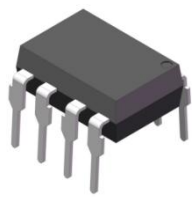
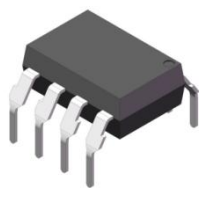


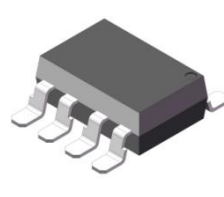
Product packaging logic diagram



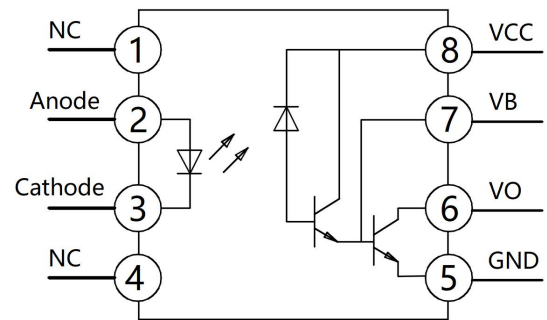
DIP8



DIP8-M



SMD8



Pin Configuration

Features

- High current transfer ratio (CTR:2000% typical)
- High isolation voltage between input and output (Viso =5000V rms)
- Operating Temperature: -40°C~85°C
- Low input current requirements: 0.5 mA
- TTL compatible output : 0.1 V ; VOL typical
- Base access allows gain bandwidth adjustment
- High output current: 60 mA
- Environmentally friendly products, compliant with CQC, UL, and VDE requirements

Mechanical Data

- Case: DIP8,DIP8-M, SMD8
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solder ability-per MIL-STD-202, Method 208

Applications

- Drive industrial controllers and actuators, Ensure the stability of signal transmission.
- At switch-mode power supplies, regulated power supplies, and battery management systems, Achieve signal isolation and amplification, ensuring the stability of power output.
- Can directly drive high-power motors and provide precise control signals. Achieve precise control over speed and direction
- Home appliances For controlling high-power loads such as motors and relays,Provide reliable signal transmission and electrical isolation to ensure the safe operation.
- Ensuring signal clarity and stability in signal transmission circuits.



Ordering Information

<u>XL</u>	<u>6N13X</u>	<u>(M)</u>	<u>(G)</u>	<u>(X)</u>	-	<u>(U)</u>	<u>(N)</u>	<u>(Y)</u>
①	②	③	④	⑤		⑥	⑦	⑧

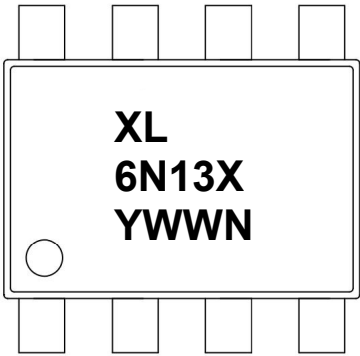
- ① Brand(XL)
- ② Product series (6N138 , 6N139)
- ③ Package type(None: DIP8、DIP8-M、SMD8)
- ④ Halogen option(None :Halogen free)
- ⑤ CTR Bank(None)
- ⑥ Lead frame (None: Copper)
- ⑦ Customer option 1 (0-9 or A- Z or none)
- ⑧ Customer option 2 (0-9 or A- Z or none)

Part Number	Package	Shipping Quantity	Marking Code
XL6N13X	DIP8	45pcs / Tube	XL6N13X
XL6N13XM	DIP8-M	45pcs / Tube	XL6N13X
XL6N13XS	SMD8	1000pcs / Tape & Reel	XL6N13X

Notes 1: X denotes product series:8,9

Marking Information

- " XL" denotes brand
- " 6N13X" denotes product series: 6N138,6X139.
- " 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	Average Forward Input Curren	I _{F(AVG)}		20	mA
	Peak Forward Input Current* ¹	I _{FPK}		40	mA
	Peak Transient Input Current * ²	I _{F(TRAN)}		1.0	A
	Reverse Voltage	V _R		5	V
	Power Dissipation	P _I		35	mW
Output	Output Power Dissipation	P _O		100	mW
	Output Current	I _o		60	mA
	Supply Voltage and Output Voltage* ³	V _{CC}	6N138	7	V
			6N139	18	
	Emitter Base Reverse Voltage (Pin 5-7)		V _{EB}		0.5

Thermal Characteristics

Parameter	Symbol	Value	Unit
Isolation Voltage * ⁴	V _{ISO}	5000	V _{rms}
Total Power Dissipation	P _T	135	mW
Operating Temperature	T _{OPR}	-40 ~ +85	°C
Storage Temperature Range	T _{STG}	-55 ~ +125	°C

Notes:

1. 50% Duty Cycle, 1 ms Pulse Width
2. < 1 us Pulse Width ,300 pps
3. Min.: -0.5 v
4. RH < 50%, t = 1 min., T_A = 25°C

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units
Power Supply Voltage	V _{CC}	4.5	18	V
Forward Input Current (ON)	I _{F(ON)}	0.5	12.0	mA
Forward Input Voltage (OFF)	V _{F(OFF)}	0	0.8	V

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol		Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V _F		I _F = 1.6mA	-	1.40	1.75	V
				T _A =25°C, I _F =1.6mA	1.25	1.40	1.70	
	Reverse Breakdown Voltage	B _{VR}		I _R =10μA, T _A = 25°C	5	-	-	V
	Capacitance	C _{in}		V _R = 0V, f = 1MHz	-	60	-	pF
Output	High Level Supply Current	I _{CCH}	6N138	V _{CC} =18V, I _F =0mA	-	0.05	10	uA
			6N139	V _O =Open	-	0.05	10	
	Low Level Supply Current	I _{CCL}	6N138	V _{CC} =18V, I _F =1.6mA	-	0.6	1.5	mA
			6N139	V _O =Open	-	0.6	1.5	
Transfer Characteristics	High Level Output Current	I _{OH}	6N138	V _O =V _{CC} =18V, I _F =0mA	-	0.01	100	μA
			6N139	A	-	-	250	
	Low Level Output Voltage	V _{OL}	6N139	I _F =0.5mA, I _O =2mA, V _{CC} =4.5V	-	0.05	0.4	V
				I _F =1.6mA, I _O =8mA, V _{CC} =4.5V	-	0.09		
				I _F =5.0mA, I _O =15mA, V _{CC} =4.5V	-	0.12		
				I _F =12mA, I _O =24mA, V _{CC} =4.5V	-	0.17		
			6N138	I _F =1.6mA, I _O =4.8mA, V _{CC} =4.5V	-	0.06		
	Current Transfer Ratio	CTR	6N139	I _F =0.5mA, V _{CC} =4.5V, V _O =0.4V	400	2500	-	%
				I _F =1.6mA, V _{CC} =4.5V, V _O =0.4V	500	2000	-	
			6N138	V _O =0.4V	300	2000	-	
	Isolation Resistance	R _{IO}		V _{IO} = 500Vdc 40~60% R.H.	-	1×10 ¹²	-	Ω
	Floating Capacitance	C _{IO}		f = 1MHz	-	0.6	-	pF

Switching Characteristics (@ $T_A = 0^\circ\text{C} \sim 70^\circ\text{C}$, $V_{CC} = 5\text{V}$, unless otherwise specified)

Parameter	Symbol		Test Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to Output High Level	T _{PHL}	6N139	I _F = 0.5 mA, R _L = 4.7 KΩ	-	5	30	us
			I _F = 0.5 mA, R _L = 4.7 KΩ, T _A =25°C	-	5	25	
			I _F = 12 mA, R _L = 270 Ω	-	0.2	2	
			I _F = 12 mA, R _L = 270 Ω T _A =25°C	-	0.2	1	
		6N138	I _F = 1.6 mA, R _L = 2.2 KΩ	-	-	15	
			I _F = 1.6 mA, R _L = 2.2 KΩ T _A =25°C	-	1.4	10	
Propagation Delay Time to Output Low Level	T _{PLH}	6N139	I _F = 0.5 mA, R _L = 4.7 KΩ	-	-	90	us
			I _F = 0.5 mA, R _L = 4.7 KΩ, T _A =25°C	-	16	60	
			I _F = 12 mA, R _L = 270 Ω	-	-	10	
			I _F = 12mA, R _L = 270 Ω, T _A =25°C	-	1.7	7	
		6N138	I _F = 1.6 mA, R _L = 2.2 KΩ	-	-	50	
			I _F = 1.6 mA, R _L = 2.2 KΩ T _A =25°C	-	8	35	
Common Mode Transient Immunity (at Output HIGH Level)	C _{MH}		I _F = 0 mA, T _A = 25°C, R _I = 2.2 KΩ, V _{CM} = 10Vp-p	1000	10000	-	V/μs
Common Mode Transient Immunity (at Output LOW Level)	C _{ML}		I _F =1.6 mA, T _A = 25°C R _I = 2.2 KΩ, V _{CM} = 10Vp-p	1000	10000	-	V/μs

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

Fig.1 Output current vs. Output Voltage

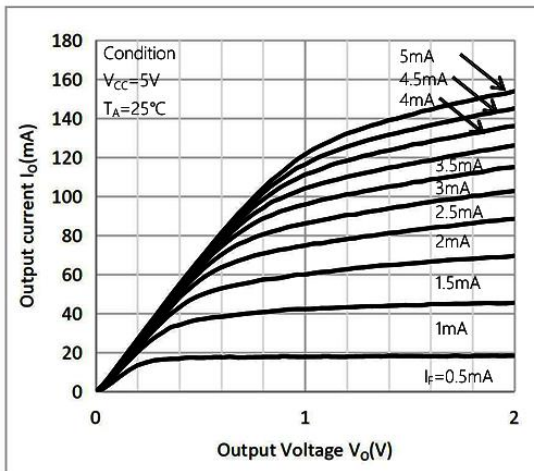


Fig.2 Current transfer ratio vs. Input current

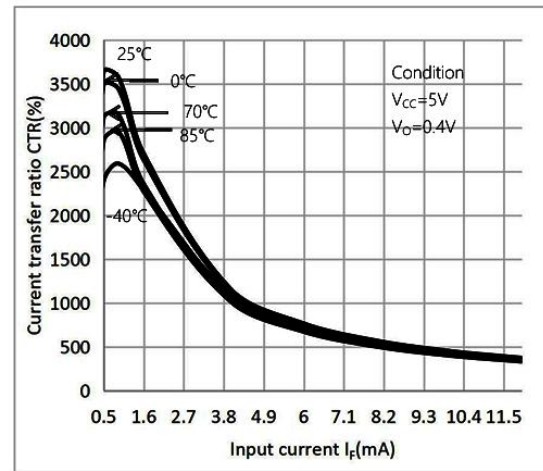


Fig.3 Output current vs. Input current

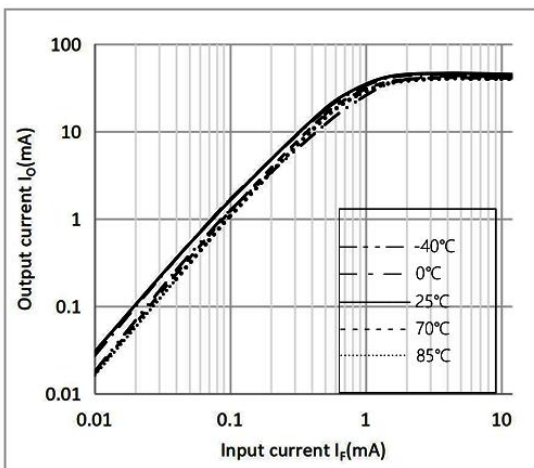


Fig.4 Input current vs. Forward Voltage

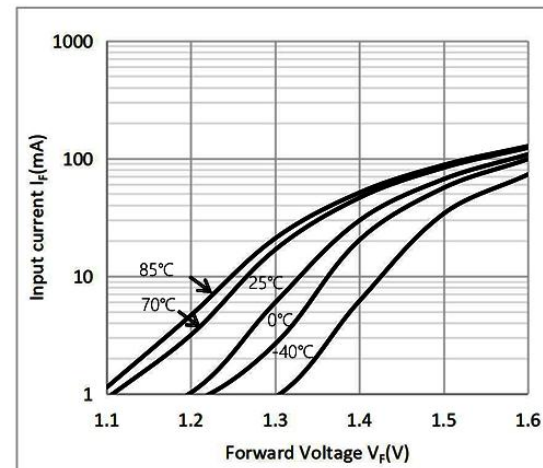


Fig.5 Propagation delay vs. Ambient temperature

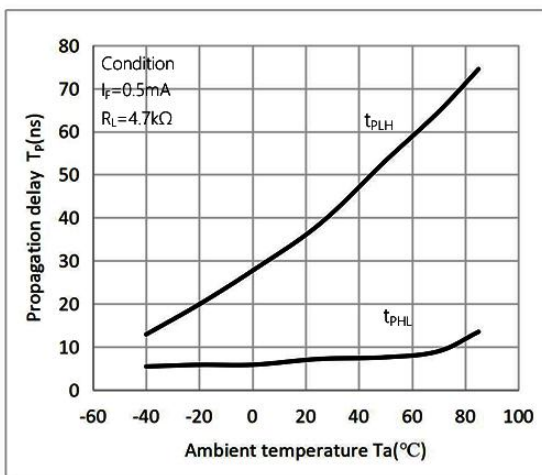
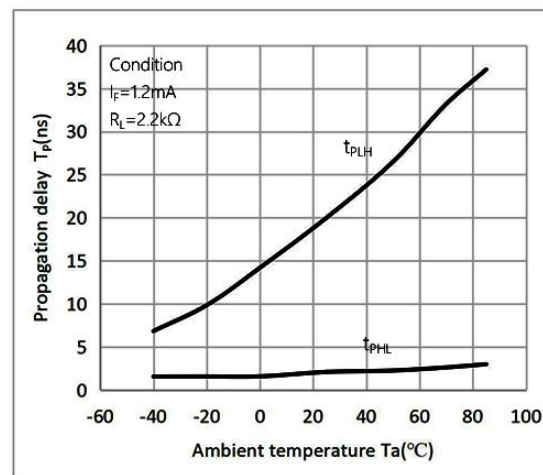


Fig.6 Propagation delay vs. Ambient temperature



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

Fig.7 Propagation delay vs. Ambient temperature

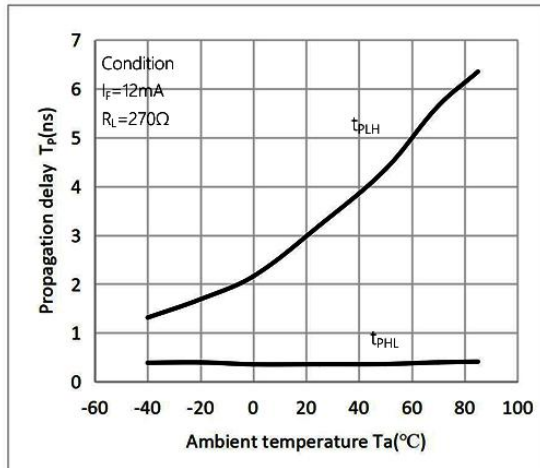


Fig.8 Forward Voltage vs. Ambient temperature

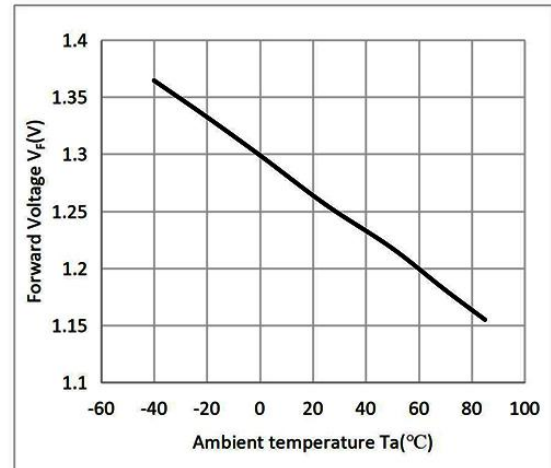


Fig.9 Logic low supply current vs. Input current

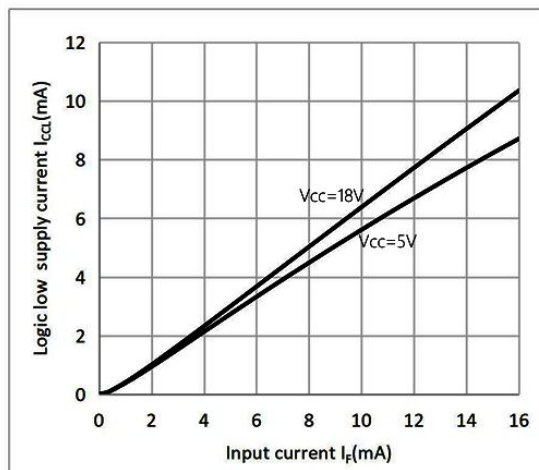
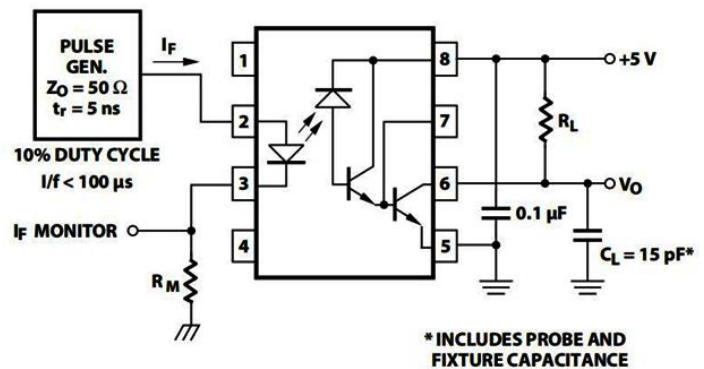
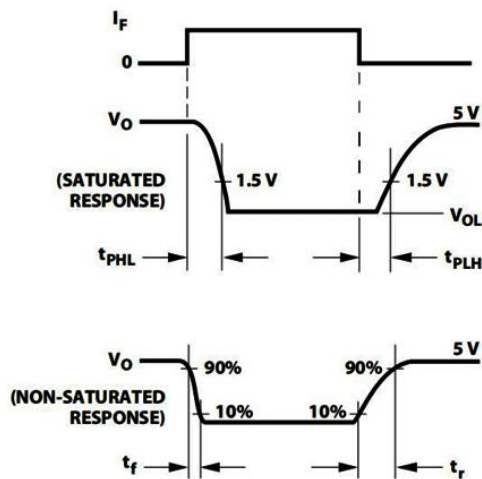
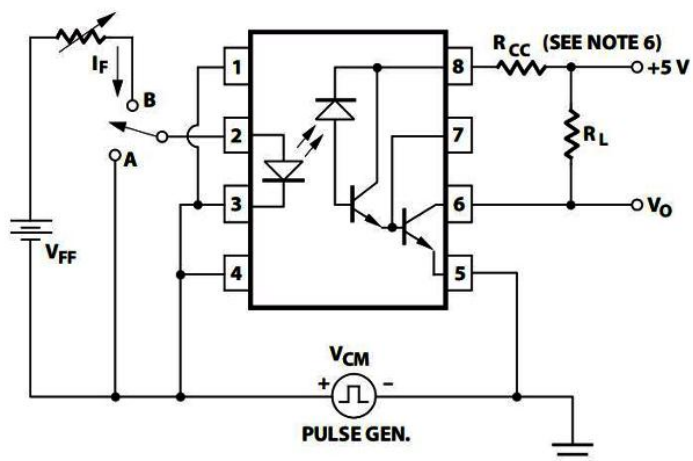


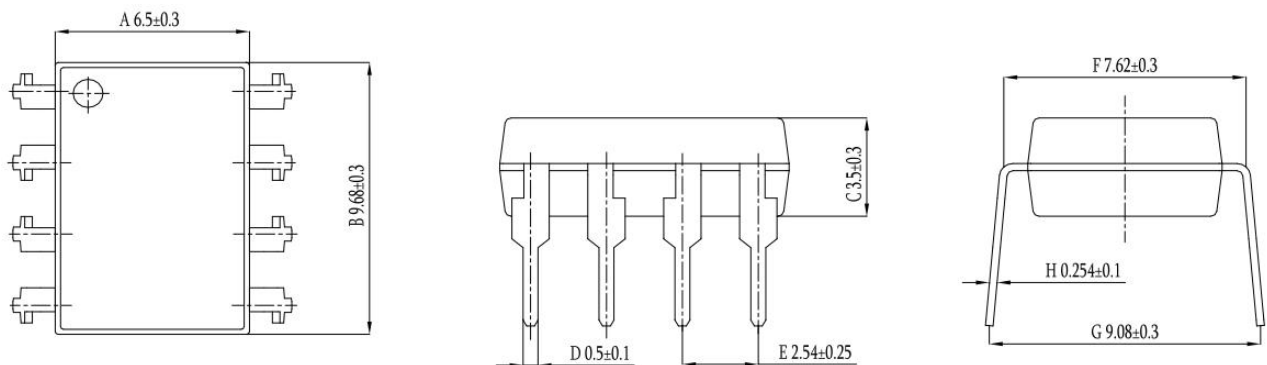
Fig.10 Switching Time Test Circuit



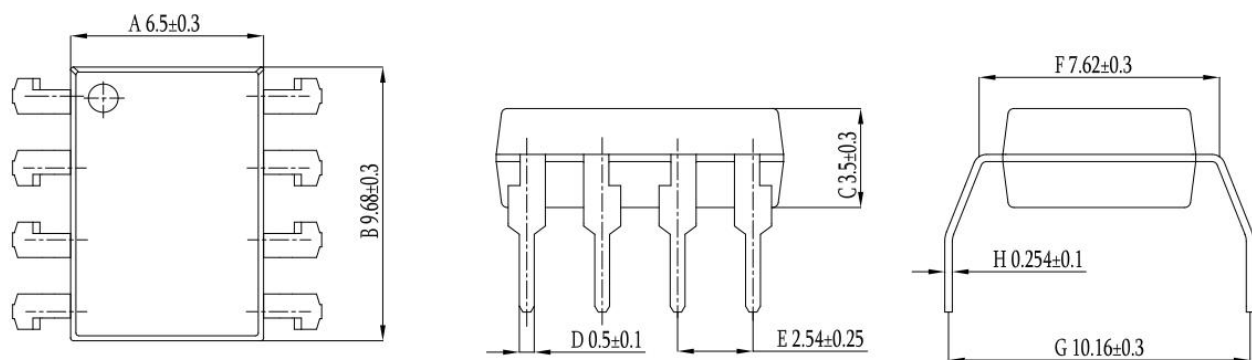


Package Outline Dimensions (unit: mm)

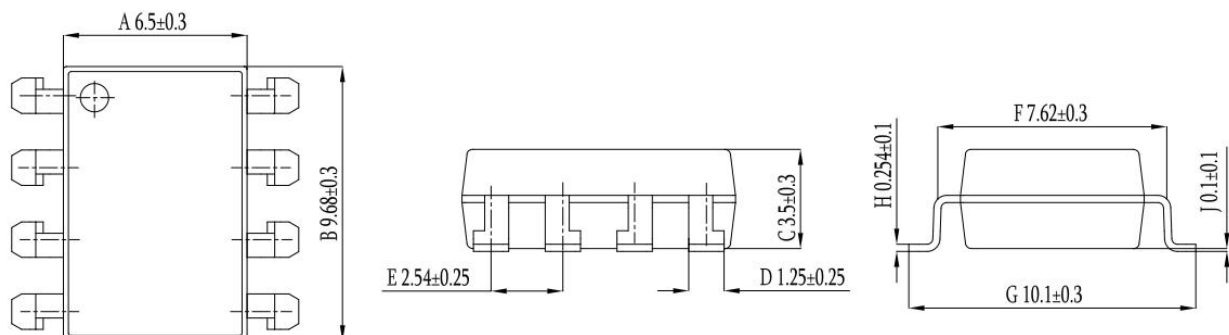
DIP8



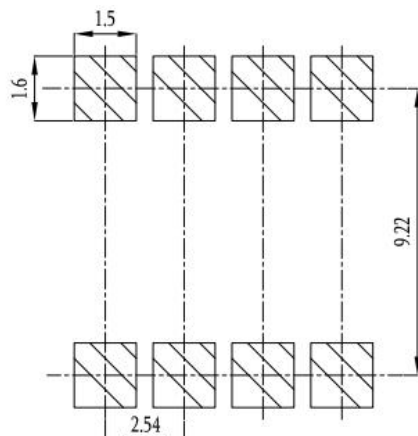
DIP8-M



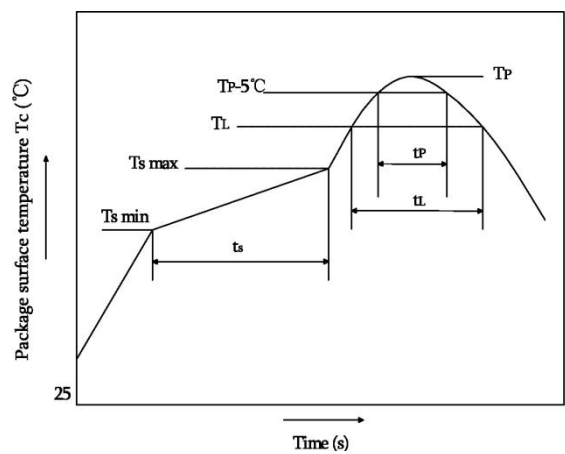
SMD8



SOLDERING FOOTPRINT (unit: mm)



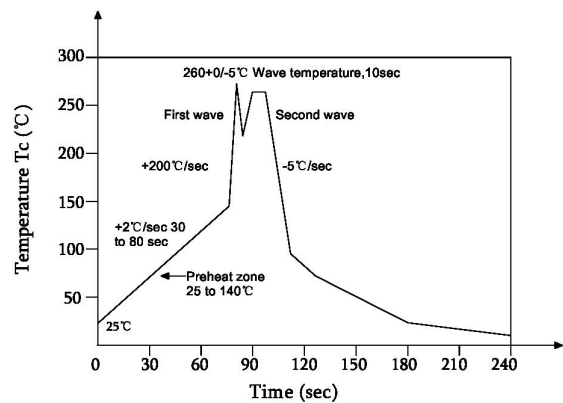
Reflow soldering



	Symbol	Min	Max	Unit
Preheat temperature	T_s	150	200	°C
Preheat time	t_s	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 T_s	~130°C
Preheat time (25°C to T_s)	> 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

- A. Hand soldering iron is only used for product rework or sample testing.
- B. 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
DIP8	Tube(500mm)	45pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP8-M	Tube(500mm)	45pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Seagull foot (M foot) tube
SMD8	Reel(φ330mm)	1000pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

■ Summary table

■ DIP8/DIP8-M (Tube)

Qty/tube: 45pcs. Qty/box: 1125pcs.

Qty/ctn : 13500pcs.

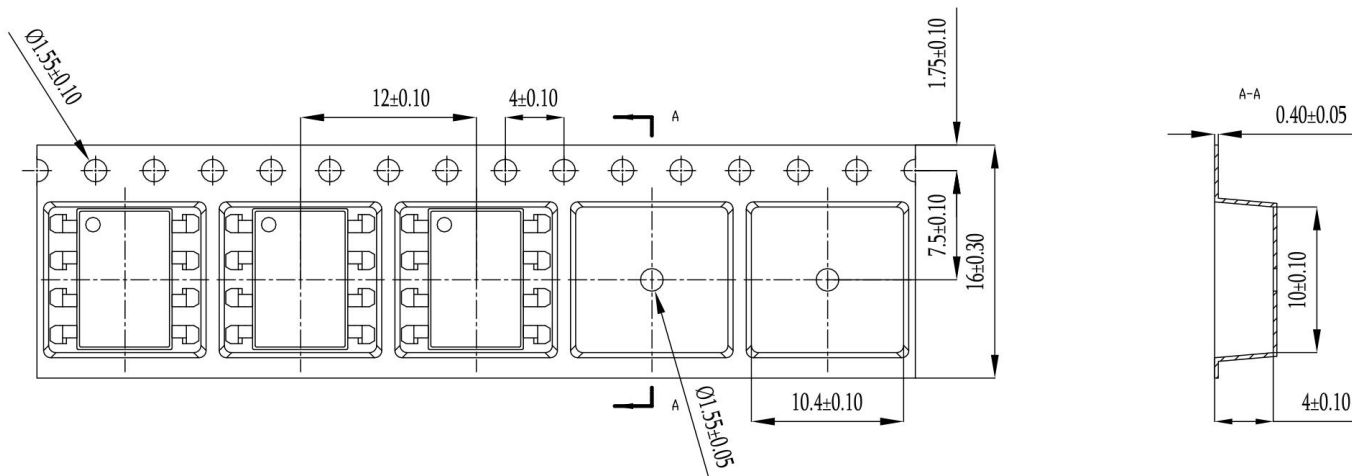
Schematic: (unit:mm)

■ SMD8 (Reel)

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

Qty/ctn : 10000pcs.

Schematic: (unit:mm)



IMPORTANT NOTICE

XINGLIGHT reserves the right to make changes without further notice to any product herein to make corrections, modifications , improvements , or other changes. XINGLIGHT does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights ,nor the rights of others .