

GaAs MMIC Mixer Chip, 6GHz-14GHz

Performance characteristics

- RF/LO frequency range: 6-14GHz
- IF frequency range: DC-7GHz
- Conversion Loss: 7.5dB
- LO-RF isolation degree: 44dB
- LO-IF isolation degree: 33dB
- RF-IF isolation degree: 17dB
- Local oscillator power: +13dBm~+17dBm
- Chip size: QFN 3x3mm

Product Introduction

GMX00614A-CQ3 is a GaAs MMIC dual balanced mixer with a frequency range of 6GHz~14GHz and an intermediate frequency range of DC~7GHz. The frequency conversion loss is 7.5dB, and the local oscillator/radio frequency isolation is 44dB, 33dB, and 17dB, respectively. The typical local oscillator input power is +15dBm. RF, LO, and IF ports have no DC blocking capacitors. The mixer adopts a 3X3mm 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. GMX00614A-CQ3 and GMX00614AM-CQ3 are mirrored versions of each other.

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=+15dBm)

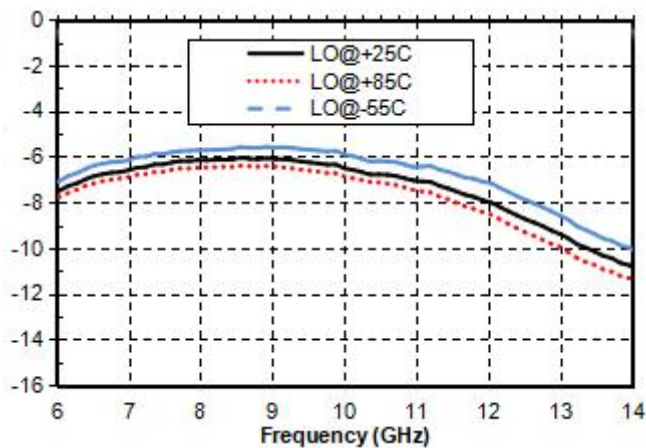
Index	Minimum value	Typical value	Maximum value	Unit
RF frequency range	6-14			GHz
Local oscillator frequency range	6-14			GHz
Intermediate frequency	DC-7			GHz
Variable frequency loss	-	7.5	-	dB
LO-RF isolation degree	-	44	-	dB
LO-IF isolation	-	33	-	dB

degree				
RF-IF isolation degree	-	17	-	dB
RF input P-1dB		10.5		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 +15dBm.				

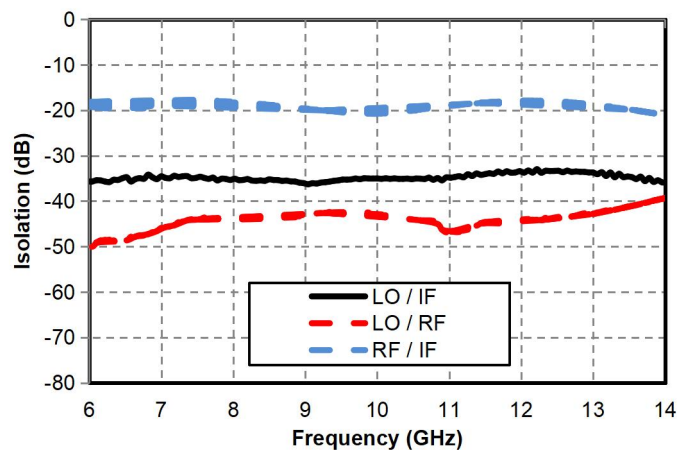
GaAs MMIC Mixer Chip, 6GHz-14GHz

Main indicator testing curve

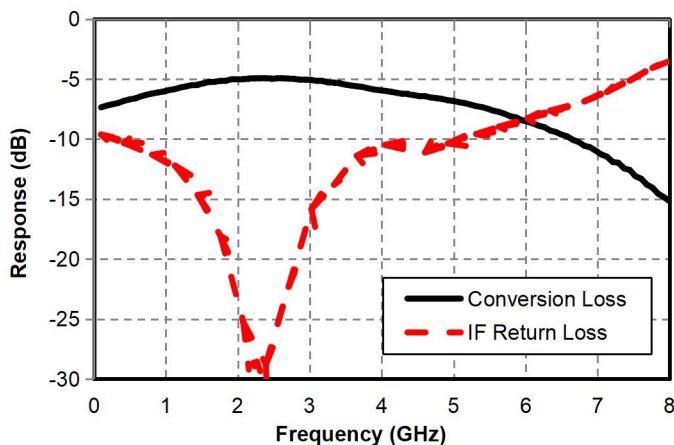
Downconversion loss vs. temperature @
LO=+15dBm



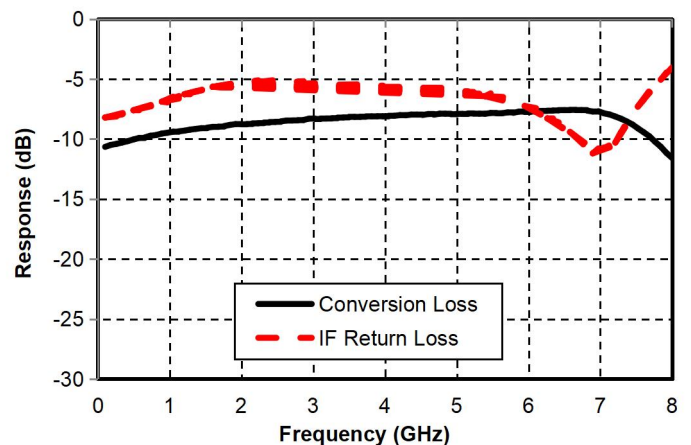
Isolation degree @ LO=+15dBm



Intermediate frequency bandwidth @
LO=6G/+15dBm

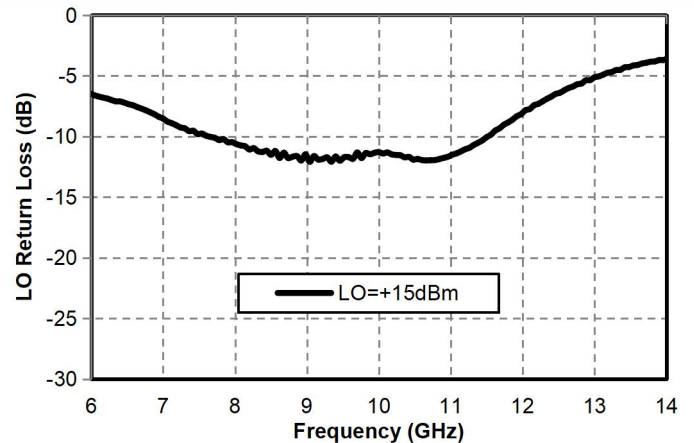
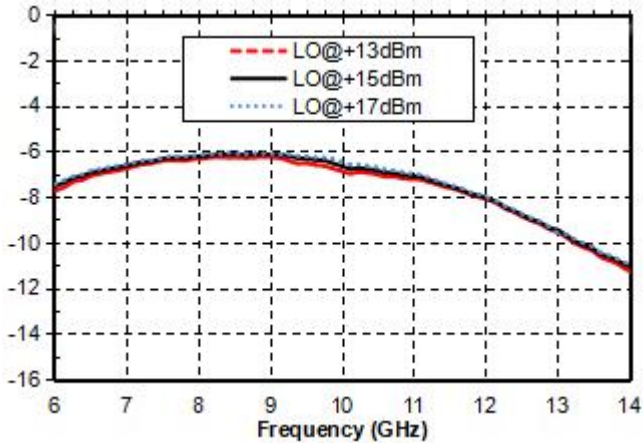


Intermediate frequency bandwidth @
LO=14G/+15dBm



Downconversion frequency conversion loss vs.
LO power

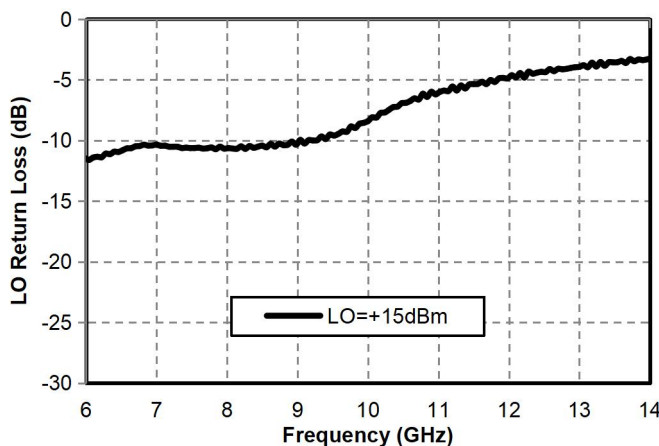
Downconversion RF return loss vs. Frequency
LO=+15dBm



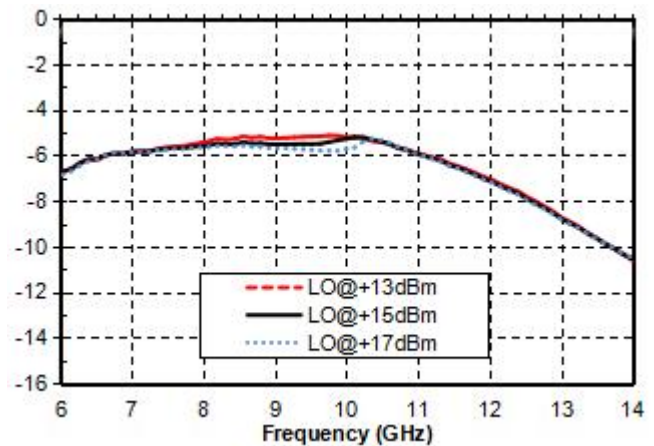
GaAs MMIC Mixer Chip, 6GHz-30GHz

Main indicator testing curve

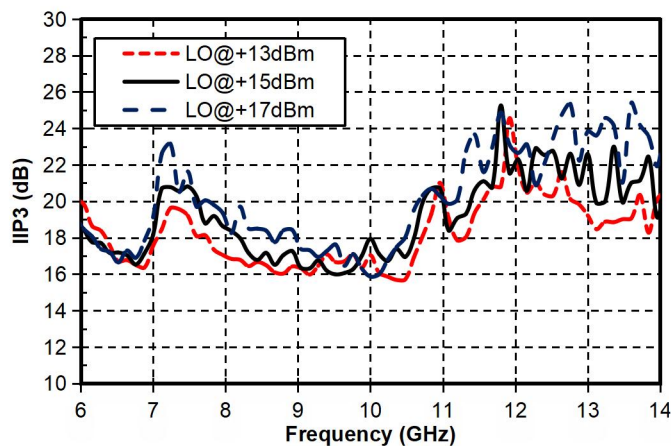
Downconversion local oscillator return loss vs. frequency LO=+15dBm



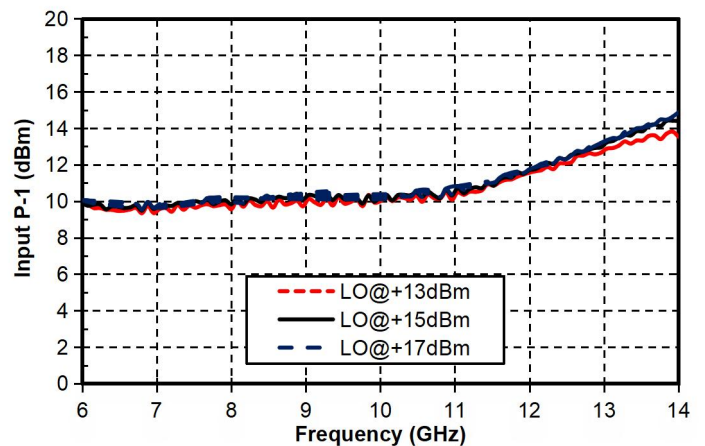
Upconversion loss vs. LO power



IIP3



Input P-1dB vs. RF frequency



Local oscillator harmonic leakage

LO(GHz)15dBm	nLO (Tested on IF port) dBc		
	1	2	3
6	/	62	44
7	/	55	64
8	/	57	55
9	/	50	59
10	/	51	53
11	/	59	72
12	/	57	68
13	/	59	67
14	/	69	62

GaAs MMIC Mixer Chip, 6GHz-30GHz

Local oscillator harmonic leakage

LO(GHz)15dBm	nLO (Tested on RF port) dBc		
	1	2	3
6	/	58	72
7	/	62	60
8	/	63	49
9	/	72	54
10	/	65	63
11	/	61	53
12	/	57	60
13	/	61	63
14	/	65	58

Lower combination spurious suppression

mRF	nLO				
	0	1	2	3	4
0	xxx	4	30	19	31
1	14	0	32	38	67
2	91	62	68	61	87
3	/	82	79	65	74
4	/	/	/	100	102

Test conditions: RF= 10.4GHz@-10dBm , LO= 10.5GHz@15dBm All relative values of 1 * RF-1 * LO (P_IF, dBm), in dBc.

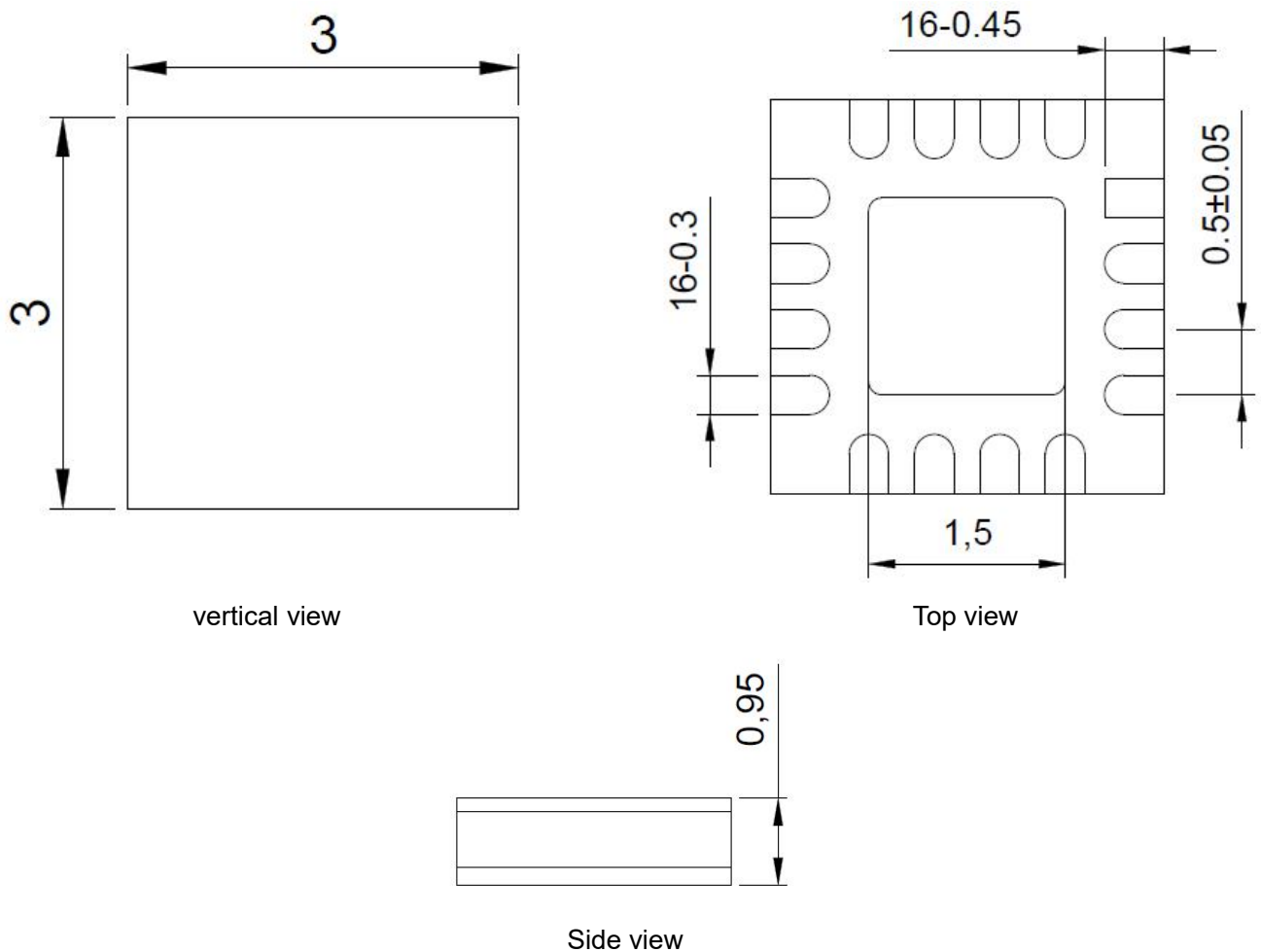
Upper combination spurious suppression

mIF	nLO				
	0	1	2	3	4
0	xxx	13	25	44	29
1	74	0	42	51	81
2	115	50	80	87	86
3	/	67	87	97	/
4	/	93	/	/	/

Test conditions: IF= 0.1GHz@-10dBm , LO= 10.5GHz@15dBm All relative values of 1 * RF-1 * LO (P_IF, dBm), in dBc.

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External structure



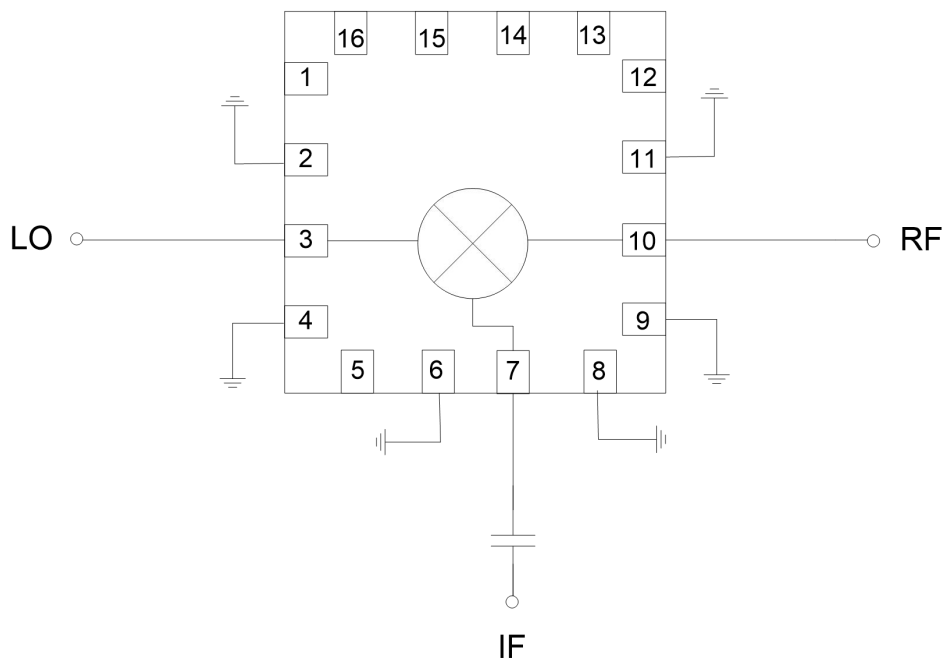
The units in the figure are all millimeters, with an unspecified tolerance of ± 0.15 mm

Pin Definition

Solder joint serial number	Functional symbols	Function Description
3	LO	Local oscillator signal terminal, no need to add a DC isolation capacitor
7	IF	Intermediate frequency signal terminal requires an additional DC isolation capacitor
10	RF	RF signal terminal, no need for external DC isolation capacitor
2、4、6、8、9、11	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

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Application Block Diagram



Precautions for use

- Sealing material: Ceramic material that meets ROHS specifications
- Lead frame material: copper alloy
- Surface coating of lead wire: gold, with a gold layer thickness of 0.3um min
- Maximum reflow soldering peak temperature: 260 °C