



世纳微电子科技(成都)有限公司
ShiNaWei Electronic Technology (Chengdu) Co., Ltd

SMPS310V

模拟型 TWS 入耳检测传感器应用手册





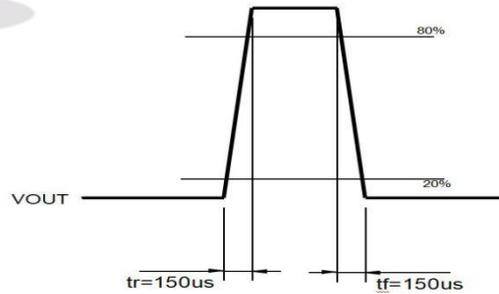
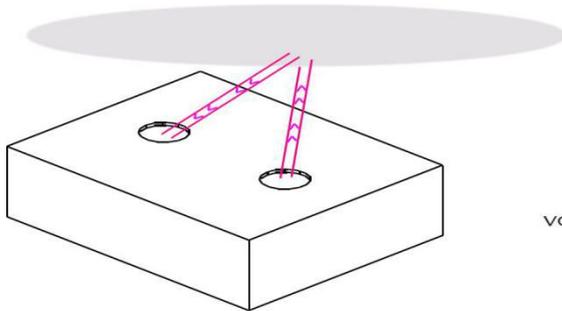
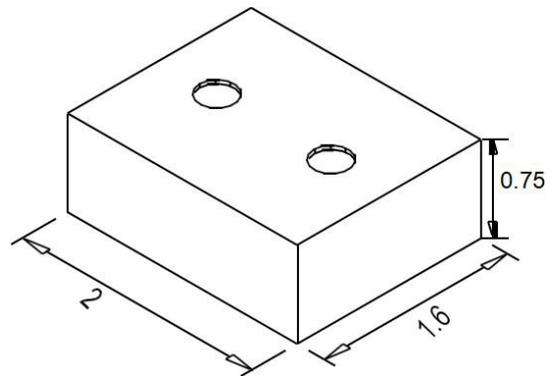
1. 功能描述:

SMPS310V是一款设计用于入耳式耳机佩戴检测的光电传感器，SMPS310V内部集成了VCSEL电检测与VCSEL发射芯片。

工作流程：用IO口控制传感器的VCSEL发光部份工作时另一个IO口同时测量传感器的VOUT脚位上是否有高电平？接收到反射信号后VOUT脚输出对应的线性电压，信号越强电压越高。

应用电图实测80%输出入耳检测距离>2mm。

例如采用250us工作50ms休息（平均电流在30uA）。待机电流180nA

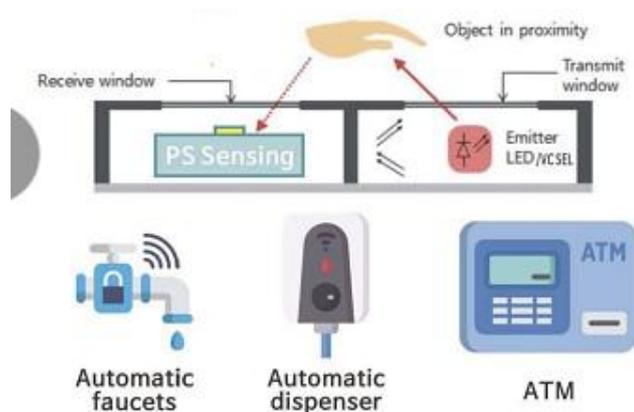


2. 特征:

- *封装：LGA
- *尺寸：2.0mm X 1.6mm X 0.75mm
- *功耗低
- *高灵敏度
- *检测距离远
- *抗干扰强

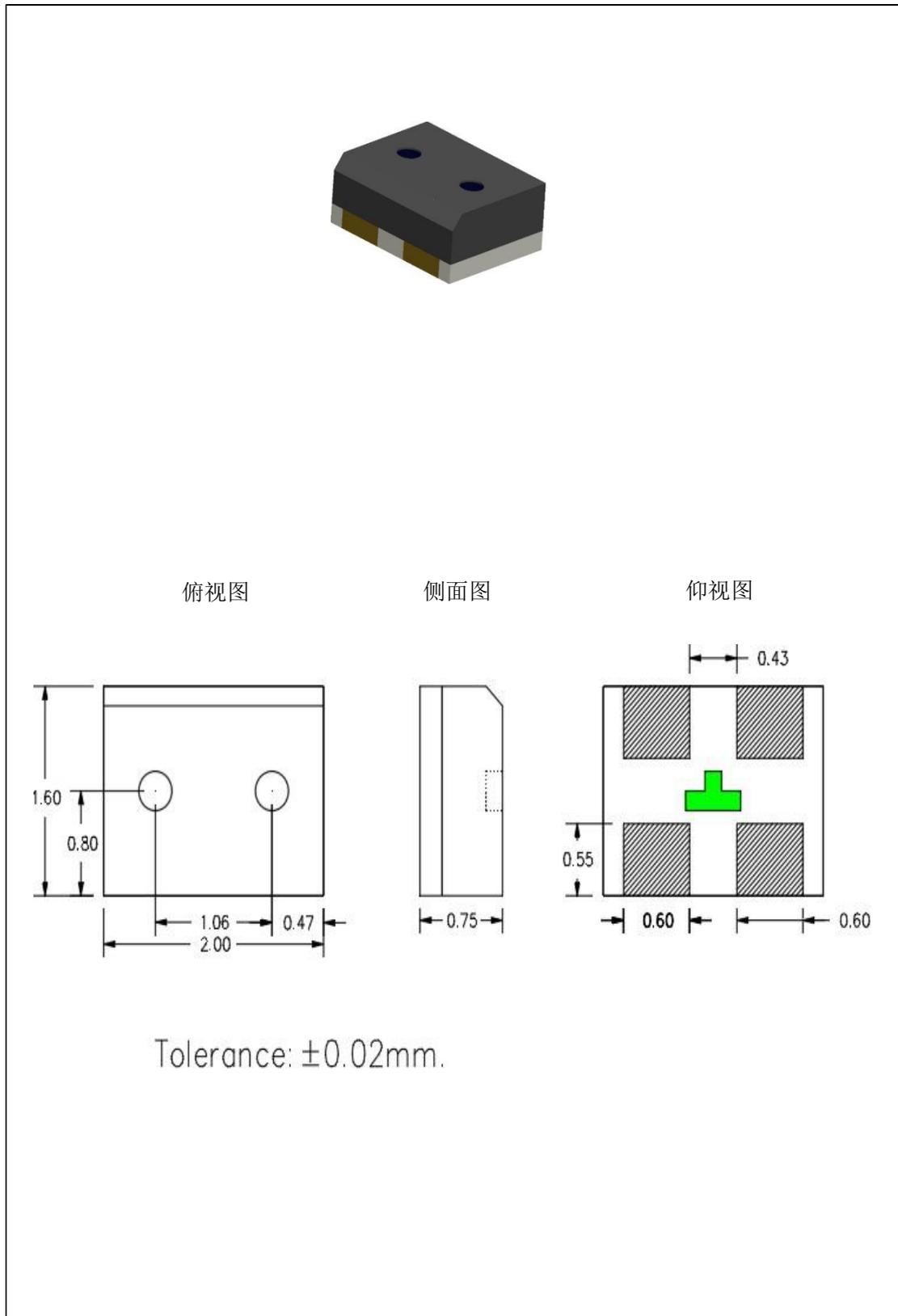
3. 应用:

- *TWS入耳式耳机
- *智能穿戴
- *移动触摸屏控
- *机械开关更换制和自动扬声器启用



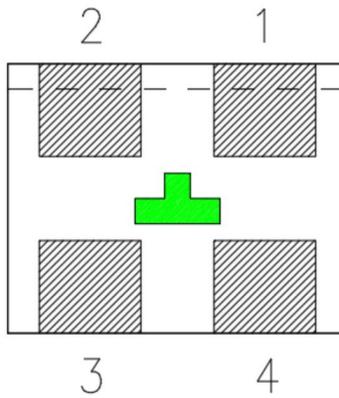


4. 封装尺寸图





5. 脚位定义

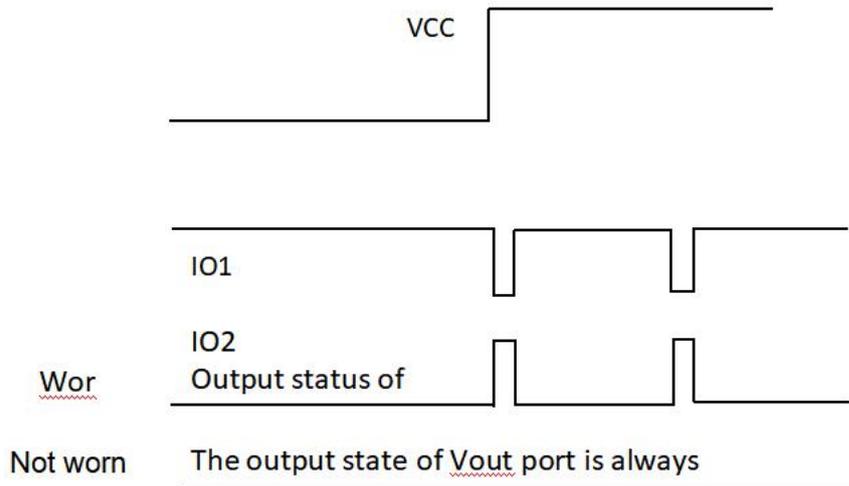


	PIN	脚位描述
1	LD-	信号输入负端
2	VCC	模拟信号电源
3	VOUT	状态电平输出 'H or L'
4	LD+	信号输入正端

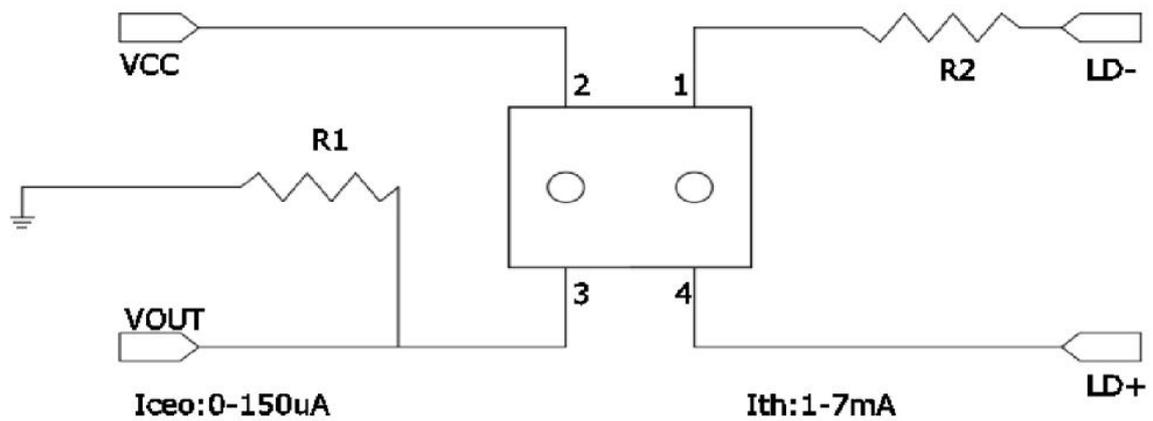


6. 应用电路的工作顺序:

例如, 250us被用于工作50ms (平均电流为30uA), 并且根据实际应用来调整时间。待机电流180nA。

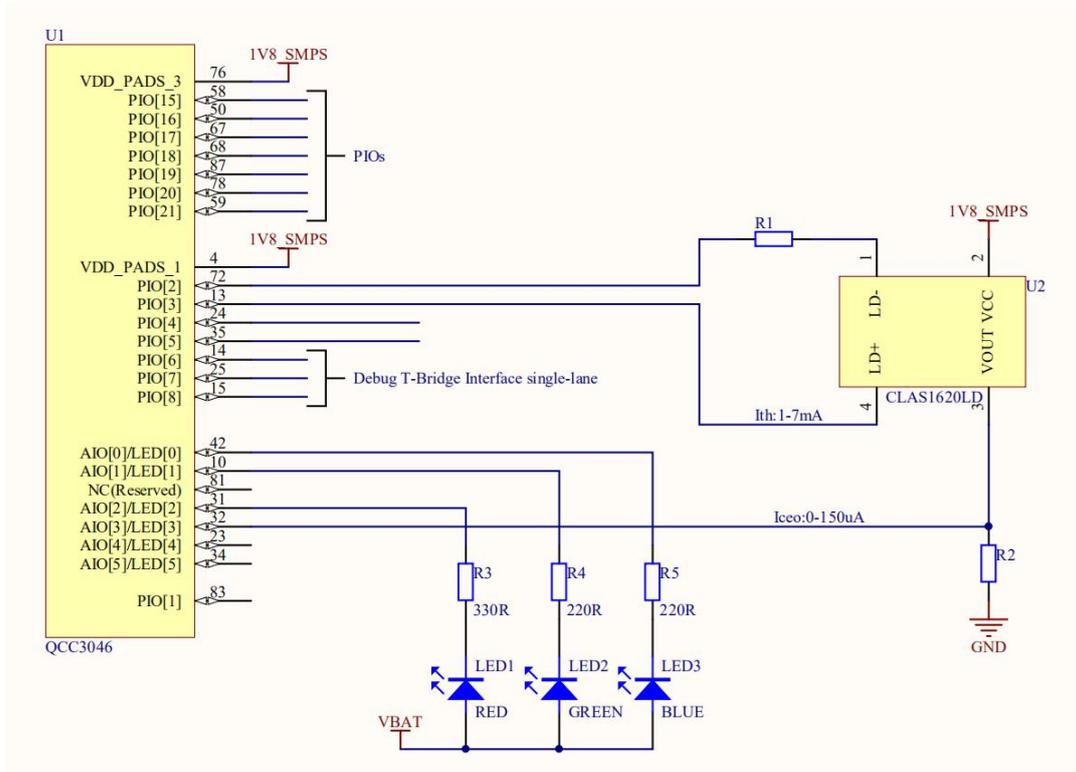


7. 典型的应用电路





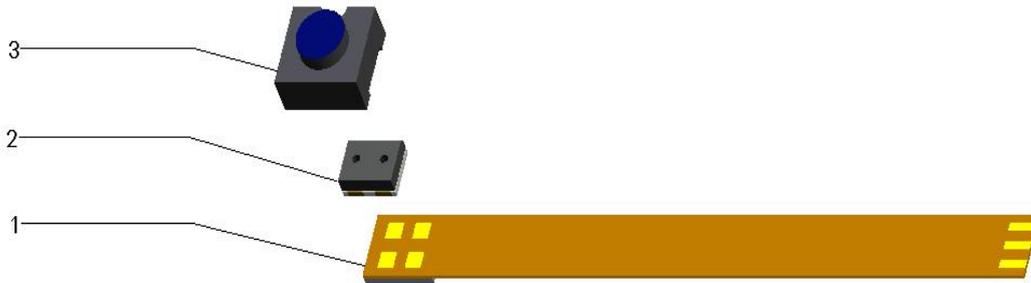
8. 基于高通QCC3046的应用电路



以上,全系统控制电路设计是基于高通QCC3046主控。(仅供参考,请参考实际设计)



9. 结构设计参考



NO.	Name	Features	Comment
1	FPC	Connect sensor to PCBA.	
2	Photoelectric sensor	It is used to detect the non - electric quantity which directly causes the change of light quantity, such as light intensity, illumination, radiation temperature measurement, gas composition analysis, etc.Can also be other non - electric charges, such as part diameter, surface roughness, strain, displacement, vibration, etc., that can be converted into changes in the amount of light. Speed, acceleration, as well as the shape of the object, the recognition of the working state.Photoelectric sensor with non - contact, fast response, Therefore, it has been widely used in industrial automation devices and robots.	
3	Filter	Used to filter light beyond the wavelength of 940nm.	



10. 发送器参数:

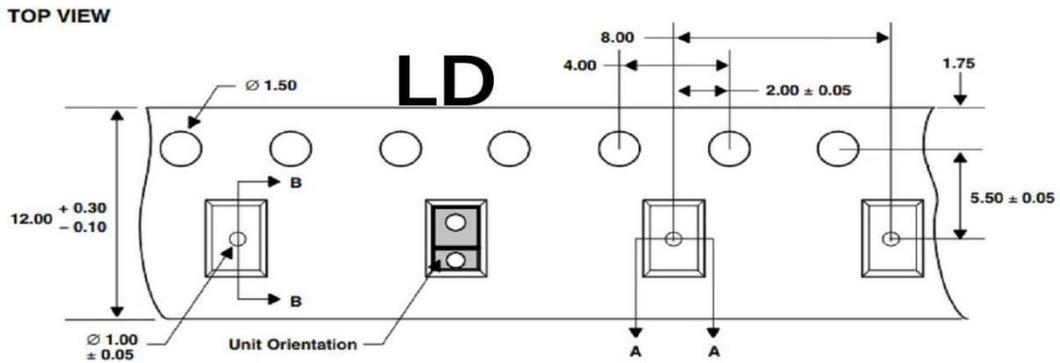
Parameters	Symbol	Min	Typical	Max	Units	Test Condition*
Optical Output Power	P_{OP}	5	6	–	mW	CW, 7.0mA, 25°C
Threshold Current	I_{th}	–	1	2	mA	CW, 25°C
Operating Current	I_{OP}	–	7	–	mA	CW, 25°C
Differential resistance	R_s	–	60	80		CW, 7.0mA, 25°C
Operating Voltage	V_{OP}	1.8	2.1	2.4	V	CW, 7.0mA, 25°C
Slope Efficiency	η_E	0.8	1	–	W/A	CW, 7.0mA, 25°C
Power Conversion Efficiency	PCE	38	41	–	%	CW, 7.0mA, 25°C
Wavelength	λ_{peak}	930	940	950	nm	CW, 7.0mA, 25°C
Spectral Width (RMS)	$\Delta\lambda$	–	1	2.5	nm	CW, 7.0mA, 25°C
Beam Full Divergence (D86)	φ	16	20	24	°	CW, 7.0mA, 25°C
ESD tolerance, human body model	ESD	260			V	HBM

11. 接收器参数:

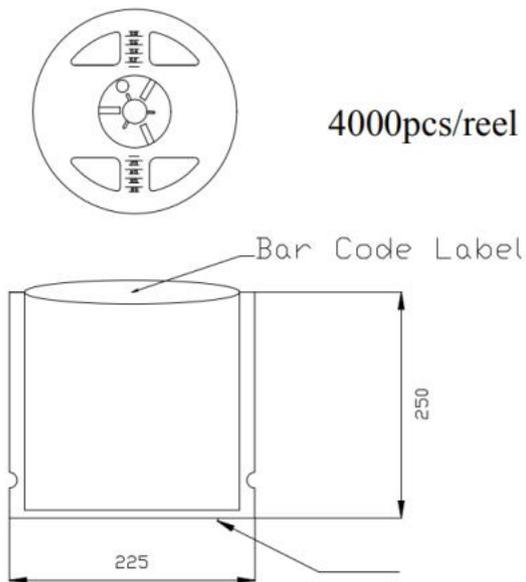
Parameters	Symbol	Min	Typical	Max	Units	Test Condition*
Collector-emitter Breakdown Voltage	BV_{CEO}	80			V	$I_{CEO}=100\mu A, 25^\circ C$
Emitter-collector Breakdown Voltage	BV_{ECO}	7			V	$I_{ECO}=10\mu A, 25^\circ C$
Collector-base Breakdown Voltage	BV_{CBO}	80			V	$I_{CBO}=100\mu A, 25^\circ C$
Collector Dark Current	I_{CEO}			30	μA	$V_{CE}=20V, 25^\circ C$
Collector Dark Current	I_{CEO}			150	μA	$V_{CE}=70V, 25^\circ C$
Collector-emitter Saturation Voltage	$V_{CE(sat)}$			0.3	V	$I_C=2MA, I_B=100\mu A, 25^\circ C$
Spectrum	λ_p	880			nm	25°C



12. 包装规格 (单位: 毫米)



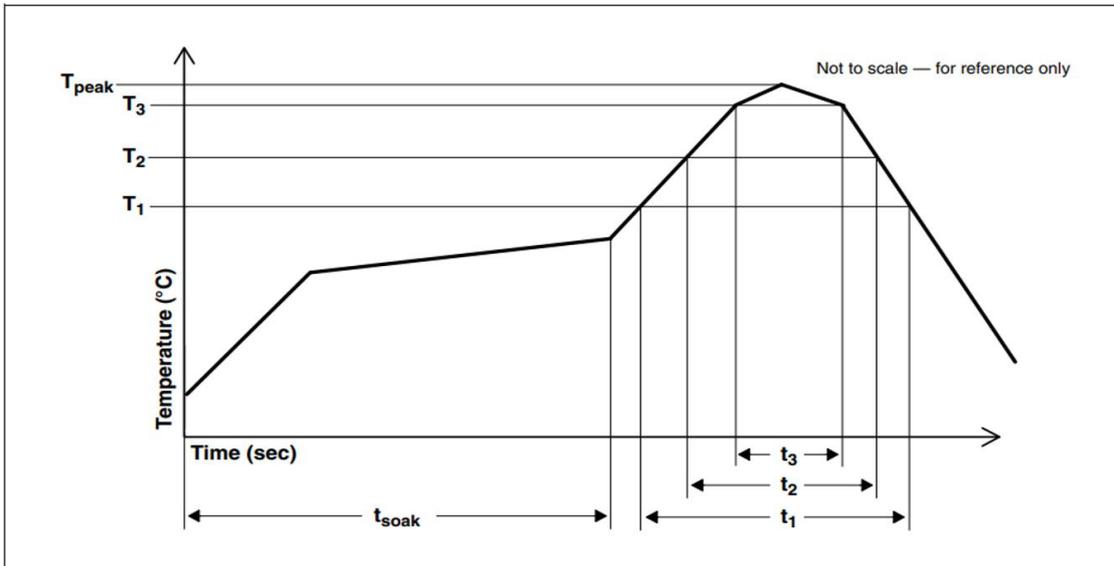
13. 包装方法: (单位: mm)





Parameter	Reference	Device
Average temperature gradient in preheating		2.5°C/sec
Soak time	t_{soak}	2 to 3 minutes
Time above 217°C (T_1)	t_1	Max 60 sec
Time above 230°C (T_2)	t_2	Max 50 sec
Time above $T_{\text{peak}} - 10^\circ\text{C}$ (T_3)	t_3	Max 10 sec
Peak temperature in reflow	T_{peak}	260°C
Temperature gradient in cooling		Max -5°C/sec

Solder Reflow Profile Graph





储存信息、水分敏感度

在焊接过程中，由于先前已被吸收到包装中的水分的释放和蒸发，可能会对该装置的光学特性产生不利影响。为了确保包装中含有尽可能少的吸收水分，每个设备在包装装运前都是干燥的。设备被包装在一个密封的镀铝信封，称为防潮袋与硅胶，以保护他们免受环境水分在运输，处理和储存前使用。防潮袋应储存在以下条件下：

温度范围：<40° C，相对湿度：<90%总时间, 如果未打开，距离镀铝的信封上的日期代码不超过12个月。如果设备未打开存储超过12个月，且湿度指示卡显示部件超出允许的湿度区域，则需要重新烘烤卷盘。如果暴露在以下条件下，则应在168小时内使用。温度范围：<30° C；相对湿度：<60%，如果需要重新烘焙，则应在50° C下进行12小时。该模块已被指定为MSL3的水分敏感性水平。