

Features

- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output (Viso = 5000V rms)
- Collector - emitter breakdown voltage $BV_{CEO} \geq 80\text{V}$
- Operating Temperature: $-55^\circ\text{C} \sim 110^\circ\text{C}$
- VDE approved
- UL approved
- CQC approved

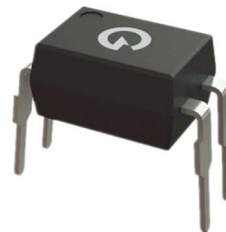
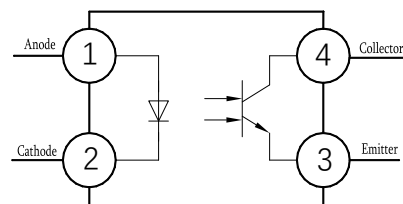
HF

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as Fan Heaters, etc
- Signal transmission between circuits of different potentials and impedances

Mechanical Data

- Case: DIP-4L, DIP-4L(M), SMD-4L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Ordering Information

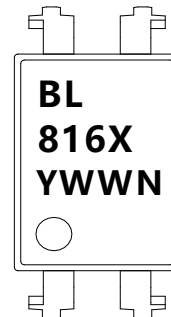
BL 816 (M) (G) (X) - (U) (N) (Y)

- ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
- ① Brand(BL)
② Product series(816)
③ Package type(DIP-4L:None, DIP-4L(M):M,SMD-4L:S)
④ Halogen option(None :Halogen free)
⑤ CTR Bank(A,B,C,D ...or None)
⑥ Lead frame (None: Copper; F:Iron)
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
BL816A	DIP-4L	100 pcs / Tube	BL816A
BL816MA	DIP-4L(M)	100 pcs / Tube	BL816A
BL816SA	SMD-4L	2000 pcs / Tape & Reel	BL816A

Marking Information

- "BL" denotes brand
- "X" denotes CTR Rank : A, B, C, D ...None.
- "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	50	mA
	Peak Forward Current *1	I _{FM}	1	A
	Reverse Voltage	V _R	6	V
	Power Dissipation	P _D	70	mW
Output	Collector Power Dissipation	P _C	150	mW
	Collector Current	I _C	50	mA
	Collector-Emitter Voltage	V _{CEO}	80	V
	Emitter-Collector Voltage	V _{ECO}	7	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Total Power Dissipation	P_{TOT}	200	mW
Isolation Voltage ^{*2}	V_{ISO}	5000	V _{rms}
Rated Impulse Isolation Voltage	V_{IOTM}	6000	V
Rated Repetitive Peak Isolation Voltage	V_{IORM}	630	V
Thermal Resistance Junction-to-Air	$R_{\theta JA}$	430	°C/W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	350	°C/W
Thermal Resistance Junction-to-Lead	$R_{\theta JL}$	368	°C/W
Operating Temperature	T_{OPR}	-55 ~ +110	°C
Storage Temperature Range	T_{STG}	-55 ~ +125	°C
Soldering Temperature ^{*3}	T_{SOL}	260	°C

Notes:

1. Pulse width $\leq 1\mu s$, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute
3. For 10 seconds

Electrical Characteristics (@ $T_A = 25^\circ C$ unless otherwise specified)

Parameter		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F = 20mA$	-	1.2	1.4	V
	Peak Forward Voltage	V_{FM}	$I_{FM} = 0.5A$	-	-	3.0	V
	Reverse Current	I_R	$V_R = 4V$	-	-	10	μA
	Input Capacitance	C_{in}	$V_R = 0V, f = 1kHz$	-	30	250	pF
Output	Collector-Emitter Dark Current	I_{CEO}	$V_{CE} = 20V, I_F = 0$	-	-	100	nA
	Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 0.1mA, I_F = 0$	80	-	-	V
	Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E = 10\mu A, I_F = 0$	7	-	-	V
Transfer Characteristics	Collector Current	I_C	$I_F = 5mA, V_{CE} = 5V$	2.5	-	30	mA
	Current Transfer Ratio	CTR	$I_F = 5mA, V_{CE} = 5V$	50	-	600	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20mA, I_C = 1mA$	-	0.1	0.4	V
	Isolation Resistance	R_{IO}	$V_{IO} = 500Vdc$ 40~60% R.H.	1×10^{12}	-	-	Ω
	Isolation current	R_{isc}	DC6000V, 40~60% R.H.	-	-	2	μA
	Floating Capacitance	C_{IO}	$V_{IO} = 0, f = 1MHz$	-	0.6	1.0	pF

	Cut-off frequency	f_c	$V_{CE} = 5V, I_C = 2mA$ $R_L = 100\Omega, -3dB$	-	80	-	kHz
	Turn On Time	T_{on}	$V_{CE} = 2V, R_L = 100\Omega$ $I_C = 2mA$	-	4	12	μs
	Turn Off Time	T_{off}		-	3	12	

Rank Table of Current Transfer Ratio CTR

Rank Mark	Min. (%)	Max. (%)	Condition
L	50	100	$I_F = 5mA, V_{CE} = 5V$
A	80	160	
B	130	260	
C	200	400	
D	300	600	
X	100	200	
Y	150	300	
No mark	50	600	

Rank Mark	Min. (%)	Max. (%)	Condition
I	50	100	$I_F = 10mA, V_{CE} = 5V$
	22	-	$I_F = 1mA, V_{CE} = 5V$
J	80	160	$I_F = 10mA, V_{CE} = 5V$
	34	-	$I_F = 1mA, V_{CE} = 5V$
K	130	260	$I_F = 10mA, V_{CE} = 5V$
	56	-	$I_F = 1mA, V_{CE} = 5V$
D1	300	450	$I_F = 5mA, V_{CE} = 5V$
	200	500	$I_F = 2mA, V_{CE} = 5V$
D2	380	600	$I_F = 5mA, V_{CE} = 5V$
	250	500	$I_F = 2mA, V_{CE} = 5V$

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

Fig.1 Allowable Forward Current vs. Ambient Temperature

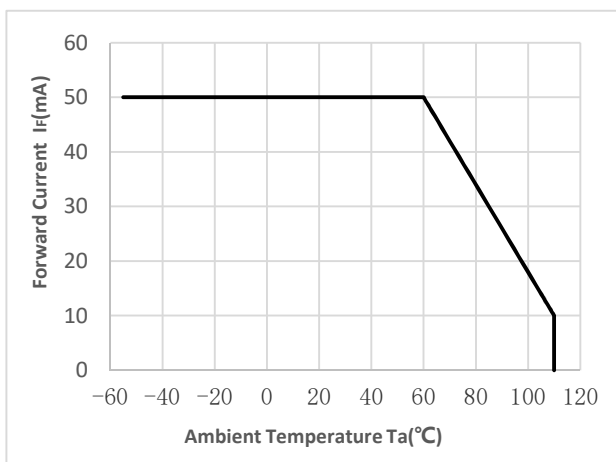


Fig.2 Allowable collector power dissipation vs. Ambient Temperature ($^\circ\text{C}$)

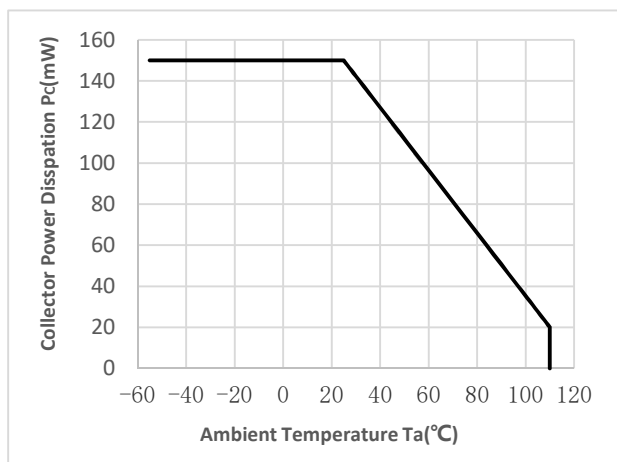


Fig.3 Relative Current Transfer Ratio vs. Forward Current

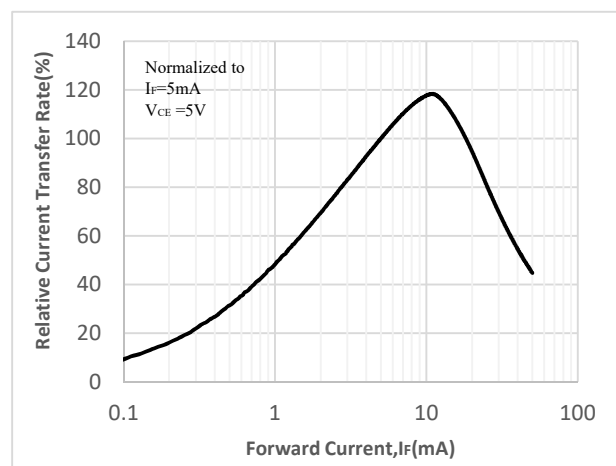


Fig.4 Forward Current vs. Forward Voltage

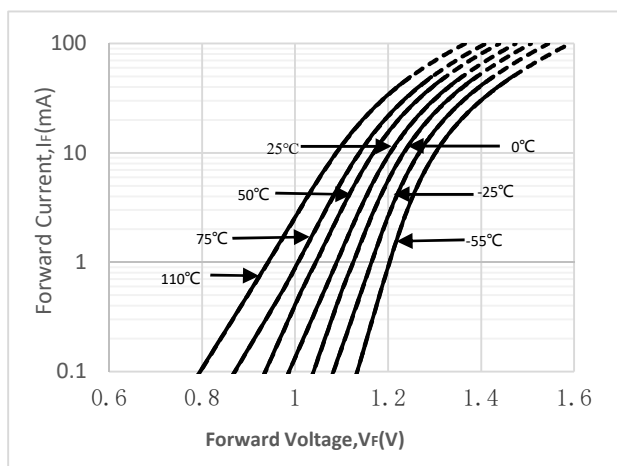


Fig.5 Collector Current vs. Collector-emitter Voltage

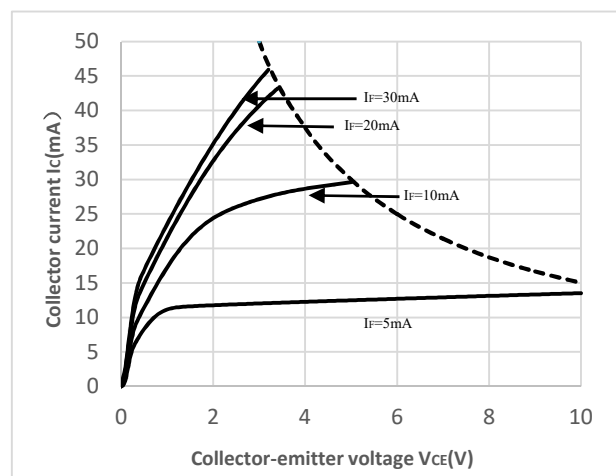


Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature

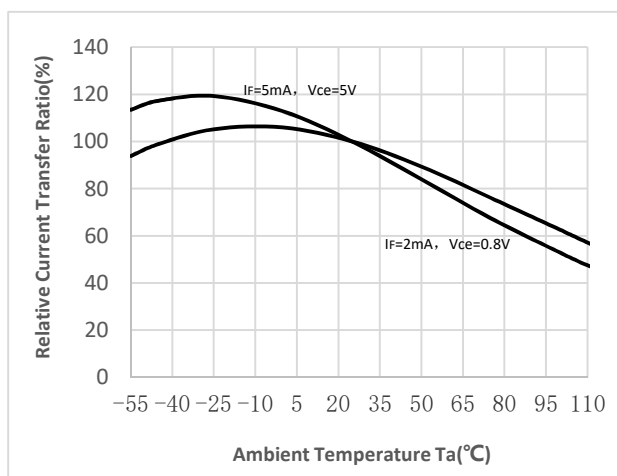


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

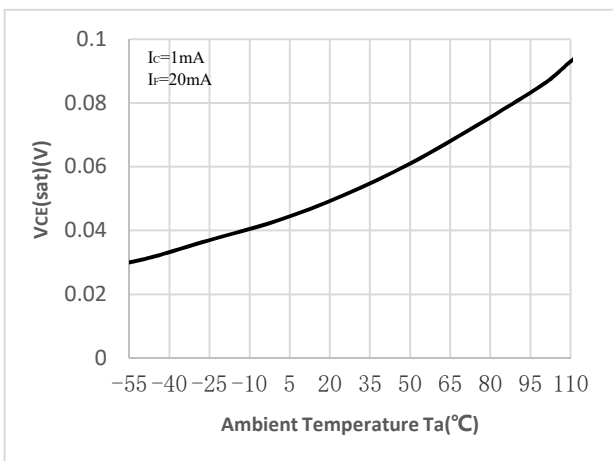


Fig.8 Collector Dark Current vs. Ambient Temperature

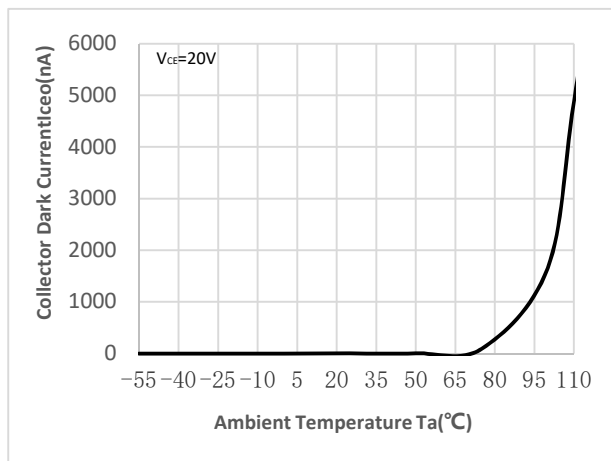


Fig.9 Response Time vs. Load Resistance

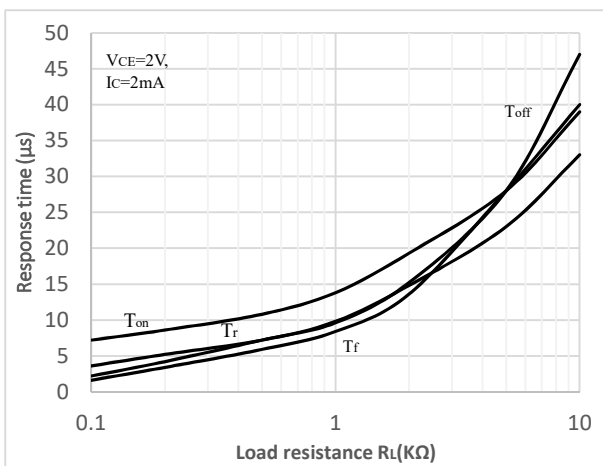


Fig.10 Frequency Response

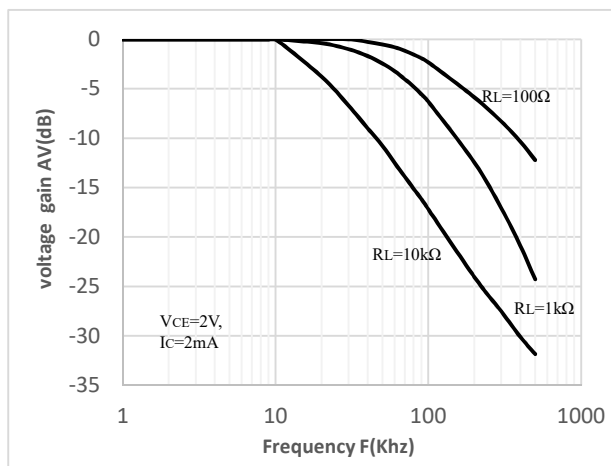


Fig.11 Collector-emitter Saturation Voltage vs. Forward Current

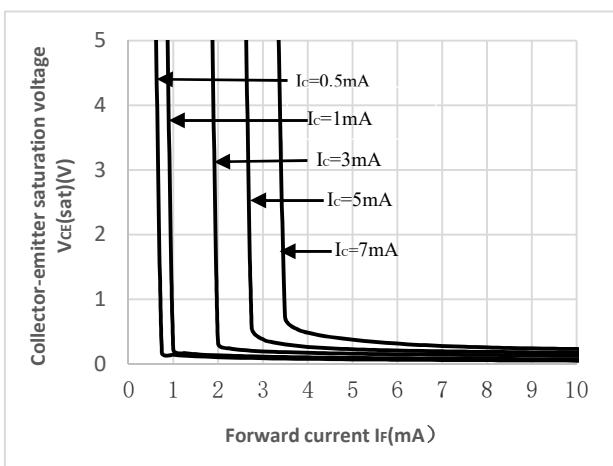
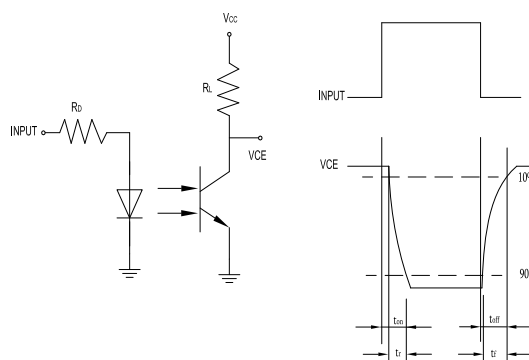
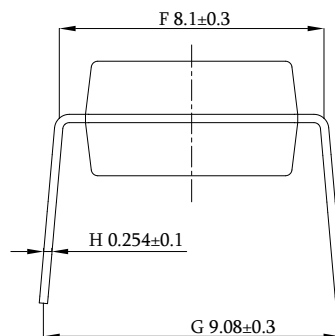
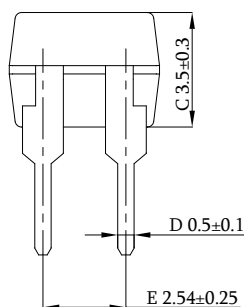
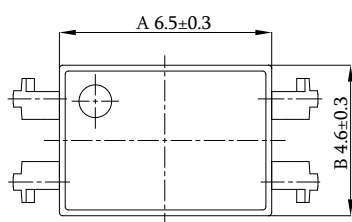


Fig.12 Switching Time Test Circuit & Waveforms

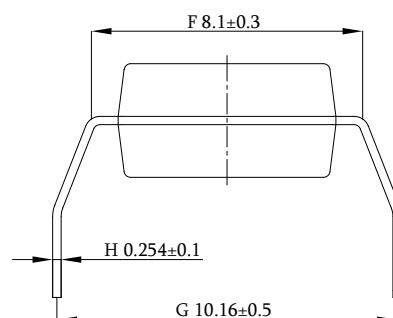
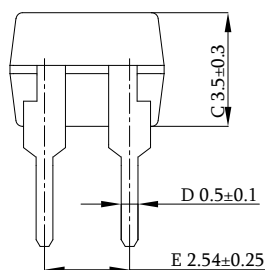
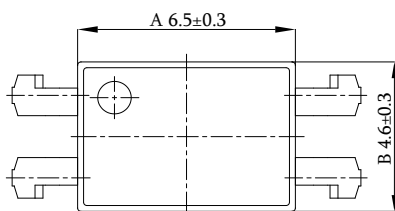


Package Outline Dimensions (unit: mm)

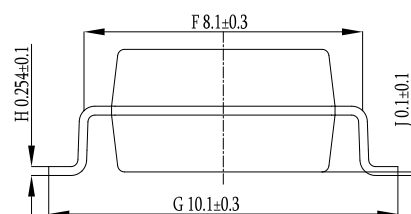
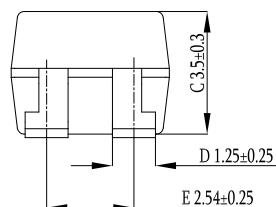
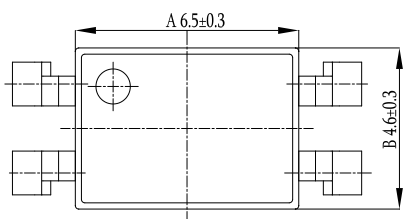
DIP-4L



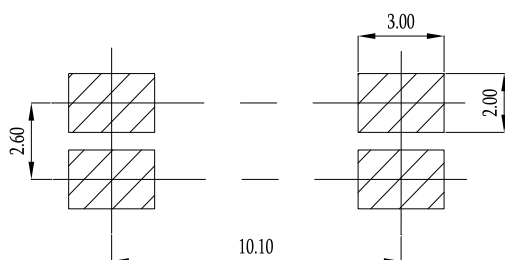
DIP-4L (M)



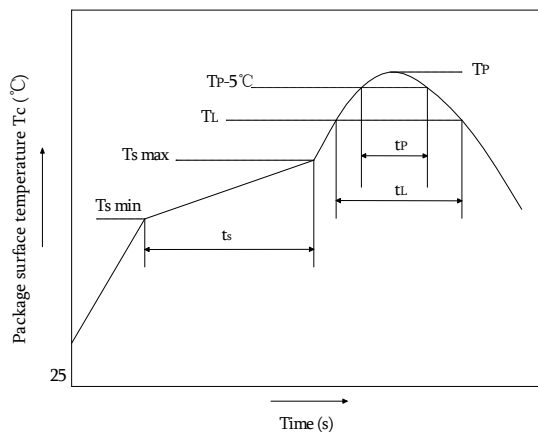
SMD-4L



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

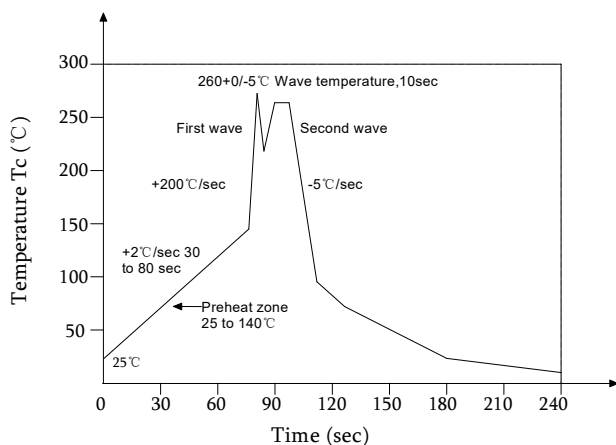


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(T _L to T _P)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _P		260	°C
Time during which T _c is between (T _P -5) and T _P	t _p		30	s
Ramp-down rate(T _P to T _L)			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-4L	Tube(500mm)	100 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP-4L(M)	Tube(500mm)	100 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Seagull foot (M foot) tube
SMD-4L	Reel($\phi 330$ mm)	2000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

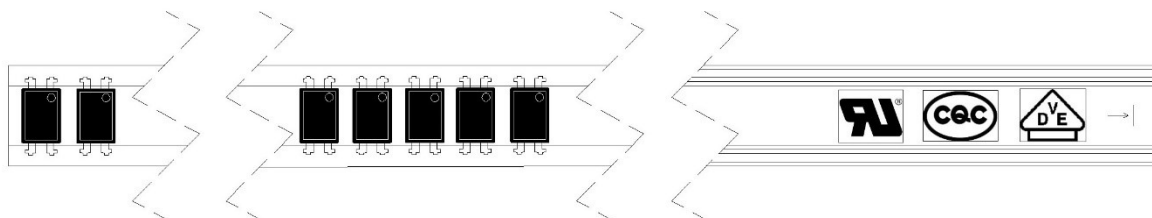
■ Summary table

■ DIP-4L/ DIP-4L(M) (Tube)

Qty/ tube : 100 pcs. Qty/box: 2500 pcs.

Qty/ctn : 30000 pcs.

Schematic: (unit:mm)

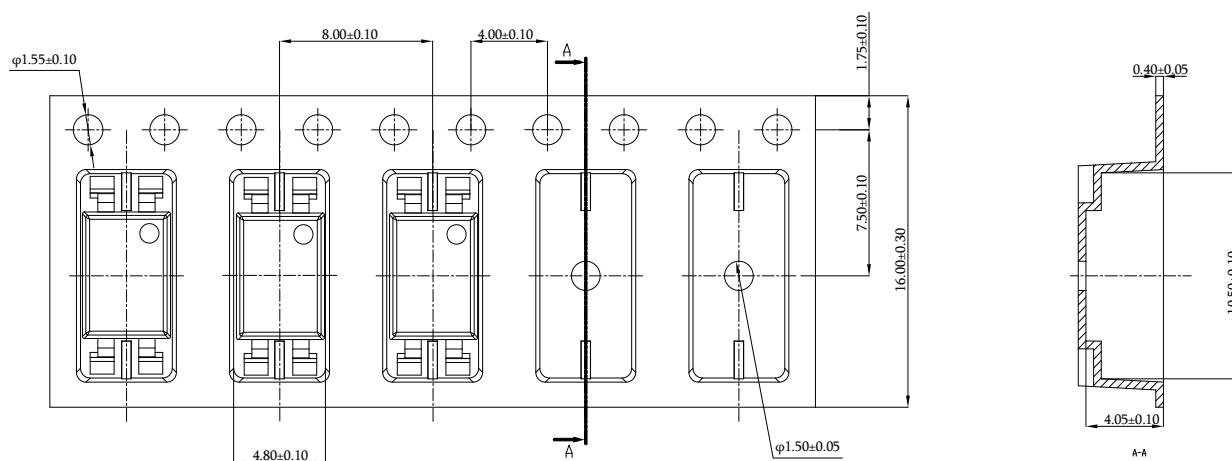


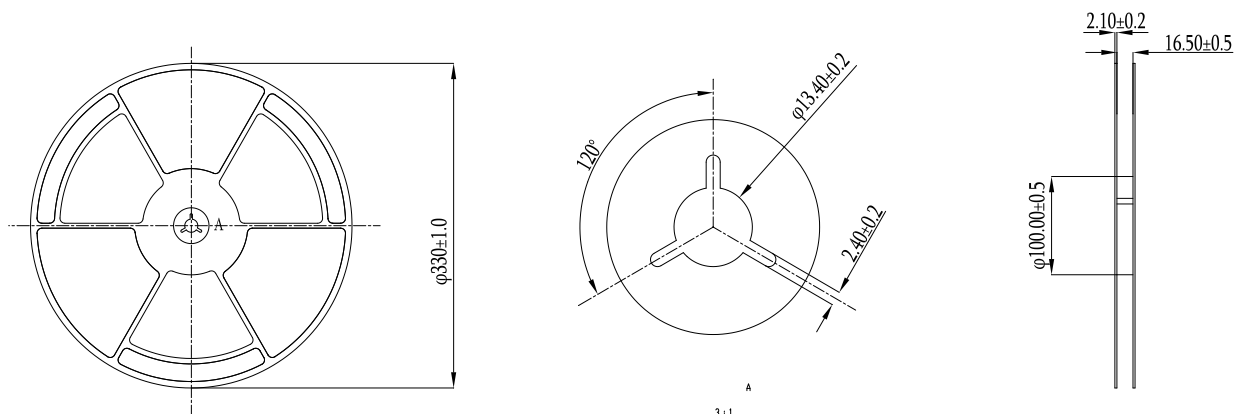
■ SMD-4L (Reel)

Qty/reel: 2000 pcs. Qty/box: 4000 pcs.

Qty/ctn : 20000 pcs.

Schematic: (unit:mm)





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