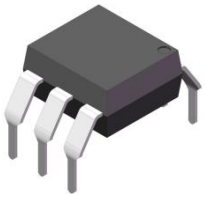
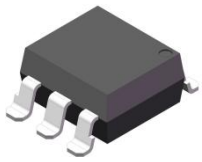
Random-phase Triac Driver Photocouple
XL301X, XL302X, XL305X, XL307X

Product packaging logic diagram

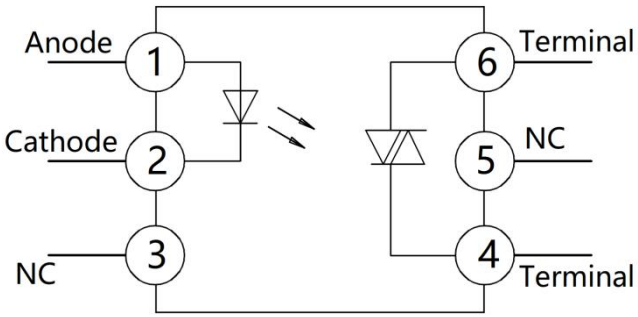
DIP6



DIP6-M



SMD6



Pin Configuration

Features

- Peak breakdown voltage:
  250V：XL301X； 400V：XL302X;
  600V：XL305X； 800V：XL307X
- High isolation voltage between input and output (Viso =5000Vrms)
- Operating Temperature: -55℃~100℃
- Environmentally friendly products, compliant with CQC, UL, and VDE requirements

Mechanical Data

- Case: DIP6, DIP6-M, SMD6
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solder ability-per MIL-STD-202, Method 208

Applications

- Commonly used in motor speed control systems，Power regulation system and follow-up system，Control of high-power equipment through low-power controls.
- Mainly used for motor speed control and temperature control。
- In the power system for power switches，Charging pile control and battery management system（BMS）,Achieve precise control of voltage/current and equipment protection。
- Vehicle power management，Drive motor control and charge/discharge management，Improving vehicle energy efficiency and safety。
- In fiber optic communication equipment, routers and medical devices，signal isolation and power control in the middle，Ensure stable operation of equipment.

Ordering Information

XL	30VX	(M)	(G)	-	(U)	(N)	(Y)
①	②	③	④		⑤	⑥	⑦

① Brand(XL)

② Product series(V:1,2,5,7;X:0,1,2,3,4)

③ Package type (DIP6: None, DIP6-M: M,SMD6: S)

④ Halogen option (None :Halogen free)

⑤ Lead frame (None: Copper)

⑥ Customer option 1 (0-9 or A-Z or none)

⑦ Customer option 2 (0-9 or A-Z or none)

Part Number	Package	Shipping Quantity	Marking Code
XL30V*1X*2	DIP6	65pcs / Tube	XL30V*1X*2
XL30V*1X*2M	DIP6-M	65pcs / Tube	XL30V*1X*2
XL30V*1X*2S	SMD6	1000pcs / Tape & Reel	XL30V*1X*2

Marking Information

- " XL" denotes brand
- " V" denotes VDRM digit: 1, 2, 5,7
- " X" denotes IFT digit: 0, 1, 2, 3, 4
- " Y" denotes Year : A(2024), B(2025), C(2026)
- " WW" denotes Week' s number
- " N" denotes the day of Week

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter			Symbol	Value	Unit
Input	Forward Current		I_F	60	mA
	Reverse Voltage		V_R	6	V
	Power Dissipation		P_D	100	mW
	Derating factor (above Ta = 85 ℃)			3.8	mW/°C
Output	Power Dissipation		P_C	300	mW
	Derating factor (above Ta = 85 ℃)			7.4	mW/°C
	Off-state Output Terminal Voltage	XL301X	V_{DRM}	250	V
		XL302X		400	
		XL305X		600	
		XL307X		800	
	Peak repetitive surge current (pw=100μs,120pps)		I_{TSM}	1	A
	Turn-on current (root mean square value)		$I_{T(RMS)}$	100	mA

Thermal Characteristics

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{TOT}	350	mW
Isolation Voltage *2	V_{ISO}	5000	Vrms
Operating Temperature	T_{OPR}	-55 ~ +100	°C
Storage Temperature Range	T_{STG}	-55 ~ +125	°C
Soldering Temperature *3	T_{SOL}	260	°C

Notes:

1. Pulse width≤1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute. At this time, pins 1, 2 & 3 are shorted, and pins 4, 5 & 6 are shorted together.
3. For 10 seconds

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Parameter			Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage		V_F	I_F=20mA	-	1.36	1.5	V
	Reverse Leakage current		I_R	V_R=6V	-	-	10	μA
Output	Peak Blocking Current	XL301X	I_{DRM}	V_{DRM} =Rated V_{DRM}, I_F= 0mA	-	-	100	nA
		XL302X						
		XL305X			-	-	500	
		XL307X						
	Peak on-state voltage		V_{TM}	I_{TM}=100mA, I_F=Rated I_{FT}	-	-	3	V
	Critical Rate of Rise off-state Voltage	XL301X	dv/dt	V_{PEAK} =Rated V_{DRM}, I_F= 0mA	-	100	-	V/μs
		XL302X						
		XL305X		V_{PEAK} =400V, I_F=0	1000	-	-	
		XL307X						
Transfer Characteristics	LED trigger current	XL3020	I_{FT}	Main terminal voltage = 3V	-	-	30	mA
		XL3011			-	-	15	
		XL3021						
		XL3051						
		XL3071						
		XL3012			-	-	10	
		XL3022						
		XL3052						
		XL3072						
		XL3013			-	-	5	
		XL3023						
		XL3053						
		XL3073						
		XL3014			-	-	3	
		XL3024						
		XL3054						
		XL3074						
	Holding Current		I_H		-	250		μA

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

Fig.1 LED Positive voltage vs Positive current

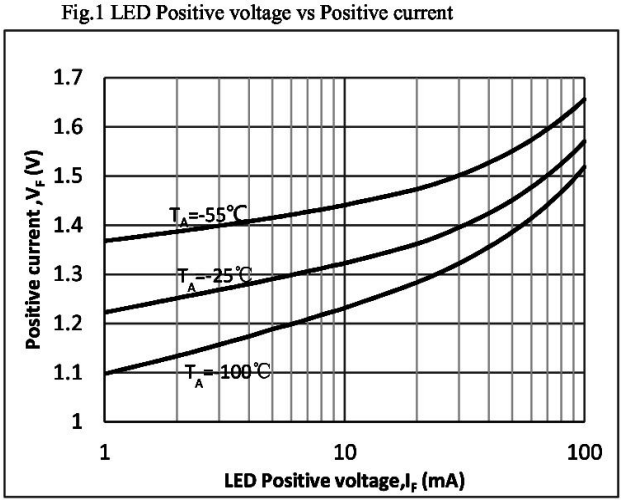


Fig.2 On-state characteristic

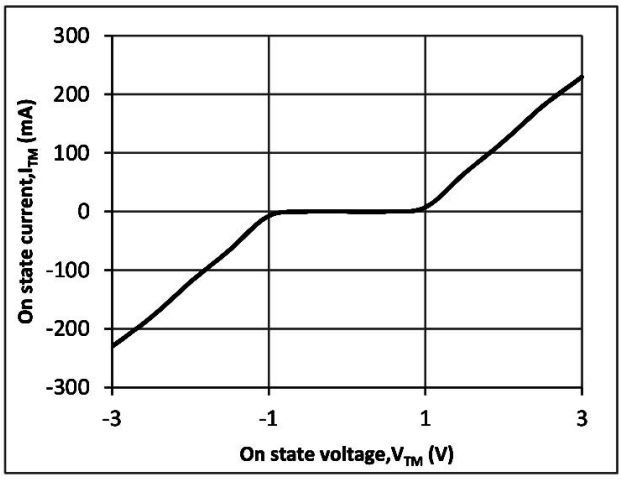


Fig.3 Trigger current vs Ambient temperature

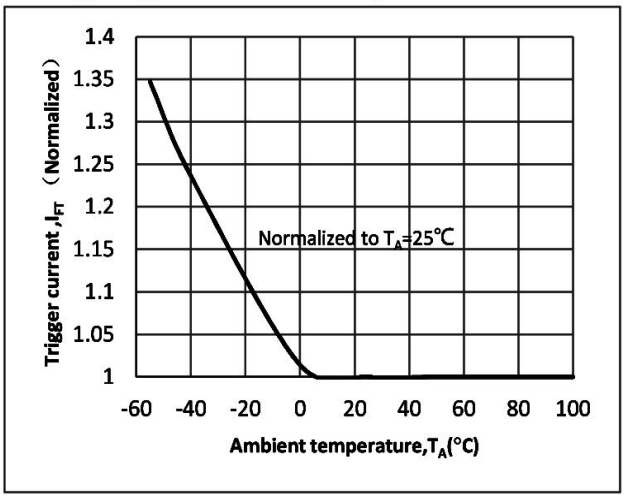


Fig4 LED Trigger current vs LED Pulse Width

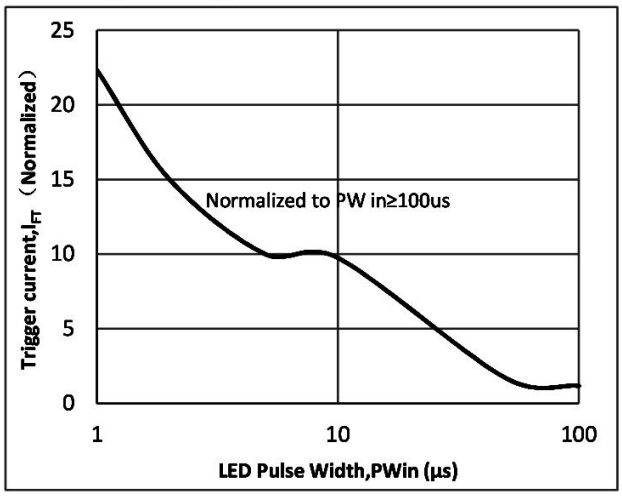


Fig.5 Holding current vs Temperature

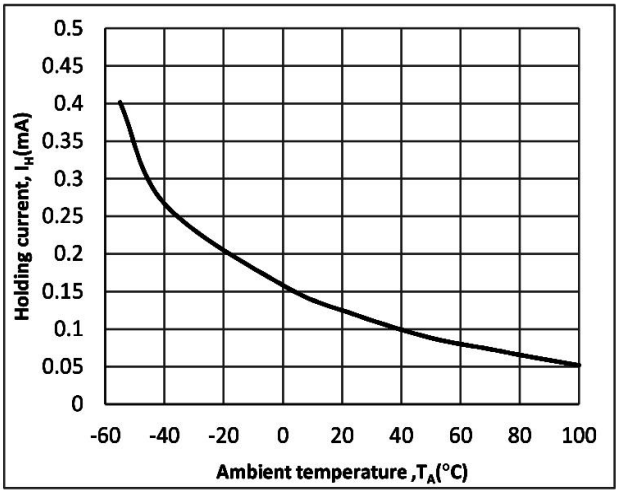
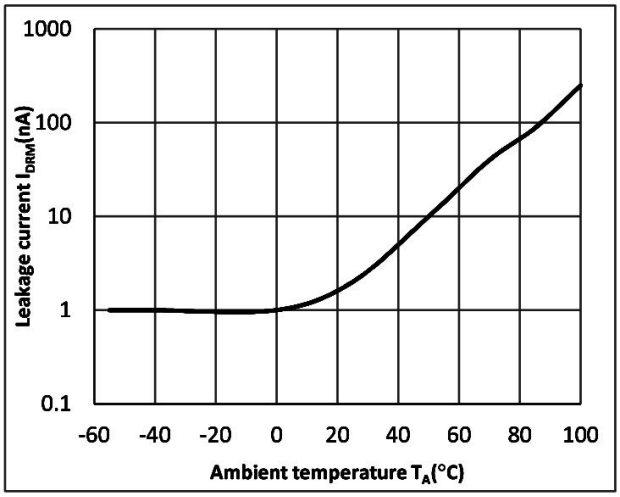
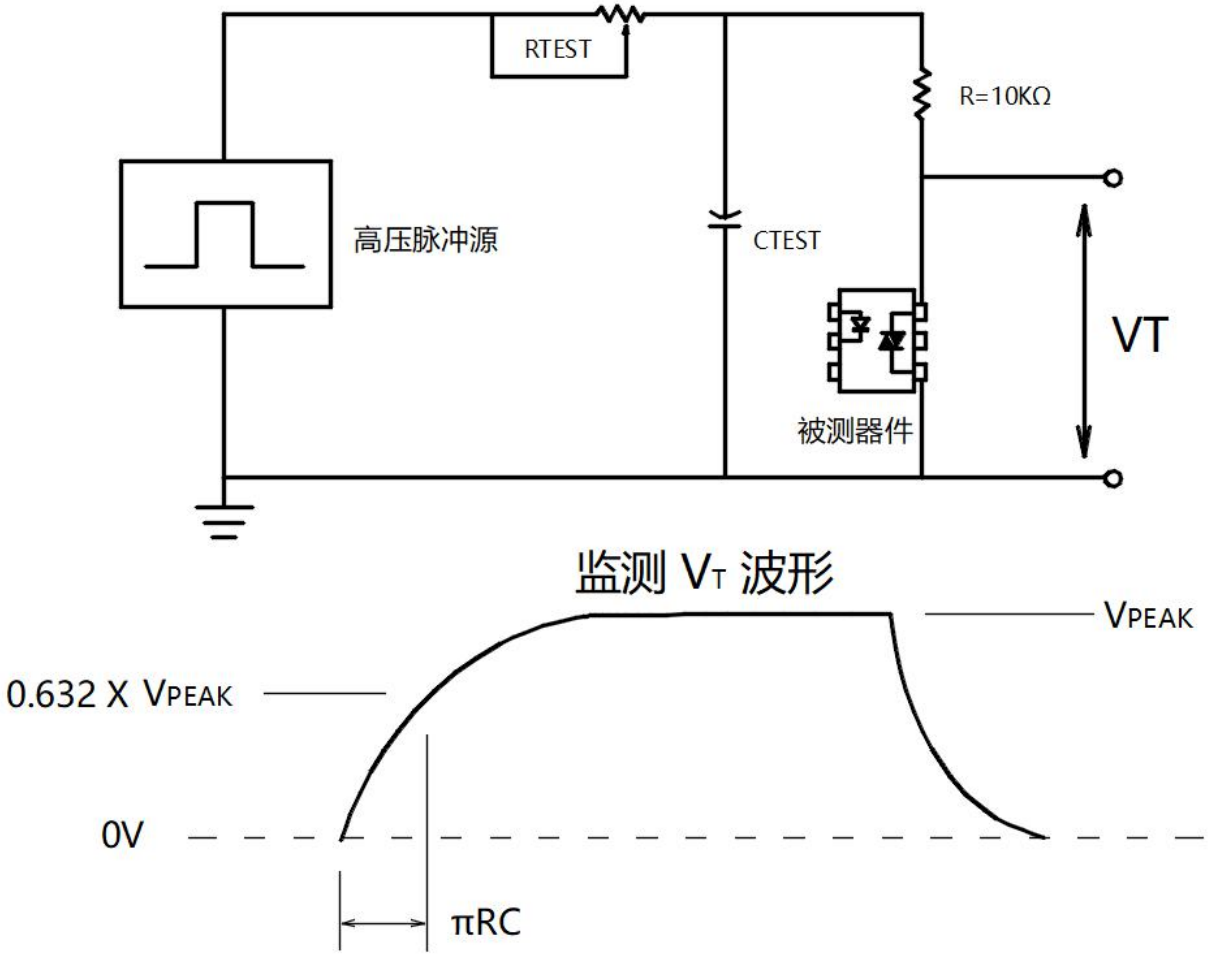


Fig.6 Leakage current vs Temperature



Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

Fig.7 Static dv / dt test circuit and waveform



The high voltage pulse applied to the output of the device under test through the RC circuit is set to the required VPEAK value. LED current is not applied. The waveform VT is monitored with X100 probe.

By adjusting the RTEST value, the dv/dt (slope) increases until the device under test is observed to be triggered (waveform collapse).Then dv/dt drops until the device under test stops being triggered. At this point, RC is recorded and the dv/dt calculated.

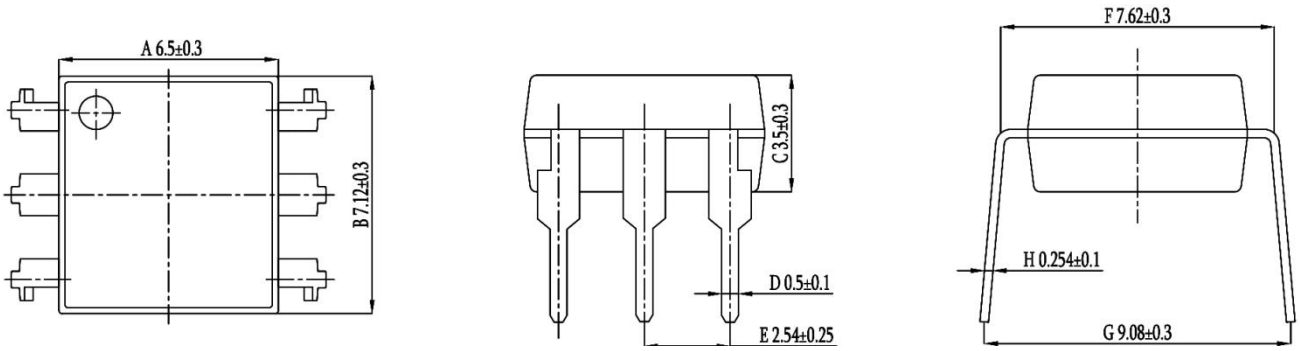
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, VPEAK = 400V for BL52X series. The dv/dt value is calculated as follows:

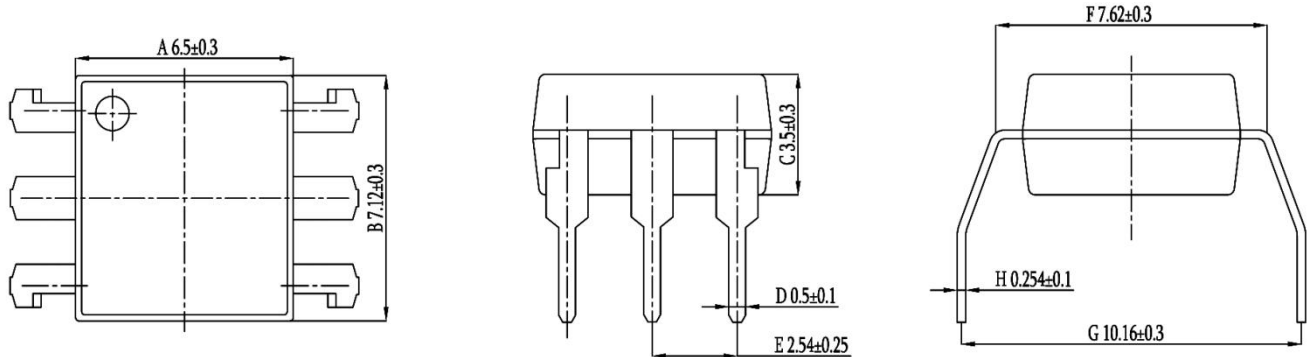
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

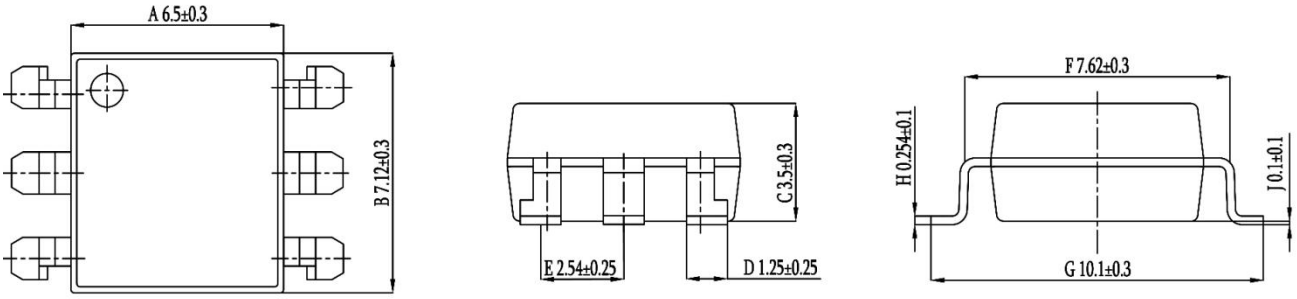
DIP6



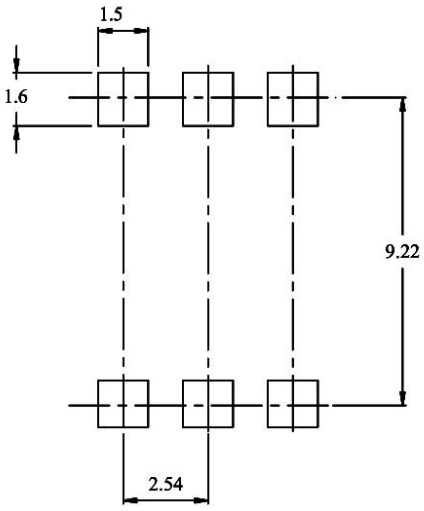
DIP6-M



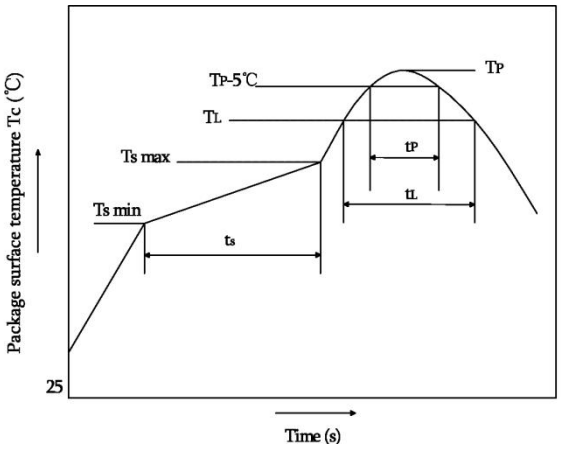
SMD6



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

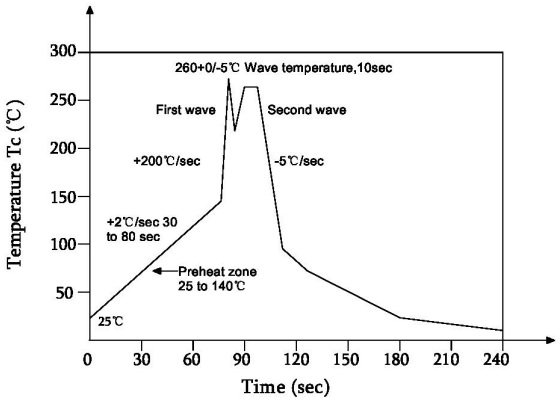


	Symbol	Min	Max	Unit
Preheat temperayure	Ts	150	200	℃
Preheat time	ts	60	120	s
Ramp-up ratea(T_L to T_P)	-	-	3	℃/s
Liquidus temperature	T_L	217		℃
Time above T_L	t_L	60	150	s
Peak temperature	Tp		260	℃
Time during which Tc is between (T_P-5) and T_P	t_p	-	30	s
Ramp-down rate(T_P to T_L)	-	-	6	℃/s

Note:

Reflow soldering is recommended at the temperatures and times shown, no more than three times.

Wave soldering



Profile feature	
Average ramp-up rate	~200℃/s
Heating rate during preheat	1℃/s to 2℃/s typical;4℃/s maximum
Final preheat temperature Ts	~130℃
Preheat time (25℃ to Ts)	>60s
Peak temperature Tp	260℃
Time within peak temperature tp	10s
Ramp-down rate	5℃/s maximum

Soldering with hand soldering iron

A. Hand soldering iron is only used for product rework or sample testing.

B. Hand soldering iron requirements:Temperature:360 ℃+5℃ within 3s.

Packing

Package Type	Packing Form	Quantity per Tube &Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
DIP6	Tube(500mm)	65 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP6-M	Tube(500mm)	65 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Seagull foot (M foot) tube
SMD6	Reel(ϕ330mm)	1000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

■ **Summary table**

■ **DIP6/DIP6-M (Tube)**

Qty/ tube : 65pcs. Qty/box: 1625pcs.

Qty/ctn : 19500pcs.

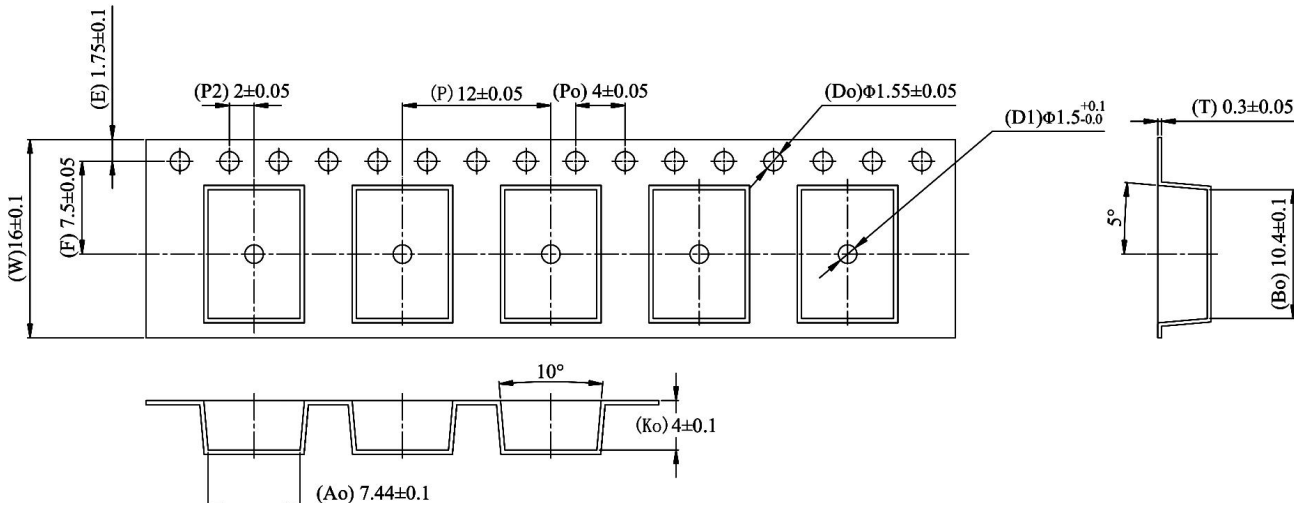
Schematic: (unit:mm)

■ **SMD6 (Reel)**

Qty/reel: 1000pcs. Qty/box: 2000pcs.

Qty/ctn : 10000pcs.

Schematic: (unit:mm)



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