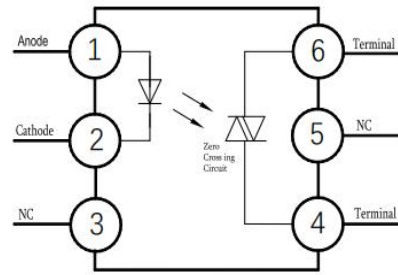


Features

- Peak breakdown voltage:
250V: TWS301X; 400V: TWS302X; 600V: TWS305X;
800V: TWS307X
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -55°C~110°C

HF

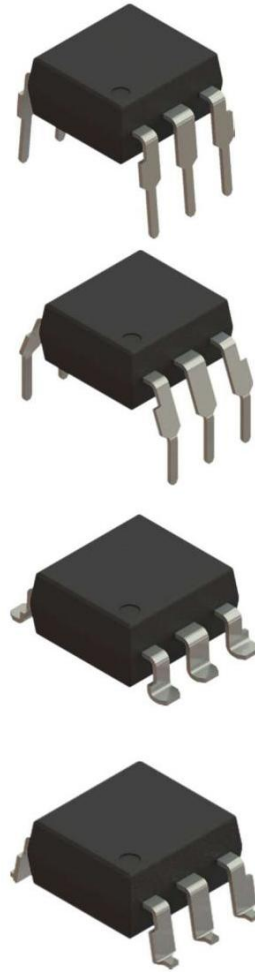


Applications

- Electromagnetic valve controls
- Ballasts
- Static AC power switch
- Interfacing microprocessors to 115 to 240Vac peripherals.
- Incandescent lamp dimmer
- Temperature controls
- Motor controls

Mechanical Data

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



Ordering Information

TWS 30VX (M) (G) - (U) (N) E

① ② ③ ④ ⑤ ⑥ ⑦

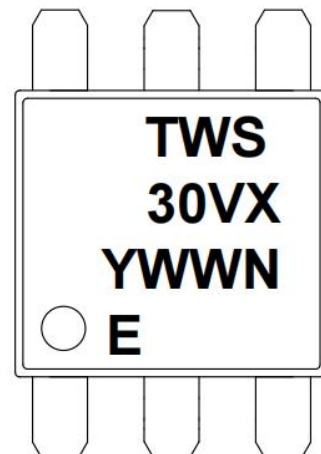
- ① Brand(TWS)
- ② Product series(V:1,2,5,7;X:0,1,2,3,4)
- ③ Package type(DIP-6L:None, DIP-6L(M):M,SMD-6L:S, SMD-6L(SS):SS)
- ④ Halogen option(None :Halogen free)
- ⑤ Lead frame (None: Copper)
- ⑥ Customer option 1 (0-9 or A-Z or None)
- ⑦ Product Versions: E

Part Number	Package	Shipping Quantity	Marking Code
TWS30V ¹ X ² -E	DIP-6L	65 pcs / Tube	TWS30V ¹ X ² ...E
TWS30V ¹ X ² M-E	DIP-6L(M)	65 pcs / Tube	TWS30V ¹ X ² ...E
TWS30V ¹ X ² S-E	SMD-6L	1000 pcs / Tape & Reel	TWS30V ¹ X ² ...E
TWS30V ¹ X ² SS-E	SMD-6L(SS)	1000 pcs / Tape & Reel	TWS30V ¹ X ² ...E

Notes 1: V denotes V_{DRM} digitsr: 1, 2, 5, 7.
2: X denotes I_{FT} digitsr:0, 1, 2, 3, 4.

Marking Information

- "TWS" denotes brand
- "V" denotes V_{DRM} digitsr: 1, 2, 5, 7
- "X" denotes I_{FT} digitsr: 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
- "E" fixed



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 °C)			3.8	mW/°C
Output	Power Dissipation		P _C	300	mW
	Derating factor (above Ta = 85 °C)			7.4	mW/°C
	Off-state Output Terminal Voltage	TWS301X	V _{DRM}	250	V
		TWS302X		400	
		TWS305X		600	
		TWS307X		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 ~ +110	°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	-	1.2	1.4	V
	Reverse Leakage current		I _R	V _R =6V	-	-	10	μA
Output	Peak Blocking Current	TWS301X	I _{DRM}	V _{DRM} =Rated V _{DRM} , I _F = 0mA	-	-	100	nA
		TWS302X						
		TWS305X						
		TWS307X					500	
	Peak on-state voltage		V _{TM}	I _{TM} =100mA, I _F =Rated I _{FT}	-	-	3	V
	Critical Rate of Rise off-state Voltage	TWS301X	dv/dt	V _{PEAK} =Rated V _{DRM} , I _F = 0mA	-	100	-	V/μs
		TWS302X						
		TWS305X						
TWS307X								
Transfer Characteristics	LED trigger current	TWS3020	I _{FT}	Main terminal voltage = 3V	-	-	30	mA
		TWS3011						
		TWS3021						
		TWS3051			-	-	15	
		TWS3071						
		TWS3012						
		TWS3022			-	-	10	
		TWS3052						
		TWS3072						
		TWS3013						
		TWS3023			-	-	5	
		TWS3053						
		TWS3073						
		TWS3014						
		TWS3024			-	-	3	
		TWS3054						
		TWS3074						
	Holding Current		I _H		-	250		μA

Fig.1 LED Positive voltage vs Positive current

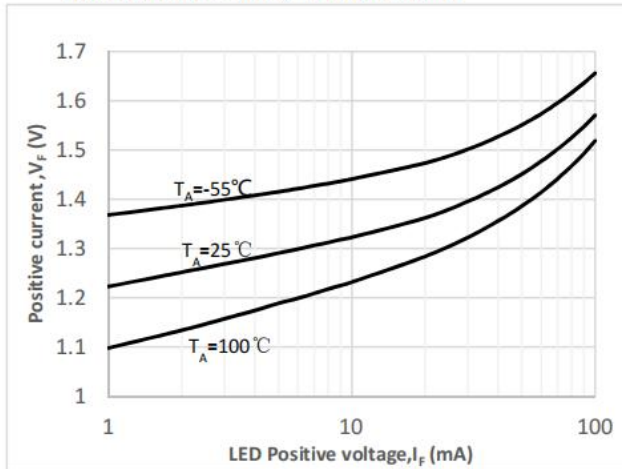


Fig.2 On-state characteristic

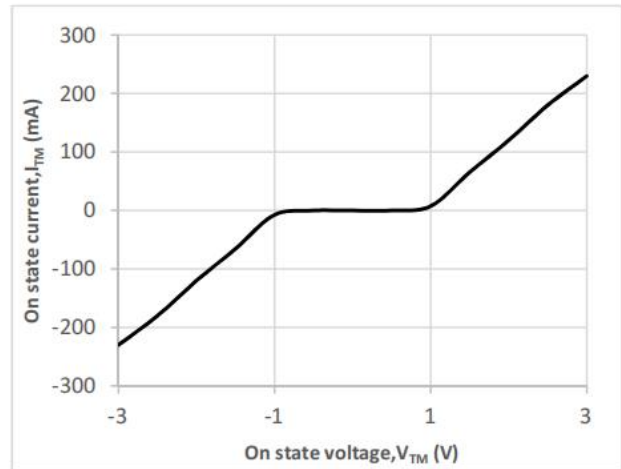


Fig.3 Trigger current vs Ambient temperature

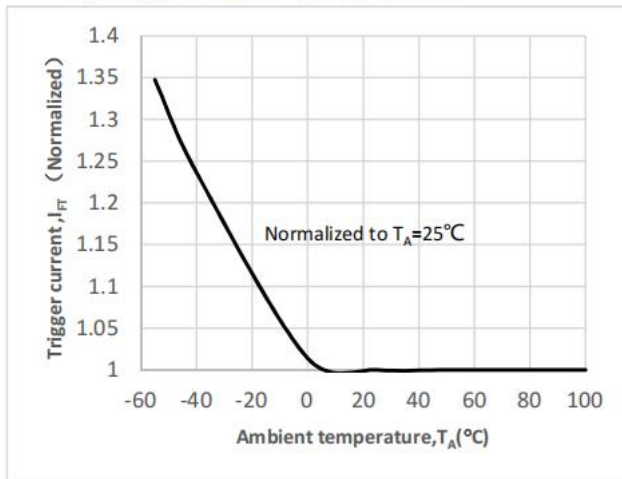


Fig.4 LED Trigger current vs LED Pulse Width

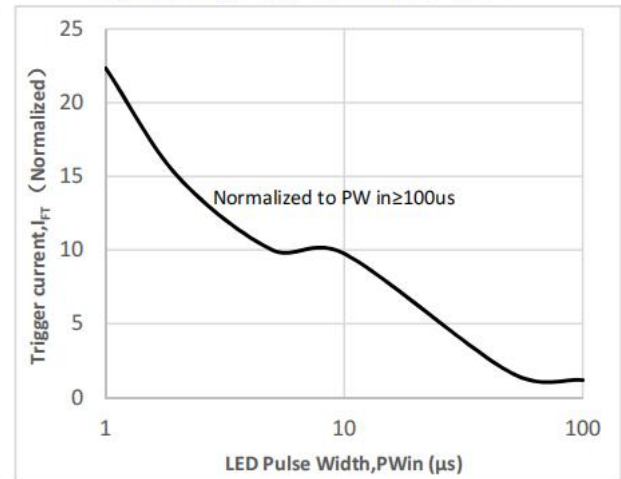


Fig.5 Holding current vs Temperature

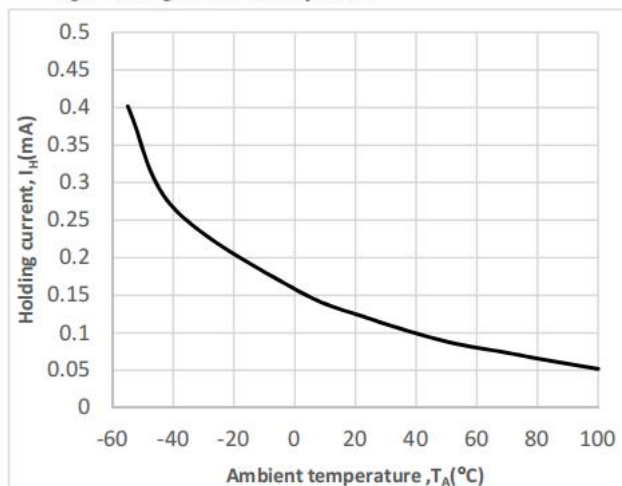


Fig.6 Leakage current vs Temperature

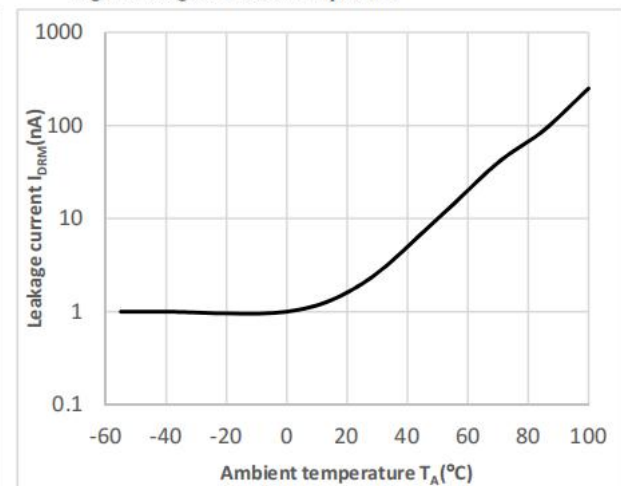
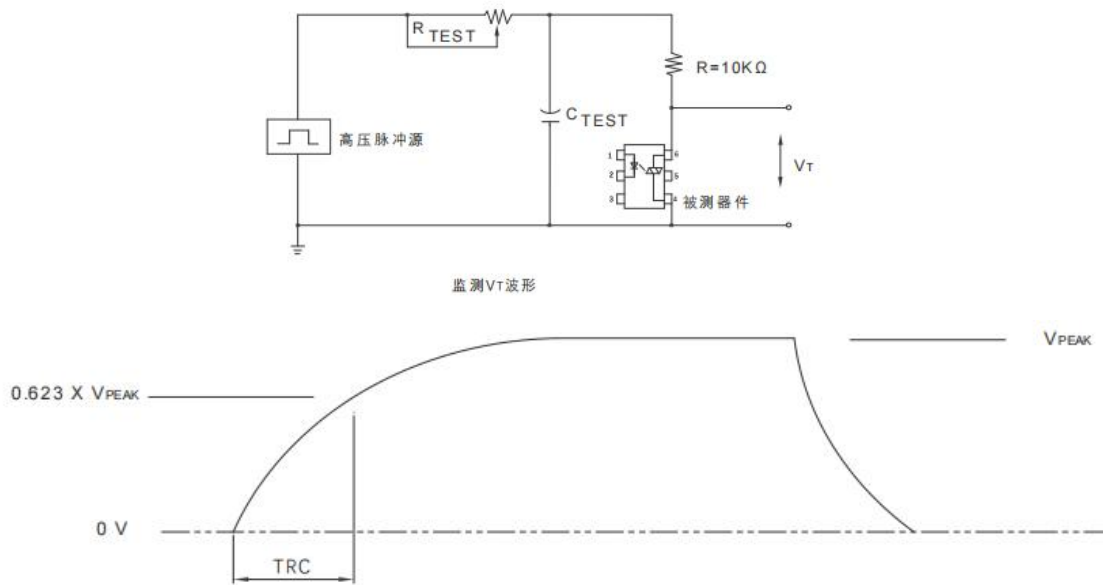


Fig.7 Static dv / dt test circuit and waveform



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.

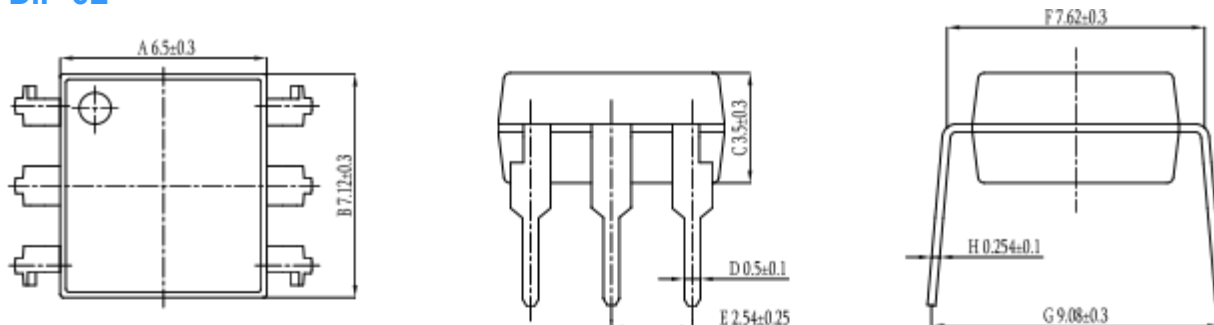
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, $V_{PEAK} = 400V$ for BL302X series. The dv/dt value is calculated as follows:

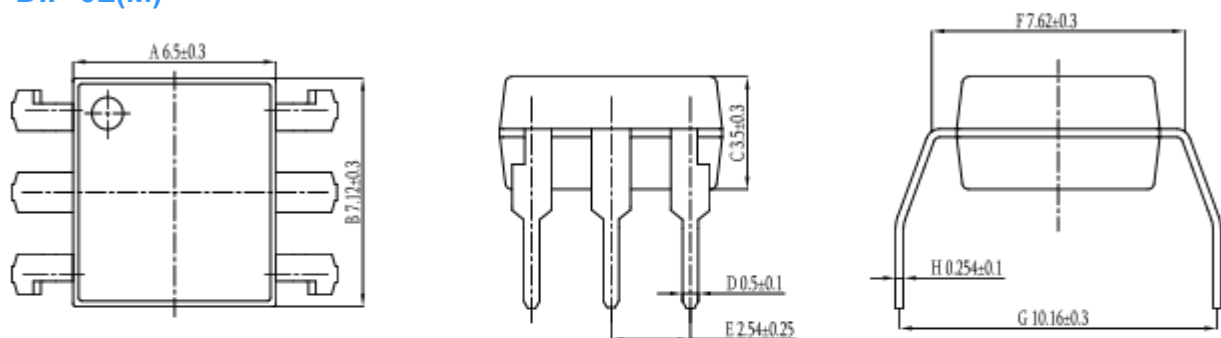
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

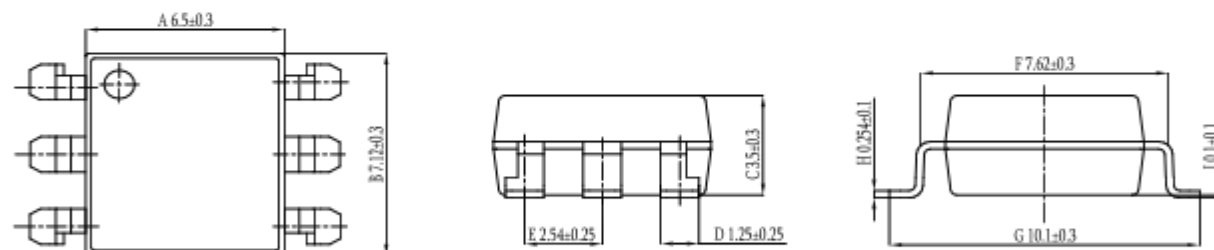
DIP-6L



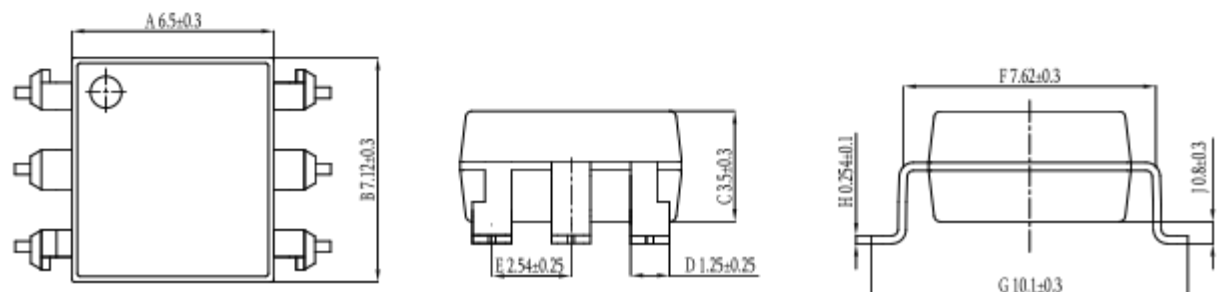
DIP-6L(M)



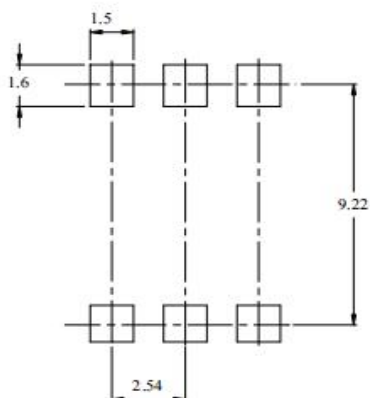
SMD-6L



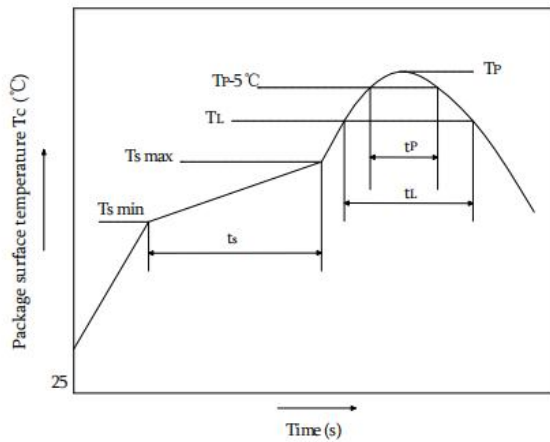
SMD-6L(SS)



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

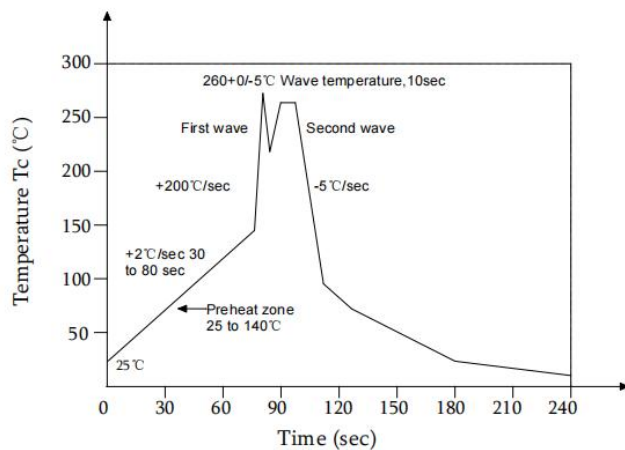


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)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

Packing

Package Type	Packing Form	Quantity per Tube & Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
DIP-6L/ DIP-6L(M)	Tube(500mm)	65 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
SMD-6L/ SMD-6L(SS)	Reel(φ330mm)	1000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Leave 25 Spaces at the beginning and 50 Spaces at the end

■ Summary table

■ DIP-6L/ DIP-6L(M) (Tube)

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

Qty/ctn : 19500 pcs.

Schematic: (unit:mm)

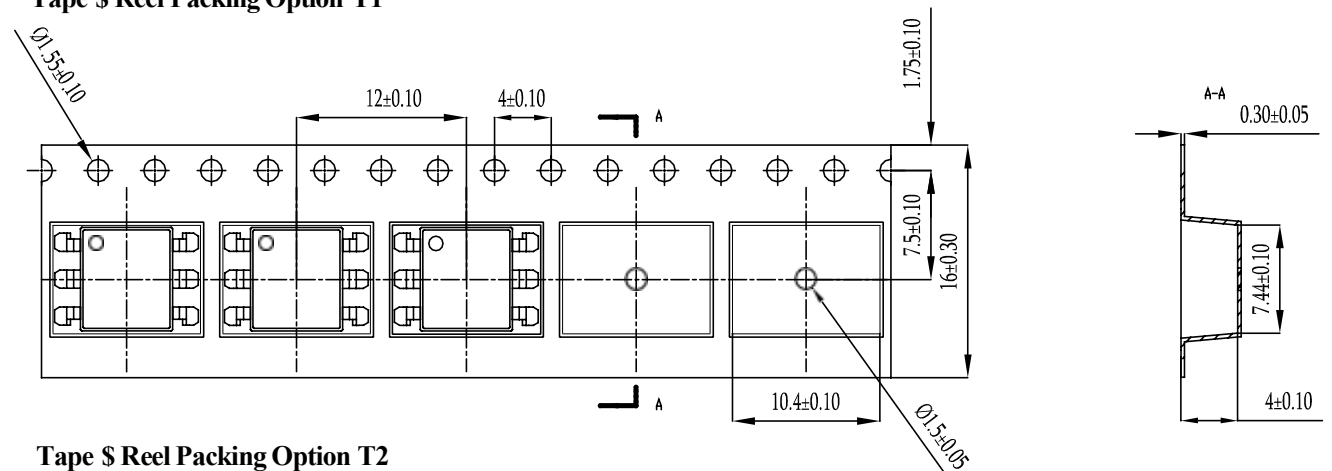
■ SMD-6L/ SMD-6L(SS) (Reel)

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

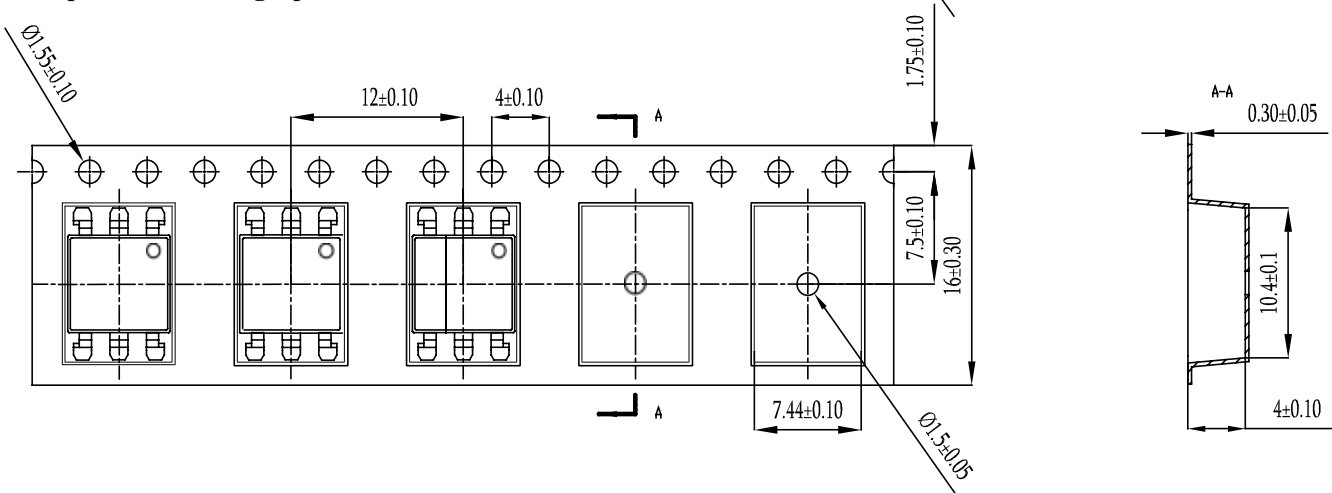
Qty/ctn : 10000 pcs.

Schematic: (unit:mm)

Tape \$ Reel Packing Option T1



Tape \$ Reel Packing Option T2



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