

恒拓电子  
HENG TUO ELECTRONICS



# *HT series*

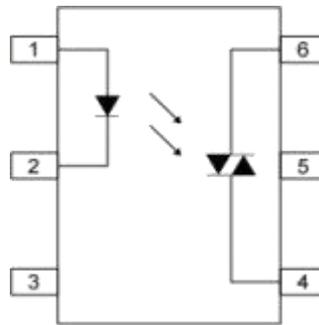
**Photocoupler  
Product Date Sheet**

## **HT-302X\_305X**

Spec No:HT-PC-302X\_305X-P-005-A1  
Effective Date:02/23/2024

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## ■ Package



Pin Configuration	
1	Anode
2	Cathode
3	No Connection
4	Terminal
5	No Connection (do not connect)
6	Terminal

## ■ Description

The HT-302X\_305X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon non zero voltage crossing photo triac. They are designed for use with a discrete power triac in the interface of logic systems , such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

## ■ Features

- 6pin Non-zero-cross optoisolators triac driver
- High input-output isolation voltage(Viso = 5,000Vrms)
- High repetitive peak off-state voltage VDRM.
- HT-302X: Min. 400V; HT-305X: Min. 600V;
- High critical rate of rise of off-state voltage( dv/dt : MIN. 1000V /s )
- Operating Temperature: -40°C~110°C
- Safety approval
- UL approved ; VDE approved ; CQC approved
- RoHS
- MSL1

## ■ Applications

- Solenoid/valve controls
- Static power switch
- AC motor drivers
- Temperature Control



## ■ Product Nomenclature

The product name is designated as below:

HT-30XX - X X - X X- XX

① ② ③ ④ ⑤

Designation:

HT =Hengtuo Technology Co.,LTD.

30XX= Product Series (302X/305X , X:1/2/3)

① = Lead form option(S1,M,NONE) <sup>(1)</sup>

② = Tape and Reel option(TA,TA1,NONE) <sup>(2)</sup>

③ = VDE order option(fixed code "V")

④ = Halogen free option(fixed code"G")

⑤ = Customer code

### Notes

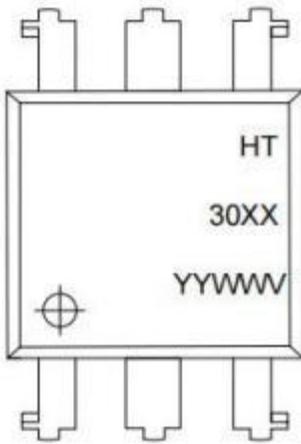
#### 1. Lead form option:

Symbol	Description
S1	DIP6-S1
M	DIP6-M
NONE	DIP6 Normal

#### 2. Tape and Reel option:

Symbol	Description
TA&TA1	Tape and Reel Type
NONE	DIP Type

## ■ Marking Information



### Designation:

HT denotes Hengtuo  
30XX denotes Device  
YY denotes year code  
WW denotes week code  
V denotes VDE

## ■ Maximum Ratings

Parameter		Symbol	Values	Unit
Input	Forward Current	$I_F$	50	mA
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	P	120	mW
	Junction Temperature	$T_J$	125	°C
Output	Off-State Output Terminal Voltage	$V_{DRM}$	HT-302X 400	V
			HT-305X 600	
	Peak Repetitive Surge Current (PW=1ms, 120 pps)	$I_{TSM}$	1	A
	On-State RMS Current	$I_{T(RMS)}$	100	mA
	Junction Temperature	$T_J$	125	°C
	Collector Power Dissipation	$P_C$	150	mW
Operating temperature range		$T_{opr}$	- 40 ~ 110	°C
Storage temperature range		$T_{stg}$	- 55 ~ 125	°C
Total Power consumption		P(W)	250	mW
Isolation Voltage <sup>(1)</sup>		$V_{ISO}$	5000	V <sub>rms</sub>
Soldering Temperature <sup>(2)</sup>		$T_{SOL}$	260	° C

### Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2).For 10 seconds

## ■ Electronic Optical Characteristics

(TA = 25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditon
Input	Forward Voltage	$V_F$	-	1.2	1.6	V	$I_F=20mA$
	Reverse Current	$V_R$	-	-	5	$\mu A$	$V_R=6V$
Output	Peak Blocking Current, Either Direction <sup>(1)</sup>	$I_{DRM}$	-	-	500	nA	$V_{DRM} =$ Rated VDRM
	Peak On-State Voltage, Either Direction	$V_{TM}$	-	-	3	V	$I_{TM}= 100mA$ Peak
	Critical rate of Rise of Off-State Voltage <sup>(2)</sup>	dv/dt	1000	-	-	V/ $\mu s$	$V_{in}=240V_{rms}$
Couple	Led Trigger Current, Current Required to Latch Output, Either Direction	HT-3021 HT-3051	-	-	15	mA	Main Terminal Voltage = 3V
		HT-3022 HT-3052	-	-	10		
		HT-3023 HT-3053	-	-	5		
	Holding Current, Either Direction	$I_H$	-	200	-	$\mu A$	

(1) Test voltage must be applied within dv/dt rating.

(2) This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor(s) only.

## ■ Characteristics Curves

Fig.1 Forward current vs.Ambient temperature

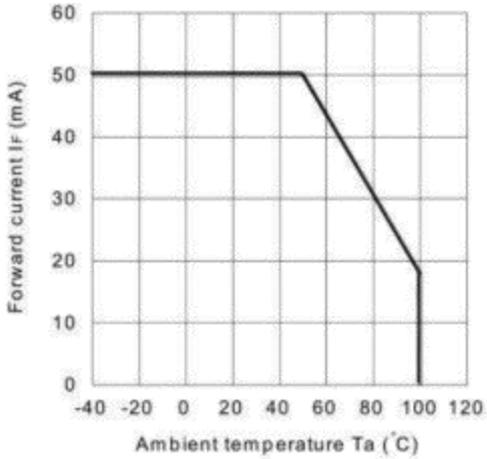


Fig.2 On-state current vs.Ambient temperature

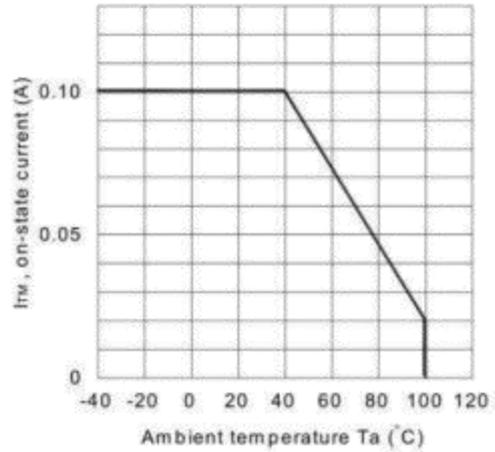


Fig.3 Minimum Trigger Current vs Ambient temperature

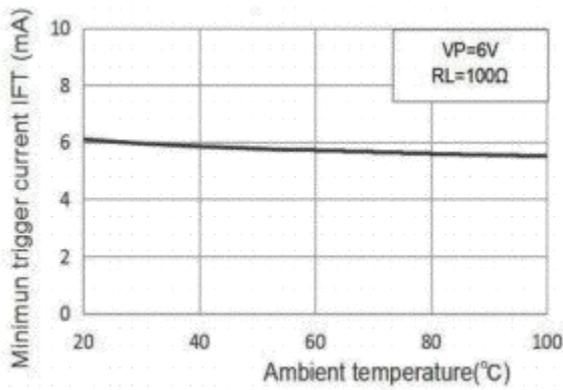


Fig.4 Forward current vs Forward Voltage

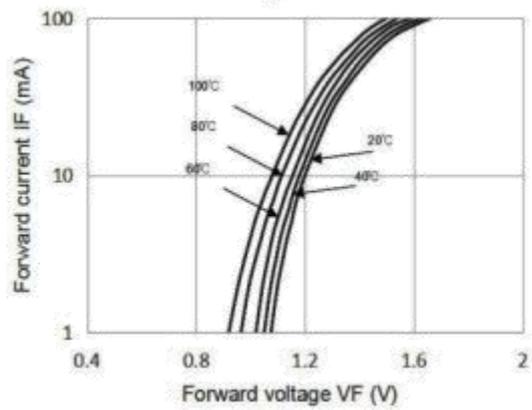


Fig.5 On-state voltage vs Ambient temperature

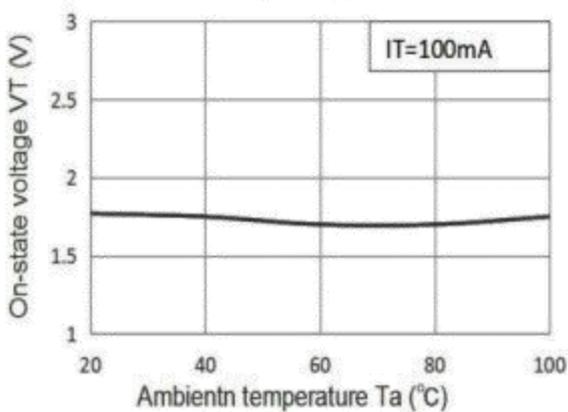


Fig.6 Holding current vs Ambient temperature

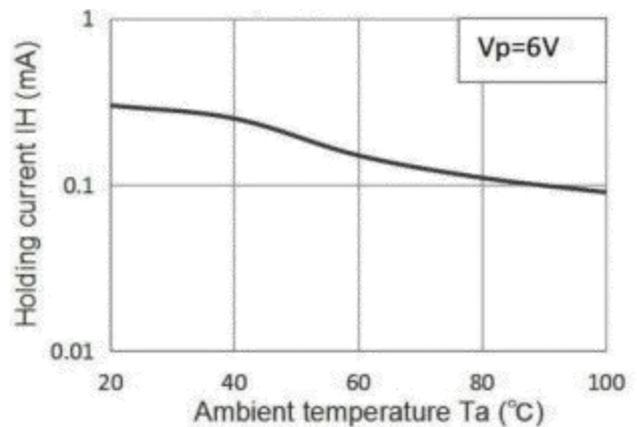




Fig.7 Repetitive peak off-state current vs Temperature

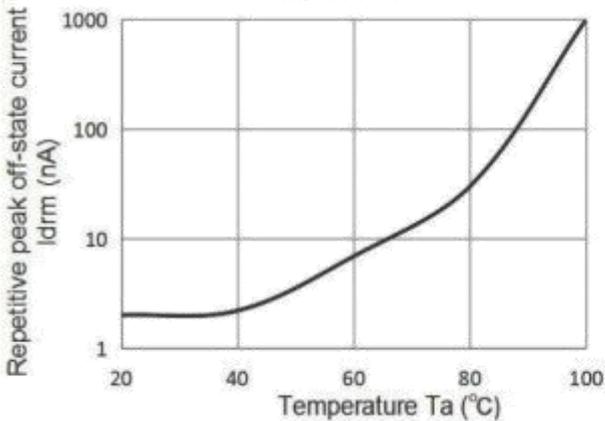


Fig.8 On-state current vs On-state voltage

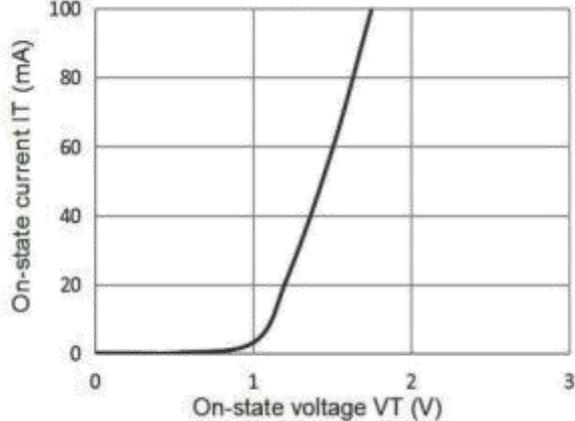
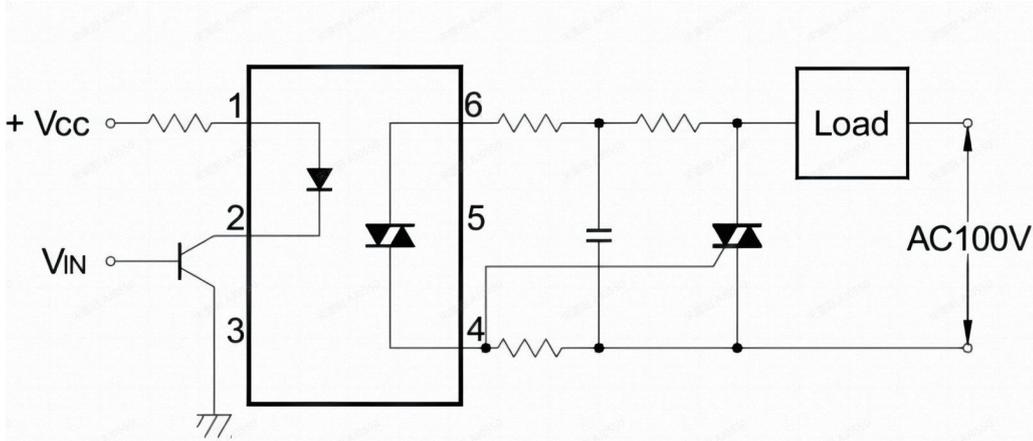
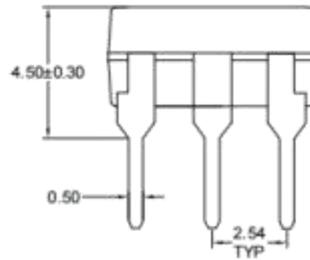
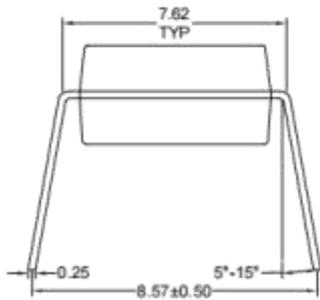
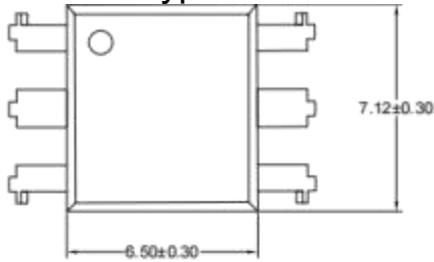


Fig.9 Basic Driver Circuit

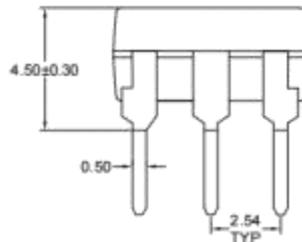
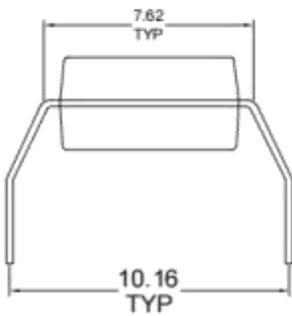
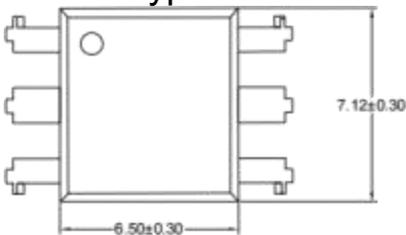


## ■ Outline Dimension

DIP Normal Type:

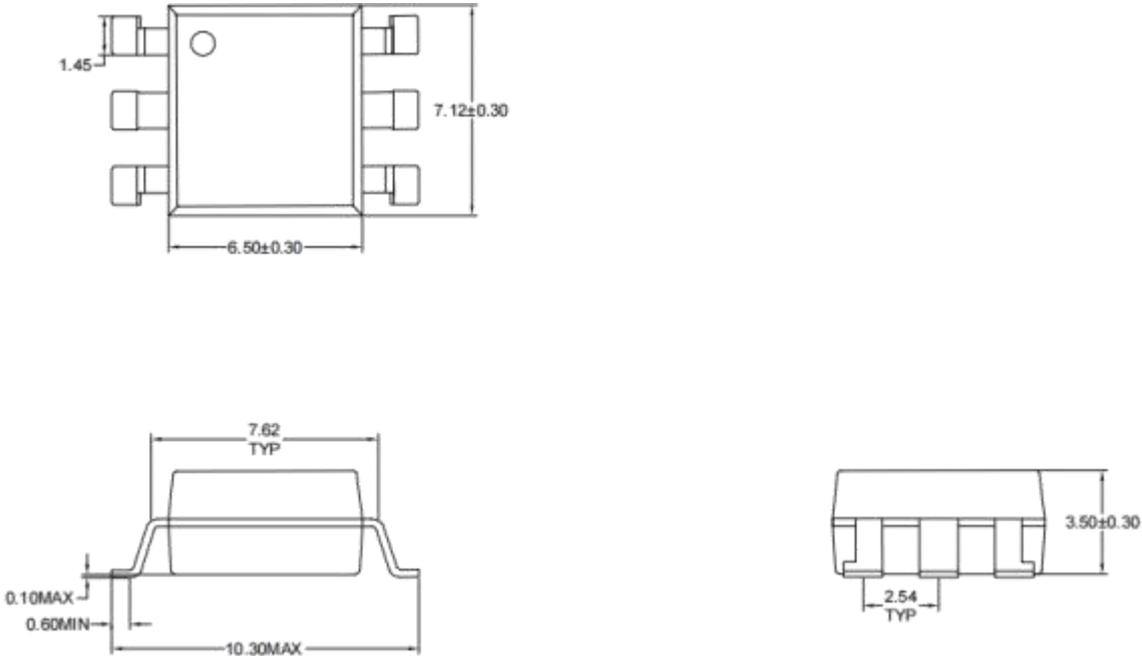


DIP M Type:





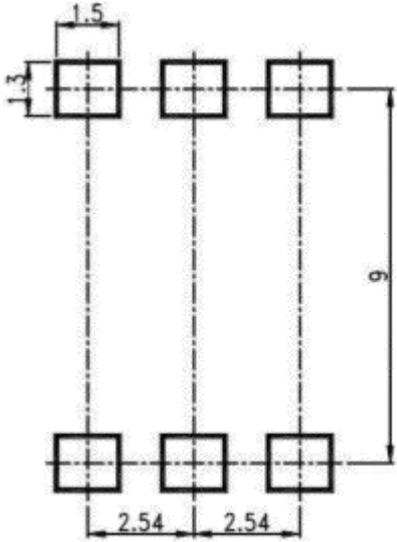
SMD S1 Type:



Unit: mm  
Tolerance: ±0.1mm

■ **Recommended solder pad Design**

For S1 type:



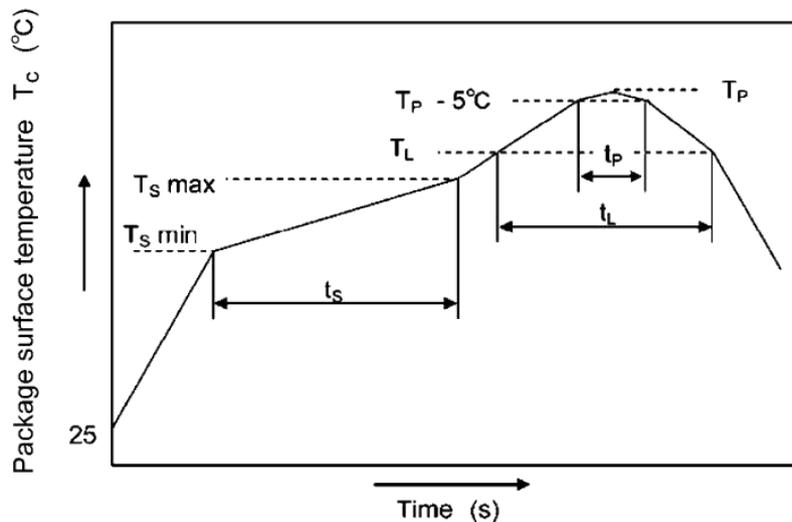
Unit: mm  
Tolerance: ±0.1mm

## ■ Temperature Profile Of Soldering

### 1. IR Reflow soldering

**(JEDEC-STD-020D compliant)**

Profile item	Conditon
Preheat	
-Temperature Min (TSmin)	150°C
-Temperature Max (TSmax)	200°C
-Time (min to max) (ts)	90 ± 30 sec
Soldering zone	
-Temperature (TL)	217°C
-Time (tL)	60-150 sec
Peak Temperature (TP)	260°C
-Time (TP-5°C to TP) (ts)	30 sec
Ramp-up rate	3°C / sec max
Ramp-down rate	3~6°C/ sec



#### Notes:

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

## 2. Wave soldering (JEDEC22A111 compliant)

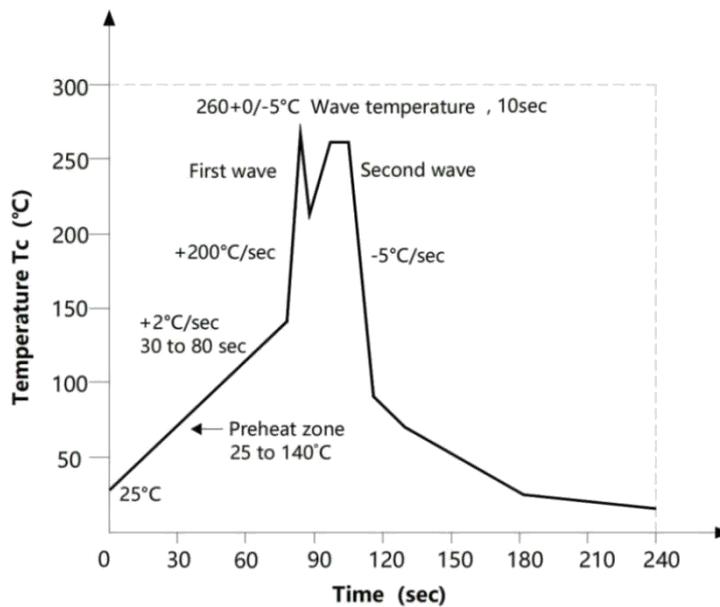
One time soldering is recommended within the condition.

Temperature:  $260 \pm 0/-5^\circ\text{C}$ .

Time: 10 sec.

Preheat temperature: 25 to  $140^\circ\text{C}$ .

Preheat time: 30 to 80 sec.



## 3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

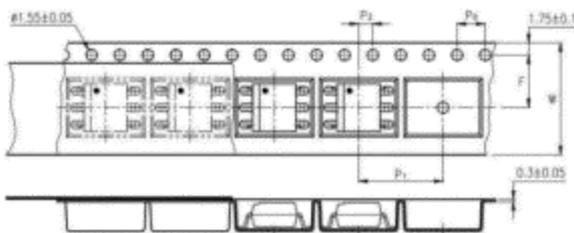
Temperature:  $380 \pm 0/-5^\circ\text{C}$

Time: 3 sec max.

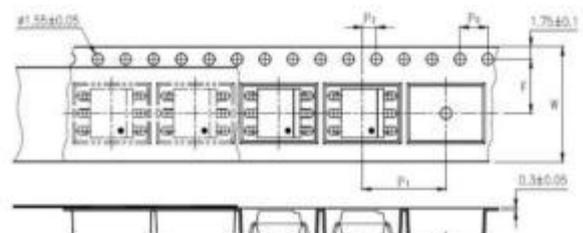
## ■ Packing

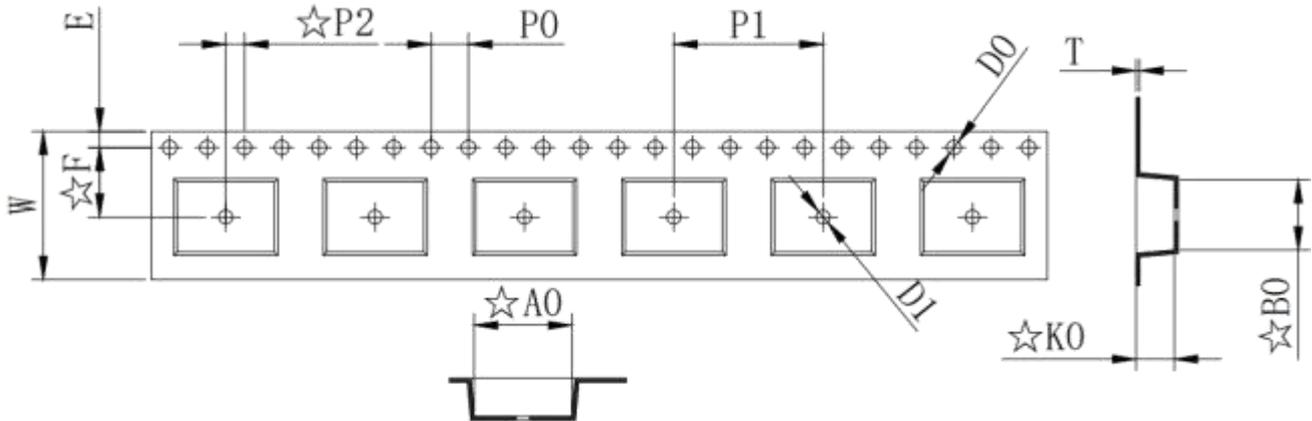
### 1. Tape and Reel

Option TA1:



Option TA:





Deminsion/mm	W	E	F	P0	P1	P2
Packagetype:S	16±0.2	1.75±0.1	7.5±0.1	4±0.1	16±0.1	2±0.1

Deminsion/mm	A0	B0	D0	D1	K0
Packagetype:S	10.45±0.1	7.6±0.1	1.5±0.1	1.5±0.1	4.1±0.1

### 1.Reel

Packagetype:S	Reel	Inner carton	Outer carton
QTY/PCS	1K/reel	2K(2 reels)	20K

### 2.Tape and Tube

Package type:Normal&M	Tube	Outer carton
QTY/PCS	65	3.25K(50 tubes)

