恒拓电子
HENGTUO ELECTRONICS

HT series

Photo Coupler
Product Data Sheet

HTV-21X

Spec No:HT-PC-HTV-21X-P-022-A0
Effective Date:07/03/2024

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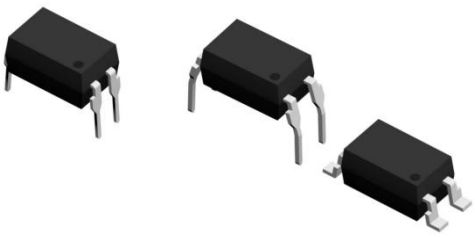
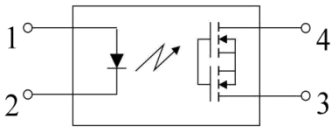
■ Package





Pin Configuration
1. AN
2. CA
3. D1
4. D2

■ Description

The HTV-21X is solid state relays containing an AlGaAs infrared LEDs on the light emitting side (input side) optically coupled to a high voltage output detector circuit. The detector consists of a photovoltaic diode array and MOSFETs on the output side. The single channel configuration is equivalent to 1 form A EMR. It is packaged in a 4-pin package and in wide-lead spacing and SMD opition.

■ Features

- Normally open signal pole signal throw relay
- Low operating current
- 60 to 600V output withstand voltage
- Wide operating temperature range of -40°C to 85°C
- High input-output isolation voltage(Viso = 5,000Vrms)
- Safety approval
  (UL 1577，VDE DIN EN60747-5-5（VDE 0884-5），CQC11-471543-2022)
- RoHS
- MSL1

■ Applications

- Measurement equipment
- Exchange equipment
- FA/OA equipment
- Security
- Industrial controls

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■ Product Nomenclature

The product name is designated as below:

HTV -21X -X X- X X- XX
① ② ③ ④ ⑤

Designation:

HT =Hengtuo Technology Co.,LTD.
V =Dip4 Package type
21X= Product Series(212,213,214,216)
① = Lead form option(S1,M,NONE)(1)
② = Tape and Reel option(TP,TP1,NONE)(2)
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	DIP4-S1
M	DIP4-M
NONE	DIP4 Normal

2. Tape and Reel option:

Symbol	Description
TP&TP1	Tape and Reel Type
NONE	DIP Type

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■ Marking Information

Designation:

HT	denotes Hengtuo
V	denotes Dip 4 Package type
21X	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	75		MW
	Peak Forward Current (100μs pulse, 100Hz)	I_{FP}	1		A
	Thermal Resistance Junction-Ambient	R_{thJ-A}	325		°C/W
	Thermal Resistance Junction-Case	R_{thJ-C}	200		°C/W
Output	Break Down Voltage	V_L	HTV-212	60	V
			HTV-213	100	
			HTV-214	400	
			HTV-216	600	
	Continuous Load Current	I_L	HTV-212	550	mA
			HTV-213	180	
			HTV-214	120	
			HTV-216	50	
	Pulse Load Current*(1)	I_{LPeak}	HTV-212	1.2	A
			HTV-213	0.5	
			HTV-214	0.3	
			HTV-216	0.15	
Power Dissipation		P_{out}	500		mW
Operating temperature range		T_{op}	–40 ~ 85		°C

Storage temperature range	T_{stg}	–40 ~ 125	°C
Total Power consumption	P(W)	550	mW
Isolation Voltage(2)	V_{ISO}	5000	Vrms
Soldering Temperature(3)	T_{SOL}	260	°C

Notes:
(1). A connection: 100ms (1 shot), VL = DC
(2)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.
(3).For 10 seconds

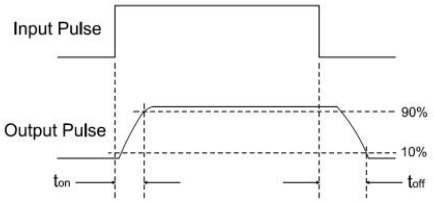
■ Electronic Optical Characteristics

(TA = 25°C)

Parameter			Symbol	Min.	Typ.	Max.	Unit	Conditon
Input	Forward Voltage		V_F	-	1.2	1.5	V	I_F=10mA
	Reverse Current		I_R	-	-	1	μA	V_R=5V
Output	Off State leakage Current		I_{leak}	-	-	1	μA	I_F=0mA, V_L=Max
	On Resistance	HTV-212	$R_{d(ON)}$	-	0.7	2.5	Ω	I_F=10mA, I_L = Max. t = 1s
		HTV-213		-	6.5	15		
		HTV-214		-	20	30		
		HTV-216		-	40	70		
	Output Capacitance	HTV-212	C_{out}	-	80	-	pF	VL = 0V, f = 1MHz
		HTV-213		-	60	-		
		HTV-214		-	45	-		
		HTV-216		-	30	-		
Transfer Characteristics	LED turn on Current		$IF_{(on)}$		2.5	5	mA	IL = Max.
	LED turn off current		$IF_{(off)}$	0.4	2.5	-	mA	IL = Max.
Turn On Time	HTV-212		T_{ON}	-	1.4	3	ms	IF = 10 mA, IL = Max. RL = 200 Ω ,
	HTV-213			-	1.2	3		

	HTV-214		-	0.4	3
	HTV-216		-	1.4	3
Turn Off Time	HTV-212	T_{OFF}	-	0.05	0.5
	HTV-213		-	0.05	0.5
	HTV-214		-	0.05	0.5
	HTV-216		-	0.05	0.5

Turn on/Turn off Time



■ Characteristics Curves

Fig.1 LED Dropout Voltage vs. Ambient Temperature

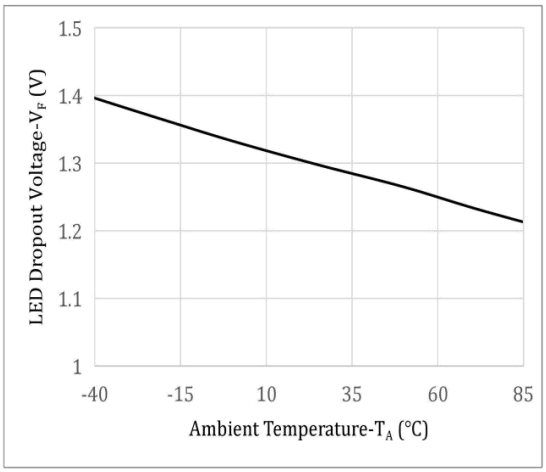


Fig.2 Output Current vs. Output Voltage

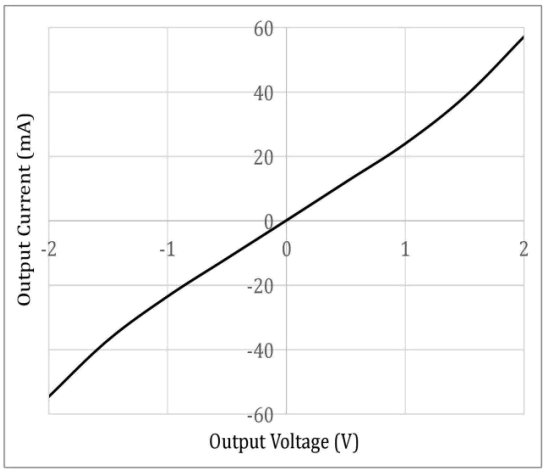


Fig.3 On Resistance vs. Ambient

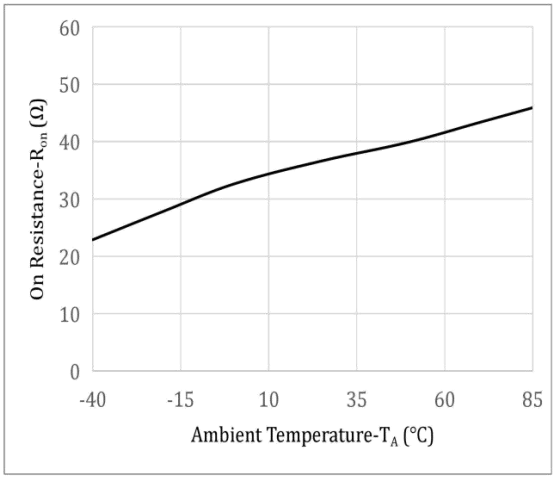


Fig.4 Load Current vs. Ambient Temperature

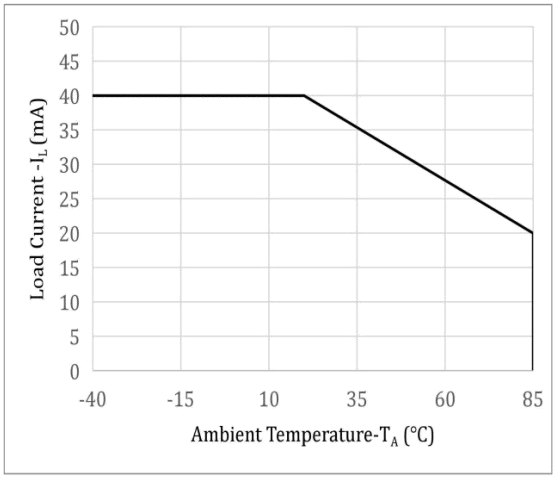


Fig.5 LED Operate Current vs. Ambient Temperature

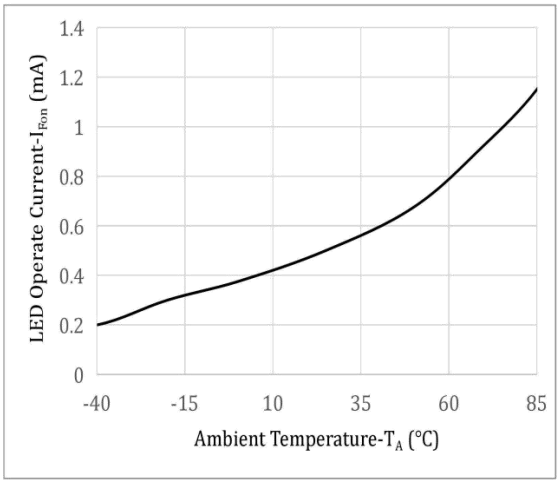


Fig.6 LED Turn Off Current vs. Ambient

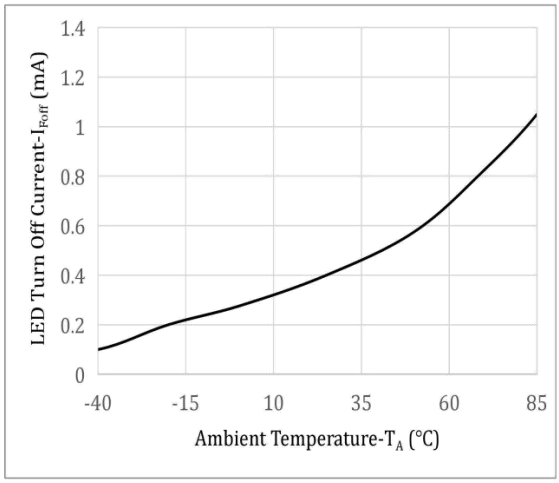


Fig.7 Turn On Time vs. Ambient Temperature

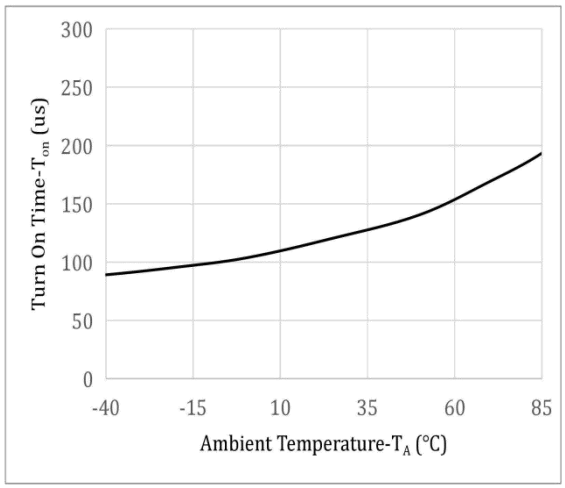


Fig.8 Turn Off Time vs. Ambient Temperature

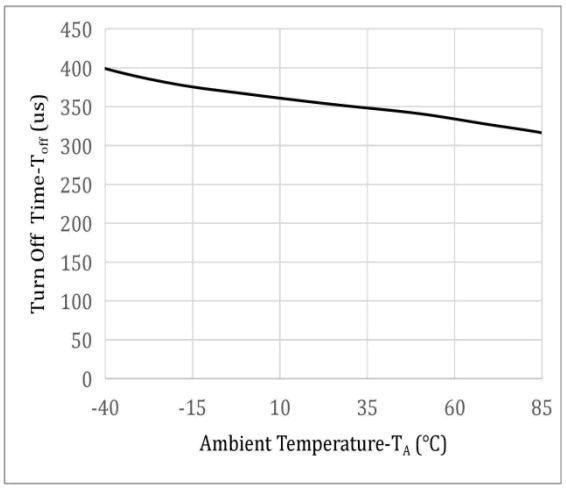


Fig.9 Turn On Time vs. LED Forward Current

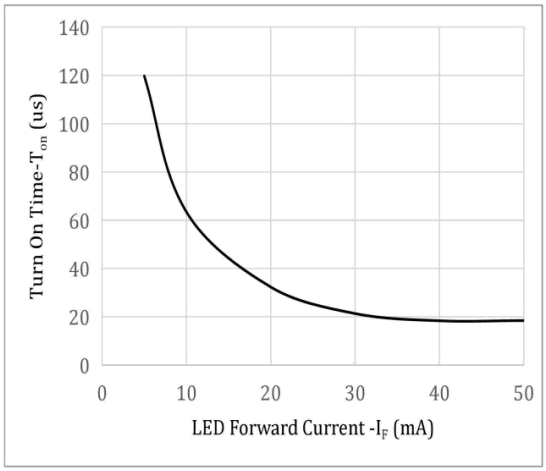


Fig.10 Turn Off Time vs. LED Forward

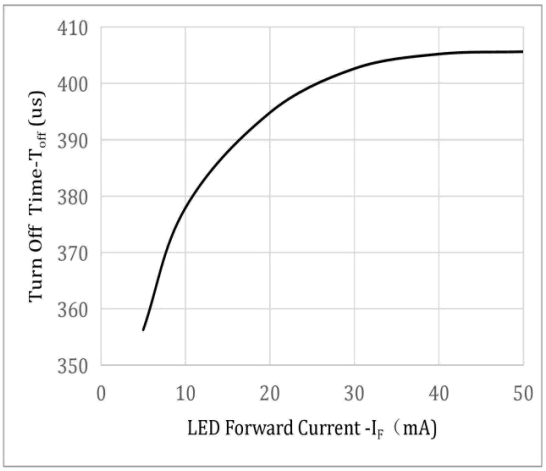
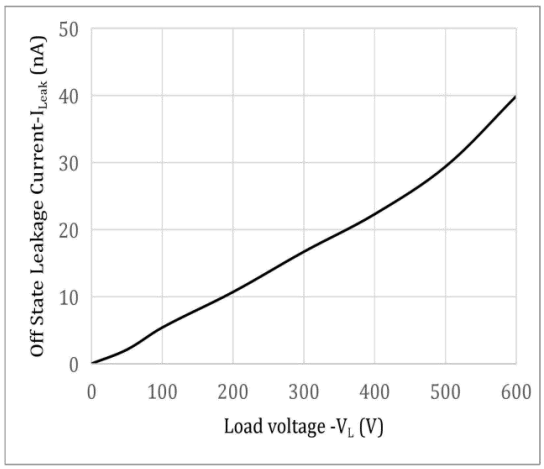


Fig.11 Off State Leakage Current vs Load Voltage



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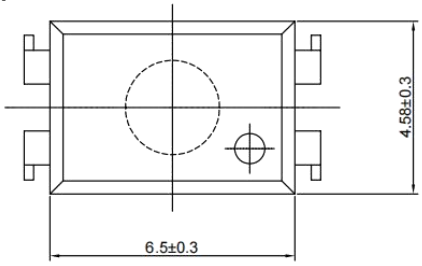
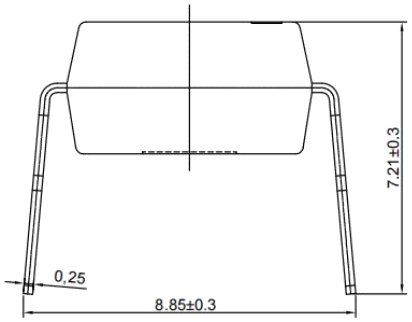
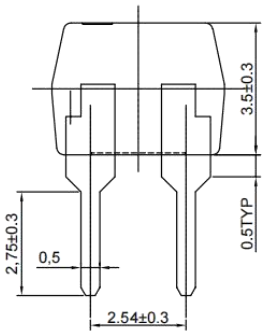
■ Outline Dimension

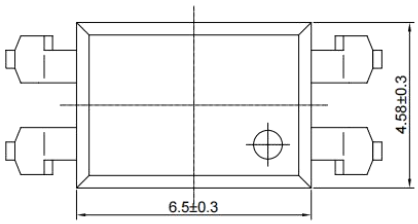
DIP Normal Type:

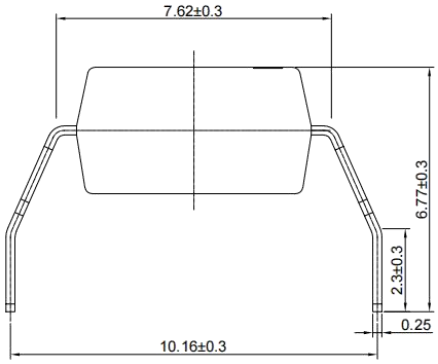


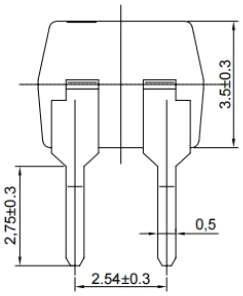




DIP M Type:







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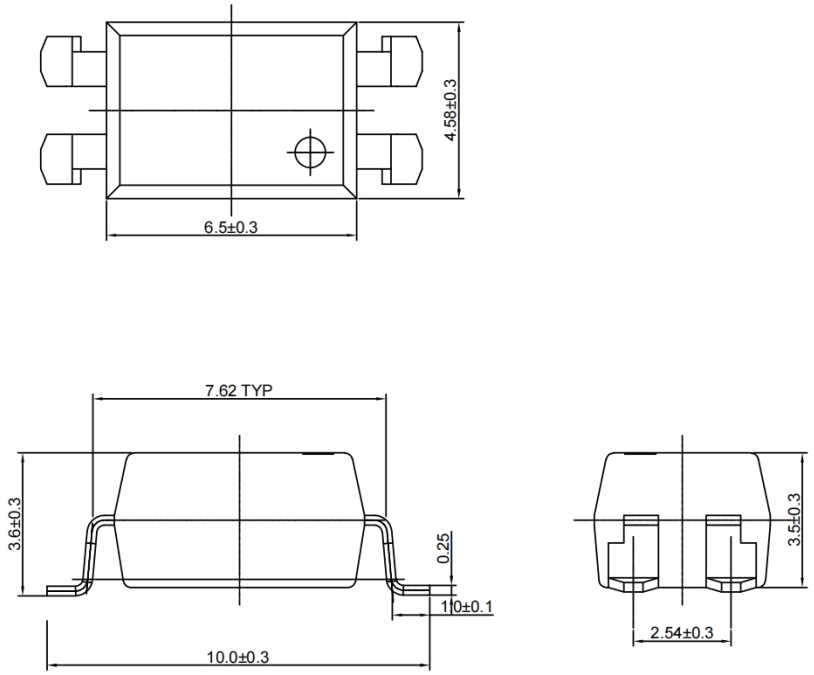
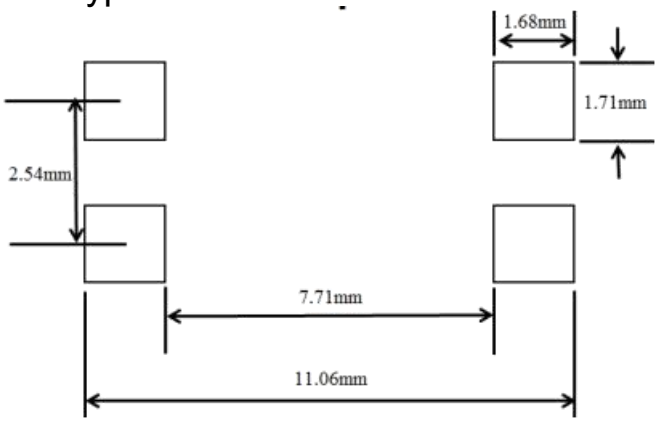
DIP S1 Type:



Unit: mm
Tolerance: ±0.1mm

■ Recommended solder pad Design

For S1 type:



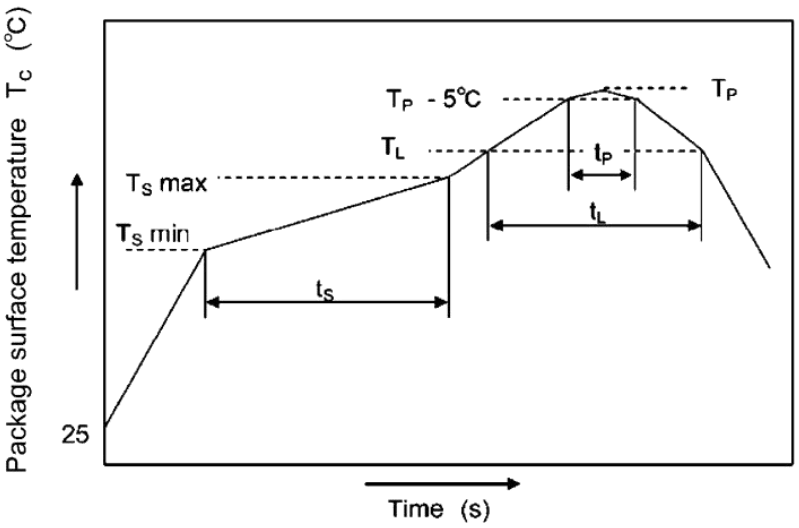
Unit: mm
Tolerance: ±0.1mm

■ 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 (t_L)	60-150 sec
Peak Temperature (TP)	260°C
-Time (TP-5℃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.

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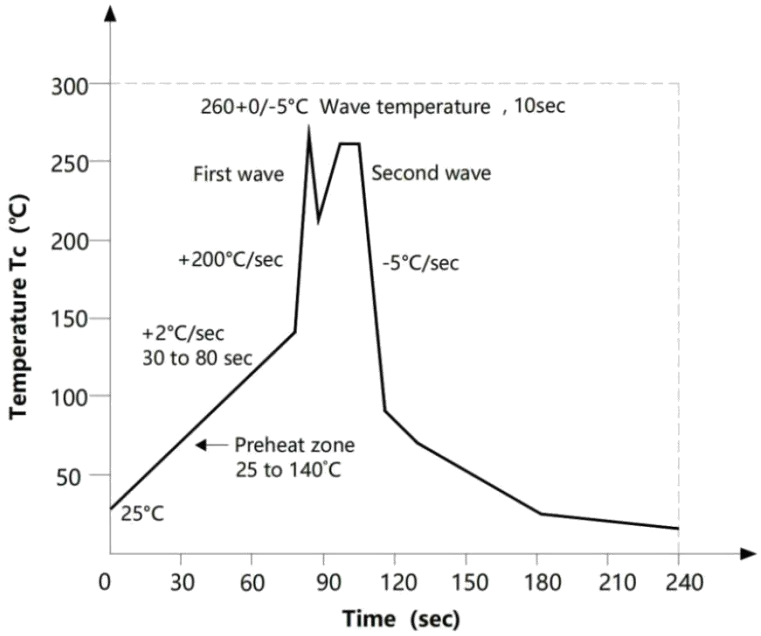
2. Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition.
Temperature:260+0/-5˚C.
Time:10 sec.
Preheat temperature:25 to 140˚C.
Preheat time:30 to 80 sec.



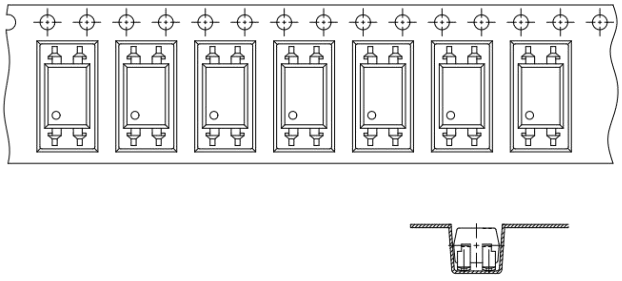
3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.
Temperature: 380+0/-5˚C
Time: 3 sec max.

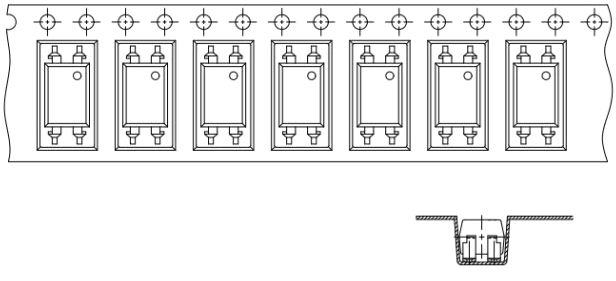
■ Packing

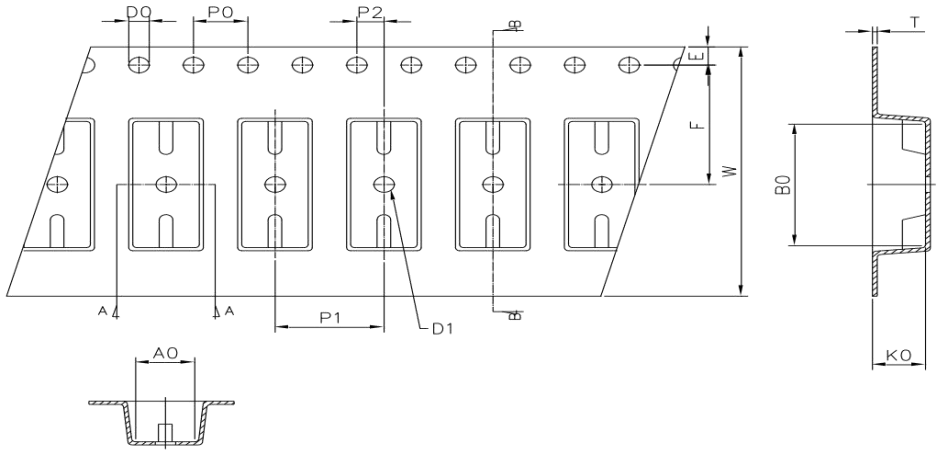
1. Tape and Reel

Option TP:



Option TP1:





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	T
Packagetype:S	4.6±0.1	10.4±0.1	1.5±0.1	1.5±0.1	4.6±0.1	0.4±0.1

Packagetype:S	Reel	Inner carton	Outer carton
QTY/PCS	1.5K/reel	3K(2 reels)	30K

2. Tape and Tube

Packagetype:Normal&M	Tube	Inner carton	Outer carton
QTY/PCS	100	5K(50 tubes)	50K

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- Hengtuo is continually improving the quality, reliability, function or design and Hengtuo reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any ”specific” application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.

文件修订履历			
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A0	首次发布	劳厚顺	2024.7.3