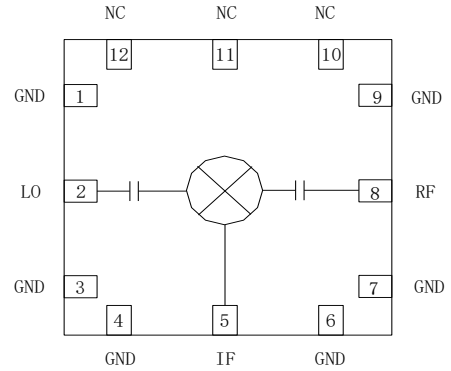


性能特点

- 变频增益: -9dB
- L0至RF隔离: 47dB
- L0至IF隔离: 42dB
- 无源双平衡拓扑结构
- 宽IF带宽: DC~4GHz
- 封装尺寸: 3*3 QFN 12L

典型应用

- 点对点通信
- 仪器仪表

功能框图

概述

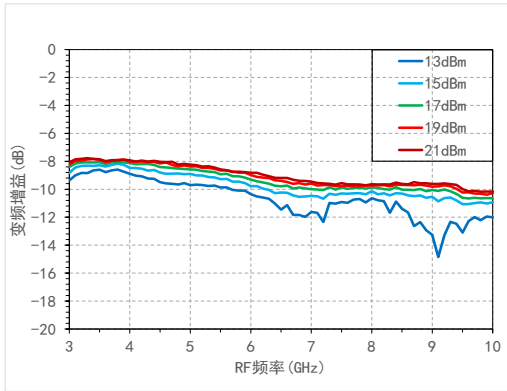
SIM221SP3B是一款通用型无源混频器,采用GaAs工艺制造。该器件为无源器件,无需偏置、外部元件或匹配电路。可用作频率3GHz至10GHz的上变频器或下变频器。

电性能表 (T_A=+25°C, IF=100MHz, L0=+17dBm USB)

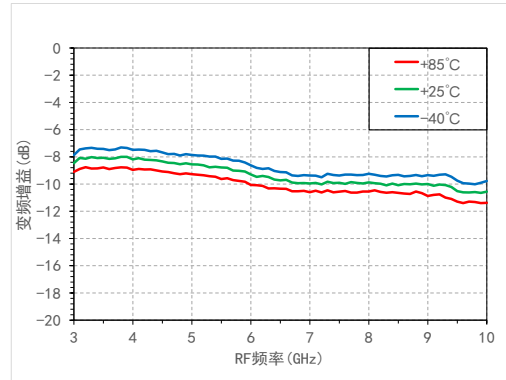
参数名称	描述	最小值	典型值	最大值	单位
频率范围	RF、L0端口	3~10			GHz
	IF端口	DC~4			GHz
变频增益			-9		dB
噪声系数			9		dB
输入IP3	P _{in} =10dBm/tone, Δf=1MHz /下变频		26		dBm
输入IP2	P _{in} =10dBm/tone, Δf=1MHz /下变频		65		dBm
输入P1dB	下变频		17.5		dBm
隔离度	RF到IF端口		26		dB
	L0到RF端口		47		dB
	L0到IF端口		42		dB

下变频测试曲线 (IF=0.1GHz, LSB)

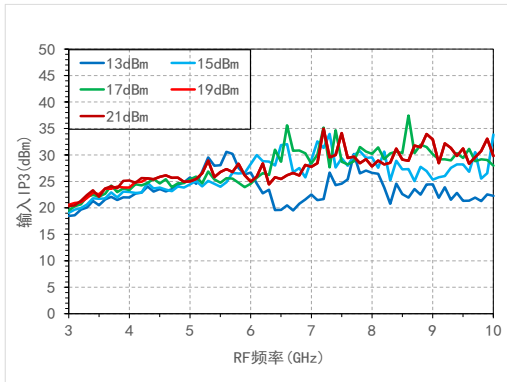
变频增益 VS 射频频率@本振功率



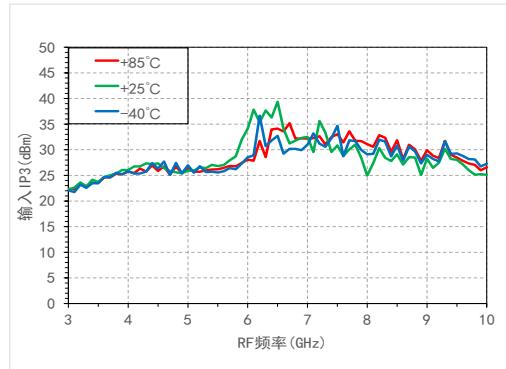
变频增益 VS 射频频率@温度 (L0=17dBm)



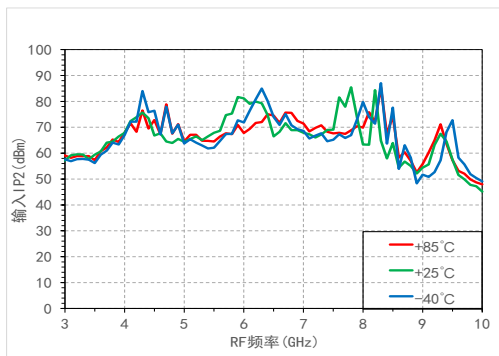
输入 IP3 VS 射频频率 @本振功率



输入 IP3 VS 射频频率@温度 (L0=17dBm)

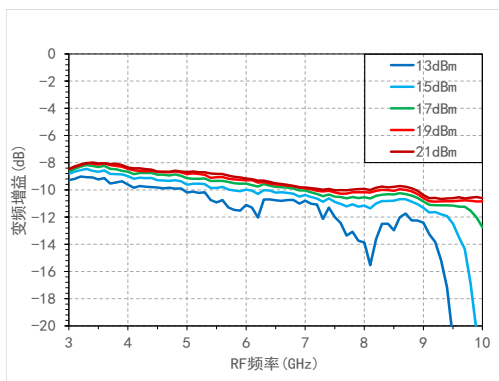


输入 IP2 VS 射频频率@温度 (L0=17dBm)

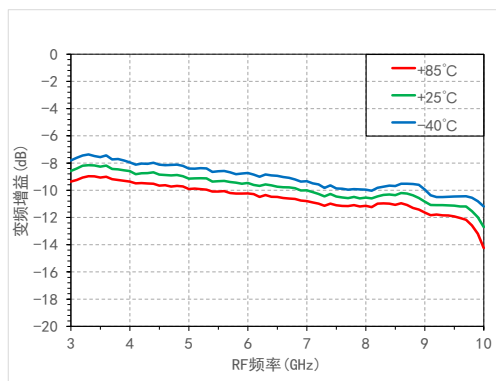


下变频测试曲线 (IF=1.1GHz, LSB)

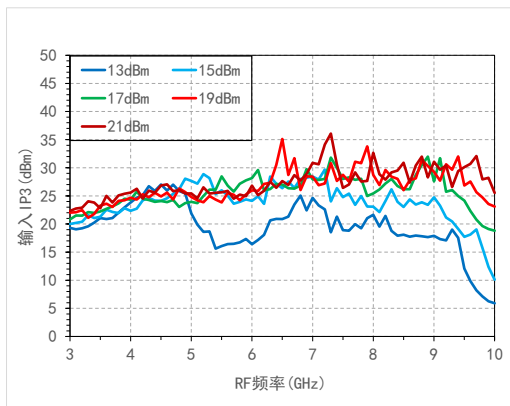
变频增益 VS 射频频率 @本振功率



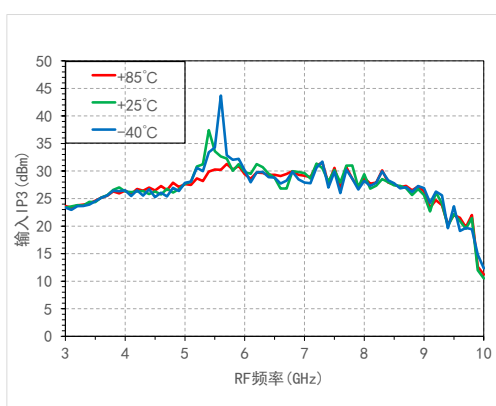
变频增益 VS 射频频率@温度 (L0=17dBm)



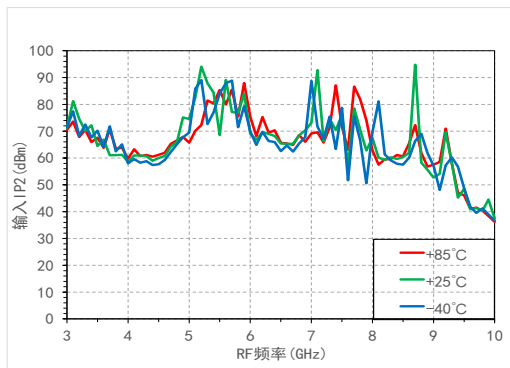
输入 IP3 VS 射频频率@本振功率



输入 IP3 VS 射频频率@温度 (L0=17dBm)

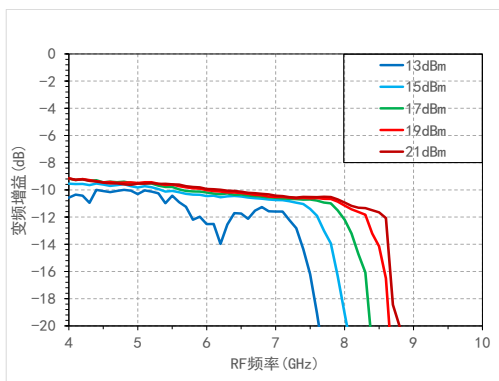


输入 IP2 VS 射频频率@温度 (L0=17dBm)

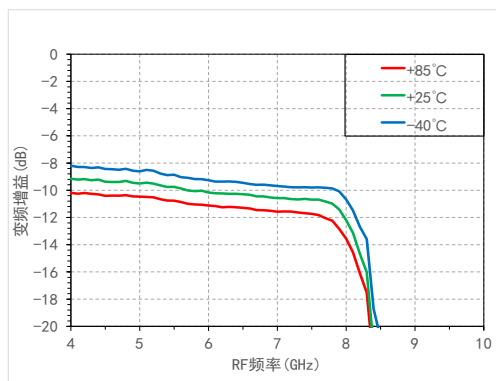


下变频测试曲线 (IF=3.0GHz, LSB)

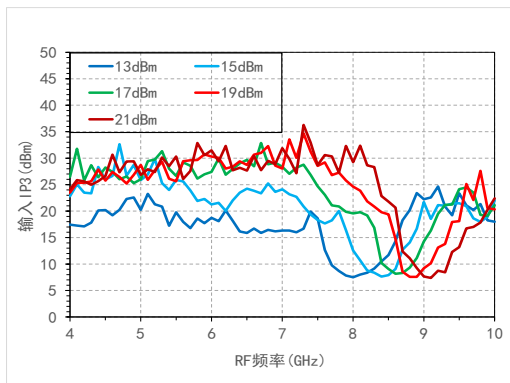
变频增益 VS 射频频率 @本振功率



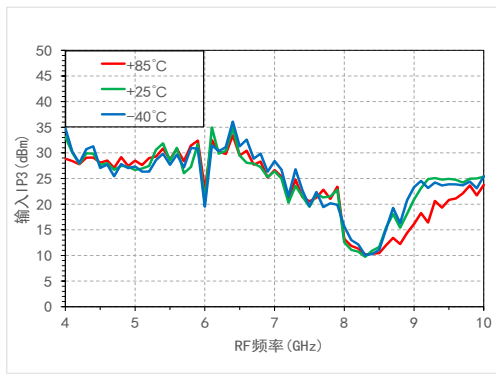
变频增益 VS 射频频率 @温度 (L0=17dBm)



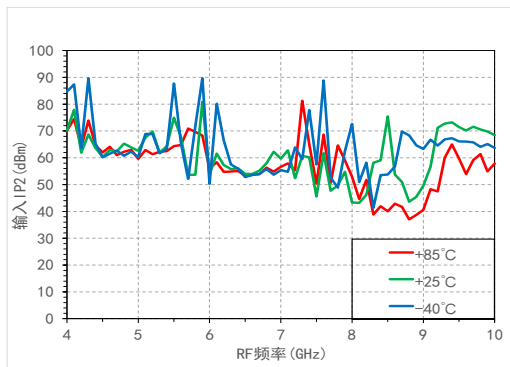
输入IP3 VS 射频频率 @本振功率



输入IP3 VS 射频频率 @温度 (L0=17dBm)

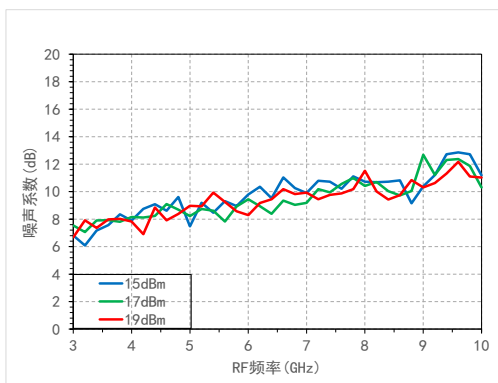


输入IP2 VS 射频频率 (L0=17dBm)

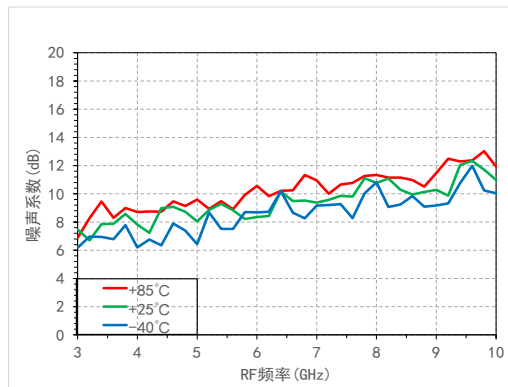


下变频测试曲线 (LSB, IF=0.1GHz)

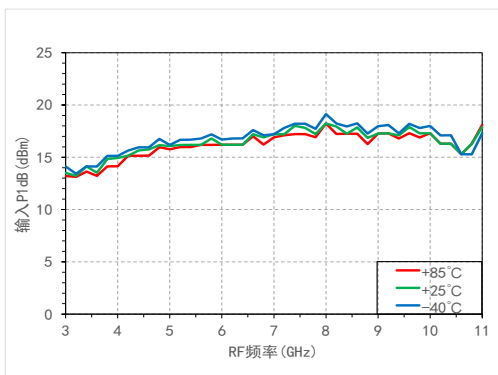
噪声 VS 射频频率 @本振功率



噪声 VS 射频频率@温度 (L0=17dBm)

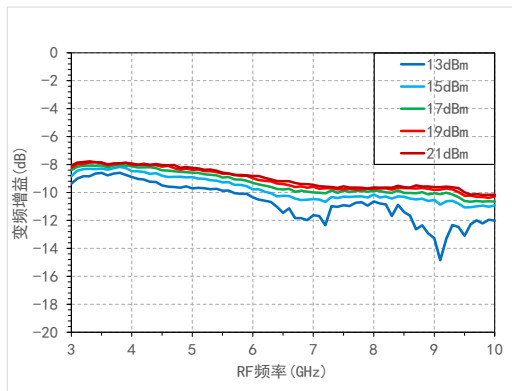


输入P1dB VS 射频频率@温度 (L0=17dBm)

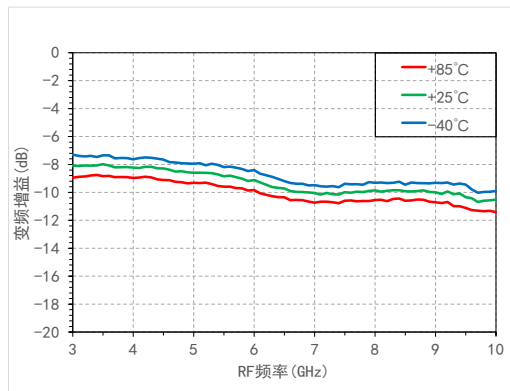


下变频测试曲线 (IF=0.1GHz, USB)

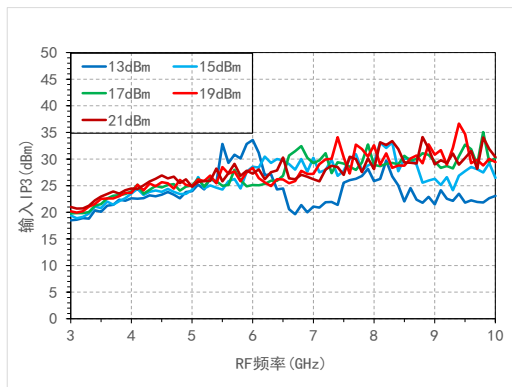
变频增益 VS 射频频率 @本振功率



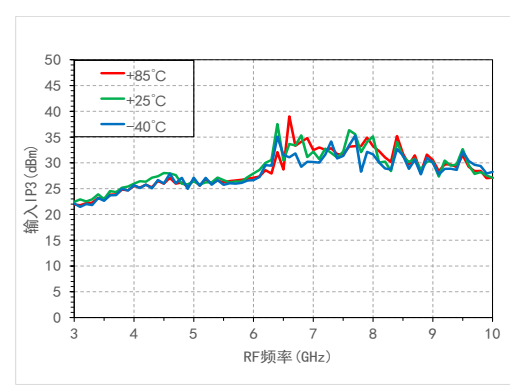
变频增益 VS 射频频率@温度 (L0=17dBm)



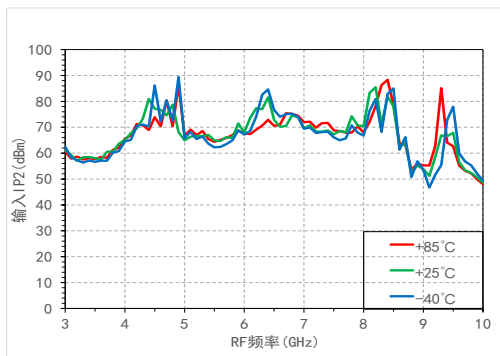
输入IP3 VS 射频频率 @本振功率



输入IP3 VS 射频频率@温度 (L0=17dBm)

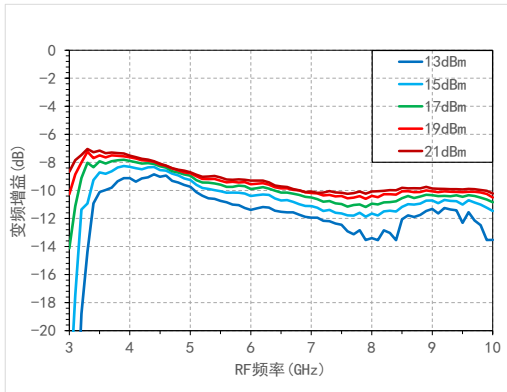


输入IP2 VS 射频频率@温度 (L0=17dBm)

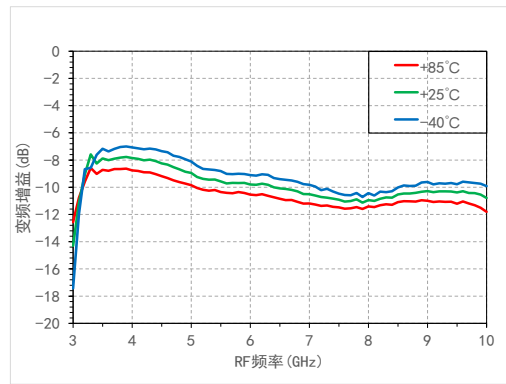


下变频测试曲线 (IF=1.1GHz, USB)

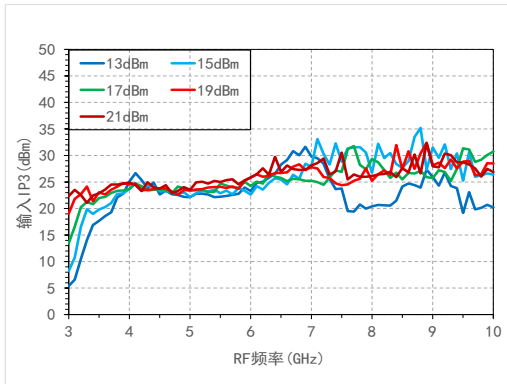
变频增益 VS 射频频率@本振功率



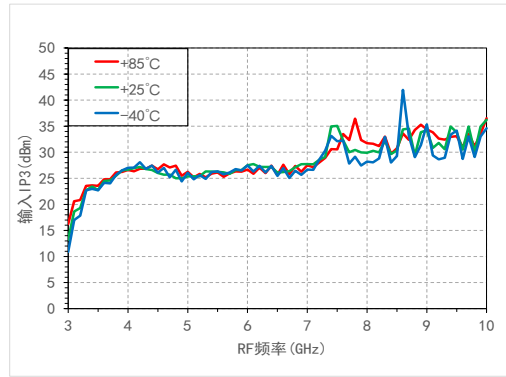
变频增益 VS 射频频率 @温度 (L0=17dBm)



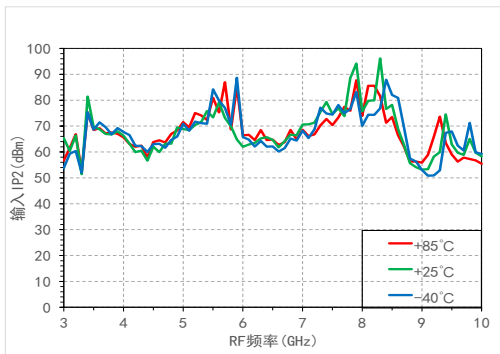
输入IP3 VS 射频频率 @本振功率



输入IP3 VS 射频频率 @温度 (L0=17dBm)

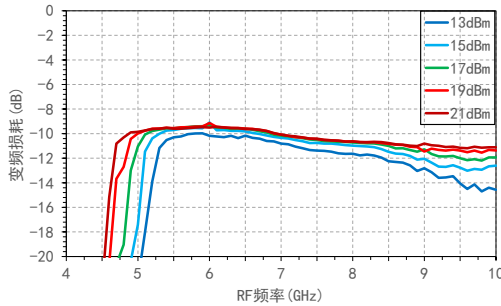


输入IP2 VS 射频频率@温度 (L0=17dBm)

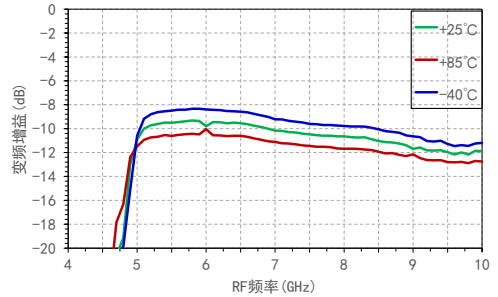


下变频测试曲线 (IF=3.0GHz, USB)

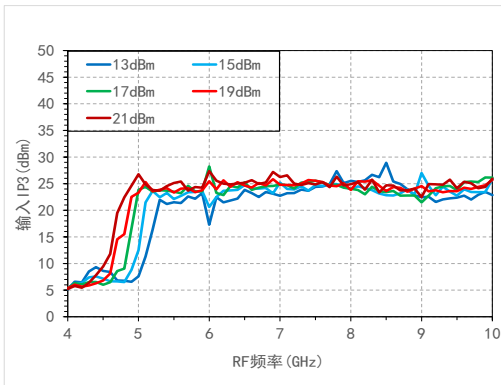
变频增益 VS 射频频率 @本振功率



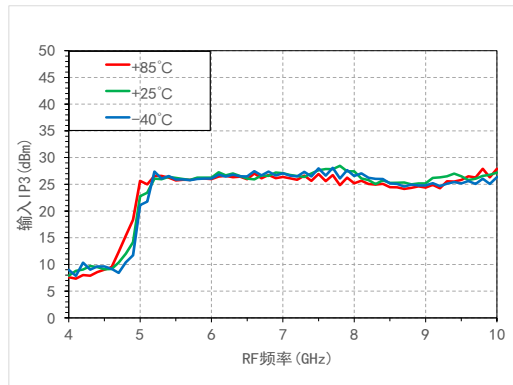
变频增益 VS 射频频率@温度 (L0=17dBm)



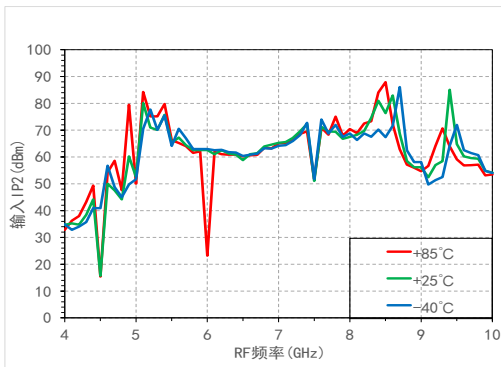
输入IP3 VS 射频频率 @本振功率



输入IP3 VS 射频频率@温度 (L0=17dBm)

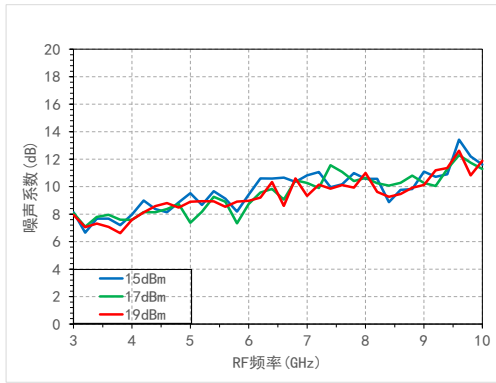


输入IP2 VS 射频频率@温度 (L0=17dBm)

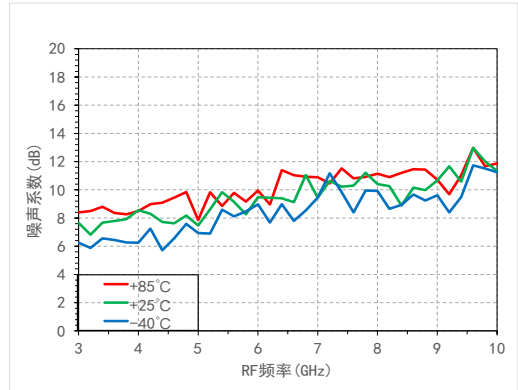


下变频测试曲线 (IF=0.1GHz, USB)

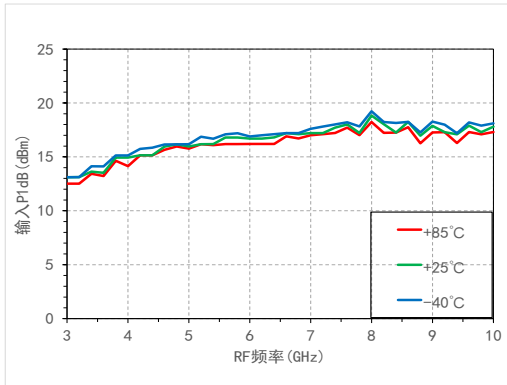
噪声 VS 射频频率 @本振功率



噪声 VS 射频频率@温度 (L0=17dBm)

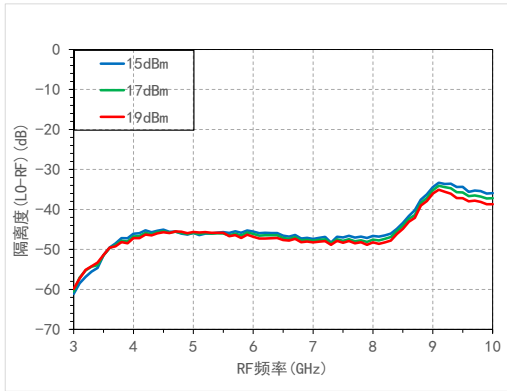


输入P1dB VS 射频频率@温度 (L0=17dBm)

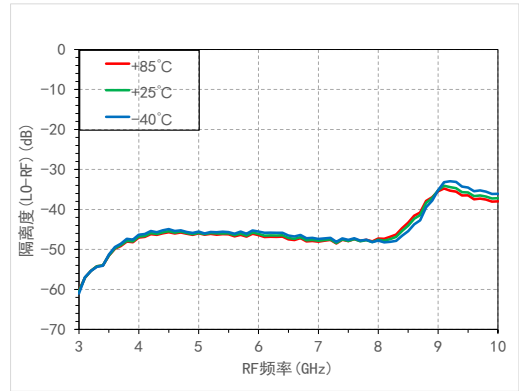


下变频测试曲线

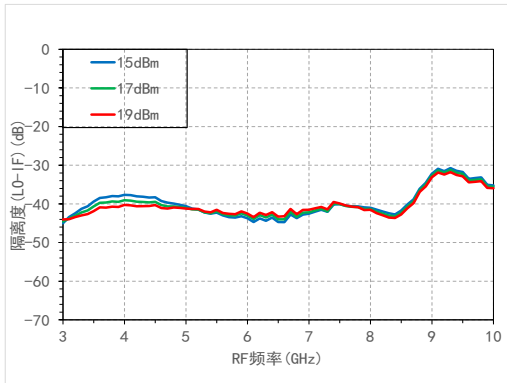
隔离度 (L0-RF) VS 射频频率 @本振功率



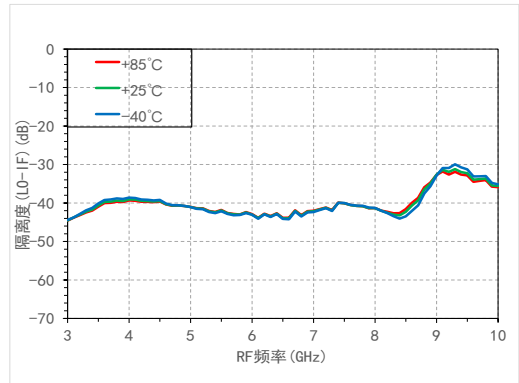
隔离度 (L0-RF) VS 射频频率@温度 (L0=17dBm)



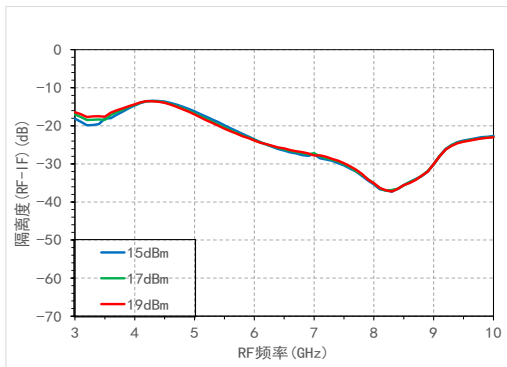
隔离度 (L0-IF) VS 射频频率 @本振功率



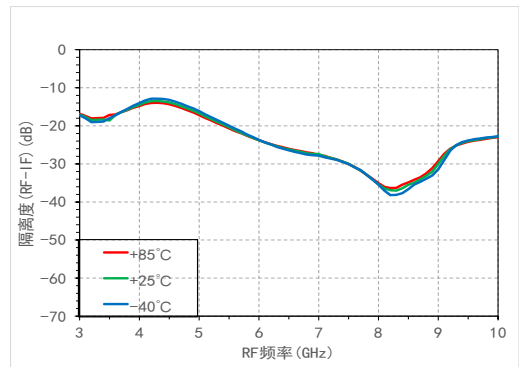
隔离度 (L0-IF) VS 射频频率@温度 (L0=17dBm)



隔离度 (RF-IF) VS 射频频率 @本振功率

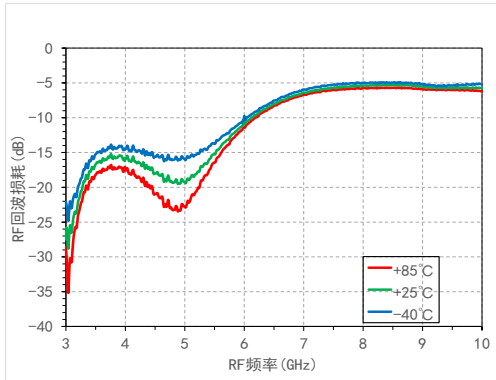


隔离度 (RF-IF) VS 射频频率@温度 (L0=17dBm)

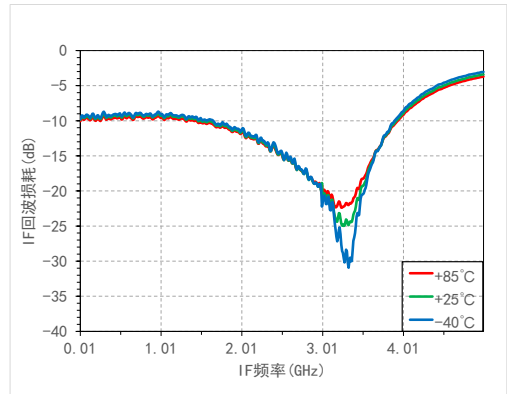


下变频测试曲线 (L0=6GHz, L0=17dBm)

RF回波损耗 VS 射频频率@温度

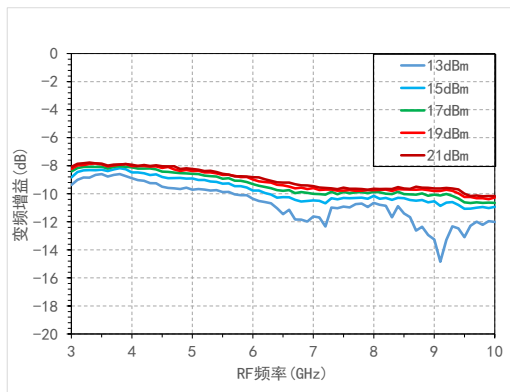


IF回波损耗 VS IF频率@温度

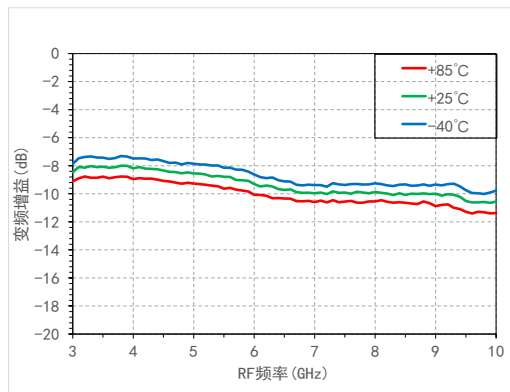


上变频测试曲线 (IF=0.1GHz, LSB)

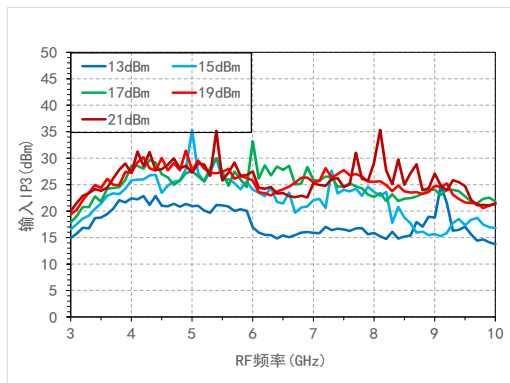
变频增益 VS 射频频率 @本振功率



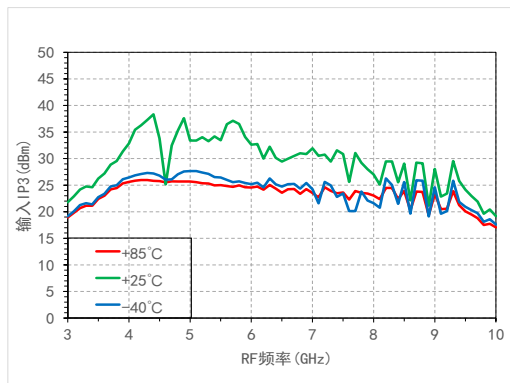
变频增益 VS 射频频率@温度 (LO=17dBm)



输入 IP3 VS 射频频率@本振功率

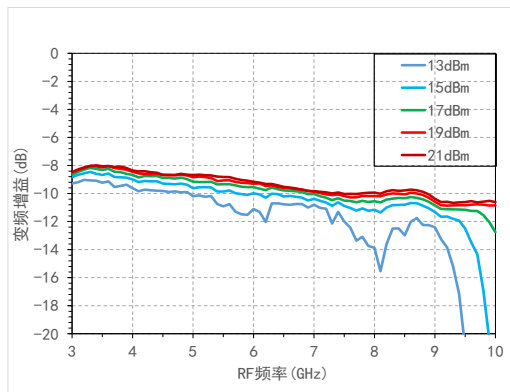


输入 IP3 VS 射频频率@温度 (LO=17dBm)

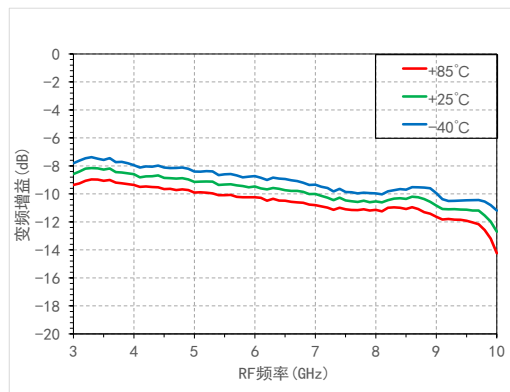


上变频测试曲线 (IF=1.1GHz, LSB)

变频增益 VS 射频频率 @本振功率

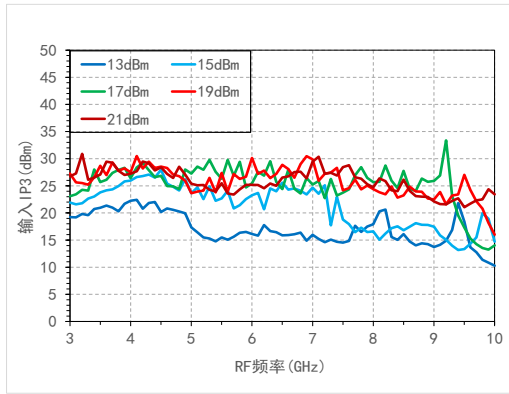


变频增益 VS 射频频率@温度 (LO=17dBm)

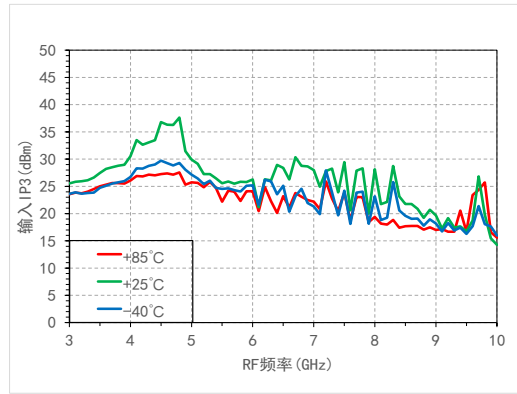


上变频测试曲线 (IF=1.1GHz, LSB)

输入IP3 VS 射频频率 @本振功率

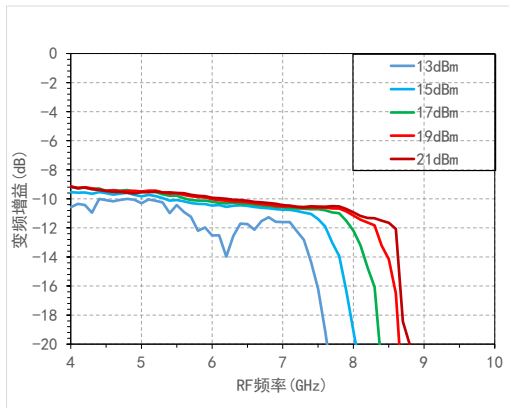


输入IP3 VS 射频频率@温度 (L0=17dBm)

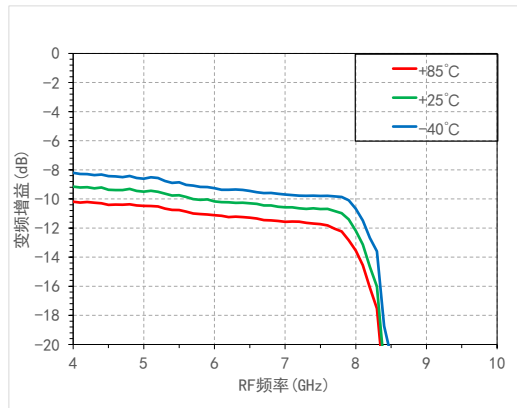


上变频测试曲线 (IF=3.0GHz, LSB)

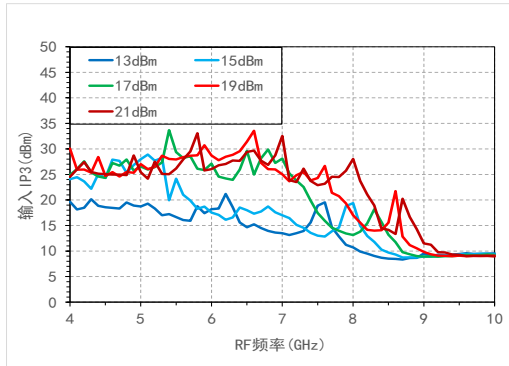
变频增益 VS 射频频率 @本振功率



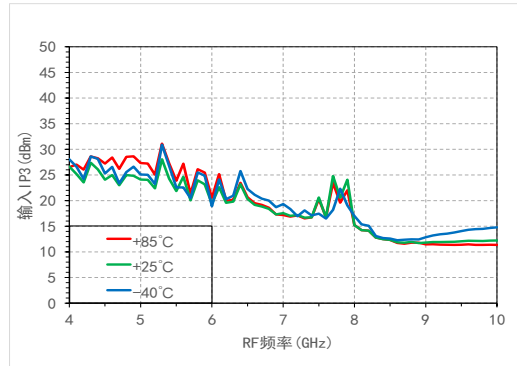
变频增益 VS 射频频率 @温度 (L0=17dBm)



输入IP3 VS 射频频率 @本振功率

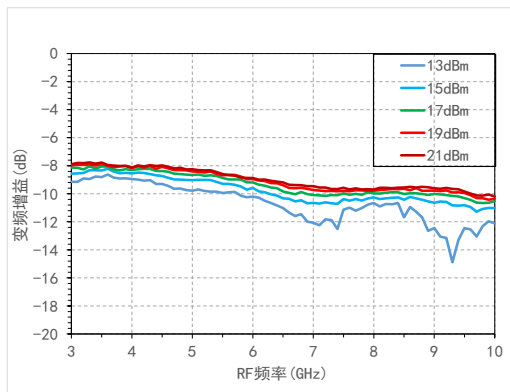


输入IP3 VS 射频频率@温度 (L0=17dBm)

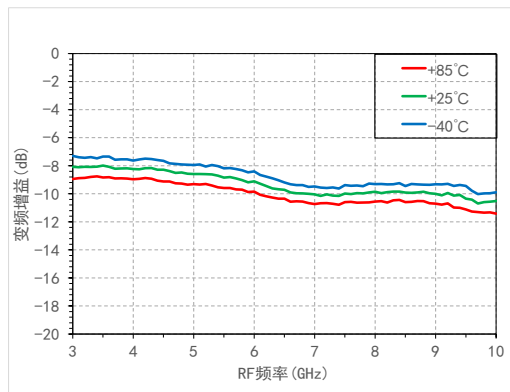


上变频测试曲线 (IF=0.1GHz, USB)

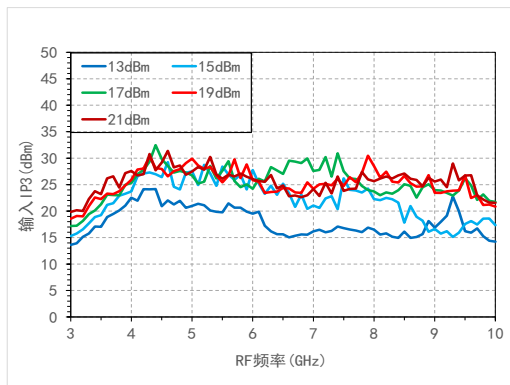
变频增益 VS 射频频率 @本振功率



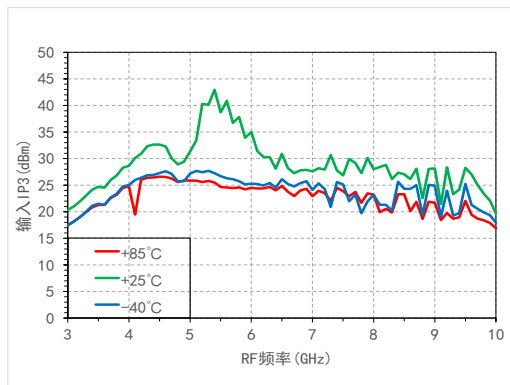
变频增益 VS 射频频率@温度 (L0=17dBm)



输入IP3 VS 射频频率 @本振功率

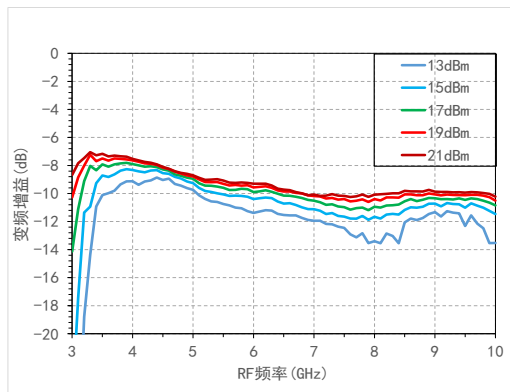


输入IP3 VS 射频频率@温度 (L0=17dBm)

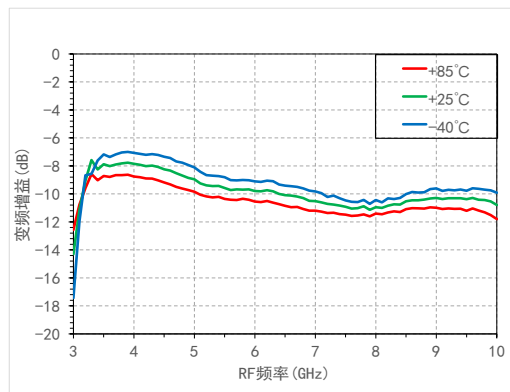


上变频测试曲线 (IF=1.1GHz, USB)

变频增益 VS 射频频率 @本振功率

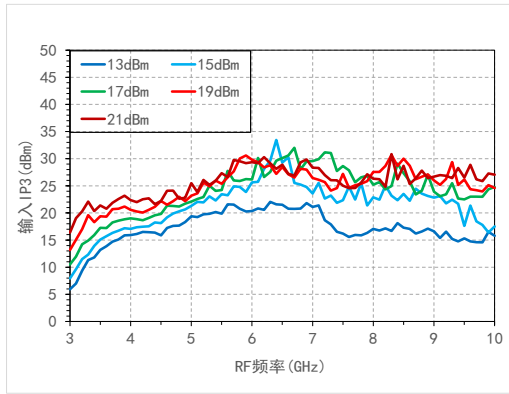


变频增益 VS 射频频率@温度 (L0=17dBm)

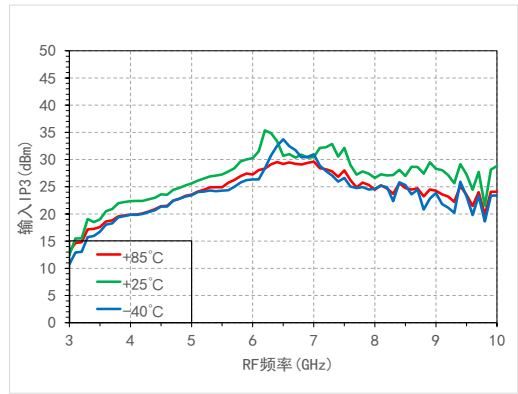


上变频测试曲线 (IF=1.1GHz, USB)

输入IP3 VS 射频频率 @本振功率

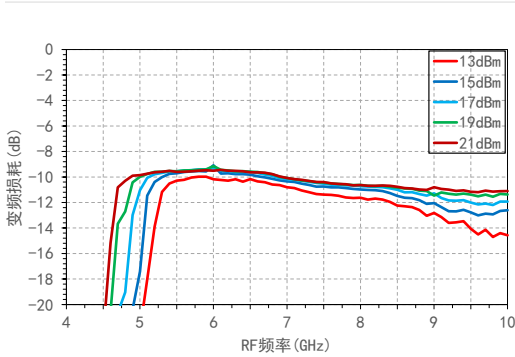


输入IP3 VS 射频频率 @温度 (LO=17dBm)

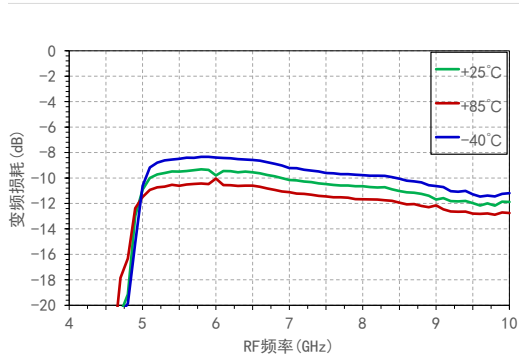


上变频测试曲线 (IF=3.0GHz, USB)

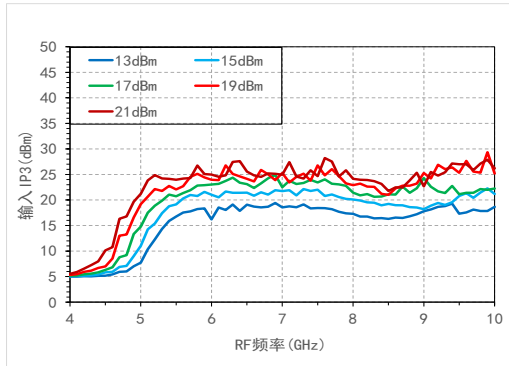
变频增益 VS 射频频率@本振功率



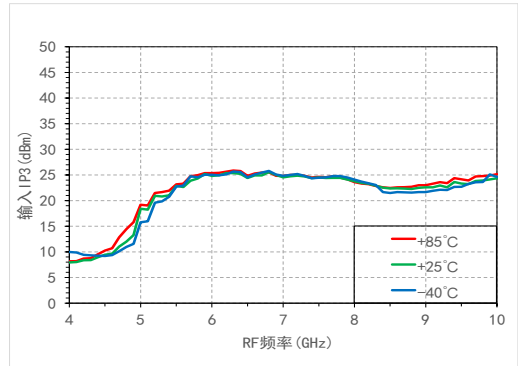
变频增益 VS 射频频率 @温度 (LO=17dBm)



输入IP3 VS 射频频率 @本振功率



输入IP3 VS 射频频率 @温度 (LO=17dBm)



杂散(下变频)

		M*LO				
		0	1	2	3	4
M*RF	0	/	13.41	51.74	25.17	47.27
	1	8.23	0.00	24.19	29.28	53.76
	2	68.44	54.14	87.75	75.83	95.87
	3	115.71	79.70	60.76	61.03	64.55
	4	93.19	106.70	96.02	93.74	102.30
RF=3.1GHz&-5dBm; LO=3GHz&+17dBm						

		M*LO				
		0	1	2	3	4
M*RF	0	/	11.98	34.49	45.02	46.79
	1	10.86	0.00	40.91	52.46	72.64
	2	67.87	51.13	86.25	76.27	79.20
	3	103.61	58.09	72.77	89.21	84.57
	4	93.03	90.32	96.07	86.85	99.48
RF=3.1GHz&-5dBm; LO=6.1GHz&+17dBm						

		M*LO				
		0	1	2	3	4
M*RF	0	/	11.37	37.08	24.51	52.16
	1	14.84	0.00	22.40	18.77	43.99
	2	55.28	71.81	89.55	68.17	72.47
	3	124.37	110.82	92.37	96.81	94.92
	4	107.87	92.89	90.40	94.78	87.64
RF=6.1GHz&-5dBm; LO=3.1GHz&+17dBm						

		M*LO				
		0	1	2	3	4
M*RF	0	/	10.35	32.81	45.34	42.77
	1	14.75	0.00	35.50	37.59	53.84
	2	55.24	76.82	77.42	76.81	89.78
	3	90.93	115.07	91.58	82.45	94.31
	4	85.41	89.84	98.54	117.00	90.54
RF=6.1GHz&-5dBm; LO=6GHz&+17dBm						

		M*LO				
		0	1	2	3	4
M*RF	0	/	6.54	48.86	41.23	50.79
	1	10.89	0.00	34.69	41.56	64.59
	2	54.62	85.72	73.62	57.90	111.86
	3	81.78	104.23	89.50	103.31	107.11
	4	92.61	80.38	81.45	100.43	107.91
RF=10.1GHz&-5dBm; LO=7.1GHz&+17dBm						

		M*LO				
		0	1	2	3	4
M*RF	0	/	2.18	27.72	60.08	35.99
	1	12.58	0.00	42.73	60.26	95.42
	2	56.13	75.22	57.96	86.11	81.34
	3	110.98	109.57	82.52	69.48	95.28
	4	78.70	104.83	85.49	83.95	89.07
RF=10.1GHz&-5dBm; LO=10GHz&+17dBm						

绝对最大额定值

RF/IF输入功率	28dBm
L0输入功率	28dBm
存储温度	-65°C~+150°C
工作温度	-40°C~+85°C
ESD_HBM	Class 1A

工作参数

工作温度	-40°C~+85°C
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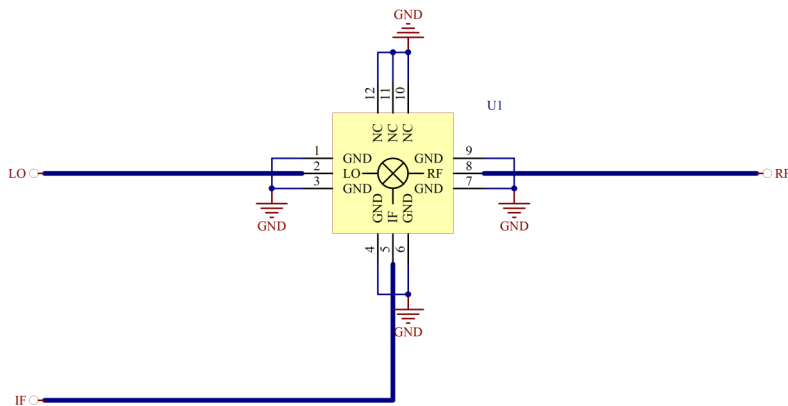
封装信息

型号	封装材料	焊盘镀层	MSL等级 ^[1]	封装标识 ^[2]	环保要求
SIM221SP3B	绿色树脂化合物	NiPdAuAg	MSL 3	S221 XXXXX	符合RoHS

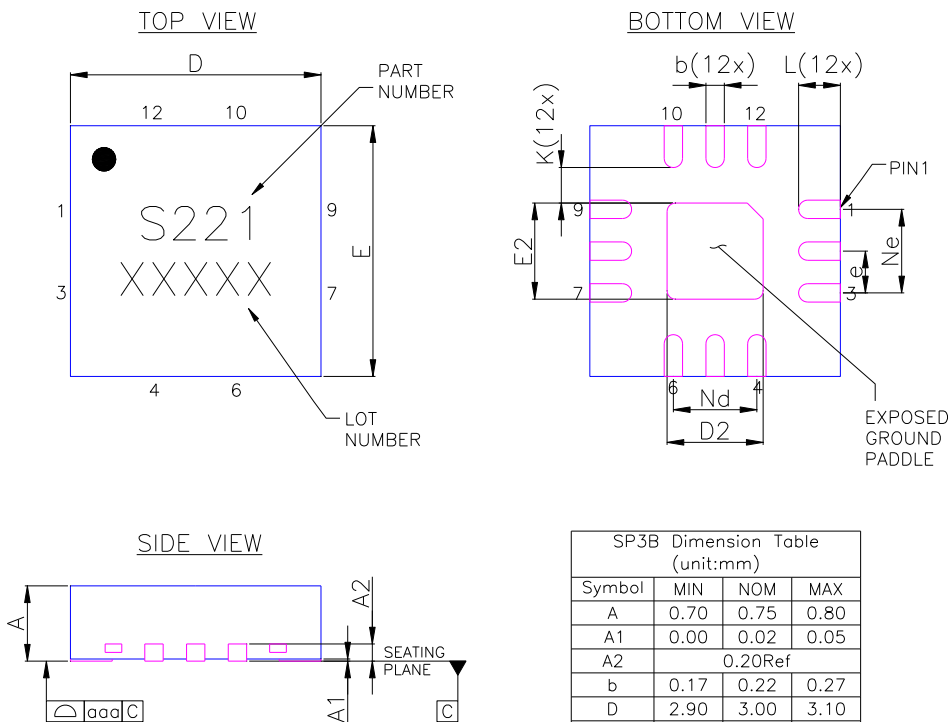
[1] 最高回流焊温度260°C

[2] XXXXX为批号

典型应用



封装外形尺寸



Symbol	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.20Ref		
b	0.17	0.22	0.27
D	2.90	3.00	3.10
D2	1.05	1.15	1.25
e	0.50BSC		
Ne	1.00BSC		
Nd	1.00BSC		
E	2.90	3.00	3.10
E2	1.05	1.15	1.25
K	0.20	---	---
L	0.40	0.50	0.60
aaa	0.08		

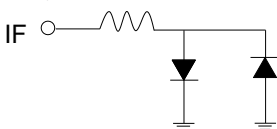
说明:

1. 单位: mm
2. 引线框架材料: 铜合金
3. 封装表面翘曲: $\leq 0.05\text{mm}$
4. 所有接地引脚请连接PCB射频地

引脚定义

引脚编号	功能符号	功能描述
1;3;4;6;7;9	GND	射频地, 封装底部exposed paddle也为RF&DC射频地
2	LO	本振端口, 交流耦合外端匹配50Ω, 有隔直电容。
5	IF	中频端口, 直流耦合外端匹配50Ω, 无隔直电容。
8	RF	射频端口, 交流耦合外端匹配50Ω, 有隔直电容。
10-12	NC	内部无连接

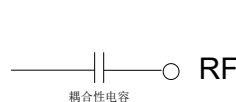
IF端口定义

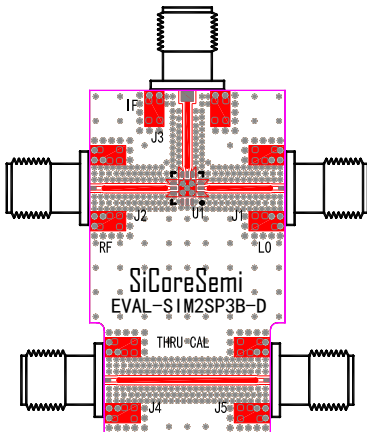
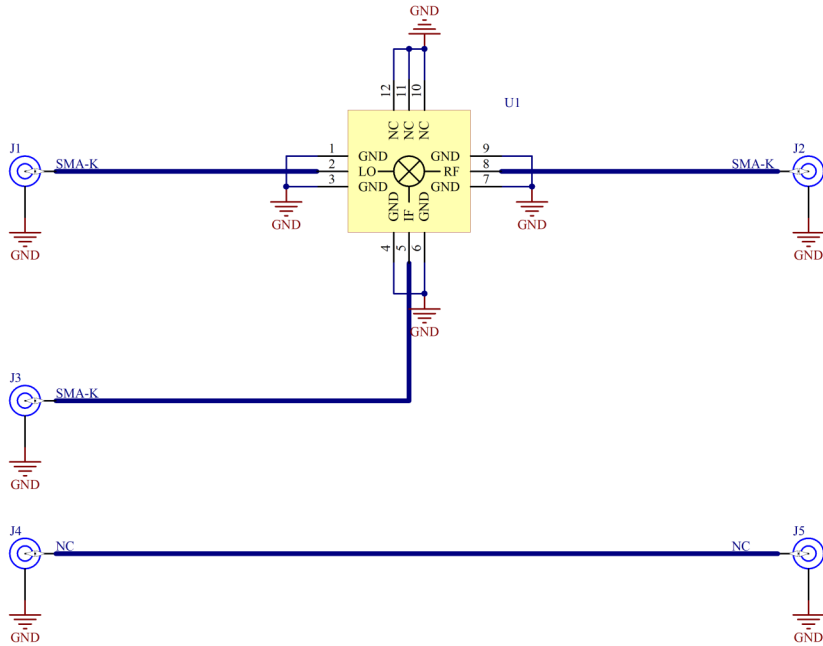


LO端口定义



RF端口定义





Designator	Description
J1, J2, J3	SMA-K PCB 连接器
U1	SIM221SP3B
J1, J2, J3	推荐使用南京傲文 D550B12E01-023型SMA-K连接器
NC表示为未使用端口或器件不焊接。芯片 NC端口外部可连接到GND。	