AOTE
SEMICONDUCTOR

晶体管光耦
Photo Transistor
AT3H4X

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

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概述 Description

AT3H4X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 AT3H4X is a photoelectric coupler composed of light-emitting diode and phototransistor. It is packaged in a 4-pin package at SSOP4.

特性 Features

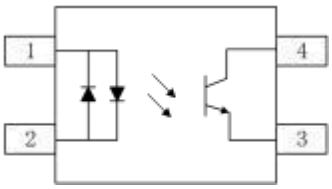
- 电流转换比(CTR)范围: ≥20% (I_F = ±1mA, V_{CE} =5V, Ta =25℃)
  Current transfer ratio: ≥20% (I_F = ±1mA, V_{CE} =5V, Ta =25℃)
- 输入-输出隔离电压 (V_{ISO} =3750 Vrms)
  High isolation voltage between input and output(V_{ISO} =3750 Vrms)
- 集电极-发射极击穿电压 BV_{CEO} ≥80V
  Collector - emitter breakdown voltage BV_{CEO} ≥ 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
- 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 packageandschematic Diagram

SSOP4



Pin Configuration
1. Anode/Cathode
2. Cathode/Anode
3. Emitter
4. Collector

产品型号命名规则Order code

AT 3H4X-UN Y-W(V) (ZZ)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① 公司代码 Company Code（AT: 奥特 AOte)

② 产品系列 Product Series （ 3H4: 3H4)

③ CTR 档位 Classification （代码 Code: A ,B or None)

④ 框架类型 Lead Frame （ Cu: 铜框架 Copper)

⑤ 树脂类型 Epoxy Type （ H: 无卤 Halogen-free)

⑥ 封装形式 Package （ S: SSOP)

⑦ 器件工作温度范围 Device Operating Temperature Range （特殊范围需填或者空白 Special Range need to be filled in or left blank)

⑧ 内部补充代码 Internal Supplementary Code （数字或者空白 Number or None)

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 或空白
  “X” denotes the classification ： A、 B 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 Insulationandsafetyrelated 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AbsoluteMaximumRatings(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
	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}	2.9	mW/℃
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-opticalcharacteristics(Ta=25℃)

参数 Parameter		符号 Symbol	最小值 Min	最大值 Max.	单位 Unit	参数 Parameter	符号 Symbol
发射端 Input	正向电压 Forward Voltage	V_F	I_F = ±20mA	-	1.2	1.4	V
	输入电容 Terminal Capacitance	C_t	V=0V, 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 =0mA	-	-	100	nA
	集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C =0.1mA, I_F =0mA	80	-	-	V
	发射极-集电极电压 Emitter-Collector Voltage	BV_{ECO}	I_E =10uA, I_F =0mA	7	-	-	V
传输特性 Transfer Characteristics	电流传输比 Current Transfer Ratio	CTR*	I_F = ±1mA, V_{CE}=5V	20	-	300	%
	集电极-发射极饱和压降 Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F = ±20mA, I_C =1mA	-	0.1	0.2	V
	隔离电阻 Isolation Resistance	R_{ISO}	DC500V,40 ~60%R.H.	$5x10^{10}$	$1x10^{11}$	-	Ω
	隔离电容 Isolation capacitance	C_{ISO}	V=0,f=1MHz	-	0.6	1.0	pF
	截止频率 Cut-off Frequency	Fc	V_{CE}=5V, I_C =2mA, R_L =100Ω,-3dB	-	80	-	kHz
	上升时间 Rise Time	T_r	V_{CE}=2V, I_C =2mA, R_L =100Ω	-	-	18	μs
	下降时间 Fall Time	T_f	V_{CE}=2V, I_C =2mA, R_L =100Ω	-	-	18	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CTRclassificationTableol$_F$ = t1mA, V_{CE}=5V,Ta=25℃)

代码code	最小值Min	最大值Max
None	20	300
A	50	150
B	100	300

典型光电特性曲线Typical Electro-optical characteristics curves

Fig.1 Relative Current Transfer Ratio vs. Forward Current

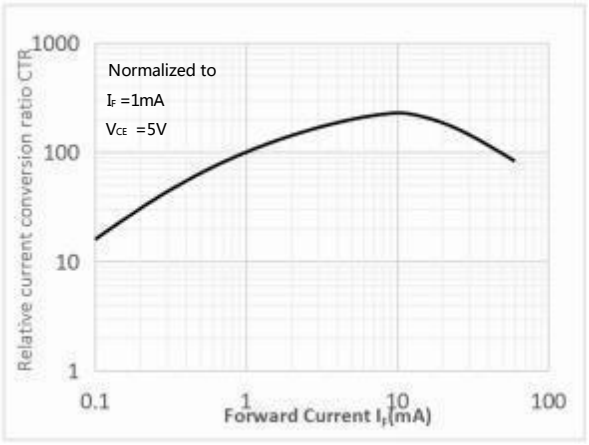


Fig.2 Forward Current vs. Forward Voltage

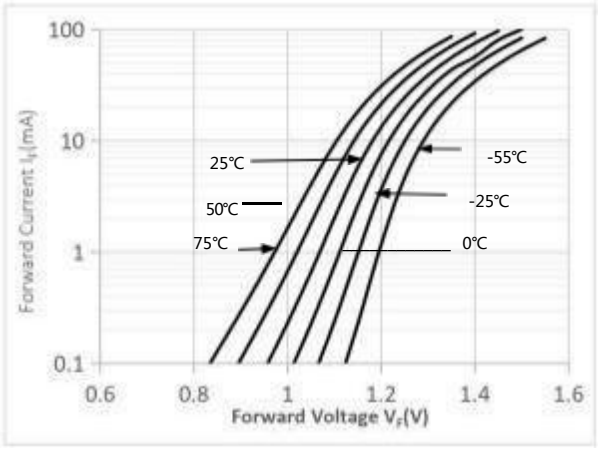


Fig.3 Collector Current vs. Collector-emitter Voltage

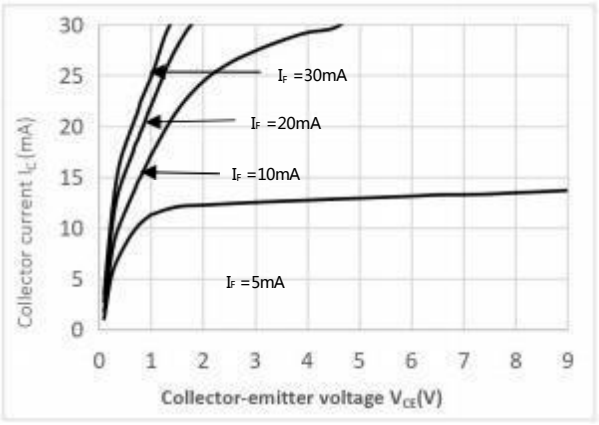


Fig.4 Relative Current Transfer Ratio vs.Ambient Temperature

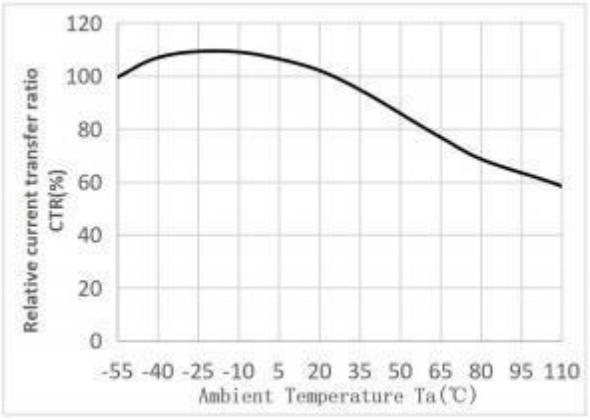


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

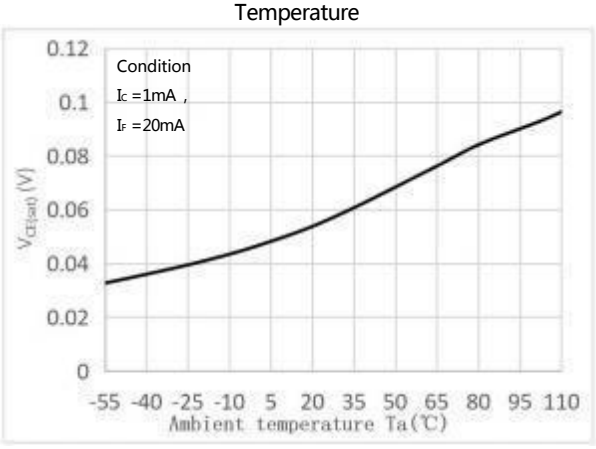


Fig.6 Collector Dark Current vs Ambient Temperature

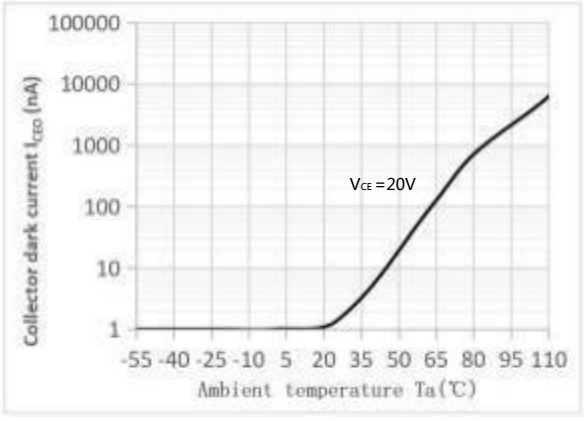


Fig.7 Response Time vs. Load Resistance

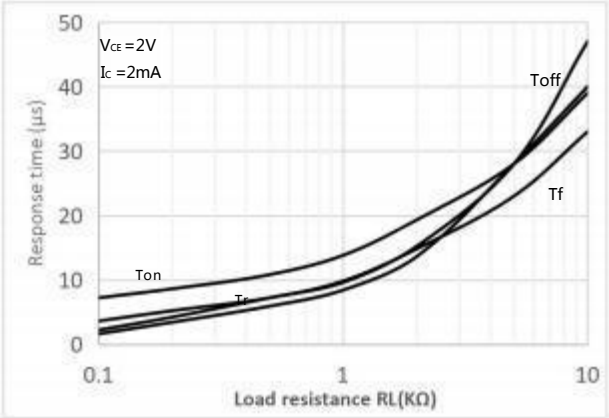


Fig.8 Frequency Response

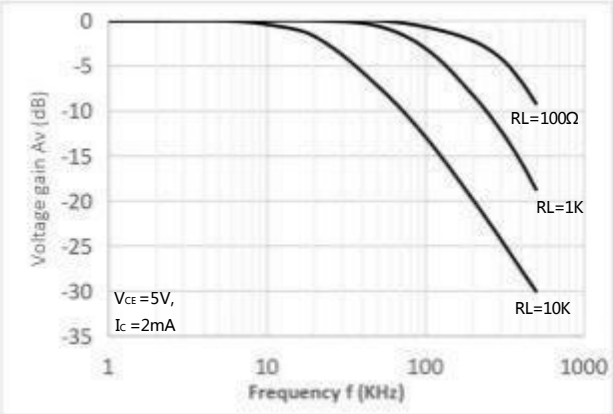


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

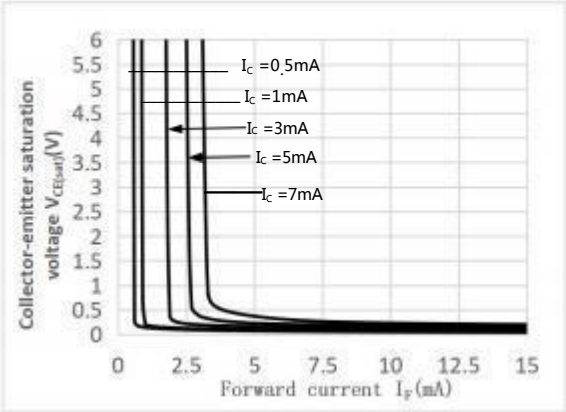
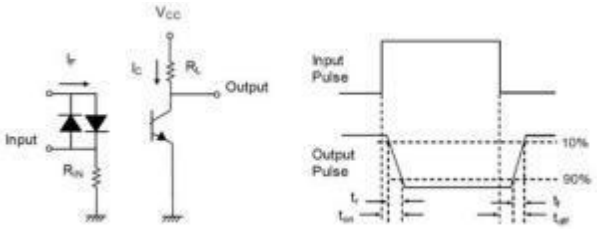
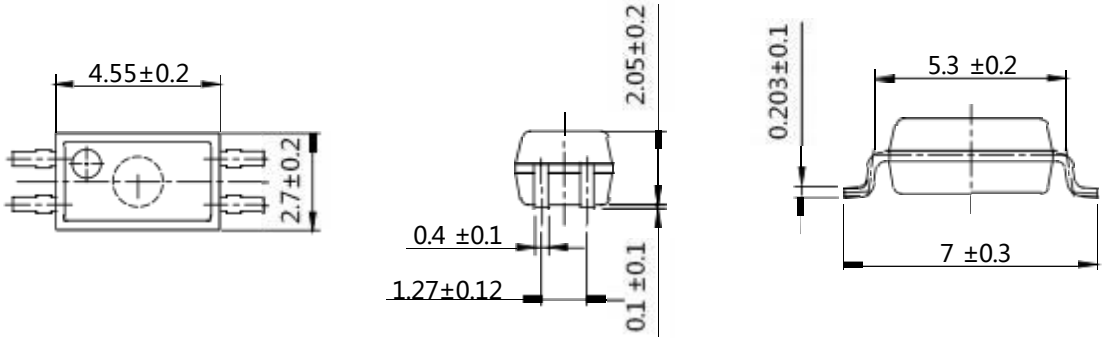


Fig.10 Switching Time Test Circuit & Waveforms



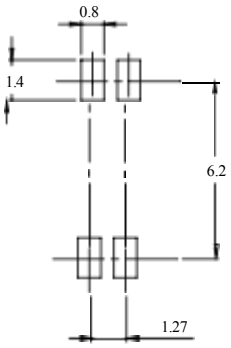
外形尺寸 。utlineDimensions

SSOP4



单位 Unit: mm

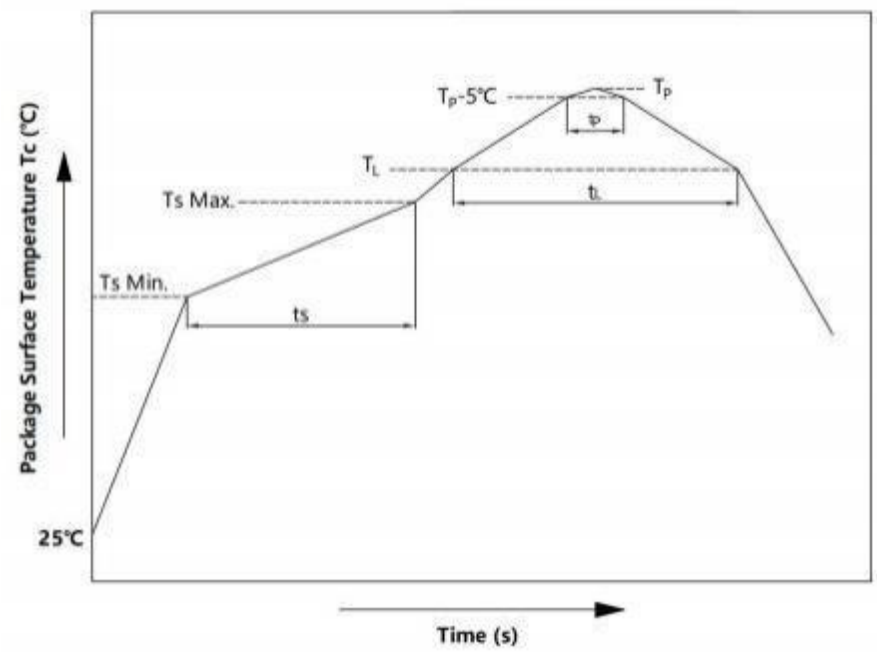
建议焊盘布局 Recommended pad Layout



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 solderReflowprofile



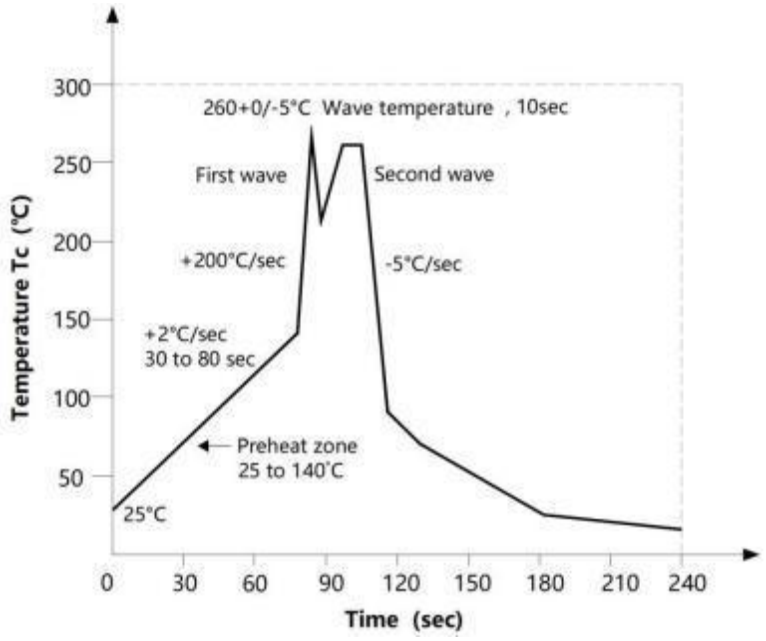
项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	Ts	150	200	℃
预热时间 Preheat Time	ts	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
时间高于 T_L Time Above T_L	t_L	60	150	s
峰值温度 Peak Temperature	T_P	-	260	℃
Tc在(T_P -5)和 T_P 之间的时间 Time During Which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



手工烙铁焊接 solderingwith handsolderingiron

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summarytable

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	双瓦楞规 格	备注
SSOP4	卷盘 (ϕ330m卷盘)	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

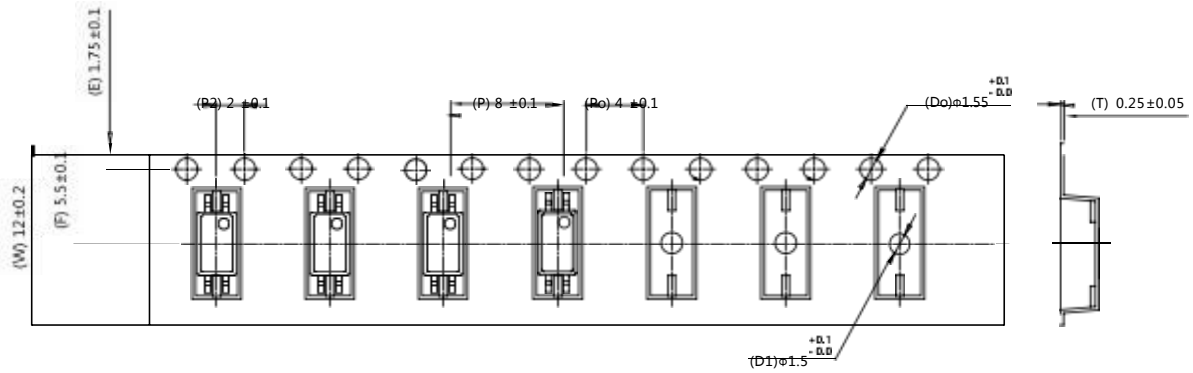
■ 编带包装Tape&Reel

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

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