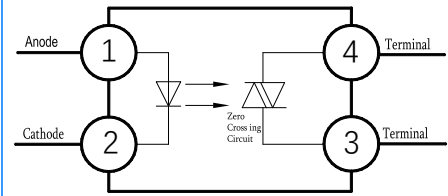


Features

- Peak breakdown voltage:
250V: BL53X; 400V: BL54X;
600V: BL56X; 800V: BL58X
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -55°C~100°C

HF



Applications

- Switching power supply, intelligent meter
- Industrial control, measuring instruments
- Office equipment such as copiers
- Household appliances: such as air conditioners, fans, water heaters, etc

Mechanical Data

- Case: DIP-4L, DIP-4L(M),SMD-4L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Ordering Information

BL 5VX (M) (G) - (U) (N) (Y)

① ② ③ ④ ⑤ ⑥ ⑦

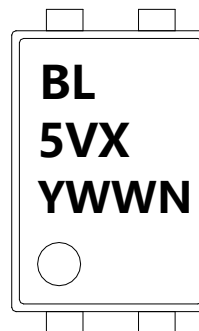
- ① Brand(BL)
- ② Product series(V:3,4,6,8; X:1,2,3,4)
- ③ Package type(DIP-4L:None, DIP-4L(M):M,SMD-4L:S)
- ④ Halogen option(None :Halogen free)
- ⑤ Lead frame (None: Copper)
- ⑥ Customer option 1 (0-9 or A-Z or none)
- ⑦ Customer option 2 (0-9 or A-Z or none)

Part Number	Package	Shipping Quantity	Marking Code
BL5V ¹ X ²	DIP-4L	100 pcs / Tube	BL5V ¹ X ²
BL5V ¹ X ² M	DIP-4L(M)	100 pcs / Tube	BL5V ¹ X ²
BL5V ¹ X ² S	SMD-4L	2000 pcs / Tape & Reel	BL5V ¹ X ²

Notes 1: V denotes V_{DRM} digits: 3, 4, 6, 8.
2: X denotes I_{FT} digits: 1, 2, 3, 4.

Marking Information

- "BL" denotes brand
- "V" denotes V_{DRM} digits: 3, 4, 6, 8
- "X" denotes I_{FT} digits: 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
	Power Dissipation derating factor (above Ta = 85 °C)	P _{DD}	3.8	mW/°C
Output	Power Dissipation	P _C	300	mW
	Power Dissipation derating factor (above Ta = 85 °C)		7.4	mW/°C
	Off-state Output Terminal Voltage	V _{DRM}	250	V
			400	
			600	
			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	V _{rms}
Operating Temperature	T _{OPR}	-55 ~ +100	°C
Storage Temperature Range	T _{STG}	-55 ~ +125	°C
Soldering Temperature *2	T _{SOL}	260	°C

Notes:

- 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.
- 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	-	1.25	1.5	V
	Reverse Leakage current	I _R	V _R =6V	-	-	10	μA
Output	Peak Blocking Current	BL53X	V _{DRM} =Rated V _{DRM} , I _F = 0mA	-	-	100	nA
		BL54X		-	-	100	
		BL56X		-	-	500	
		BL58X		-	-	500	

Zero Cross Triac Driver Photocouple

BL53X ,BL54X,BL56X,BL58X

	Peak on-state voltage		V_{TM}	$I_{TM}=100mA,$ $I_F=Rated\ I_{FT}$	-	-	2.5	V
	Critical Rate of Rise off- state Voltage	BL53X	dv/dt	$V_{PEAK}=Rated\ V_{DRM},$ $I_F=0mA$	-	100	-	V/ μs
		BL54X			-	-	-	
		BL56X			-	-	-	
		BL58X			1000	-	-	
	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	BL531	I_{FT}	Main terminal voltage = 3V	-	10	15	mA
		BL541			-	-	-	
		BL561			-	-	-	
		BL581			-	-	-	
		BL532			-	5	10	
		BL542			-	-	-	
		BL562			-	-	-	
		BL582			-	-	-	
		BL533			-	3	5	
		BL543			-	-	-	
		BL563			-	-	-	
		BL583			-	-	-	
		BL534			-	2	3	
		BL544			-	-	-	
		BL564			-	-	-	
		BL584			-	-	-	
	Holding Current		I_H		-	250		μA

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Fig.1 LED Positive voltage vs Positive current

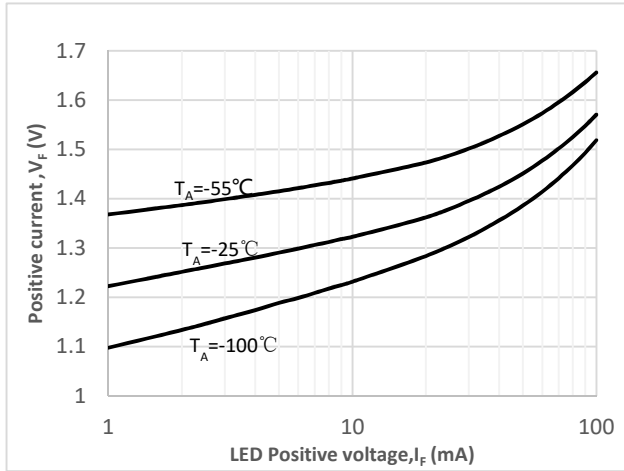


Fig.2 On-state characteristic

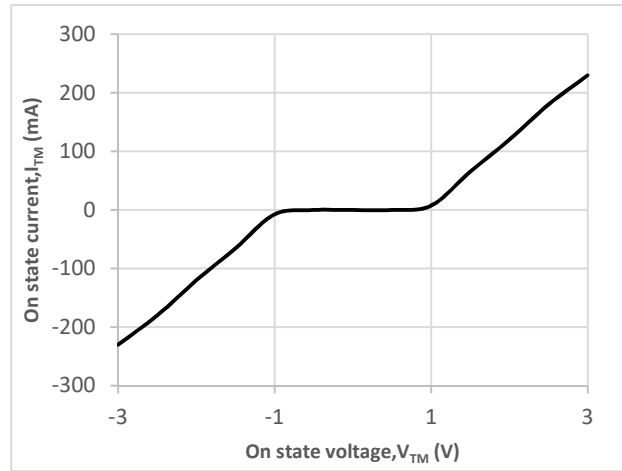


Fig.3 Trigger current vs Ambient temperature

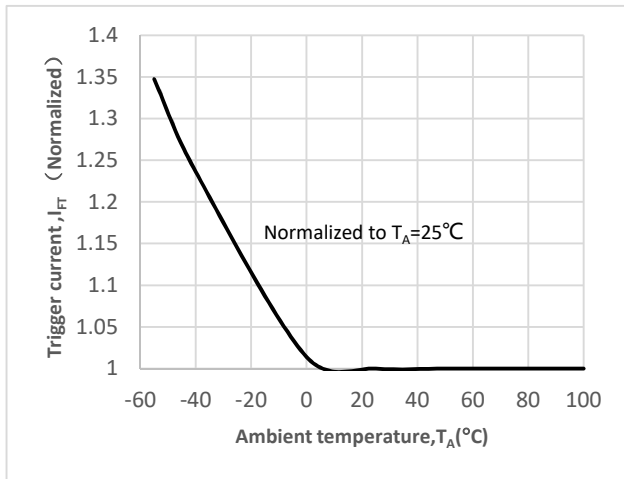


Fig.4 LED Trigger current vs LED Pulse Width

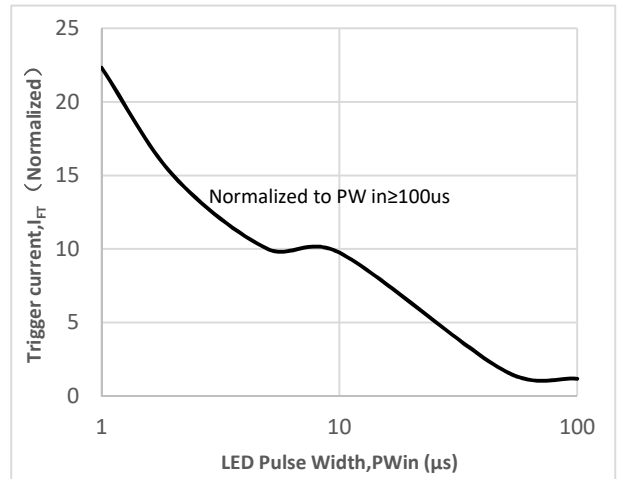


Fig.5 Holding current vs Temperature

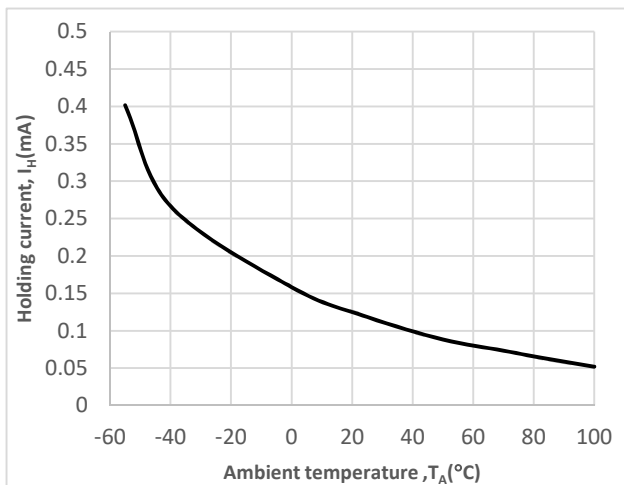


Fig.6 Leakage current vs Temperature

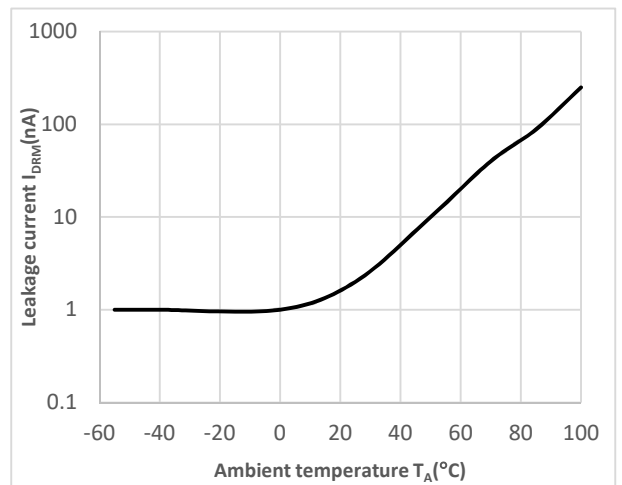


Fig.7 Inhibit state leakage current vs Ambient temperature

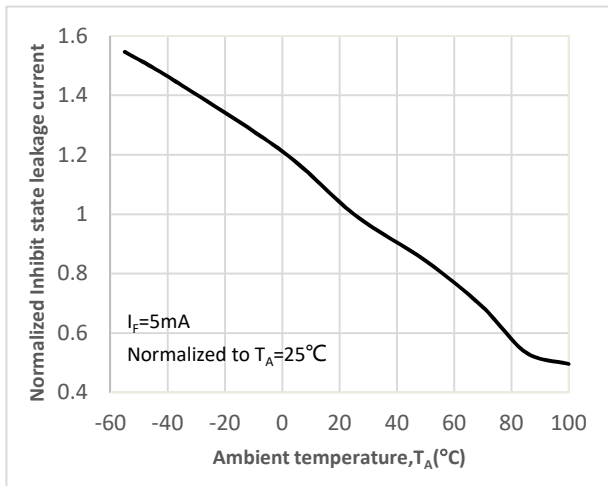


Fig.8 Inhibition voltage vs Ambient temperature

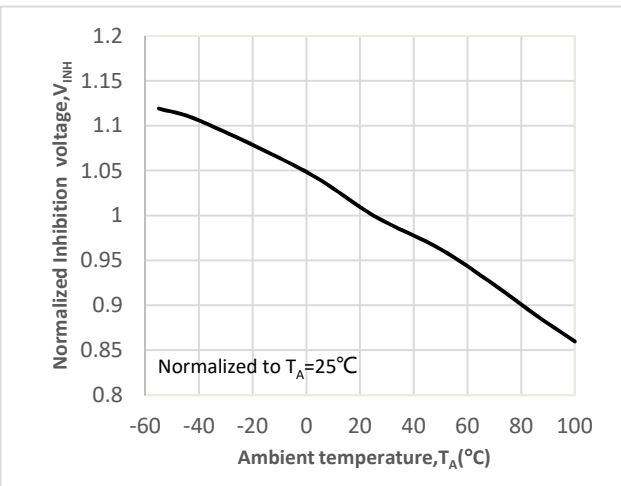
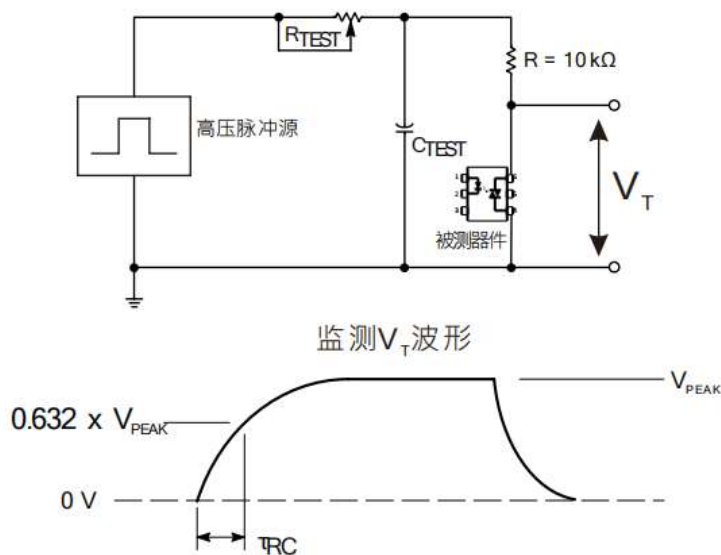


Fig.9 Static dv / dt test circuit and waveform



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, τ_{RC} is recorded and the dv/dt calculated.

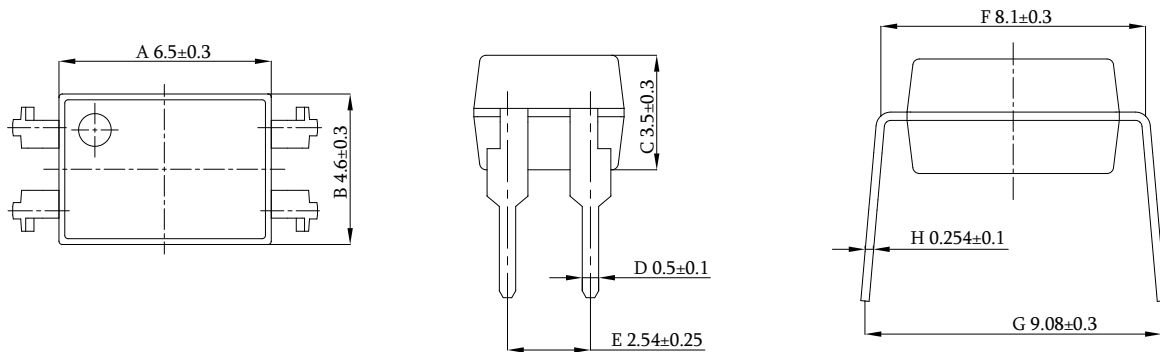
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, $V_{PEAK} = 400V$ for QX302X series. The dv/dt value is calculated as follows:

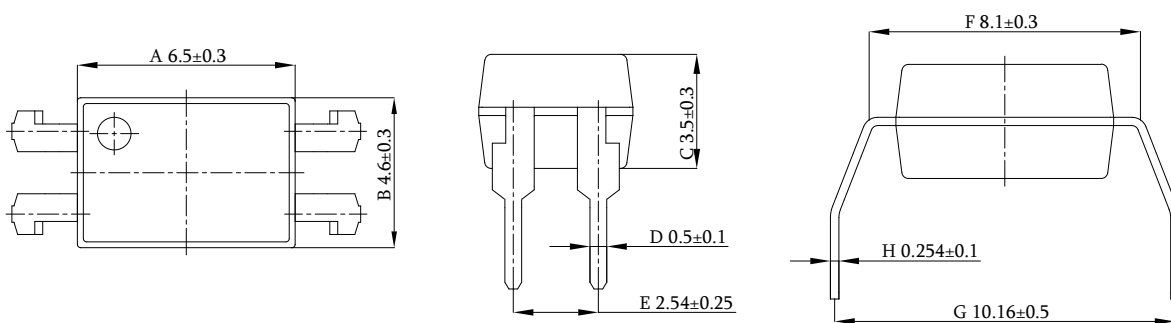
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

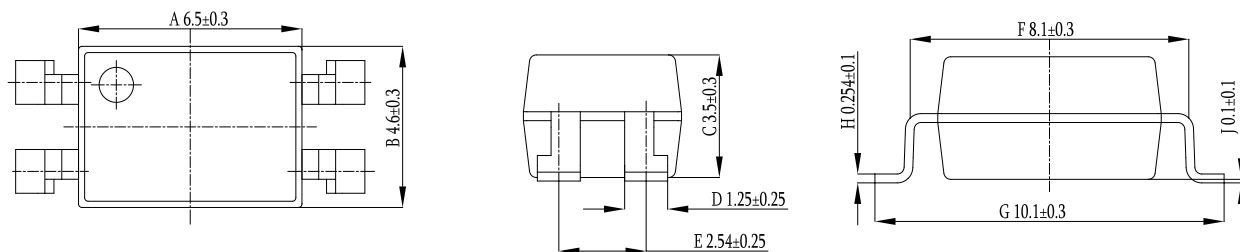
DIP-4L



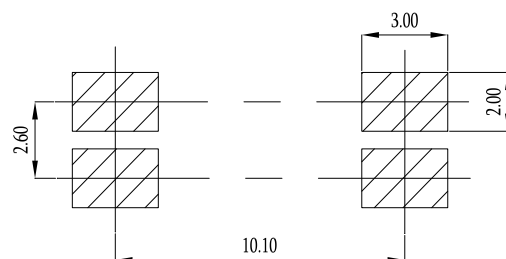
DIP-4L(M)



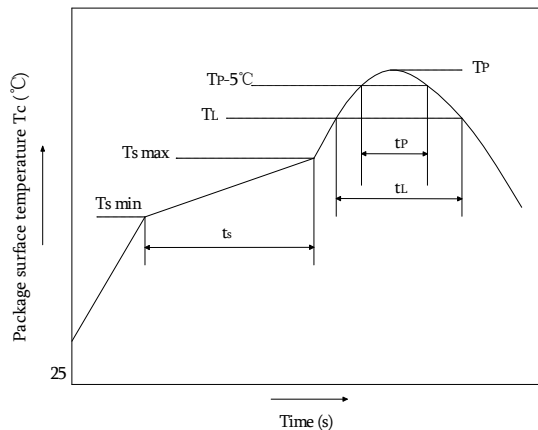
SMD-4L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

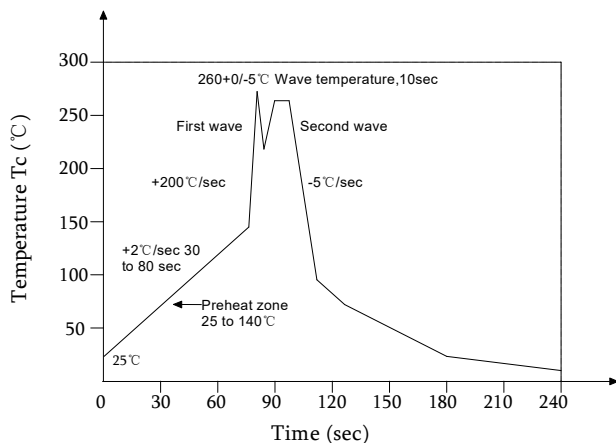


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)			6	°C/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°C/s
Heating rate during preheat	1°C/s to 2°C/s typical; 4°C/s maximum
Final preheat temperature Ts	~130°C
Preheat time (25°C to Ts)	>60s
Peak temperature Tp	260°C
Time within peak temperature tp	10s
Ramp-down rate	5°C/s maximum

Soldering with hand soldering iron

- Hand soldering iron is only used for product rework or sample testing.
- Hand soldering iron requirements: Temperature: 360 °C ± 5°C 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-4L	Tube(500mm)	100 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP-4L(M)	Tube(500mm)	100 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Seagull foot (M foot) tube
SMD-4L	Reel(φ330mm)	2000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

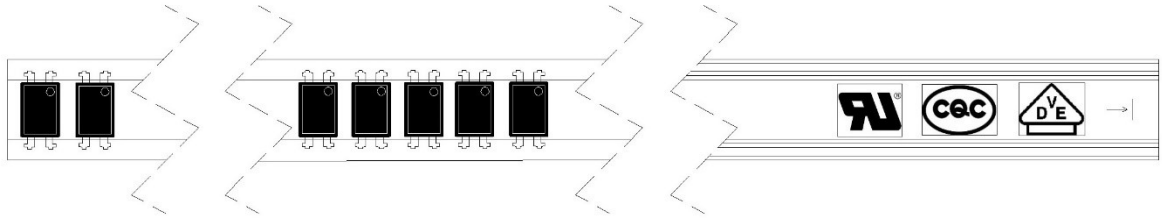
■Summary table

■ DIP-4L/ DIP-4L(M) (Tube)

Qty/ tube : 100 pcs. Qty/box: 2500 pcs.

Qty/ctn : 30000 pcs.

Schematic: (unit:mm)

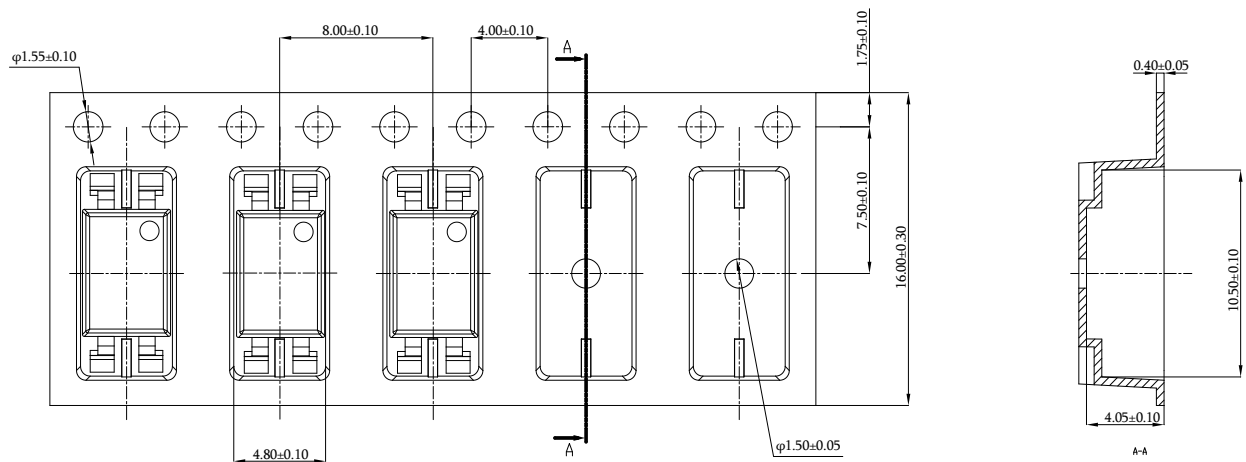


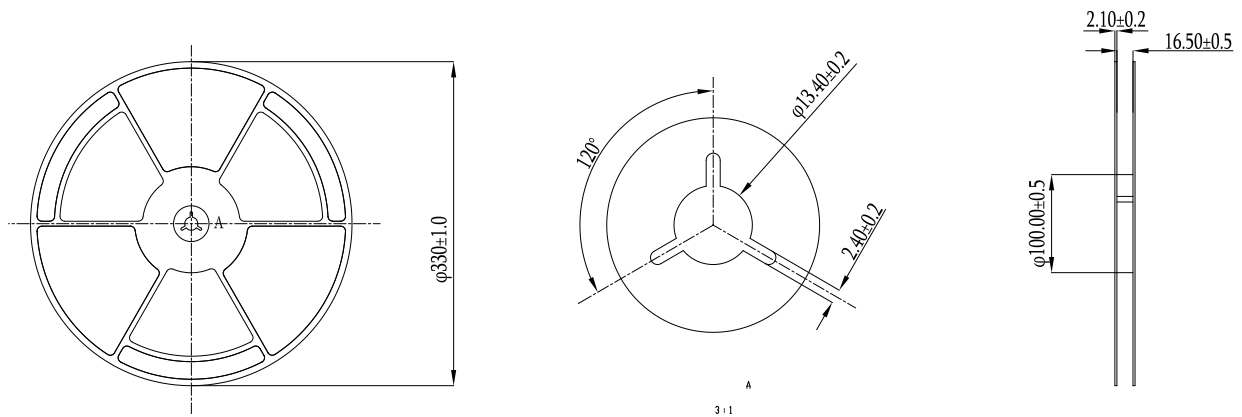
■SMD-4L (Reel)

Qty/reel: 2000 pcs. Qty/box: 4000 pcs.

Qty/ctn : 20000 pcs.

Schematic: (unit:mm)





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