性能特点

- 频率范围: 13.5~16GHz
- 小信号增益：28 dB
- P_1dB 输出功率: 29 dBm
- Psat 输出功率: 29.5 dBm
- Bias: Vd = 8 V , Id = 193 mA
- 芯片尺寸: 4.0mm×4.0mm× 0.75mm

产品简介

ZRA1296 是一款 Ku 波段功率放大器，采用 GaAs 工艺制造。其工作频率覆盖范围 13.5~16GHz，小信号增益为 28dB，饱和输出功率 29.5dBm。

应用领域

- 点对点无线电
- Ku 频段 VSAT

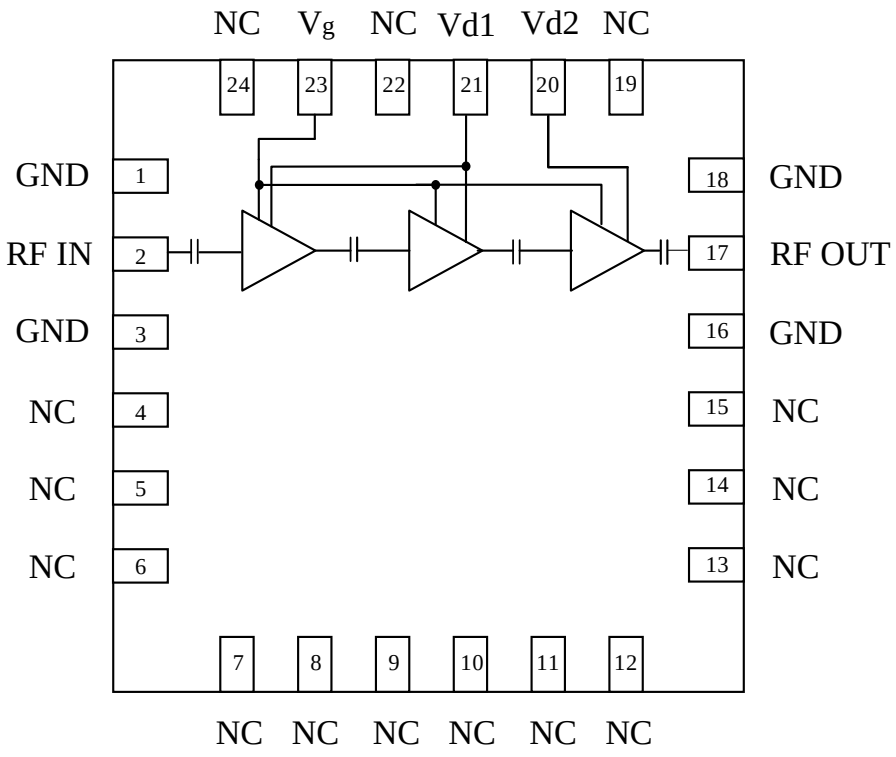


Figure 1. Functional Block Diagram

目录

1. 性能参数

1.1.电参数

除非状态特殊说明，所有参数均在 Vd = 8V, Id = 193mA, T_A = 25°C 条件下测试得出。

参数名称	最小值	典型值	最大值	单位
Frequency Range	13.5		16	GHz
Gain	27.5	28	30	dB
Input Return Loss	14	28		dB
Output Return Loss	17	20		dB
Output P1dB	28	29	29.2	dBm
Saturated Output Power(P_{sat})	28.5	29.5	29.5	dBm
OIP3(POUT/Tone = 17.5dBm, 1MHz tonespacing)	28.5	28.5	31.2	dBm
Gain Temperature Coefficient		-0.038		dB/°C
Power Temperature Coefficient		-0.01		dB/°C

1.2.允许最大参数范围

参数名称	参数值 / 范围	单位
Drain Voltage (Vd)	+8.5	V
Gate Voltage Range (Vg)	-4 to 0	V
Drain Current (Id)	300	mA
Power Dissipation (PDISS)	2.5	W
RF Input Power,CW, 50Ω,T = 25ºC	+10	dBm
Junction Temperature	170	ºC
Soldering Temperature (30s, max.)	260	ºC
Storage Temperature	-65 to 150	ºC

以上参数仅表示应力范围，并不意味在这些条件下的功能操作。芯片在以上所列参数范围外工作可能造成芯片永久性损坏。

1.3.ESD 等级

参数名称	参数值	等级
Human Body Model (HBM)	±250V	Class-1A

1.4.推荐工作条件

Vd(V)	Id(mA)
+5	165
+6	175
+7	185
+8	193

2. 典型性能特点

除非状态特殊说明，所有参数均在 Vd = 8V，Id = 193mA，T_A = 25°C 条件下测试得出。

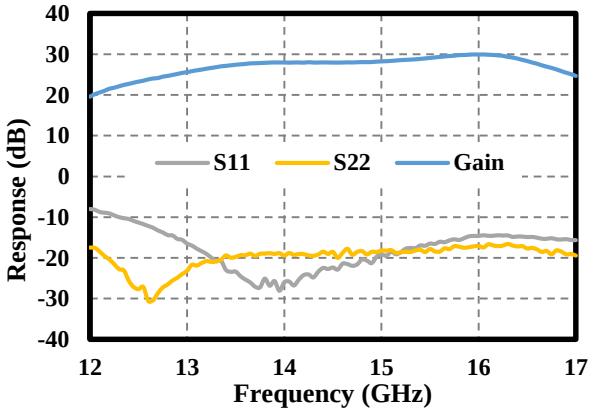


Figure 2. Gain & Return Loss

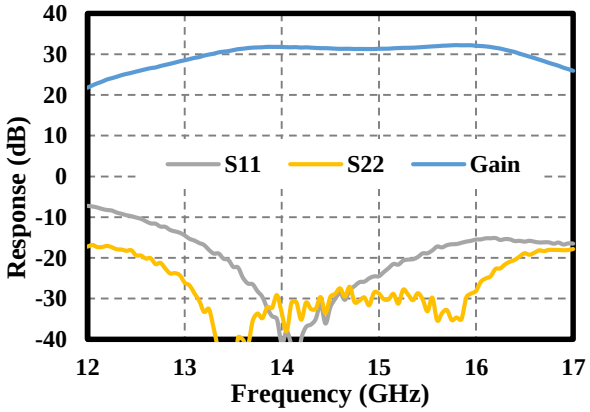


Figure 3. Gain & Return Loss (Vd = 5V 165mA)

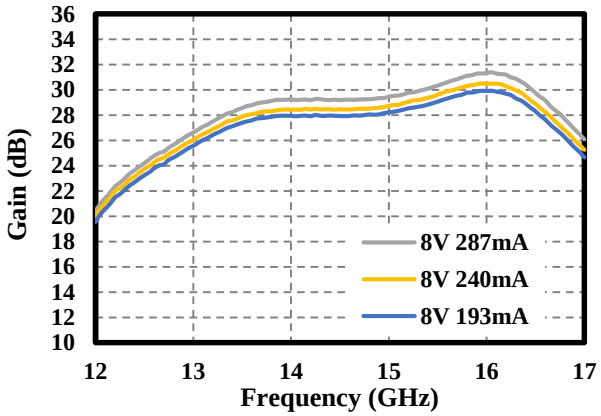


Figure 4. Gain vs. Id

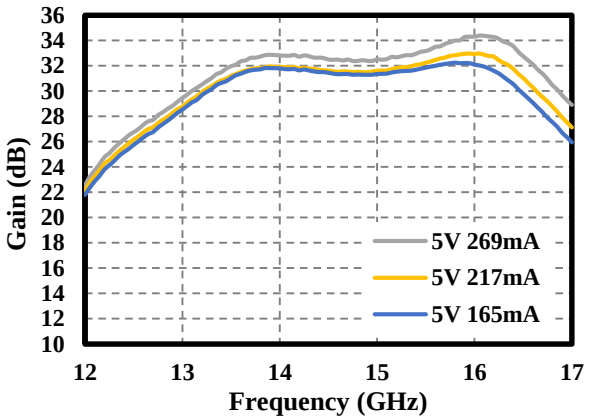


Figure 5. Gain vs. Id

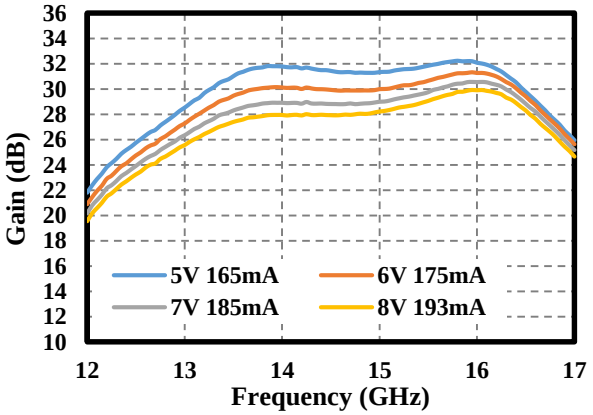


Figure 6. Gain vs. Vd

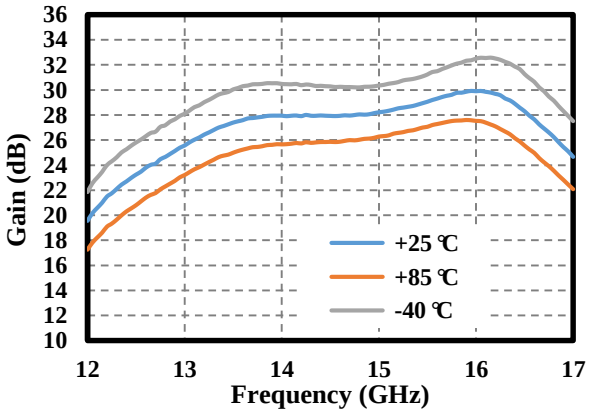


Figure 7. Gain vs. Temp

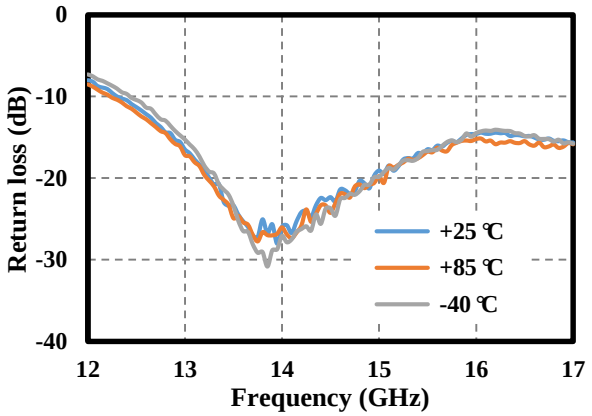


Figure 8. Input Return loss

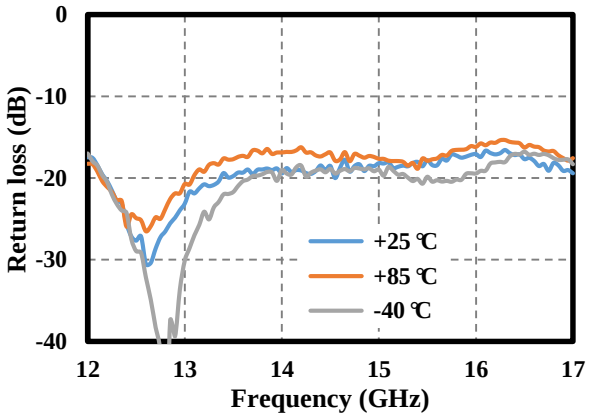


Figure 9. Output Return loss

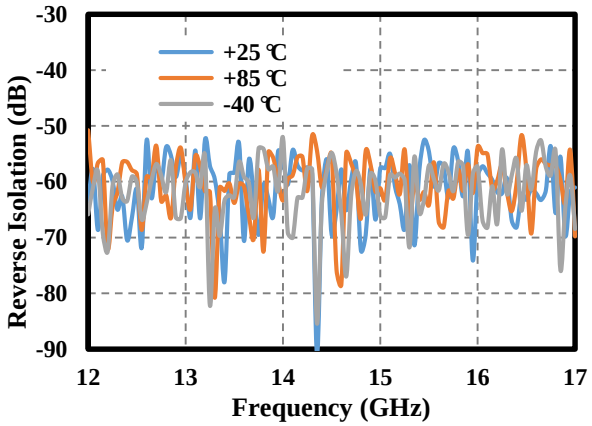


Figure 10. Reverse Isolation

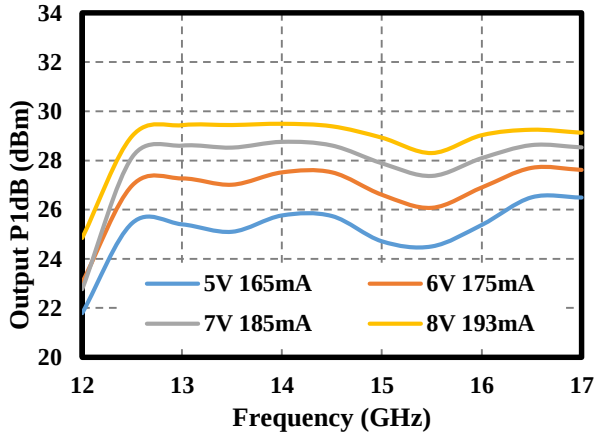


Figure 11. P1dB vs. Vd

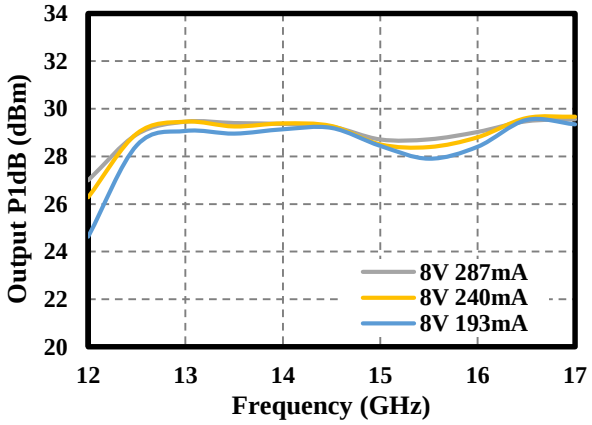


Figure 12. P1dB vs. Id

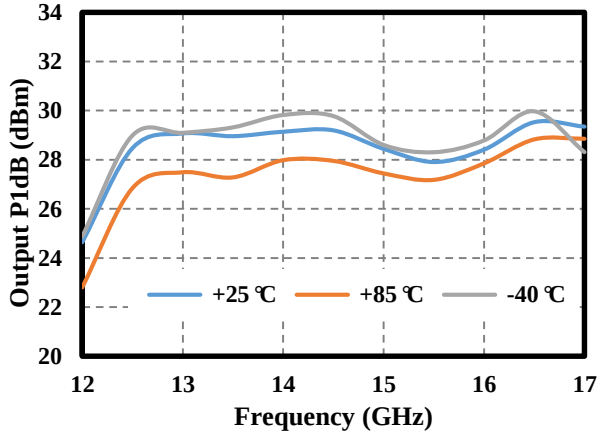


Figure 13. P1dB vs. Temp

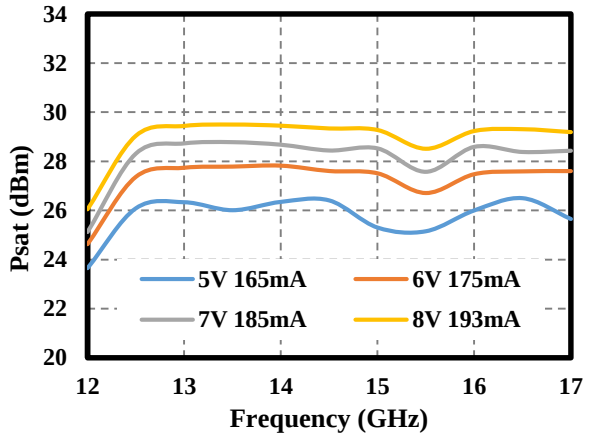


Figure 14. Psat vs. Vd

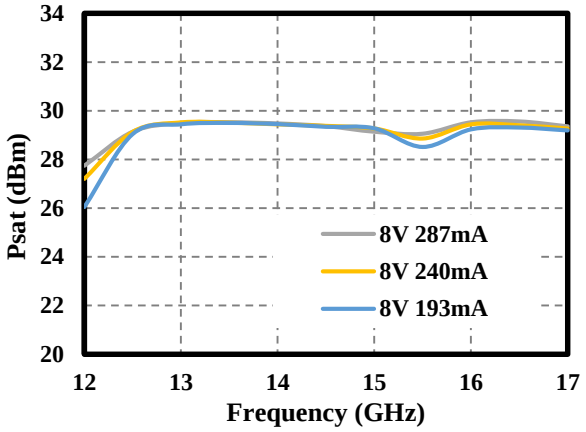


Figure 15. Psat vs. Id

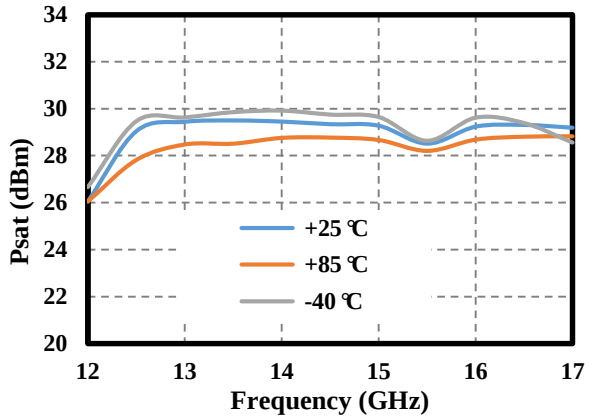


Figure 16. Psat vs. Temp

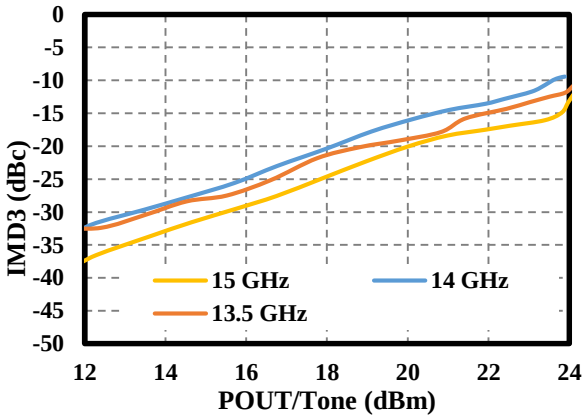


Figure 17. IMD3 vs. Pout/Tone

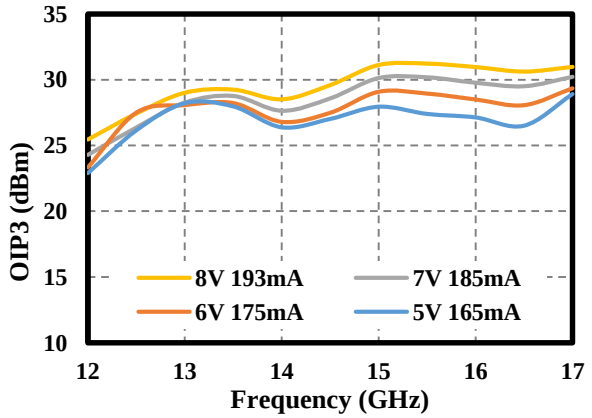


Figure 18. OIP3 vs. Vd
(Pout/Tone = 17.5 dBm)

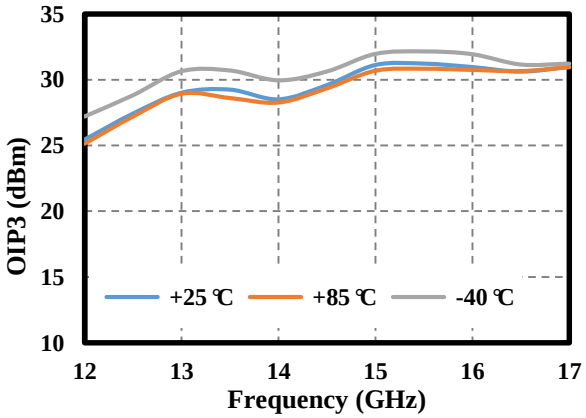


Figure 19. OIP3 vs. Temp
(Pout/Tone = 17.5 dBm)

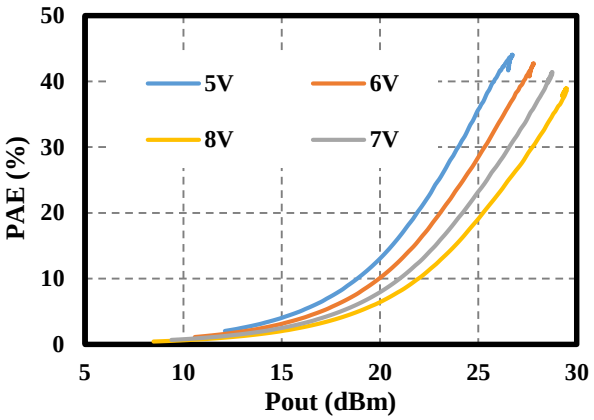


Figure 20. PAE vs. Pout @ 14GHz

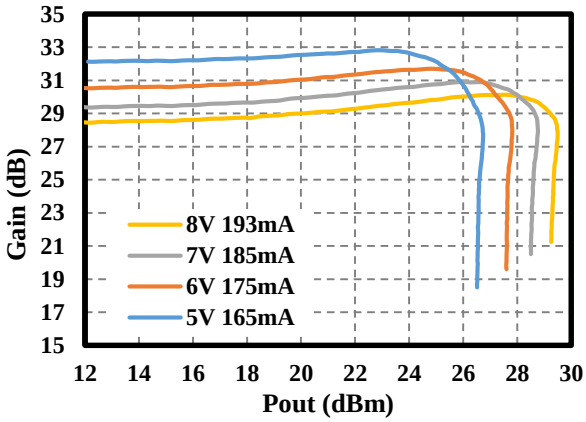


Figure 21. Gain vs. Pout @ 14GHz

3. 管脚信息

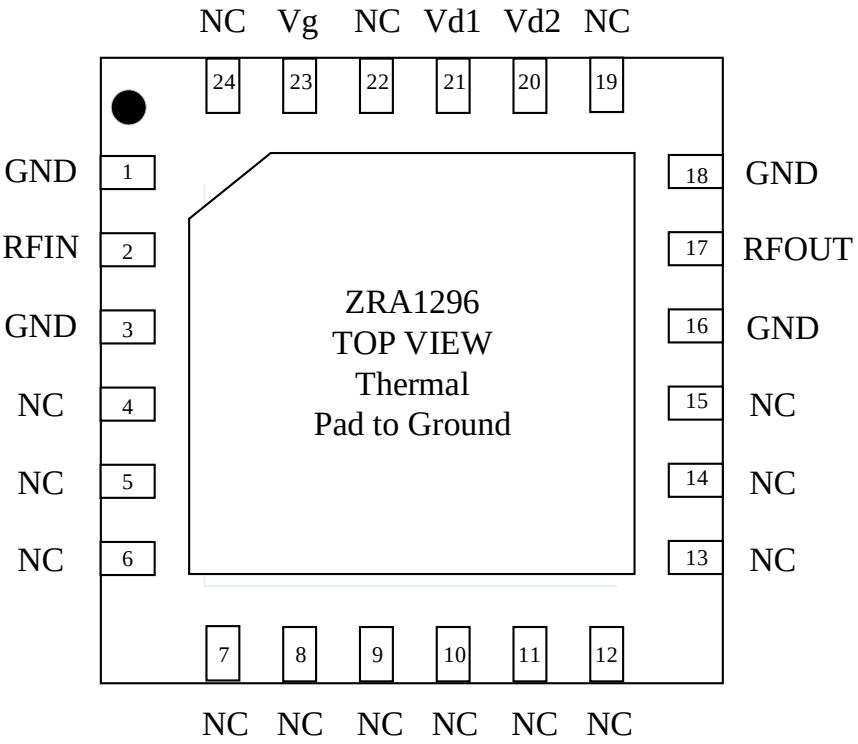


Figure 22. 管脚信息

Table 1. 管脚描述

管脚号	管脚名	描述
2	RF IN	射频信号输入端口
17	RF OUT	射频信号输出端口
23	Vg	放大器的栅极电源输入
20、21	Vd2, Vd1	放大器的漏极电源输入
1, 3, 16, 18	GND	接地
4, 5, 6, 7, 8, 9, 10, 11, 12 , 13, 14, 15, 19, 22, 24	N/C	不连接或接地

4. 典型应用电路

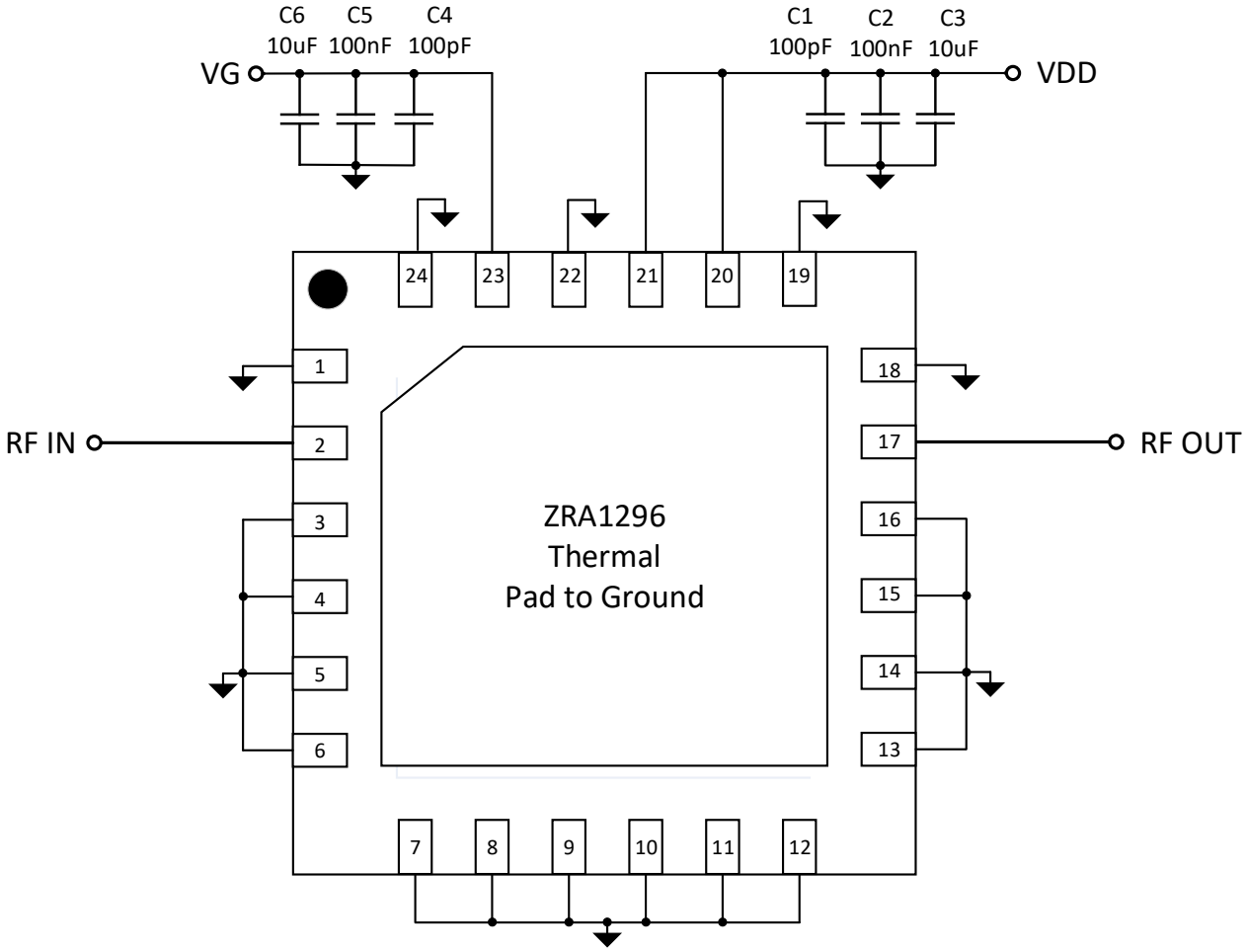


Figure 23. 应用电路图

注意：Vg 和 Vd 电源上的 10uF 电容必须放置，并且尽量靠近芯片。

Table 2. 物料清单

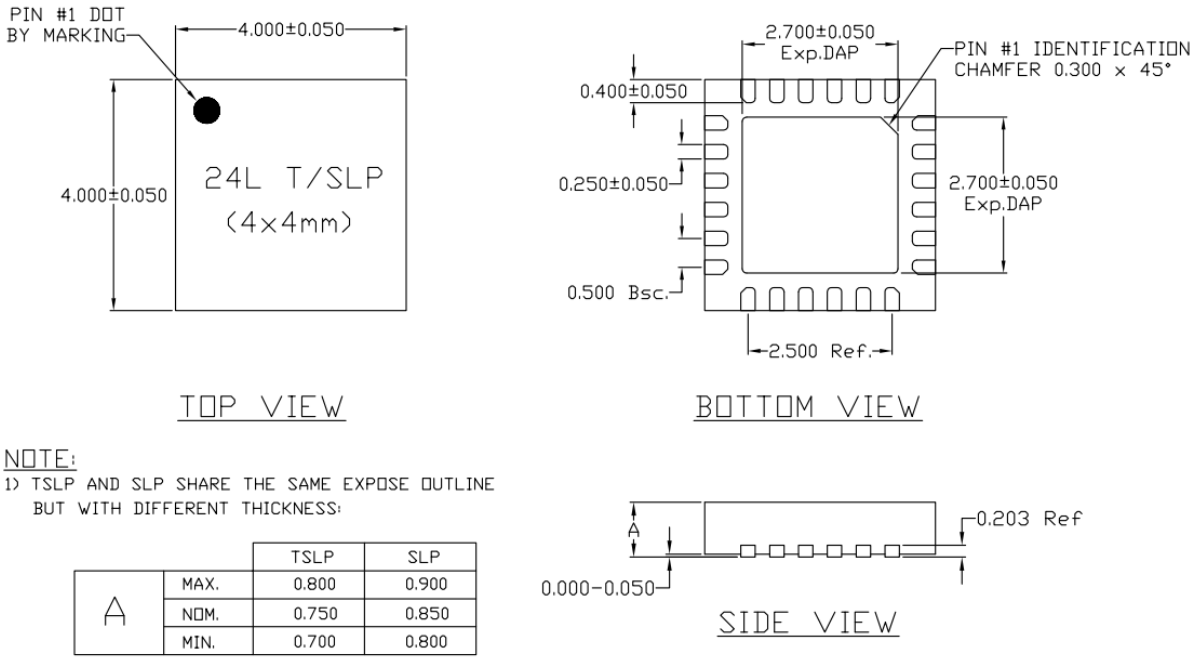
Component	P/N	Supplier	Value	Size
C5	CC0402KRX7R7BB104	YAGEO	100nF	0402C
C4,C1	CC0402JRNPO9BN101	YAGEO	100pF	0402C
C3, C6	CC0603KRX5R6BB106	YAGEO	10uF	0603C
C2	CC0402KRX5R8BB105	YAGEO	1uF	0402C

5. 丝印图解

第一行:知融科技公司标识
第二行:芯片型号
第三行:公司内部编码

Figure 24. 芯片丝印描述

6. 外形尺寸



		TSLP	SLP
A	MAX.	0.800	0.900
	NOM.	0.750	0.850
	MIN.	0.700	0.800

Figure 25. 外形尺寸

7. 推荐焊接曲线

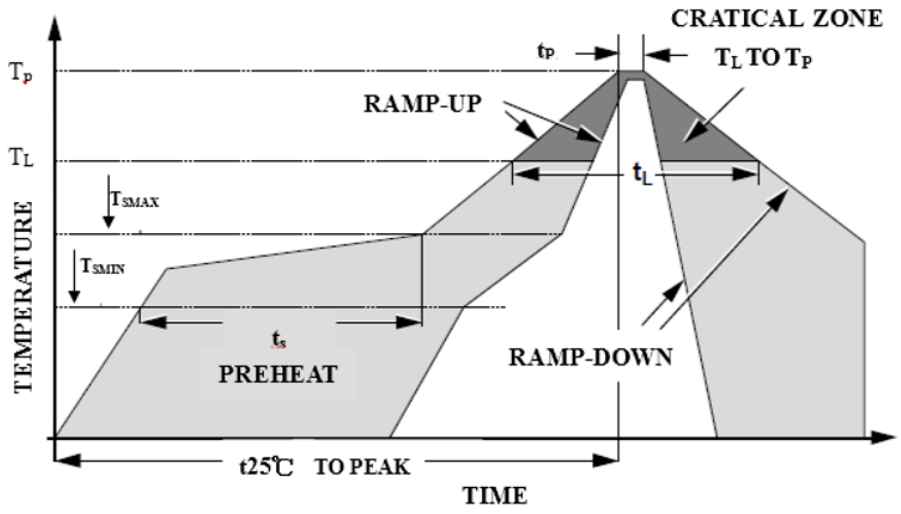


Figure 26. Recommended Soldering Curve

Table 3. Recommended Soldering Profile Limits

Profile Feature	**Pb Free**
Average Ramp Rate (T_L to T_P)	1.25°C/sec max
Preheat Minimum Temperature (T_{SMIN}) Maximum Temperature (T_{SMAX}) Time (T_{SMIN} to T_{SMAX}), t_S	 100 200 60 sec to 75 sec
Ramp-Up Rate (T_{SMAX} to T_L)	1.25℃/sec
Time Maintained Above Liquidous (t_L) Liquidous Temperature (T_L)	~50 sec 217 ℃
Peak Temperature (T_P)	260 ℃ ±5℃
Time Within 5 ℃ of Actual Peak Temperature (t_P)	20 sec to 30 sec
Ramp-Down Rate	3℃/sec max
Time 25℃ (t25℃) to Peak Temperature	5 min max

8. 评估板照片

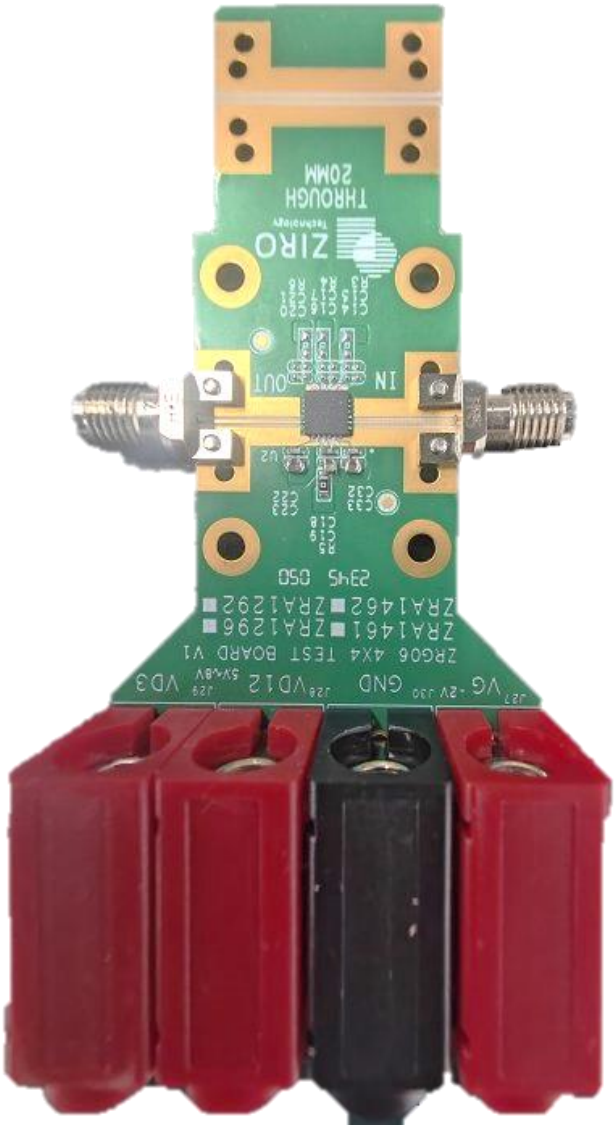
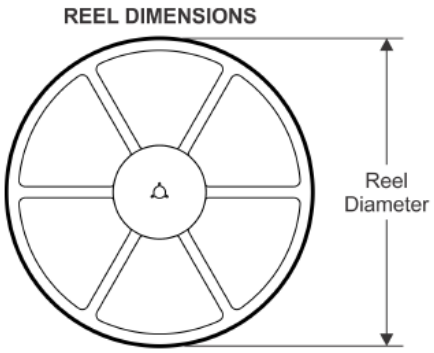


Figure 27. Evaluation Board

Table 4. Suggested Stacking

TOP	Copper	0.035mm
Dielectric	RO4350B	0.168mm
GND	Copper	0.018mm
Dielectric	pp	0.1mm
SIG	Copper	0.018mm
Dielectric	FR4	1.25mm
BOTTOM	Copper	0.035mm

9. 卷带包装信息



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thichness
W	Overall width of the carrier tape
P	Pitch between successive cavith centers

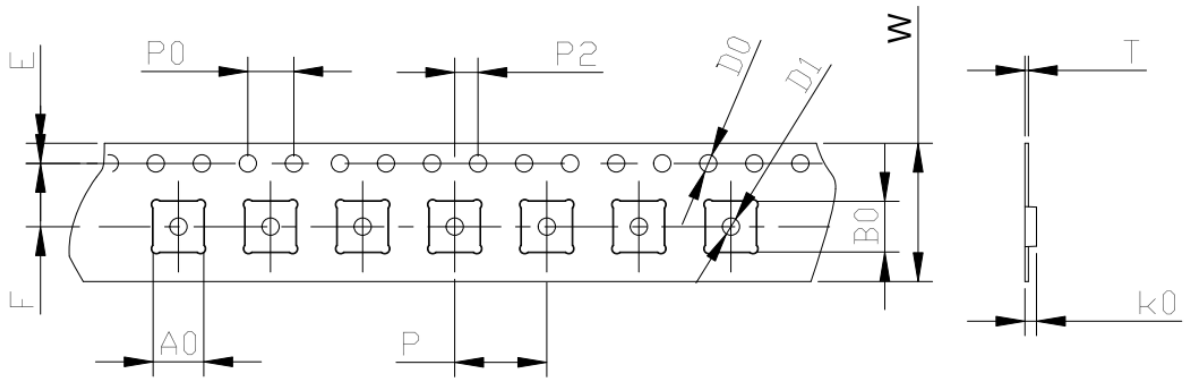


Figure 28. Packaging Information

Table 5. 卷带尺寸信息

Reel Diameter (mm)	W mm	A0 mm	B0 mm	K0 mm	E mm	F mm	P mm	P0 mm	P2 mm	D0 mm	D1 mm	T mm
180	12.0	4.40	4.40	1.20	1.75	5.50	8.00	4.00	2.00	1.50	1.50	0.30

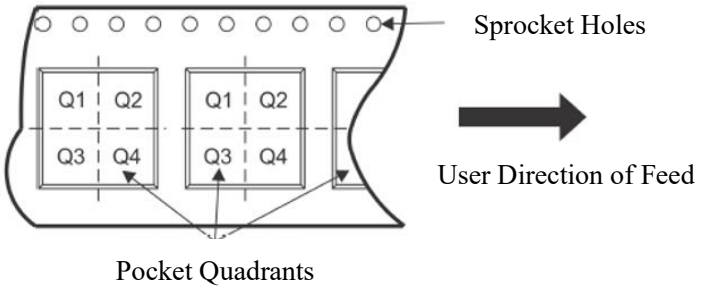


Figure 29. Quadrant Assignments for Pin1 Orientation in Tape

Table 6.订购信息

Part Number	Package Type	Quantity/Reel (pcs)	Reel Diameter mm	MSL Rating	Temperature Range	Pin1 Quadrant
ZRA1296QRA	QFN-24	250	180	2	-40℃ to +85℃	Q2
ZRA1296QRB	QFN-24	1000	180	2	-40℃ to +85℃	Q2
ZRA1296QRC	QFN-24	3000	330	2	-40℃ to +85℃	Q2

10. 历史版本

Revision	Description	Modifier	Date
Rev.0.1	初始发布	YT	2023.12.08
Rev.0.2	测试数据添加	YDS	2023.12.11
Rev.0.3	调整格式	YT	2024.01.02