

恒拓电子
HENG TUO ELECTRONICS



HT series

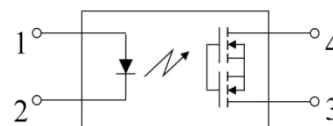
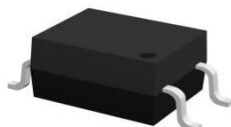
**Photo Coupler
Product Data Sheet**

HTM-21X

Spec No:HT-PC-HTM-21X-P-021-A0
Effective Date:07/03/2024

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■ Package



Pin Configuration

- 1. AN
- 2. CA
- 3. D1
- 4. D2

■ Description

The HTM-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. The devices in a 4-pin small outline SOP package.

■ 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 = 3,750Vrms)
- Safety approval
(UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5) , CQC11-471543-2022)
- RoHS
- MSL1

■ Applications

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



■ Product Nomenclature

The product name is designated as below:

HTM - 21X - X X - X X - XX
 ① ② ③ ④ ⑤

Designation:

HT =Hengtuo Technology Co.,LTD.

M =Sop4 Package Type

21X= Product Series(212,213,214,216)

① = Lead form option(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

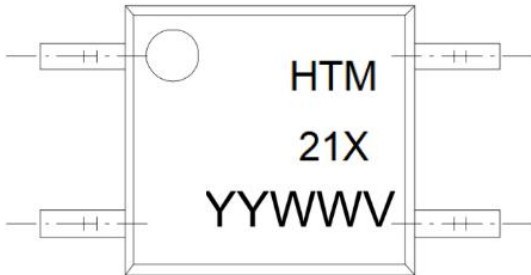
1. Lead form option:

Symbol	Description
NONE	SOP4

2. Tape and Reel option:

Symbol	Description
TP&TP1	Tape and Reel Type

■ Marking Information



Designation:

HT	denotes Hengtuo
M	denotes Sop 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 (100 μ s pulse, 100Hz)	I_{FP}	1	A	
	Thermal Resistance Junction-Ambient	R_{thJ-A}	325	$^{\circ}C/W$	
	Thermal Resistance Junction-Case	R_{thJ-C}	200	$^{\circ}C/W$	
Output	Break Down Voltage	V_L	HTM-212	60	V
			HTM-213	100	
			HTM-214	400	
			HTM-216	600	
	Continuous Load Current	I_L	HTM-212	550	mA
			HTM-213	180	
			HTM-214	120	
			HTM-216	50	
	Pulse Load Current ^{*(1)}	I_{LPeak}	HTM-212	1.2	A
			HTM-213	0.5	
			HTM-214	0.3	
			HTM-216	0.15	
Power Dissipation	P_{out}	500	mW		
Operating temperature range	T_{op}	-40 ~ 85	$^{\circ}C$		

Storage temperature range	T_{stg}	-40 ~ 125	°C
Total Power consumption	P(W)	550	mW
Isolation Voltage ⁽²⁾	V_{ISO}	3750	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.

(2).For 10 seconds

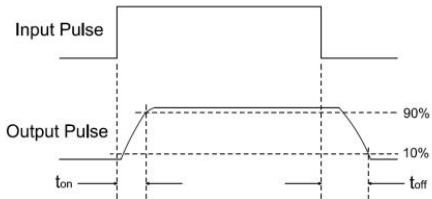
■ Electronic Optical Characteristics (TA = 25°C)

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



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

Turn on/Turn off Time





Characteristics Curves

Fig.1 LED Dropout Voltage vs. Ambient Temperature

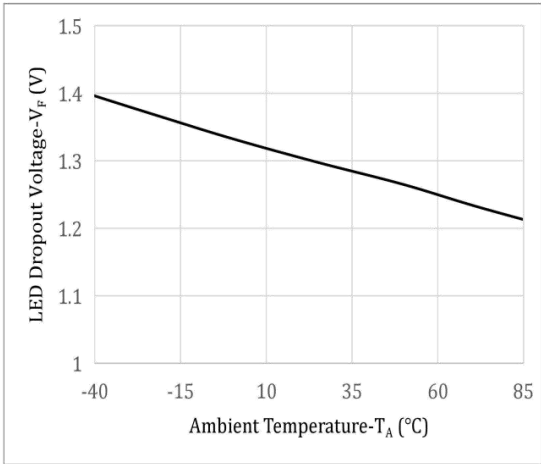


Fig.2 Output Current vs. Output Voltage

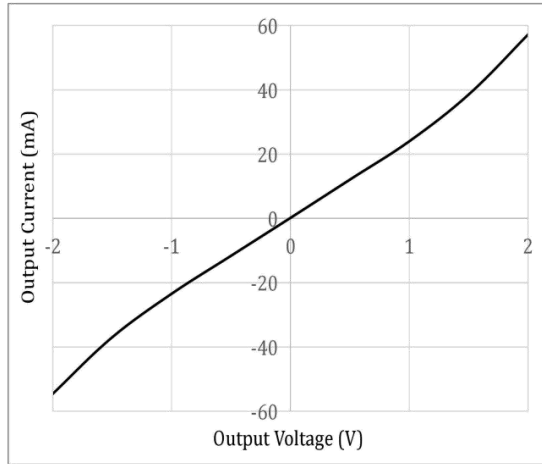


Fig.3 On Resistance vs. Ambient

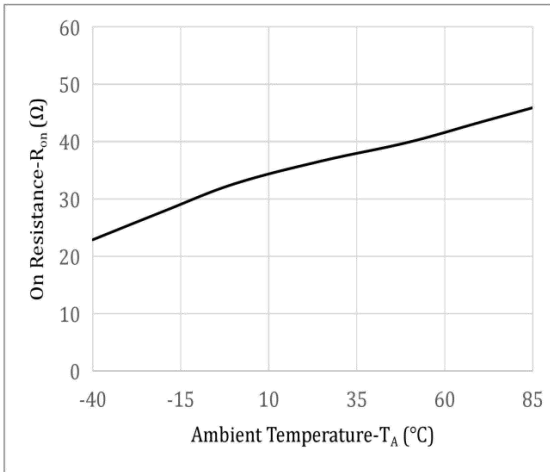


Fig.4 Load Current vs. Ambient Temperature

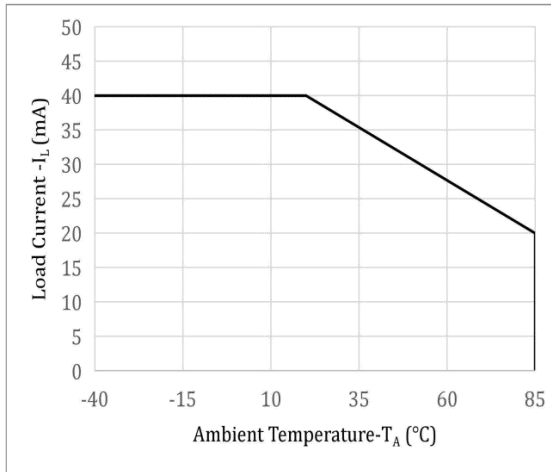


Fig.5 LED Operate Current vs. Ambient Temperature

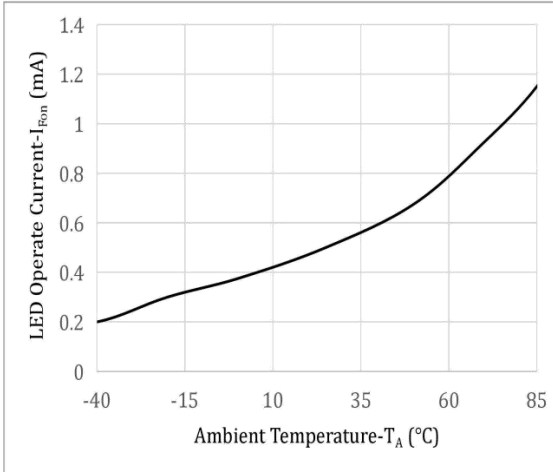


Fig.6 LED Turn Off Current vs. Ambient

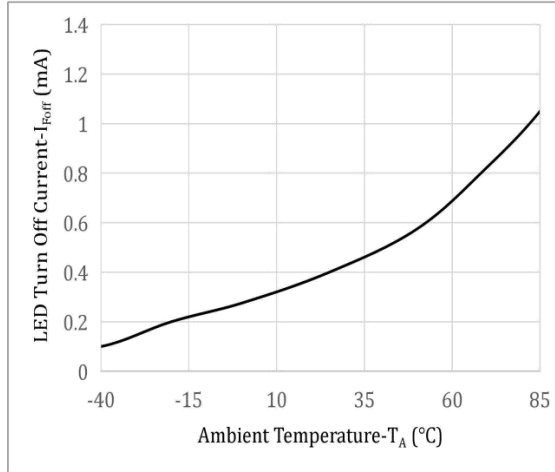


Fig.7 Turn On Time vs. Ambient Temperature

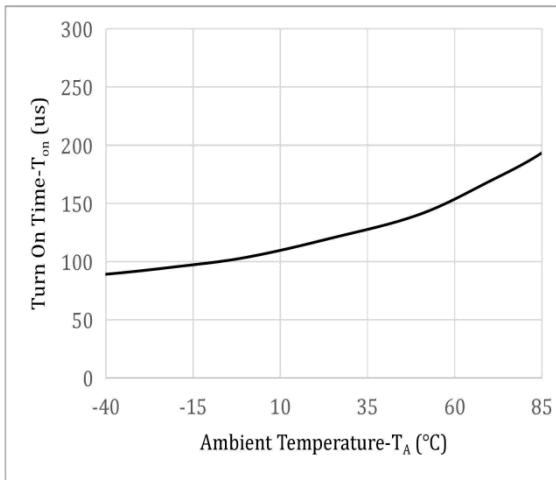


Fig.8 Turn Off Time vs. Ambient Temperature

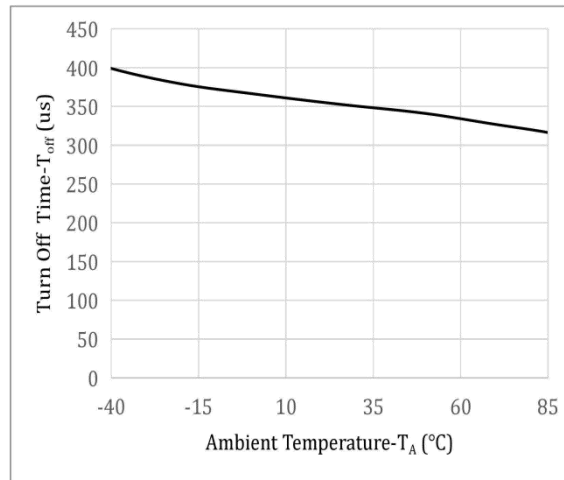


Fig.9 Turn On Time vs. LED Forward Current

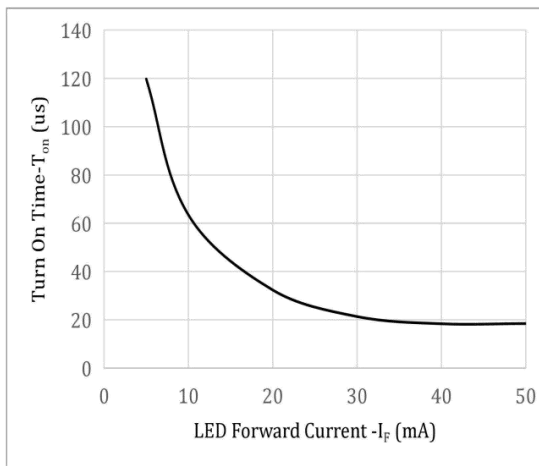


Fig.10 Turn Off Time vs. LED Forward Current

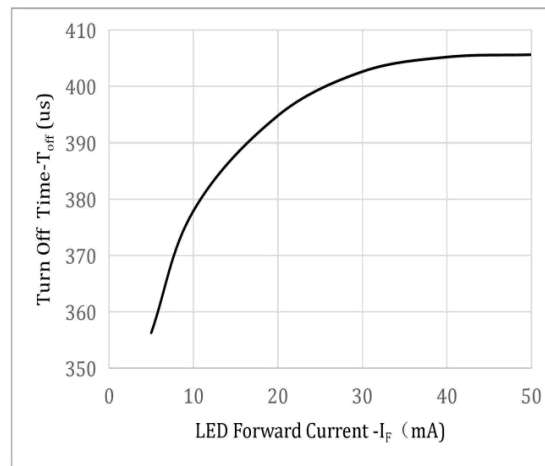
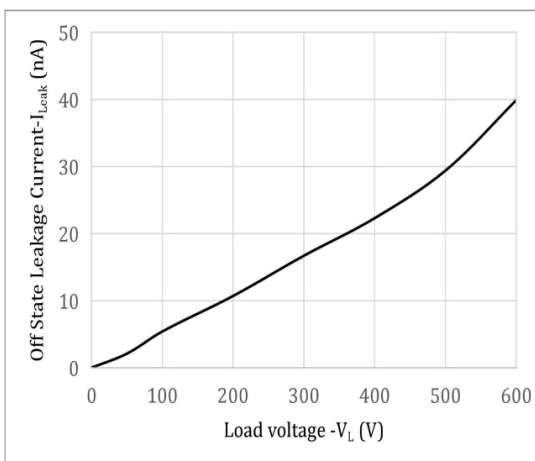
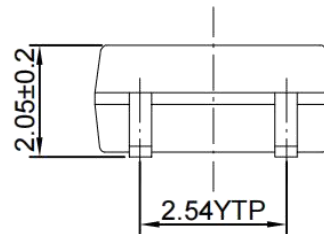
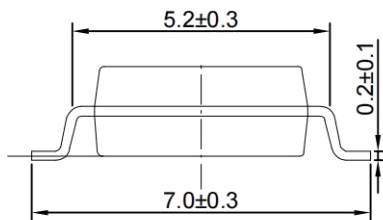
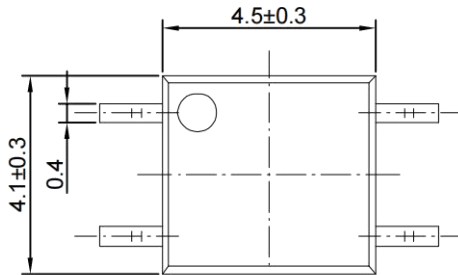


Fig.11 Off State Leakage Current vs Load Voltage

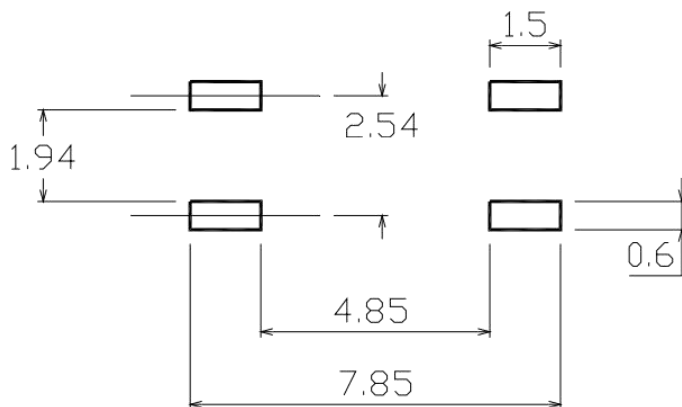


■ Outline Dimension



Unit: mm
Tolerance: ± 0.1 mm

■ Recommended solder pad Design



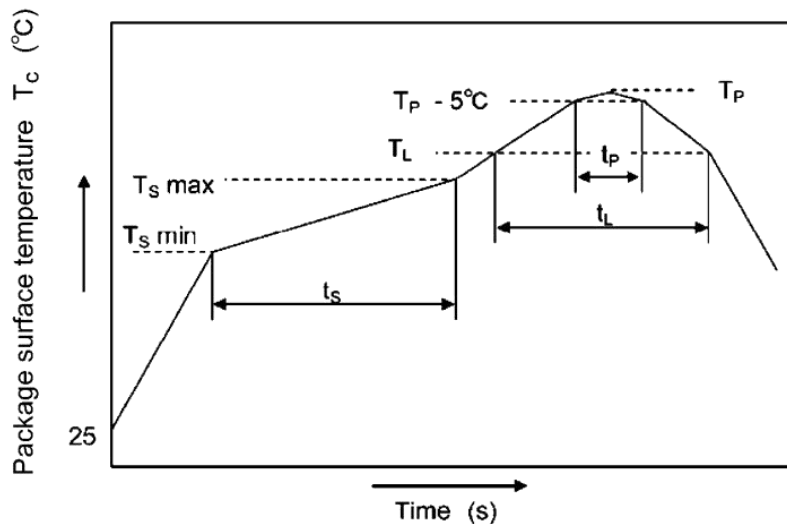
Unit: mm
Tolerance: ± 0.1 mm

■ 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)

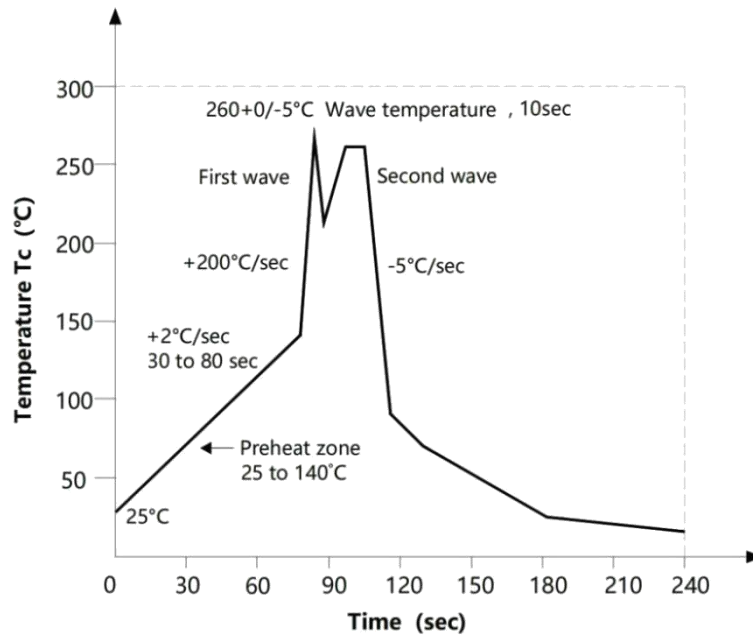
One time soldering is recommended within the condition.

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

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.

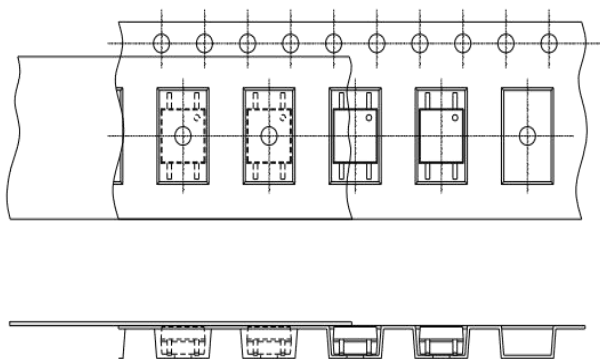
Temperature: $380 \pm 0/-5^\circ\text{C}$

Time: 3 sec max.

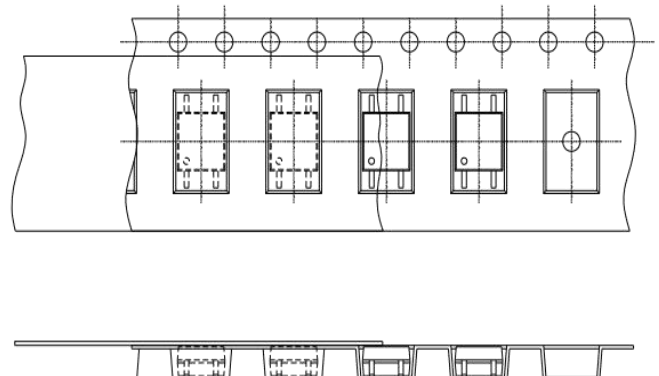
■ Packing

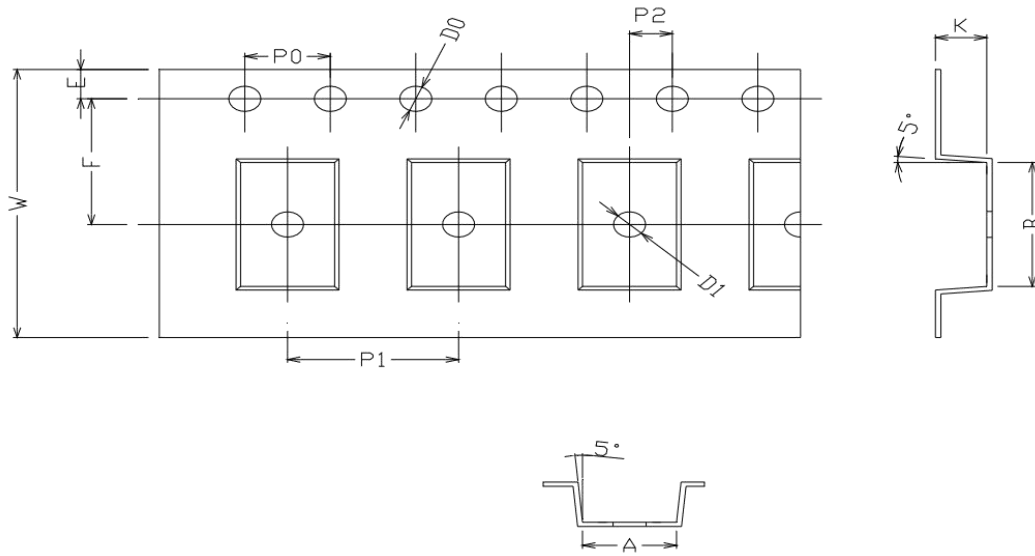
1. Tape and Reel

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	A	B	D0	D1	K
Packagetype:S	4.4 ± 0.1	7.5 ± 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	9K(3 reels)	90K



■ Attention:

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- 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.
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- When requiring a device for any "specific" application, please contact our sales in advance.
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