

## GaAs MMIC Mixer Chip, 0.4 GHz-2GHz

### Performance characteristics

- RF/LO frequency range: 0.4 - 2 GHz
- IF frequency range : DC-0.6GHz
- Conversion loss : 10 dB@+15dBm LO input
- LO-RF isolation: 48dB
- LO-IF isolation : 39dB
- RF-IF isolation : 22 dB
- Local oscillator power: +13dBm~+17dBm
- Chip size: 2.38 x 1.87 x 0.1mm

### Product Introduction

GMX-004020AA is a GaAs MMIC double-balanced mixer with a frequency range of 0.4 GHz to 2 GHz , an IF range of DC to 0.6 GHz , a conversion loss of 10 dB , a LO/RF isolation of 48 dB , a LO/IF isolation of 39 dB , an RF/IF isolation of 22 dB , and a typical LO input power of +15 dBm. The back of the chip is metallized for eutectic sintering or conductive adhesive bonding. There are no DC blocking capacitors on the RF , LO, and IF ports . GX-004020 and GX-004020AA are mirror versions of each other.

#### Use restriction parameter <sup>1</sup>

Maximum RF input power	+22dBm
Maximum LO input power	+22dBm
Maximum IF input power	+22dBm
Operating temperature	-55 ~ +85°C
storage temperature	-65 ~ +150°C

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

#### Electrical performance parameters ( $T_A = +25^\circ\text{C}$ , IF = 100MHz , LO = + 15dBm )

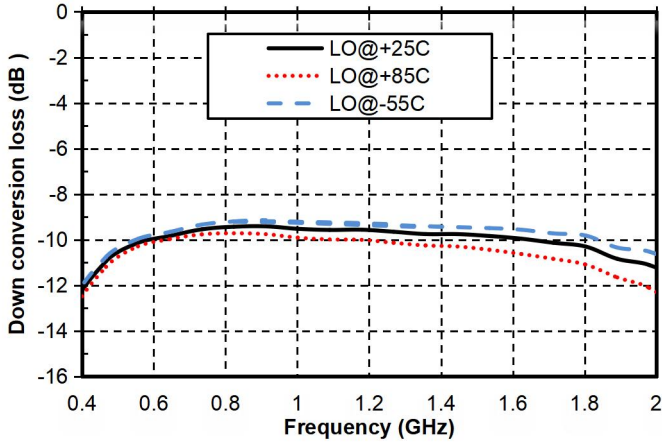
index	Minimum	Typical Value	Maximum	unit
RF frequency range	0.4-2			GHz
LO frequency range	0.4-2			GHz
IF frequency	DC-0.6			GHz
Frequency conversion loss	-	10	-	dB
LO-RF Isolation	-	48	-	dB
LO-IF isolation	-	39	-	dB
RF-IF isolation	-	22	-	dB
RF input P-1dB		13		dB m
IIP3		15		dBm

The above parameters are all tested in down-conversion mode, with intermediate frequency 0.1GHz and local oscillator power + 15dBm.

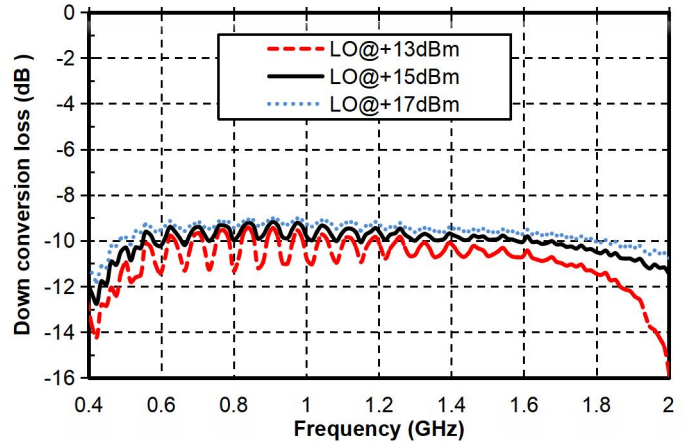
## GaAs MMIC Mixer Chip, 0.4GHz-2GHz

### Main index test curve

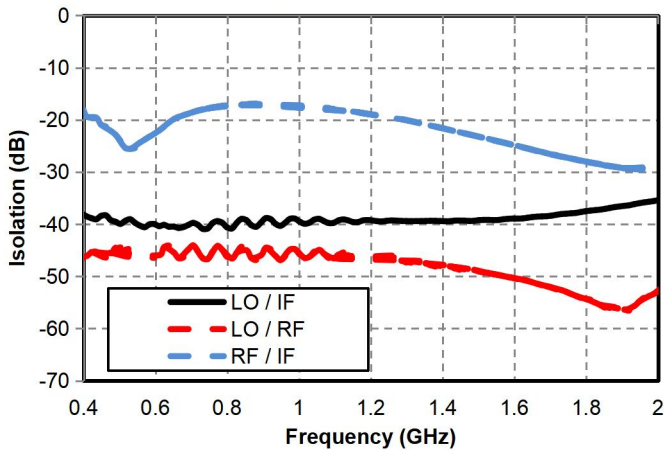
Downconversion loss vs. temperature @ LO = +15dBm



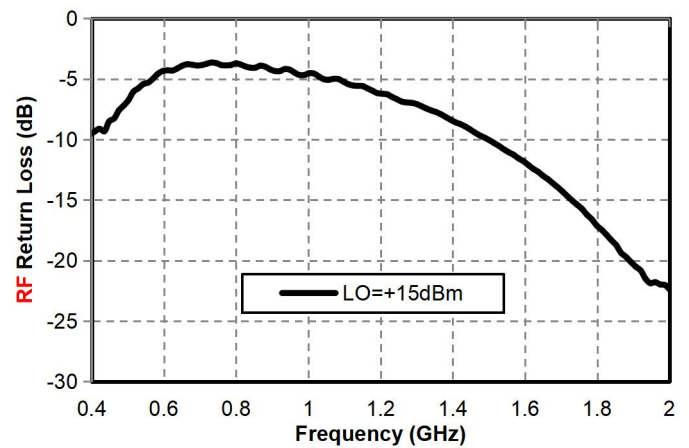
Downconversion Loss vs. LO Power



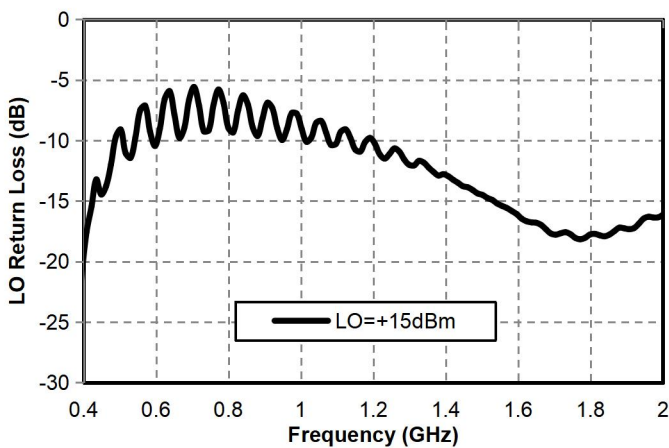
Isolation @ LO = +15dBm



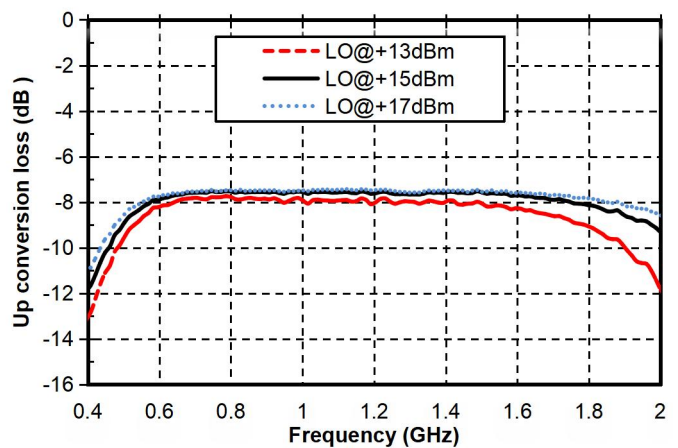
RF Return Loss Vs. Frequency



LO Return Loss Vs. Frequency

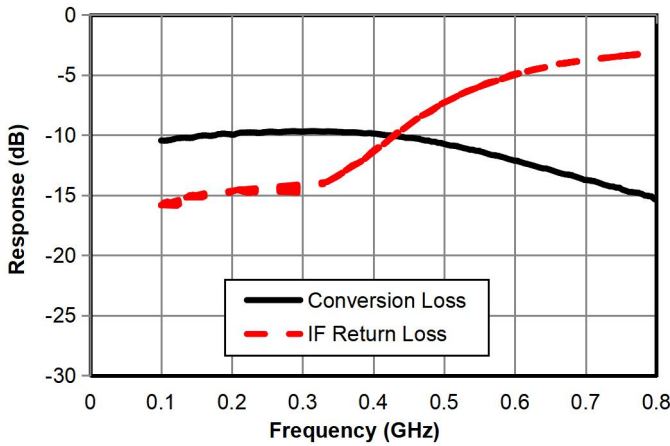


Upconversion Loss vs. LO Power

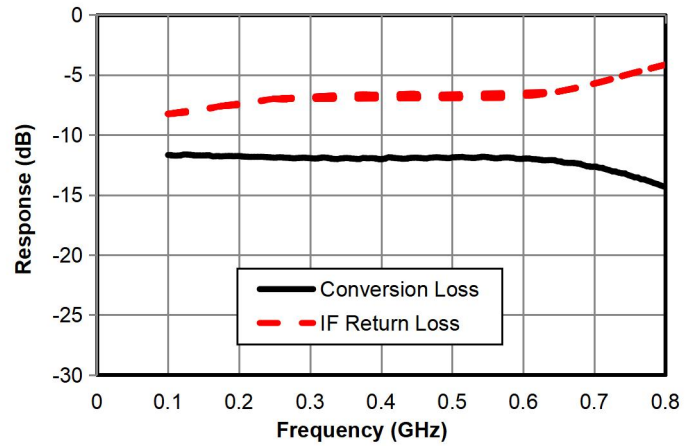


## GaAs MMIC Mixer Chip, 0.4GHz-2GHz

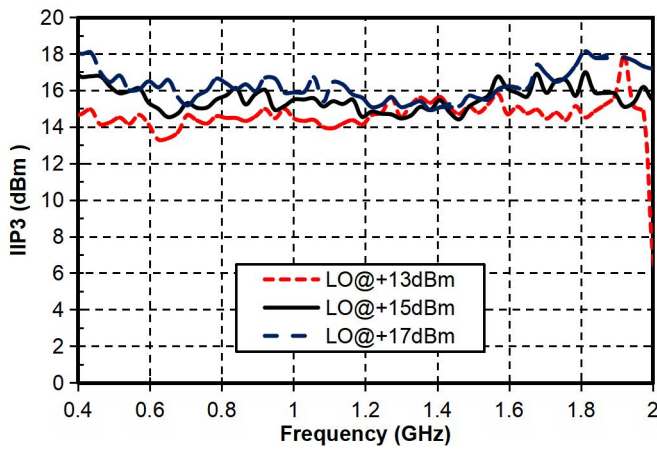
Down-converter IF bandwidth, return loss  
@LO=0.4G, 15dBm



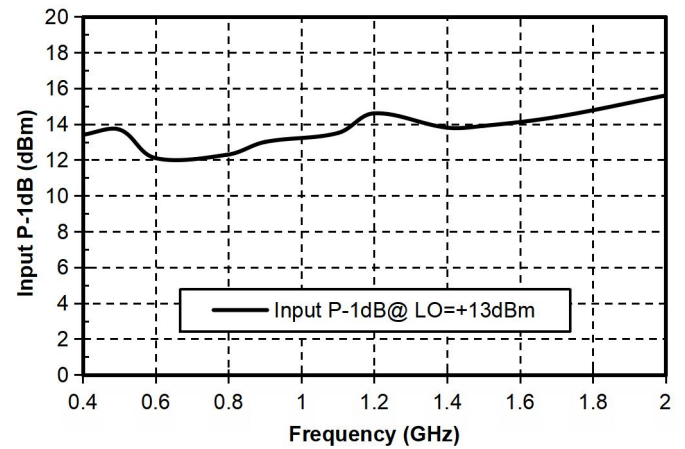
Down-converter IF bandwidth, return loss  
@LO=2G, 15dBm



IIP3



P-1 vs. Frequency



### LO harmonic RF leakage

LO(GHz) 15dBm	nLO (measured at RF port) dBc		
	1	2	3
0.4	X	47	53
0.6	X	45	58
0.8	X	41	67
1	X	41	53
1.2	X	42	53
1.4	X	46	55
1.6	X	52	62
1.8	X	54	56
2	X	56	62

## GaAs MMIC Mixer Chip, 0.4GHz-2GHz

### LO harmonic IF leakage

LO(GHz)15dBm	nLO (measured at IF port) dBc		
	1	2	3
0.4	X	58	55
0.6	X	63	59
0.8	X	71	53
1	X	77	57
1.2	X	58	58
1.4	X	63	56
1.6	X	61	62
1.8	X	63	58
2	X	66	68

### Down-conversion combined spurious suppression

mRF	nLO				
	0	1	2	3	4
0	xxx	6	42	23	32
1	8	0	29	45	46
2	63	60	64	54	88
3	67	80	84	57	73
4	76	86	80	84	84

Test conditions : RF = 1.1 GHz @ -10 dBm , LO = 1.0 GHz @ 1.5 dBm

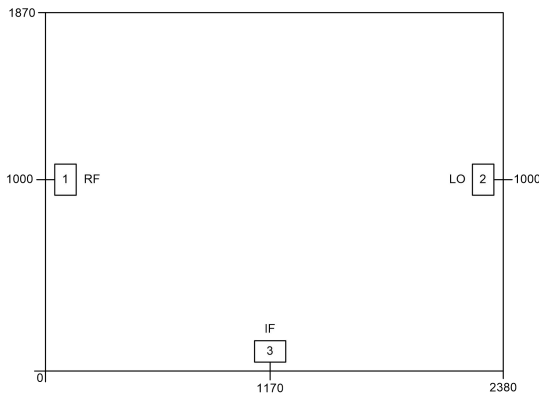
### Up-conversion combined spurious suppression

iF	nLO				
	0	1	2	3	4
0	xxx	13	7	20	23
1	8	0	27	15	49
2	53	47	49	53	55
3	67	90	73	48	68
4	65	84	67	67	64

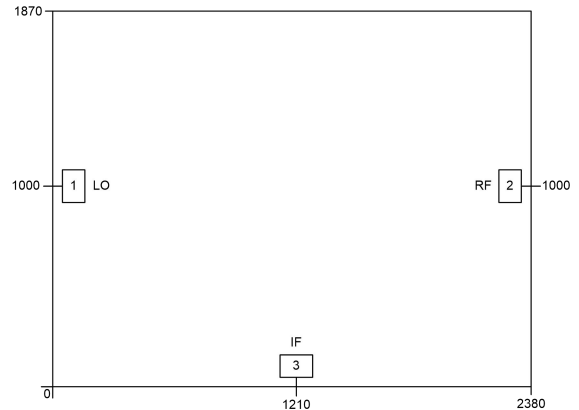
Test conditions: IF = 0.3 GHz @ -10dBm , LO = 1 GHz @ 1.5 dBm

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### Appearance structure <sup>2</sup>



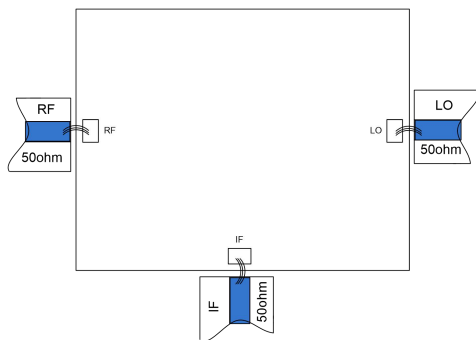
IMX - 0 04020 A



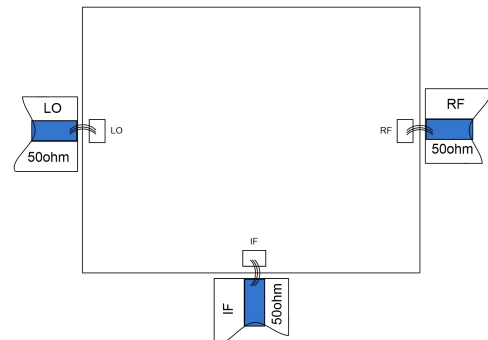
IMX - 0 04020 A M

【2】 The units in the figure are all micrometers, and the dimensional tolerance is  $\pm 50\mu\text{m}$ .

### Recommended assembly drawing



IMX - 0 04020 A



IMX - 0 04020 A M

### Bonding point definition

Bonding point number	Function Symbol	Functional Description
1	RF/LO	The local oscillator signal terminal requires an external DC blocking capacitor
2	LO/RF	RF signal end, requires external DC blocking capacitor
3	IF	Intermediate frequency signal end, requires external DC blocking capacitor
Chip bottom	GND	The bottom of the chip needs to be well grounded to RF and DC

Note 1: LO and RF ports can be used interchangeably, but the electrical performance indicators may vary.

Note 2: It is recommended to solder three gold bonding wires to the pad.