AOTE SEMICONDUCTOR

晶体管光耦
Photo Transistor

EL3H7X

Product Data Sheet

AOTE DCC
RELEASE

台湾奥特半导体科技有限公司

TAIWAN AOTE SEMICONDUCTOR TECHNOLOGY CO.,LTD

www.aotesemi.com

概述 Description

EL3H7X是一款由发光二极管和光电晶体管组成的光电耦合器。 四引脚封装 （SSOP4）。
The EL3H7X is a photoelectric coupler composed of light-emitting diode and phototransistor. It is packaged in a 4-pin package at SSOP4.

特性 Features

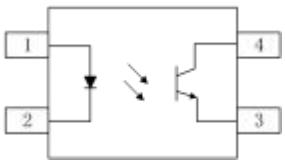
- 电流转换比(CTR)范围: ≥80% (I_F =5mA, V_{CE}=5V, Ta=25℃)
  Current transfer ratio: ≥80% (I_F =5mA, V_{CE}=5V, Ta =25℃)
- 输入-输出隔离电压 (V_{ISO}=3750 Vrms)
  High isolation voltage between input and output(V_{ISO}=3750 Vrms)
- 集电极-发射极击穿电压 BV_{CEO}≥80V
  Collector - emitter breakdown voltage BV_{CEO}≥ 80V
- 工作温度： -55℃ ~110℃
  Operating Temperature: -55℃ ~110℃
- 符合加强绝缘标准
  Meet reinforced insulation standards
- 符合安规标准： UL 1577， VDE DIN EN60747-5-5 (VDE 0884-5 ） ， CQC11-471543-2022
  Meet safety standard approval: UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5) ， CQC11-471543-2022

应用 Applications

- 开关电源， 智能电表
  Switching power supply, intelligent meter
- 工业控制， 测量仪器
  Industrial control, measuring instruments
- 办公设备， 比如复印机
  Office equipment such as copiers
- 家用电器， 比如空调、风扇、热水器等
  Household appliances: such as air conditioners, fans, water heaters, etc.

封装和原理图 Package and Schematic Diagram

SSOP4



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

印字信息 Marking Information

- 印字中“ ”为奥特品牌 LOGO
  “ ” denotes LOGO
- 印字中的“X”代表产品分档： A、 B、C、 D 或空白
  “X” denotes the classification： A、 B、C 、 D or None
- 印字中“Y”代表年份； A(2018),B(2019),C(2020) … ...
  “Y” denotes YEAR： A(2018), B(2019), C(2020) … ...
- 印字中“WW”代表周号
  “WW” denotes Week’ s number
- 印字中“E”代表内部代码
  “E” denotes Internal code
- 印字中的“H”代表无卤
  “H” denotes Halogen-free

绝缘和安规信息 Insulation and Safety related specifications

项目 Item	符号 Symbol	数值 Value	单位 Unit	备注 Remark
爬电距离 Creepage Distance	L	>5.0	mm	从输入端到输出端， 沿本体最短距离路径 Measured from input terminals to output terminals, shortest distance path along body
电气间隙 Clearance Distance	L	>5.0	mm	从输入端到输出端， 通过空气的最短距离 Measured from input terminals to output terminals, shortest distance through air
绝缘距离 Insulation Thickness	DTI	>0.4	mm	发射器和探测器之间的绝缘厚度 Insulation thickness between emitter and detector
峰值隔离电压 Peak Isolation Voltage	V_{IORM}	600	V_{peak}	DIN/EN/IEC EN60747-5-5
瞬态隔离电压 Transient isolation voltage	V_{IOTM}	5000	V_{peak}	DIN/EN/IEC EN60747-5-5
隔离电压 Isolation Voltage	Viso	>3750	Vrms	For 1 min

极限参数 Absolute Maximum Ratings (Ta =25℃)

参数 Parameter		符号 Symbol	额定值 Rating	单位 Unit
发射端 Input	正向电流 Forward Current	I_F	50	mA
	峰值正向电流(1us， 脉冲) Peak forward current (1us, pulse)	I_{FP}	1000	mA
	反向电压 Reverse Voltage	V_R	6	V
	功耗 Power Dissipation	P_D	70	mW
	额定值降低因子(在 Ta = 90°C 以上) Power dissipation Derating factor (above Ta = 90°C)	P_{DD}	2.0	mW/°C
接收端 output	集电极功耗 Collector Power Dissipation	P_C	150	mW
	集电极电流 Collector Current	I_C	50	mA
	集电极-发射极电压 Collector-Emitter Voltage	V_{CEO}	80	V
	发射极-集电极电压 Emitter-Collector Voltage	V_{ECO}	7	V
总功耗 Total Power Dissipation		Ptot	200	mW
隔离电压 Isolation Voltage		Viso	3750	Vrms
工作温度 Operating Temperature		T_{opr}	-55～+110	℃
存储温度 Storage Temperature		T_{stg}	-55～+125	℃
焊接温度 Soldering Temperature		T_{sol}	260	℃

产品特性参数 Electro-optical Characteristics (Ta =25℃)

参数 Parameter		符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
发射端 Input	正向电压 Forward Voltage	V_F	I_F=20mA	-	1.2	1.4	V
	反向电流 Reverse Current	I_R	V_R=4V	-	-	10	μA
	输入电容 Terminal Capacitance	C_t	V=0, F =1KHz	-	30	250	pF
接收端 Output	集电极暗电流 Collector Dark Current	I_{CEO}	V_{CE}=20V, I_F =0	-	-	100	nA
	集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C =0.1mA, I_F =0	80	-	-	V
	发射极-集电极电压 Emitter-Collector Voltage	BV_{ECO}	I_E =0.01mA, I_F =0	7	-	-	V
传输特性 Transfer Characteristics	电流传输比 Current Transfer Ratio	CTR*	I_F =5mA ,V_{CE}=5V	80	-	600	%
	集电极-发射极饱和压降 Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=10mA,I_C =1mA	-	0.1	0.2	V
	隔离电阻 Isolation Resistance	R_{ISO}	V_{I-O} =DC500V 40 ~60%R.H.	$5x10^{10}$	$1x10^{11}$	-	Ω
	隔离电容 Isolation capacitance	C_{ISO}	V=0,F=1MHz	-	0.3	1.0	pF
	上升时间 Rise Time	T_r	V_{CE}=2V, I_C =2mA, R_L =100Ω	-	3	18	μs
	下降时间 Fall Time	T_f		-	2	18	μs
	导通时间 Turn on time	Ton		-	5	-	μs
	关断时间 Turn off time	Toff		-	3	-	μs

注*： 电流传输比=I_C/I_F x 100%。

Note*： CTR=I_C/I_F x 100%.

电流传输比分档表 CTR Classification Table (I_F =5mA, V_{CE}=5V, Ta =25℃)

代码 Code	最小值 Min.	最大值 Max.
None	80	600
A	80	160
B	130	260
C	200	400
D	300	600

典型光电特性曲线 Typical Electro-Optical Characteristics Curves

Fig.1 Relative Current Transfer Ratio vs. Forward Current

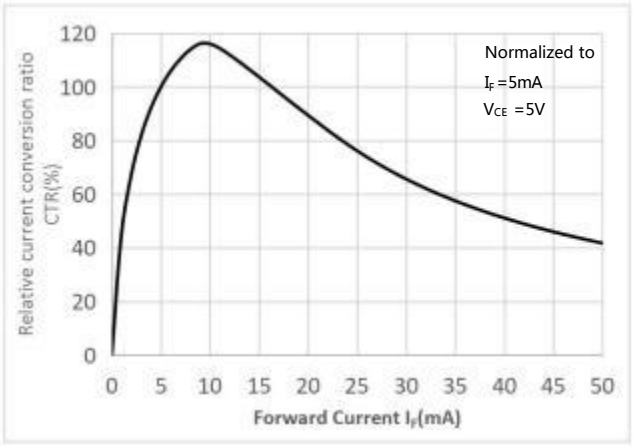


Fig.2 Forward Current vs. Forward Voltage

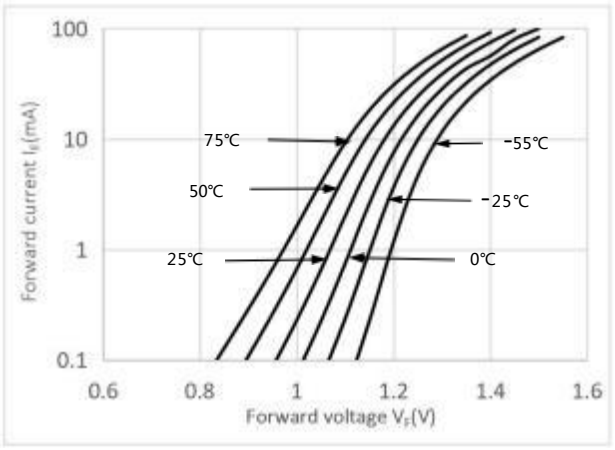


Fig.3 Collector Current vs. Collector-emitter Voltage

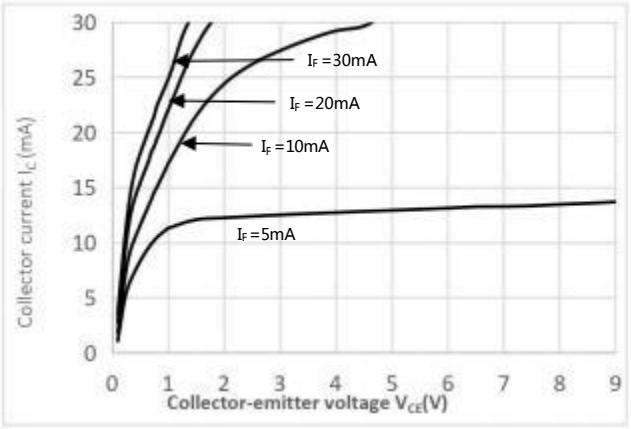


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

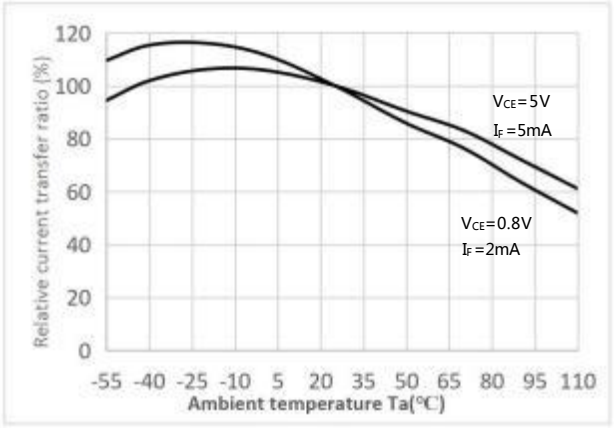


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

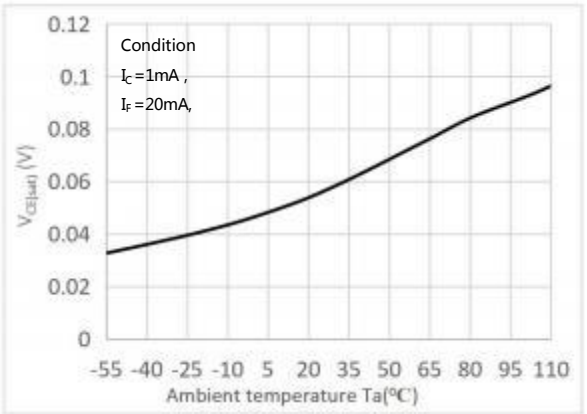


Fig.6 Collector Dark Current vs Ambient Temperature

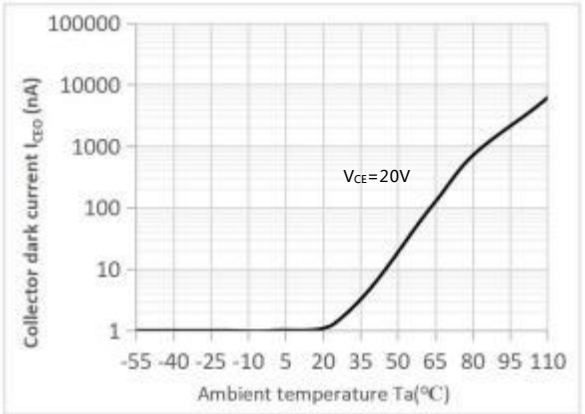


Fig.7 Response Time vs. Load Resistance

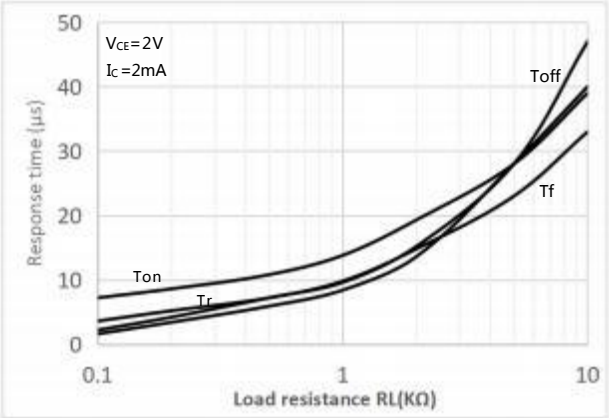


Fig.8 Frequency Response

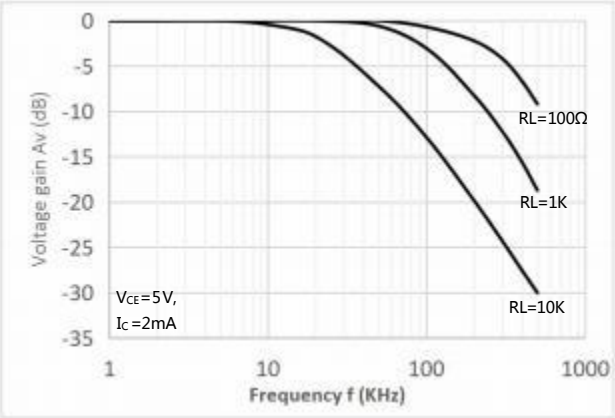


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

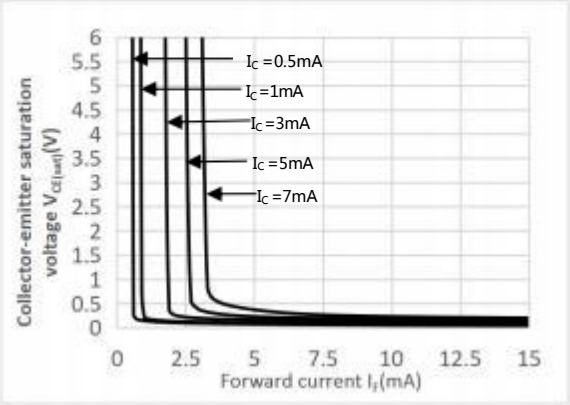
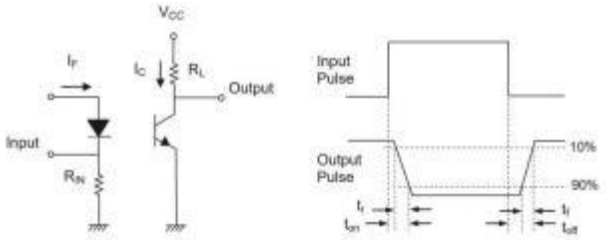
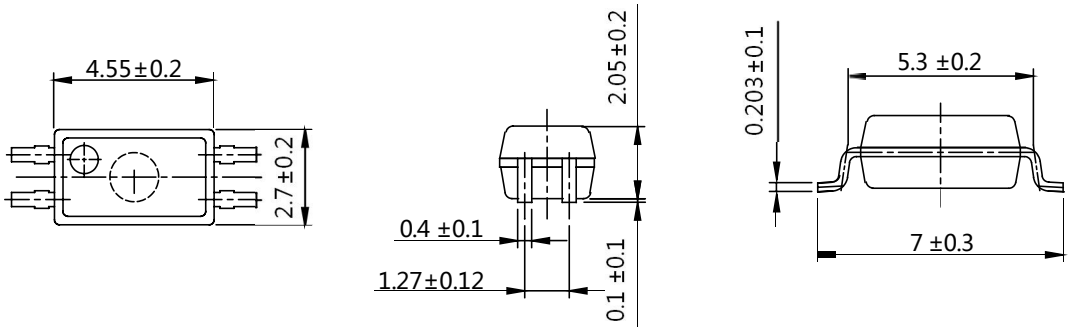


Fig.10 Switching Time Test Circuit & Waveforms



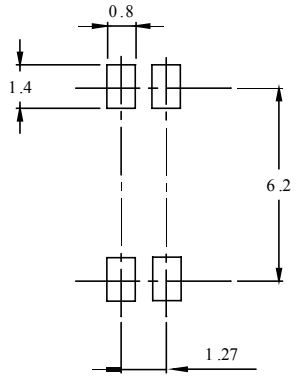
外形尺寸 Outline Dimensions

SSOP4



单位 Unit: mm

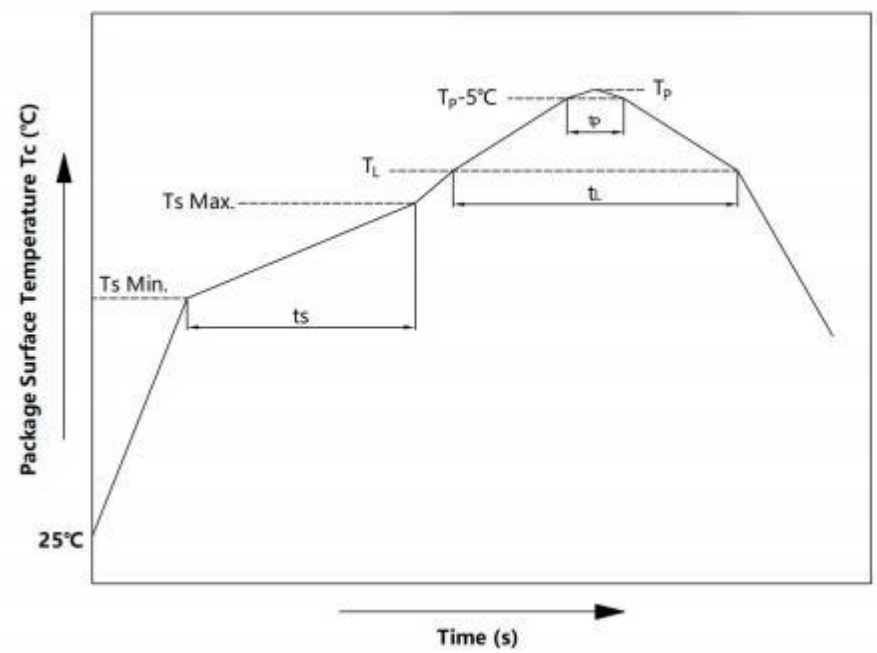
建议焊盘布局 Recommended Pad Layout



单位 Unit: mm

注： 上图为产品正视图。
Note： The picture above is the front view of the product.

回流焊温度曲线图 Solder Reflow Profile



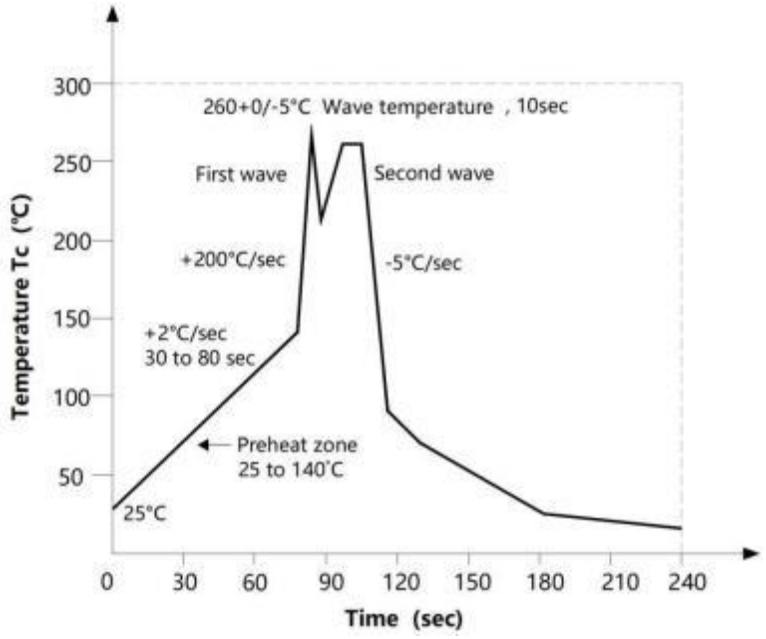
项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	Ts	150	200	℃
预热时间 Preheat Time	ts	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
时间高于 T_L Time Above T_L	t_L	60	150	s
峰值温度 Peak Temperature	T_P	-	260	℃
Tc 在(T_P-5)和 T_P 之间的时间 Time During Which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

注 Note：

建议在所示的温度和时间条件下进行回流焊， 最多不能超过三次；

Reflow soldering is recommended at the temperatures and times shown, no more than three times;

波峰焊温度曲线图 Wave Soldering Profile



手工烙铁焊接 Soldering with hand soldering iron

A. 手工烙铁焊仅用于产品返修或样品测试；
Hand soldering iron is only used for product rework or sample testing;

B. 手工烙铁焊要求： 温度 360℃ ± 5℃， 时间≤3s。
Hand soldering iron requirements： Temperature： 360℃ ± 5℃, within 3s.

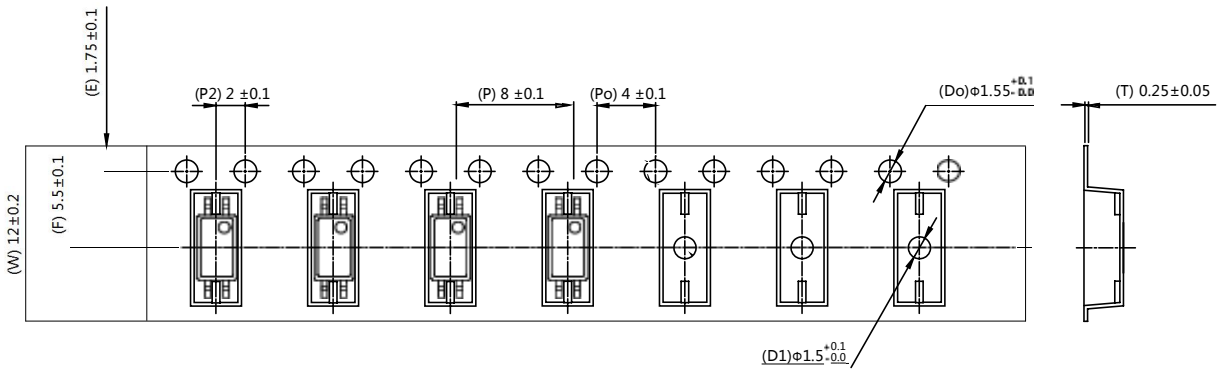
包装 Packing

■ 汇总表 Summary table

封装形式	包装方式	盘数量	盒数量	箱数量	静电袋规格	盒规格	箱(双瓦楞)规格	备注
SSOP4	卷盘 (ϕ330mm 蓝盘)	3000 只/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	34*6*34cm	38*36*36.5cm	首端各空 50 个空格，末端空 100
Package Type	**Packing Form**	**Quantity per Reel**	**Quantity per Box**	**Quantity per Carton**	**Antistatic Bag Specification**	**Box Specification**	**Carton Specification**	**Note**
SSOP4	Reel (ϕ330mm Blue)	3000 pcs /reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	34*6*34cm	38*36*36.5cm	Leave 50 Spaces at the beginning and 100 Spaces at the end

■ 编带包装 Tape & Reel

1) 每卷数量： 3000 只。
   Qty/reel： 3000 pcs.
2) 每箱数量： 60000 只。
   Qty/ctn： 60000 pcs.
3) 内包装： 每盒 2 盘。
   Inner packing： 2 reels/box.
4) 示意图 Schematic：



单位 Unit： mm

注意 Attention

- 奥特持续不断改进质量、可靠性、功能或设计， 保留此文件更改的权利恕不另行通知。
  AOTE continuously improve quality, reliability, function and design. We reserve the right to change this document without prior notice.
- 请遵守产品规格书使用， 奥特不对使用时不符合产品规格书条件而导致的质量问题负责。
  Please use in accordance with the product specification. AOTE is not responsible for the quality problems caused by non-compliance with the product specifications.
- 对于需要高可靠性或安全性的设备/装置需求， 请联系我们的销售人员。
  For equipment/devices requiring high reliability or safety, please contact our sales representatives.
- 当需要用于任何“特定”应用时， 请咨询我们的销售人员。
  When requiring a device for any ” specific” application, please contact our sales in advice.
- 如对文件中表述的内容有疑问， 欢迎联系我们。
  If you have any questions about the contents of the document, please contact us.

单击下面可查看定价，库存，交付和生命周期等信息

>>AOTE(奥特)