

### 性能特点

频率范围: 13~20GHz

增益: 25 dB

P<sub>-1dB</sub>: 24dBm@V<sub>dd</sub>=+5V

27.5dBm@V<sub>dd</sub>=+8V

P<sub>sat</sub>: 25.5dBm@V<sub>dd</sub>=+5V

28.5dBm@V<sub>dd</sub>=+8V

PAE@P<sub>-1dB</sub>: 34%@V<sub>dd</sub>=+8V

PAE@P<sub>sat</sub>: 37%@V<sub>dd</sub>=+8V

直流供电: V<sub>dd</sub>= +5V ~ +8V;

V<sub>g</sub>= -2V ~ 0V

芯片尺寸: 4mm×4mm×0.75mm

### 产品简介

ZRA125LP4 是一款 GaAs pHEMT MMIC 放大器芯片, 其工作频率覆盖 13~20GHz, 线性增益大于 24 dB, 饱和输出功率大于 28.5dBm, PAE 可到达 34%以上。

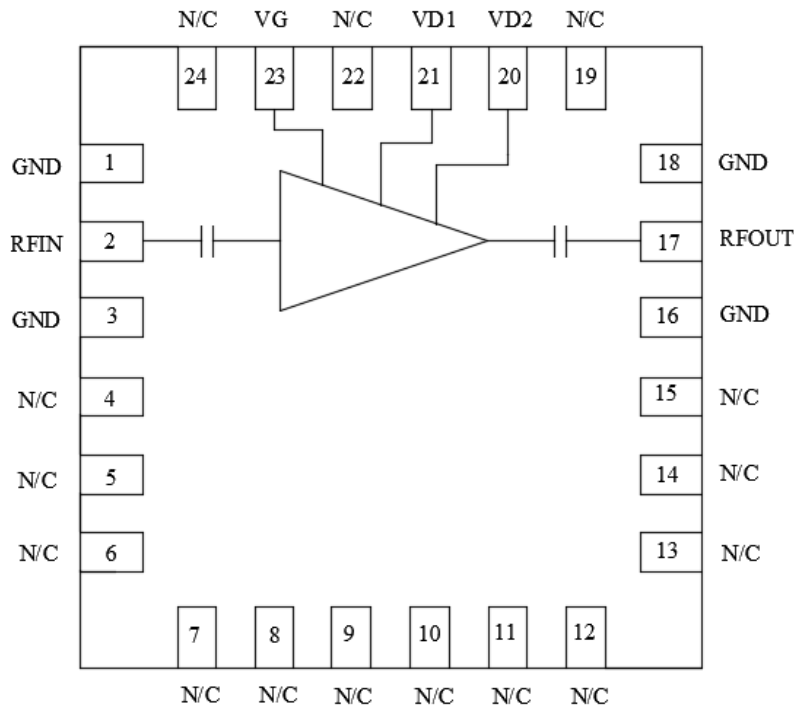


图 1 芯片功能框图

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### 1. 性能参数表

#### 1.1 电参数 (TA=+25°C, Vdd=8V, Id=190mA\*)

指标	最小值	典型值	最大值	单位
频率范围	13~20			GHz
小信号增益	23	25	27	dB
输入回波损耗	9	12	25	dB
输出回波损耗		15	20	dB
P <sub>1</sub> dB	27	28	28.5	dBm
Psat	27.7	29	29.5	dBm
PAE (@Psat)		37		%
静态电流		190		mA

\*调整 Vg 以实现 Id=190mA, Vg 调整范围:-2 到 0V

#### 1.2 允许最大参数范围

参数名称	参数说明	最大范围		单位
		最小值	最大值	
Vdd	直流供电	-	+8.5	V
Vg	直流供电	-4	0	V
Operating Temperature	工作温度	-40	+85	°C
Junction Temperature (TJ)	结温	-	150	°C
Storage Temperature (TSTG)	存储温度	-65	150	°C

#### 1.3 ESD 等级

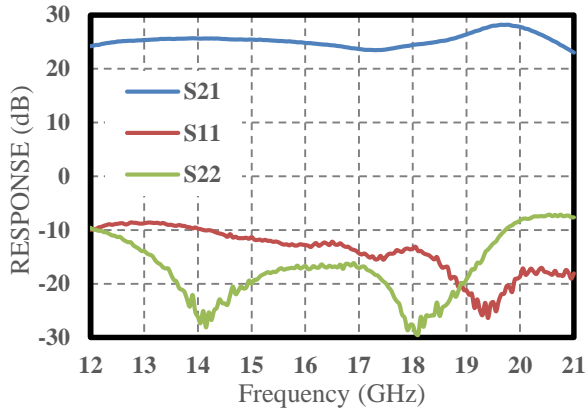
参数名称	参数值	等级
Human Body Model (HBM)	±250V	Class-1A

#### 1.4 推荐工作范围 (TA=+25°C)

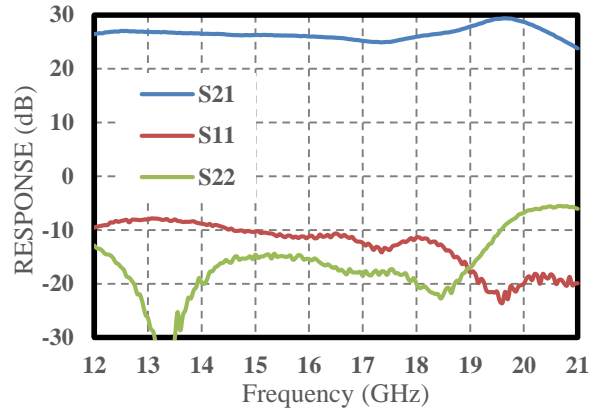
Vdd(V)	Id(mA)
+5	163
+7	179
+8	190

注：放大器将在以上所示的整个电压范围工作。调整 Vg 以在 Vdd=+8V@Id=190mA。

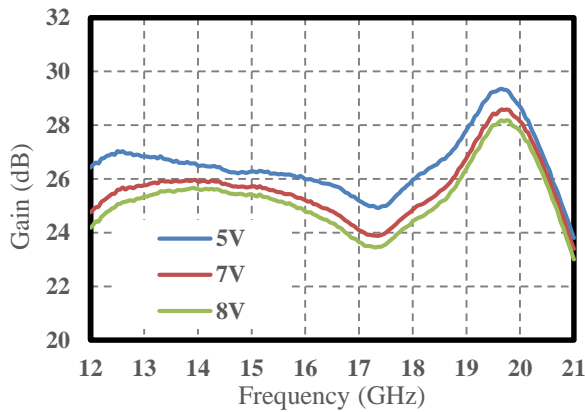
## 2. 典型性能参数



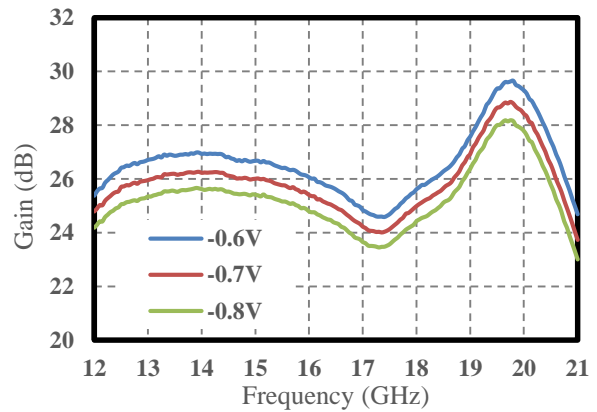
**Gain & Return Loss**  
(Vdd = 8V, Id = 190mA)



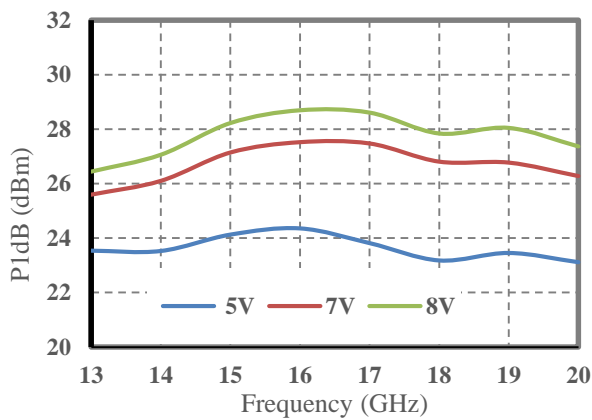
**Gain & Return Loss**  
(Vdd = 5V, Id = 163mA)



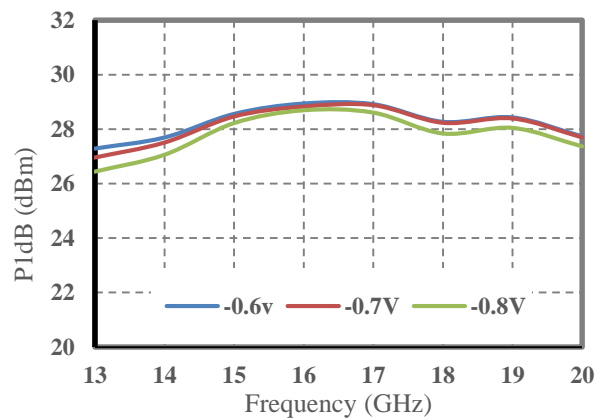
**Gain vs. Vd**



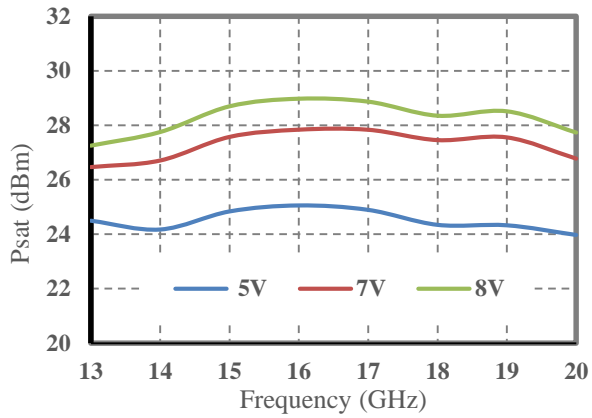
**Gain vs. Vg (Vdd = 8V)**



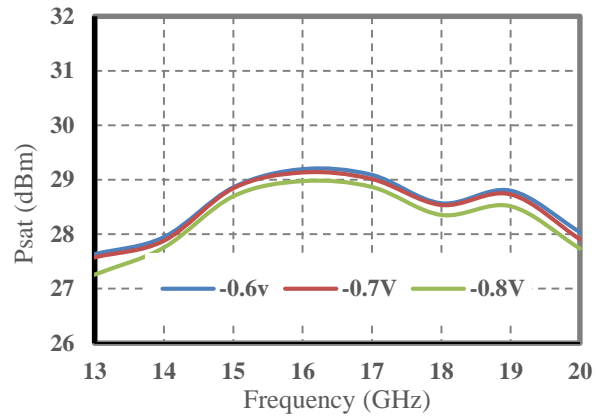
**P1dB vs. Vd**



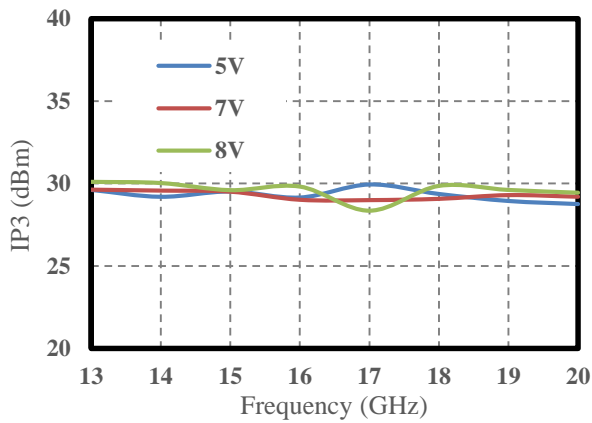
**P1dB vs. Vg (Vdd = 8V)**



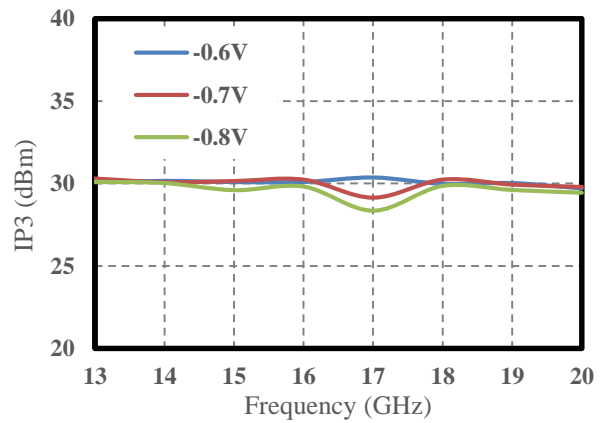
**Psat vs. Vd**



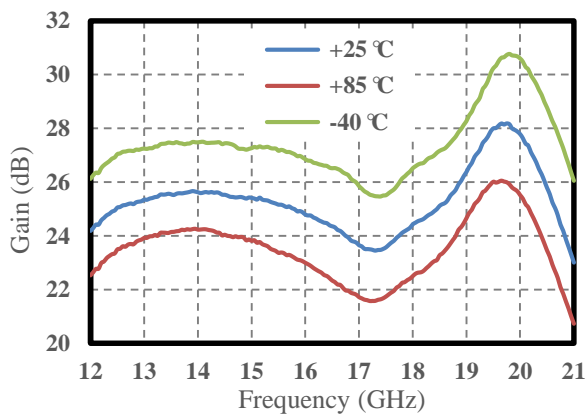
**Psat vs. Vg (Vdd = 8V)**



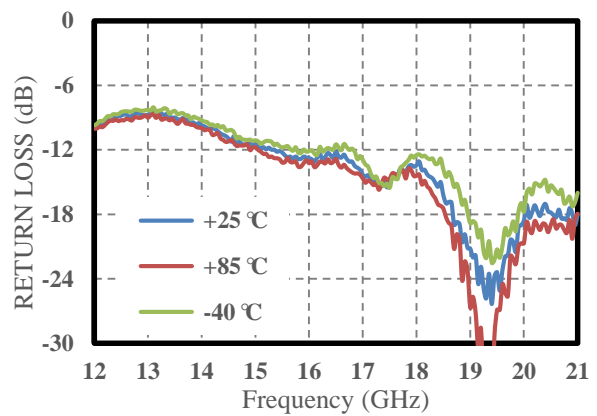
**OIP3 vs. Vd (Pout = P1dB - 12dB)**



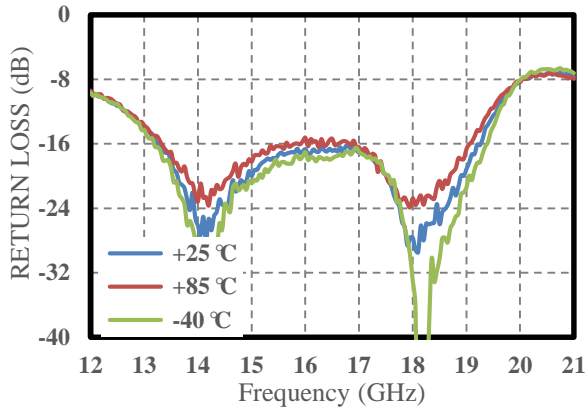
**OIP3 vs. Vg (Pout = P1dB - 12dB)**



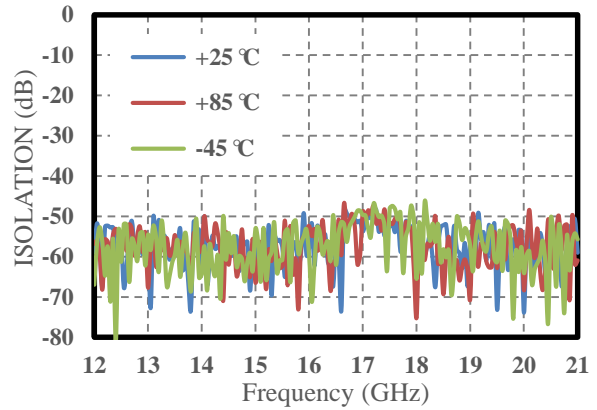
**Gain vs. Temp**



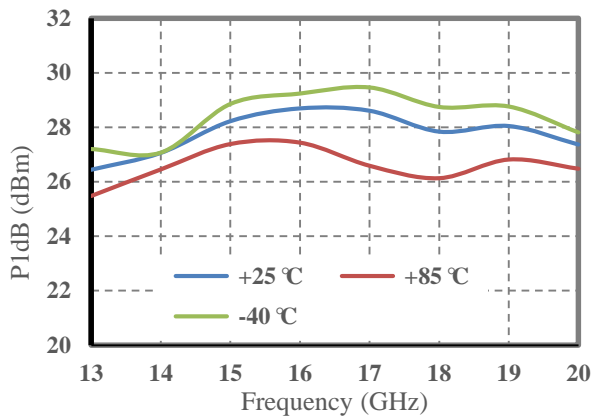
**S11 vs. Temp (Vdd = 8V)**



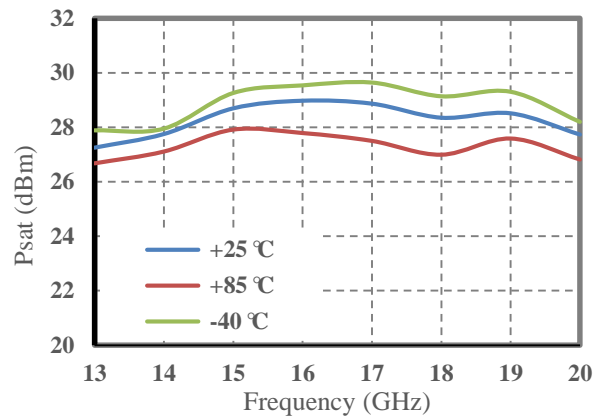
**S22 vs. Temp (Vdd = 8V)**



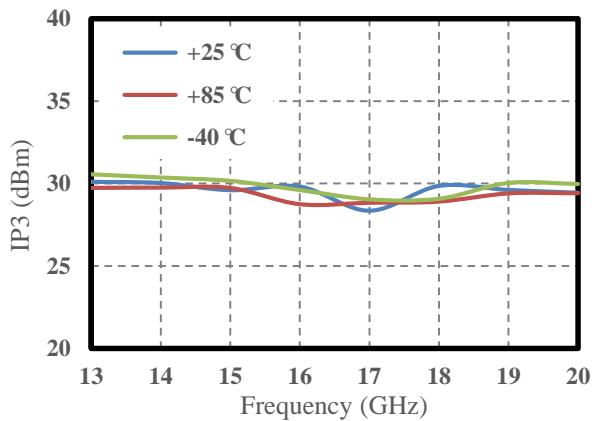
**Isolation vs. Temp (Vdd = 8V)**



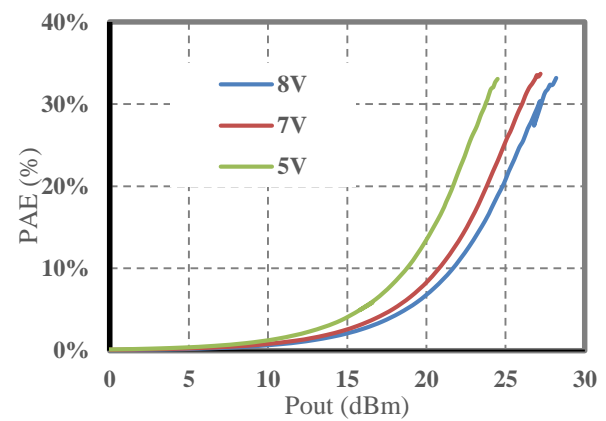
**P1dB vs. Temp (Vdd = 8V)**



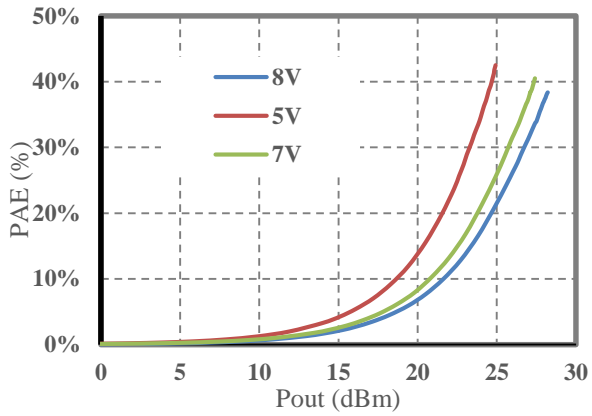
**Psat vs. Temp (Vdd = 8V)**



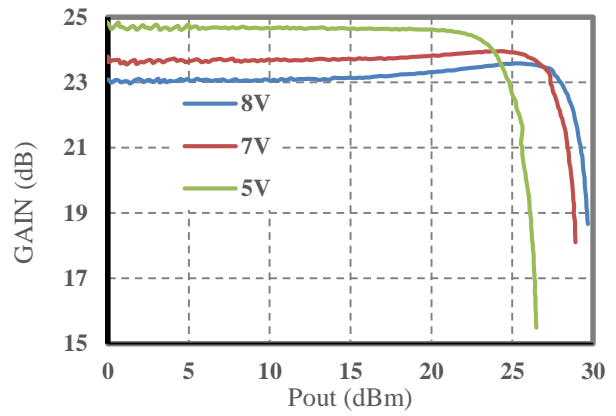
**OIP3 vs. Temp (Pout = P1dB - 12dB)**



**PAE vs. Pout (Freq = 18GHz)**



**PAE vs. Pout (Freq = 14GHz)**



**Gain vs. Pout (Freq = 18GHz)**

### 3. 管脚描述

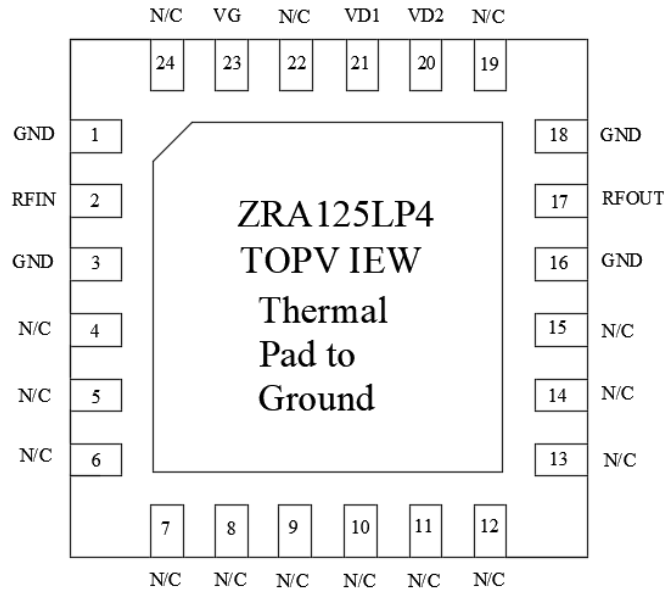


图 2 管脚描述

管脚号	管脚名	描述
1,3,16,18	GND	接地
2	RFIN	射频信号输入接口
4,5,6,7,8,9,10,11,12, 13,14,15,19,22,24	N/C	不连接
17	RFOUT	射频信号输出接口
20,21	VD2、VD1	放大器的漏极电源电压
23	VG	放大器的栅极电源电压



#### 4. 外形尺寸

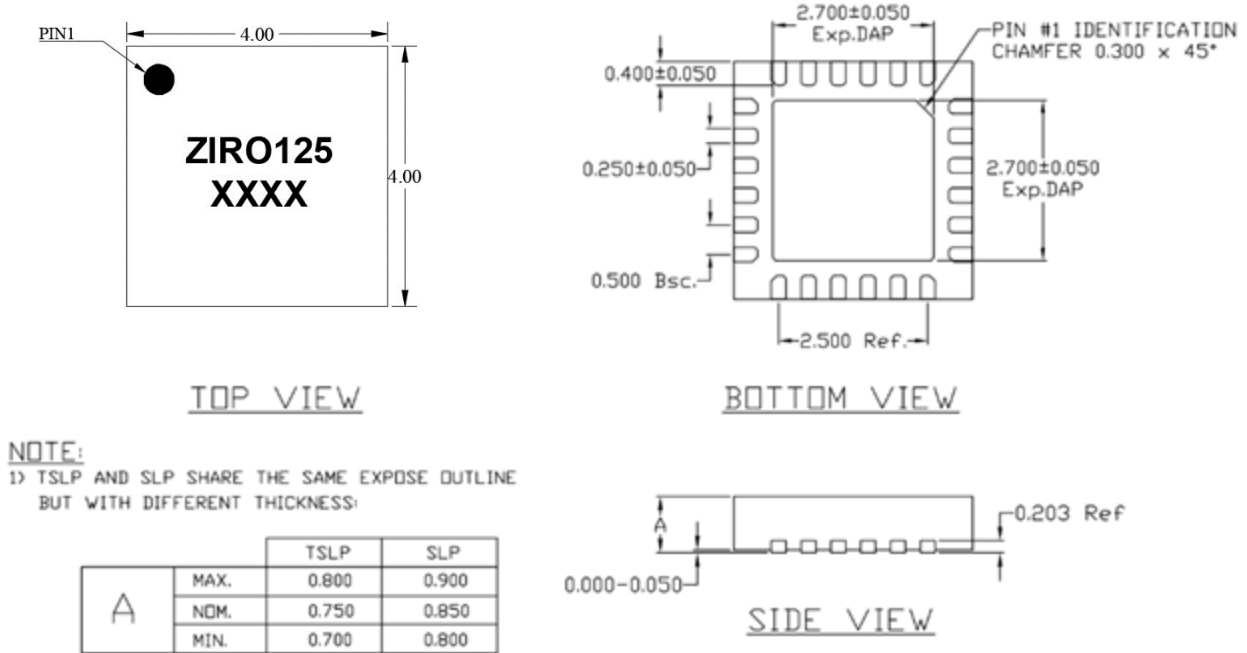


图 3 外形尺寸

#### 5. 典型应用电路

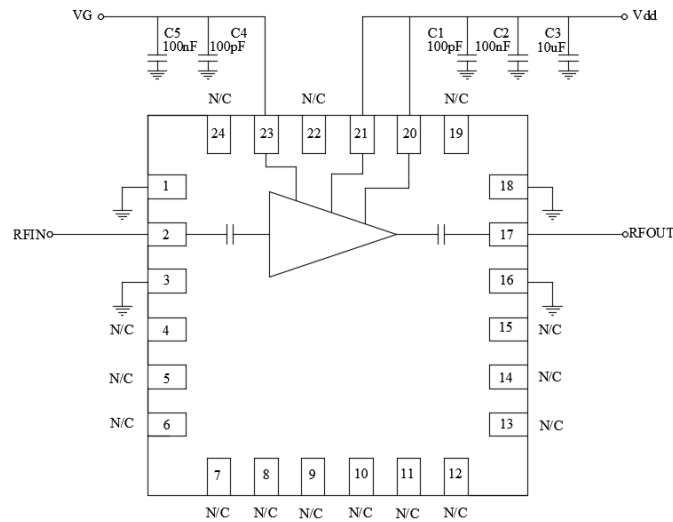


图 4 参考原理图

Component	P/N	Supplier	Value	Size
C1、C4	CC0402JRNPO9BN101	YAGEO	100pF	0402
C2、C5	CC0402KRX7R7BB104	YAGEO	100nF	0402
C3	CC0603KKX7R6BB106	YAGEO	10uF	0603

## 6. 卷带包装信息

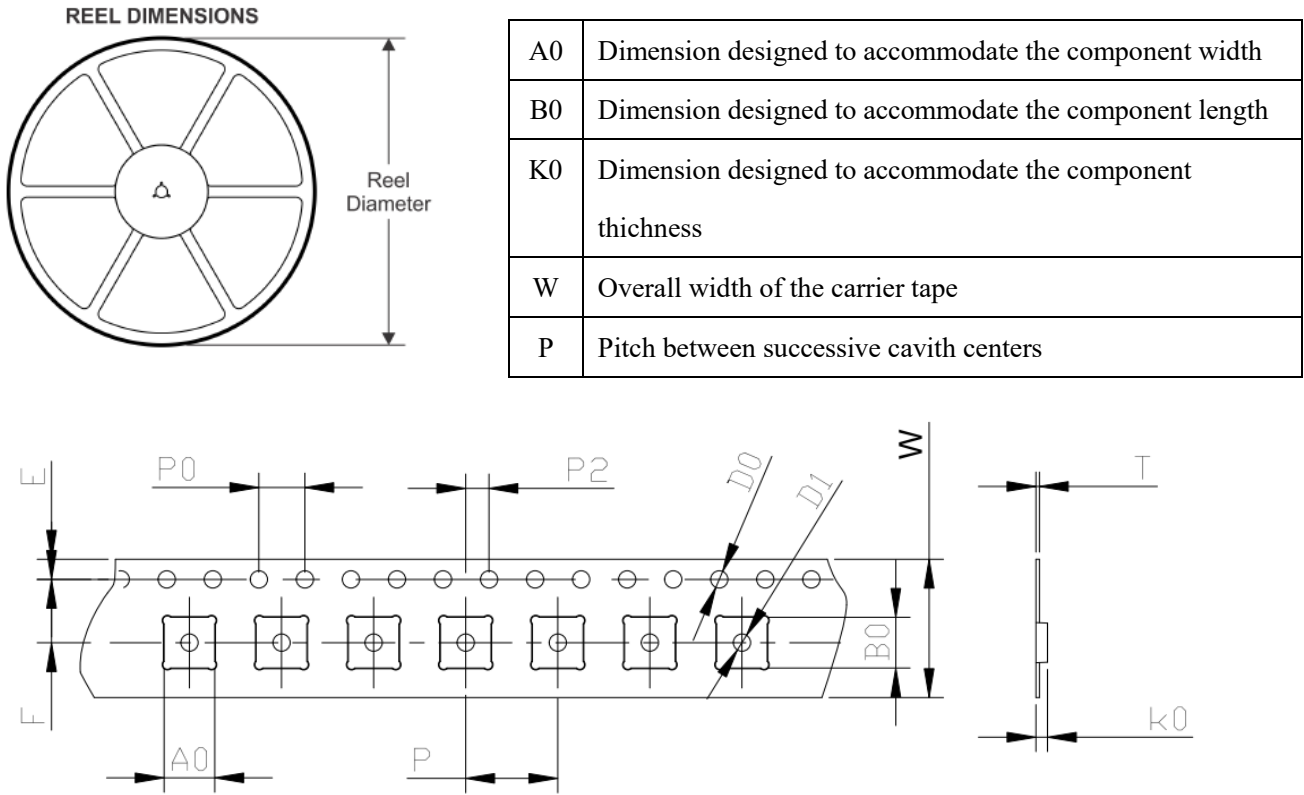


图 5 尺寸信息

载带尺寸信息:

Reel Diameter (mm)	W	A0	B0	K0	K1	E	F	P	P0	P2	D0	D1	T
180	12	4.40	4.40	1.20	0	1.75	5.50	8.00	4.00	2.00	1.50	1.50	0.30

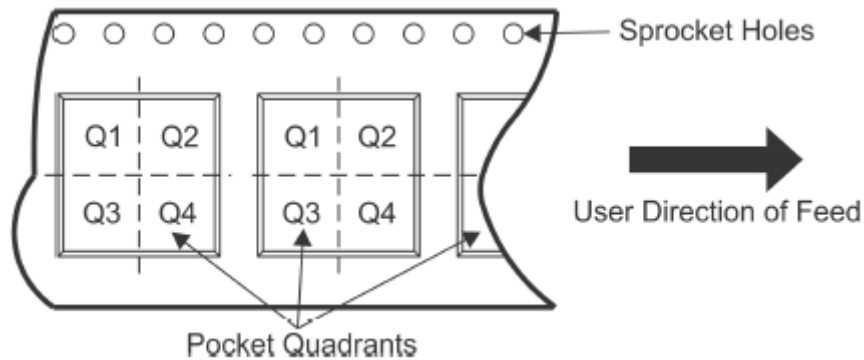


图 6 卷带中 Pin1 描述

订购信息:

Part Number	Package Type	Pins	Quantity/Reel	Reel Diameter mm	Temperature Range	Pin1 Quadrant
ZRA125LP4A	QFN	24	250	180	-40°C to +85°C	Q2
ZRA125LP4B	QFN	24	1000	180	-40°C to +85°C	Q2
ZRA125LP4C	QFN	24	3000	330	-40°C to +85°C	Q2

### 7. 评估板

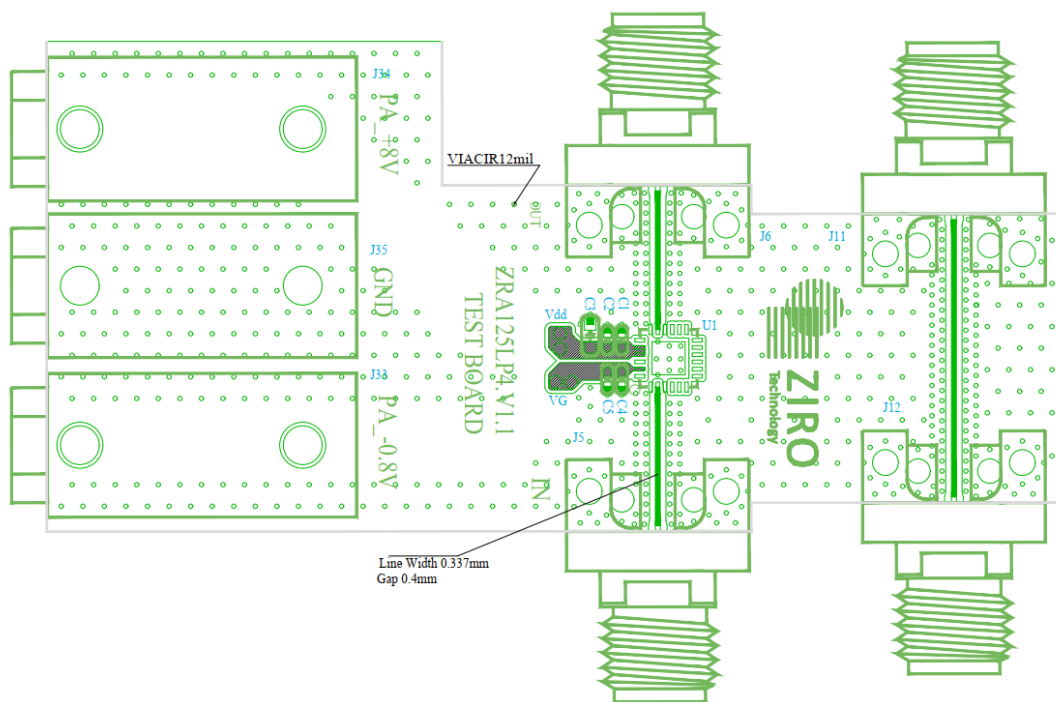


图 7

### Layer Stackup

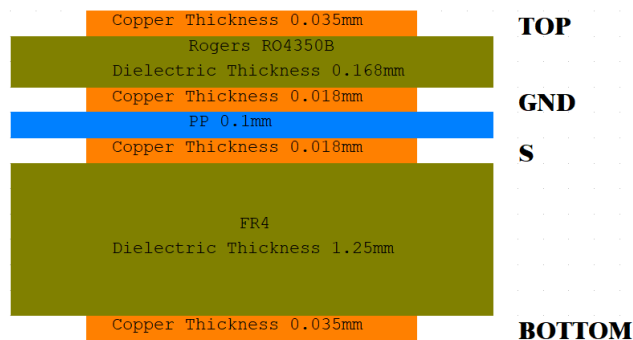


图 8

## 8. 历史版本

版次	修改内容	修改人	修改时间
Rev.0.4	初版发布	YDS	2023-9-1
Rev.0.5	格式、参数内容修改	YDS	2023-10-25
Rev.0.6	PAE、P1dB和Psat参数修改	YDS	2023-11-01
Rev.0.7	格式调整	DX1	2024-01-10