性能特点

频率范围：13~20GHz

增益：25 dB

$P_{-1}dB$：24dBm@Vdd=+5V

27.5dBm@Vdd=+8V

Psat： 25.5dBm@Vdd=+5V

28.5dBm@Vdd=+8V

PAE@$P_{-1}dB$：34%@Vdd=+8V

PAE@Psat：37%@Vdd=+8V

直流供电：Vdd= +5V ~ +8V；

Vg= -2V ~ 0V

芯片尺寸：4mm×4mm×0.85mm

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。

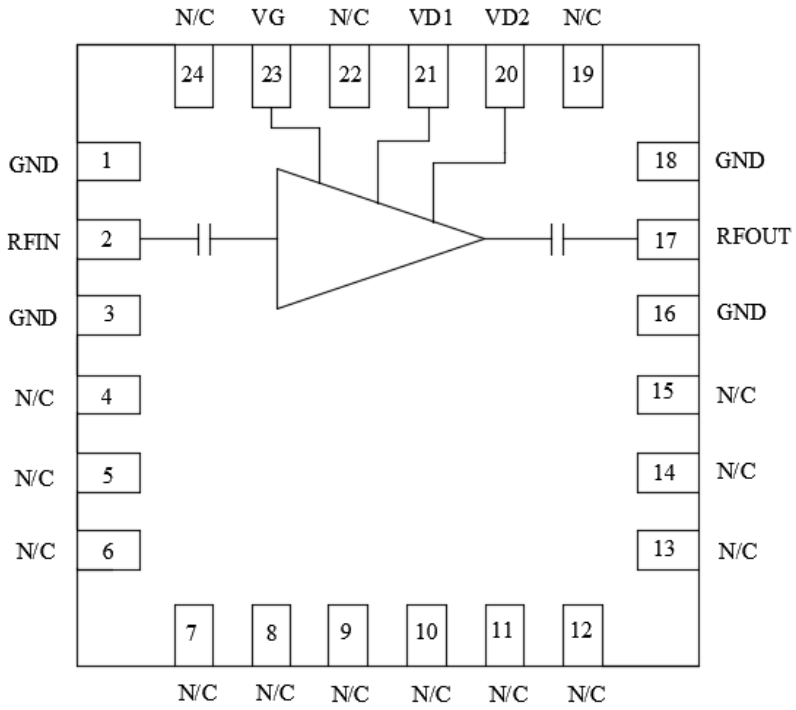


图 1 芯片功能框图

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_{-1}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	℃
Junction Temperature (TJ)	结温	-	150	℃
Storage Temperature (TSTG)	存储温度	-65	150	℃

1.3 ESD 等级

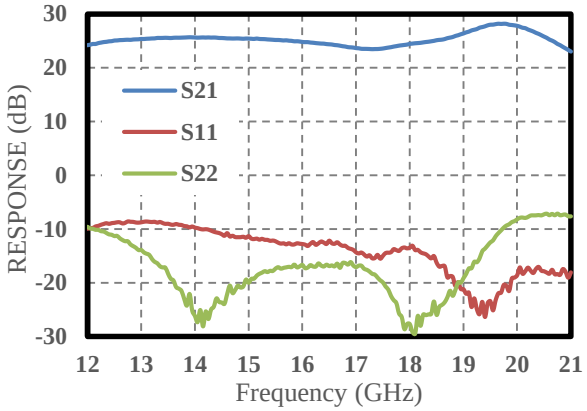
参数名称	参数值	等级
Human Body Model (HBM)	±250V	Class-1A

1.4 推荐工作范围（TA=+25℃）

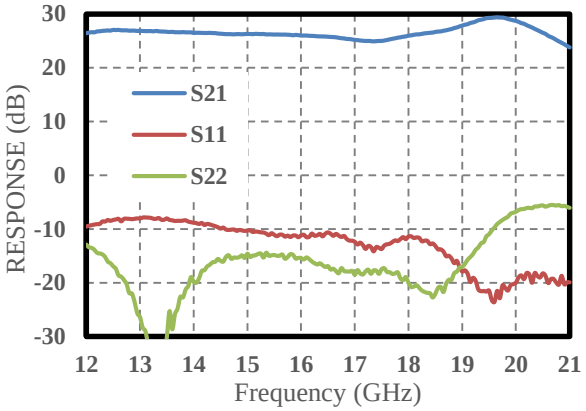
Vdd(V)	Id(mA)
+5	163
+7	179
+8	190

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。

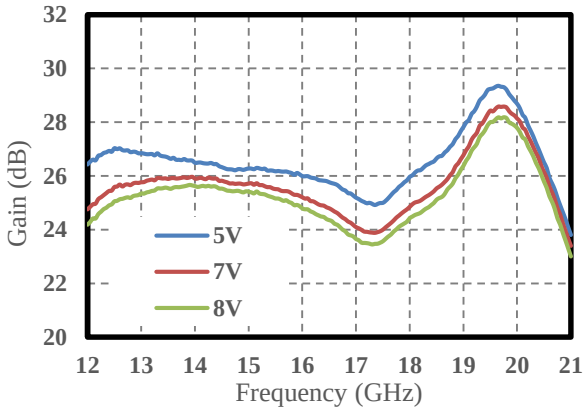
2. 典型性能参数



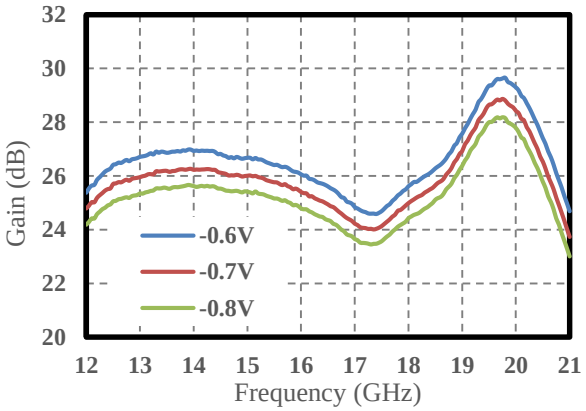
Gain & Return Loss
（Vdd = 8V，Id = 190mA）



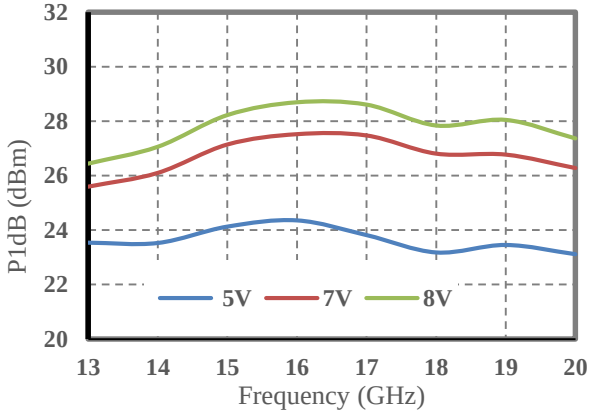
Gain & Return Loss
（Vdd = 5V，Id = 163mA）



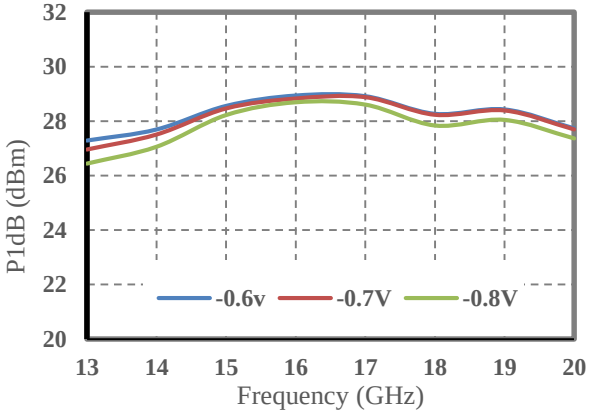
Gain vs. Vd



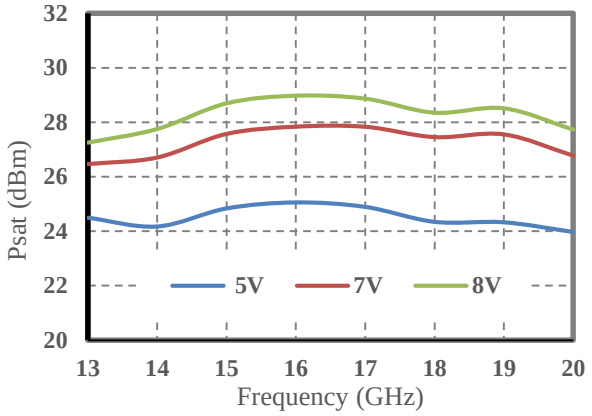
Gain vs. Vg (Vdd = 8V)



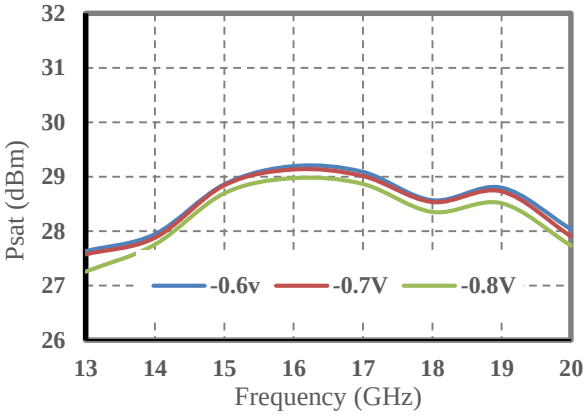
P1dB vs. Vd



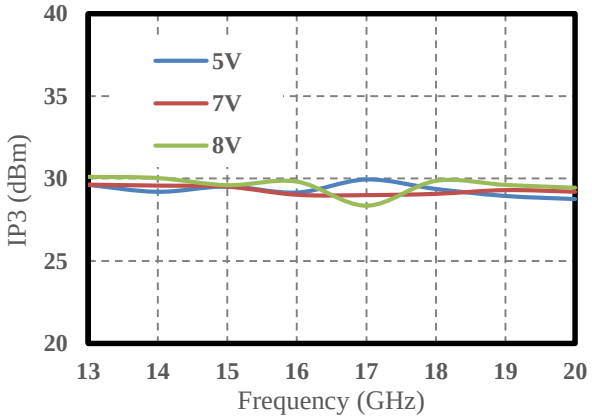
P1dB vs. Vg (Vdd = 8V)



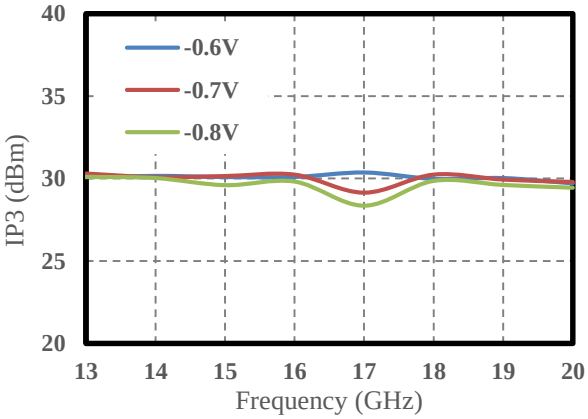
Psat vs. Vd



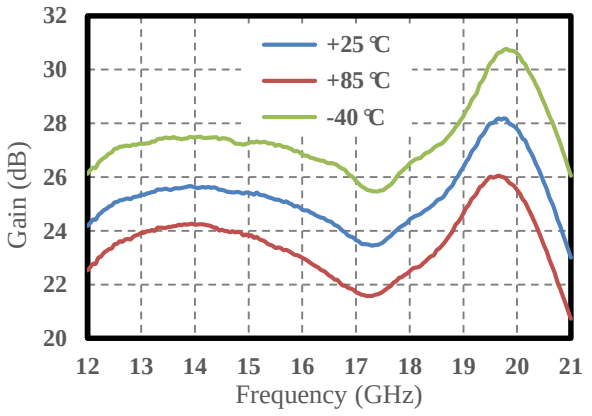
Psat vs. Vg (Vdd = 8V)



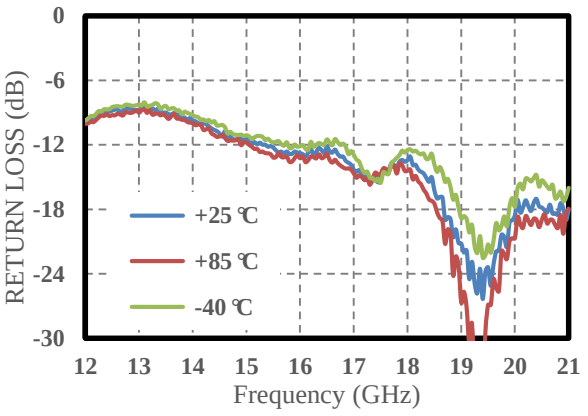
OIP3 vs. Vd (Pout=P1dB-12dB)



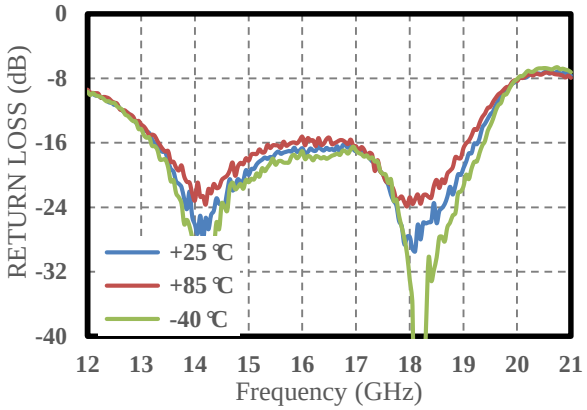
OIP3 vs. Vg (Pout = P1dB - 12dB)



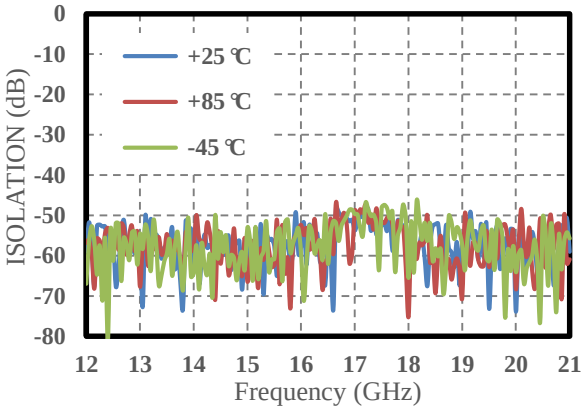
Gain vs. Temp



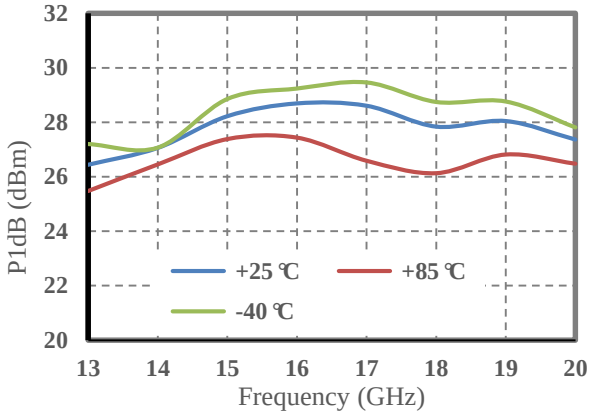
S11 vs. Temp（Vdd = 8V）



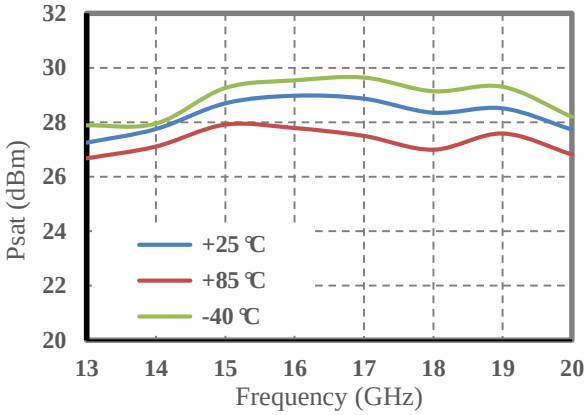
S22 vs. Temp（Vdd = 8V）



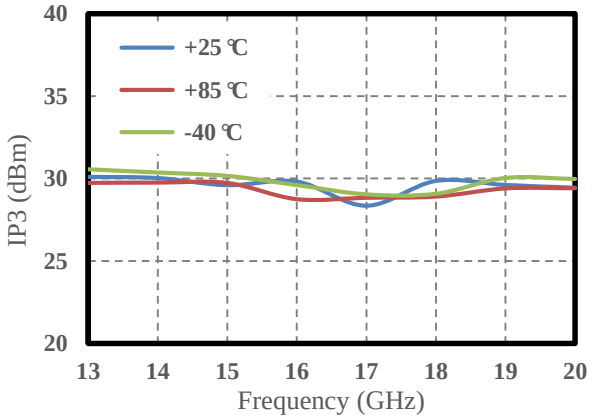
Isolation vs. Temp（Vdd = 8V）



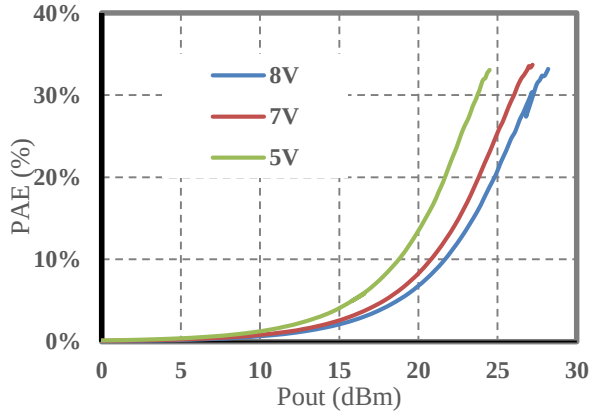
P1dB vs. Temp（Vdd = 8V）



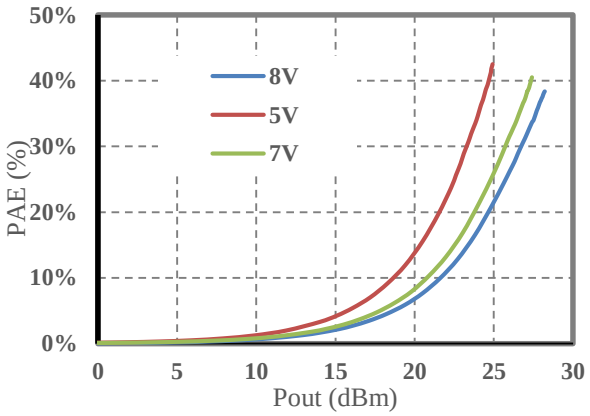
Psat vs. Temp（Vdd = 8V）



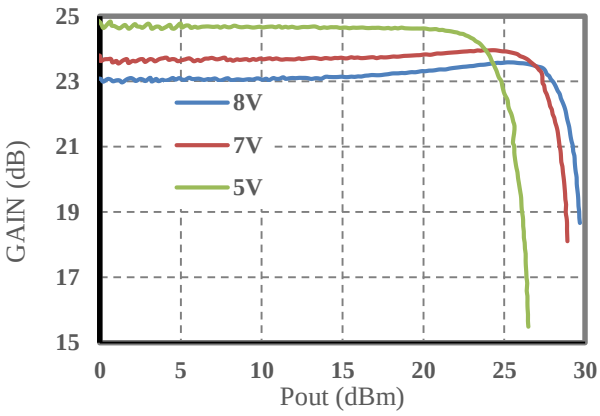
OIP3 vs. Temp（Pout = P1dB - 12dB）



PAE vs. Pout（Freq = 18GHz）



PAE vs. Pout（Freq = 14GHz）



Gain vs. Pout（Freq = 18GHz）

3. 管脚描述

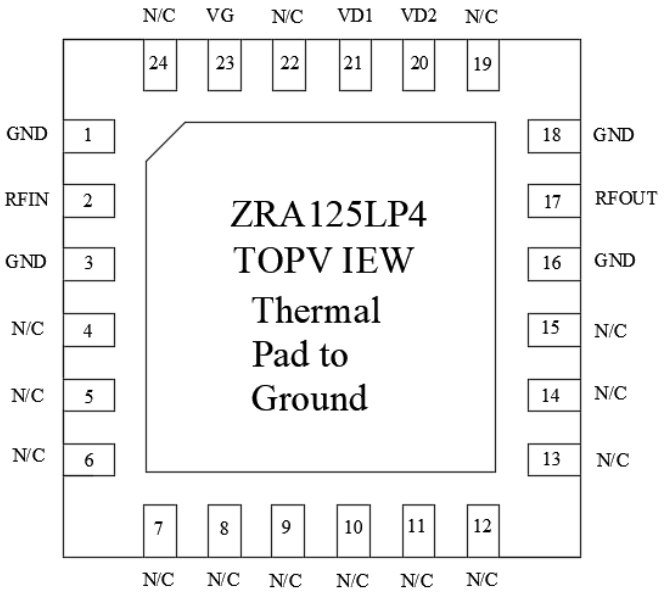
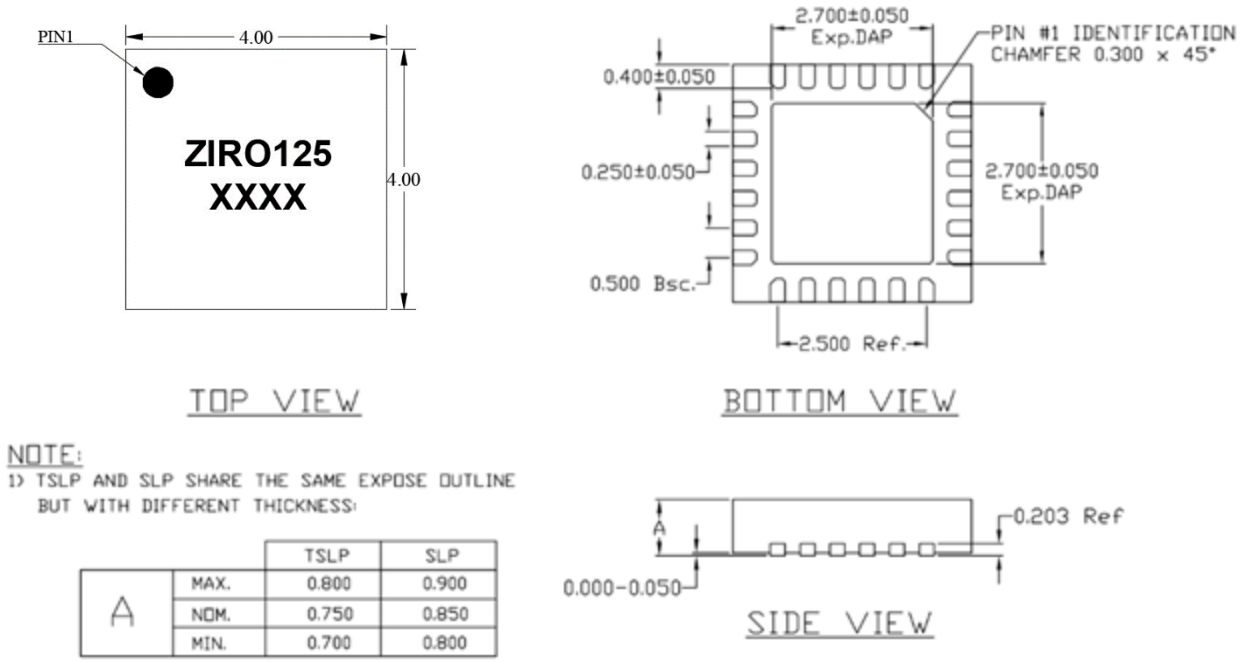


图 2 管脚描述

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



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

图 3 外形尺寸

5. 典型应用电路

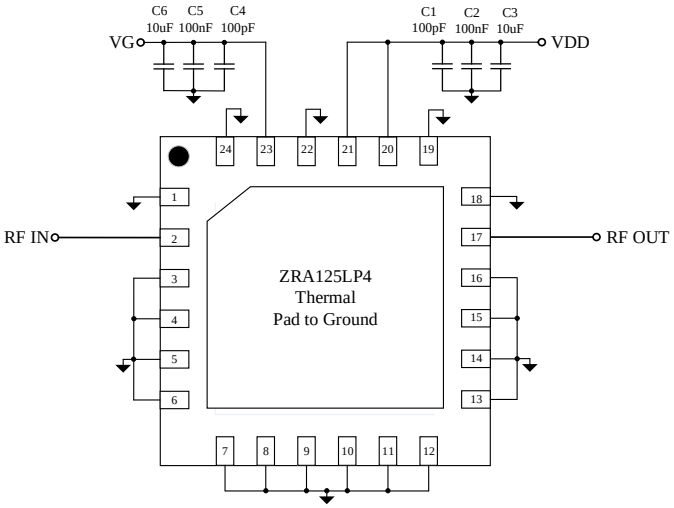
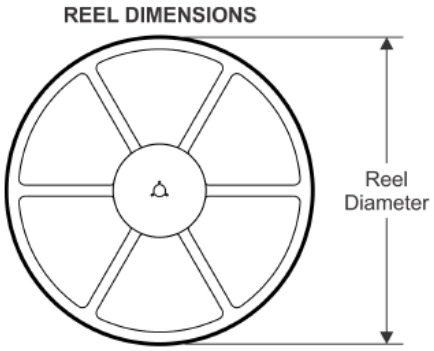


图 4 参考原理图

Component	P/N	Supplier	Value	Size
C1、C4	CC0402JRNPO9BN101	YAGEO	100pF	0402
C2、C5	CC0402KRX7R7BB104	YAGEO	100nF	0402
C3、C6	CC0603KKX7R6BB106	YAGEO	10uF	0603

6. 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

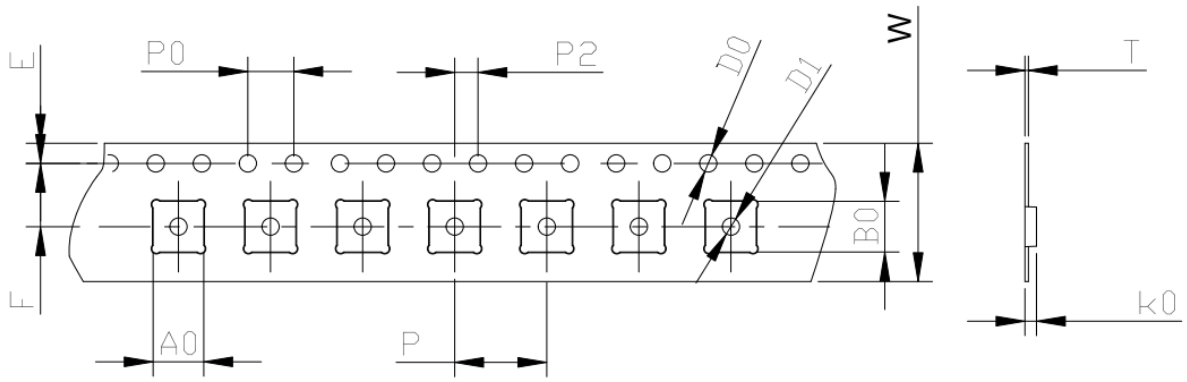


图 5 尺寸信息

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

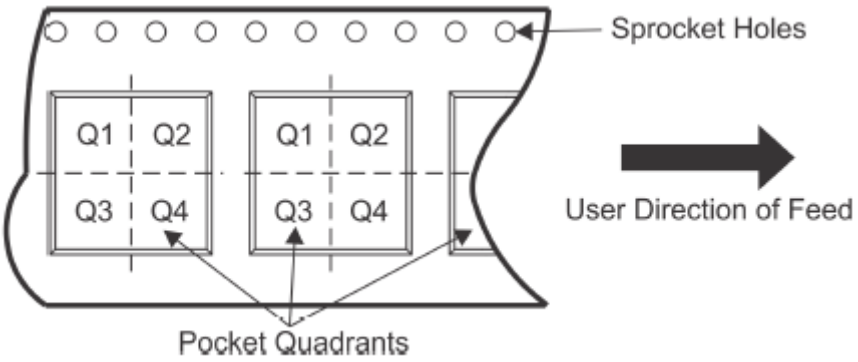


图 6 卷带中 Pin1 描述

订购信息：

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

7. 评估板

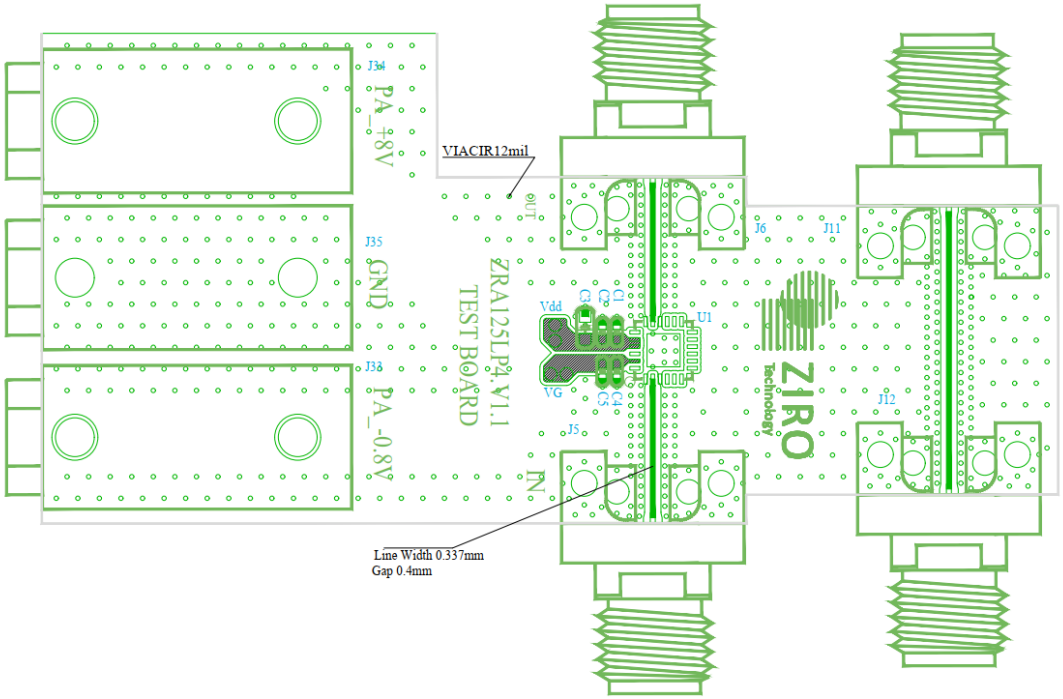


图 7

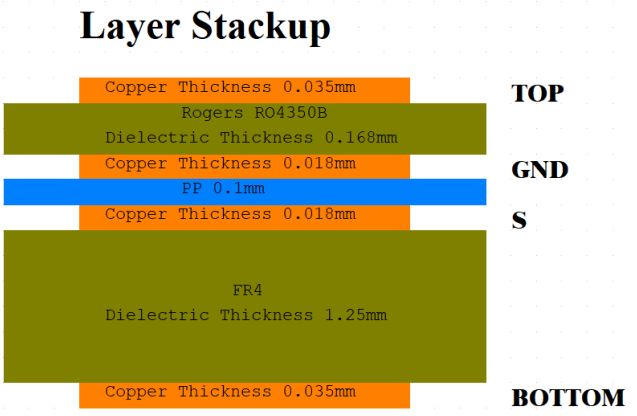


图 8

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
Rev.1.0	芯片封装厚度修正	DX1	2024-05-28