Zero Cross Triac Driver Photocouple

TWS303X,TWS304X,TWS306X,TWS308X

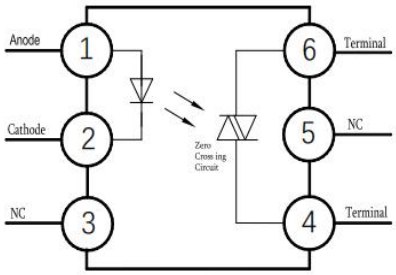
Features

HF

- Peak breakdown voltage:

  250V：TWS303X；400V：TWS304X； 600V：TWS306X；

  800V： TWS308X
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -55℃~110℃



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, 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) (Y)

① ② ③ ④ ⑤ ⑥ ⑦

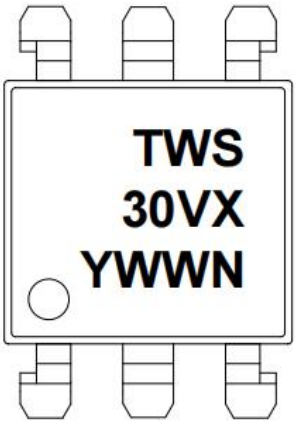
① Brand(TWS)
② Product series(V:3,4,6,8;X:0,1,2,3,4)
③ Package type(DIP-6L:None, DIP-6L(M):M,SMD-6L:S, SMD-6L(SS):SS)
④ Halogen option(None :Halogen free)
⑤ Lead frame (None: Copper)
⑥ Customer option 1 (0-9 or A-Z or None)
⑦ Customer option 2 (0-9 or A-Z or None)

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

Notes 1: V denotes VDRM digitsr: 3, 4, 6, 8.
2: X denotes IFT digitsr:0, 1, 2, 3, 4.

Marking Information

- "TWS" denotes brand
- "V" denotes V_{DRM} digitsr: 3, 4, 6,8
- "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



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	TWS303X	V_{DRM}	250	V
		TWS304X		400	
		TWS306X		600	
		TWS308X		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 ~ +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	TWS303X	I_{DRM}	V_{DRM} =Rated V_{DRM}, I_F= 0mA	-	-	100	nA
		TWS304X						
		TWS306X			-	-	500	
		TWS308X						

	Peak on-state voltage		V_{TM}	I_{TM}=100mA, I_F=Rated I_{FT}	-	-	3	V
	Critical Rate of Rise off-state Voltage	TWS303X	dv/dt	V_{PEAK} =Rated V_{DRM}, I_F= 0mA	1000	-	-	V/μs
		TWS304X						
		TWS306X						
		TWS308X			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	TWS3031	I_{FT}	Main terminal voltage = 3V	-	-	15	mA
		TWS3041						
		TWS3061						
		TWS3081						
		TWS3032			-	-	10	
		TWS3042						
		TWS3062						
		TWS3082						
		TWS3033			-	-	5	
		TWS3043						
		TWS3063						
		TWS3083						
	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

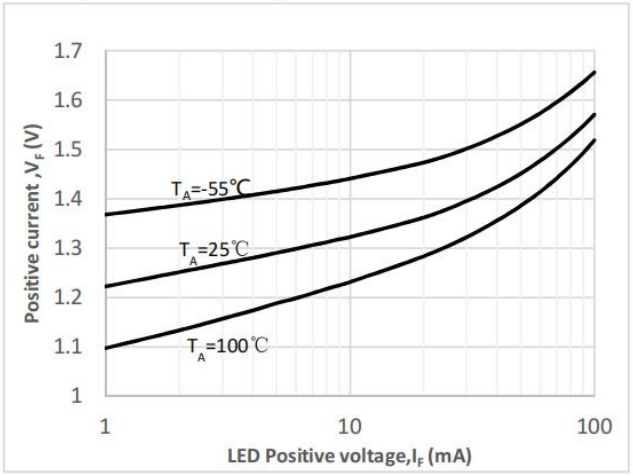


Fig.2 On-state characteristic

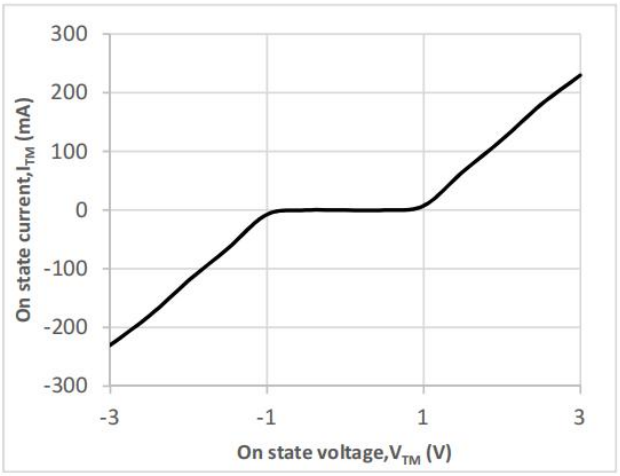


Fig.3 Trigger current vs Ambient temperature

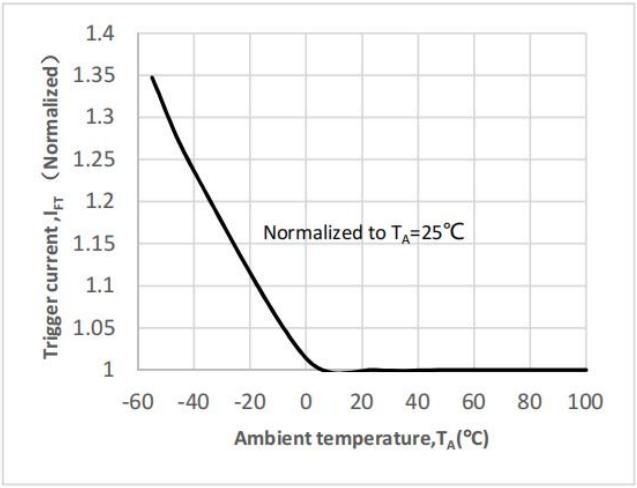


Fig4 LED Trigger current vs LED Pulse Width

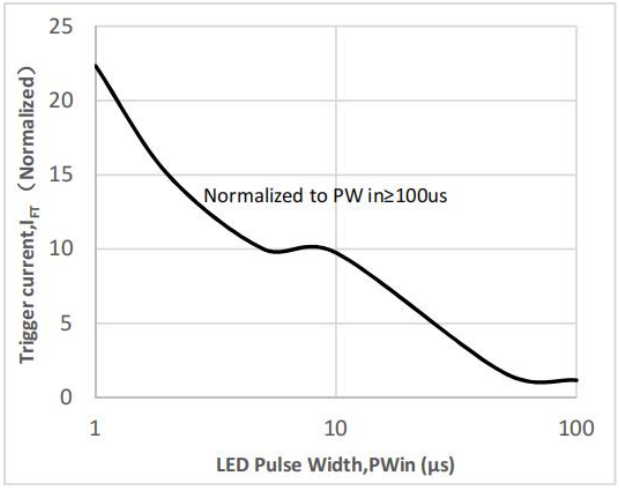


Fig.5 Holding current vs Temperature

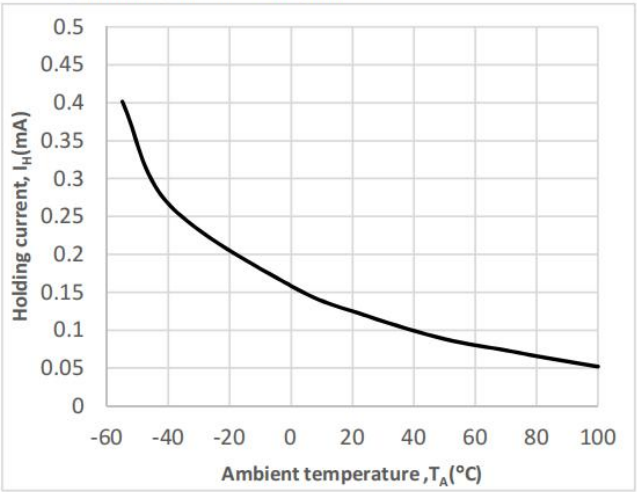


Fig.6 Leakage current vs Temperature

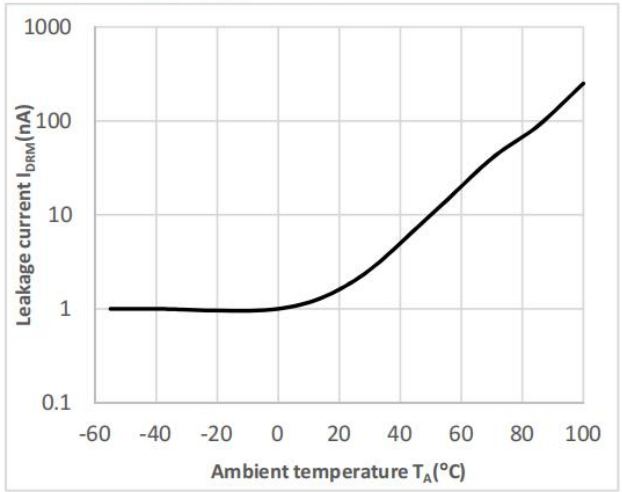


Fig.7 Inhibit state leakage current vs Ambient temperature

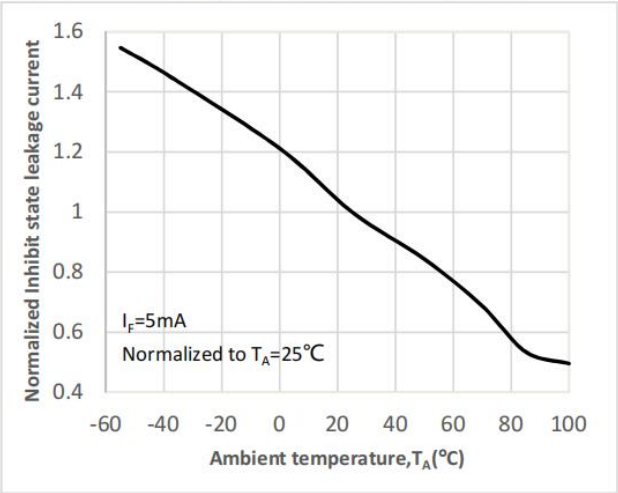


Fig.8 Inhibition voltage vs Ambient temperature

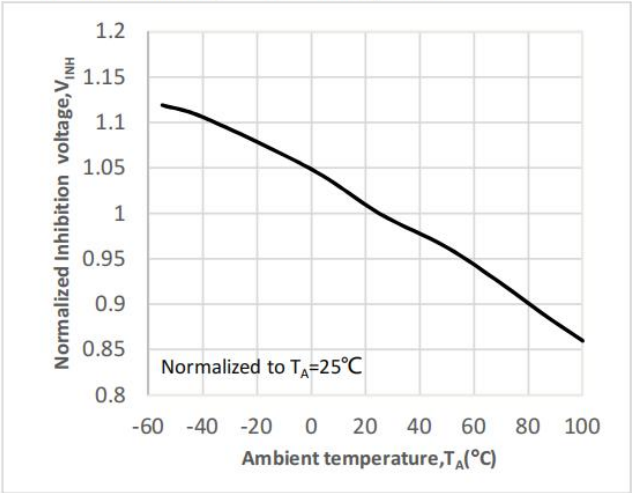
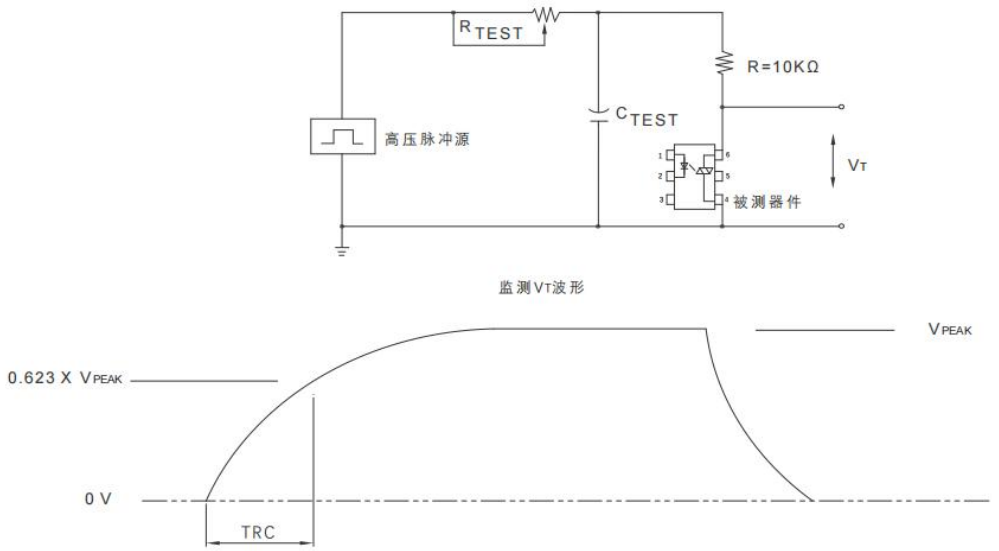


Fig.9 Static dv / dt test circuit and waveform



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.

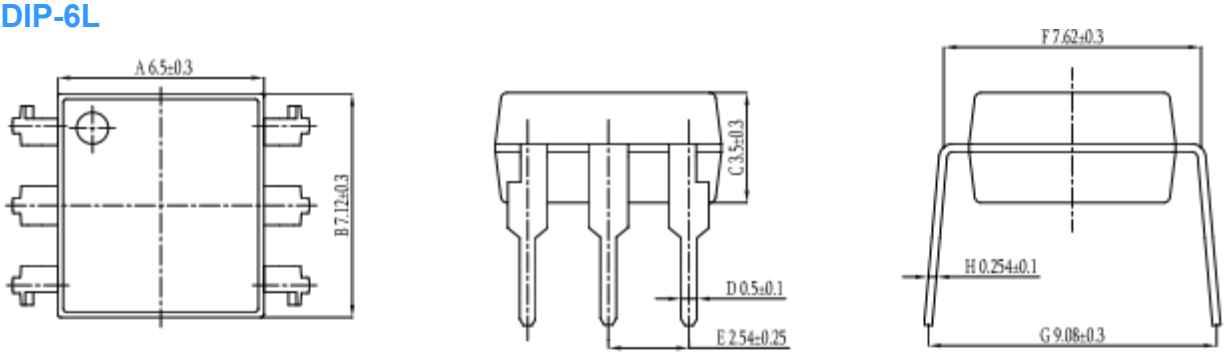
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, VPEAK = 400V for BL304X series. The dv/dt value is calculated as follows:

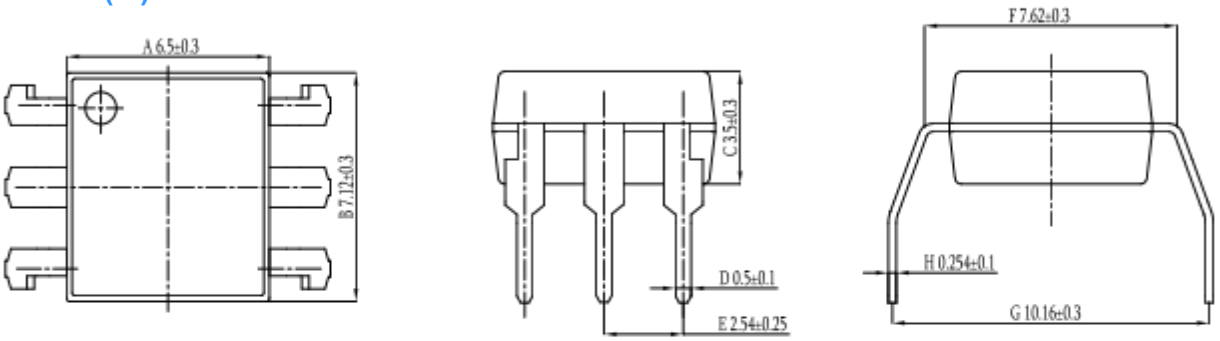
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Package Outline Dimensions (unit: mm)

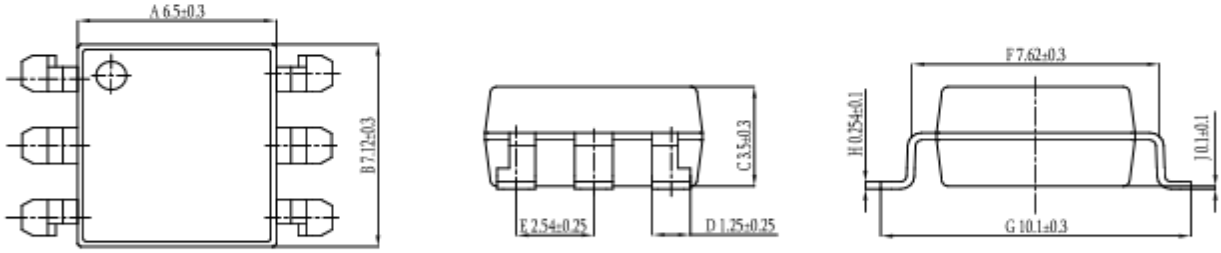
DIP-6L



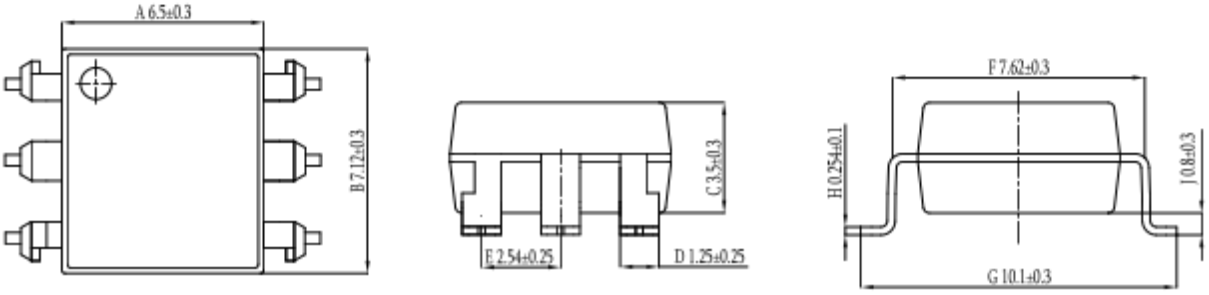
DIP-6L(M)



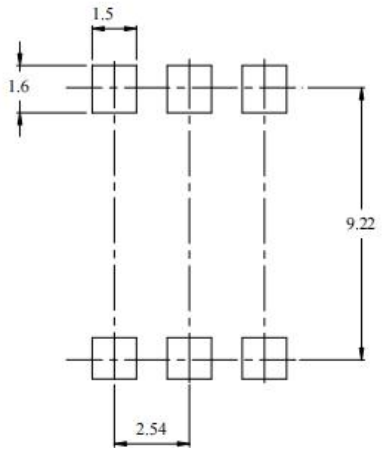
SMD-6L



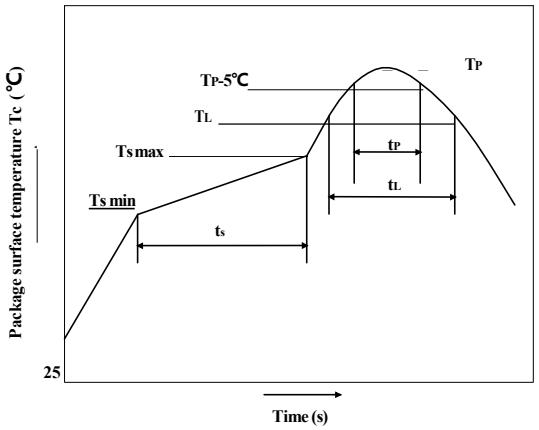
SMD-6L(SS)



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

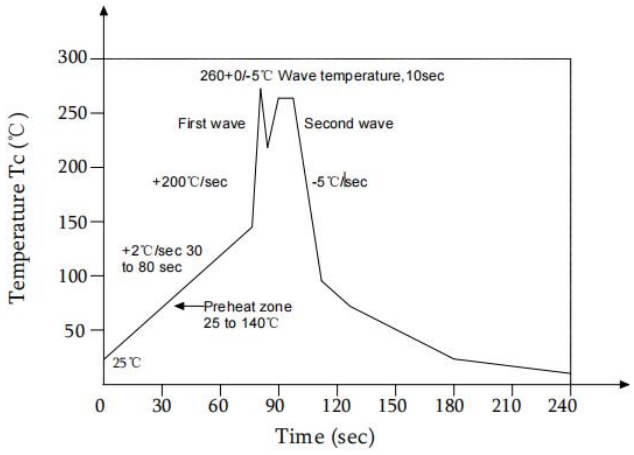


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	℃
Preheat time	ts	60	120	s
Ramp-up rate(T_L to T_P)			3	℃/s
Liquidus temperature	T_L	217		℃
Time above T_L	t_L	60	150	s
Peak temperature	Tp		260	℃
Time during which Tc is between (T_P-5) and T_P	t_p		30	s
Ramp-down rate(T_P to T_L)			6	℃/s

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
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

TWSs. Qty/ctn ： 19500 pcs.

Schematic：(unit:mm)

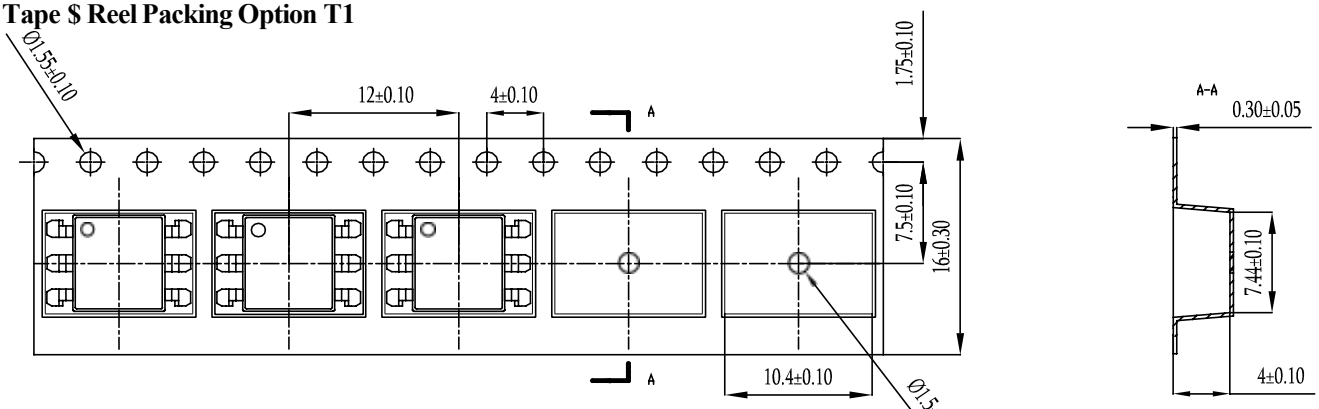
■SMD-6L/ SMD-6L(SS)（Reel)

Qty/reel： 1000 pcs. Qty/box：2000

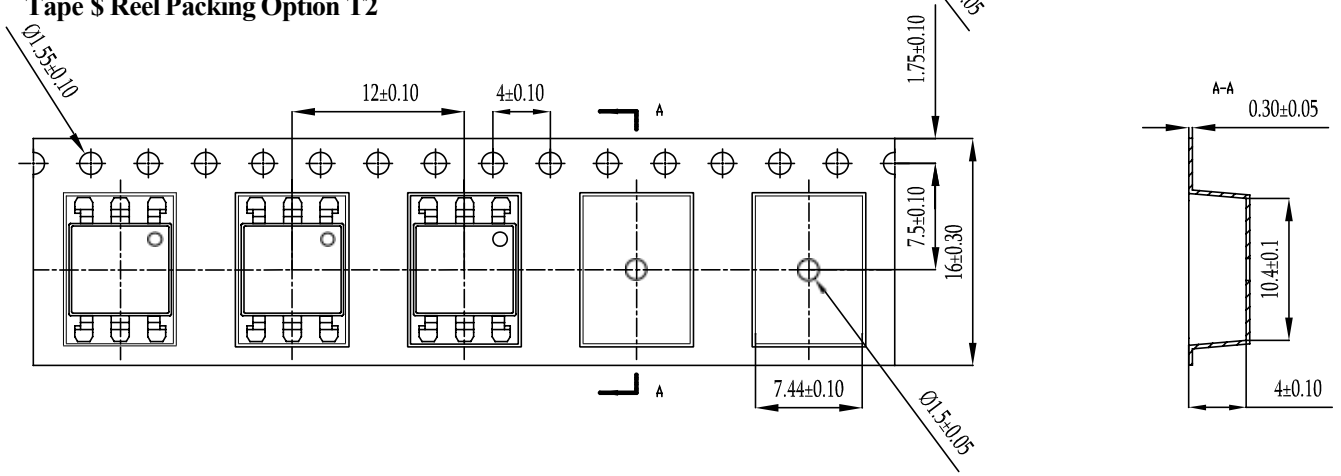
TWSs. Qty/ctn ： 10000 pcs.

Schematic：(unit:mm)

Tape $ Reel Packing Option T1



Tape $ Reel Packing Option T2



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