

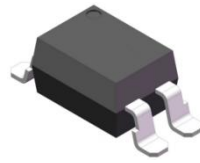
Product packaging logic diagram



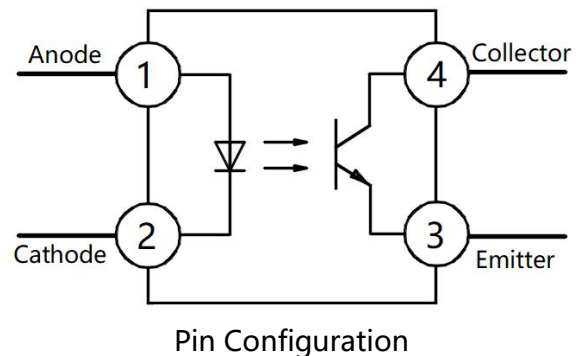
DIP4



DIP4-M



SMD4



Features

- Current transfer ratio
(CTR: 200~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output ($V_{iso} = 5000\text{V}_{rms}$)
- Collector - emitter breakdown voltage $BV_{CEO} \geq 80\text{V}$
- Operating Temperature: $-55^\circ\text{C} \sim 100^\circ\text{C}$
- Environmentally friendly products, compliant with CQC, UL, and VDE requirements

Mechanical Data

- Case: DIP4、DIP4-M、SMD4
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solder ability-per MIL-STD-202, Method 208

Applications

- Industrial automation equipment (PLC module, sensor interface)
- Measurement instrument signal isolation
- Design and application of smart meters and switching power supplies
- Photo voltaic inverters, energy storage system applications
- Main control circuit for household appliances (air conditioning, refrigerator, water heater);



Ordering Information

XL 816 (M) (G) (X) - (U) (N) (Y)
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Brand (XL)
- ② Product series (816)
- ③ Package type(None: (DIP4、DIP4-M、SMD4)
- ④ Halogen option(None : Halogen free)
- ⑤ CTR Bank(C,D or 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
XL816X	DIP4	100pcs / Tube	XL816X
XL816MX	DIP4-M	100pcs / Tube	XL816X
XL816SX	SMD4	2000pcs / Tape & Reel	XL816X

Notes 1: X denotes CTR Rank : A, B or None.

Marking Information

- " XL" denotes brand.
- " 816" denotes Product series.
- " X" denotes CTR Rank : 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	IF	50	mA
	Peak Forward Current *1	IFM	1	A
	Reverse Voltage	VR	6	V
	Power Dissipation	PD	70	mW
Output	Collector Power Dissipation	PC	150	mW
	Collector Current	IC	50	mA
	Collector-Emitter Voltage	VCEO	80	V
	Emitter-Collector Voltage	VECO	7	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Total Power Dissipation	PTOT	200	mW
Isolation Voltage *2	VISO	5000	V _{rms}
Rated Impulse Isolation Voltage	VIOTM	6000	V
Rated Repetitive Peak Isolation Voltage	VIORM	630	V
Thermal Resistance Junction-to-Air	R _{θJA}	430	°C/W
Thermal Resistance Junction-to-Case	R _{θJC}	350	°C/W
Thermal Resistance Junction-to-Lead	R _{θJL}	368	°C/W
Operating Temperature	TOPR	-55 ~ +110	°C
Storage Temperature Range	TSTG	-55 ~ +125	°C
Soldering Temperature *3	TSOL	260	°C

Notes:

1. Pulse width ≤ 1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute
3. 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
	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 = 10μA, 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 = 5 mA, V _{CE} = 5V	200	-	600	%
	Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _F = 20mA, I _C = 1mA	-	0.1	0.2	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 =100Ω, -3dB	-	80	-	kHz
	Turn On Time	T _{on}	V _{CE} =2V, R _L = 100Ω	-	4	18	μs
Turn Off Time	T _{off}	I _C =2mA	-	3	18		

Rank Table of Current Transfer Ratio CTR

Rank Mark	Min. (%)	Max. (%)	Condition
C	200	400	I _F = 5 mA, V _{CE} = 5V
D	300	600	

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

Fig.1 Allowable Forward Current vs. Ambient Temperature

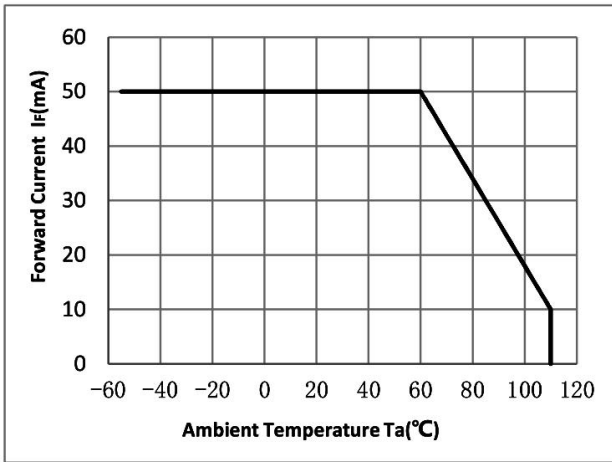


Fig.2 Allowable collector power dissipation vs. Ambient Temperature (°C)

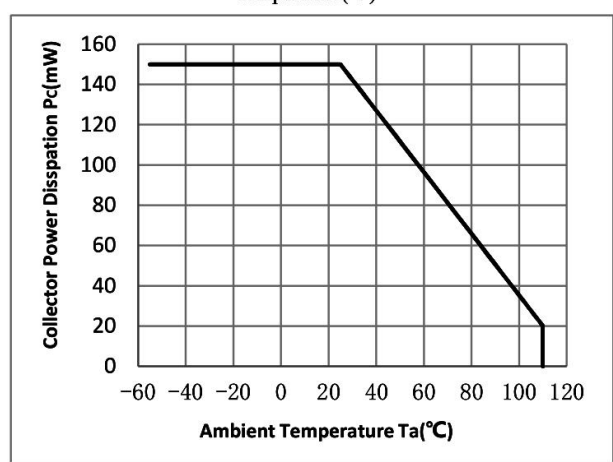


Fig.3 Relative Current Transfer Ratio vs. Forward Current

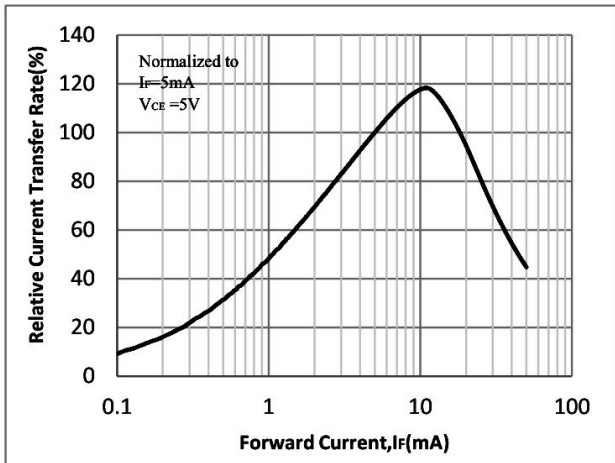


Fig.4 Forward Current vs. Forward Voltage

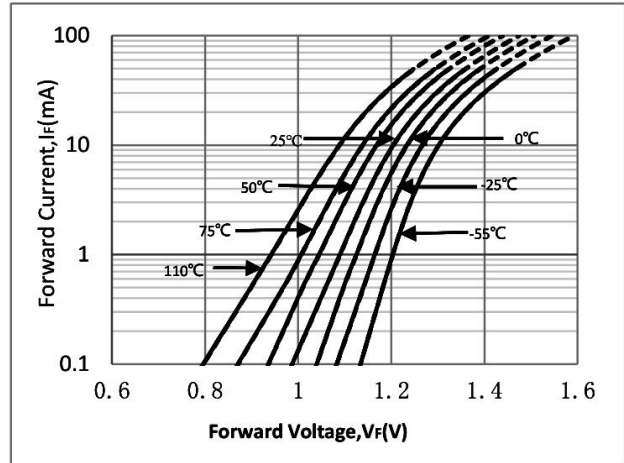


Fig.5 Collector Current vs. Collector-emitter Voltage

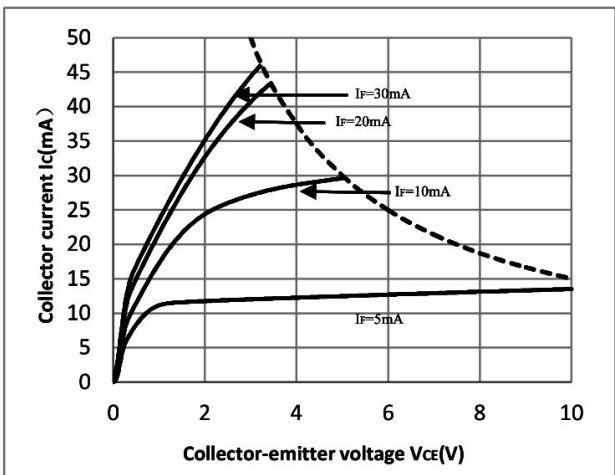
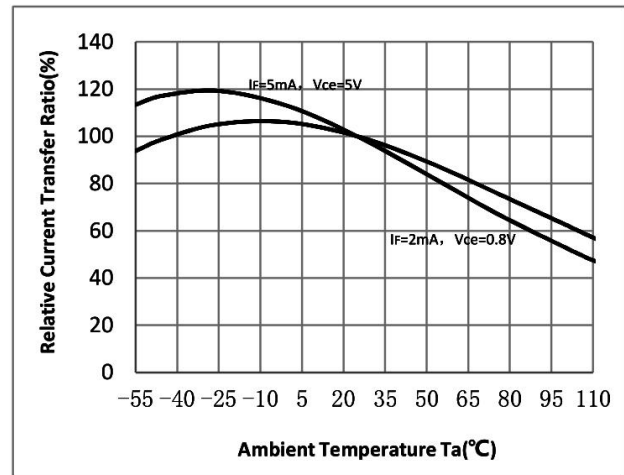


Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature



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

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

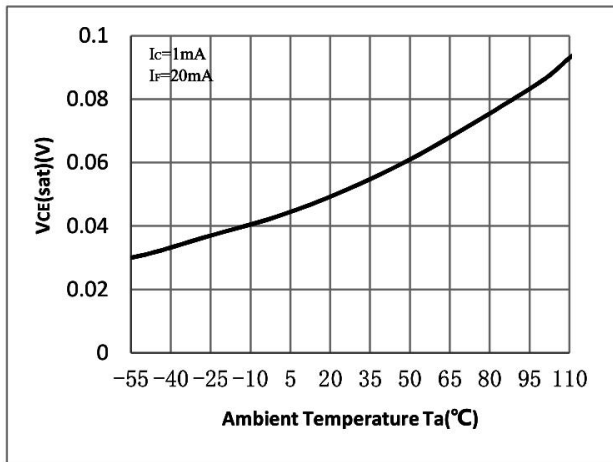


Fig.8 Collector Dark Current vs. Ambient Temperature

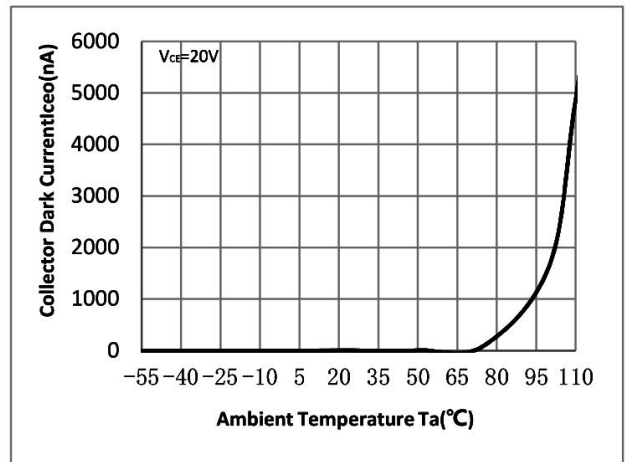


Fig.9 Response Time vs. Load Resistance

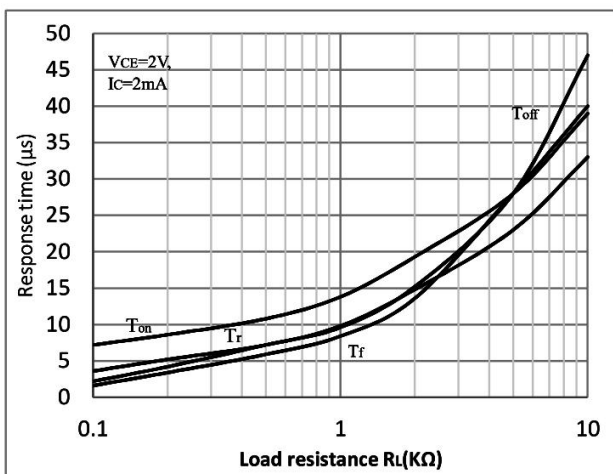


Fig.10 Frequency Response

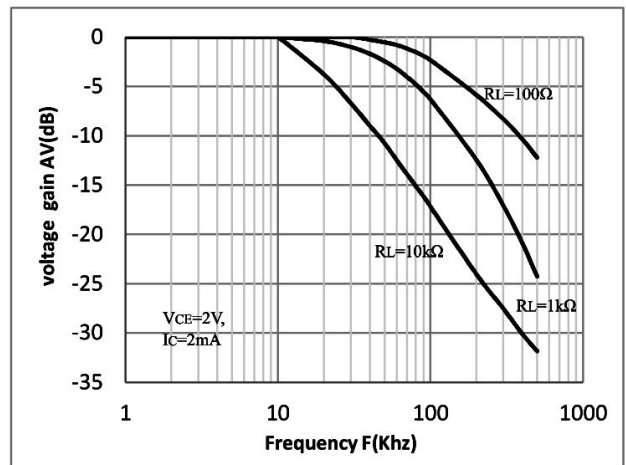


Fig.11 Collector-emitter Saturation Voltage vs. Forward Current

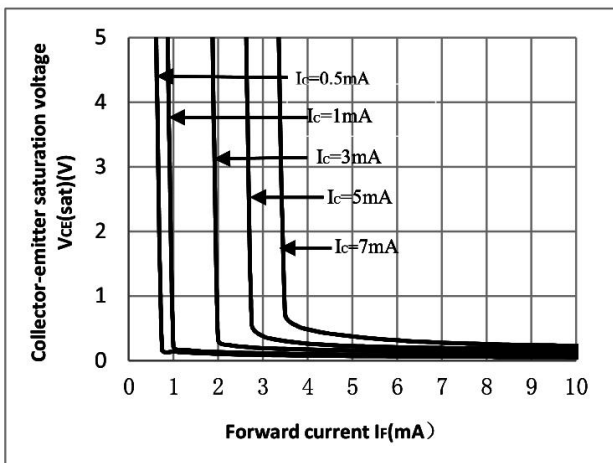
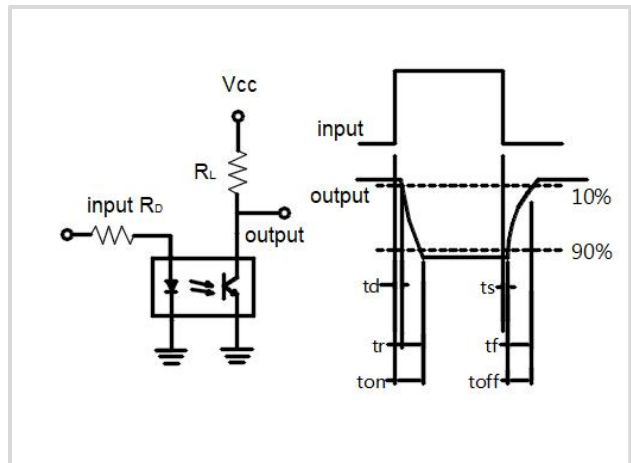
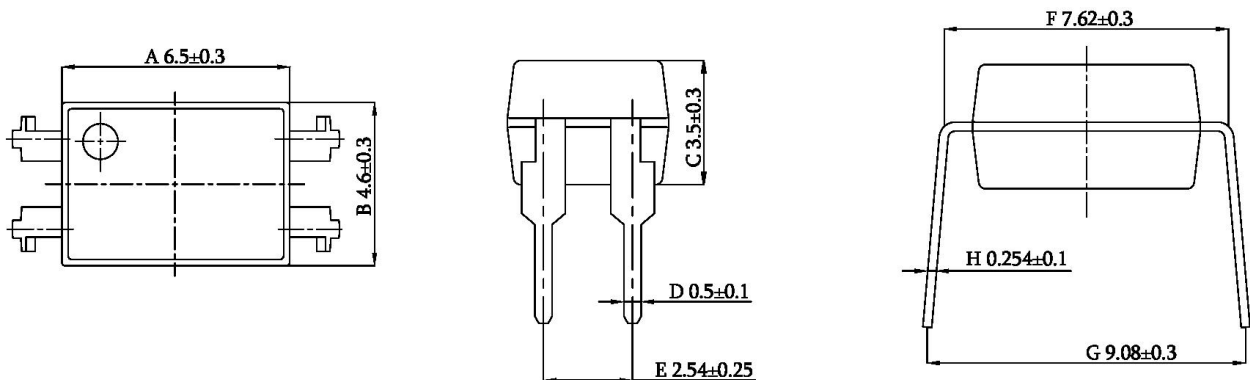


Fig.12 Switching Time Test Circuit & Waveforms

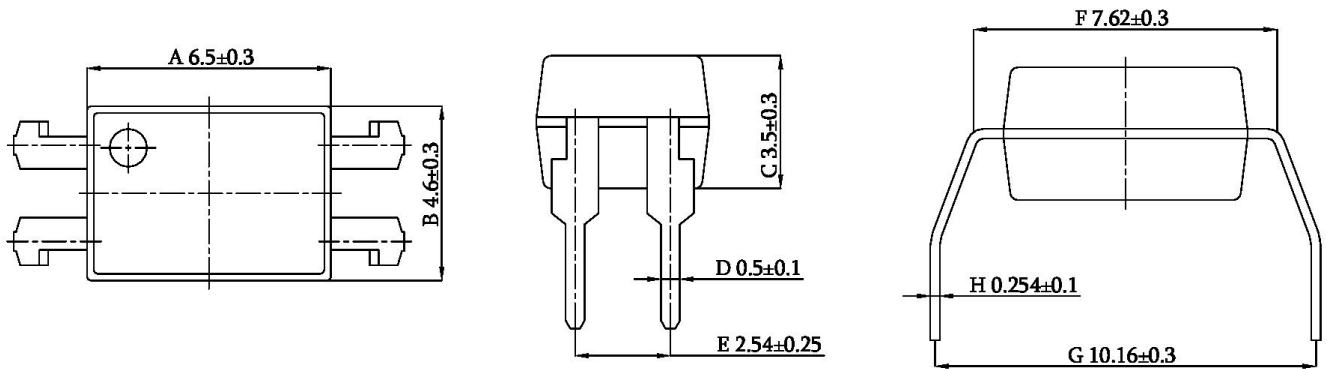


Package Outline Dimensions (unit: mm)

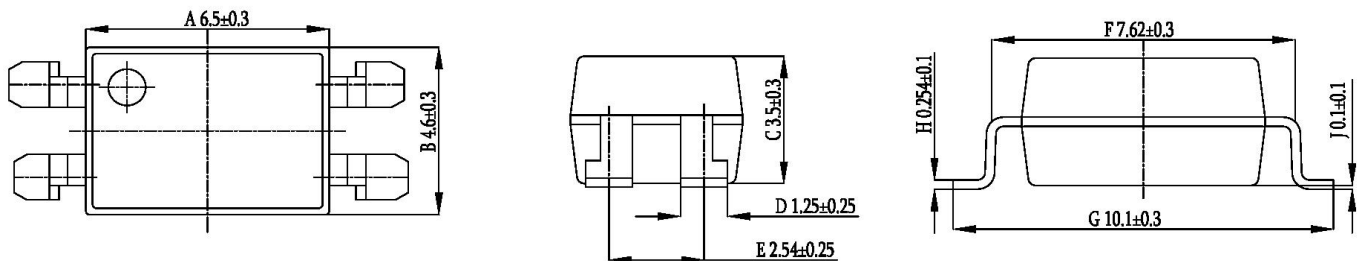
DIP4



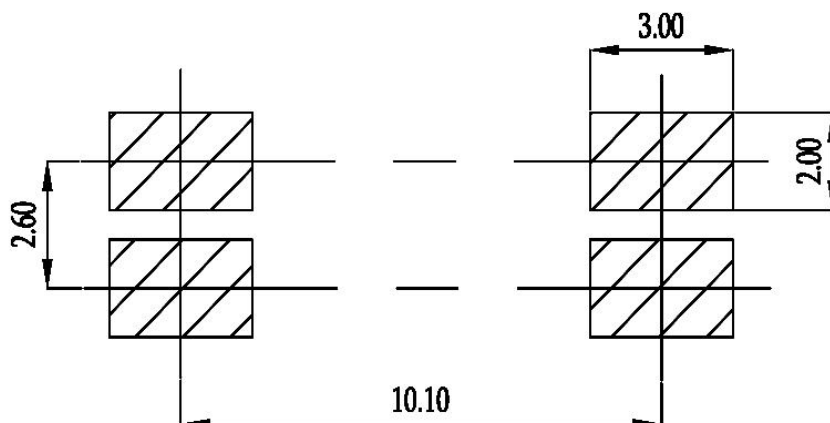
DIP4-M



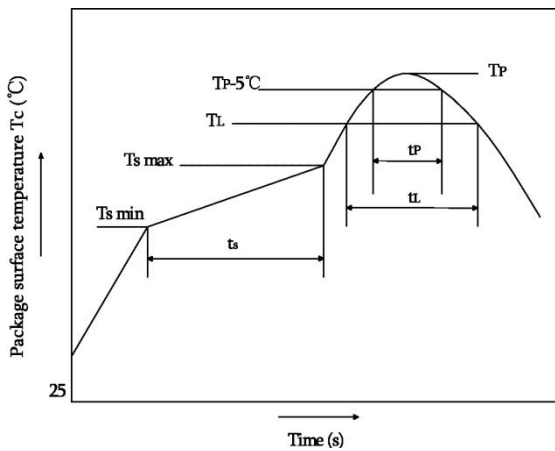
SMD4



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

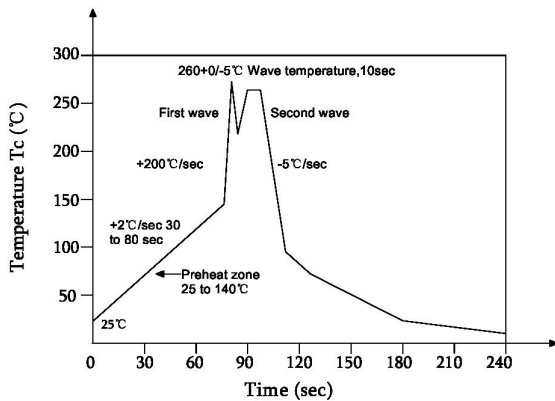


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(TL to TP)			3	°C/s
Liquidus temperature	T _L	217		°C
Time above T _L	t _L	60	150	s
Peak temperature	T _p		260	°C
Time during which T _c is between (T _p -5) and T _p	t _p		30	s
Ramp-down rate(T _p to T _L)			6	°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

- 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
DIP4	Tube(500mm)	100 pcs/tube	25 tubes /box	12 boxes /ctn	190*670mm	520*105*50mm	545*372*235mm	Straight insert type material tube
DIP4-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
SMD4	Reel(φ330mm)	2000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Guard band 200mm /min.

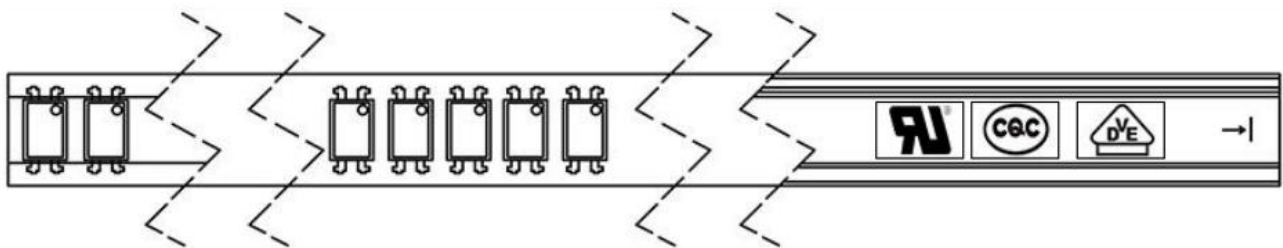
■ Summary table

■ DIP4/DIP4-M (Tube)

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

Qty/ctn : 30000pcs.

Schematic: (unit:mm)

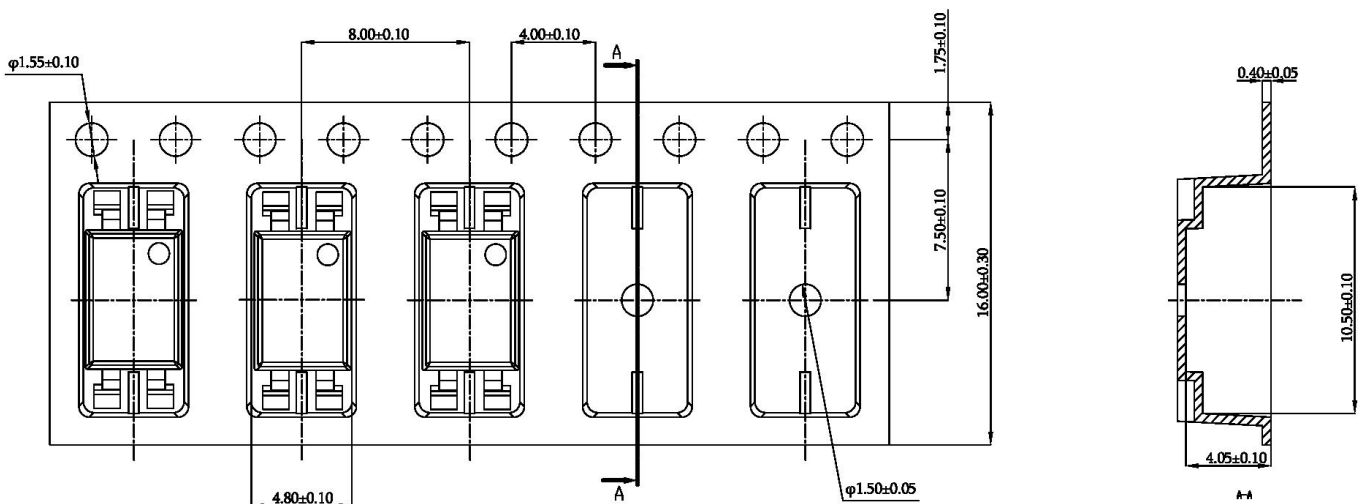


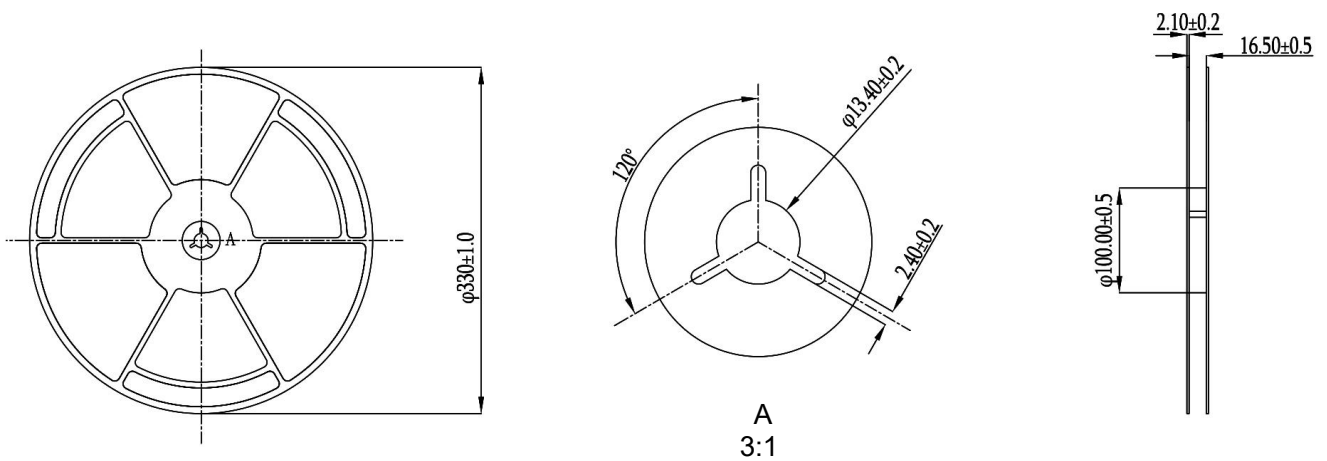
■ SMD4 (Reel)

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

Qty/ctn : 20000pcs.

Schematic: (unit:mm)





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