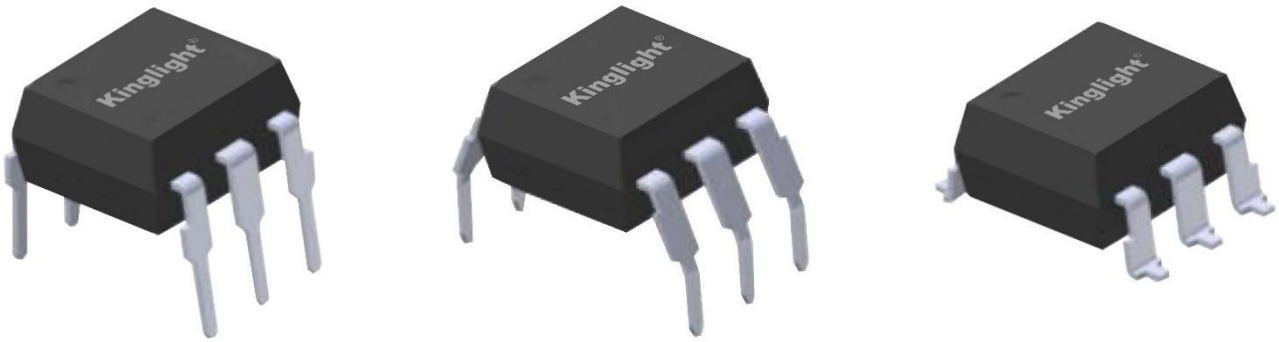
Kinglight®
晶台微电子

KLH11LX

DIP6 SCHMITT TRIGGER PHOTOCOUPLER

DIP6 施密特触发光电耦合器



* 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.
* 本文档中提到的产品型号和规格如有更改或改进，恕不另行通知。在生产使用之前，客户应参考产品规格书的最新数据表。
  Product models and specifications mentioned in this document are subject to change or improvement without notice. Customers should refer to the latest data sheets in the product specifications prior to production use.
* 在使用本文档中引用的产品时，请确保产品在数据手册中规定的环境和电气限制范围内运行。如果客户使用超过指定的限制，晶台微电子将不会对任何后续问题负责。
  When using the products referenced in this document, ensure that the products are operated within the environmental and electrical limits specified in the data sheet. If the customer uses the product beyond the specified limits, Kinglight Microelectronics will not be responsible for any subsequent problems.
* 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.
* 未经晶台微电子允许，不得复制或转载本文件的内容和信息。对于最新的信息，请参考官方网站 Http://www.klmicro.com。
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1. 产品特点 Product features

- 高传输速率，规格值频率为1MHz(NRZ) High data rate, 1MHZ typical (NRZ)
- 输入与输出间高隔离电压(Viso=5000 V rms)
  High isolation voltage between input and output (Viso=5000 V rms)
- 在整个电压和温度波动范围内无闭锁和振荡
  Free from latch up and oscillation throughout voltage and temperature ranges
- 微处理器兼容的驱动器 Microprocessor compatible drive
- 逻辑兼容输出在最大 0.4V 电压下输出 16mA 电流
  Logic compatible output sinks 16mA at 0.4V maximum
- 保证开/关阈值滞后 Guaranteed on/off threshold hysteresis
- 宽供电电压能力，兼容所有常用逻辑系统
  Wide supply voltage capability, compatible with all popular logic systems
- 紧凑型双联封装 Compact dual-in-line package
- 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:CQC25001469218) CQC approved (No.CQC25001469218)
  VDE认证已批准(编号:40061363) VDE approved (No.40061363)

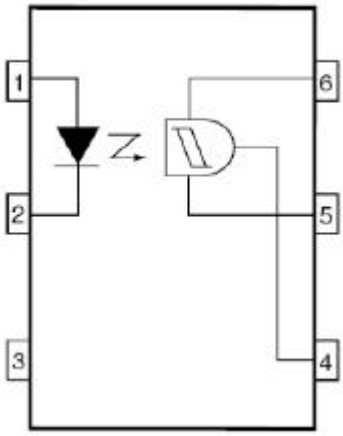
2. 产品描述 Product Description

- KLH11LX系列由一个砷化镓红外发光二极管和一个高速集成电路检测器组成，该输出检测器包含了一个施密特触发器，可为抗噪和脉冲整形提供滞后。
  The KLH11LX series of devices each consist of a GaAs infrared emitting diode optically coupled to a high speed integrated circuit detector. The output detector incorporates a Schmitt trigger, which provides hysteresis for noise immunity and pulse shaping.
- 该器件采用6引脚DIP封装，并有宽导线间距和SMD选项。
  The devices are in a 6-pin DIP package and available in wide-lead spacing and SMD option.

3. 产品应用 Product Applications

- 逻辑到逻辑隔离器 Logic to logic isolator
- 可编程电流传感器 Programmable current level sensor
- 线路接受器-消除噪音和瞬态问题 Line receiver – eliminate noise and transient problems
- 交流到TTL的转换-方波整形 AC to TTL conversion – square wave shaping
- 电源设备的数字编程 Digital programming of power supplies
- 计算机与外围设备的接口 Interfaces computers with peripherals

4. 功能图 Functional Diagram



引脚配置 Pin Configuration

1. 阳极 Anode
2. 阴极 Cathode
3. 无连线 No Connection
4. 输出电压 Vo
5. 接地极 GND
6. 工作电压 Vcc

真值表
Truth Table

Input	Output
H	L
L	H

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	60	mA
	反向电压 Reverse voltage	V_R	6	V
	功耗 Power dissipation	P_D	120	mW
输出 Output	V_{45}允许范围 V_{45} Allowed Range	V_O	0 to16	V
	V_{65}允许范围 V_{65} Allowed Range	V_{CC}	3 to16	V
	输出电流 Output Current	I_O	50	mA
	功耗 Power dissipation	P_D	150	mW
总消耗功率 Total Consume Power		P_{TOT}	250	mW
隔离电压 (1*) Isolation Voltage		V_{iso}	5000	Vrms
工作温度 Operating temperature		T_{OPR}	-55 to +100	℃
储存温度 Storage temperature		T_{STG}	-55 to +125	℃
焊接温度 (2*) Soldering temperature		T_{SOL}	260	℃

附注 (Notes):

1* 交流电源1分钟, 相对湿度在40~60%RH环境下, 隔离电压测试时, 1&2&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, 2&3 are shorted together, and pins 4, 5 & 6 are shorted together.

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

6. 电气特性(Ta=25℃,除非另有规定)

Electrical Characteristics(Ta=25℃ unless specified otherwise)

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	-	1.15	1.5	V	I_F=10mA
	反向电流 Reverse current	I_R	-	-	10	μA	V_R=5V
	输入电容 Input capacitance	C_J	-	-	100	pF	V=0V,f=1MHz
输出 Output	工作电压范围 Operation Voltage Range	V_{CC}	3	-	15	V	-
	供应电流 Supply Current	$I_{CC(off)}$	-	1.6	5	mA	V_{CC}=5V I_F=0mA
	输出电流(高电位) Output Current(High)	I_{OH}	-	-	100	μA	I_F=0mA V_{CC}=V_O=15V
	隔离电阻 Isolation Resistance	R_{ISO}	10^{11}	-	-	Ω	V_{I-O}=500VDC

• 温度Ta=25℃下规格值 Typical values at Ta = 25°C

• 传输特性 (Ta=25℃, 除非另有规定)
Transfer Characteristics (Ta=25℃ unless specified otherwise)

参数 Parameter		符号 Symbol	最小值 Min.	规格值 Typ.	最大值 Max.	单位 Unit	条件 Condition
供应电流 Supply Current		$I_{CC(on)}$	-	1.6	5	mA	V_{CC}=5V I_F=10mA
输出电压(低电位) Output Voltage(Low)		V_{OL}	-	-	0.4	V	V_{CC}=5V I_F=I_{Fon}(max) R_L=270 Ω
阀值开启电流 Turn on Threshold Current 1*	KLH11L1	I_{Fon}	-	-	1.6	mA	V_{CC}=5V R_L=270 Ω
	KLH11L2		-	-	10		
	KLH11L3		-	-	5		
阀值电流关闭 Turn off Threshold Current		I_{Foff}	-	1	-	mA	V_{CC}=5V R_L=270 Ω
滞后率 Hysteresis Ratio		I_{Foff}/ I_{Fon}	0.5	-	0.9	-	V_{CC}=5V R_L=270 Ω
导通时间 Turn on Time		t_{on}	-	-	4	μs	V_{CC}=5V I_F=I_{Fon} R_L=270 Ω
下降时间 Fall Time		t_f	-	0.1	-	μs	
关闭时间 Turn off Time		t_{off}	-	-	4	μs	
上升时间 Rise Time		t_r	-	0.1	-	μs	
传输数据速率 Data Rate		-	-	1	-	MHz	-

• 温度Ta=25℃下规格值 Typical values at Ta = 25°C

附注(Notes):

1* Max $I_{F(ON)}$ 是触发输出所需的最大电流。例如，1.6mA的最大触发电流就要求LED的输出电流大于1.6mA，以保证器件正常工作。建议使用10%的保护带，来考虑LED的使用寿命的衰减，允许的最大LED驱动电流为60mA。

Max $I_{F(ON)}$ is the maximum current required to trigger the output. For examples, a 1.6mA maximum trigger current would require the LED to be driven at a current greater than 1.6mA to guarantee the device will turn on. A 10% guard band is recommended to account for degradation of the LED over its lifetime. The maximum allowable LED drive current is 60mA.

7. 特性曲线 Characteristic Curves

图 1.正向电流与正向电压曲线图
Figure1.Forward Current vs Forward Voltage

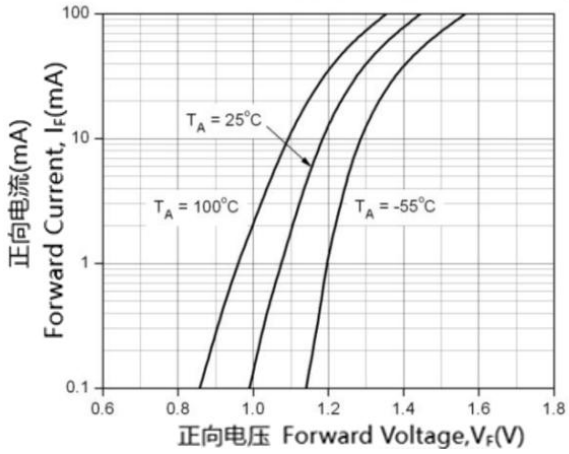


图 2.传输特性
Figure 2. Transfer Characteristics

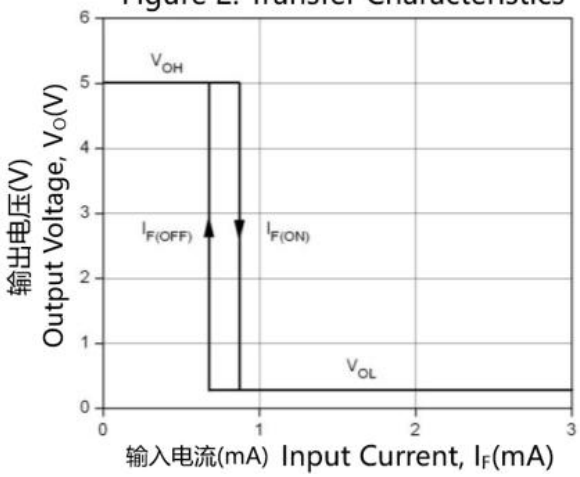


图 3.打开阀值电流与供应电压曲线图
Figure 3. Turn On Threshold Current vs Supply Voltage

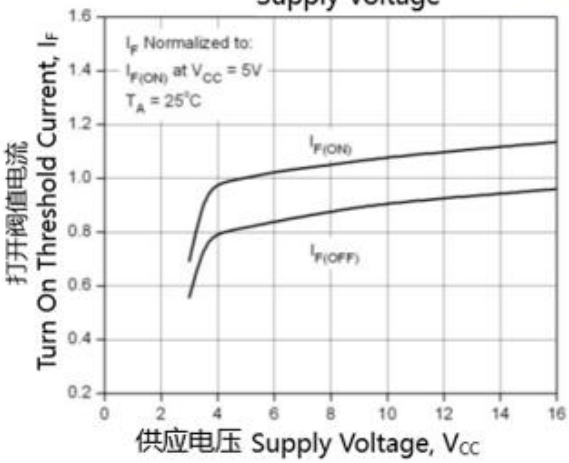


图 4.打开阀值电流与环境温度曲线图
Figure 4. Turn On Threshold Current vs Ambient Temperature

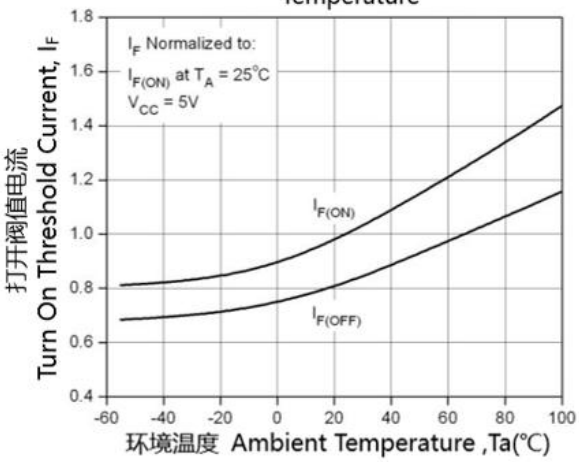


图 5.低输出电压与负载电流曲线图
Figure 5. Low Level Output Voltage vs Load Current

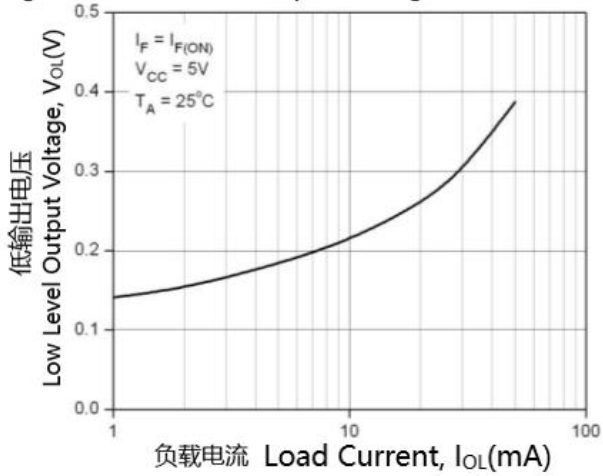


图 6.供应电流与供应电压曲线图
Figure 6. Supply Current vs Supply Voltage

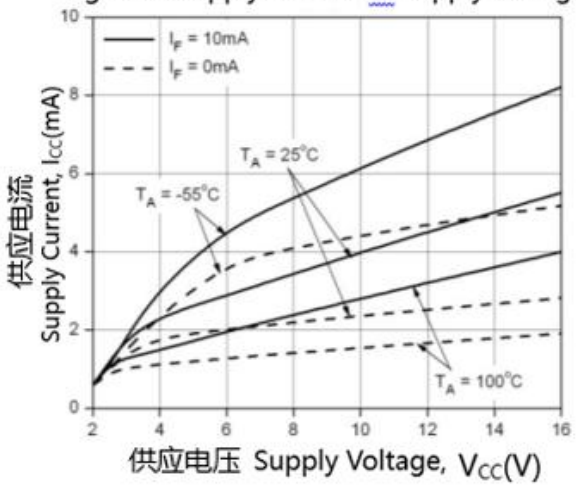
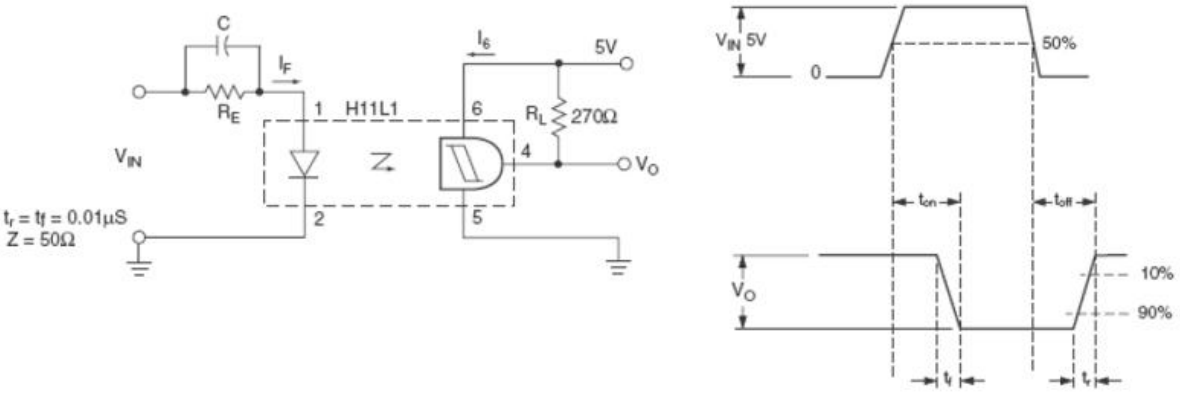


图7 开关时间测试电路及波形

Fig7. Switching Time Test Circuit & Waveforms



8. 订单信息 Order Information

• 材料编号 Part Number

KLH11LXY-Z-V

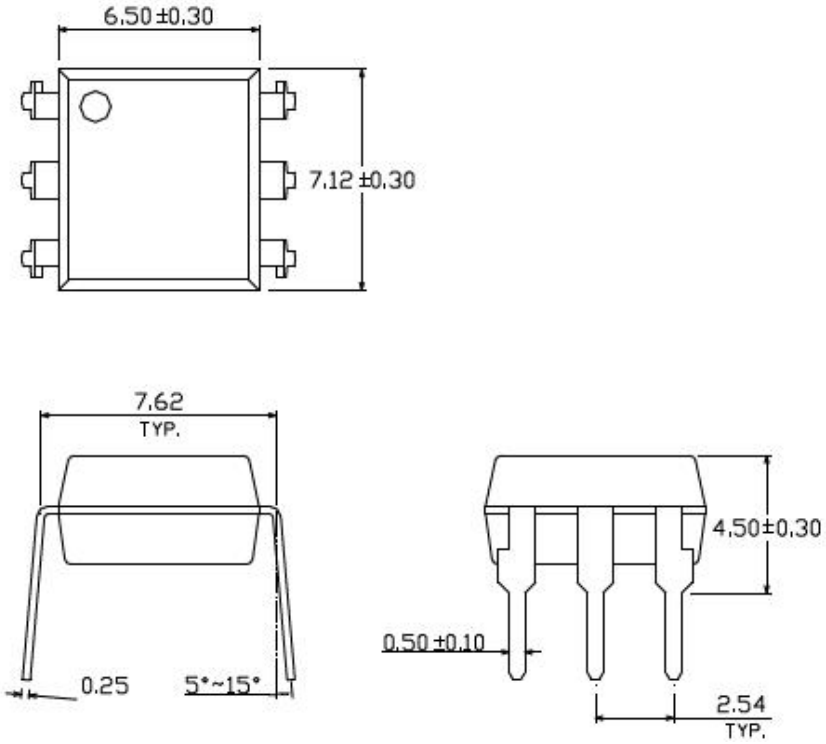
附注(Notes):

X = 零件编号(1、2 或 3)
Part No. (1, 2 or 3)
Y = 引脚形式选项(S、S1、M 或 无)
Lead form option (S, S1, M or none)
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)

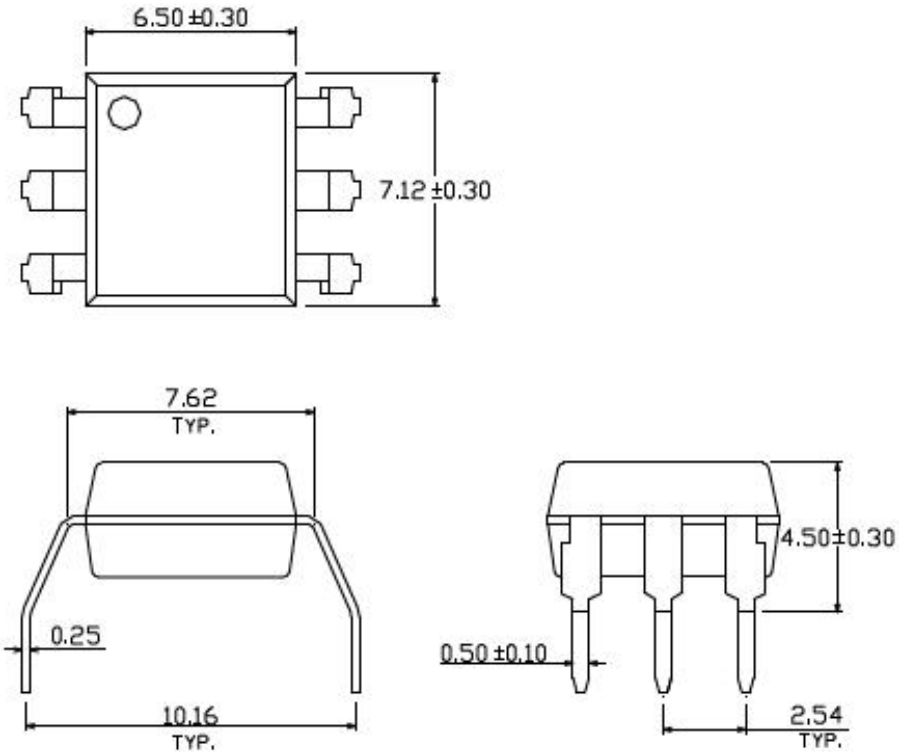
选项 Option	描述 Description	包装数量 Packing quantity
无 None	标准DIP-6 Standard DIP-6	每管65pcs 65 units per tube
M	宽引脚弯曲(0.4英寸间距) Wide lead bend (0.4 inch spacing)	每管65pcs 65 units per tube
S-TA	表面贴装引线形式+TA载带和卷轴选项 Surface mount lead form + TA tape & reel option	每卷1000pcs 1000 units per reel
S-TB	表面贴装引线形式+TB载带和卷轴选项 Surface mount lead form + TB tape & reel option	每卷1000pcs 1000 units per reel
S1-TA	表面贴装引线形式(低剖面)+TA载带和卷轴选项 Surface mount lead form (low profile) + TA tape & reel option	每卷1000pcs 1000 units per reel
S1-TB	表面贴装引线形式(低剖面)+TB载带和卷轴选项 Surface mount lead form (low profile) + TB tape & reel option	每卷1000pcs 1000 units per reel

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

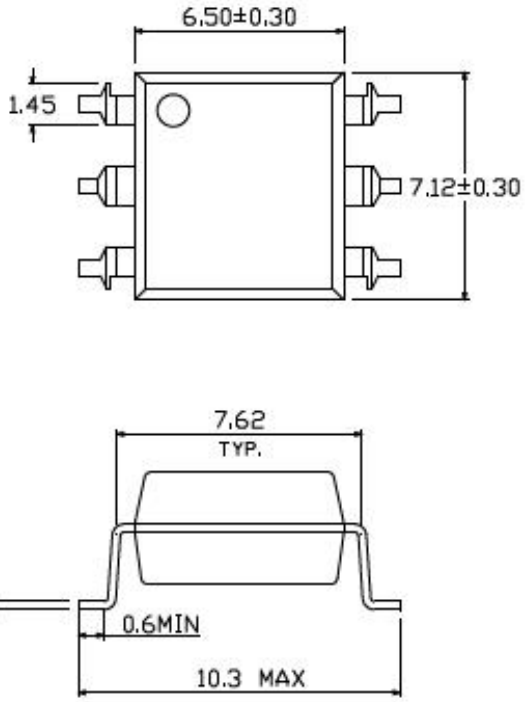
• 标准DIP型号 Standard DIP Type



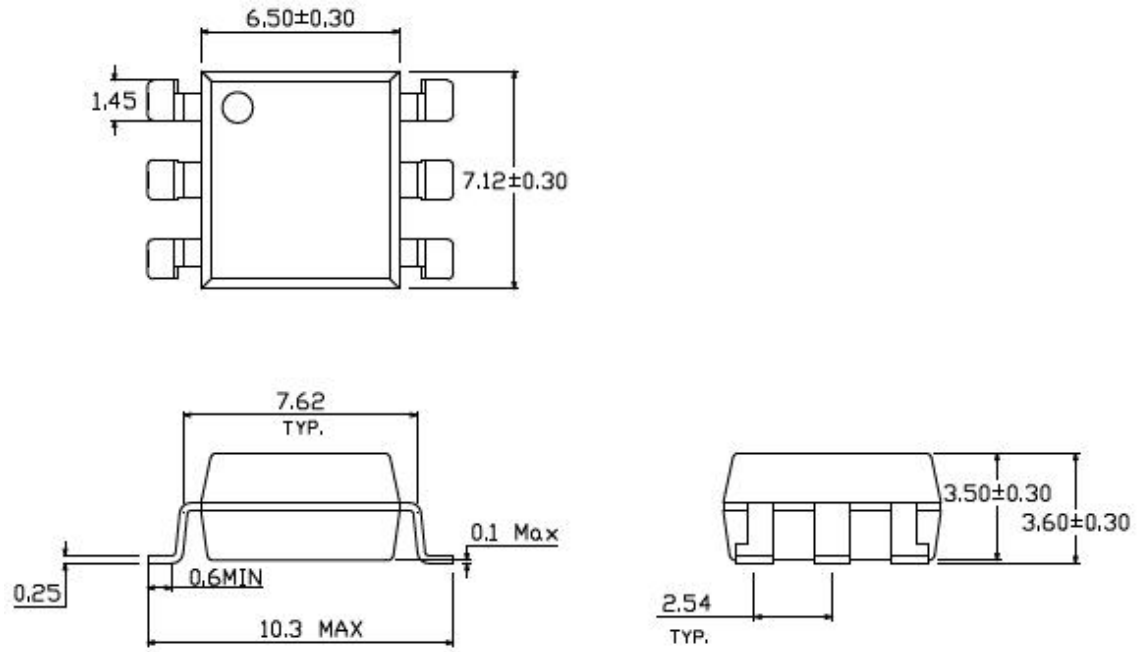
• 选择M型号 Option M Type



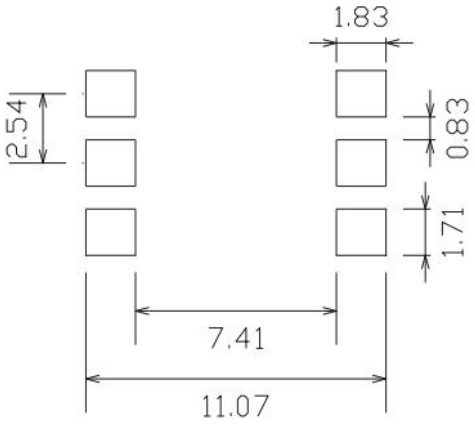
• 选择S型号 Option S Type



• 选择S1型号 Option S1 Type



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

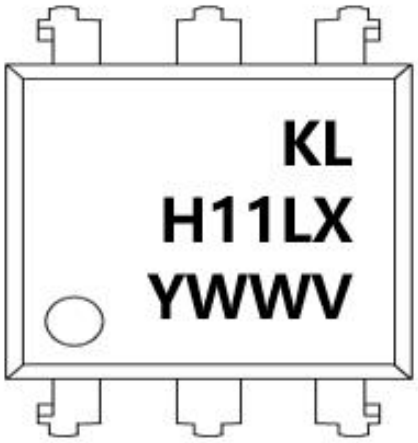


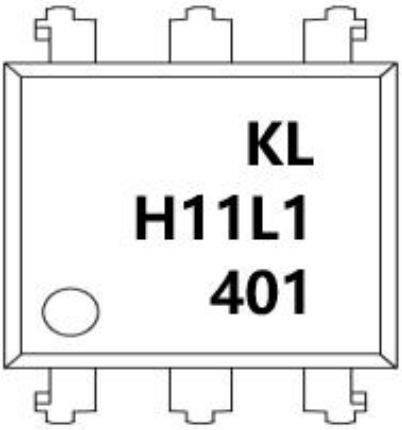
附注(Notes):

a. 推荐焊盘尺寸仅供参考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

H11LX = 表示材料部件号 Denotes Device Part Number
X表示零件编号(1、2 或 3) Part No. (1, 2 or 3)

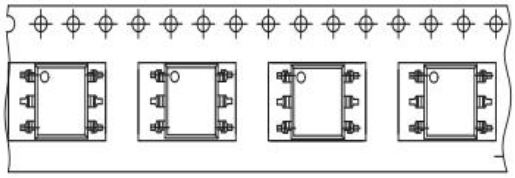
Y = 表示1位年份代码 Denotes 1 digit Year code

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)

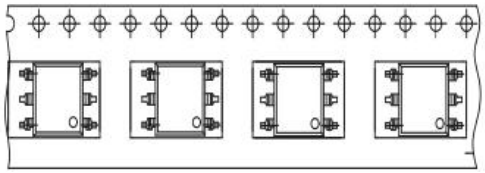
11. 料带和卷轴包装规格 Tape & Reel Packing Specifications

• 选择TA Option TA



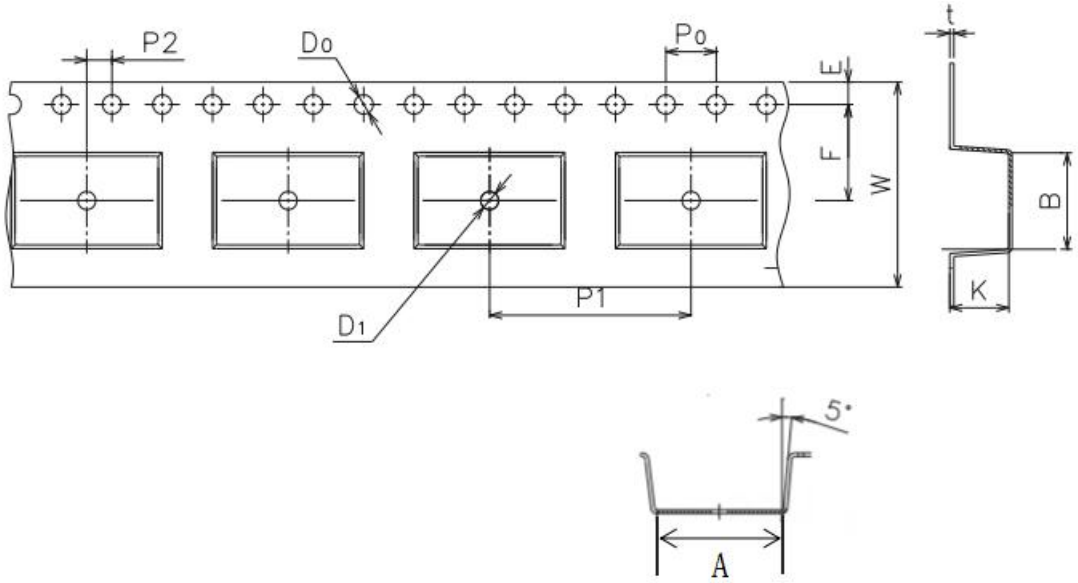
卷轴进给方向 Direction of feed from reel

• 选择TB Option TB



卷轴进给方向 Direction of feed from reel

料带尺寸Material belt size



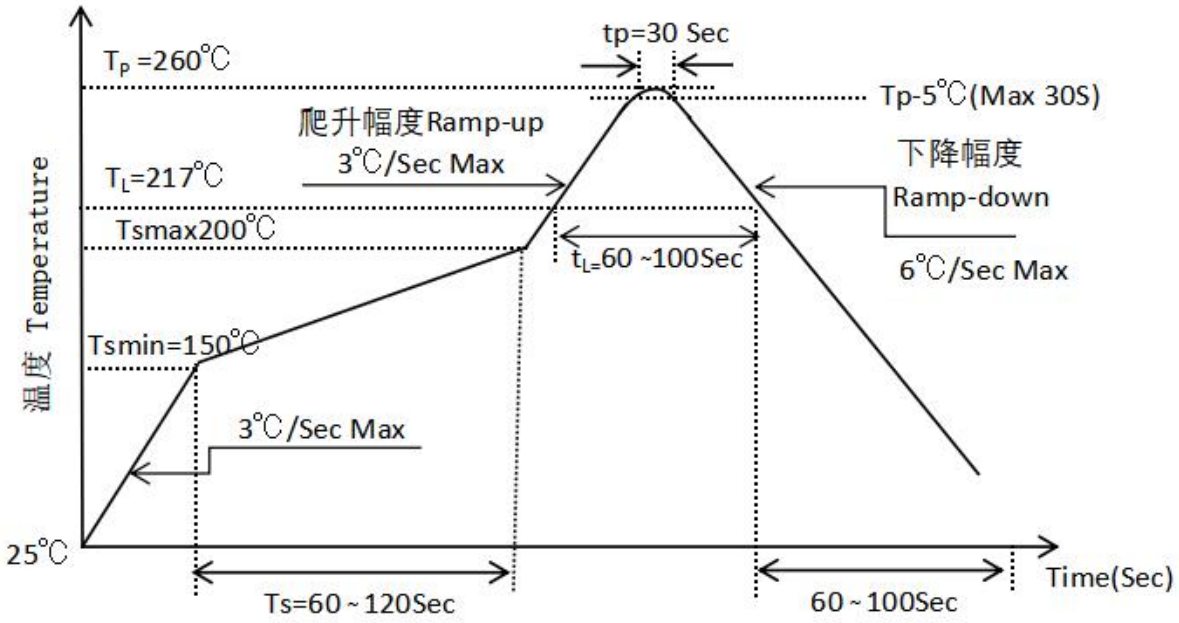
尺寸编号 Dimension No.	A	B	D0	D1	E	F
尺寸(mm) Dimension(mm)	10.8±0.1	7.55±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
尺寸编号 Dimension No.	P0	P1	P2	t	W	K
尺寸(mm) Dimension(mm)	4.0±0.15	16.0±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

12. 焊接温度曲线 Temperature Profile Of Soldering

• 回流焊焊接条件 Reflow soldering Soldering Condition

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.

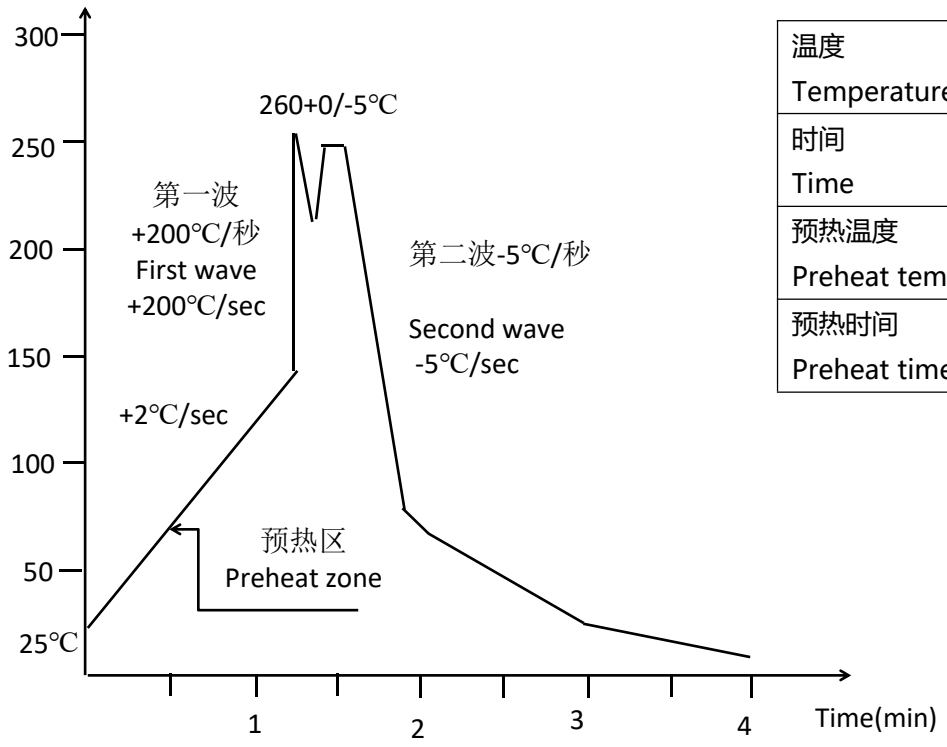


项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	T_s	150	200	℃
预热时间 Preheat Time	ts	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
高于液相线温度(T_L) 的时间 Time above Liquidus Temperature T_L	t_L	60	100	s
峰值温度 Peak Temperature	T_P	-	260	℃
T_c 在(T_P-5)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

• 波峰焊温度曲线 Wave Soldering

温度条件下, 建议一次焊接

One time soldering is recommended within the condition of temperature



温度 Temperature	260℃+0/-5℃
时间 Time	10秒 10S
预热温度 Preheat temperature	25至140℃ 25 to 140℃
预热时间 Preheat time	30至80秒 30 to 80 S