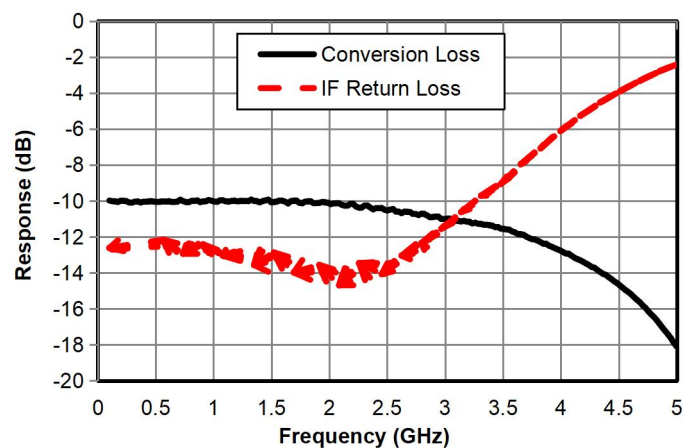
Isolation degree @ LO=+13dBm



Intermediate frequency bandwidth @
LO=2G/+13dBm

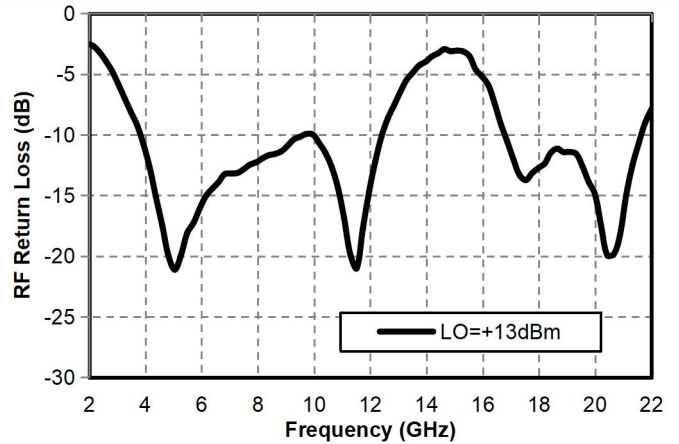
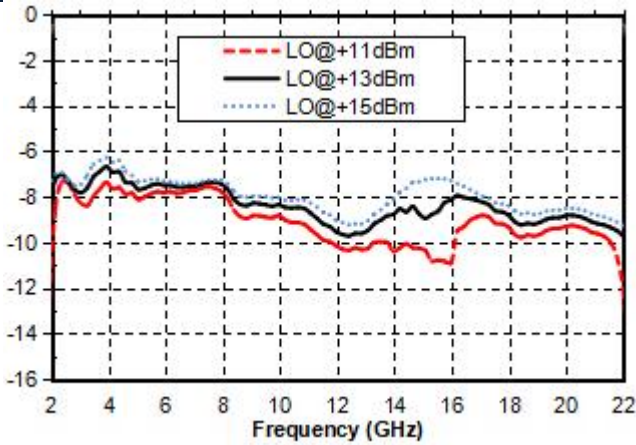


Intermediate frequency bandwidth @
LO=22G/+13dBm



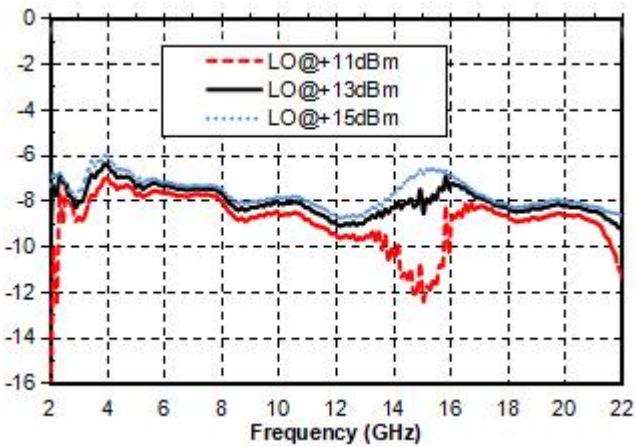
Downconversion frequency conversion loss vs.
LO power

Downconversion RF return loss vs. frequency
LO=+13dBm

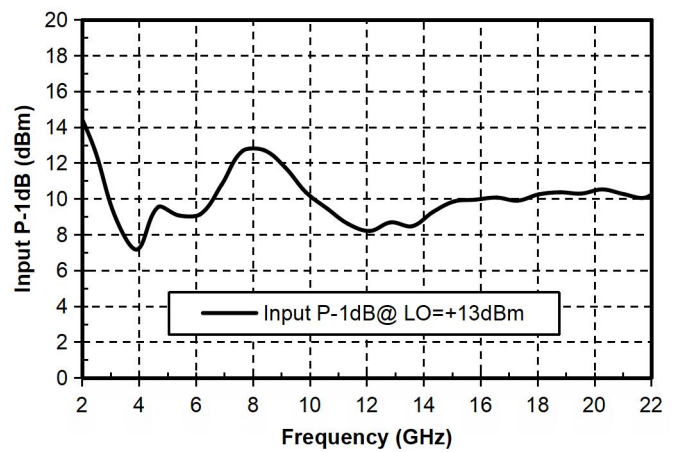


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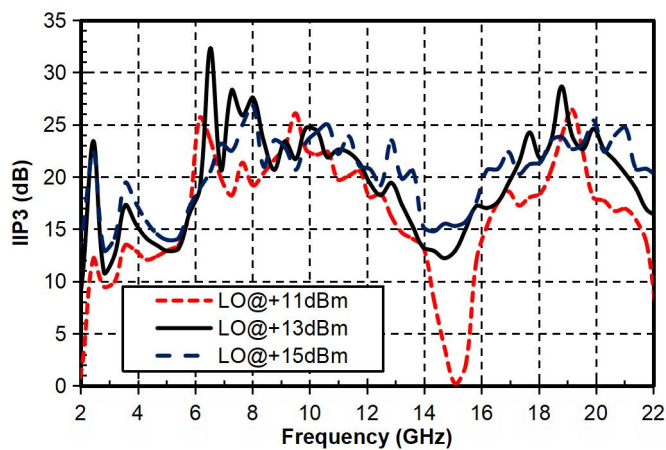
Upconversion loss vs. LO power



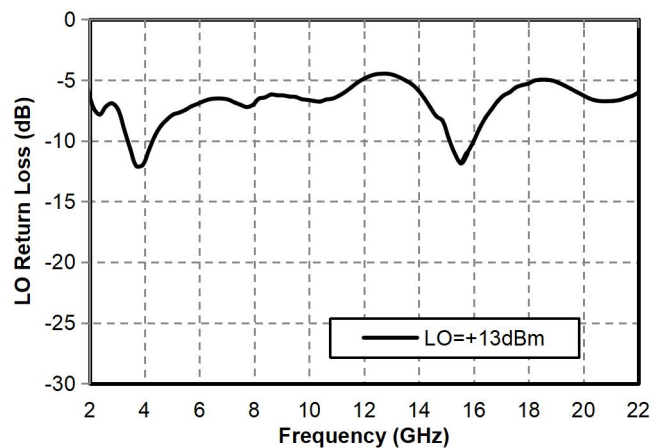
Input P-1dB vs. RF frequency



IIP3



Local oscillator standing wave vs. frequency



Local oscillator harmonic leakage

LO(GHz)13dBm	nLO (Tested at RF port) dBc		
	1	2	3
2	56	40	60
4	51	37	58
6	48	39	52
8	54	48	64
10	53	63	74
12	56	51	61
14	64	61	46
16	56	52	66
18	42	48	/
20	38	50	/
22	35	47	/

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Downconversion combination spurious suppression

Combined Stray Testing	nLO				
	0	1	2	3	4
mRF	0	1	2	3	4
0	×××	-3.87	39.66	12.44	37.72
1	28.56	0	34.62	33.51	35.72
2	79.63	49.31	55.62	46.33	76.28
3	75.36	71.03	77.91	56	71.84
4	97.33	97.05	112	92.07	91.45

Test conditions: RF= 5.1GHZ@-10dBm , LO= 5GHz@13dBm All relative values of 1 * RF-1 * LO (P_IF, dBm), in dBc.

Combined Stray Testing	nLO				
	0	1	2	3	4
mRF	0	1	2	3	4
0	×××	4.76	33.71	12.77	43.32
1	18.16	0	38.04	24.69	32.74
2	76.91	73.68	79.78	72	79.7
3	82.23	76.8	85.88	83.73	89.35
4	/	/	/	/	/

Test conditions: RF= 10.1GHZ@-10dBm , LO= 10GHz@13dBm All relative values of 1 * RF-1 * LO (P_IF, dBm), in dBc.

Combined Stray Testing	nLO					
	mRF	0	1	2	3	4
0	×	×	×	36.71	21.69	/
1	31.58	0	40.14	39.71	58.57	
2	68.82	62.4	74.63	63.77	79.98	
3	98.12	82.21	81.4	57.36	93.71	
4	/	/	/	102.65	/	

Test conditions: RF= 15.1GHZ@-10dBm , LO= 15GHz@13dBm All relative values of 1 * RF-1 * LO (P_IF, dBm), in dBc.

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Upconversion combination stray suppression

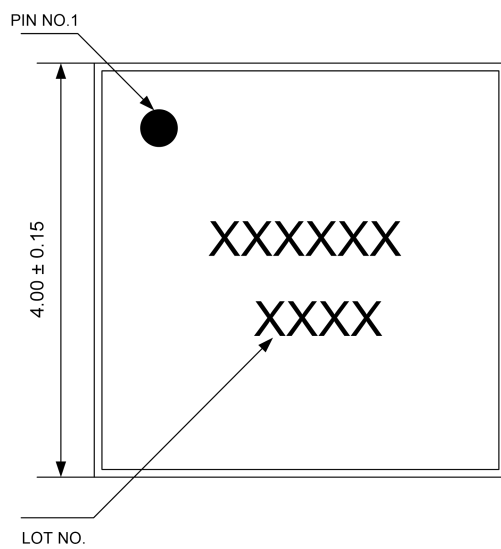
Combined Stray Testing	nLO					
	mRF	0	1	2	3	4
0	×	×	×	7	25	24
1	21	0	29	14	41	
2	50	58	61	68	47	
3	73	61	82	68	70	
4	85	110	87	92	84	

IF=1.3GHZ@-10DBM,LO=5GHZ@13DBM, The relative value of 1 * RF-1 * LO (P_IF, dBm), in dBc.

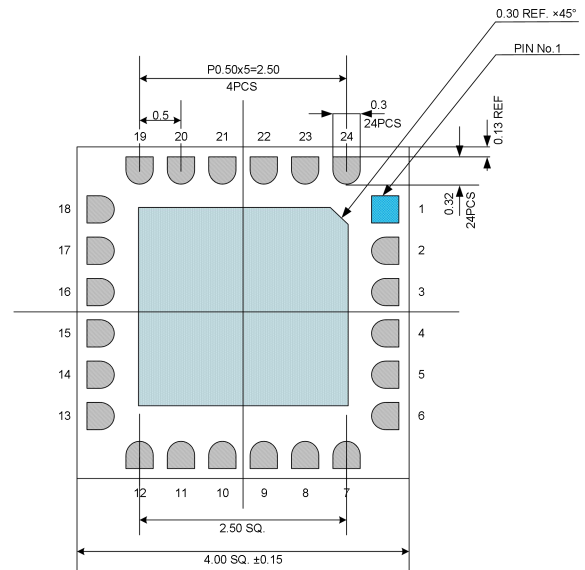
Combined Stray Testing	nLO					
	mRF	0	1	2	3	4
0	×	×	×	31	49	40
1	13	0	23	23	37	
2	55	65	68	54	97	
3	70	64	69	63	79	
4	105	101	101	102	/	

IF=2.3GHZ@-10DBM,LO=10GHZ@13DBM, The relative value of 1 * RF-1 * LO (P_IF, dBm), in dBc.

External structure



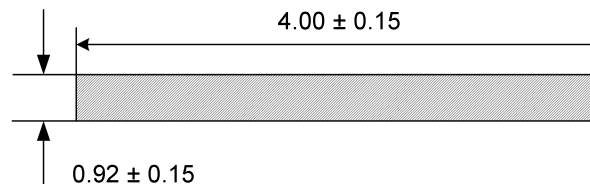
vertical view



Top view

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External structure



Side view

The units in the figure are all millimeters, with an unspecified tolerance of ± 0.15 mm

Pin Definition

Solder joint serial number	Functional symbols	Function Description
3	LO	The local oscillator signal terminal requires an additional DC isolation capacitor
10	IF	Intermediate frequency signal terminal requires an additional DC isolation capacitor
16	RF	RF signal terminal requires an additional DC isolation capacitor
2、4、9、11、15、17	GND	The pins should have sufficient and good contact with the RF and DC ground
Chip bottom	GND	The bottom of the chip needs to be well grounded with RF and DC
other	NC	No welding required

Application Block Diagram

