Kinglight®
晶台微电子

KL452

SOP4 HIGH VOLTAGE PHOTO DARLINGTON PHOTOCOUPLER

SOP4高压达林顿光耦



*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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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

- 符合无卤素标准 Compliance Halogens free
- 高集电极-发射极电压 (V_{CEO}=350V) High collector- emitter voltage (V_{CEO}=350V)
- 电流传输比(CTR: Min 1000% at I_F =1mA, V_{CE} =2V)

Current transfer ratio (CTR: Min 1000% at I_F =1mA, V_{CE} =2V)

- 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)

- 紧凑型 4 引脚 SOP封装，外形尺寸为 2.0 毫米

Compact 4 Pin SOP with a 2.0 mm profile

- 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:CQC23001408001) CQC approved (No.CQC23001408001)

UL认证已批准 (编号:UL-CA-2340753-0) UL approved (No: UL-CA-2340753-0)

VDE认证已批准(编号:40059021) VDE approved (No.40059021)

2. 产品描述 Product Description

- KL452系列由一个红外发射二极管和一个高压光电达林顿检测器组成

The KL452 contains an infrared emitting diode, optically coupled to a high voltage Photo Darlington detector

- 采用 4 引脚小外形 SMD 封装

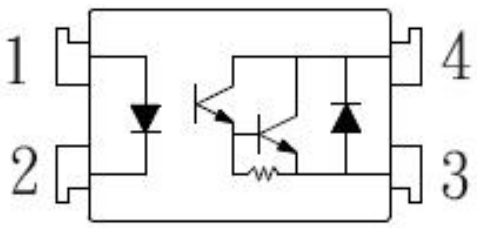
It is packaged in a 4-pin small outline SMD package

3. 产品应用 Product Applications

- 电话机、电话交换机 Telephone set, telephone exchangers
- 程序控制器 Sequence controllers
- 系统设备，测量仪器 System appliances, measuring instruments
- 不同电位和阻抗电路之间的信号传输

Signal transmission between circuits of different potentials and impedances

4. 功能图 Functional Diagram



引脚配置 Pin Configuration

1. 阳极 Anode
2. 阴极 Cathode
3. 发射极 Emitter
4. 集电极 Collector

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
	峰值正向电流 Peak forward current (t = 10μs)	I_{FM}	1	A
	功耗 Power dissipation	P_D	100	mW
输出 Output	集电极-发射极电压 Collector-Emitter voltage	V_{CEO}	350	V
	集电极电流 Collector current	I_C	150	mA
	发射极-集电极电压 Emitter-Collector voltage	V_{ECO}	0.1	V
	功耗 Power dissipation	P_C	150	mW
总消耗功率 Total Consume Power		P_{TOT}	170	mW
隔离电压 (1*) Isolation Voltage		V_{ISO}	3750	V rms
工作温度 Operating temperature		T_{OPR}	-55 to +110	℃
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分钟内, 相对湿度在40~60%RH环境下, 隔离电压测试时, 1&2脚短接在一起, 3&4脚短接在一起
AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, Pins 1 and 2 are shorted together, and pins 3 and 4 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	-	1.2	1.4	V	I_F=10mA
	反向电流 Reverse current	I_R	-	-	10	μA	V_R=4V
	输入电容 Input capacitance	C_{in}	-	50	-	pF	V=0, f=1kHz
输出 Output	集电极暗电流 Collector-Emitter dark current	I_{CEO}	-	-	100	nA	V_{CE}=200V I_F =0mA
	集电极-发射极击穿电压 Collector-Emitter breakdown voltage	V_{CEO}	350	-	-	V	I_C=0.1mA I_F=0mA
	发射极-集电极击穿电压 Emitter-Collector breakdown voltage	V_{ECO}	0.1	-	-	V	I_E=0.01mA I_F=0mA

• 附注(Notes):

Ta=25℃时的规格值 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
电流传输比 Current Transfer ratio	CTR	1000	2000	-	%	I_F=1mA V_{CE}=2V
集电极与发射极间饱和电压 Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	1.2	1.5	V	I_F=20mA I_C=100mA
隔离电阻 Isolation resistance	R_{IO}	5×10^{10}	10^{11}	-	Ω	V_{IO}=500Vdc 40~60% R.H
浮动电容 Floating capacitance	C_{IO}	-	0.6	-	pF	V_{IO}=0, f=1MHz
截止频率 Cut-off frequency	f_C	-	7	-	kHz	V_{CE}=2V I_C=2mA R_L=100Ω, -3dB
上升时间 Rise time	t_r	-	80	250	μs	V_{CE}=2V I_C=20mA R_L=100Ω,
下降时间 Fall time	t_f	-	10	100		

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

7. 特性曲线 Characteristic Curves

图1.正向电流与正向电压的关系

Figure 1. Forward Current vs Forward Voltage

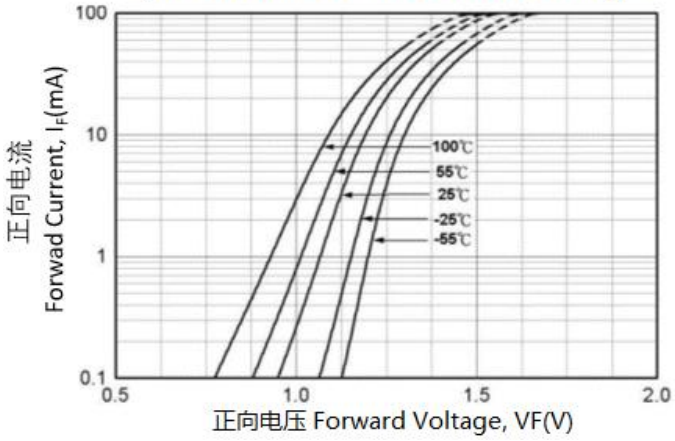


图2.集电极电流与集电极发射极电压的关系

Figure 2. Collector Current vs Collector Emitter Voltage

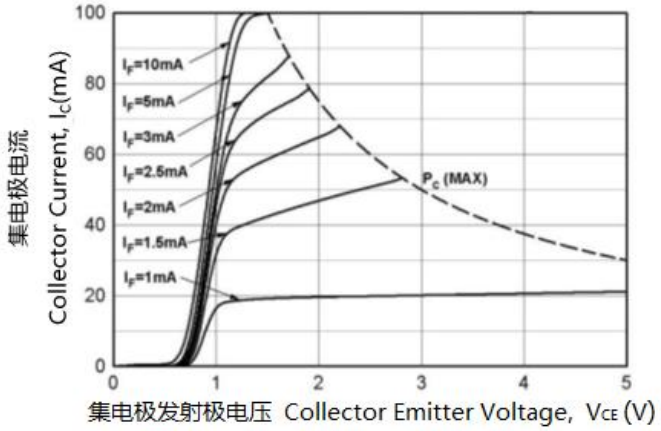


图3.集电极与发射极间饱和电压与环境温度的关系

Figure 3. Collector Emitter Saturation vs Ambient Temperature

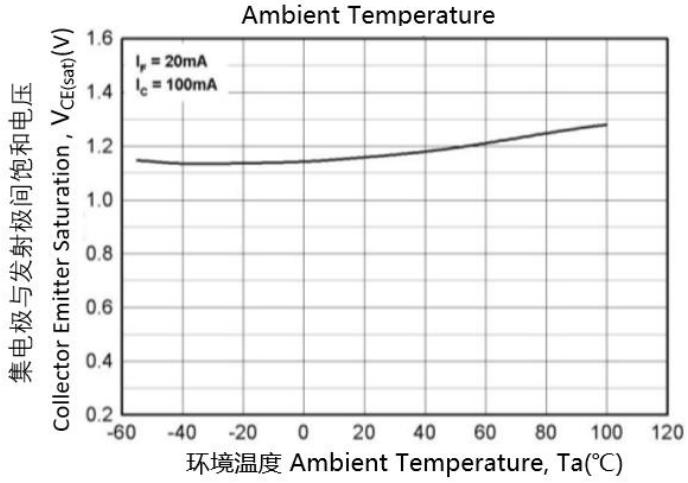


图4.集电极与发射极间饱和电压与正向电流的关系

Figure 4. Collector Emitter Saturation vs Forward Current

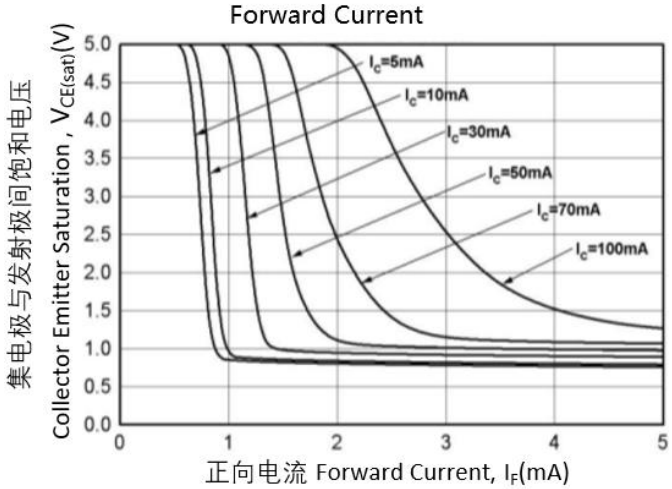


图5.电流传输比与正向电流的关系

Figure 5. Current Transferratio vs Forward Current

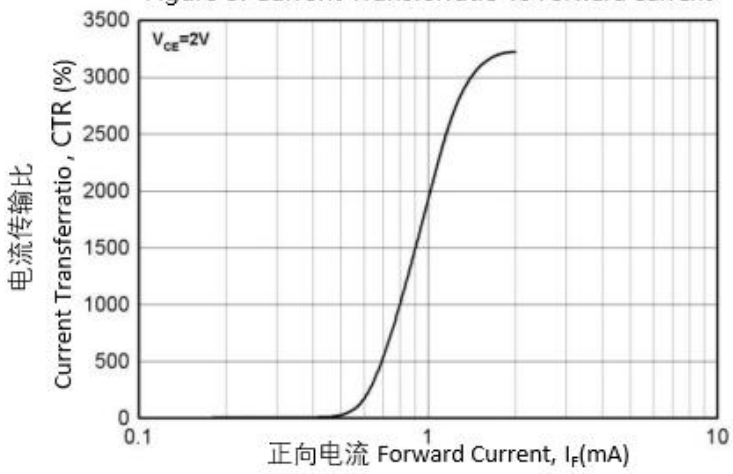


图6.电流传输比与环境温度的关系

Figure 6. Current Transferratio vs Ambient Temperature

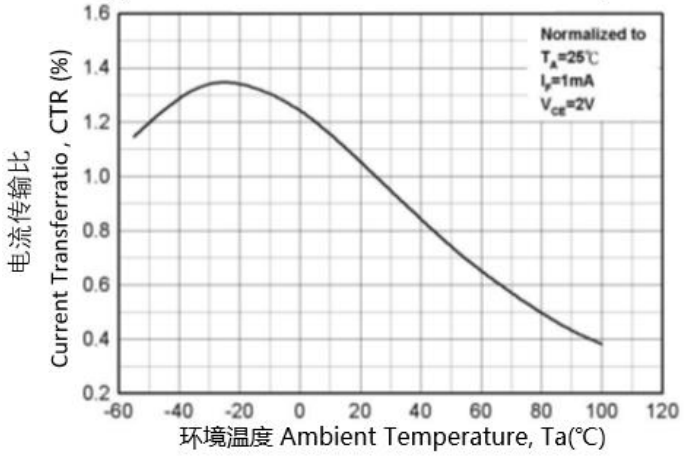


图7.集电极暗电流与环境温度的关系

Figure 7. Collector Dark Current vs Ambient Temperature

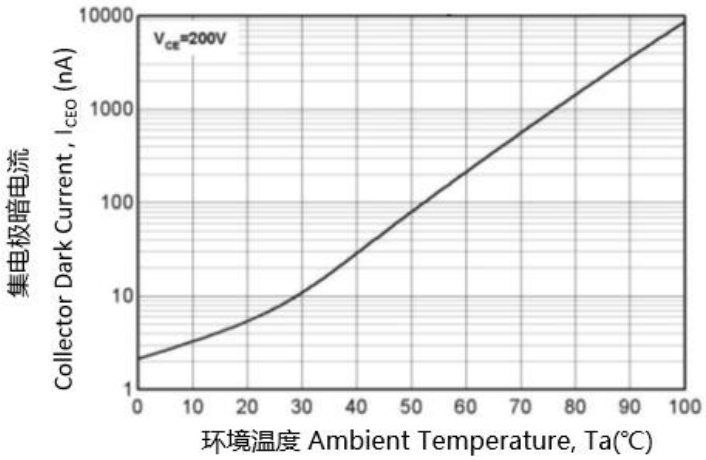


图8.响应时间与负载电阻的关系

Figure 8. Response Time vs Load Resistance

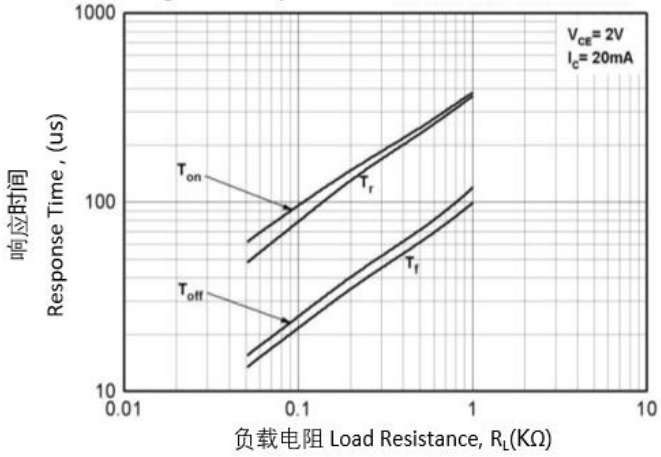
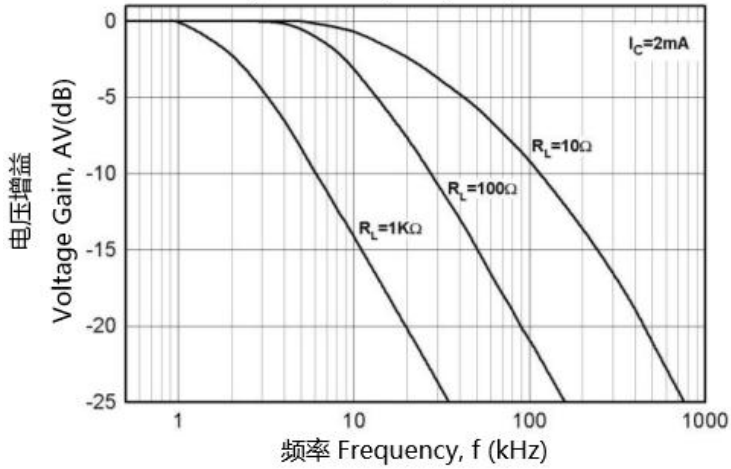


图9.频率响应

Figure 9. Frequency Response



8. 订单信息 Order Information

• 材料编号 Part Number

KL452-Y-V

附注(Notes):

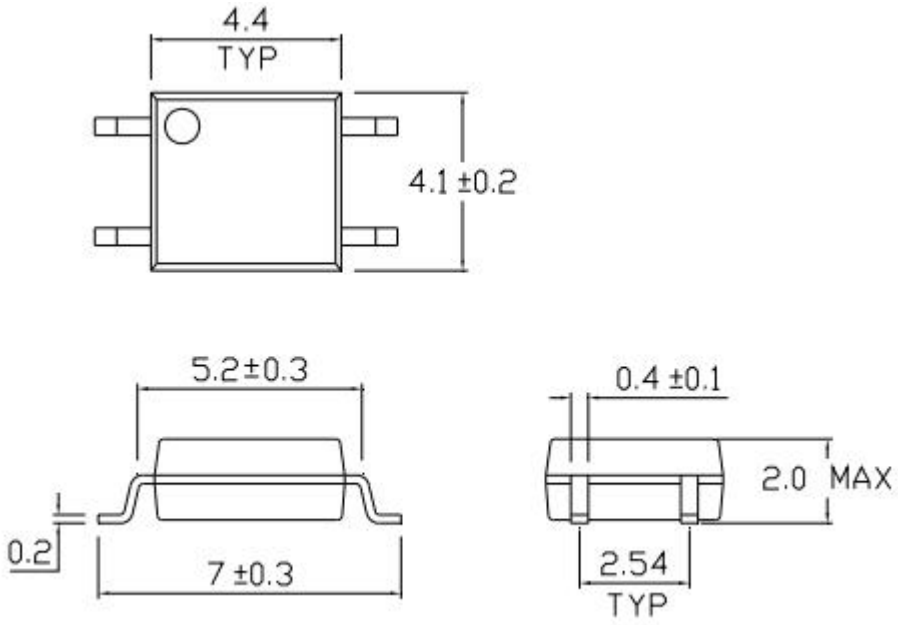
Y = 料带和卷轴选项(TA、TB 或 无) Tape and reel option (TA, TB or none)

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)

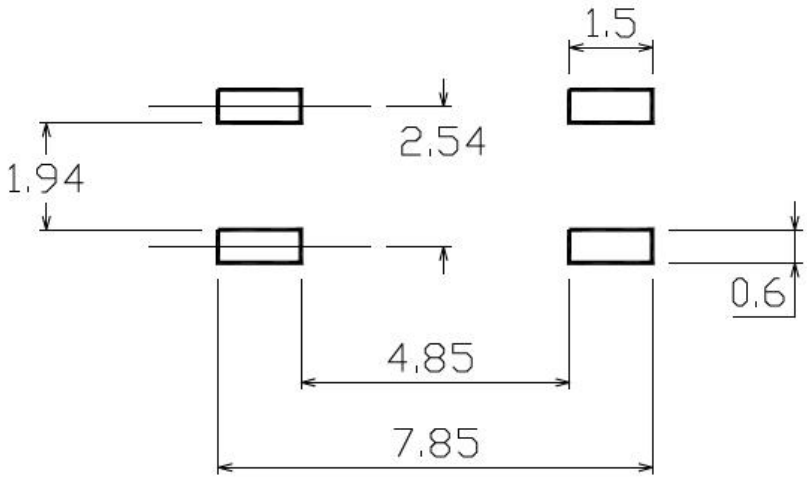
选项 Option	描述 Description	包装数量 Packing quantity
TA	TA载带和卷轴选项 TA Tape & reel option	每卷3500pcs 3500 units per reel
TB	TB载带和卷轴选项 TB Tape & reel option	每卷3500pcs 3500 units per reel
TA-V	TA载带和卷轴选项 +VDE TA Tape & reel option + VDE	每卷3500pcs 3500 units per reel
TB-V	TB载带和卷轴选项 +VDE TB Tape & reel option + VDE	每卷3500pcs 3500 units per reel
/	内盒装:每盒3盘 Inner box packaging:3 reels/box	每盒10500pcs 10500 pcs per box
/	每箱装:10个内盒 Pack per Carton:10 inner boxes	每箱105000pcs 105000 pcs per reel Carton

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

- 包装尺寸 (尺寸单位为mm)
  Package Dimension (Dimensions in 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





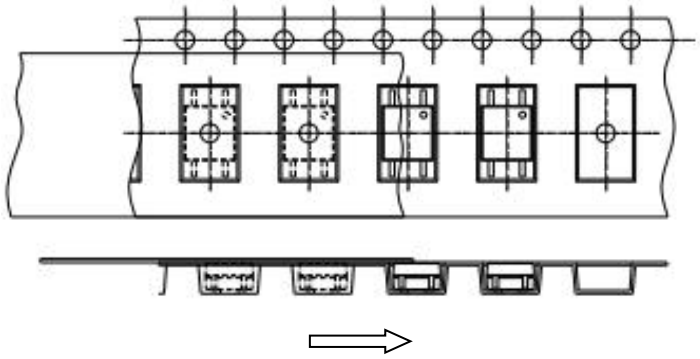
(范本参考 Template reference)

附注(Notes):

KL	= 表示晶台微电子有限公司 Denotes Kinglight Microelectronics
452	= 表示材料部件号 Denotes Device Part Number
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)

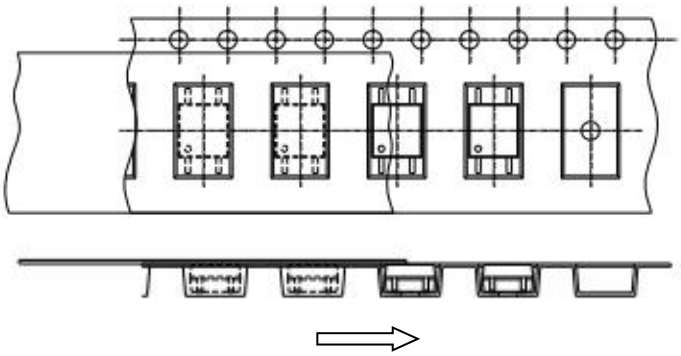
11. 料带和卷轴包装规格 Tape & Reel Packing Specifications

• 选择TA Option TA



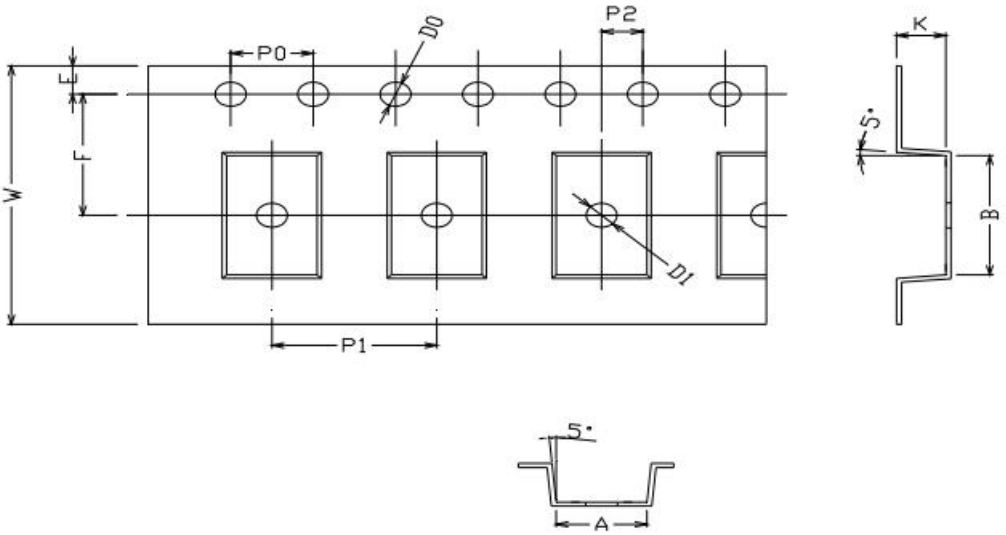
卷轴进给方向 Direction of feed from reel

• 选择TB Option TB



卷轴进给方向 Direction of feed from reel

料带尺寸Material belt size



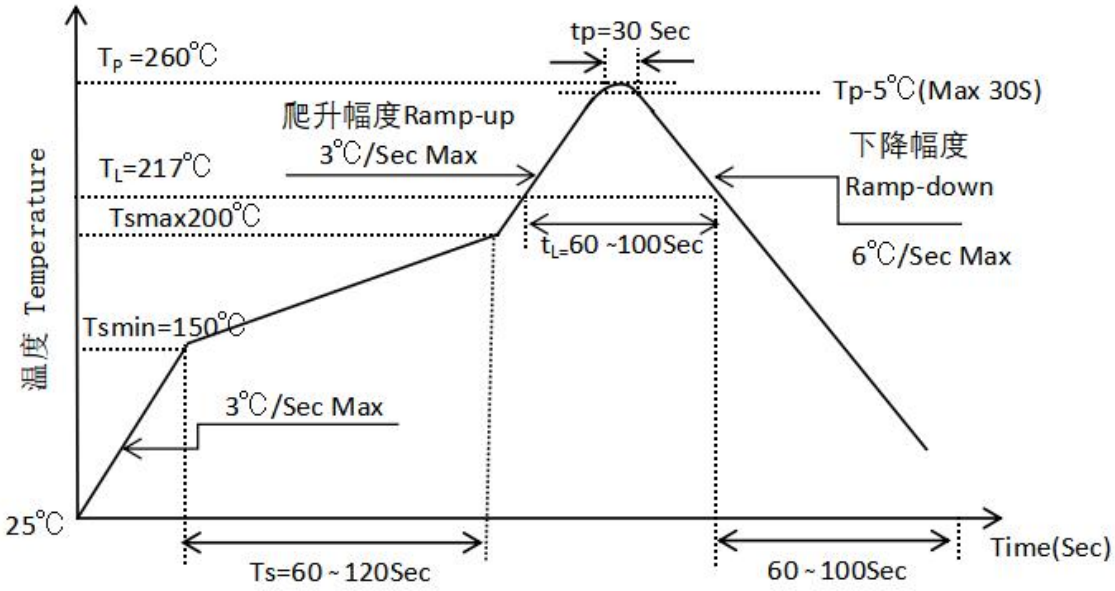
尺寸编号 Dimension No.	A	B	D0	D1	E	F
尺寸(mm) Dimension(mm)	4.4±0.1	7.4±0.1	1.5+0.1/-0	1.5±0.1	1.75±0.1	7.5±0.1
尺寸编号 Dimension No.	P0	P1	P2	t	W	K
尺寸(mm) Dimension(mm)	4.0±0.15	8.0±0.1	2.0±0.1	0.25±0.03	16.0±0.2	2.4±0.1

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