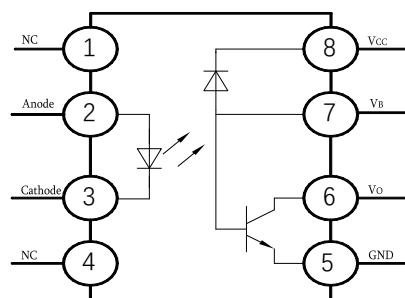


Features

- Very high speed: 1 MBit/s
- High isolation voltage between input and output ($V_{iso} = 5000V_{rms}$)
- Operating Temperature: $-40^{\circ}C \sim 100^{\circ}C$
- Open-Collector Output

HF

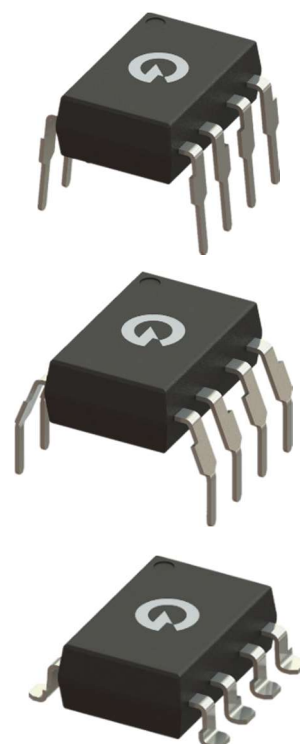


Applications

- Output interface to CMOS-LSTTL-TTL
- Telecommunication equipment
- Power transistor isolation in motor drives
- Replacement for low speed phototransistor photo couplers

Mechanical Data

- Case: SMD-8L、DIP-8L (M) 、DIP-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 6N13X (M) (G) (X) - (U) (N) (Y)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

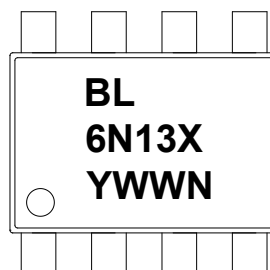
- ① Brand(BL)
- ② Product series(6N135, 6N136)
- ③ Package type(DIP-8L:None, DIP-8L(M):M, SMD-8L:S)
- ④ Halogen option(None :Halogen free)
- ⑤ CTR Bank(None)
- ⑥ Lead frame (None: Copper)
- ⑦ Customer option 1 (0-9 or A-Z or none)
- ⑧ Customer option 2 (0-9 or A-Z or none)

Part Number	Package	Shipping Quantity	Marking Code
BL6N13X*1	DIP-8L	45 pcs / Tube	BL6N13X*1
BL6N13X*1M	DIP-8L(M)	45 pcs / Tube	BL6N13X*1
BL6N13X*1S	SMD-8L	1000 pcs / Tape & Reel	BL6N13X*1

Notes 1: X denotes product series: 5, 6

Marking Information

- "BL" denotes brand
- "6N13X" denotes product series: 6N135, 6N136.
- "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	DC/Average forward input current	$I_F(\text{avg})$	25	mA
	Peak forward input current (50% duty cycle, 1 ms p.w.)	$I_F(\text{pk})$	50	mA
	Reverse Voltage	V_R	5	V
	Peak transient input current	$I_{F(\text{trans})}$	1	A
	Power Dissipation	P_I	45	mW
Output	Supply Voltage	V_{CC}	-0.5~30	V
	Output Current	I_O	8	mA
	Peak output current	$I_{O(\text{pk})}$	16	mA
	Output power dissipation	P_O	100	mW
	Output Voltage	V_O	-0.5~20	V
	Emitter-base reverse voltage	V_{EBR}	5	V
	Base current	I_B	5	mA

Thermal Characteristics

Parameter	Symbol	Value	Unit
Isolation Voltage *2	V_{ISO}	5000	Vrms
Operating Temperature	T_{OPR}	-40 ~ +100	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +125	$^\circ\text{C}$
Soldering Temperature *3	T_{SOL}	260	$^\circ\text{C}$

Notes:

1. Pulse width $\leq 1\mu\text{s}$, 300 pps
2. 40 to 60% RH, AC for 1 minute
3. 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	$I_F = 16\text{mA}$	-	1.45	1.7	V
	Reverse Breakdown Voltage	BV_R	$I_R = 10\mu\text{A}$	5	20	-	V
	Diode Temperature Coefficient	$\Delta V_F / \Delta T_A$	$I_F = 16\text{mA}$	-	-1.6	-	mV/ $^\circ\text{C}$
Output	High Level Supply Current	I_{CCH}	$V_{CC} = 15\text{V}, I_F = 0\text{mA}$ $V_O = \text{Open}$	-	-	1	μA
			$T_A = 0 \sim 70^\circ\text{C}$	-	-	2	μA
	Low Level Supply Current	I_{CCL}	$V_{CC} = 15\text{V}, I_F = 16\text{mA}$, $V_O = \text{Open}$	-	50	200	μA
Transfer Characteristics	High Level Output Current	I_{OH}	$V_{CC} = 5.5\text{V}, V_O = 5.5\text{V}$ $I_F = 0\text{mA}$	-	0.001	0.5	μA
			$V_{CC} = 15\text{V}, V_O = 15\text{V}$ $I_F = 0\text{mA}$	-	0.005	1	
			$V_{CC} = 15\text{V}, V_O = 15\text{V}$ $T_A = 0 \sim 70^\circ\text{C}$	-	-	50	
	Low Level Output Voltage	V_{OL}	6N135 $V_{CC} = 4.5\text{V}, I_F = 16\text{mA}$ $I_O = 1.1\text{mA}$	-	0.1	0.4	V
			6N136 $V_{CC} = 4.5\text{V}, I_F = 16\text{mA}$ $I_O = 3\text{mA}$	-	0.1	0.4	V
	Current Transfer ratio	CTR	6N135 $V_{CC} = 4.5\text{V}, I_F = 16\text{mA}$	7	18	50	%
			6N136 $V_O = 0.4\text{V}$	19	24	50	
	Isolation Voltage	V_{ISO}	$R_H < 50\%$, $T_A = 25^\circ\text{C}$, $I_{I-O} \leq 50\mu\text{A}$	5000	-	-	V_{RMS}
	Isolation Resistance	R_{IO}	$V_{IO} = 500\text{V}$	-	1×10^{12}	-	Ω
	Floating Capacitance	C_{IO}	$f = 1\text{MHz}$	-	0.6	-	pF

Switching Characteristics (@ $T_A = -40^{\circ}\text{C} \sim 85^{\circ}\text{C}$, $V_{CC} = 5\text{V}$, $I_F = 7.5\text{mA}$, unless otherwise specified)

Parameter	Symbol		Test Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to Output HIGH Level	T_{PLH}	6N135	$I_F = 16\text{mA}$, $R_L = 4.1\text{K}\Omega$	-	1300	1500	ns
		6N136	$I_F = 16\text{mA}$, $R_L = 1.9\text{K}\Omega$	-	600	800	
Propagation Delay Time to Output Low Level	T_{PHL}	6N135	$I_F = 16\text{mA}$, $R_L = 4.1\text{K}\Omega$	-	200	1500	ns
		6N136	$I_F = 16\text{mA}$, $R_L = 1.9\text{K}\Omega$	-	200	800	
Common Mode Transient Immunity (at Output HIGH Level)	$ CM_H $	6N135	$R_L = 4.1\text{K}\Omega$	1000	-	-	$\text{V}/\mu\text{s}$
		6N136	$R_L = 1.9\text{K}\Omega$				
Common Mode Transient Immunity (at Output LOW Level)	$ CM_L $	6N135	$R_L = 4.1\text{K}\Omega$	1000	-	-	$\text{V}/\mu\text{s}$
		6N136	$R_L = 1.9\text{K}\Omega$				

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

Fig.1 Normalized CTR vs. Input current

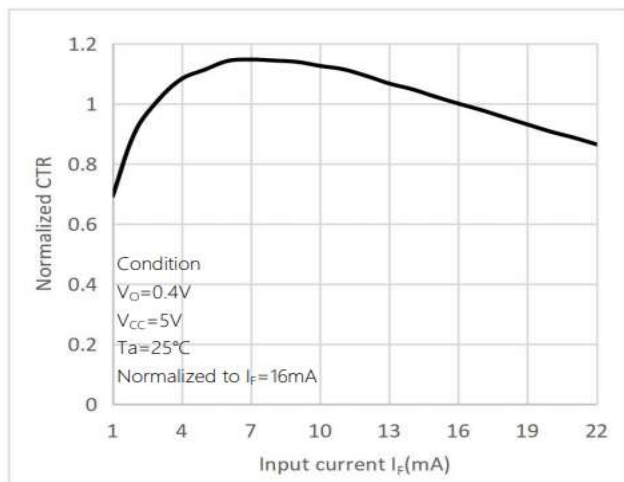


Fig.2 Normalized CTR vs. Ambient temperature

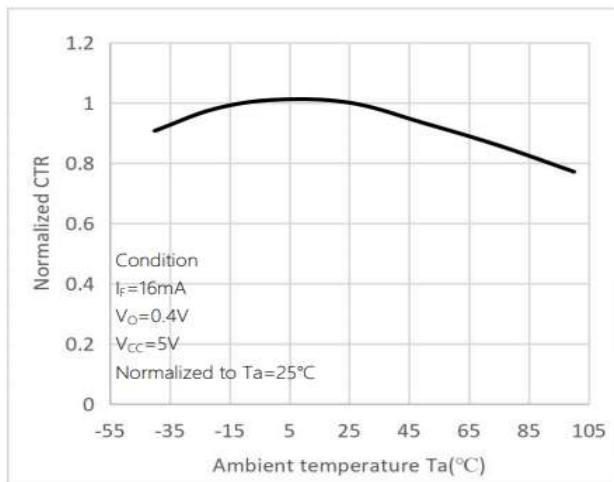


Fig.3 Output current vs. Output voltage

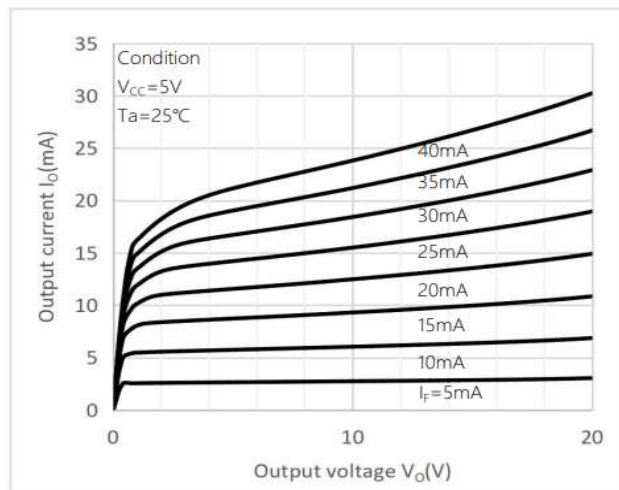


Fig.4 High level output voltage vs. Ambient temperature

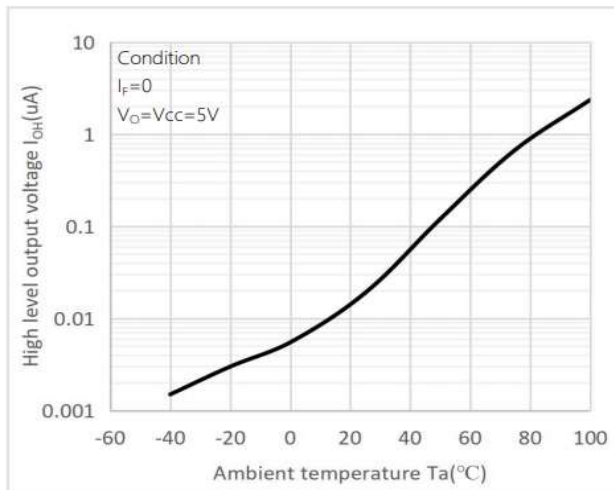


Fig.5 Propagation Delay Time vs. Ambient temperature

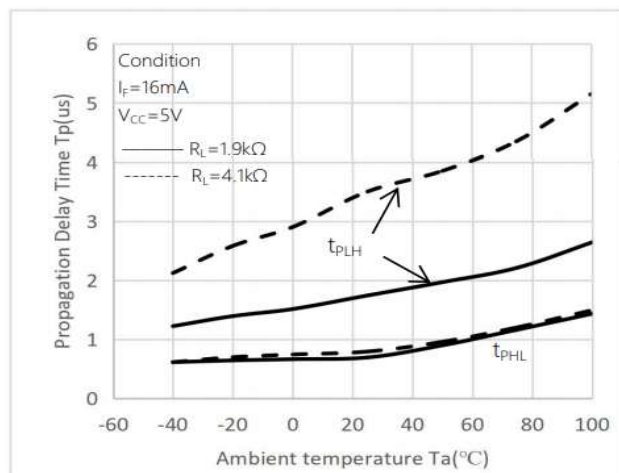


Fig.6 Propagation Delay Time vs. Load resistance

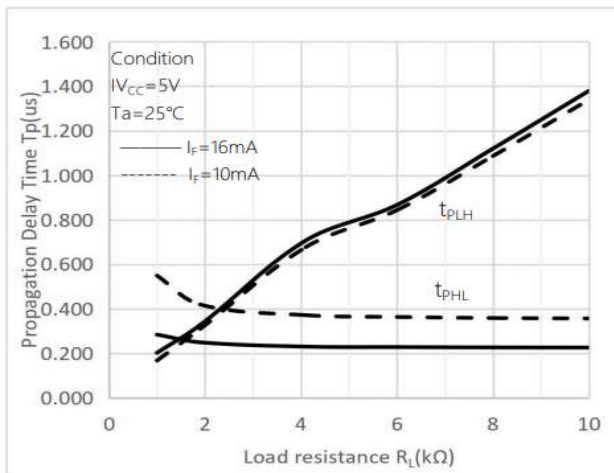


Fig.7 Switching Time Test Circuit

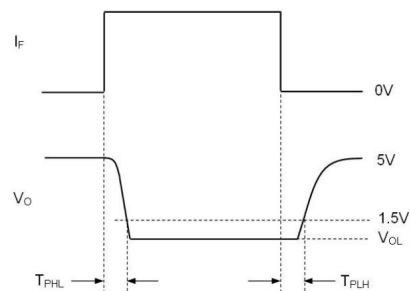
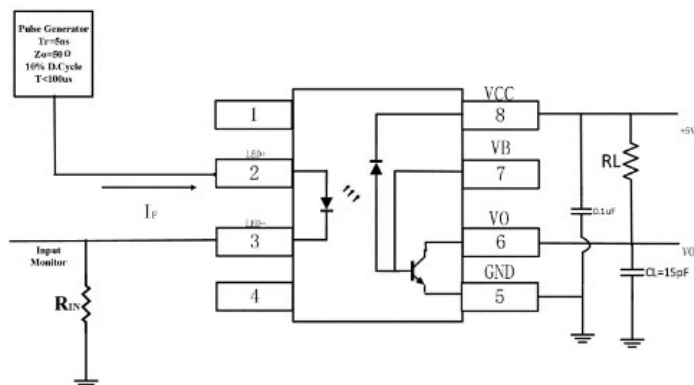
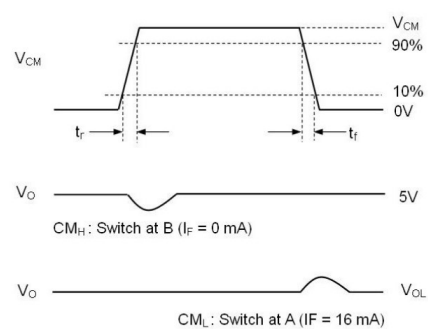
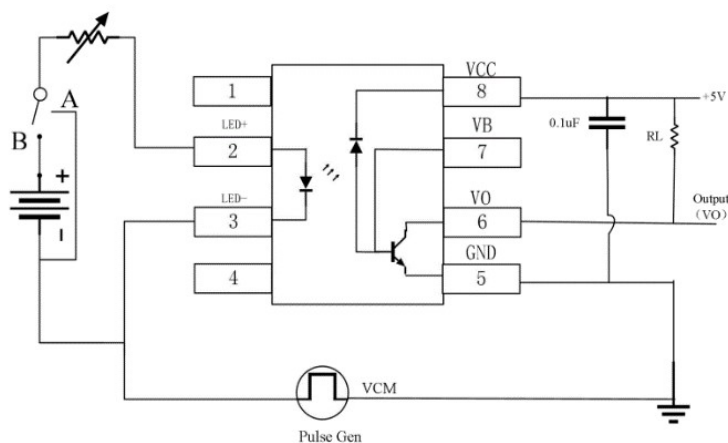
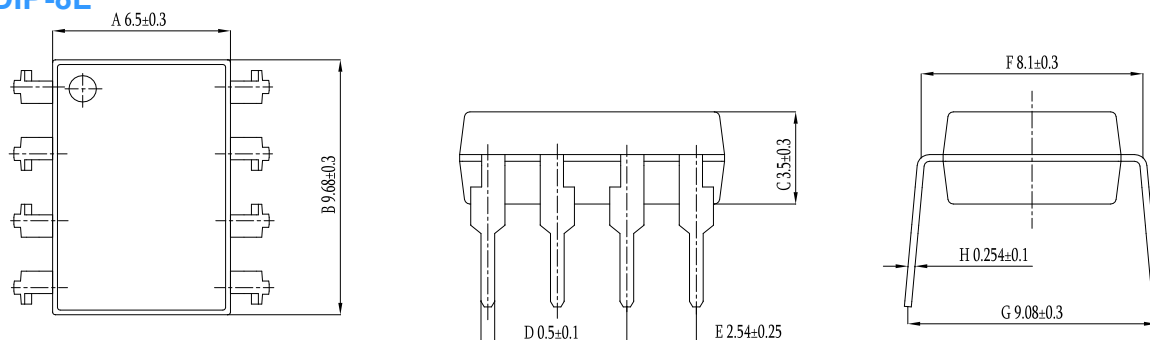


Fig.8 Test Circuit for Common Mode Transient Immunity

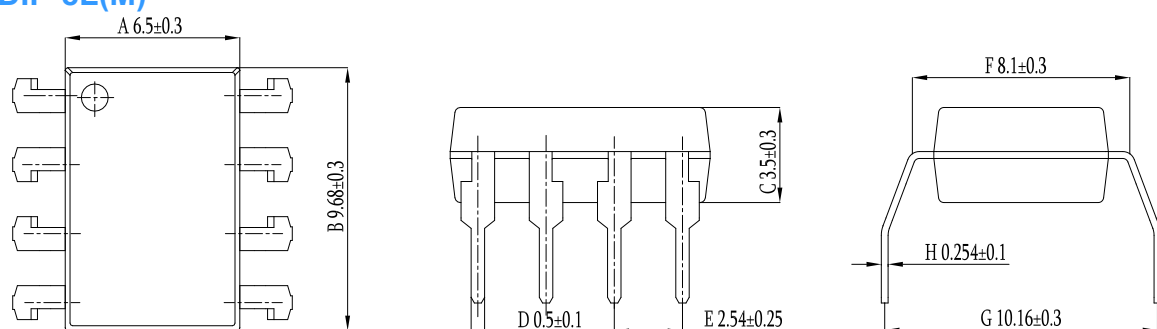


Package Outline Dimensions (unit: mm)

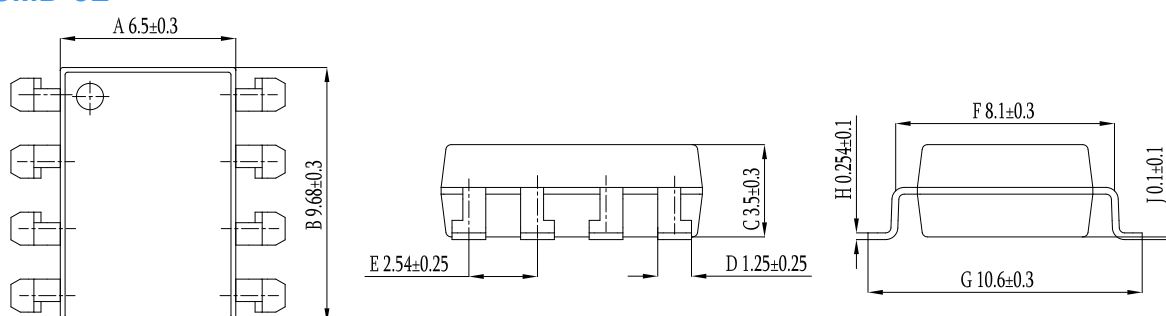
DIP-8L



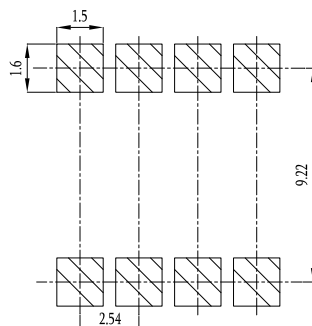
DIP-8L(M)



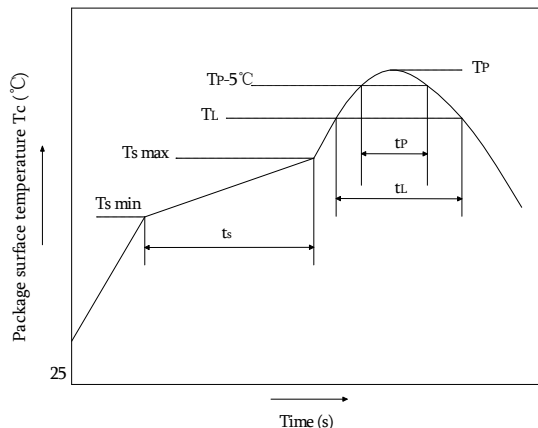
SMD-8L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

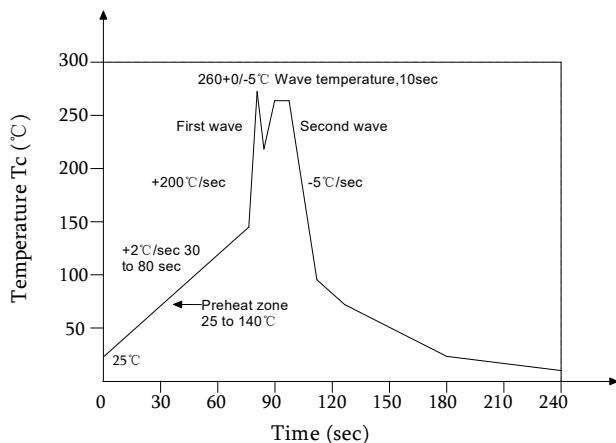


	Symbol	Min	Max	Unit
Preheat temperature	T_s	150	200	°C
Preheat time	t_s	60	120	s
Ramp-up rate(T_L to T_P)			3	°C/s
Liquidus temperature	T_L	217		°C
Time above T_L	t_L	60	150	s
Peak temperature	T_P		260	°C
Time during which T_c is between ($T_P - 5$) and T_P	t_p		30	s
Ramp-down rate(T_P to T_L)			6	°C/s

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

- 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(ϕ 330mm)	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.

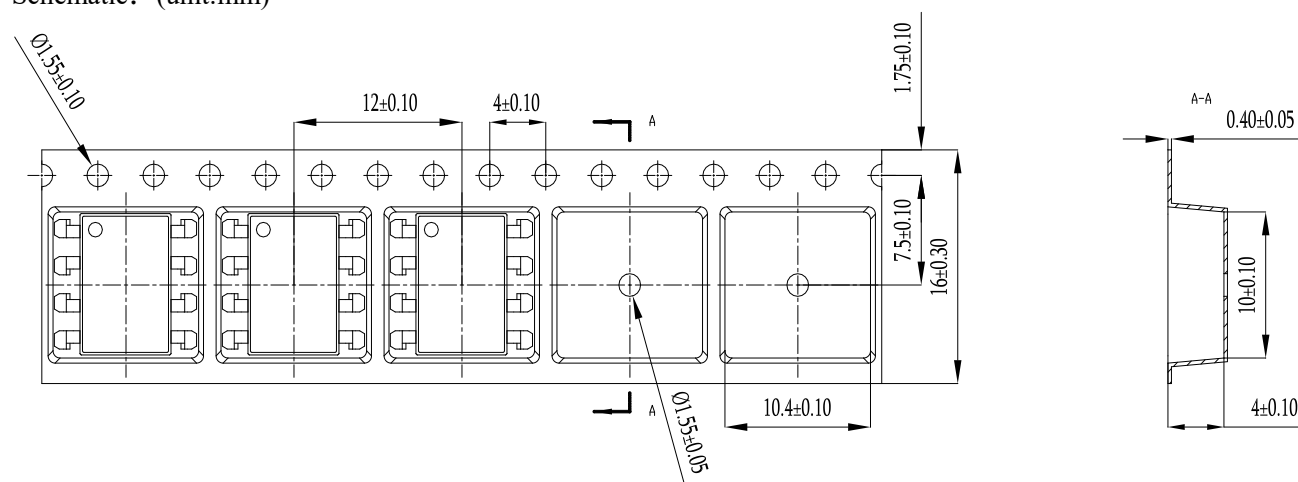
Schematic: (unit:mm)

■SMD-8L (Reel)

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

Qty/ctn : 10000 pcs.

Schematic: (unit:mm)



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