

Features

- Peak breakdown voltage:
400V: BL52X; 600V: BL55X
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -55°C~100°C

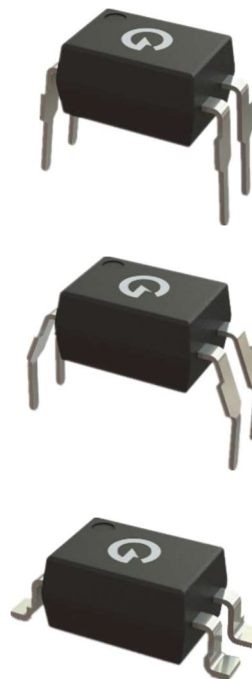
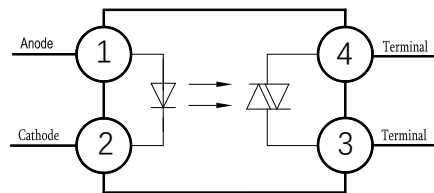
HF

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

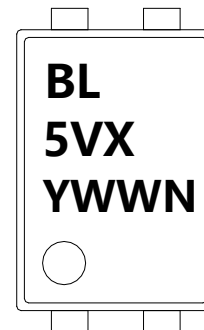
- ① Brand(BL)
- ② Product series(V:2,5; X:0,1,2,3,4)
- ③ Package type(DIP-4L:None, DIP-4L(M):M,SMD-4L:S)
- ④ Halogen option(None :Halogen free)
- ⑤ Lead frame (None: Copper)
- ⑥ Customer option 1 (0-9 or A-Z or none)
- ⑦ Customer option 2 (0-9 or A-Z or none)

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: 2, 5.
 2: X denotes I_{FT} digits: 0, 1, 2, 3, 4.

Marking Information

- "BL" denotes brand
- "V" denotes V_{DRM} digits: 2, 5
- "X" denotes I_{FT} digits: 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 (@ $T_A = 25^{\circ}\text{C}$ 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 $T_a = 90^{\circ}\text{C}$)	P_{DD}	3.8	mW/ $^{\circ}\text{C}$
Output	Power Dissipation	P_C	300	mW
	Power dissipation derating factor (above $T_a = 90^{\circ}\text{C}$)		7.4	mW/ $^{\circ}\text{C}$
	Off-state Output Terminal Voltage	V_{DRM}	400	V
			600	
	Peak repetitive surge current (pw=100 μs , 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	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +125	$^{\circ}\text{C}$
Soldering Temperature ^{*2}	T_{SOL}	260	$^{\circ}\text{C}$

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

Parameter			Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage		V_F	$I_F=20\text{mA}$	-	1.24	1.5	V
	Reverse Leakage current		I_R	$V_R=6\text{V}$	-	-	10	μA
Output	Peak Blocking Current		I_{DRM}	$V_{\text{DRM}}=\text{Rated } V_{\text{DRM}},$ $I_F=0\text{mA}$	-	-	100	nA
	Peak on-state voltage		V_{TM}	$I_{\text{TM}}=100\text{mA},$ $I_F=\text{Rated } I_{\text{FT}}$	-	-	2.5	V
	Critical Rate of Rise off-state Voltage	BL52X	dv/dt	$V_{\text{PEAK}}=\text{Rated } V_{\text{DRM}},$ $I_F=0\text{mA}$	-	100	-	V/ μs
		BL55X			1000	-	-	
Transfer Characteristics	LED trigger current	BL520	I_{FT}	Main terminal voltage = 3V	-	20	30	mA
		BL521			-	10	15	
		BL551			-	5	10	
		BL522			-	3	5	
		BL552			-	2	3	
		BL523			-	-	-	
		BL553			-	-	-	
		BL524			-	-	-	
		BL554			-	-	-	
	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

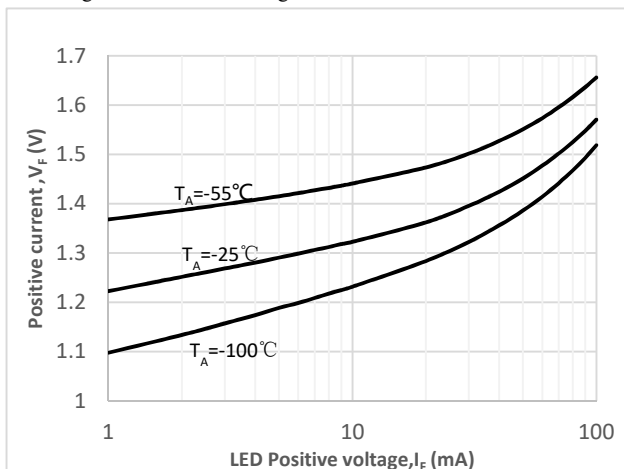


Fig.2 On-state characteristic

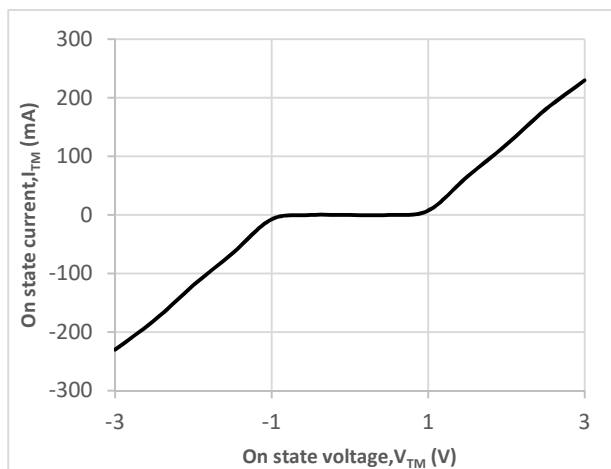


Fig.3 Trigger current vs Ambient temperature

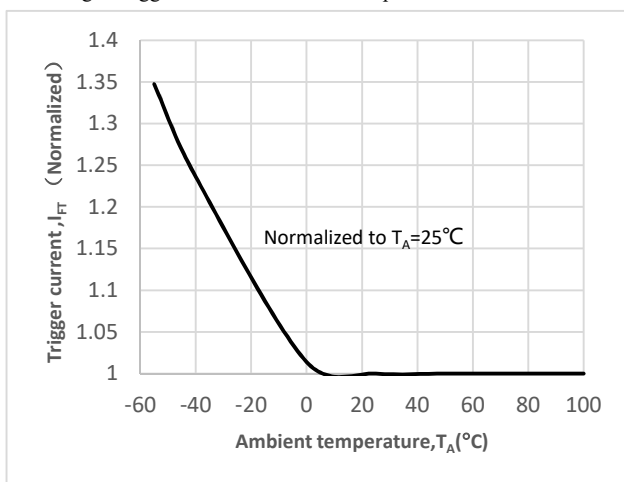


Fig.4 LED Trigger current vs LED Pulse Width

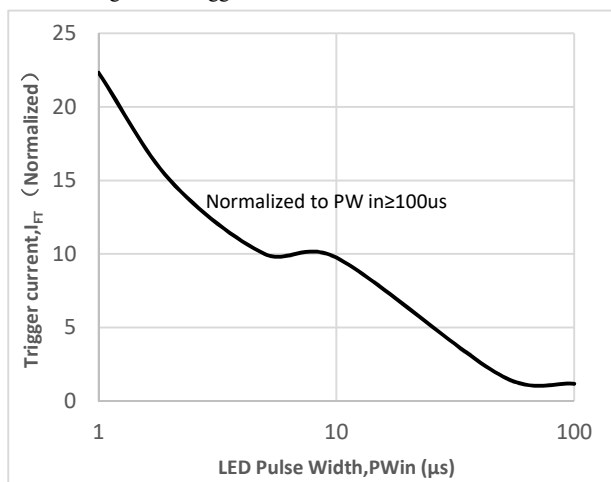


Fig.5 Holding current vs Temperature

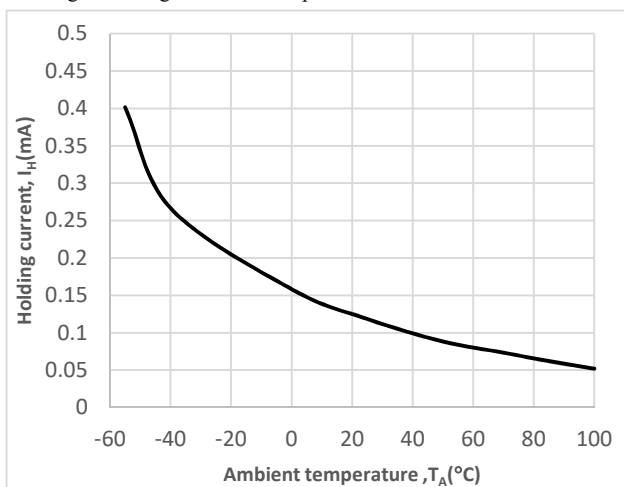


Fig.6 Leakage current vs Temperature

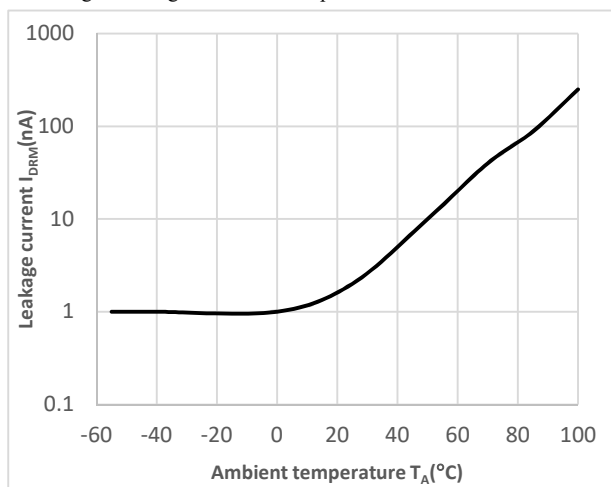
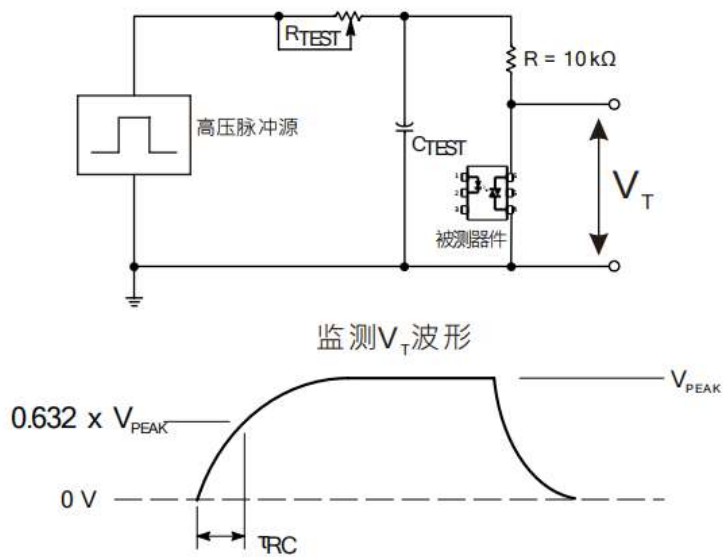


Fig.7 Static dv / dt test circuit and waveform



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.

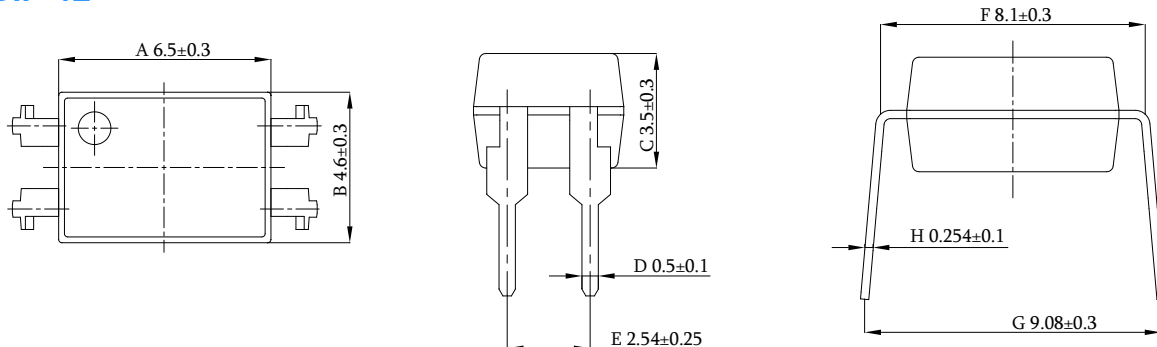
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, $V_{PEAK} = 400V$ for BL52X series. The dv/dt value is calculated as follows:

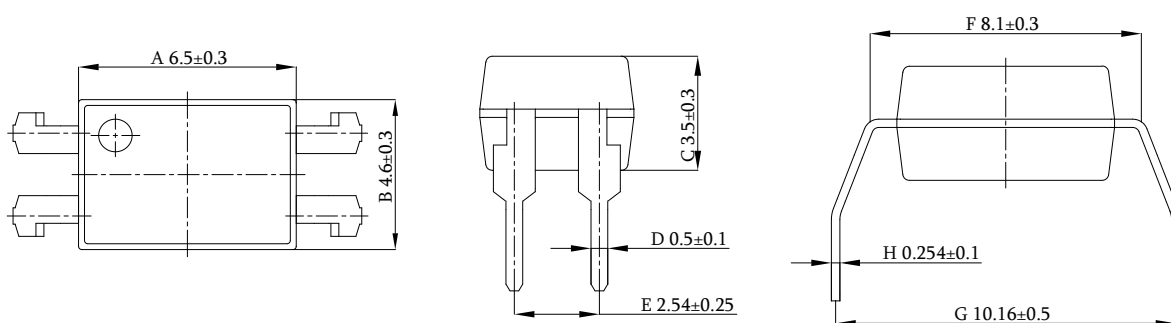
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

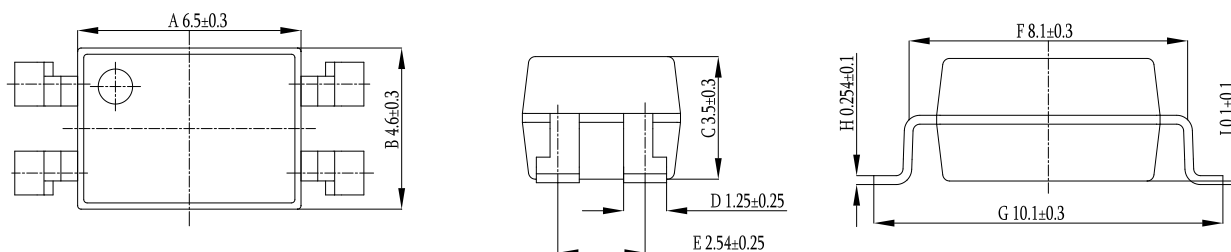
DIP-4L



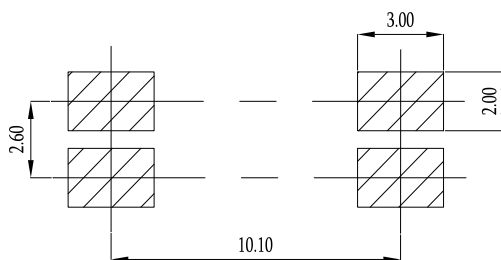
DIP-4L(M)



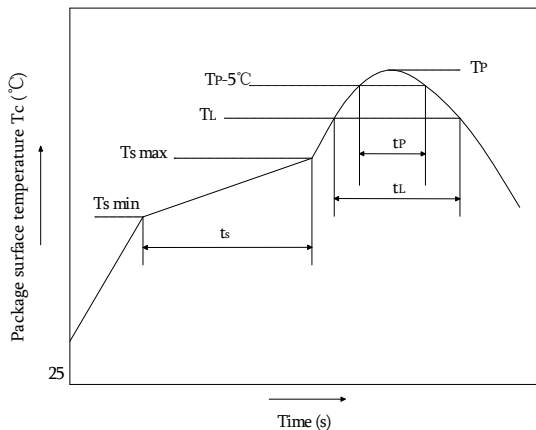
SMD-4L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

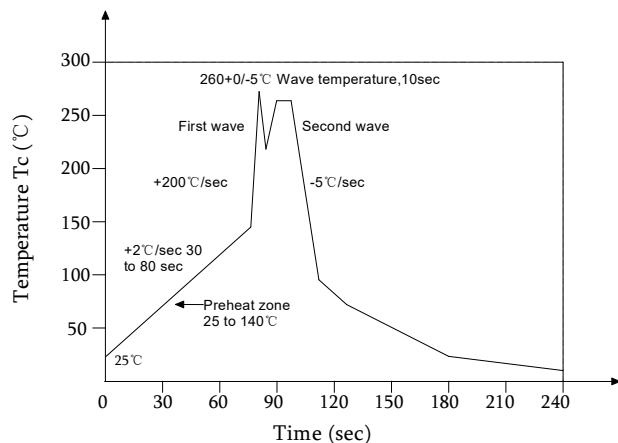


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)			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 T _P	260°C
Time within peak temperature t _p	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.

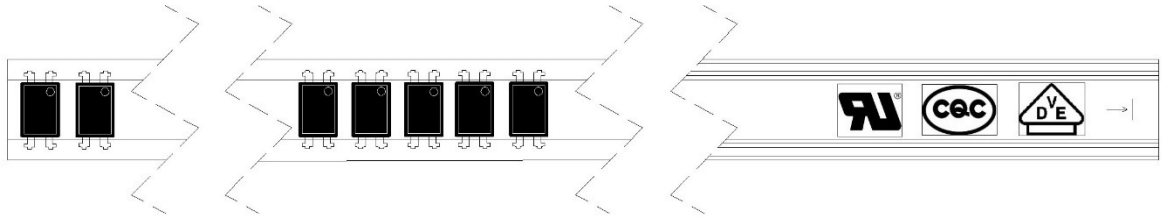
■Summary table

■ DIP-4L/ DIP-4L(M) (Tube)

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

Qty/ctn : 30000 pcs.

Schematic: (unit:mm)

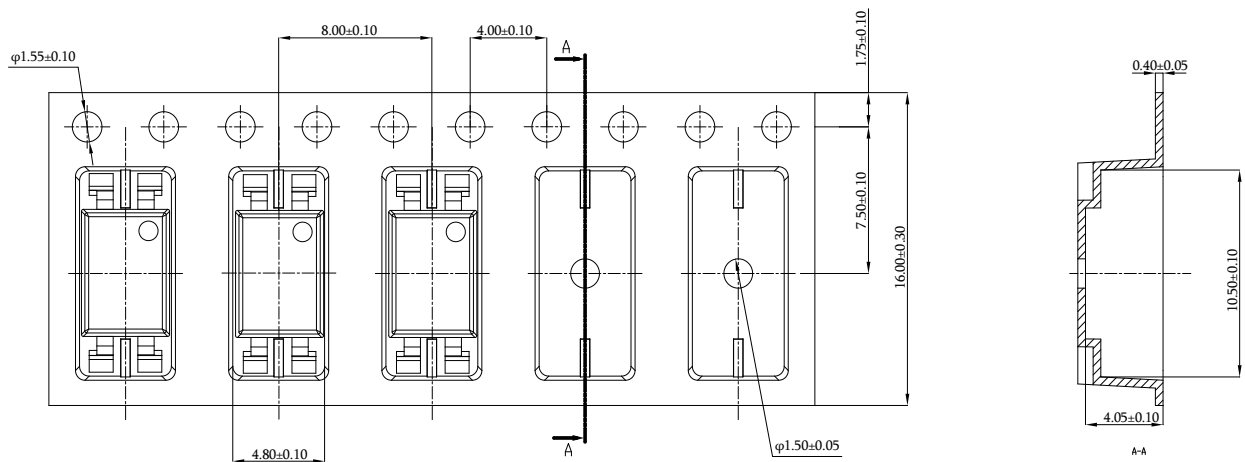


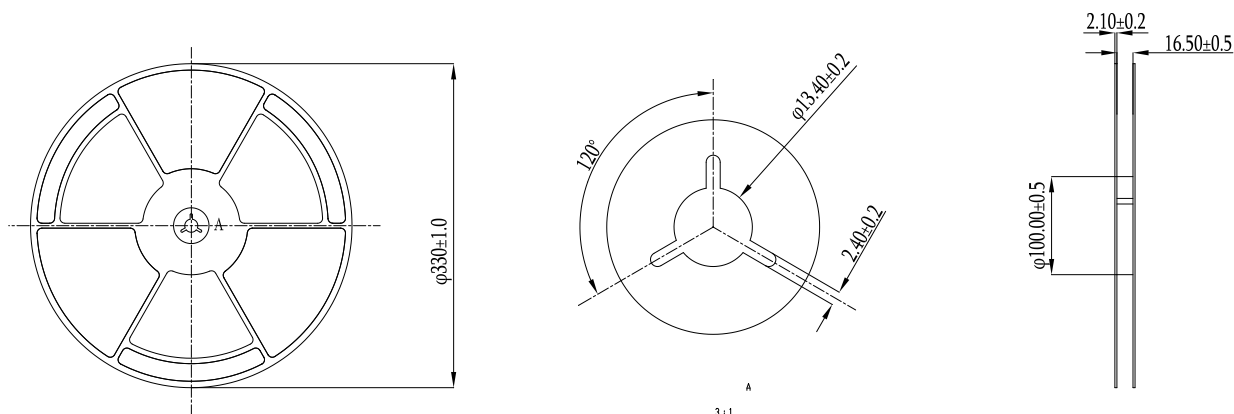
■SMD-4L (Reel)

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

Qty/ctn : 20000 pcs.

Schematic: (unit:mm)





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