

性能特点

频率范围:10~13.5GHz

增益:16.5dB

噪声系数:1.4dB

P_{1dB} 输出功率:4dBm

单电源供电:2V@15mA

射频端口阻抗:50 Ohm

封装尺寸:3mm×3mm×0.75mm

产品简介

ZRL1402LP2H 是一款低噪声放大器芯片，工作频率覆盖 10~13.5GHz。该低噪声放大器可提供大于 15dB 的增益，带内噪声系数小于 1.5dB。该低噪放采用单电源供电，工作电压范围为+2V~+4V。该芯片射频 I/O 具备隔直，特性阻抗为 50 Ohm。芯片采用 3*3mm QFN 封装。

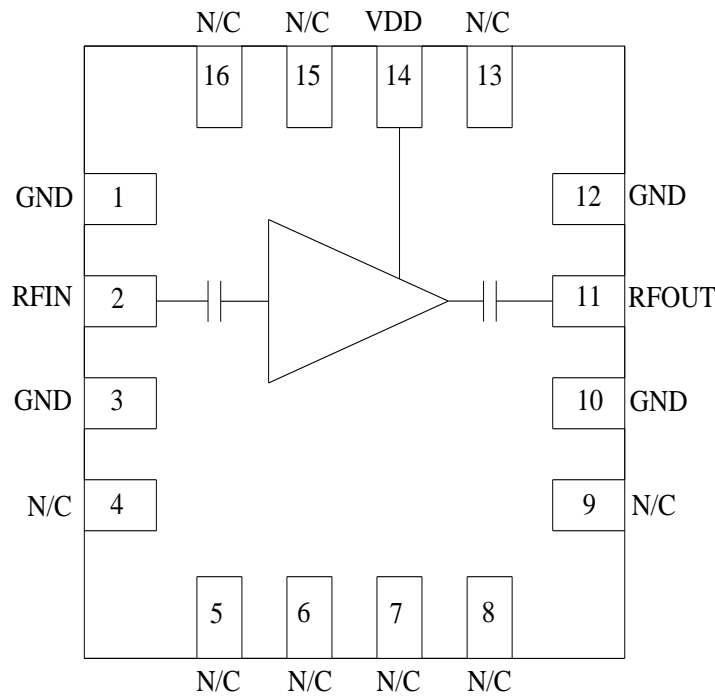


Figure 1.芯片功能框图

1. 性能参数

1.1. 电参数

除非状态特殊说明，所有参数均在 $V_d = 2V, I_d = 15mA, T_A = 25^\circ C$ 条件下测试得出。

指标	最小值	特征值(11GHz)	最大值	单位
频率范围	10~13.5			GHz
小信号增益	15	16.5	17.2	dB
噪声系数		1.4		dB
输入回波损耗		15		dB
输出回波损耗		15		dB
P ₁ dB 输出功率		4		dBm
饱和输出功率 (Psat)		5.2		dBm
OIP3 (P _{out} /Tone=P ₁ -6dB, 1MHz tonspacing)		17		dBm
静态电流		15		mA

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	-	+4.5	V
Operating Temperature	工作温度	-40	+85	°C
Junction Temperature (T _J)	结温	-	175	°C
Storage Temperature (T _{STG})	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

2. 典型性能参数

除非状态特殊说明，所有参数均在 $V_d=2V$, $I_d=15mA$, $T_A=25^\circ C$ 条件下测试得出。

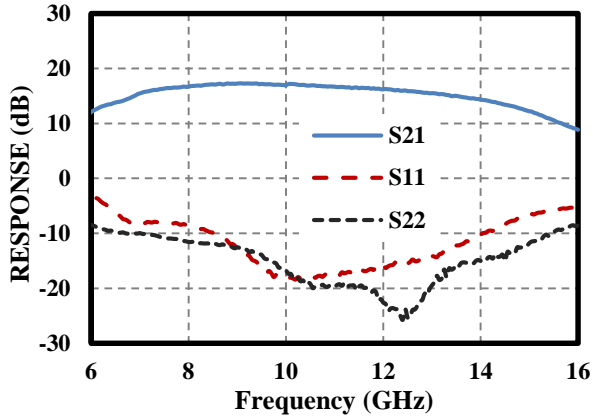


Figure 2. Gain & ReturnLoss

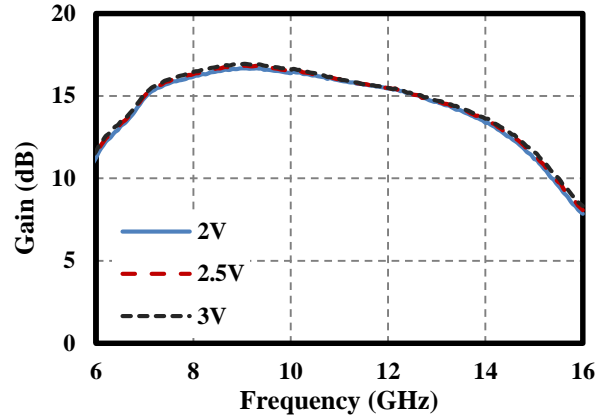


Figure 3. Gain vs. Vd

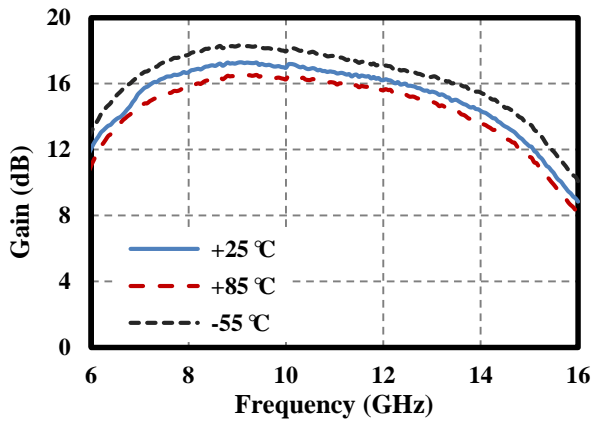


Figure 4. Gain vs. Temp

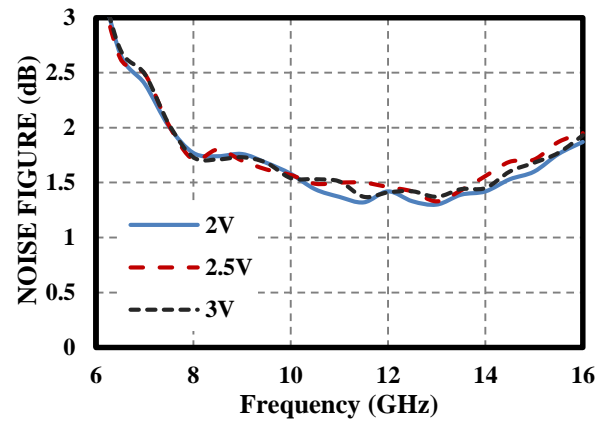


Figure 5. Noise vs. Vdd

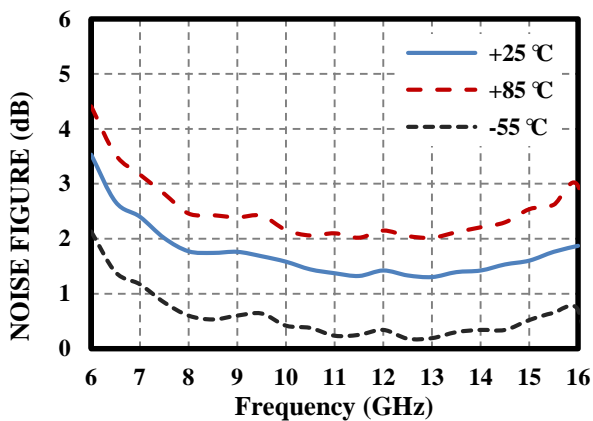


Figure 6. Noise vs. Temp

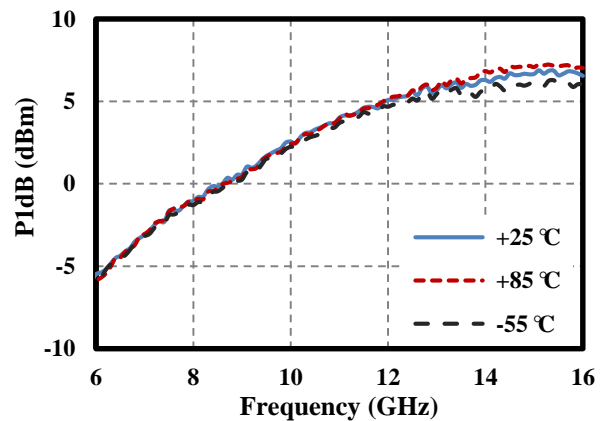


Figure 7. Output P1dB vs. Temp

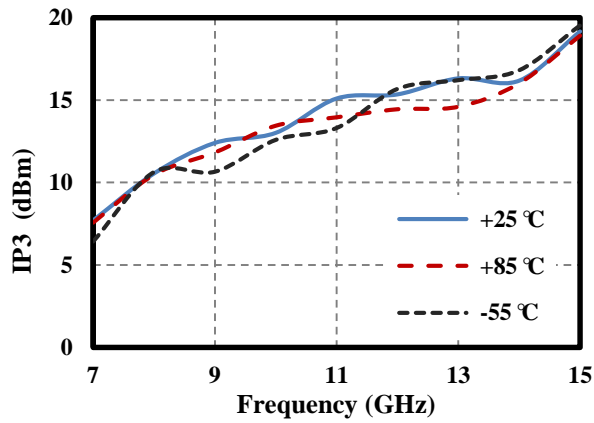


Figure 8. OIP3 vs. Temp

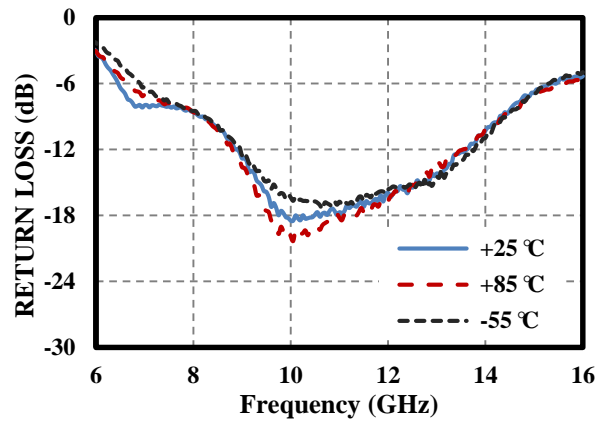


Figure 9. Input Return Loss vs. Temp

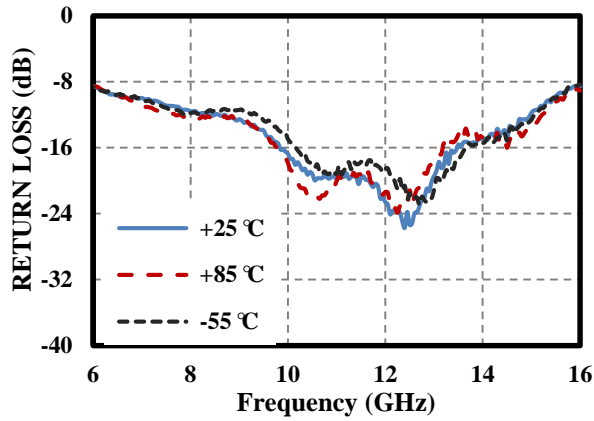


Figure 10. Output Return Loss vs. Temp

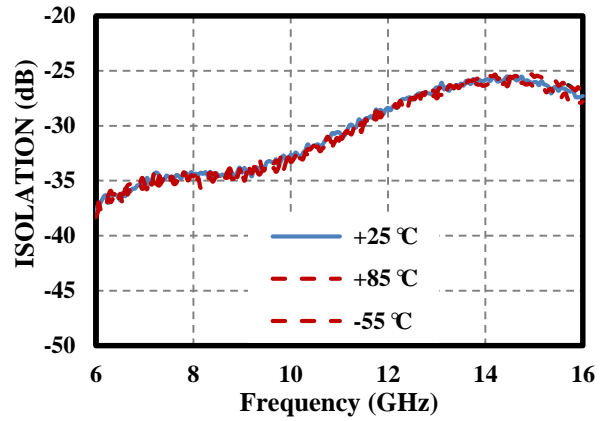
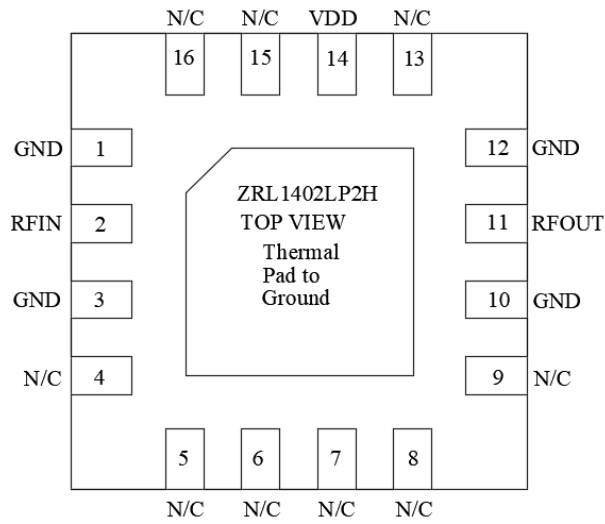


Figure 11. Reverse Isolation vs. temp

3. 管脚描述



管脚号	管脚名	管脚描述
1,3,10,12	GND	接地
2	RFIN	射频信号输入端口
4,5,6,7,8,9,13,15,16	N/C	不连接
11	RFOUT	射频信号输出端口
14	VDD	放大器漏极供电接口

4. 外形尺寸

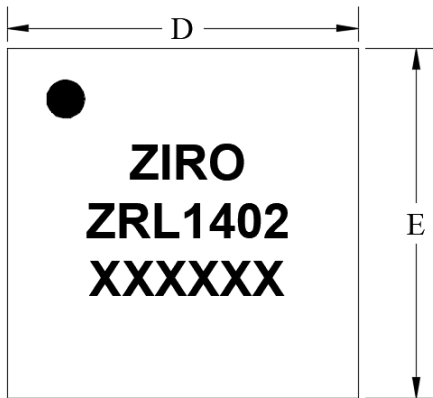


Figure 12. TOP VIEW

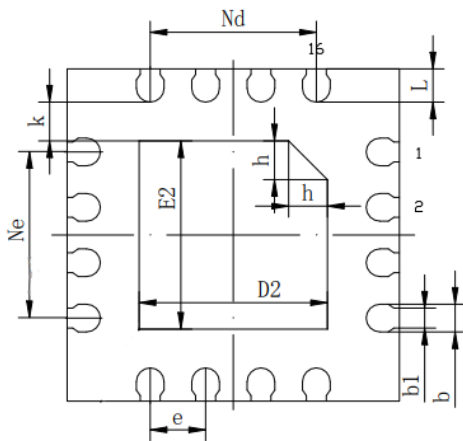


Figure 13. BOTTOM VIEW

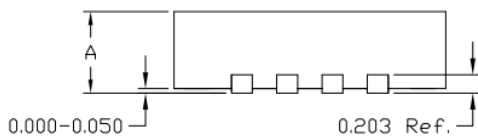


Figure 14. SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.20	0.25	0.30
b1	0.18REF		
c	0.203REF		
D	2.90	3.00	3.10
D2	1.60	1.70	1.80
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.60	1.70	1.80
L	0.25	0.30	0.35
h	0.30	0.35	0.40
k	0.30	0.35	0.40

5. 推荐电路图

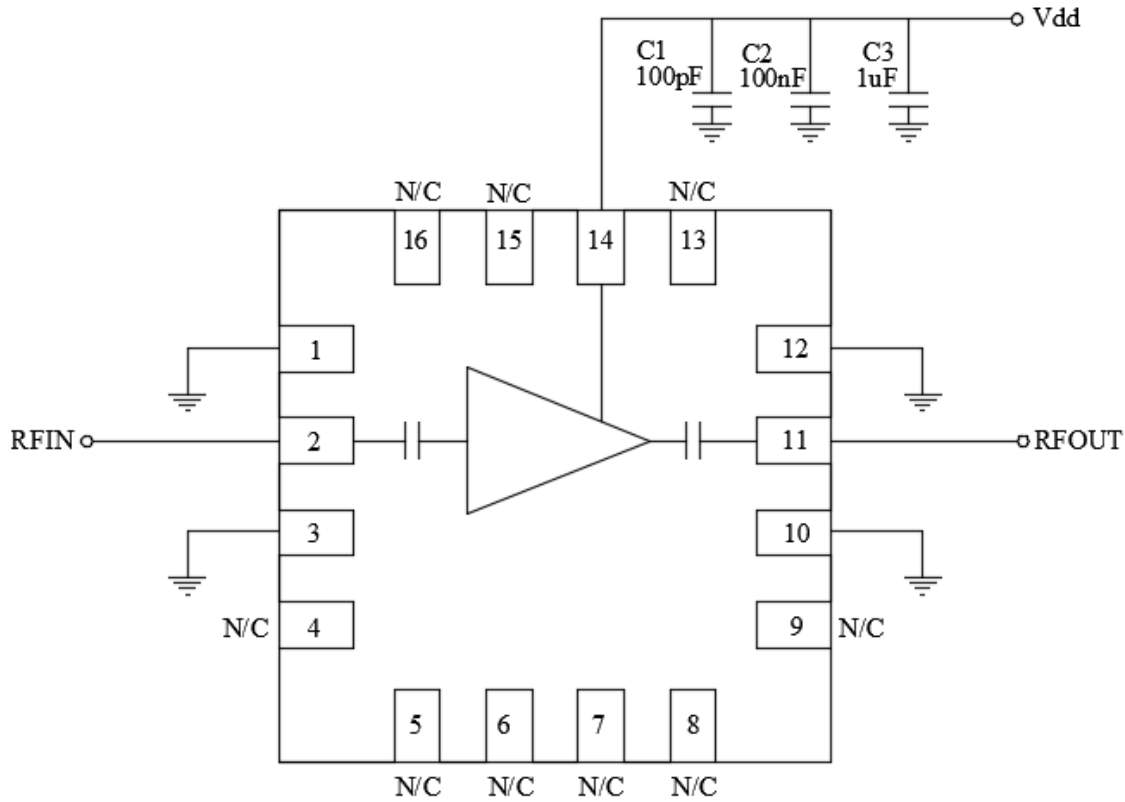


Figure 15. 管脚描述

Component	P/N	Supplier	Value	Size
C1	CC0402JRNPO9BN101	YAGEO	100pF	0402
C2	CC0402KRX7R7BB104	YAGEO	100nF	0402
C3	CC0402KRX7R5BB105	YAGEO	1uF	0402

6. 参考 PCB

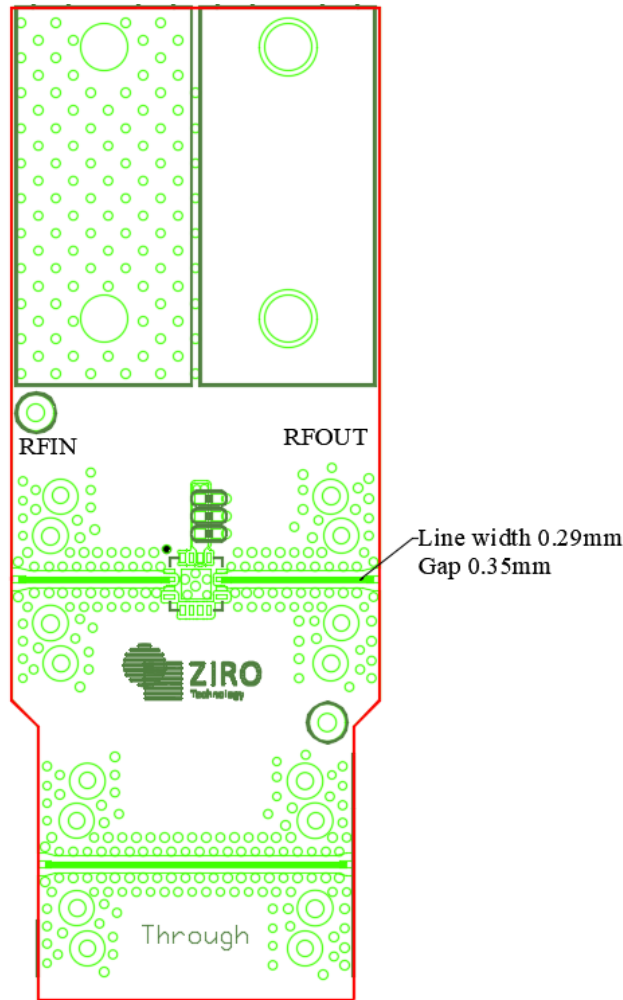
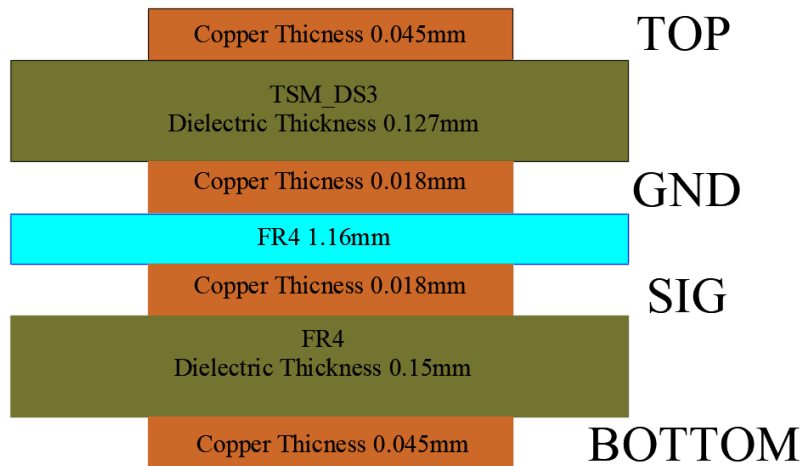


Figure 16. Evaluation Board

Layer Stackup



7. 卷带信息

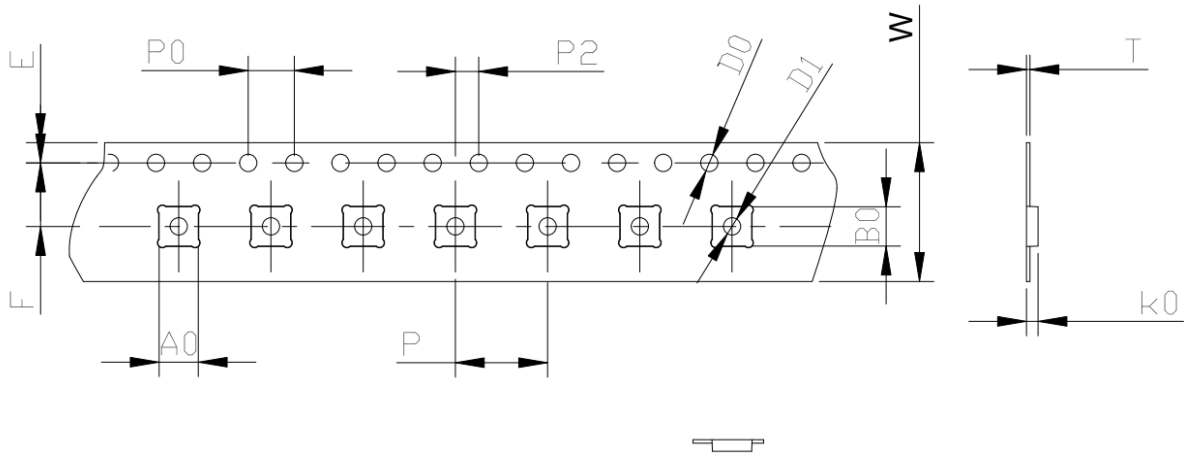


Figure 12. 包装信息

Table1 卷带尺寸

E	F	W	P2	D0	D1	P0	P2	A0	B0	K0	T
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1.75	5.50	12.00	2.00	1.50	1.50	4.00	2.00	3.40	3.40	1.00	0.3

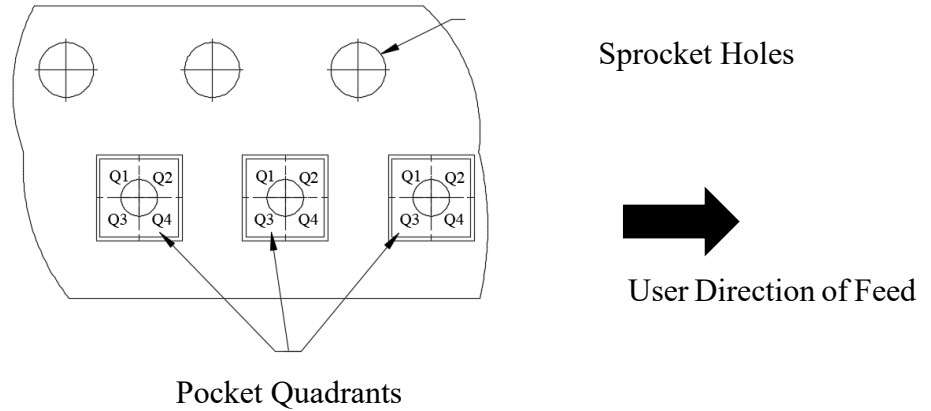


Figure 13. PIN1 脚在卷带里的分布

Table2 订购信息

Part Number	Package Type	Quantity/Reel (pcs)	Reel Diameter (mm)	Temperature Range	MSL	Pin1 Quadrant
ZRL1402QRC	QFN 16L	3000	180.0	-40°C to +85°C	3	Q2
ZRL1402QRB	QFN 16L	1000	180.0	-40°C to +85°C	3	Q2
ZRL1402QRA	QFN 16L	250	180.0	-40°C to +85°C	3	Q2

8. 历史版本

Revision	Description	Modifier	Date
Rev.0.4	新增数据	YDS	2024.04.08