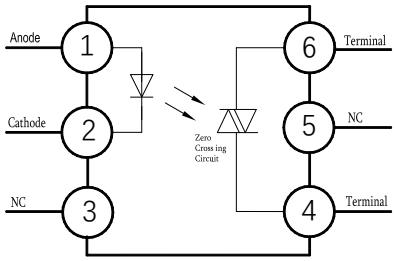
Zero Cross Triac Driver Photocouple

BL303X ,BL304X,BL306X,BL308X

Features

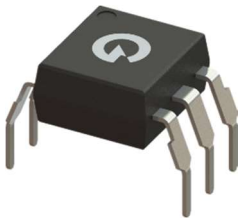
HF

- Peak breakdown voltage:
- 250V：QX303X；400V：QX304X；600V：QX306X；800V：QX308X
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -55℃~100℃



Applications

- Electromagnetic valve controls
- Light controls
- Static power switch
- AC Motor Drive
- Electromagnetic contact switch
- Solid state relay



Mechanical Data

- Case: DIP-6L, DIP-6L(M),SMD-6L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

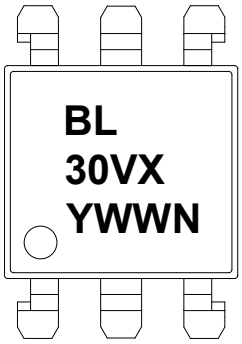
BL	30VX	(M)	(G)	-	(U)	(N)	(Y)
①	②	③	④		⑤	⑥	⑦

① Brand(BL)
② Product series(V:3,4,6,8;X:0,1,2,3)
③ Package type(DIP-6L:None, DIP-6L(M):M,SMD-6L:S)
④ Halogen option(None :Halogen free)
⑤ Lead frame (None: Copper)
⑥ Customer option 1 (0-9 or A-Z ornone)
⑦ Customer option 2 (0-9 or A-Z ornone)

Part Number	Package	Shipping Quantity	Marking Code
BL3031	DIP-6L	65 pcs / Tube	BL3031
BL3041M	DIP-6L(M)	65 pcs / Tube	BL3041
BL3061S	SMD-6L	1000 pcs / Tape & Reel	BL3061

Marking Information

- "BL" denotes brand
- "V" denotes V_{DRM} digitsr: 3, 4, 6,8
- "X" denotes I_{FT} digitsr: 0, 1, 2, 3
- "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 ℃)			7.6	mW/°C
	Off-state Output Terminal Voltage	BL303X	V_{DRM}	250	V
		BL304X		400	
		BL306X		600	
		BL308X		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}	330	mW
Isolation Voltage *1	V_{ISO}	5000	Vrms
Operating Temperature	T_{OPR}	-55 ~ +100	°C
Storage Temperature Range	T_{STG}	-55 ~ +125	°C
Soldering Temperature *2	T_{SOL}	260	°C

Notes：

1. 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.
2. 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	BL303X	I_{DRM}	V_{DRM} =Rated V_{DRM}, I_F= 0mA	-	-	100	nA
		BL304X						
		BL306X			-	-	500	
		BL308X						
	Peak on-state voltage		V_{TM}	I_{TM}=100mA, I_F=Rated I_{FT}	-	-	3	V
	Critical Rate of Rise off-state Voltag	BL303X	dv/dt	V_{PEAK} =Rated V_{DRM}, I_F= 0mA	1000	-	-	V/μs
		BL304X						
		BL306X						
		BL308X			600	-	-	
	Inhibition voltage (MT1-MT2 voltage above which device will not trigger)		V_{Inh}	I_F= Rated I_{Ft}			20	V
	Leakage in Inhibited State		I_{DRM2}	I_F= Rated I_{Ft} V_{DRM} =Rated V_{DRM} off state			500	μA
Transfer Characteristics	LED trigger current	BL3031	I_{FT}	Main terminal voltage = 3V	-	-	15	mA
		BL3041						
		BL3061						
		BL3081						
		BL3032			-	-	10	
		BL3042						
		BL3062						
		BL3082						
		BL3033			-	-	5	
		BL3043						
		BL3063						
		BL3083						
	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

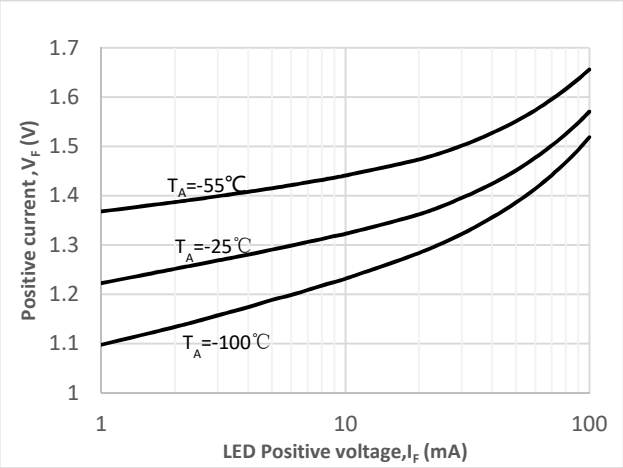


Fig.2 On-state characteristic

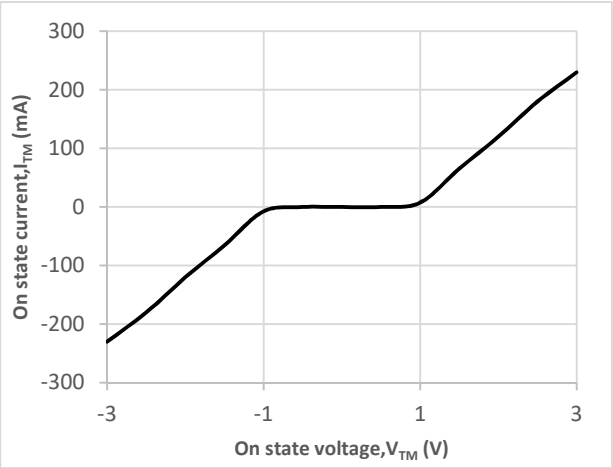


Fig.3 Trigger current vs Ambient temperature

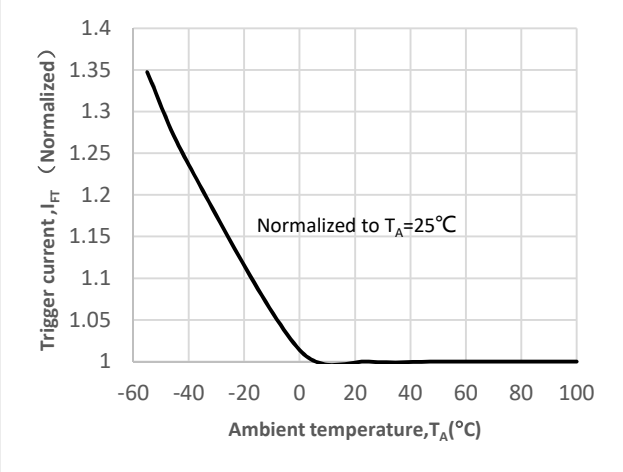


Fig4 LED Trigger current vs LED Pulse Width

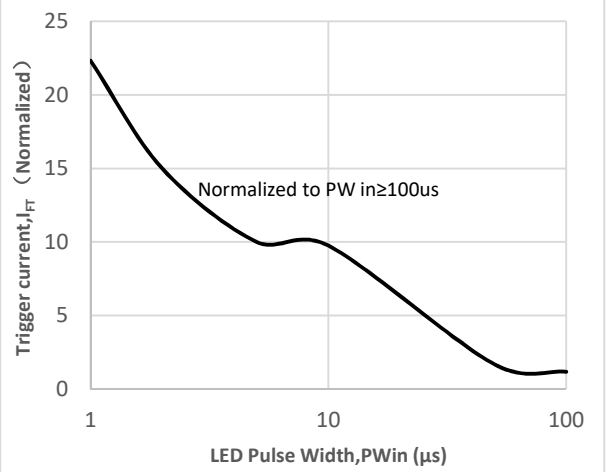


Fig.5 Holding current vs Temperature

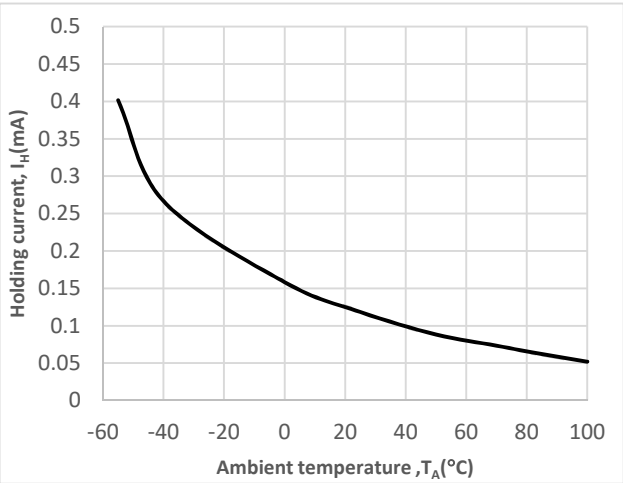


Fig.6 Leakage current vs Temperature

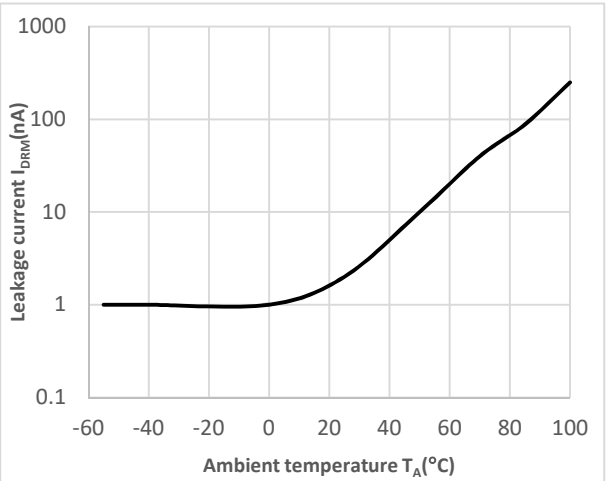


Fig.7 Inhibit state leakage current vs Ambient temperature

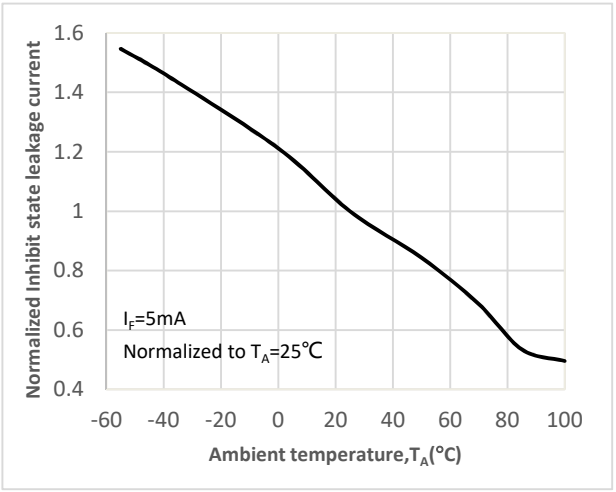


Fig.8 Inhibition voltage vs Ambient temperature

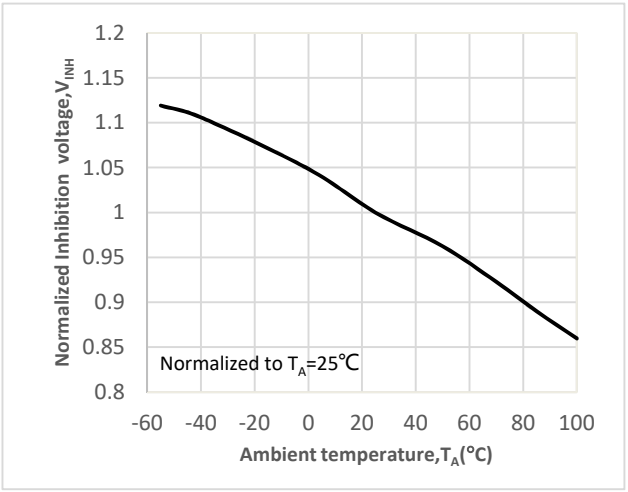
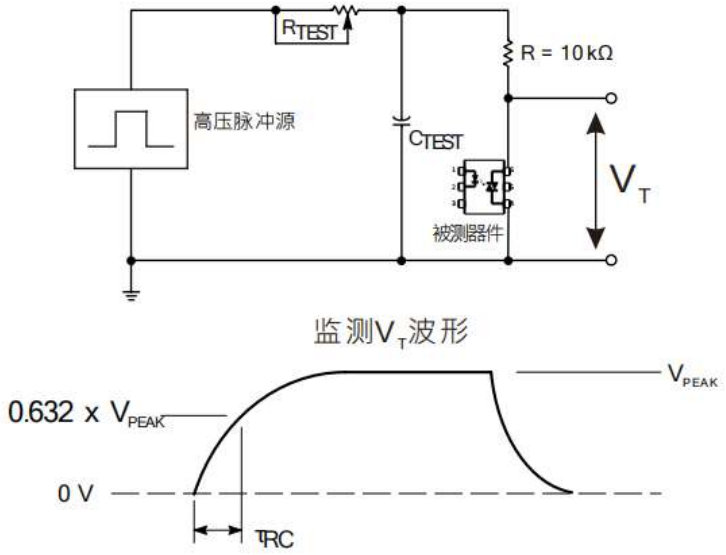


Fig.9 Static dv / dt test circuit and waveform



The high voltage pulse applied to the output of the device under test through the RC circuit is set to the required V_{PEAK} value. LED current is not applied. The waveform V_T is monitored with X100 probe. By adjusting the R_{TEST} 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.

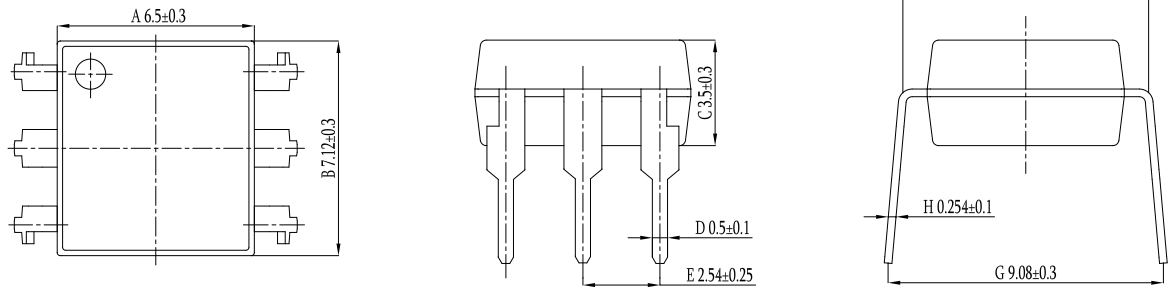
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, VPEAK = 400V for QX302X series. The dv/dt value is calculated as follows:

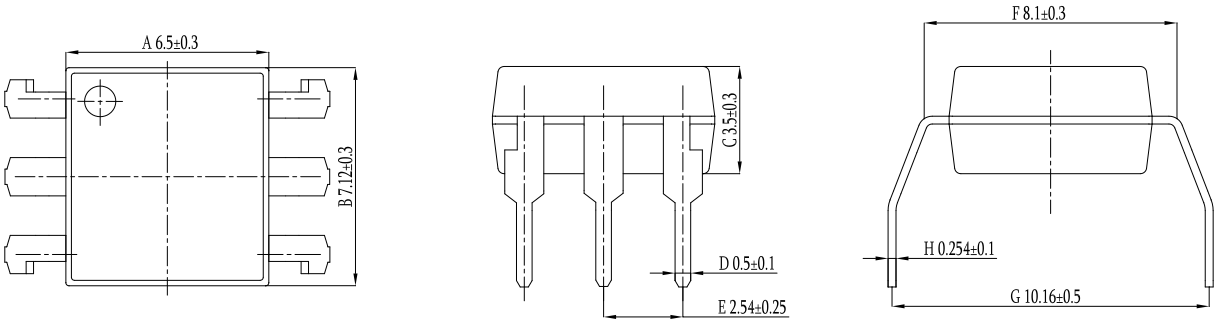
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

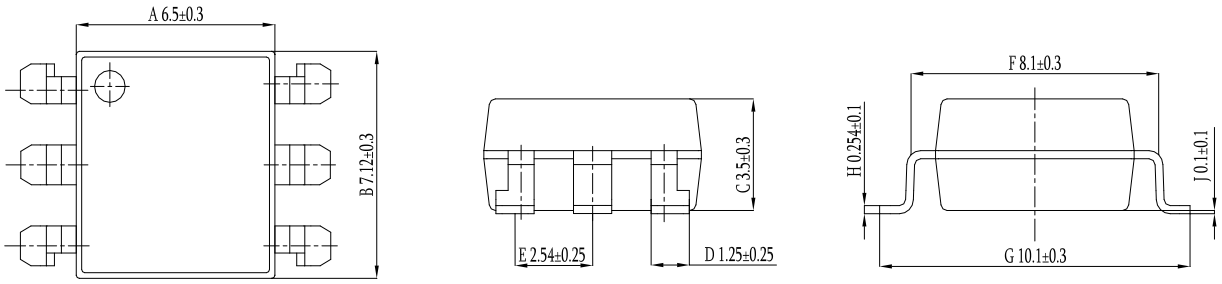
DIP-6L



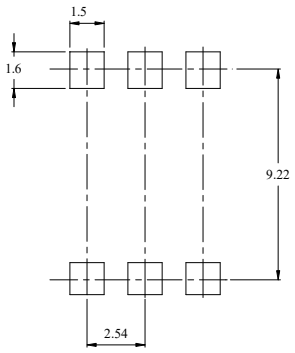
DIP-6L(M)



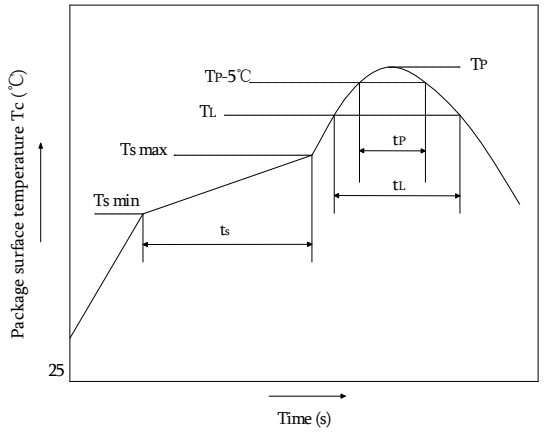
SMD-6L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

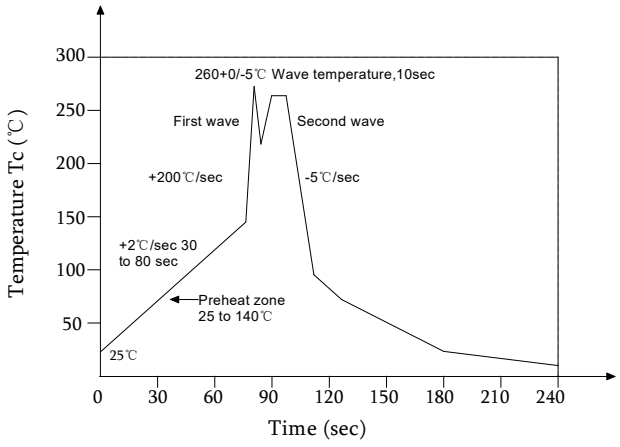


	Symbol	Min	Max	Unit
Preheat temperayure	Ts	150	200	℃
Preheat time	ts	60	120	s
Ramp-up ratea(T_L to T_P)			3	℃/s
Liquidus temperature	T_L	217		℃
Time above T_L	t_L	60	150	s
Peak temperature	Tp		260	℃
Time during which Tc is between (T_P-5) and T_P	t_p		30	s
Ramp-down rate(T_P to T_L)			6	℃/s

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.

Pcaking

Package Type	Packing Form	Quantity per Tube &Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
DIP-6L	Tube(500mm)	65 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP-6L(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
SMD-6L	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

■ DIP-6L/ DIP-6L(M) (Tube)

Qty/ tube ： 65 pcs. Qty/box： 1.625 pcs.

Qty/ctn ： 19500 pcs.

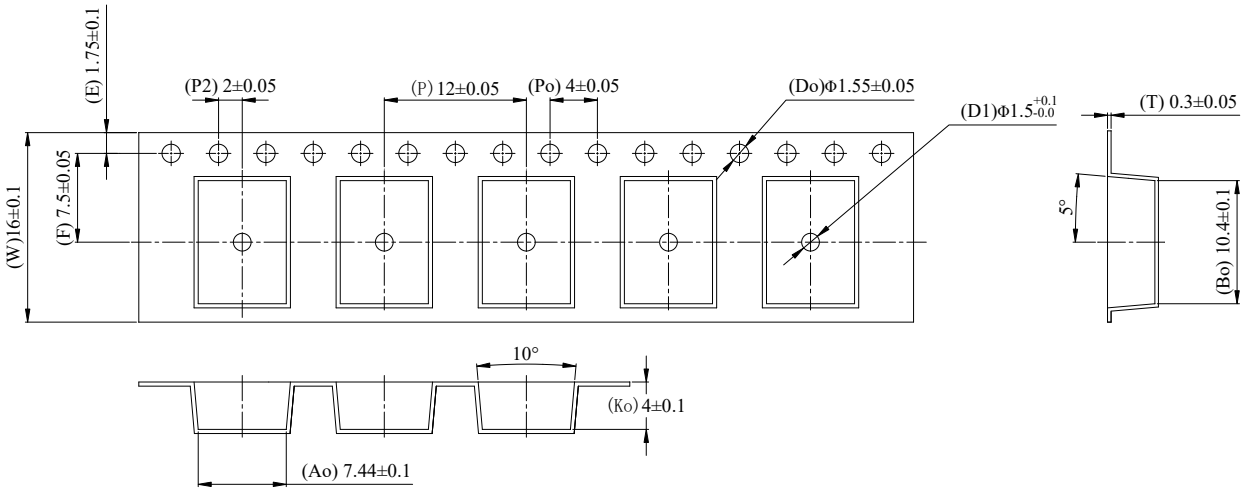
Schematic：(unit:mm)

■SMD-6L （Reel）

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

Qty/ctn ： 10000 pcs.

Schematic：(unit:mm)



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