

## GaAs MMIC Mixer Chip, 18GHz-50GHz

### Performance characteristics

- RF/LO frequency range: 18-50 GHz
- IF frequency range : DC-22GHz
- Conversion loss : 7.0 dB@+15dBm LO input
- LO-RF isolation: 46dB
- LO-IF isolation : 37dB
- RF-IF isolation : 33 dB
- Local oscillator power: +13dBm~+17dBm
- Chip size: 1.46 x 1.44 x 0.1mm

### Product Introduction

GMX-1850C/CM is a GaAs MMIC double-balanced mixer with a frequency range of 18 GHz to 50 GHz , an IF range of DC to 22 GHz , a conversion loss of 8.0 dB , a LO/RF isolation of 46 dB , a LO /IF isolation of 37 dB , an RF/IF isolation of 33 dB , and a typical LO input power of +15 dBm. The chip uses an on-chip through-hole metallization process to ensure good grounding, and no additional grounding measures are required. Easy to use. The back of the chip is metallized, suitable for eutectic sintering or conductive adhesive bonding. There are no DC blocking capacitors on the RF, LO, and IF ports . The GMX - 1850C and GMX - 1850CM are mirror images 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 )

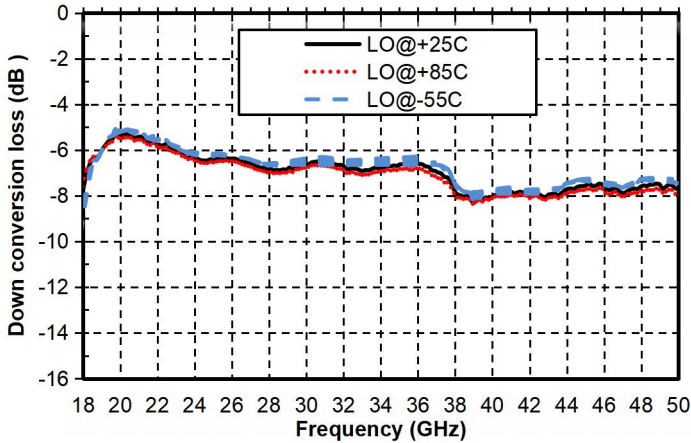
index	Minimum	Typical Value	Maximum	unit
RF frequency range	18-50			GHz
LO frequency range	18-50			GHz
IF frequency	DC-22			GHz
Frequency conversion loss	-	7.0	-	dB
LO-RF Isolation	-	46	-	dB
LO-IF isolation	-	37	-	dB
RF-IF isolation	-	33	-	dB
RF input P-1dB	11			dB m
IIP3	15			dBm

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

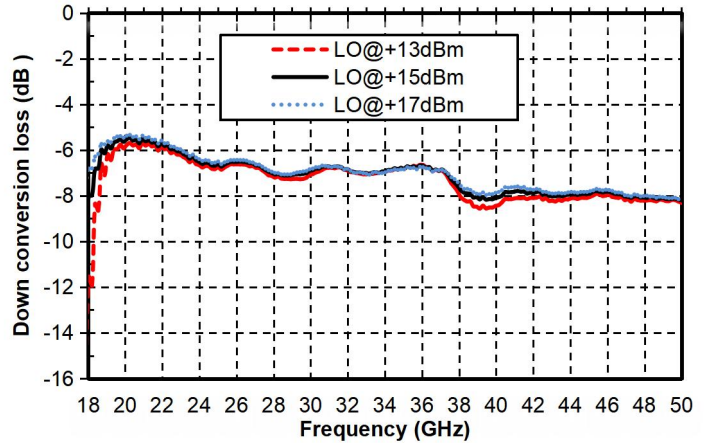
## GaAs MMIC Mixer Chip, 18GHz-50GHz

### Main index test curve

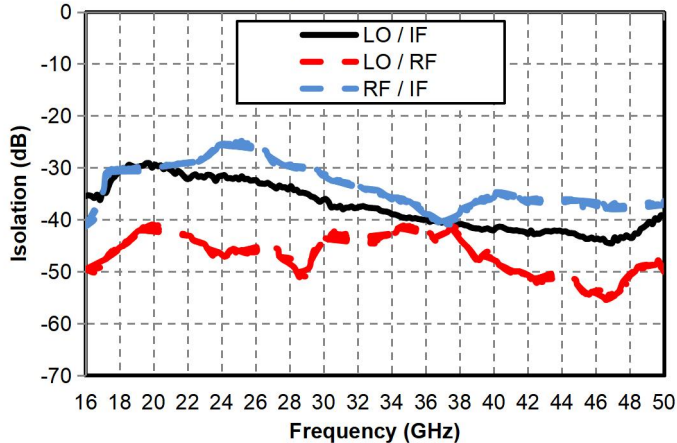
Down-conversion loss vs. temperature @  
LO=+15Bm



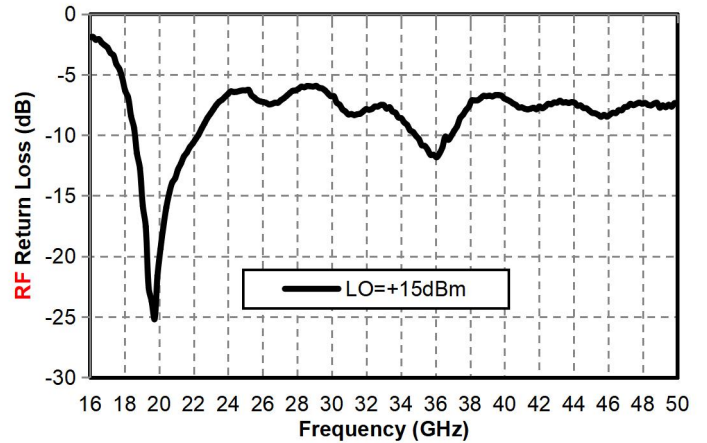
Downconversion Loss vs. LO Power



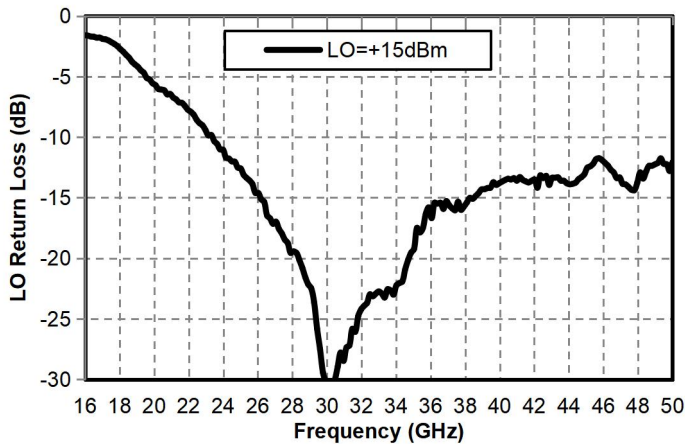
Isolation @ LO = +15dBm



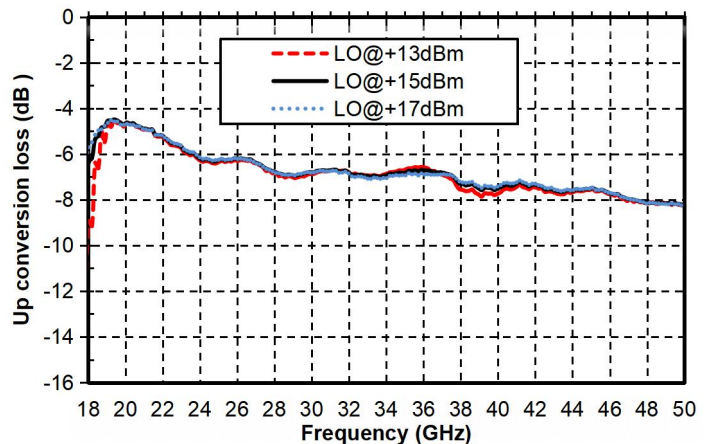
RF Return Loss Vs. Frequency



LO Return Loss Vs. Frequency

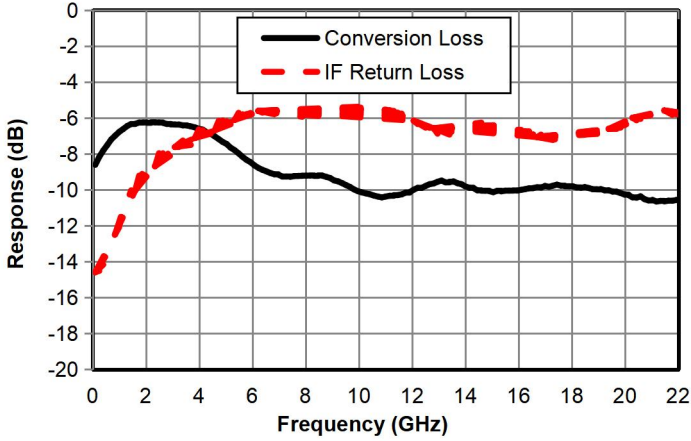


Upconversion Loss vs. LO Power

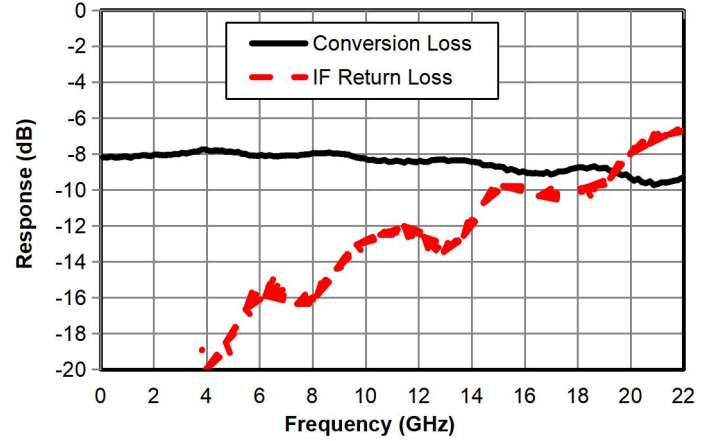


## GaAs MMIC Mixer Chip, 18GHz-50GHz

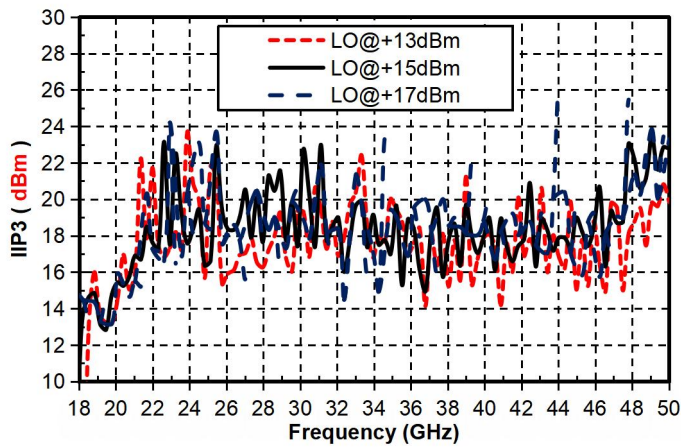
Down-converter IF bandwidth, return loss  
@LO=18G, 15dBm



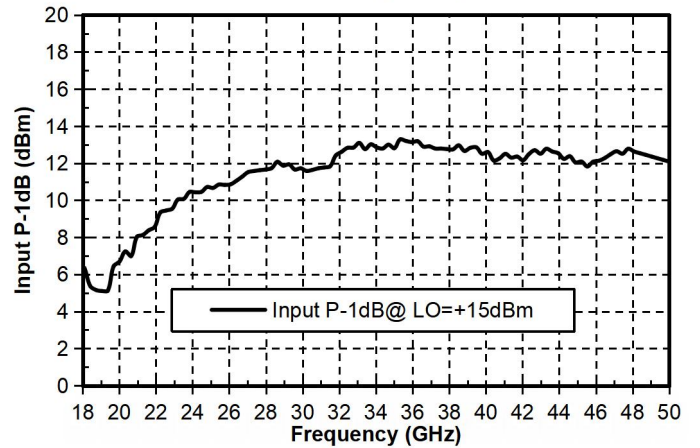
Down-converter IF bandwidth, return loss  
@LO=50G, 15dBm



IIP3



P-1 vs. Frequency



### LO harmonic leakage (probe carrier test)

LO(GHz) 1 5dB m	n LO (measured at RF port) dBc	
	2	3
18	37	X
19	38	X
20	38	X
twenty one	38	X
twenty two	38	X
twenty three	37	X
twenty four	38	X
25	37	X

## GaAs MMIC Mixer Chip, 18GHz-50GHz

### LO harmonic leakage (probe carrier test)

LO(GHz) 1 5dB m	n LO ( measured at I F port) dBc	
	2	3
18	63	X
19	62	X
20	65	X
twenty one	67	X
twenty two	68	X
twenty three	70	X
twenty four	72	X
25	68	X

### Down-conversion combined spurious suppression (probe carrier test, RF and LO

terminals are directly fed by the signal source , no filter, etc.)

mRF	nLO				
	0	1	2	3	4
0	xxx	-1	34	/	/
1	26	0	30	37	/
2	/	46	64	46	83
3	/	89	67	58	69
4	/	/	/	82	98

Test conditions: RF = 20.1GHz @ -10dBm , LO = 20GHz @ 15dBm , all values are relative values of 1\*RF - 1\*LO( P\_IF , dBm ) , unit is dBc .

### Up-conversion combined spurious suppression (probe carrier test, I F, LO terminals

are directly fed by the signal source , no filter, etc.)

iF	nLO				
	0	1	2	3	4
0	xxx	14	7	/	/
1	69	0	31	/	/
2	97	39	62	/	/
3	/	66	73	/	/
4	/	96	/	/	/

Test conditions: IF = 1.3 GHz@-10dBm , LO = 2.5GHz@1.5dBm , all values are relative values of 1\* LO -1\* IF ( P\_RF , dBm ) , unit: dBc .

## GaAs MMIC Mixer Chip, 18GHz-50GHz

Down-conversion combined spurious test (compared with the test results of foreign target devices on the same platform)

(Assembly test, RF and LO terminals are directly fed by signal sources , without filters, etc.)

I MX - 1850C (XXX - 1850X)					
Combined spurious test	nLO				
mRF	0	1	2	3	4
0	xxx(xxx)	2(-6)	33(23)	/(/)	/(/)
1	23(23)	0(0)	27(25)	39(28)	/(/)
2	84(74)	44(51)	60(68)	45(52)	82(87)
3	/(/)	81(81)	67(75)	55(57)	68(73)
4	/(/)	/(/)	/(/)	81(100)	105(112)
RF = 20.1GHZ@-10dBm , LO = 20 GHz@ 16dBm					
Combined spurious test	nLO				
mRF	0	1	2	3	4
0	xxx(xxx)	-10(-11)	/(/)	/(/)	/(/)
1	16(17)	0(0)	30(38)	/(/)	/(/)
2	/(/)	66 (71)	67(58)	73(72)	/(/)
3	/(/)	/(/)	88(94)	82(79)	86(91)
4	/(/)	/(/)	/(/)	/(/)	110(/)
RF = 30.1GHZ@-10dBm , LO = 30 GHz@ 16dBm					
Combined spurious test	nLO				
mRF	0	1	2	3	4
0	xxx(xxx)	-1(-3)	27(23)	/(/)	/(/)
1	26(25)	0(0)	25(27)	37(28)	/(/)
2	81(75)	59(61)	60(69)	48(59)	83(95)
3	/(/)	/(/)	79(95)	63(77)	68(85)
4	/(/)	/(/)	/(/)	96(/)	100(/)
RF = 23 GHZ @ -10dBm, LO = 21 GHz @ 16 dBm					
Combined spurious test	nLO				
mRF	0	1	2	3	4
0	xxx(xxx)	1(-5)	33(30)	/(/)	/(/)
1	36(27)	0(0)	24(25)	30(39)	/(/)
2	72(82)	61(66))	71(65)	54(58)	69(67)
3	/(/)	/(/)	82(/)	65(67)	81(73)

4	I(I)	I(I)	I(I)	I(I)	99(89)
RF= 24 GHZ@-10dBm, LO= 19 GHz@1 6 dBm					

## GaAs MMIC Mixer Chip, 18GHz-50GHz

Up-conversion combined spurious test (compared with the test results of foreign target devices on the same platform)

(Assembly test, IF and LO terminals are directly fed by the signal source , without filters, etc.)

I MX - 1850C (XXX - 1850X)					
Combined spurious test	nLO				
iF	0	1	2	3	4
0	xxx(xxx)	10 (17)	13 (4)	I (I)	I (I)
1	90 (87)	0(0)	29 (24)	I (I)	I (I)
2	I (I)	51 (52)	67 (63)	I (I)	I (I)
3	I (I)	58 (75)	80 (79)	I (I)	I (I)
4	I (I)	91 (95)	99 (I)	I (I)	I (I)
IF=0.1GHz@-10dBm , LO = 20GHz @ 16dBm					
Combined spurious test	nLO				
m I F	0	1	2	3	4
0	xxx(xxx)	14 (9)	11 (7)	I (I)	I (I)
1	69 (65)	0(0)	28 (21)	I (I)	I (I)
2	105 (99)	41 (42)	72 (60)	I (I)	I (I)
3	I (I)	65 (65)	86 (75)	I (I)	I (I)
4	I (I)	107 (101)	I (100)	I (I)	I (I)
IF = 1 GHz @ -10 dBm , LO = 24 GHz @ 1 6 dBm					
Combined spurious test	nLO				
m I F	0	1	2	3	4
0	xxx(xxx)	12(8)	8(13)	I(I)	I(I)
1	69(64)	0(0)	30(26)	I(I)	I(I)
2	101(95)	39(41)	74(56)	I(I)	I(I)
3	I( 105 )	66(67)	85(79)	I(I)	I(I)
4	I(I)	94(102)	I(I)	I(I)	I(I)
IF = 1.3GHz@-10dBm , LO = 25GHz @ 16dBm					
Combined spurious test	I (I)				

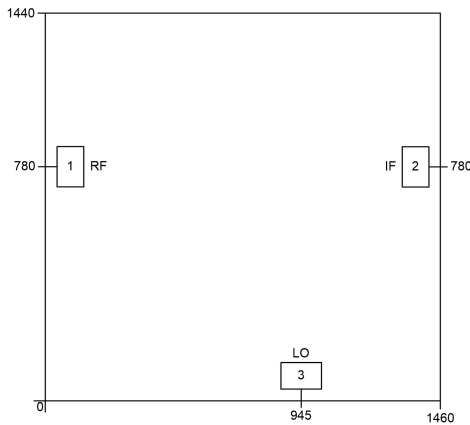


m I F	0	1	2	3	4
0	xxx(xxx)	10(8)	9(13)	/(/)	/(/)
1	62(45)	0(0)	34(30)	/(/)	/(/)
2	77(76)	69(68)	71(68)	/(/)	/(/)
3	88(73)	84(87)	84(83)	/(/)	/(/)
4	/(/)	/(/)	/(/)	/(/)	/(/)

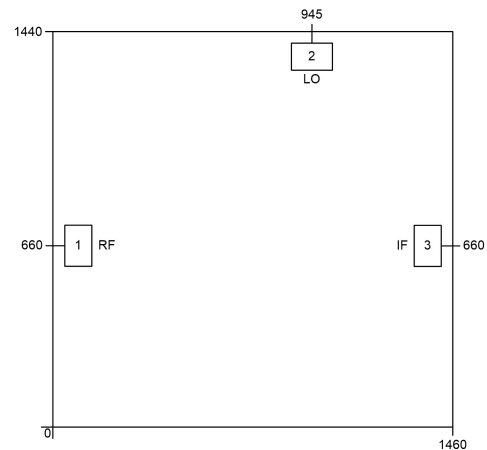
IF = 5.3GHz@-10dBm , LO = 25GHz @ 16dBm

## GaAs MMIC Mixer Chip, 18GHz-50GHz

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



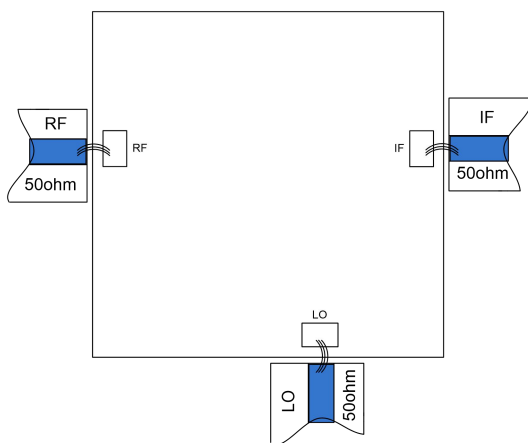
I MX - 1850C



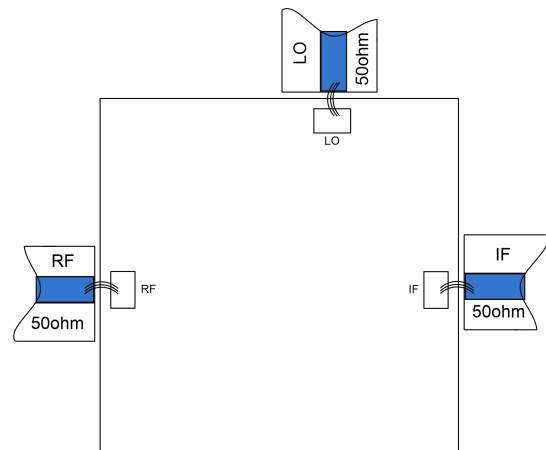
I MX - 1850CM

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

### Recommended assembly drawing



I MX - 1850C



I MX - 1850CM

Bonding point definition		
Bonding point number	Function Symbol	Functional Description
1	LO/RF	The local oscillator signal terminal requires an external DC blocking capacitor
2	RF/ LO	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.