

恒拓电子  
HENG TUO ELECTRONICS



# *HT series*

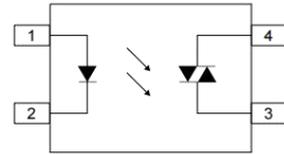
**Photocoupler  
Product Date Sheet**

## **HTM-302X\_305X**

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

Zhejiang Hengtuo Electronic technology Co.,Ltd  
298 Yongqing Road,Nanhu District,Jiaxing City,Zhejiang Province  
Tel-0573-82819382  
<https://hengtuo-elec.com>

## ■ Package



Pin Configuration

- 1 Anode
- 2 Cathode
- 3 GND
- 4 VCC

## ■ Description

The HTM-302X\_305X series devices are optocouplers composed of a GaAs infrared light emitting diode and a single-crystal silicon chip random phase photoelectric bidirectional thyristor.

## ■ Features

- Peak breakdown voltage
  - HTM-302X: Min.400V
  - HTM-305X: Min.600V
- 4pin non zero-cross optoisolators triac driver outp
- High input-output isolation voltage(Viso = 3,750Vrms)
- Operating Temperature: -40℃~110℃
- Safety approval
  - UL approved
  - VDE approved
  - CQC approved
- RoHS
- MSL1

## ■ Applications

- Lighting Control
- AC Motor Starter
- Static power switc
- Temperature Controls



## ■ Product Nomenclature

The product name is designated as below:

HT M-30XX - X - X X-XX  
① ② ③ ④

Designation:

HT =Hengtuo Technology Co.,LTD.

M= Packaging form

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

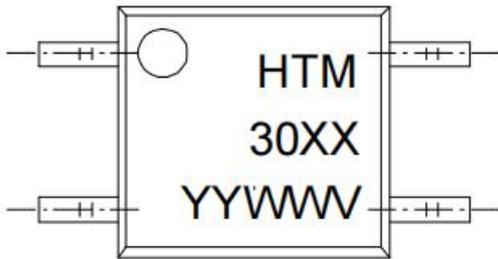
① = Tape and Reel option(TP,TP1,NONE)

② = VDE order option(fixed code "V")

③ = Halogen free option(fixed code"G")

④ = Customer code

## ■ Marking Information



### Designation:

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

## ■ Maximum

Parameter		Symbol	Values	Unit	
Input	Forward Current	$I_F$	50	mA	
	Reverse Voltage	$V_R$	6	V	
	Power Dissipation	$P$	100	mW	
	Junction Temperature	$T_J$	125	°C	
Output	Off-State Output Terminal Voltage	$V_{DRM}$	HTM-302X	400	V
			HTM-305X	600	
	On state RMS current	$I_{T(RMS)}$	100	mA(RMS)	
	Peak Repetitive Surge Current (PW=1ms, 120 pps)	$I_{TSM}$	1	A	
	Junction Temperature	$T_J$	125	°C	
	Collector Power Dissipation	$P_C$	300	mW	
Operating temperature range		$T_{op}$	- 40 ~ 110	° C	
Storage temperature range		$T_{stg}$	- 55 ~ 125	° C	
Total Power consumption		$P_{(W)}$	330	mW	
Isolation Voltage <sup>(1)</sup>		$V_{ISO}$	3750	Vrms	
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	$I_F=10mA$	
	Reverse Current	$I_R$	-	-	5	$\mu A$	$V_R=6V$	
Output	Peak Blocking Current, Either Directot <sup>(1)</sup>	$I_{DRM}$	-	-	100	nA	$V_{DRM} = \text{Rated } V_{DRM}$	
	Peak On-State Voltage, Either Dire	$V_{TM}$	-	-	2.5	V	$I_{TM}=100mA$ Peak	
	Critical rate of Rise of Off-State Voltage <sup>(2)</sup>	HTM-302X	$dv/dt$	-	100	-	V/ $\mu s$	$V_{in}=240Vrms$
		HTM-305X		1000	-	-		
Transfer Characteristics	Led Trigger Current, Current Required to Latch Output, Either Direction	HTM-3021 HTM-3051	$I_{FT}$	-	-	15	mA	Main Terminal Voltage = 3V
		HTM-3022 HTM-3052		-	-	10		
		HTM-3023 HTM-3053		-	-	5		
	Holding Current, Either Direction	$I_H$	0.5	1.0	5.0	mA		
	Turn-On Time	$T_{on}$	-	-	100	$\mu s$	$V_D=6V$ $R_L=100\ \Omega$ $I_F=20mA$	

(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

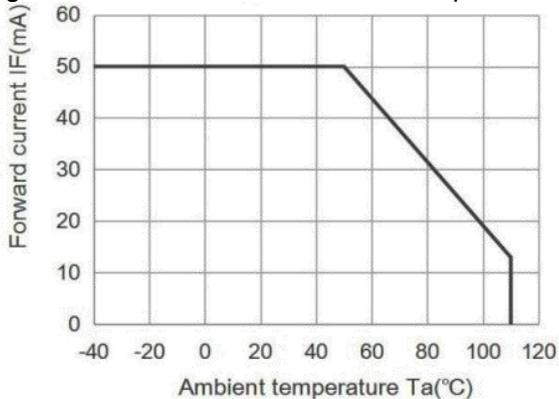


Fig.2 On-state current ITM (A) vs.Ambient temperature

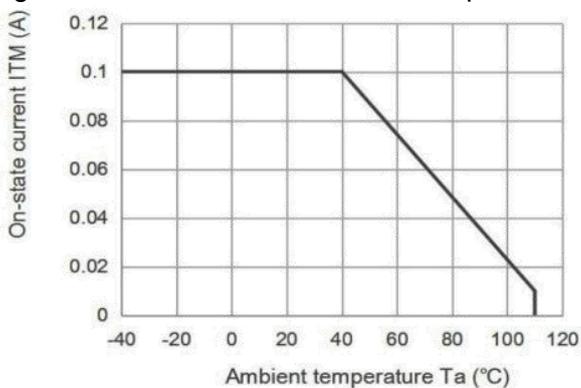


Fig.3 Minimum Trigger Current vs.Ambient temperature

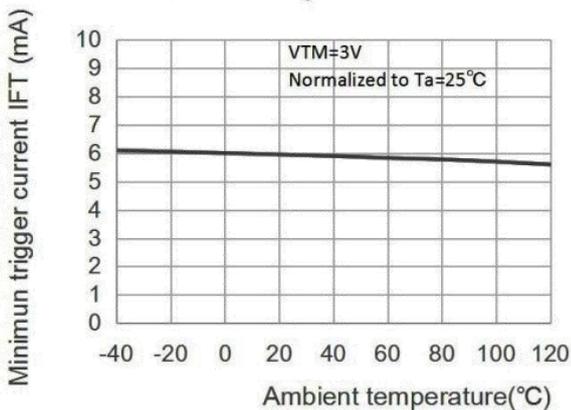


Fig.4 Forward current vs Forward Voltage

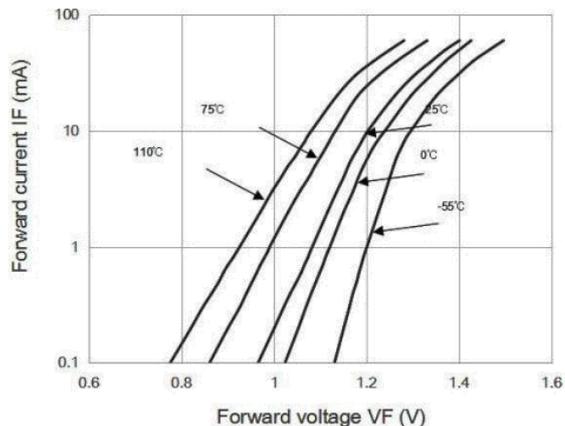


Fig.5 On-state voltage vs . Ambient temperature

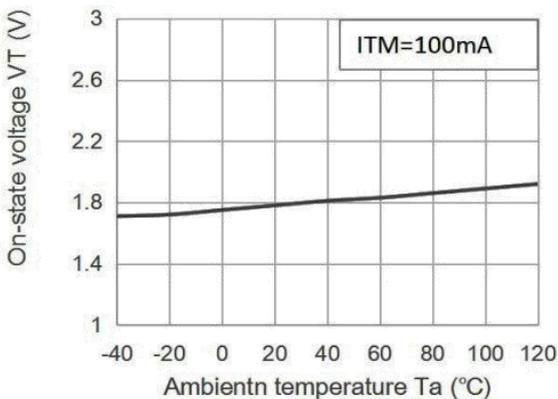


Fig.6 Holding current IH (mA) vs Ambient temperature

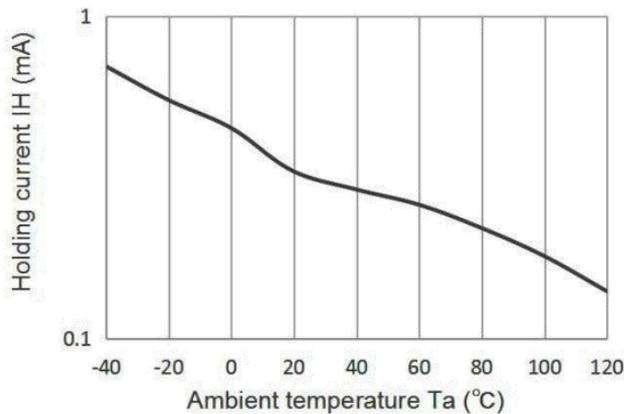




Fig.7 Repetitive peak off-state current vs Temperature

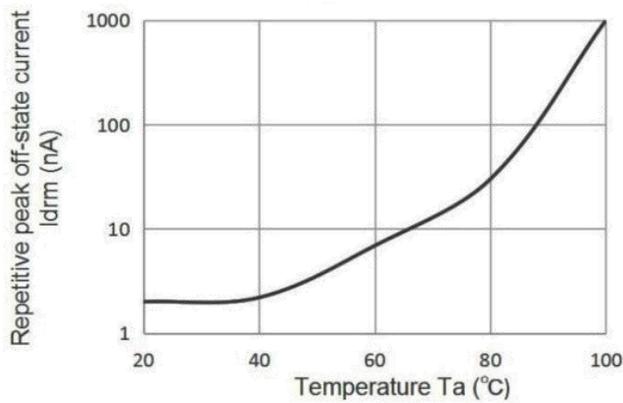


Fig.8 On-state current vs On-state voltage

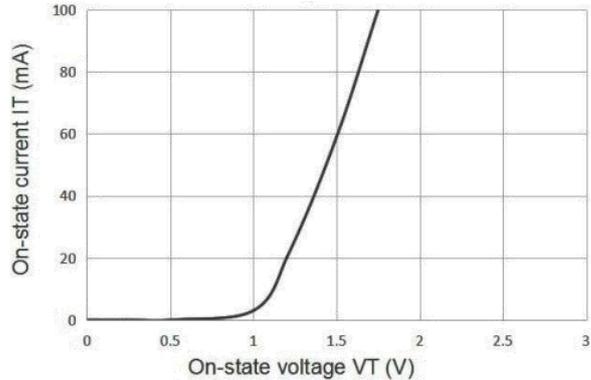


Fig.9 Basic Operation Circuit Medium/High Power Triac Drive Circuit

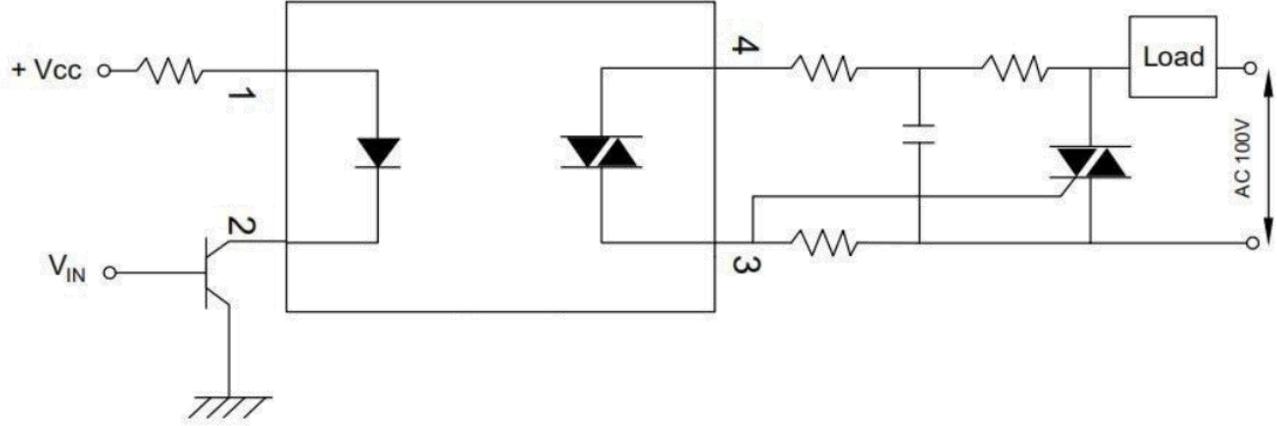
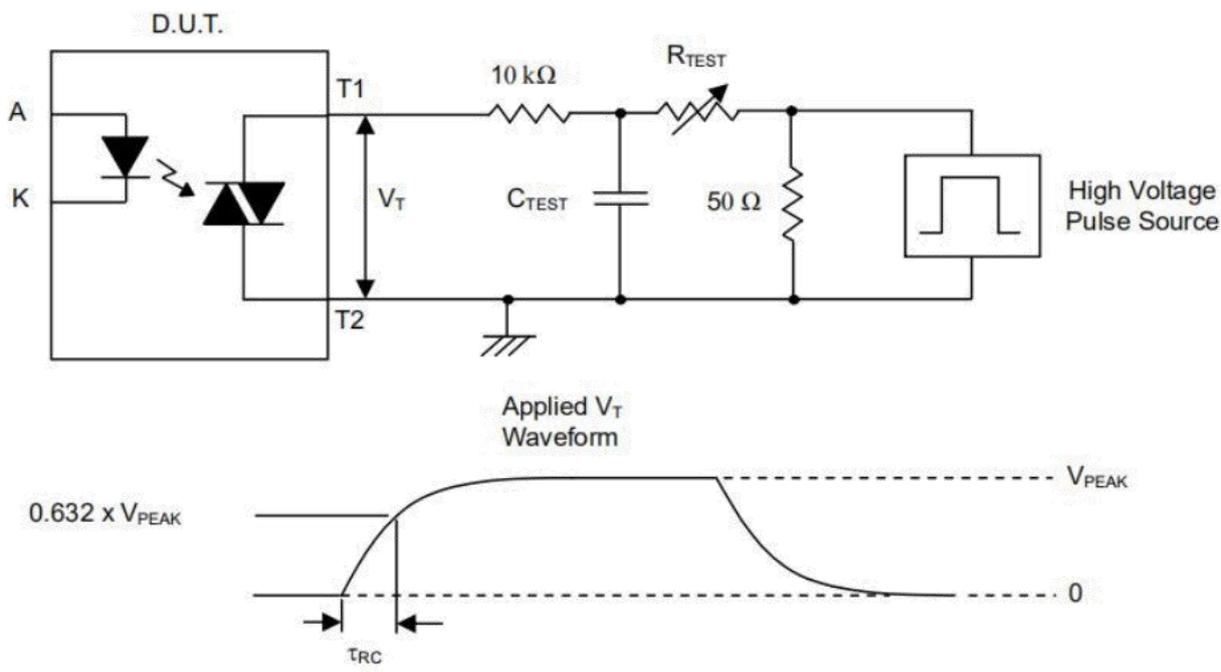
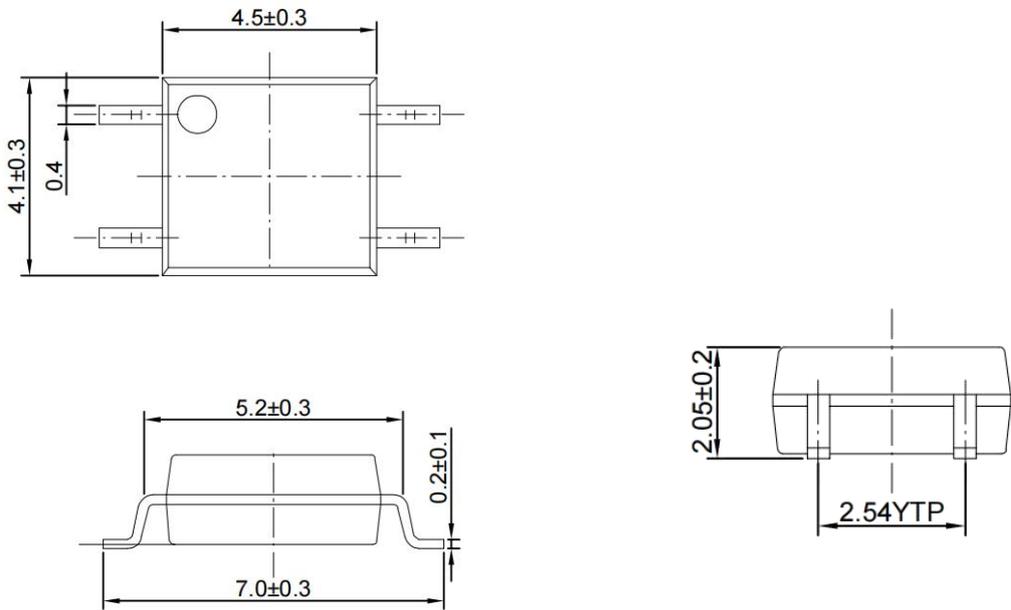


Fig10.Static dv/dt Test Circuit & Waveform

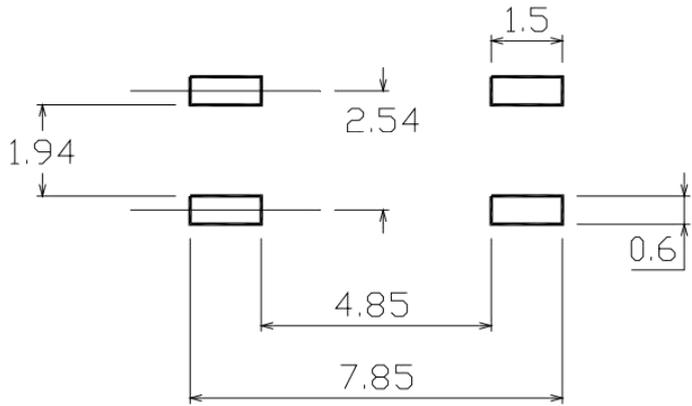


## Outline Dimension



Unit: mm  
Tolerance:  $\pm 0.1$  mm

## Recommended solder pad Design



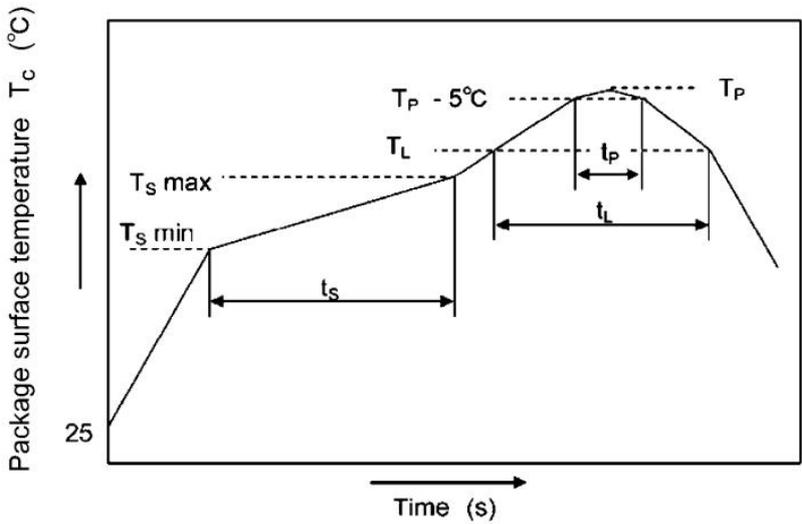
Unit: mm  
Tolerance:  $\pm 0.1$  mm



# 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)**

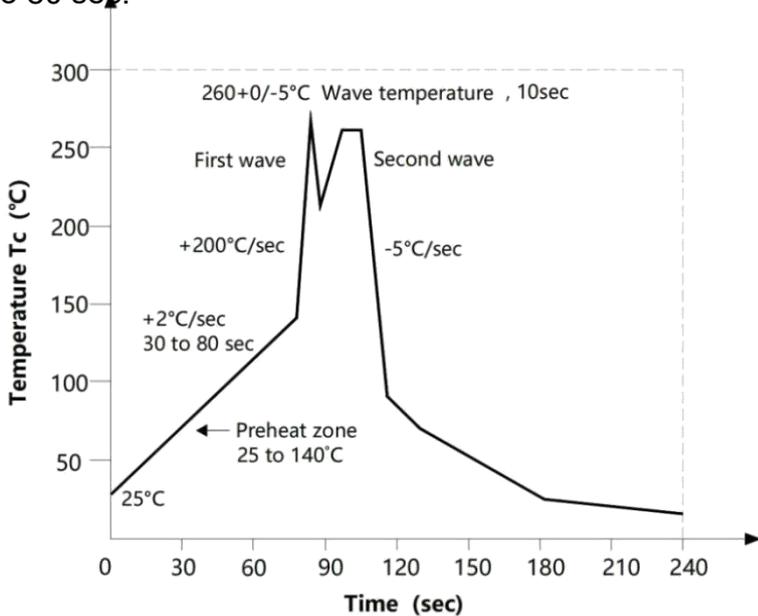
One time soldering is recommended within the condition.

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

Time: 10 sec.

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

Preheat time: 30 to 80 sec.



**3. Hand soldering by soldering iron**

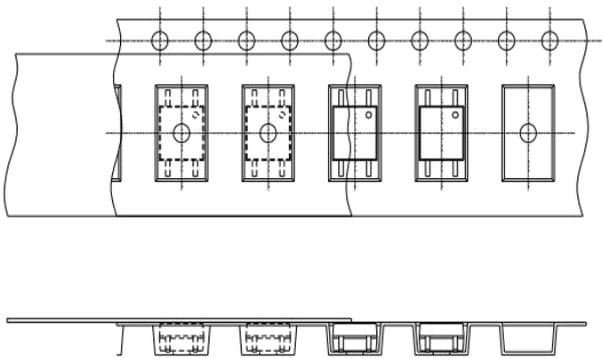
Allow single lead soldering in every single process. One time soldering is recommended.

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

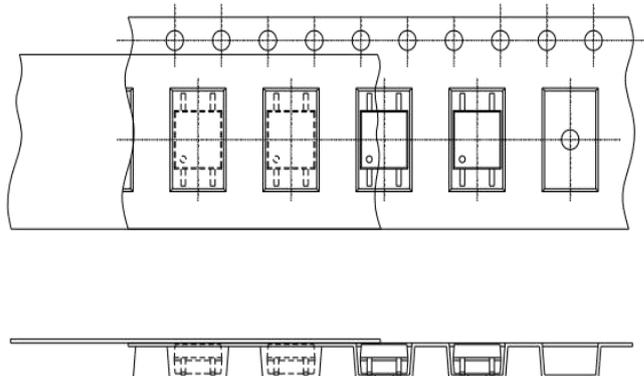
Time: 3 sec max.

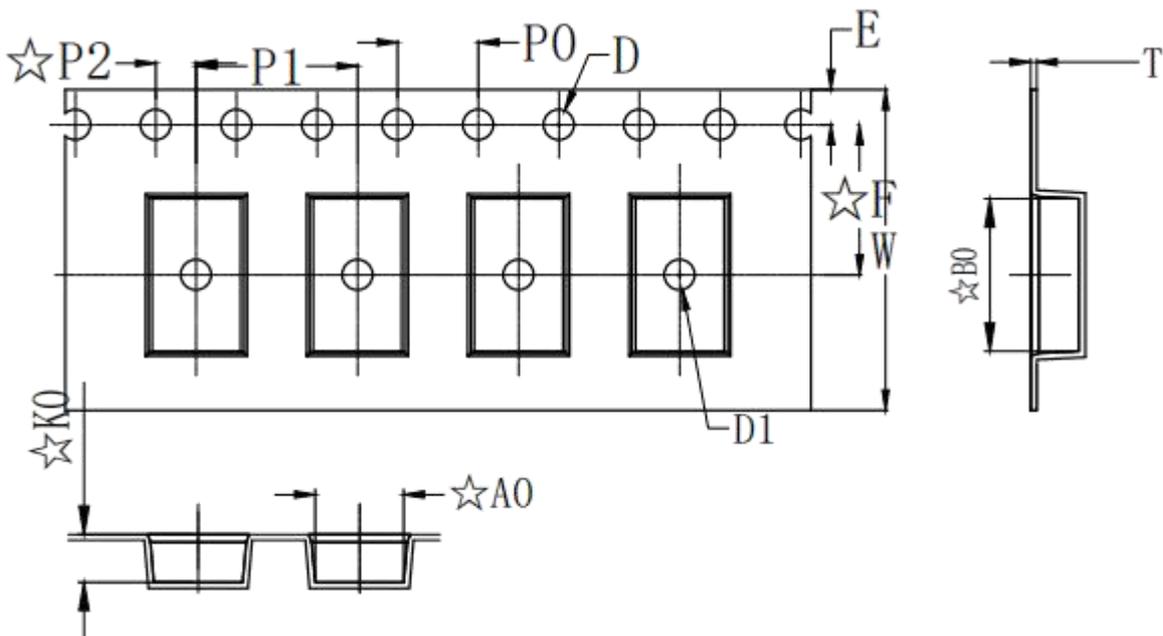
**■ Packing  
Tape and Reel**

**Option TP1:**



**Option TP:**





Deminsion/mm	W	E	F	P0	P1	P2
Packagetype:S	16±0.2	1.75±0.1	7.5±0.1	4±0.1	8±0.1	2±0.1

Deminsion/mm	A0	B0	D0	D1	K0
Packagetype:S	4.4±0.1	7.6±0.1	1.5±0.1	1.5±0.1	2.4±0.1

Packagetype:S	Reel	Inner carton	Outer carton
QTY/PCS	3K/reel	6K(2 reels)	60K

