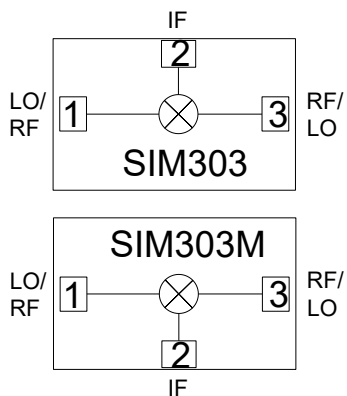


性能特点

- 变频损耗：9.5dB
- L0至RF隔离：53dB
- L0至IF隔离：28dB
- 无源双平衡拓扑结构
- 宽IF带宽：DC~4GHz
- 芯片尺寸：1.480*1.450mm

典型应用

- 点对点通信
- 仪器仪表
- 5G通信

功能框图

概述

SIM303/SIM303M是互为镜像的通用型双平衡MMIC混频器，采用GaAs工艺制造。该器件在带宽范围内具有出色的变频损耗、卓越的隔离和杂散抑制。可用作频率4.5GHz至24GHz的上变频器或下变频器。

电性能表 (T_a=+25°C, IF=100MHz, LO=+17dBm 配置A,下变频, LSB)

参数名称	描述	最小值	典型值	最大值	单位
频率范围	RF、L0端口	4.5~24			GHz
	IF端口	DC~4			GHz
本振功率范围		16		21	dBm
变频损耗	Pin=0dBm		9.5		dB
RF回波损耗	Pin=0dBm		9		dB
输入IP3	Pin=0dBm/tone, Δf=1MHz		27.7		dBm
输入IP2	Pin=0dBm		60		dBm
输入P1dB			16		dBm
杂散	2L0-2RF		83		dBc
	3L0-3RF		67		dBc
	2IF+1L0 ^①		72		dBc
隔离度	RF到IF端口		33		dB
	L0到RF端口		53		dB
	L0到IF端口		28		dB

附注①：2IF+1L0为上变频杂散指标

电性能表 ($T_A=+25^{\circ}\text{C}$, $I_F=100\text{MHz}$, $L_O=+17\text{dBm}$ 配置B, LSB, 下变频)

参数名称	描述	最小值	典型值	最大值	单位
频率范围	RF、LO端口	4.5~24			GHz
	IF端口	DC~4			GHz
本振功率范围		15		20	dBm
变频损耗	$P_{in}=0\text{dBm}$		10		dB
RF回波损耗	$P_{in}=0\text{dBm}$		10		dB
输入IP3	$P_{in}=0\text{dBm}/\text{tone}$, $\Delta f=1\text{MHz}$		27.3		dBm
输入IP2	$P_{in}=0\text{dBm}$		68		dBm
输入P1dB			16.8		dBm
杂散	2LO-2RF		81		dBc
	3LO-3RF		70		dBc
	2IF+1LO ^①		72		dBc
隔离度	RF到IF端口		28		dB
	LO到RF端口		55		dB
	LO到IF端口		34		dB

附注①: 2IF+1LO为上变频杂散指标

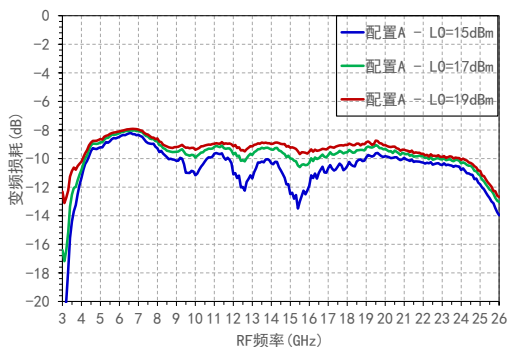
SIM303砷化镓双平衡混频器

SIM303M砷化镓双平衡混频器

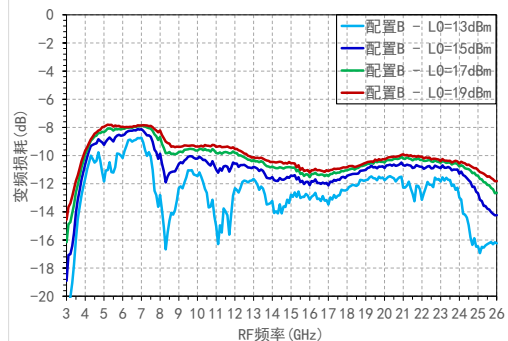

SIM303应用时可通过配置 A/B 两种不同方式来实现最佳杂散抑制。如果需要较优的变频增益(转换损耗)则选择配置A(端口1作为RF输入或输出, 端口3作为LO输入)。如果您需要较低的LO驱动功率, 则选择配置B(端口1作为 LO输入, 端口3作为RF输入或输出)。

下变频测试曲线 (IF=100MHz, LSB, 配置A/B, Pin=0dBm)

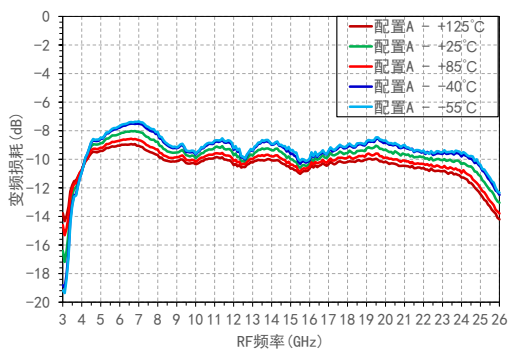
变频损耗 VS RF频率



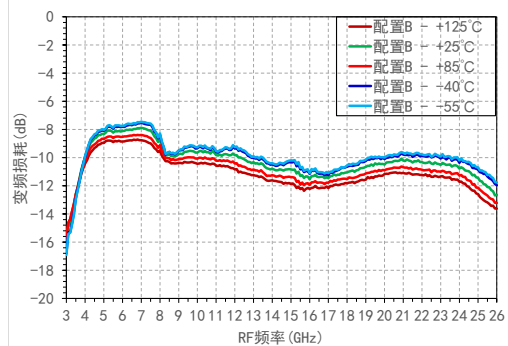
变频损耗 VS RF频率



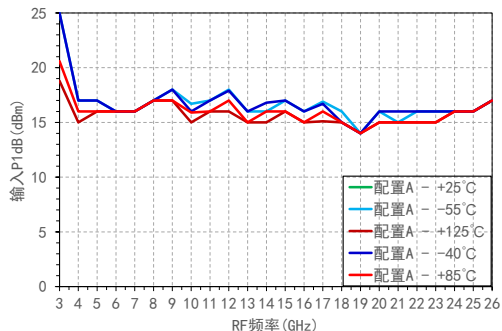
变频损耗 VS RF频率 (L0=17dBm)



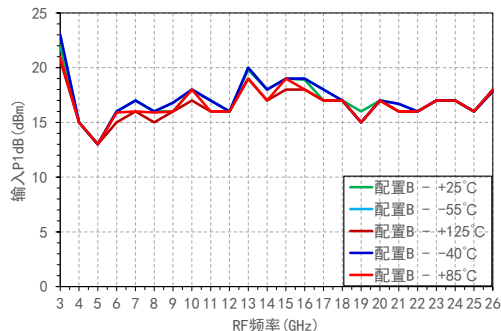
变频损耗 VS RF频率 (L0=17dBm)



输入P1dB VS RF频率 (L0=17dBm)



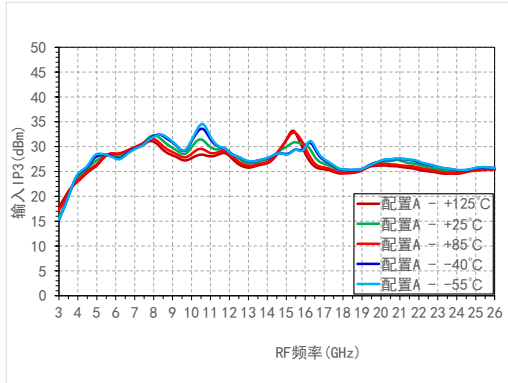
输入P1dB VS RF频率 (L0=17dBm)



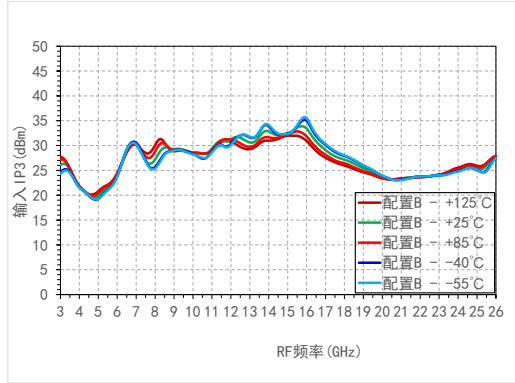
SIM
混频器系列

下变频测试曲线 (IF=100MHz, LSB, 配置A/B, Pin=0dBm)

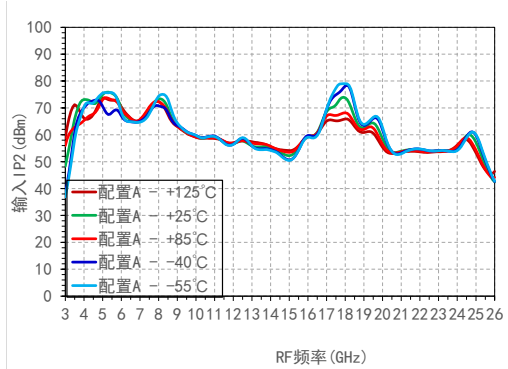
输入IP3 VS RF频率 (L0=17dBm)



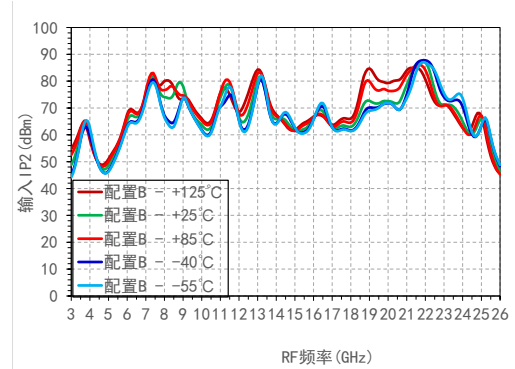
输入IP3 VS RF频率 (L0=17dBm)



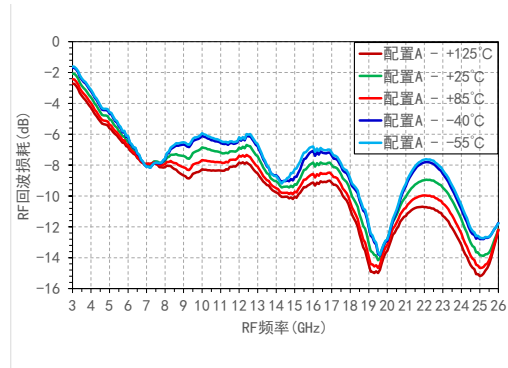
输入IP2 VS RF频率 (L0=17dBm)



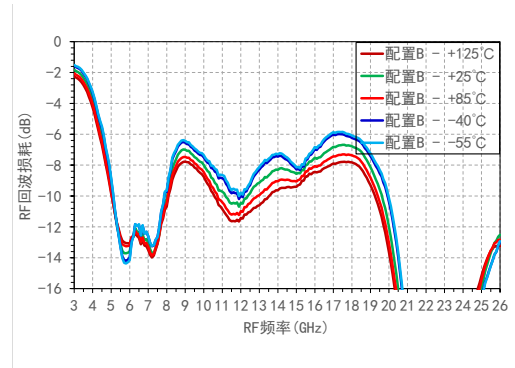
输入IP2 VS RF频率 (L0=17dBm)



RF 回波损耗 VS RF频率 (L0=17dBm)

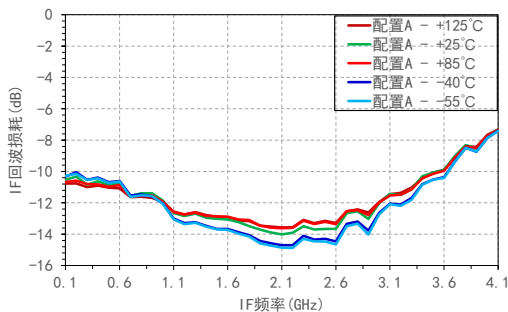


RF 回波损耗 VS RF频率 (L0=17dBm)

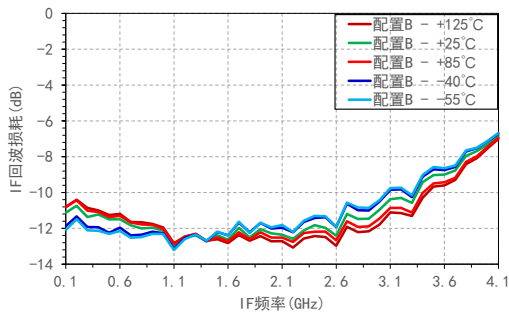


下变频测试曲线 (IF=100MHz, LSB, 配置A/B, Pin=-10dBm)

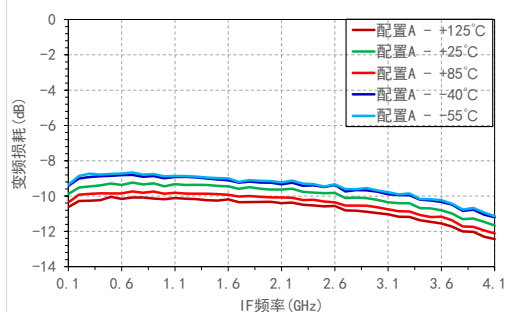
IF回波损耗 VS IF频率 (L0=17dBm)



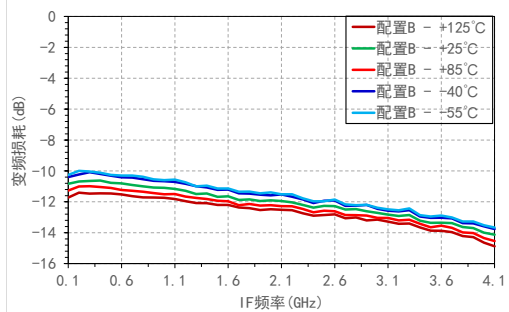
IF回波损耗 VS IF频率 (L0=17dBm)



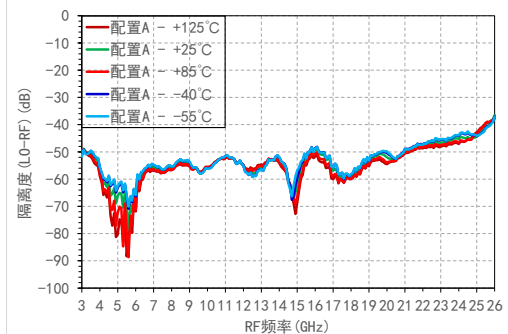
变频损耗 VS IF频率 (L0=17dBm, L0=20GHz)



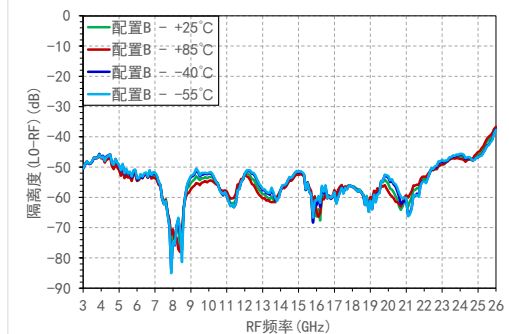
变频损耗 VS IF频率 (L0=17dBm, L0=20GHz)



L0-RF隔离度 VS 射频频率 (L0=17dBm)



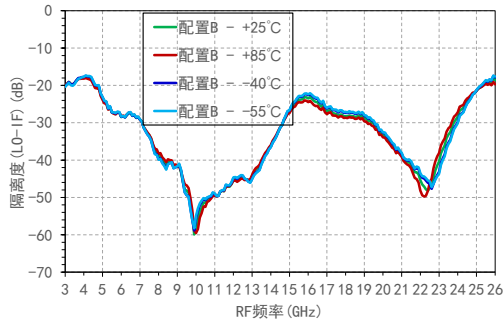
L0-RF隔离度 VS 射频频率 (L0=17dBm)



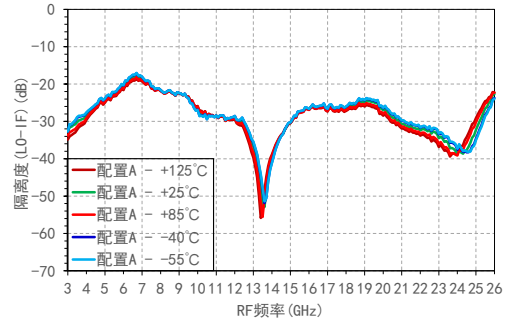
SIM
混频器系列

下变频测试曲线 (IF=100MHz, LSB, 配置A/B, Pin=-10dBm)

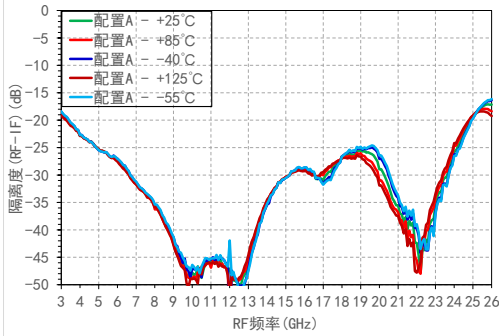
L0-IF隔离度 VS 射频频率 (L0=17dBm)



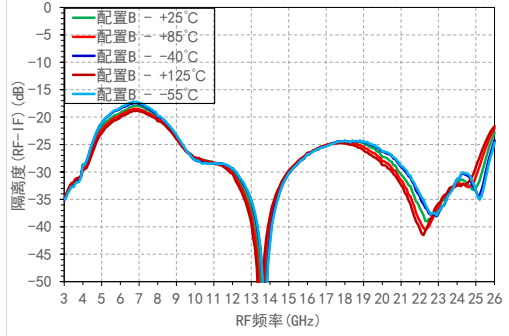
L0-IF隔离度 VS 射频频率 (L0=17dBm)



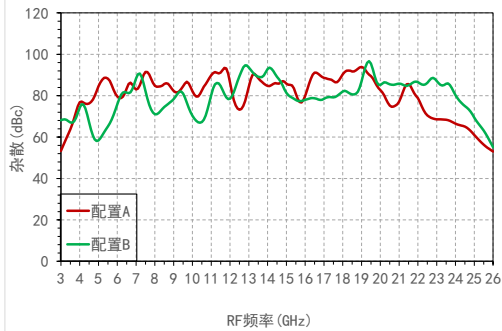
RF-IF隔离度 VS 射频频率 (L0=17dBm)



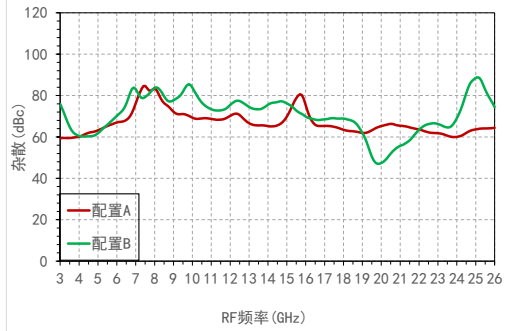
RF-IF隔离度 VS 射频频率 (L0=17dBm)



2LO-2RF 杂散 VS RF 频率

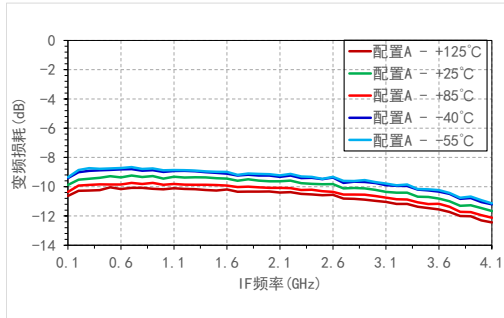


3LO-3RF 杂散 VS RF 频率

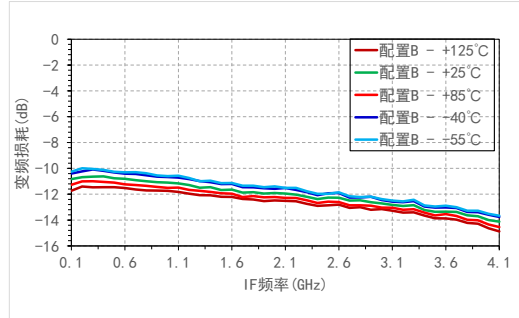


下变频测试曲线 (IF=100MHz,USB, 配置A/B, Pin=-10dBm)

变频损耗 VS IF频率 (LO=17dBm, LO=8GHz)



变频损耗 VS IF频率 (LO=17dBm, LO=8GHz)


下变频杂散表
配置A

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	-12.62	28.95	10.84	35.98	22.67
	1	16.94	0.00	27.91	38.64	29.75	25.40
	2	76.37	60.80	97.85	58.33	89.68	65.02
	3	87.03	74.70	93.18	78.84	93.06	92.49
	4	91.37	77.90	75.15	88.11	82.20	96.44
	5	83.96	80.43	76.38	75.56	87.49	93.97

RF=5GHz&-10dBm; LO=5.1GHz&+17dBm

配置B

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	-9.27	15.78	3.04	48.25	13.78
	1	14.47	0.00	34.12	35.43	50.77	24.04
	2	71.88	44.75	57.66	50.80	72.92	49.90
	3	78.59	80.32	85.37	58.22	85.06	76.28
	4	94.84	93.96	80.92	80.67	106.14	98.62
	5	96.42	90.68	85.60	99.00	83.90	103.72

RF=5GHz&-10dBm; LO=5.1GHz&+17dBm

配置A

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	4.15	31.21	6.14	/	/
	1	38.89	0.00	46.43	30.40	31.71	/
	2	70.91	91.38	78.17	79.24	88.32	62.03
	3	70.58	87.66	80.98	81.67	92.02	93.34
	4	/	63.68	87.02	91.75	87.59	81.42
	5	/	/	70.45	88.44	79.80	90.16

RF=13GHz&-10dBm; LO=13.1GHz&+17dBm

配置B

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	6.72	11.67	-4.90	/	/
	1	28.50	0.00	62.62	31.75	38.41	/
	2	88.29	91.49	84.67	94.94	75.14	84.07
	3	81.99	92.55	93.16	81.69	99.60	91.48
	4	/	82.43	89.12	81.08	98.47	96.97
	5	/	/	87.91	74.88	94.02	82.64

RF=13GHz&-10dBm; LO=13.1GHz&+17dBm

配置A

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	-3.66	21.68	/	/	/
	1	47.80	0.00	55.34	43.62	/	/
	2	86.30	71.45	71.58	69.22	73.68	/
	3	/	72.33	82.42	76.23	79.08	64.21
	4	/	/	85.00	82.34	82.21	87.49
	5	/	/	/	70.73	87.17	95.05

RF=22GHz&-10dBm; LO=22.1GHz&+17dBm

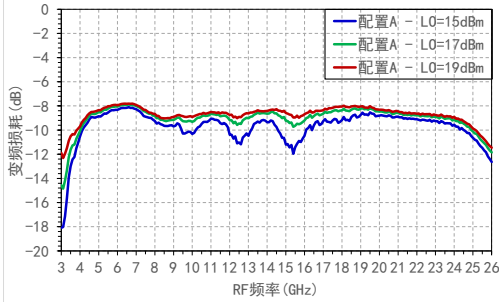
配置B

		M*L0					
		0	1	2	3	4	5
M*RF	0	/	10.08	28.44	/	/	/
	1	25.36	0.00	42.27	41.35	/	/
	2	68.07	66.42	77.57	67.55	79.71	/
	3	/	79.11	90.53	73.96	91.45	72.25
	4	/	/	70.67	75.96	84.96	77.34
	5	/	/	/	79.91	95.95	99.47

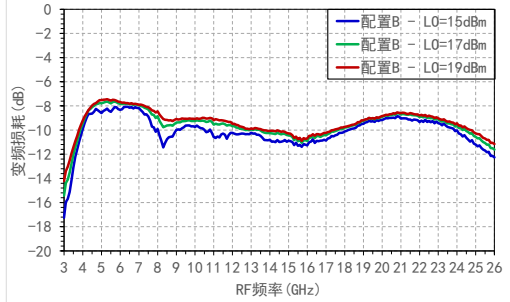
RF=22GHz&-10dBm; LO=22.1GHz&+17dBm

上变频测试曲线 (IF=100MHz,配置A/B,LSB, Pin=0dBm)

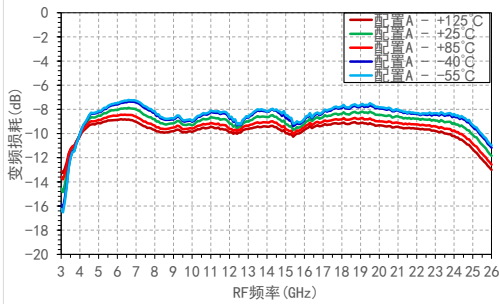
变频损耗 VS RF频率



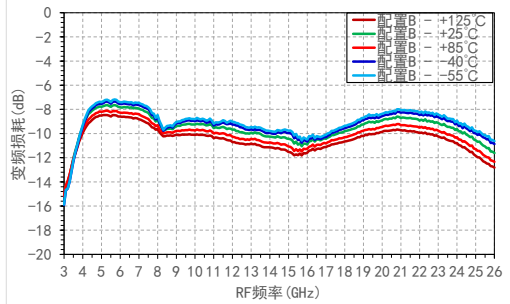
变频损耗 VS RF频率



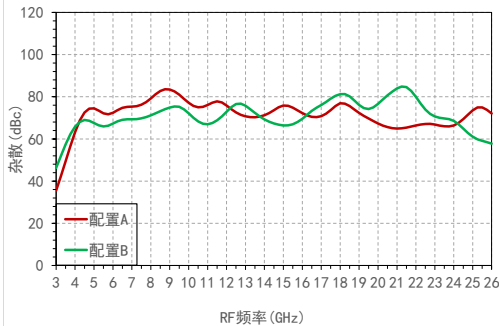
变频损耗 VS RF频率 (LO=17dBm)



变频损耗 VS RF频率 (LO=17dBm)



2IF+1LO杂散 VS RF频率



SIM

混频器系列

上变频杂散表

		配置A					
M*IF	M*LO	0	1	2	3	4	5
	-5		89.04	95.02	104.20	81.80	105.09
-4		88.84	106.46	102.24	107.49	80.58	101.65
-3		113.48	64.20	84.16	71.11	102.74	64.73
-2		78.22	72.54	55.98	64.86	52.17	91.49
-1		19.87	0.09	29.58	14.20	31.99	21.06
0		/	14.52	-1.77	13.86	4.36	23.86
1		19.88	0.00	32.50	15.07	33.46	23.17
2		77.46	75.61	55.33	63.75	52.18	82.70
3		87.60	64.37	112.31	68.18	94.90	64.79
4		93.22	114.77	104.59	81.70	84.76	108.46
5		109.37	83.93	87.44	81.97	100.73	101.16

IF=0.1GHz&-10dBm; LO=5.1GHz&+17dBm

		配置B					
M*IF	M*LO	0	1	2	3	4	5
	-5		90.32	103.35	83.84	87.29	99.80
-4		97.07	91.35	103.77	90.75	83.24	83.99
-3		98.89	76.08	105.91	86.13	97.13	84.63
-2		95.18	74.81	61.79	83.07	57.49	68.64
-1		44.51	0.08	29.56	23.63	44.52	25.56
0		/	2.62	-9.30	19.26	2.52	27.09
1		44.52	0.00	29.16	22.29	42.49	26.68
2		104.81	81.60	61.62	89.16	54.74	71.14
3		87.97	74.02	103.12	104.10	96.23	80.41
4		98.45	106.68	107.52	104.41	83.92	82.87
5		99.31	87.23	85.65	112.95	83.30	105.33

IF=0.1GHz&-10dBm; LO=5.1GHz&+17dBm

		配置A					
M*IF	M*LO	0	1	2	3	4	5
	-5		68.36	102.67	86.09	75.50	/
-4		86.71	88.80	80.00	92.38	/	/
-3		91.84	107.61	82.01	75.61	/	/
-2		107.24	75.37	66.99	81.25	/	/
-1		18.58	-0.12	13.99	28.38	/	/
0		/	15.86	8.58	20.26	/	/
1		/	0.00	14.58	27.16	/	/
2		91.96	72.17	67.58	74.81	/	/
3		110.94	89.02	79.49	73.20	/	/
4		103.21	86.94	84.25	94.95	/	/
5		117.13	80.06	79.39	78.08	/	/

IF=0.1GHz&-10dBm; LO=13.1GHz&+17dBm

		配置B					
M*IF	M*LO	0	1	2	3	4	5
	-5		91.62	117.50	101.62	71.33	/
-4		93.40	107.45	100.86	70.31	/	/
-3		95.06	77.42	95.81	87.70	/	/
-2		110.65	86.77	49.35	65.44	/	/
-1		40.27	-0.19	29.38	19.92	/	/
0		/	22.28	-8.06	12.98	/	/
1		40.25	0.00	26.77	19.31	/	/
2		83.16	66.69	49.97	60.73	/	/
3		103.67	73.85	98.66	109.36	/	/
4		113.24	101.83	100.29	88.24	/	/
5		114.68	83.19	101.04	94.61	/	/

IF=0.1GHz&-10dBm; LO=13.1GHz&+17dBm

		配置A					
M*IF	M*LO	0	1	2	3	4	5
	-5		86.75	99.73	68.42	/	/
-4		91.19	101.41	95.70	/	/	/
-3		107.33	76.45	93.23	/	/	/
-2		114.24	72.41	62.92	/	/	/
-1		19.62	0.15	28.86	/	/	/
0		/	9.58	4.59	/	/	/
1		19.62	0.00	28.43	/	/	/
2		112.28	65.09	65.22	/	/	/
3		104.96	82.56	73.25	/	/	/
4		98.87	101.80	76.74	/	/	/
5		94.87	87.33	71.68	/	/	/

IF=0.1GHz&-10dBm; LO=22.1GHz&+17dBm

		配置B					
M*IF	M*LO	0	1	2	3	4	5
	-5		96.72	102.18	91.90	/	/
-4		91.37	86.46	74.34	/	/	/
-3		87.63	83.78	100.91	/	/	/
-2		111.90	84.87	70.17	/	/	/
-1		42.91	0.17	34.13	/	/	/
0		/	12.53	25.66	/	/	/
1		42.91	0.00	35.26	/	/	/
2		107.67	70.69	72.01	/	/	/
3		102.83	102.35	76.66	/	/	/
4		87.21	108.40	93.24	/	/	/
5		111.79	80.46	76.22	/	/	/

IF=0.1GHz&-10dBm; LO=22.1GHz&+17dBm


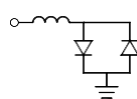

绝对最大额定值

RF/L0输入功率	25dBm@25°C
存储温度	-65°C~+150°C
工作温度	-55°C~+85°C
ESD_HBM	TBD

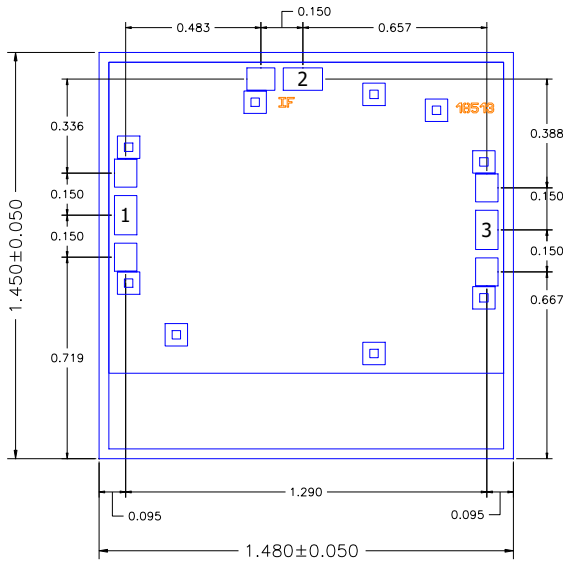
注意事项

1. 禁止试图用湿化学方法清洁芯片表面。
2. 本品属于静电敏感器件，储存和使用时注意防静电。
3. 干燥、氮气环境储存。


SIM
混频器系列
SIM303/303M引脚定义

引脚	功能符号	描述	示意图
1	L0/RF	DC对地短路, 交流匹配50欧姆。芯片内部无隔直电容。若芯片外端口不加隔直电容时, 电源电流不能超过12mA, 否则器件会损坏。	
2	IF	DC 对二极管耦合, 芯片内部无隔直电容。若芯片外端口不加隔直电容时, 电源电流不能超过12mA, 否则器件会损坏。	
3	RF/L0	DC对地短路, 交流匹配50欧姆。芯片内部无隔直电容。若芯片外端口不加隔直电容时, 电源电流不能超过12mA, 否则器件会损坏。	

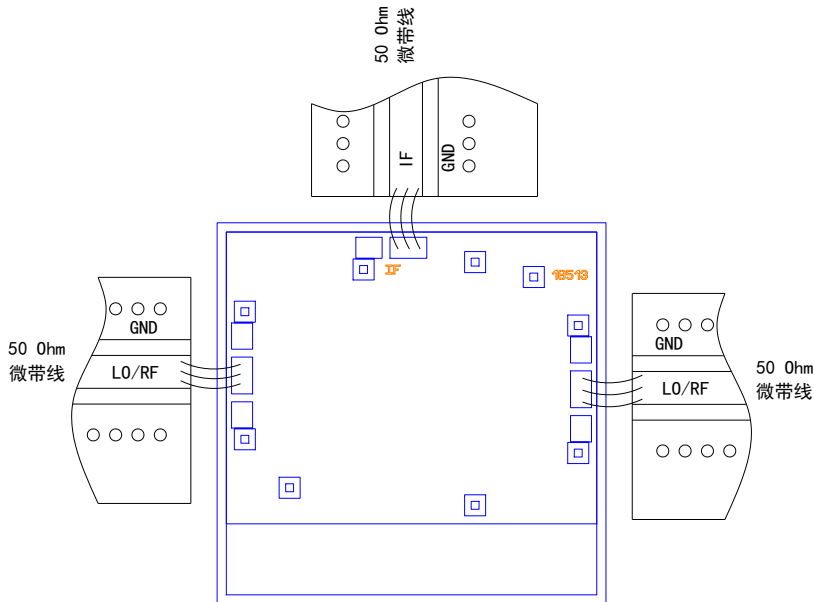
SIM303外形尺寸图



说明:

1. 单位:毫米;
2. 键合压点材质镀金;
3. 芯片厚度:0.100±0.015 (mm);
4. 不能在通孔上进行键合;
5. 芯片背面金属化;
6. 芯片背面接地;

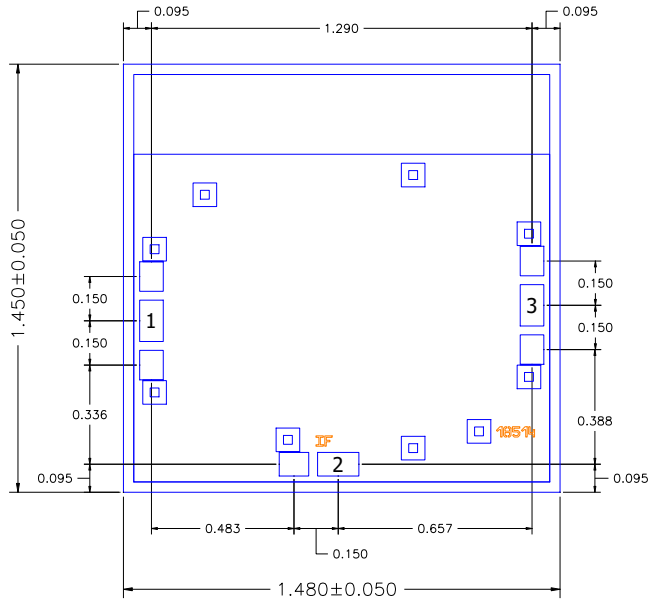
SIM303芯片装配图



说明:

1. 芯片背面接地, 粘接材料: 导电胶;
2. 芯片键合线材料: 1mil Au;
3. 键合时注意图所有线长尽量短

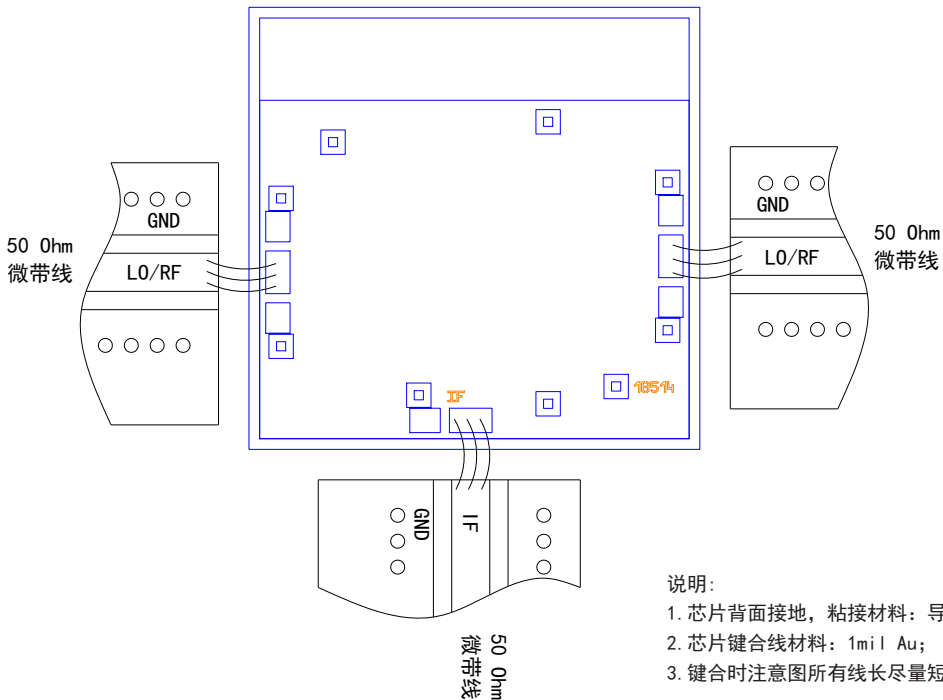
SIM303M外形尺寸图



说明:

1. 单位: 毫米;
2. 键合压点材质镀金;
3. 芯片厚度: 0.100 ± 0.015 (mm);
4. 不能在通孔上进行键合;
5. 芯片背面金属化;
6. 芯片背面接地;

SIM303M芯片装配图



说明:

1. 芯片背面接地, 粘接材料: 导电胶;
2. 芯片键合线材料: 1mil Au;
3. 键合时注意图所有线长尽量短

双通道典型应用

