KLM80L, KLM81L

SOP5 3.3V HIGH SPEED 15MBit/s LOGIC GATE PHOTOCOUPLER

SOP5 3.3V高速15MBit/s逻辑门光耦



＊本文档中包含的信息反映了具有代表性的使用场景，仅供技术参考。
The information contained in this document reflects representative usage scenarios and is intended for technical reference only.
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＊本文档中的信息适用于电子元器件应用中的典型用法。如有任何特殊用途，请向晶台微电子咨询，以获得进一步的帮助。
The information in this document applies to typical use in electronic component applications. For special applications, please contact Kinglight Microelectronics for further assistance.
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1. 产品特点 Product features

- 高速15MBit/s High speed 15MBit/s
- 可保证在-40至85℃温度范围内运行 Guaranteed performance from -40 to 85℃
- 兼容 3.3和5V CMOS，逻辑门输出 3.3 and 5 V CMOS compatibility, Logic gate output
- 无卤素 (溴<900ppm, 氯<900ppm, 溴+氯<1500ppm)
  Halogens free (Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- 输入与输出间高隔离电压(Viso=3750 V rms)
  High isolation voltage between input and output (Viso=3750 V rms)
- 符合欧盟REACH法规 Compliance with EU REACH
- 无Pb且符合ROHS标准 Pb free and RoHS compliant
- 安全审批 Safety approval
  CQC认证已批准(编号:CQC25001468793) CQC approved (No.CQC25001468793)
  VDE认证已批准(编号:40061363) VDE approved (No.40061363)

2. 产品描述 Product Description

- KLM80L和KLM81L 由一个红外发射二极管和一个 CMOS 检测器集成电路组成。
  The KLM80L and KLM81L consist of an infrared emitting diode optically coupled to a CMOS detector IC.
- 这些器件采用 5 脚SOP封装，适用于表面贴装技术。
  The devices are packaged in 5-pin SOP package and are suitable for surface mounting technology.

3. 产品应用 Product Applications

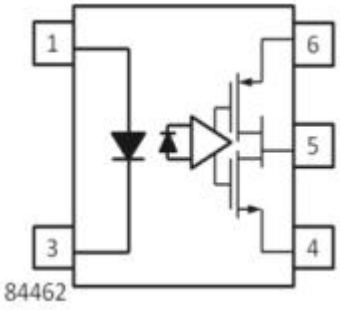
- 线路接收器，数据传输 Line receiver, data transmission
- 高速逻辑接地隔离 High speed logic ground isolation
- 数据多路复用 Data multiplexing
- 开关电源 Switching power supplies
- 脉冲变压器更换 Pulse transformer replacement
- 计算机外围接口 Computer peripheral interface

Truth Table(Positive Logic)

Input	Output
H	L
L	H

4. 功能图 Functional Diagram

Schematic



引脚配置 Pin Configuration

1. 阳极 Anode
3. 阴极 Cathode
4. 接地 GND
5. 输出电压 V_{out}
6. 电源电压 V_{CC}

5. 光电特性 Electrical-Optical characteristics

• 最大限度额定值(温度=25℃) Absolute Maximum Ratings(Ta=25℃)

参数 Parameter		符号 Symbol	额定值 Rated Value	单位 Unit
输入 Input	正向电流 Forward current	I_F	15	mA
	反向电压 Reverse voltage	V_R	5	V
	功耗 Power dissipation (T_A = 25°C)	P_D	35	mW
输出 Output	功耗 Power dissipation (T_A = 25°C)	P_O	85	mW
	输出电流 Output current	I_O	20	mA
	工作电压 (1*) Supply voltage	V_{CC}	5.5	V
总功率 Total Power Dissipation		P_T	100	mW
隔离电压 (2*) Isolation Voltage		V_{iso}	3750	Vrms
工作温度 Operating temperature		T_{OPR}	-40 to +85	℃
储存温度 Storage temperature		T_{STG}	-55 to +125	℃
焊接温度 (3*) Soldering temperature		T_{SOL}	260	℃

附注 (Notes):

1* The V_{CC} supply must be bypassed by a 0.1μF capacitor or larger. This can be either a ceramic or solid tantalum capacitor with good high frequency characteristic and should be connected as close as possible to the package V_{CC} and GND pins

V_{CC} 电源必须由一个 0.1μF 或更大的电容器旁路。该电容可以是陶瓷电容，也可以是具有良好高频特性的固体钽电容，并应尽可能靠近封装的 V_{CC} 和 GND 引脚连接。

2* 交流电源1分钟内, 相对湿度在40~60%RH环境下, 隔离电压测试时, 1&3脚短接在一起, 4、5&6脚短接在一起

AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1&3 are shorted together, and pins 4, 5&6 are shorted together.

3* 焊接时间为10秒 Soldering time is 10 seconds

6. 电气特性 Electrical Characteristics

参数 Parameter		符号 Symbol	最小值 Min.	规格值 Typ.	最大值 Max.	单位 Unit	条件 Condition
输入 Input	正向电压 Forward voltage	V_F	-	1.4	1.8	V	I_F=8mA
	反向电压 Reverse voltage	V_R	5.0	-	-	V	I_R=10μA
	正向电压温度系数 Temperature coefficient of forward voltage	$\Delta V_F/\Delta T_A$	-	-1.7	-	mV/℃	I_F=8mA
	输入电容 Input capacitance	C_{IN}	-	60	-	pF	V_F=0, f=1MHz
输出 Output	高电平工作电流 High level supply current	I_{CCH}	-	1.3	6	mA	I_F=0mA
	低电平工作电流 Low level supply current	I_{CCL}	-	1.3	6	mA	I_F=8mA
	高电平输出电压 High level output voltage	V_{OH}	V_{CC}-1	V_{CC}-0.3	-	V	I_F=0mA, I_O=-4mA V_{CC}=3.3V
			V_{CC}-1	V_{CC}-0.2	-	V	I_F=0mA, I_O=-4mA V_{CC}=5V
	低电平输出电压 Low level output voltage	V_{OL}	-	0.21	0.6	V	I_F=8mA, I_O=4mA V_{CC}=3.3V
			-	0.17	0.6	V	I_F=8mA, I_O=4mA V_{CC}=5V
	输入阈值电流 Input threshold current	I_{FT}	-	2	5	mA	I_{OL}=20uA V_{CC}=3.3V

开关特性 Switching Characteristics

参数 Parameter		符号 Symbol	最小值 Min.	规格值 Typ.*	最大值 Max.	单位 Unit	条件 Condition
到输出高电平的传播延迟时间 Propagation Delay Time to output high level		t_{PHL}	-	30	65	ns	I_F=8mA, V_{CC}=3.3V
			-	33	-	ns	I_F=8mA, V_{CC}=5V
到输出低电平的传播延迟时间 Propagation delay time to output low level		t_{PLH}	-	48	65	ns	I_F=8mA, V_{CC}=3.3V
			-	52	-	ns	I_F=8mA, V_{CC}=5V
脉冲宽度失真 Pulse width distortion		$\lvert t_{PHL}-t_{PLH}\rvert$	-	20	50	ns	I_F=8mA, V_{CC}=3.3V
				22	-	ns	I_F=8mA, V_{CC}=5V
输出上升时间 Output rise time		t_r	-	7	-	ns	I_F=8mA, V_{CC}=3.3V
输出下降时间 Output fall time		t_f	-	7	-	ns	
逻辑高电平时的共模瞬态抗扰度(4*) Common Mode Transient Immunity at Logic High	KLM80L	$\lvert CM_H\rvert$	5000	-	-	V/us	I_F = 0mA, T_A =25°C V_{CM}=1000Vp-p
	KLM81L		10000	-	-		
逻辑低电平时的共模瞬态抗扰度(5*) Common Mode Transient Immunity at Logic Low	KLM80L	$\lvert CM_L\rvert$	5000	-	-	V/us	I_F = 8mA, T_A =25°C V_{CM}=1000Vp-p
	KLM81L		10000	-	-		

7. 特性曲线 Characteristic Curves

图1. 正向电流 vs 正向电压的关系

Figure 1. Forward Current vs Forward Voltage

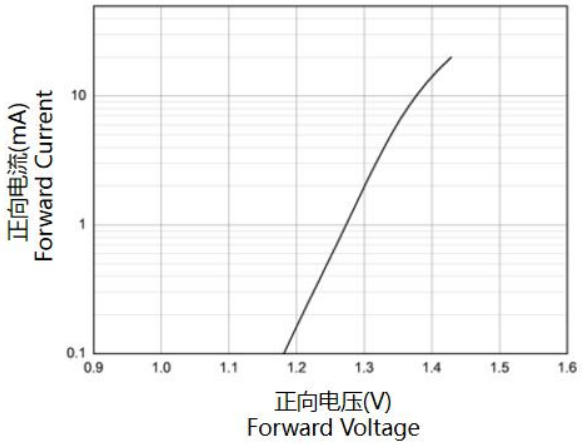


图2 输入阈值电流 vs 环境温度的关系

Fig.2 Input threshold current vs ambient temperature

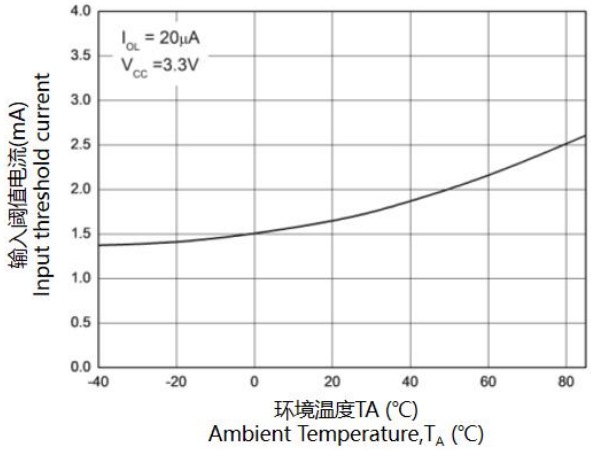


图3. 高电平工作电流 vs 环境温度的关系

Figure 3. High level supply current vs Ambient Temperature

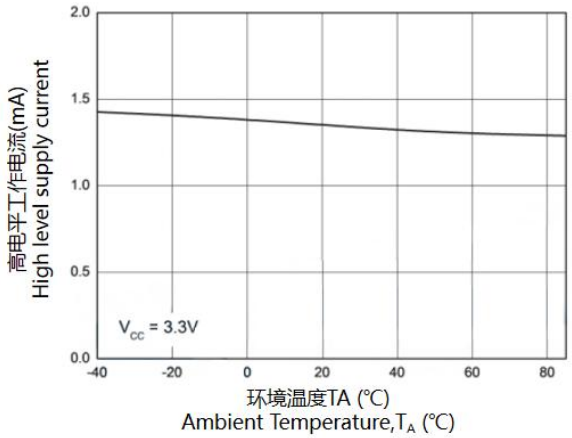


图4. 低电平工作电流 vs 环境温度的关系

Figure 4. Low level supply current vs Ambient Temperature

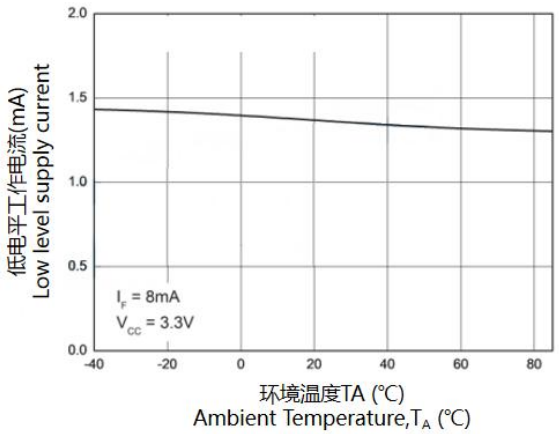


图5. 开关时间 vs 正向电流的关系

Figure 5. Switching time vs Forward current

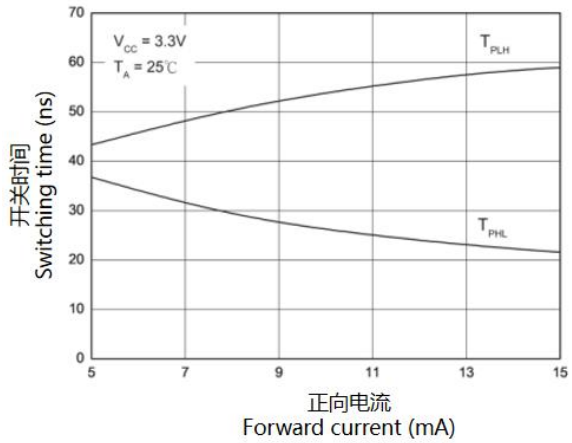


图6. 开关时间 vs 正向电流的关系

Figure 6. Switching time vs Forward current

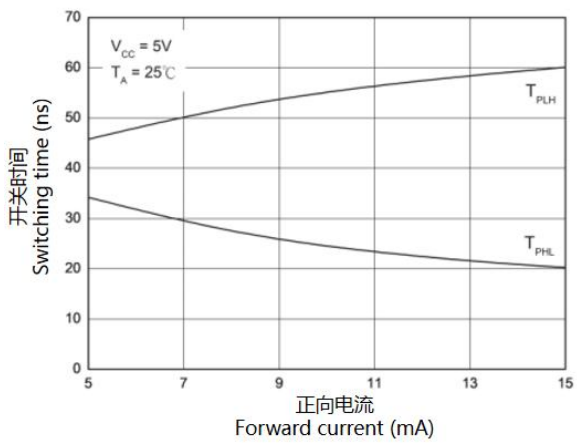


Figure 7. tPHL, tPLH, tr 和 tf的测试电路和波形 Test circuit and waveforms for tPHL, tPLH, tr and tf

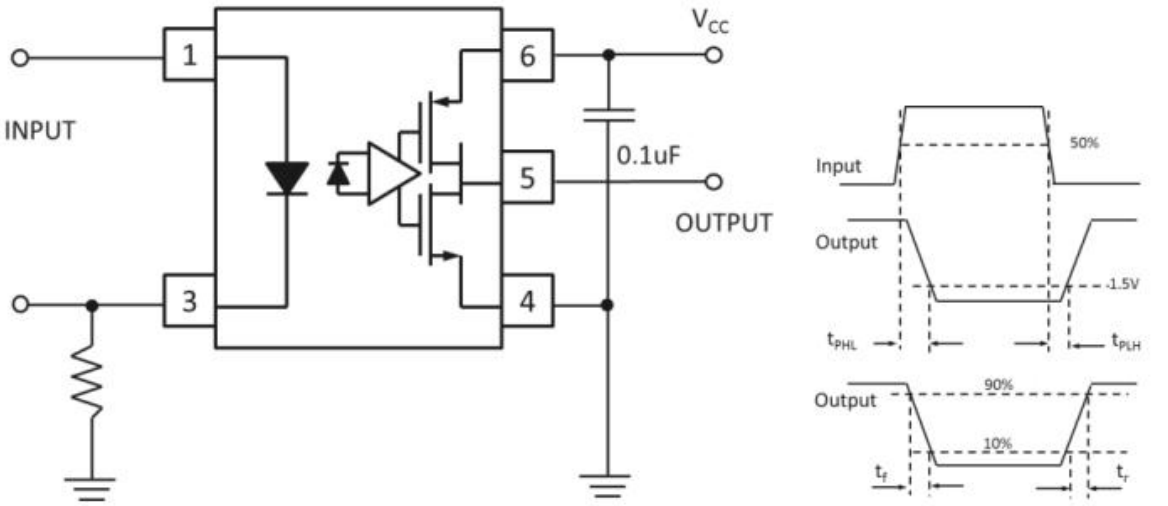
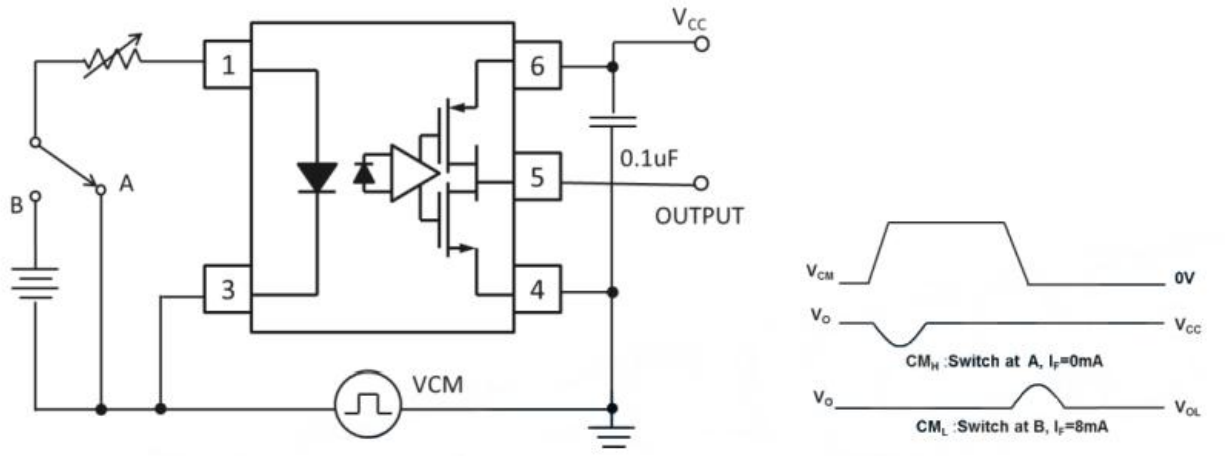


图8.测试电路共模瞬态抗扰度 Test circuit Common mode Transient Immunity



*4.CMH-为确保输出保持在高电平状态（即 VOUT > 2.0V），共模电压的最大可容许上升率
CMH-The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the HIGH state (i.e., VOUT > 2.0V)
*5.CML-为确保输出保持在低电平输出状态（即 VOUT < 0.8V），共模电压的最大可容许上升率
CML-The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the LOW output state (i.e., VOUT < 0.8V)

8. 订单信息 Order Information

• 材料编号 Part Number

KLM8XL-Z-V

附注(Notes):

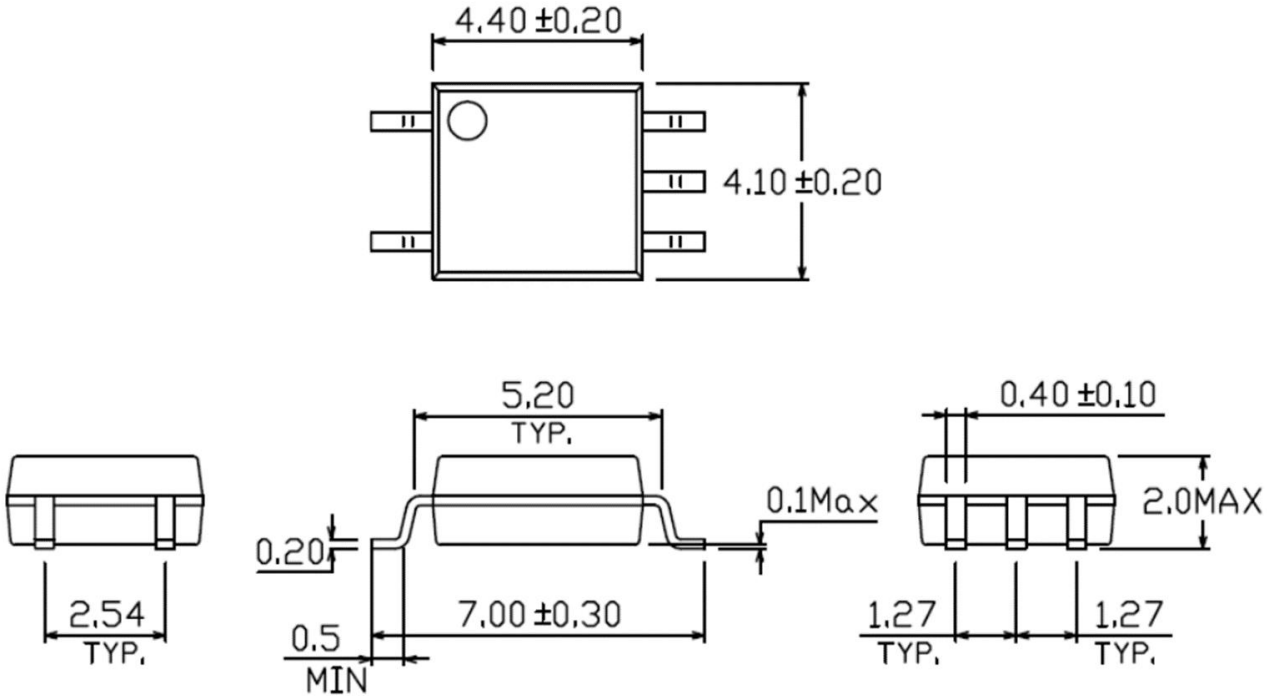
X =零件编号(0或1) Part No. (0 or 1)

Z = 料带和卷轴选项 (TA, TB或无)
Tape and reel option (TA、TB or none)

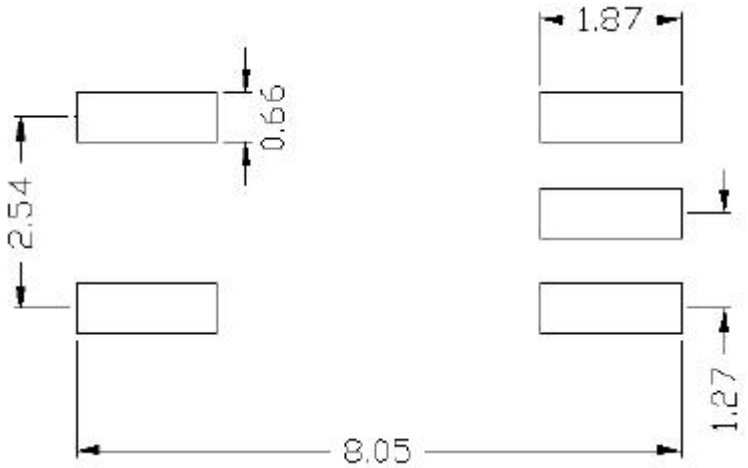
V = 表示VDE标识(客户指定镭射字符才加"V")
VDE (Only add "V" to laser characters specified by the customer)

选项 Option	描述 Description	包装数量 Packing quantity
无 None	标准SMD选项 Standard SMD option	每管100pcs 100 units per tube
TA	表面贴装引线形式+TA载带和卷轴选项 Surface mount lead form + TA tape & reel option	每卷3000pcs 3000 units per reel
TB	表面贴装引线形式+TB载带和卷轴选项 Surface mount lead form + TB tape & reel option	每卷3000pcs 3000 units per reel
/	内盒装：每盒3盘 Inner box packaging：3reels/box	每盒9000pcs 9000pcs per box
/	每箱装：10个内盒 Pack per Carton: 10inner boxes	每箱90000pcs 90000pcs per Carton

9. 封装尺寸(单位:毫米) Package Drawing(Unit:mm)



• 表面贴片类型PIN脚焊盘布局 Surface patch type PIN foot pad layout

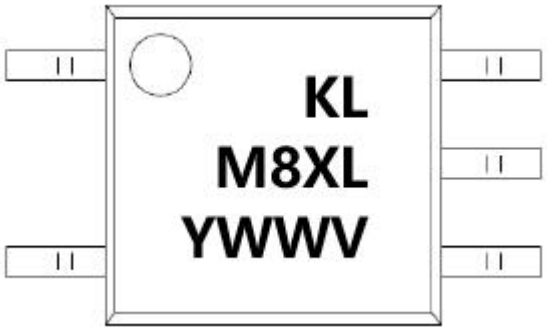


备注 Notes

a. 建议焊盘尺寸仅供参考Suggested pad dimension is just for reference only

b.请根据个人需要修改焊盘尺寸Please modify the pad dimension based on individual needs

10.设备标记 Device marking





(范本参考 Template reference)

附注(Notes):

KL = 表示晶台微电子有限公司 Denotes Kinglight Microelectronics

M8XL = 表示材料部件号 Denotes Device Part Number
X表示零件编号(0或1) Part No. (0 or 1)

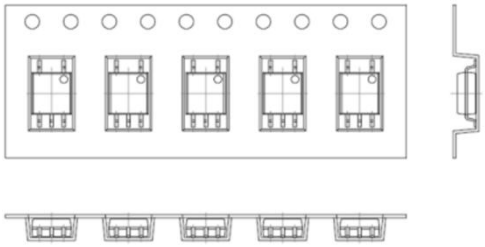
Y = 表示1位年份代码Denotes 1 digit Year code

WW = 表示2位周别代码Denotes 2 digit Week code

V = 表示VDE标识(客户指定镭射字符才加"V")
VDE (Only add "V" to laser characters specified by the customer)

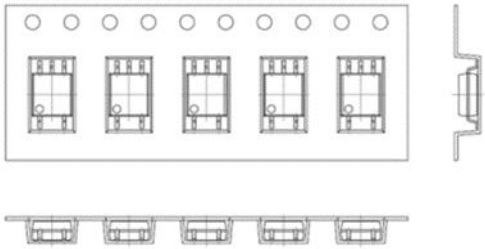
11.料带和卷轴包装规格 Tape & Reel Packing Specifications

• 选择TA Option TA



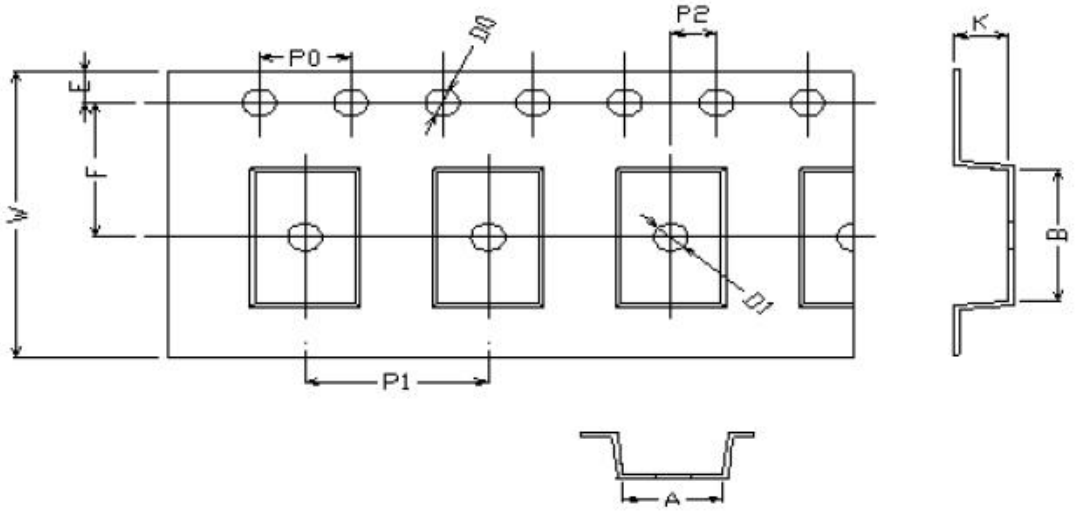
卷轴进给方向 Direction of feed from reel

• 选择TB Option TB



卷轴进给方向 Direction of feed from reel

料带尺寸Material belt size



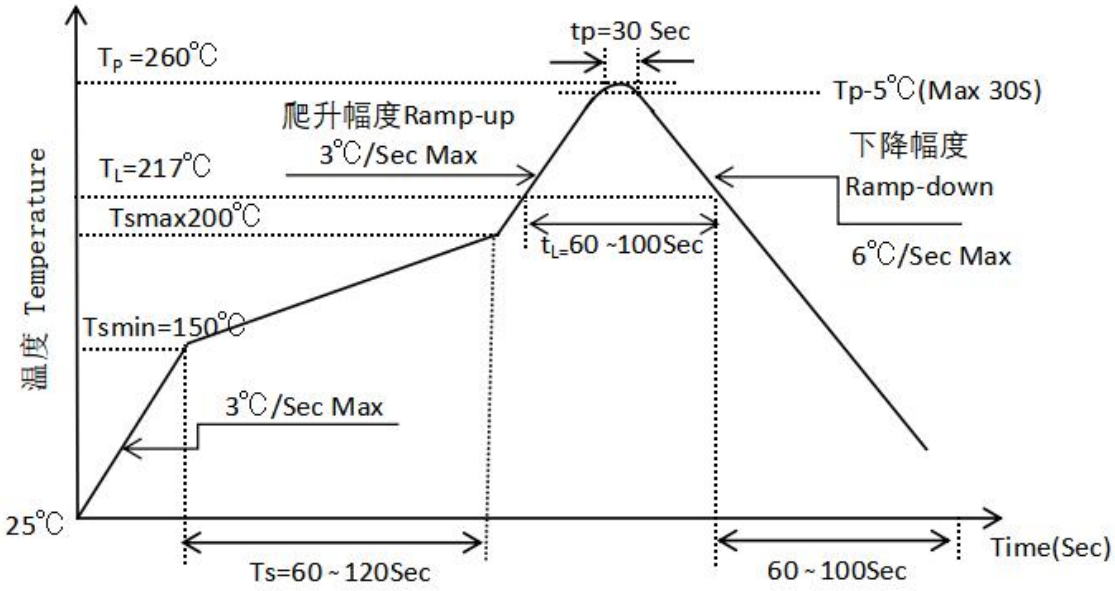
尺寸编号 Dimension No.	A	B	D0	D1	E	F
尺寸(mm) Dimension(mm)	4.4±0.1	7.6±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
尺寸编号 Dimension No.	P0	P1	P2	t	W	K
尺寸(mm) Dimension(mm)	4.0±0.15	8.0±0.1	2.0±0.1	0.3±0.1	16.0±0.2	2.4±0.1

12.焊接温度曲线 Temperature Profile Of Soldering

• 回流焊温度曲线 Reflow soldering

建议在下面所示的温度和时间分布条件下, 进行一次回流焊作业, 不得超过三次

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.



项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	T_s	150	200	℃
预热时间 Preheat Time	ts	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
高于液相线温度(T_L)的时间 Time above Liquidus Temperature T_L	t_L	60	100	s
峰值温度 Peak Temperature	T_P	-	260	℃
T_c 在(T_P-5)和 T_P之间的时间 Time During Which T_c Is Between (T_P-5) and T_P	t_p	-	30	s
降温速率 Ramp-down Rate(T_P to T_L)	-	-	6	℃/s