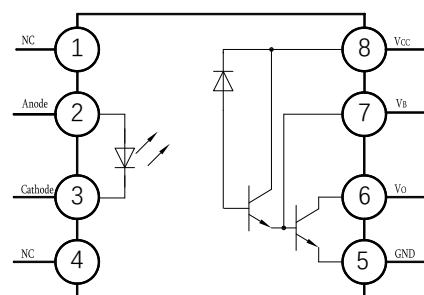


Features

- High current transfer ratio (CTR:2000% typical)
- High isolation voltage between input and output ($V_{iso} = 5000V_{rms}$)
- Operating Temperature: $-40^{\circ}C \sim 85^{\circ}C$
- Low input current requirements: 0.5 mA
- TTL compatible output : 0.1 V V_{OL} typical
- Base access allows gain bandwidth adjustment
- High output current: 60 mA

HF



Notes:

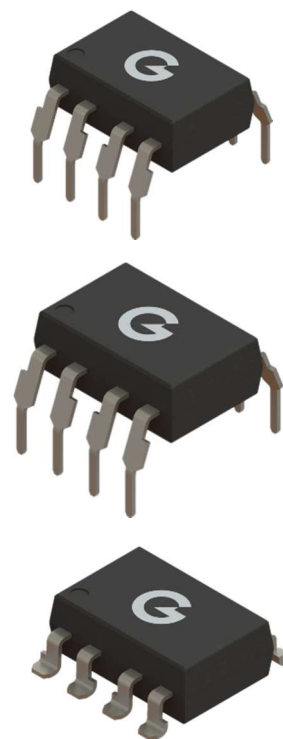
0.1 μ F bypass capacitor must be connected between pins 5 and 8

Applications

- Ground isolate most logic families – TTL/TTL, CMOS/ TTL, CMOS/CMOS, LSTTL/TTL, CMOS/LSTT
- Low input current line receiver
- EIA RS-232C line receiver
- Telephone ring detector
- 117 V ac line voltage status indicator – low input power dissipation
- Low power systems – ground isolation

Mechanical Data

- Case: DIP-8L 、 DIP-8L (M) 、 SMD-8L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Truth Table (Positive Logic) :

LED	VO
OFF	H
ON	L

Ordering Information

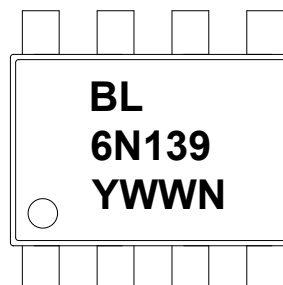
BL 6N139 (M) (G) (X) - (U) (N) (Y)

- ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
- ① Brand(BL)
② Product series(6N139)
③ Package type(DIP-8L:None, DIP-8L(M):M,SMD-8L:S)
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
BL6N139	DIP-8L	45 pcs / Tube	BL6N139
BL6N139M	DIP-8L(M)	45 pcs / Tube	BL6N139
BL6N139S	SMD-8L	1000 pcs / Tape & Reel	BL6N139

Marking Information

- "BL" denotes brand
- "6N139" denotes Product series.
- "Y" denotes Year : A(2024), B(2025), C(2026)
- "WW" denotes Week's number
- "N" denotes the day of Week.



Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Input	Average Forward Input Current	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}	18	V
	Emitter Base Reverse Voltage (Pin 5-7)	V_{EB}	0.5	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Isolation Voltage *4	V_{ISO}	5000	Vrms
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., $T_A = 25^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	$I_F = 1.6\text{mA}$	-	1.40	1.75	V
		$T_A = 25^\circ\text{C}, I_F = 1.6\text{mA}$	1.25	1.40	1.70	
	Reverse Breakdown Voltage	$I_R = 10\mu\text{A}, T_A = 25^\circ\text{C}$	5	-	-	V
	Capacitance	$V_R = 0\text{V}, f = 1\text{MHz}$	-	60	-	pF
	Diode Temperature Coefficient	$\Delta V_F / \Delta T_A$ $I_F = 1.6\text{mA}$	-	-1.8	-	mV/°C

Output	High Level Supply Current	I_{CCH}	$V_{CC}=18V, I_F=0mA$ $V_O=Open$	-	0.01	10	μA
	Low Level Supply Current	I_{CCL}	$V_{CC}=18V, I_F=1.6mA$ $V_O=Open$	-	0.4	1.5	mA
Transfer Characteristics	High Level Output Current	I_{OH}	$V_O=V_{CC}=18V, I_F=0mA$	-	0.05	100	μA
	Low Level Output Voltage	V_{OL}	$I_F=0.5mA, I_O=2mA,$ $V_{CC}=4.5V$	-	0.1	0.4	V
			$I_F=1.6mA, I_O=8mA,$ $V_{CC}=4.5V$				
			$I_F=5.0mA, I_O=15mA,$ $V_{CC}=4.5V$				
			$I_F=12mA, I_O=24mA,$ $V_{CC}=4.5V$	-	0.2	-	
	Current Transfer Ratio	CTR	$I_F=0.5mA, V_{CC}=4.5V,$ $V_O=0.4V$	400	2000	-	%
			$I_F=1.6mA, V_{CC}=4.5V,$ $V_O=0.4V$	500	1600	-	
	Isolation Resistance	R_{IO}	$V_{IO} = 500V_{dc}$ 40~60% R.H.	-	1×10^{12}	-	Ω
	Floating Capacitance	C_{IO}	$f = 1MHz$	-	0.6	-	pF

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to Output High Level	T_{PHL}	$I_F = 0.5 mA, R_I = 4.7 K\Omega$	-	5	30	μs
		$I_F = 0.5 mA, R_I = 4.7 K\Omega,$ $T_A = 25^\circ C$	-	5	25	
		$I_F = 12 mA, R_I = 270 \Omega$	-	0.2	2	
		$I_F = 12 mA, R_I = 270 \Omega$ $T_A = 25^\circ C$	-	0.2	1	
Propagation Delay Time to Output Low Level	T_{PLH}	$I_F = 0.5 mA, R_I = 4.7 K\Omega$	-	18	90	μs
		$I_F = 0.5 mA, R_I = 4.7 K\Omega,$ $T_A = 25^\circ C$	-	18	60	
		$I_F = 12 mA, R_I = 270 \Omega$	-	2	10	
		$I_F = 12 mA, R_I = 270 \Omega,$ $T_A = 25^\circ C$	-	2	7	
Common Mode Transient Immunity (at Output HIGH Level)	$ CM_H $	$I_F = 0 mA, T_A = 25^\circ C,$ $R_I = 2.2 K\Omega, V_{CM} = 10V_{p-p}$	1000	10000	-	V/ μs
Common Mode Transient Immunity (at Output LOW Level)	$ CM_L $	$I_F = 1.6 mA, T_A = 25^\circ C$ $R_I = 2.2 K\Omega, V_{CM} = 10V_{p-p}$	1000	10000	-	V/ μs

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

Fig.1 Output Current vs. Output Voltage

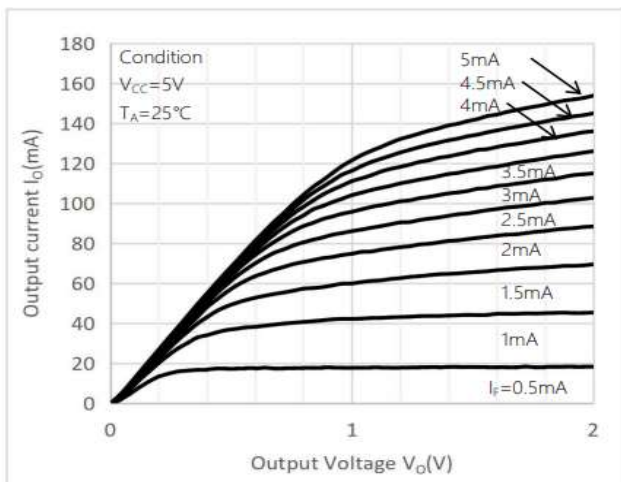


Fig.2 Current transfer ratio vs. Input current

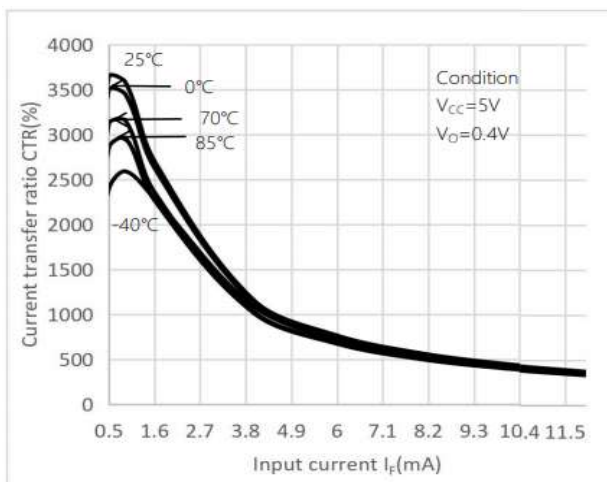


Fig.3 Output current vs. Input current

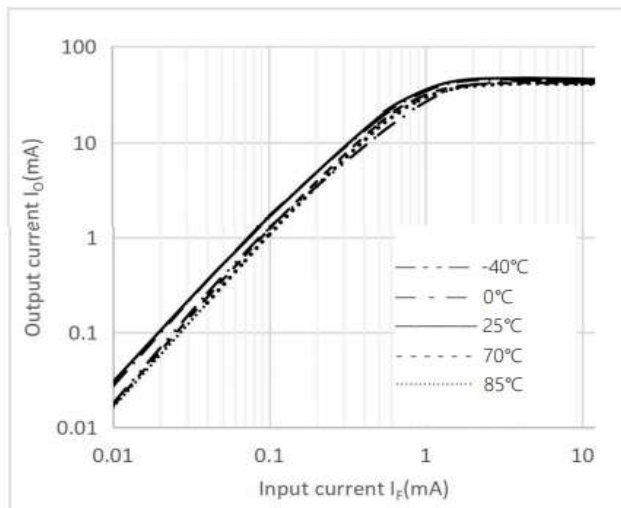


Fig.4 Input current vs. Forward Voltage

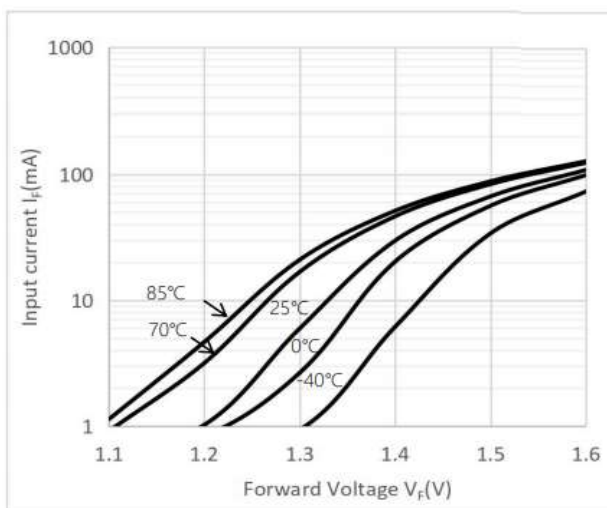


Fig.5 Propagation delay vs. Ambient temperature

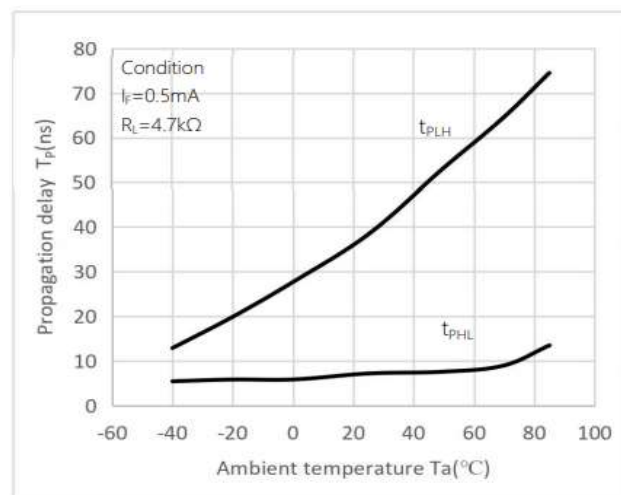


Fig.6 Propagation delay vs. Ambient temperature

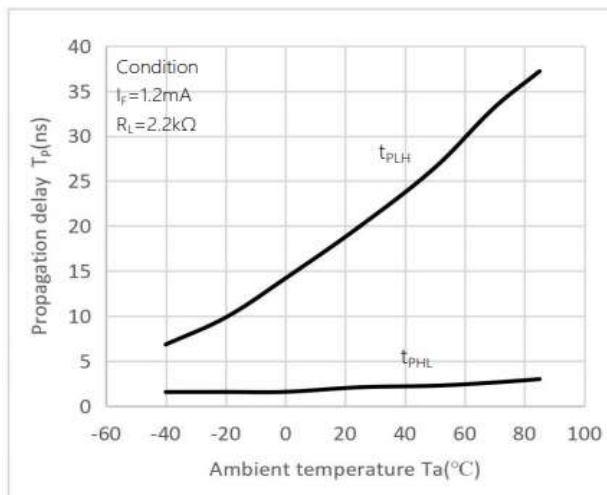


Fig.7 Propagation delay vs. Ambient temperature

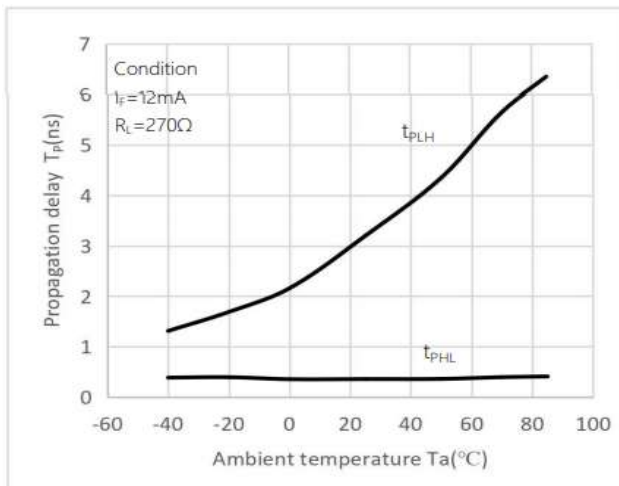


Fig.8 Forward Voltage vs. Ambient temperature

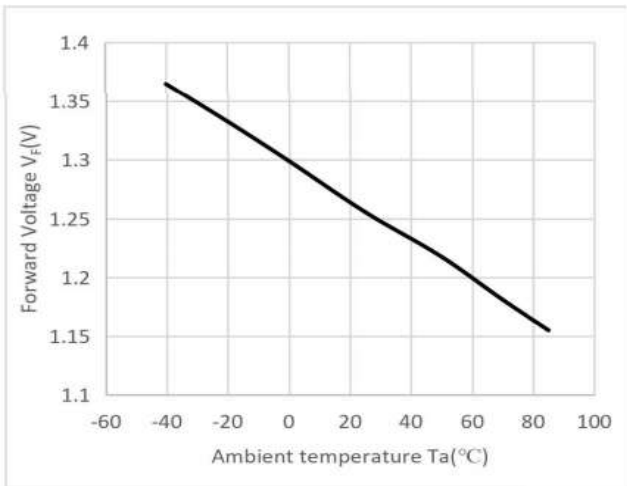


Fig.9 Logic low supply current vs. Input current

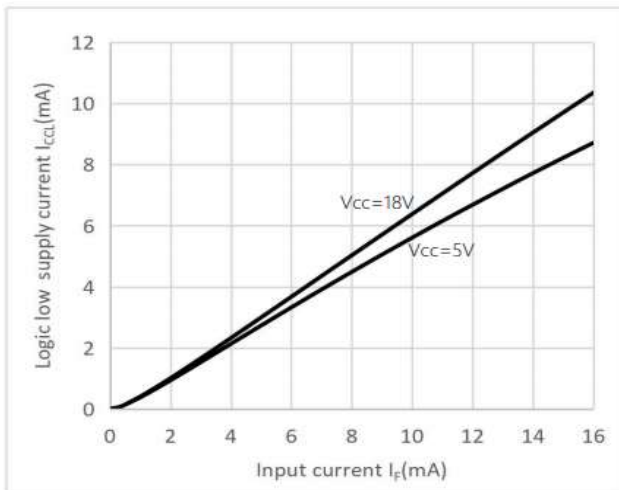


Fig.10 Switching Time Test Circuit

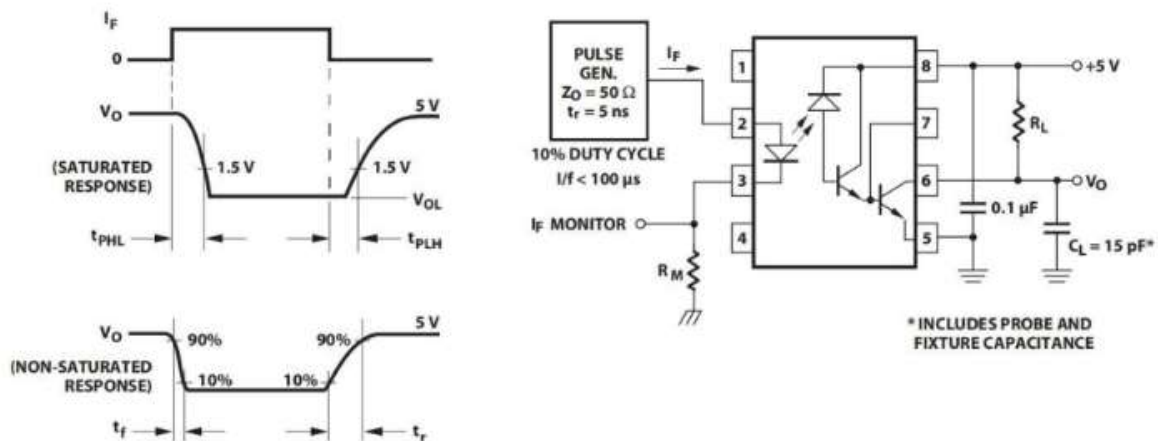
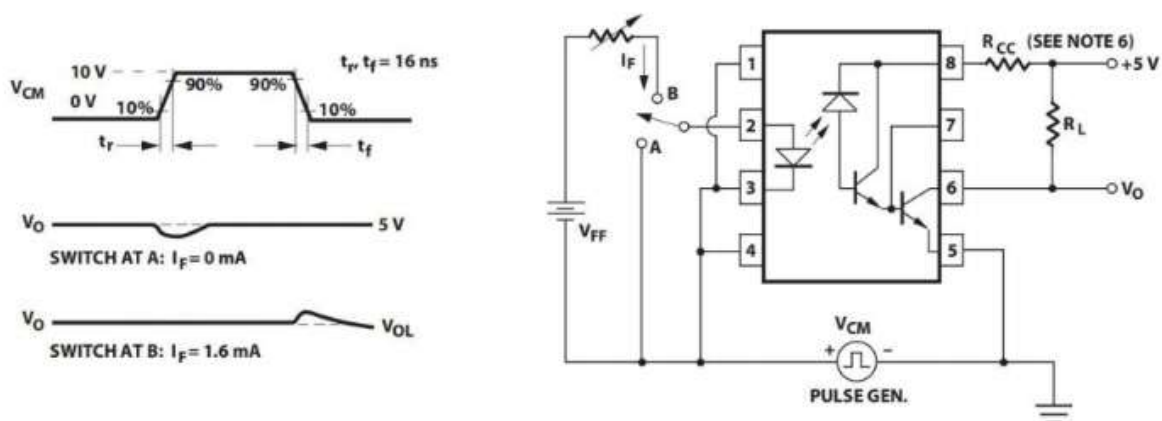
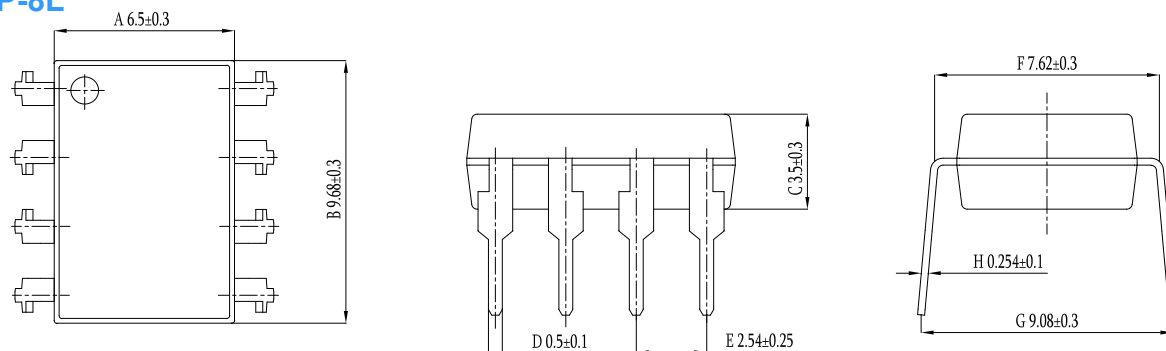


Fig.11 Test Circuit Common Mode Transient Immunity

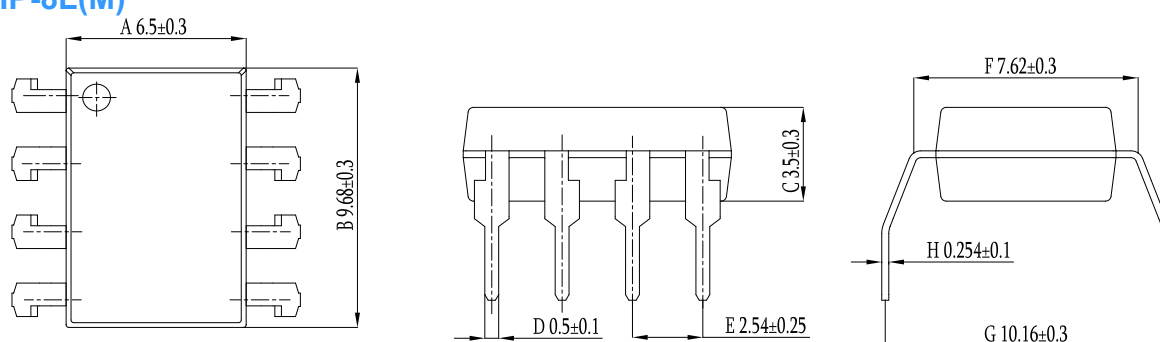


Package Outline Dimensions (unit: mm)

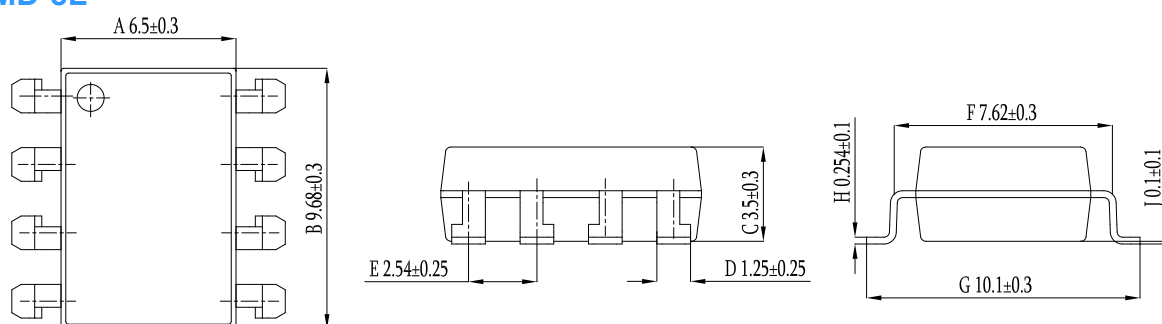
DIP-8L



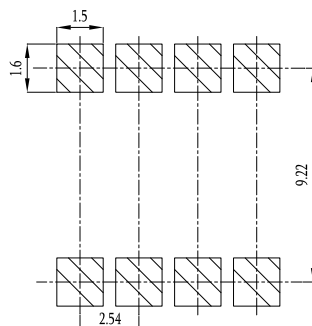
DIP-8L(M)



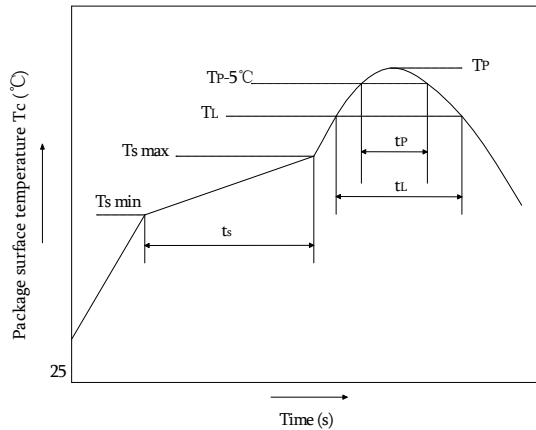
SMD-8L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

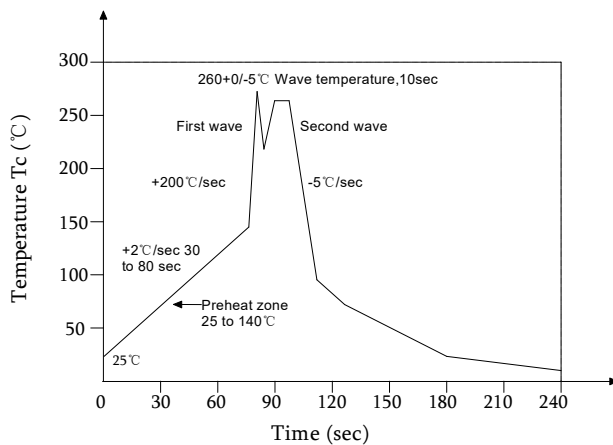


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)			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-8L	Tube(500mm)	45 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP-8L(M)	Tube(500mm)	45 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Seagull foot (M foot) tube
SMD-8L	Reel(φ330mm)	1000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

■Summary table

■DIP-8L/ DIP-8L(M) (Tube)

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

Qty/ctn : 13500 pcs.

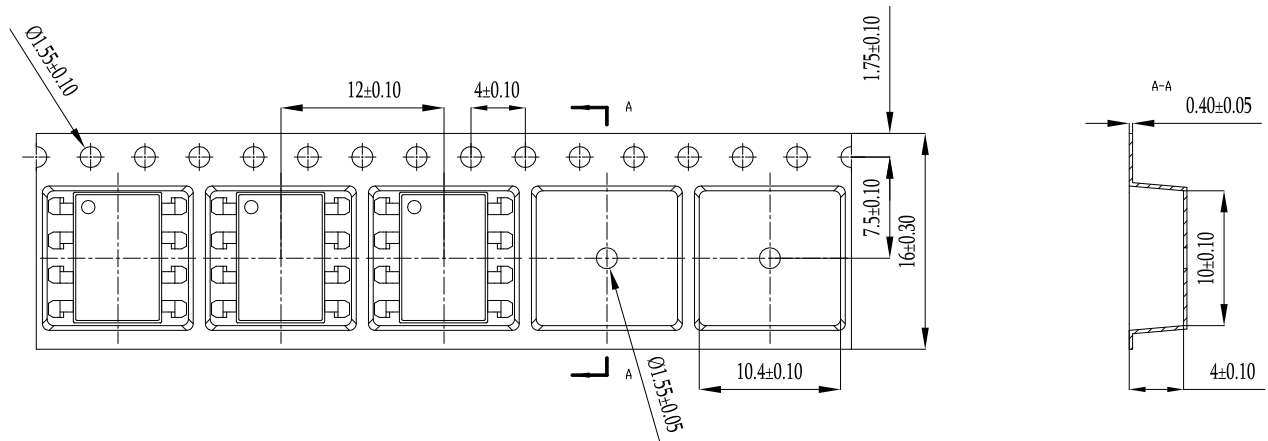
Schematic: (unit:mm)

■SMD-8L (Reel)

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

Qty/ctn : 10000 pcs.

Schematic: (unit:mm)



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