

恒拓电子
HENG TUO ELECTRONICS

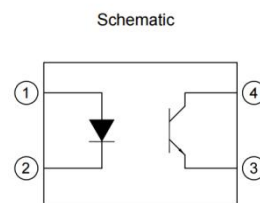
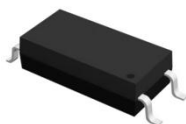


HT series

**Photo Coupler
Product Specification**

HT-10XX

■ Package



Pin Configuration
1 Anode
2 Cathode
3 Emitter
4 Collector

■ Description

The HT-10XX is a photoelectric coupler composed of light-emitting diode and phototransistor. It is packaged in a 4-pin LSOP 4 package .

■ Features

- Current transfer ratio
(CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
(CTR: 63~320% at $I_F = 10\text{mA}$, $V_{CE} = 5\text{V}$)
- High input-output isolation voltage($V_{iso} = 5,000\text{Vrms}$)
- 8mm long creepage distance
- Operating Temperature: $-55^{\circ}\text{C} \sim 110^{\circ}\text{C}$
- Safety approval
(UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5) , CQC11-471543-2022)
- RoHS
- MSL1

■ Applications

- Programmable controllers
- Switching power supply, intelligent meter
- Home appliances: such as air conditioners, fans, water heaters, etc



■ Product Nomenclature

The product name is designated as below:

HT - 10XX - XX - XX - XX

①② ③④ ⑤

Designation:

HT =Hengtuo Technology Co.,LTD.

10XX= Product Series(100X,101X)

① = Tape and Reel option⁽¹⁾

② = Lead frame Material⁽²⁾

③ = VDE order option(fixed code "V")

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

⑤ = Customer code

Notes

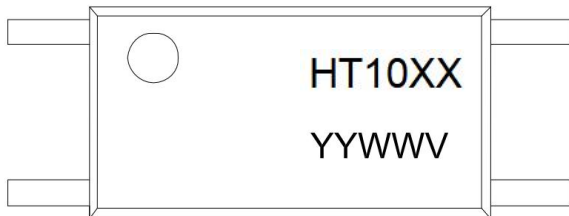
1. Tape and Reel option:

Symbol	Description
TP&TP1	Tape and Reel Type

2. Lead frame Material

Symbol	Description
NONE	Copper

■ Marking Information



Designation:

HT denotes Hengtuo
10XX 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	70	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	Collector - Emitter Voltage	V_{CEO}	80
Emitter - Collector Voltage		V_{ECO}	7	V
Collector Current		I_C	50	mA
Collector Power Dissipation		P_C	150	mW
Operating temperature range		T_{op}	-55 ~ 110	$^{\circ}C$
Storage temperature range		T_{stg}	-55 ~ 125	$^{\circ}C$
Total Power consumption		P(W)	200	mW
Isolation Voltage ⁽¹⁾		V_{ISO}	5000	Vrms
Soldering Temperature ⁽²⁾		T_{SOL}	260	$^{\circ}C$

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	1.4	V	$I_F=20mA$
	Reverse Current	I_R	-	-	10	μA	$V_R=4V$
	Terminal Capacitance	C_t	-	30	250	pF	$V=0, f=1KHz$
Output	Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=20V, I_F=0$
	Collector-Emitter Breakdown Voltage	BV_{CEO}	80			V	$I_C=0.1mA, I_F=0$
	Emitter-Collector Breakdown Voltage	BV_{ECO}	7			V	$I_E=10\mu A, I_F=0$
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			0.3	V	$I_F=10mA, I_C=1mA$
	Isolation Resistance	R_{iso}	5×10^{10}	1×10^{11}	-	Ω	DC500V, 40 ~ 60% R.H.
	Floating Capacitance	C_f		0.6	1	pF	$V=0, f=1MHz$
	Response Time (Rise)	t_r			18	μs	$V_{CE}=5V, I_C=5mA$
	Response Time (Fall)	t_f			18	μs	$RL=100\Omega$

■ Rank Table Of Current Transfer Ratio (CTR= $I_C/I_F \times 100\%$)

Rank Code	Symb ol	Min	Max	Conditon
HT-1010,1000	CTR	50	600	$I_F=5mA, V_{CE}=5V, T_a=25^\circ C$
HT-1017,1007		80	160	
HT-1018,1008		130	260	
HT-1019,1009		200	400	
HT-1012,1002	CTR	63	125	$I_F=10mA, V_{CE}=5V, T_a=25^\circ C$
HT-1013,1003		100	200	
HT-1014,1004		160	320	
HT-1012,1002	CTR	22		$I_F=1mA, V_{CE}=5V, T_a=25^\circ C$
HT-1013,1003		34		
HT-1014,1004		56		

■ Characteristics Curves

Fig.1 Relative Current Transfer Ratio vs. Forward Current

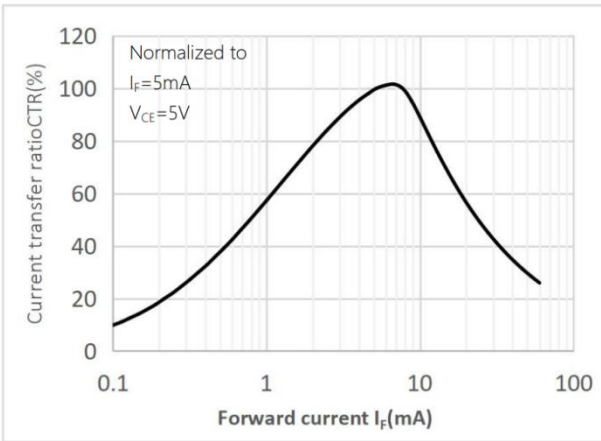


Fig.2 Forward Current vs. Forward Voltage

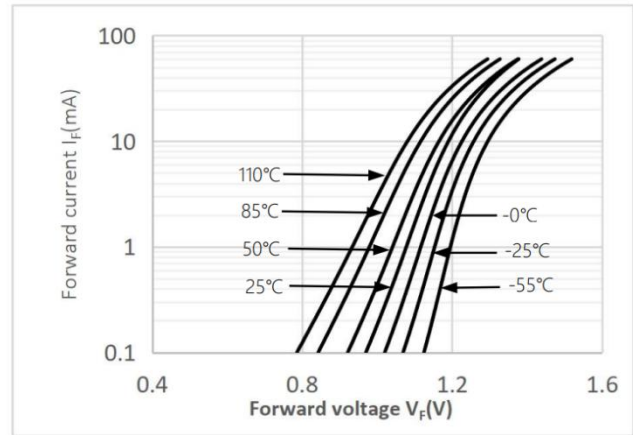


Fig.3 Collector Current vs. Collector-emitter Voltage

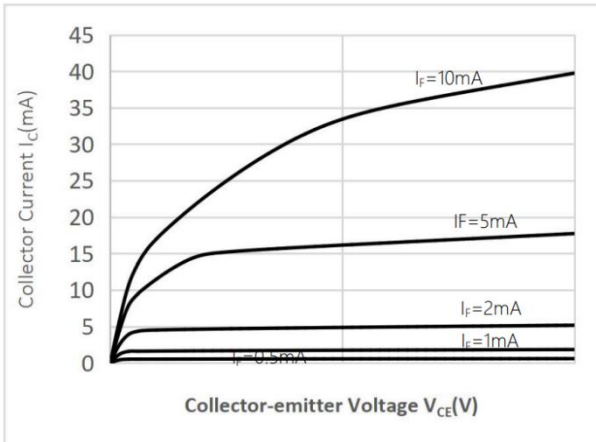


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

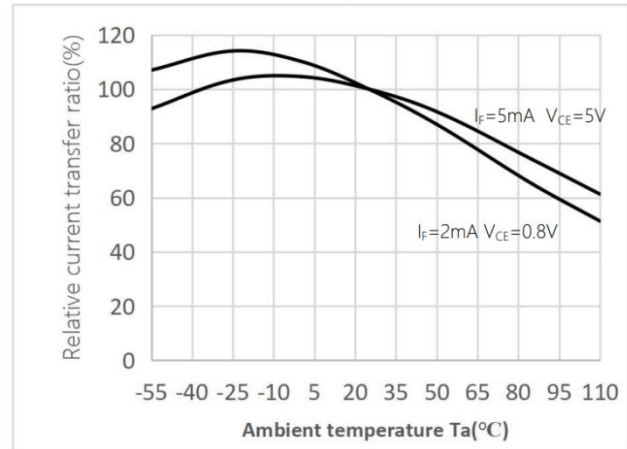


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

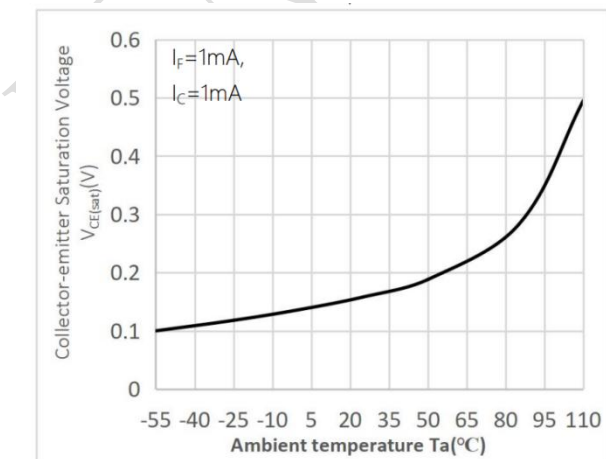


Fig.6 Collector Dark Current vs Ambient Temperature

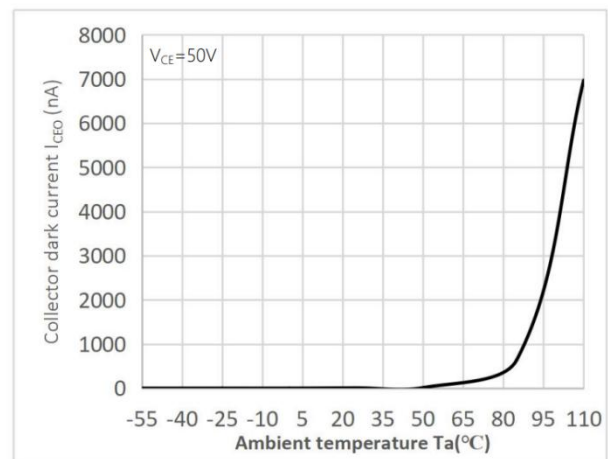


Fig.7 Response Time vs. Load Resistance

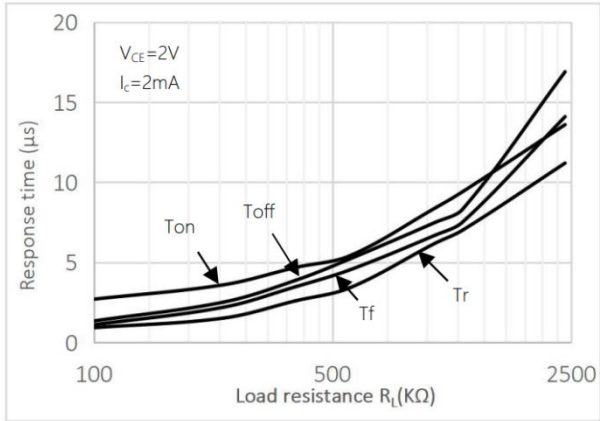


Fig.8 Frequency Response

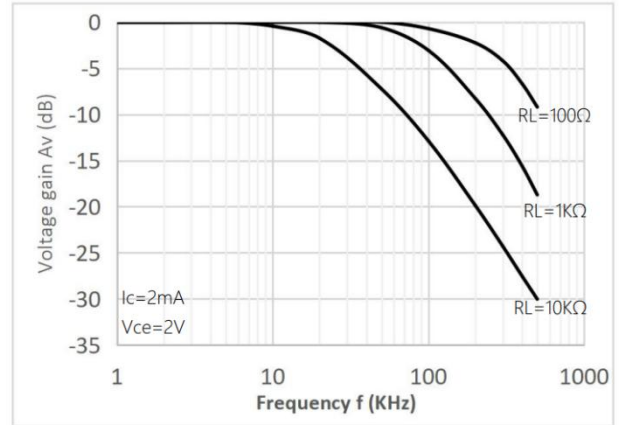


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

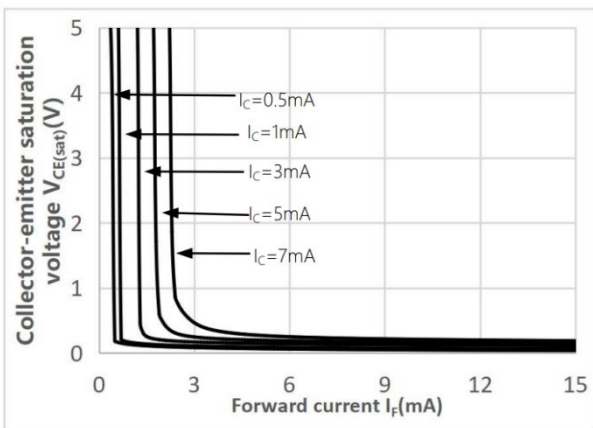
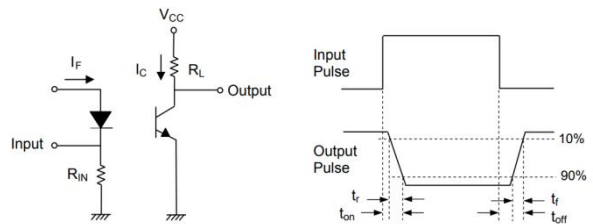
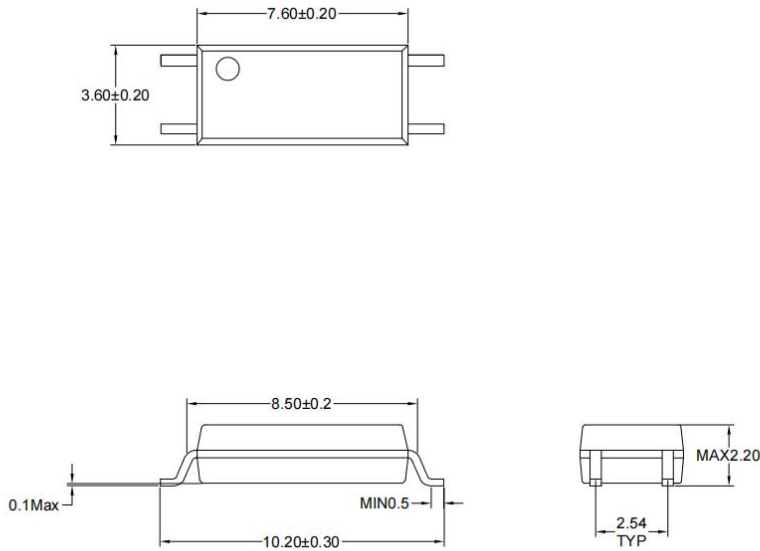


Fig.10 Switching Time Test Circuit & Waveforms

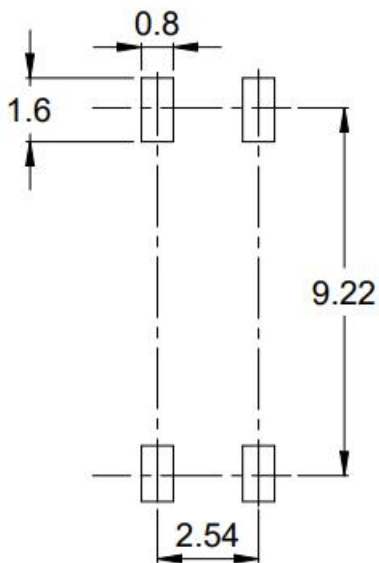


■ Outline Dimension



Unit: mm
Tolerance: ±0.1mm

■ Recommended solder pad Design

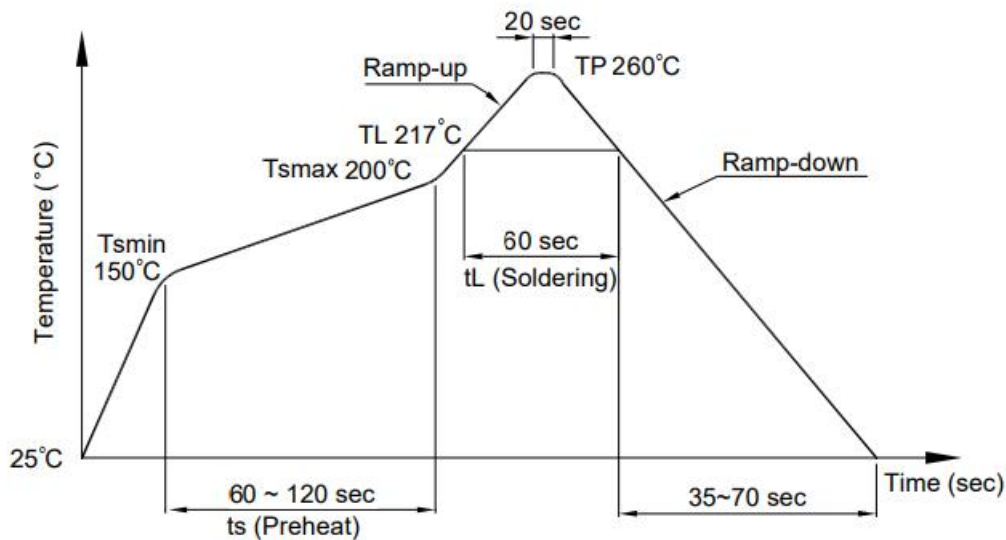


Unit: mm
Tolerance: ±0.1mm

■ Temperature Profile Of Soldering

1. IR Reflow soldering (JEDEC-STD-020 compliant)

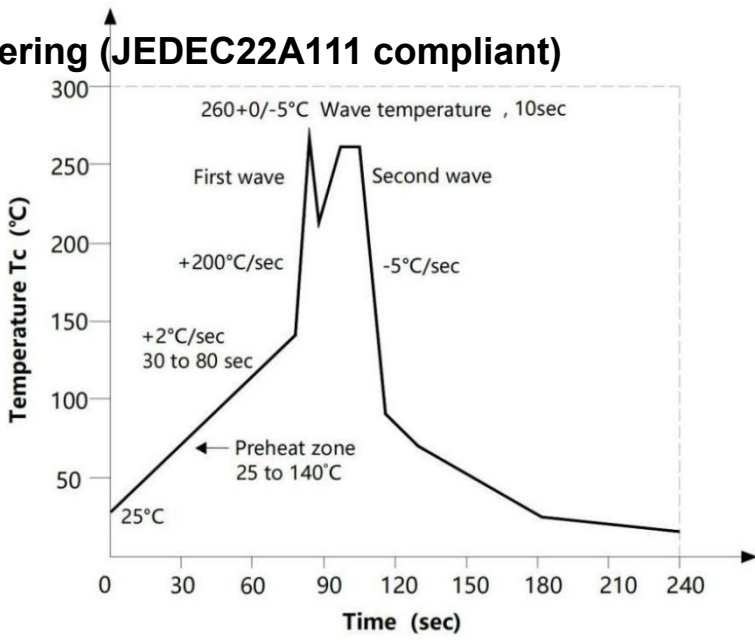
Profile item	Condition
Preheat	150°C
-Temperature Min (TSmin)	200°C
-Temperature Max (TSmax)	90 ± 30 sec
-Time (min to max) (ts)	
Soldering zone	217°C
-Temperature (TL)	60 sec
-Time (tL)	
Peak Temperature (TP)	260°C
Ramp-up rate	3°C / sec max
Ramp-down rate	3~6°C/ sec



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)

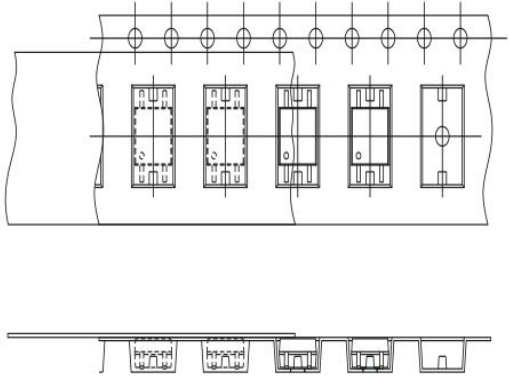


3. Hand soldering by soldering iron

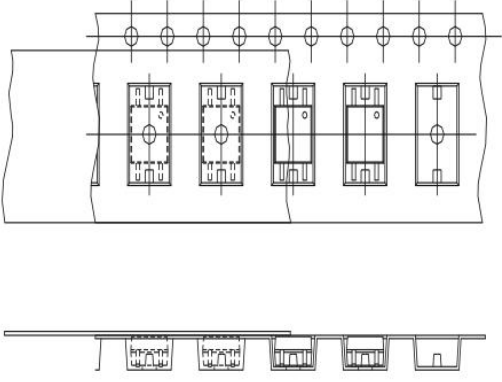
Allow single lead soldering in every single process. One time soldering is recommended.
Temperature: 380+0/-5°C
Time: 3 sec max.

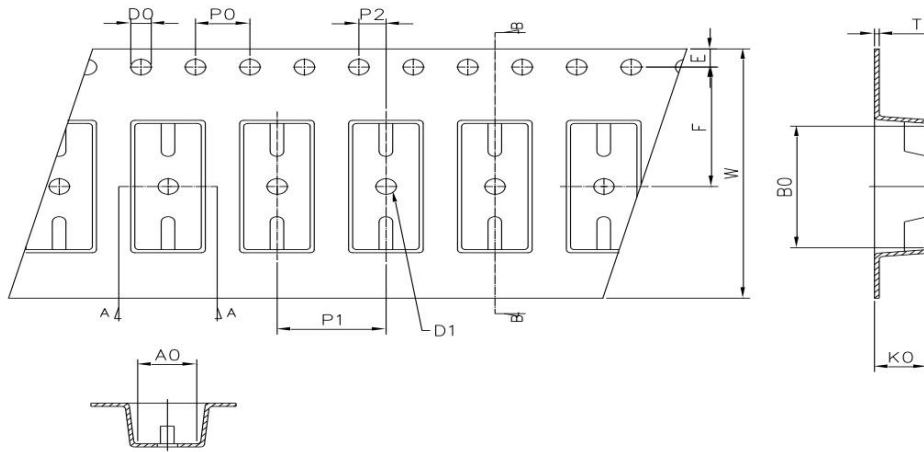
■ Packing Tape and Reel

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	3.95 ± 0.1	10.82 ± 0.1	1.5 ± 0.1	1.5 ± 0.1	2.25 ± 0.1	0.4 ± 0.1

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

■ Attention:

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