Kinglight®
晶台微电子



# KLD3H7

# 8 PIN ULTRA SMALL SSOP PHOTOTRANSISTOR PHOTOCOUPLER

## SSOP8 晶体管光耦





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# 1. 产品特点 Product features

- 电流转换率(Current transfer ratio)
  CTR: 50~600% at $I_F$ =5mA, $V_{CE}$ =5V
- 输入与输出高隔离电压(Viso=3750 V rms)
  High isolation voltage between input and output (Viso=3750 V rms)
- 紧凑型 8 引脚 SSOP，外形尺寸为 2.0 毫米 Compact 8 Pin SSOP with a 2.0 mm profile
- 符合无卤素 Halogen Free
- 无铅且符合 RoHS 规范 Pb free and RoHS compliant

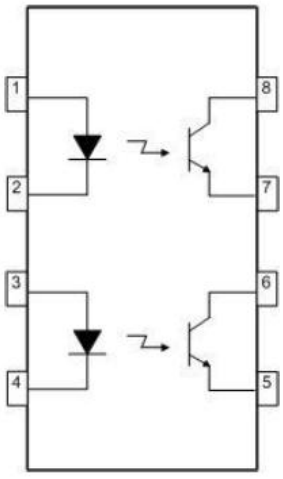
# 2. 产品描述 Product Description

- KLD3H7 光电耦合器由一个红外发射二极管,与一个光电晶体管探测器组成，并用绿色无污染材料封装
  The KLD3H7 contains an infrared emitting diode optically coupled to a phototransistor detector encapsulated with green compound.
- KLD3H7 采用 8 引脚小外形 SMD 封装，提供 2个通道
  KLD3H7 offers 2 channels in an 8-pin small outline SMD package.

# 3. 产品应用 Product Applications

- DC-DC转换器 DC-DC Converters
- 可编程序控制器 Programmable controllers
- 电信设备 Telecommunication equipments
- 不同电位,不同阻抗的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, ③ 阳极 Anode
②, ④ 阴极 Cathode
⑤, ⑦ 发射极 Emitter
⑥, ⑧ 集电极 Collector

## 5. 光电特性 Electrical-Optical characteristics

• 最大限度额定值(温度=25±5ºC) Absolute Maximum Ratings(Ta=25±5ºC)

| 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(1us，pulse) Peak forward current | $I_{FP}$ | 1 | A |
| | 反向电压 Reverse voltage | $V_R$ | 6 | V |
| | 功耗 Power dissipation | $P_D$ | 70 | mW |
| 输出 Output | 集电极电流 Collector current | $I_C$ | 50 | mA |
| | 集电极-发射极电压 Collector and emitter Voltage | $V_{CEO}$ | 80 | V |
| | 发射极-集电极电压 Emitter-Collector Voltage | $V_{ECO}$ | 7 | V |
| | 功耗 Power dissipation | $P_C$ | 150 | mW |
| 总功耗 Total power dissipation | | $P_{TOT}$ | 200 | mW |
| 隔离电压 *1 Isolation Voltage | | $V_{ISO}$ | 3750 | V rms |
| 工作温度 Operating temperature | | $T_{OPR}$ | -55 ~ +110 | ℃ |
| 储存温度 Storage temperature | | $T_{STG}$ | -55 ~ +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40~60%环境下，LED 侧引脚短接在一起，探测器侧引脚短接在一起
AC for 1 minute，40~60%RH in this test, LED side pins shorted together, and detector side pins 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 | $I_F$=20mA |
| | 反向电流 Reverse current | $I_R$ | - | - | 10 | μA | $V_R$=4V |
| | 输入电容 Input capacitance | $C_{IN}$ | - | 30 | 250 | pF | V=0, f=1kHz |
| 输出 Output | 集电极-发射极暗电流 Collector-Emitter dark current | $I_{CEO}$ | - | - | 100 | nA | $V_{CE}$=20V $I_F$ =0mA |
| | 集电极-发射极击穿电压 Collector-Emitter breakdown voltage | $V_{CEO}$ | 80 | - | - | V | $I_C$=0.1mA |
| | 发射极-集电极击穿电压 Emitter-Collector breakdown voltage | $V_{ECO}$ | 7 | - | - | V | $I_E$=0.1mA |
| 传输特性 Transfer Characteristics | 电流传输比 Current Transfer ratio | CTR | 50 | - | 600 | % | $I_F$=5mA $V_{CE}$=5V |
| | 集电极-发射极饱和电压 Collector-Emitter saturation voltage | $V_{CE(sat)}$ | - | 0.1 | 0.2 | V | $I_F$=10mA $I_C$=1mA |
| | 隔离电阻 Isolation resistance | $R_{IO}$ | $5x10^{10}$ | - | - | Ω | $V_{IO}$=500Vdc 40~60% R.H. |
| | 浮动电容 Floating capacitance | $C_{IO}$ | - | 0.3 | 1.0 | pF | $V_{IO}$=0 f=1MHz |
| | 上升时间 Rise Time | $t_r$ | - | 5 | 18 | μs | $V_{CE}$=2V, $I_C$=2mA $R_L$=100Ω |
| | 下降时间 Fall Time | $t_f$ | - | 3 | 18 | μs | |

• 传输特性等级表($T_a$=25℃, 除非另有规定)

Transfer Characteristics level table ($T_a$=25℃ unless specified otherwise)

# 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

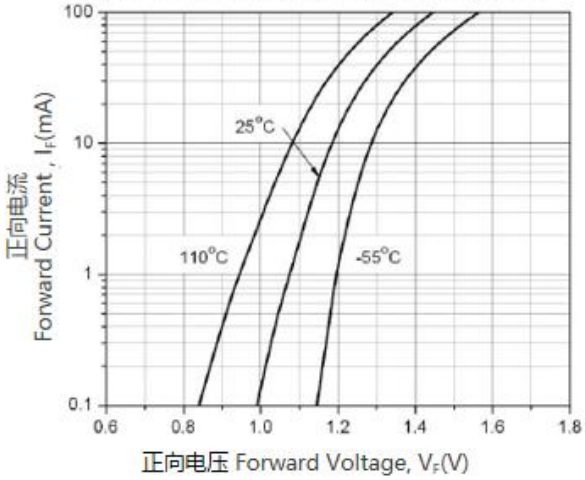



图2 集电极电流与正向电流的关系
Figure 2. Normalized Collector Current vs Forward Current

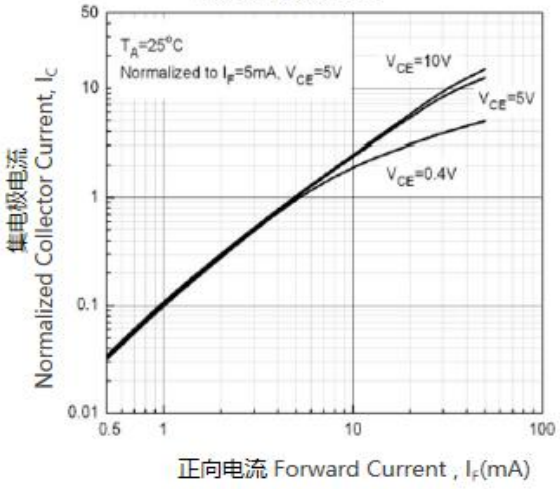



图3 电流传输比与正向电流的关系
Figure 3. Normalized Current Transfer Ratio vs Forward Current

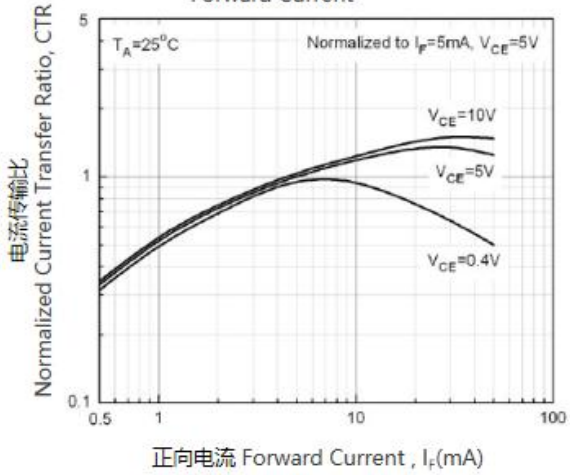



图4 集电极电流与环境温度的关系
Figure 4. Normalized Collector Current vs Ambient Temperature

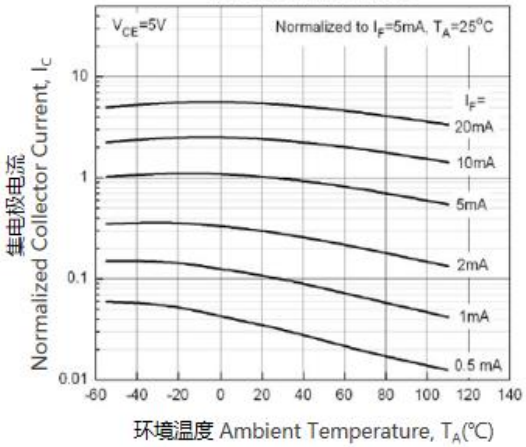



图5 电流传输比与环境温度的关系
Figure 5. Current Transfer Ratio vs Ambient Temperature

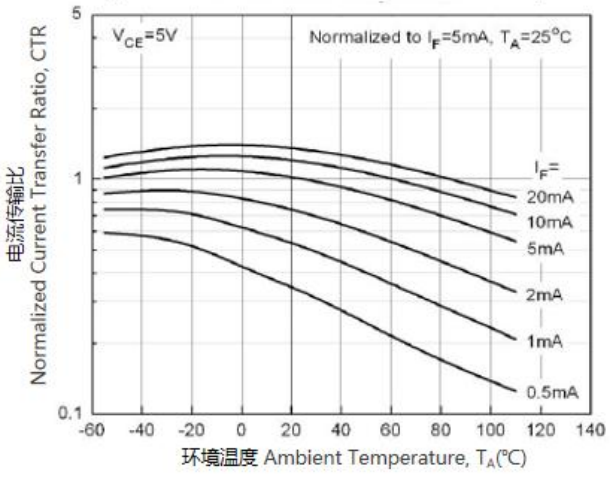



图6 集电极电流与集电极-发射极电压的关系
Figure 6. Collector Current vs Collector-Emitter Voltage

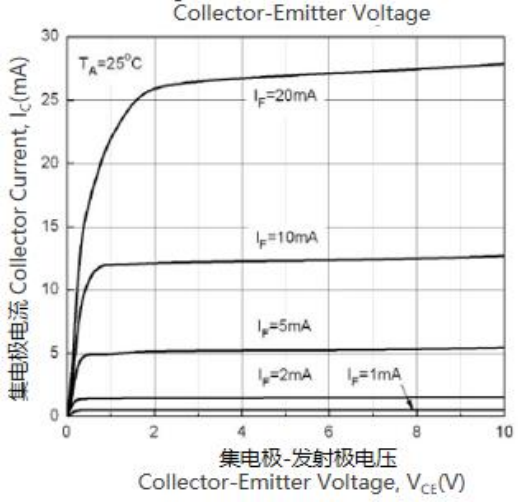


图7 集电极电流与集电极-发射极电压的关系
Figure 7. Collector Current vs Collector-Emitter Voltage

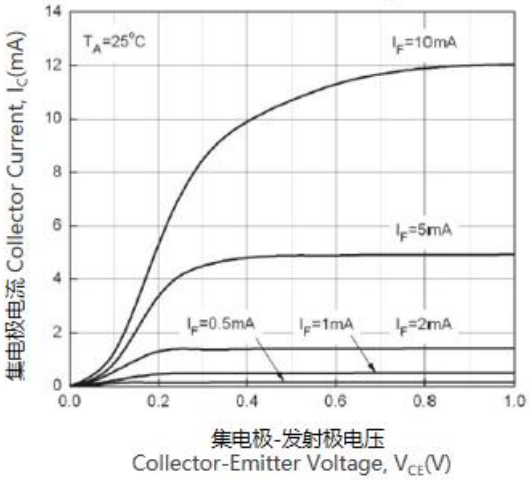



图8. 集电极暗电流 vs 环境温度的关系
Figure 8. Collector Dark Current vs Ambient Temperature

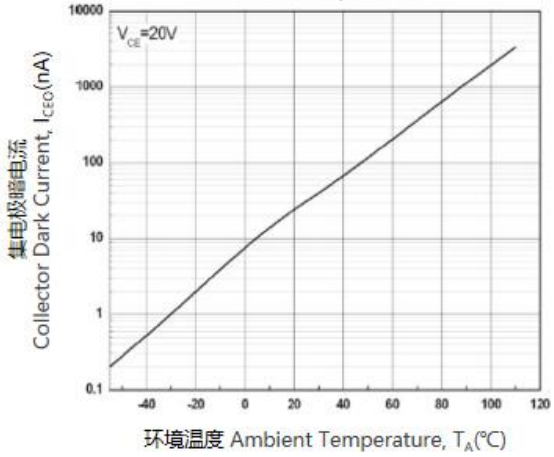



图9 集电极-发射极饱和电压与环境温度的关系
Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

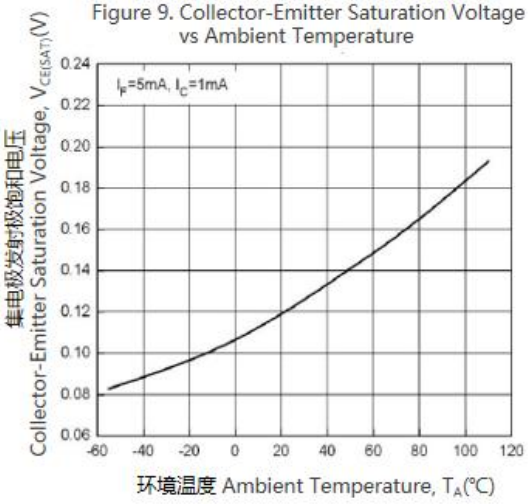



图10 开关时间与负载电阻的关系
Figure 10. Switching Time vs Load Resistance

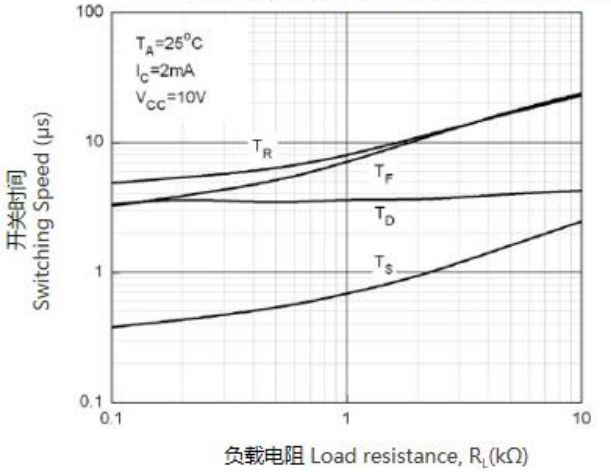
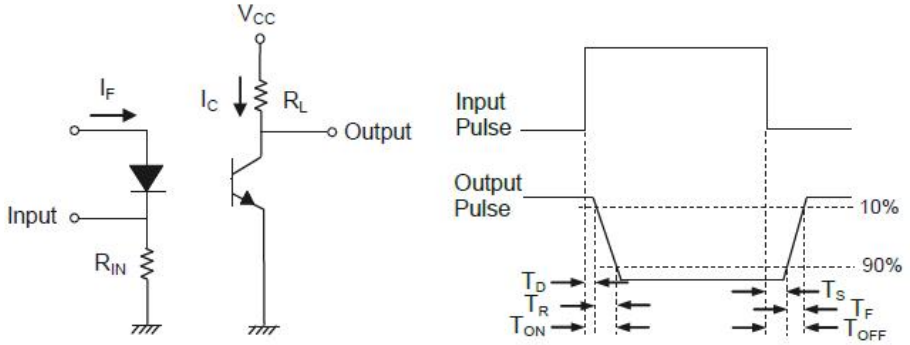



图11 开关时间测试电路及波形
Fig.11 Switching Time Test Circuit & Waveforms



# 8. 订单信息 Order Information

• 零件编号 Part Number

## KLD3H7-Z-V

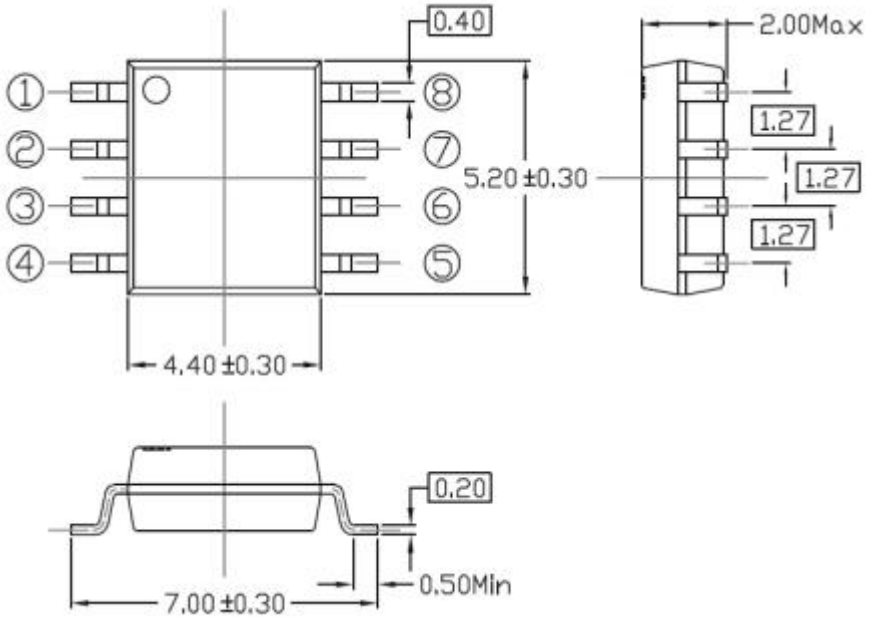
**Notes**

Z = 载带和卷轴包装方式 (TA or none)
Tape and reel option (TA or none)

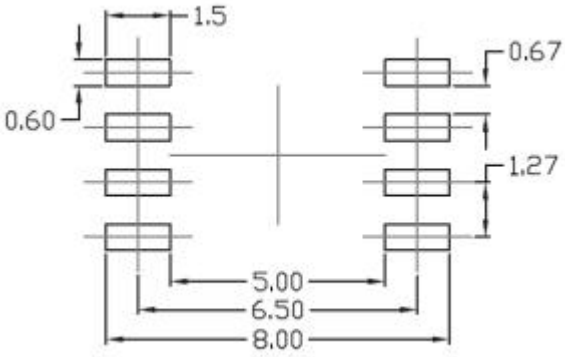
V = 表示VDE标识(客户指定镭射字符才加"V")
VDE (Only add "V" to laser characters specified by the customer)

| 选项<br>Option | 描述<br>Description | 包装数量<br>Packing quantity |
|---|---|---|
| None | KLD3H7料管选项<br>Tube option of KLD3H7 | 每管80pcs<br>80 units per tube |
| -TA | KLD3H7的载带 & 卷轴选择<br>tape & reel option of KLD3H7 | 每卷1000pcs<br>1000 units per reel |
| / | 内盒装：每盒3盘<br>Inner box packaging：3reels/box | 每盒3000pcs<br>3000pcs per box |
| / | 每箱装：10个内盒<br>Pack per Carton: 10inner boxes | 每箱30000pcs<br>30000pcs per Carton |

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




• 表面贴装引线框架 推荐焊盘布局 Recommended pad layout for surface mount lead frame

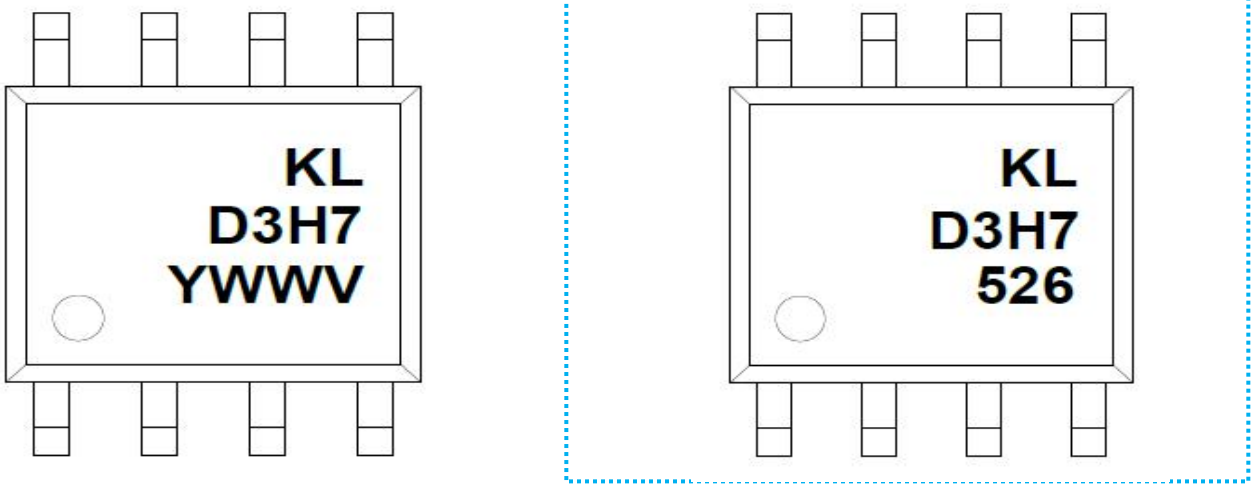



附注(Notes):

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)

**备注Notes**

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

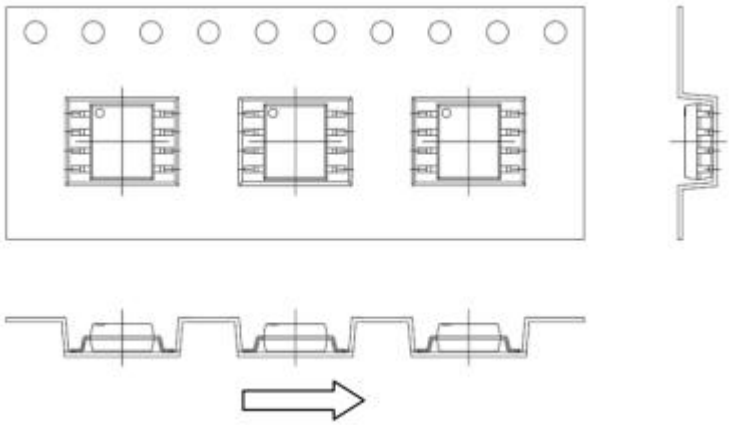
D3H7 = 表示设备部件号 Denotes Device Part Number

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

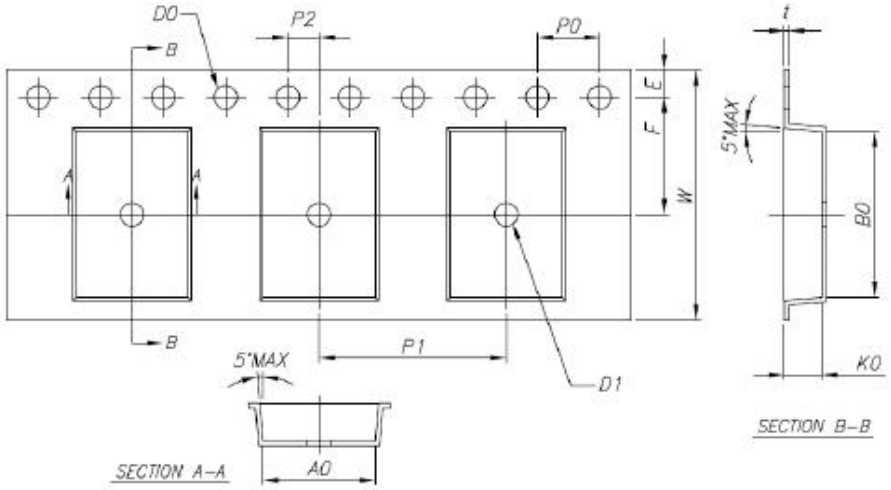
V = 表示VDE标识(客户指定镭射字符才加"V")
VDE (Only add "V" to laser characters specified by the customer)

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



卷轴进给方向 Direction of feed from reel

## 料带尺寸Material belt size



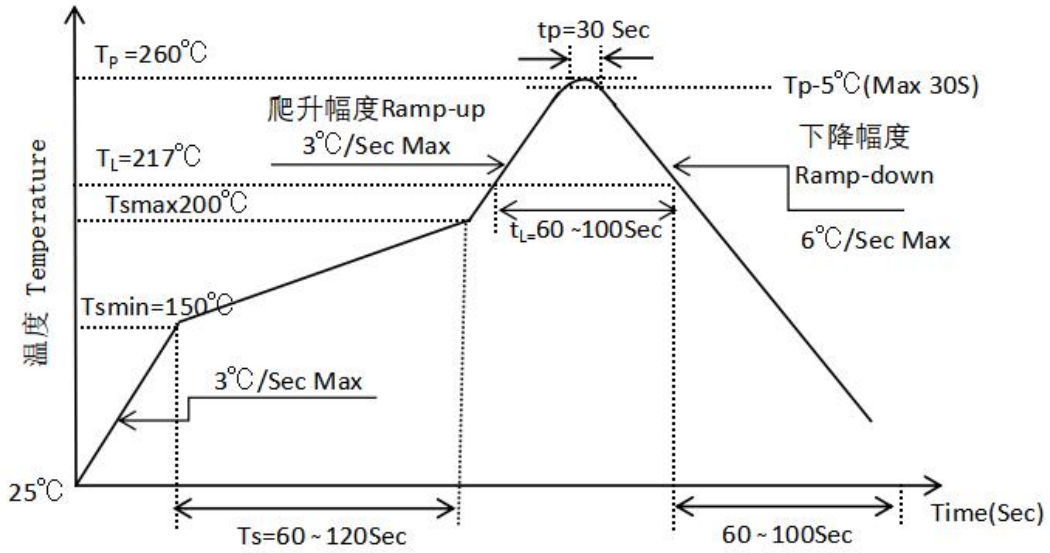

| 尺寸编号 Dimension No. | A0 | B0 | D0 | D1 | E | F |
|---|---|---|---|---|---|---|
| 尺寸(mm) Dimension(mm) | 7.4±0.1 | 5.6±0.1 | 1.5+0.1/-0 | 1.5+0.1/-0 | 1.75±0.1 | 7.5±0.1 |
| 尺寸编号 Dimension No. | P0 | P1 | P2 | t | W | K0 |
| 尺寸(mm) Dimension(mm) | 4.0±0.1 | 12.0±0.1 | 2.0±0.1 | 0.3±0.05 | 16.0±0.3 | 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<br>Item | 符号<br>Symbol | 最小值<br>Min. | 最大值<br>Max. | 单位<br>Unit |
|---|---|---|---|---|
| 预热温度<br>Preheat Temperature | $T_s$ | 150 | 200 | ℃ |
| 预热时间<br>Preheat Time | $t_s$ | 60 | 120 | s |
| 升温速率<br>Ramp-Up Rate ($T_L$ to $T_P$) | - | - | 3 | ℃/s |
| 液相线温度<br>Liquidus Temperature | $T_L$ | 217 | | ℃ |
| 高于液相线温度($T_L$ )的时间<br>Time above Liquidus Temperature $T_L$ | $t_L$ | 60 | 100 | s |
| 峰值温度<br>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<br>Ramp-down Rate($T_P$ to $T_L$ ) | - | - | 6 | ℃/s |