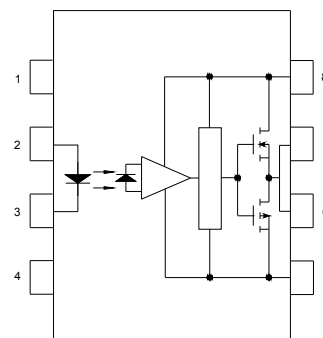


● Description

The KTLP250 series consists of an GaAlAs Light emitter diode and an integrated. This unit is 8-lead DIP package. KTLP250 series is suitable for gate driving circuit of IGBT or power MOSFET.

● Schematic



- | | |
|------------|------------------------|
| 1. N.C. | 5. GND |
| 2. Anode | 6. Vo (Voltage Output) |
| 3. Cathode | 7. Vo (Voltage Output) |
| 4. N.C. | 8. Vcc |

● Features

1. This unit is 8.lead DIP package.
2. Input threshold current: $I_F=5\text{mA}$ (max.)
3. Supply current (I_{CC}): 11mA (max.)
4. Supply voltage (V_{CC}): 10 – 35V
5. Output current (IO): $\pm 1.5\text{A}$ (max.)
6. Switching time (t_{pLH}/t_{pHL}): 0.5 μs (max.)
7. Isolation voltage: 5000Vrms (max.)
8. MSL class 1
9. Agency Approvals:
 - UL Approved (No. E169586): UL1577
 - c-UL Approved (No. E169586)
 - VDE Approved (No. 40020973): DIN EN60747-5-5

● Applications

- Transistor inverter
- Inverter For air conditioner
- IGBT gate drive
- Power MOSFET gate drive

● Truth Table

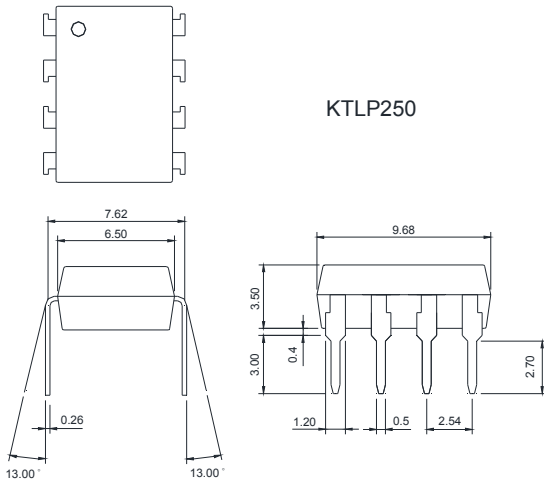
LED	OUTPUT	Q1	Q2
ON	HIGH LEVEL	ON	OFF
OFF	LOW LEVEL	OFF	ON

* The use of a 0.1 μF bypass capacitor must be connected between pins 8 and 5 is recommended.

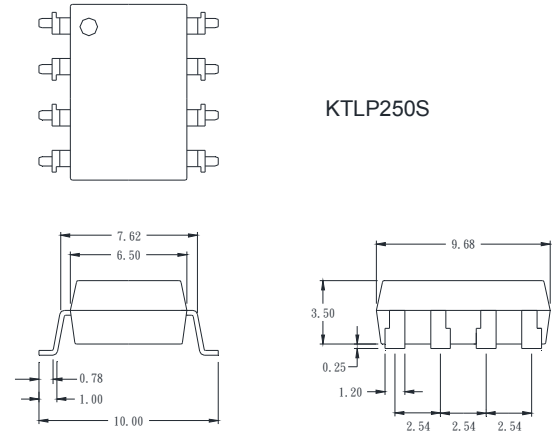
● **Outside Dimension**

Unit : mm

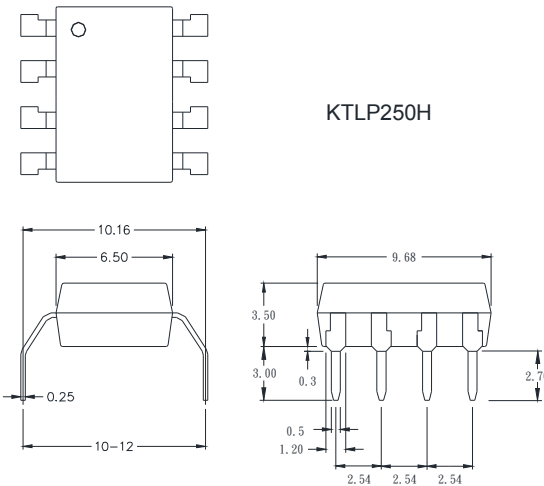
1. Dual-in-line type



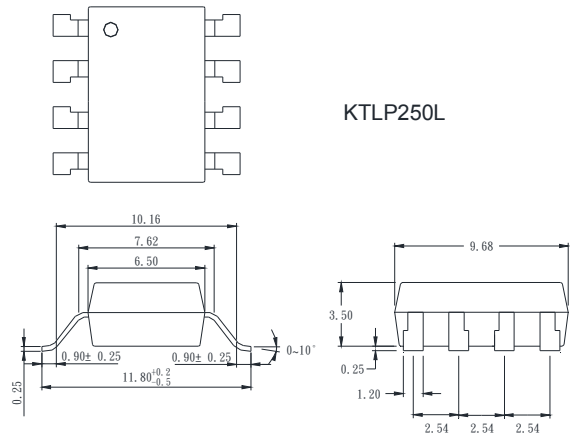
2. Surface mount type



3. Long creepage distance type

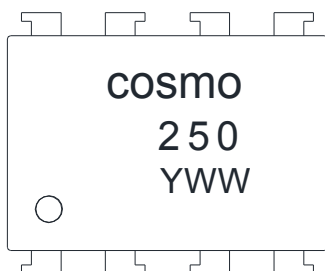


4. Long creepage distance for surface mount type



TOLERANCE: ±0.2mm

● **Device Marking**



Notes:

cosmo
250
YWW Y: Year code / WW: Week code

● Absolute Maximum Ratings

(Ta = 25°C)

Parameter		Symbol	Rating	Unit	
Input	Forward current	I_F	20	mA	
	Forward current derating (Ta ≥ 70°C)	$\Delta I_F / \Delta Ta$	-0.36	mA/°C	
	Peak transient forward current (*Note 1)	I_{FPT}	1	A	
	Reverse voltage	V_R	5	V	
	Junction temperature	T_j	125	°C	
Output	“H” peak output current(Pw ≤ 2.5μs, f ≤ 15kHz) (*Note 2)		I_{OPH}	-1.5	A
	“L” peak output current(Pw ≤ 2.5μs, f ≤ 15kHz) (*Note 2)		I_{OPL}	+1.5	A
	Output voltage	(Ta ≤ 70°C)	V_O	35	V
		(Ta=85°C)		24	
	Supply voltage	(Ta ≤ 70°C)	V_{CC}	35	V
		(Ta=85°C)		24	
	Output voltage derating (Ta ≥ 70°C)		$\Delta V_O / \Delta Ta$	-0.73	V / °C
	Supply voltage derating (Ta ≥ 70°C)		$\Delta V_{CC} / \Delta Ta$	-0.73	V / °C
Junction temperature		T_j	125	°C	
Operating frequency (*Note 3)		f	25	KhZ	
Operating temperature range		Topr	-40~115	°C	
Storage temperature range		Tstg	-55~125	°C	
Lead soldering temperature(10s) (*Note 4)		Tsol	260	°C	
Isolation voltage (AC, 1min., R.H ≤ 60%) (*Note 5)		BVs	5000	Vrms	

*Note1: Pulse width $P_w \leq 1 \mu s, 300pps$.

*Note2: Exponential waveform.

*Note3: Exponential waveform, $I_{OPH} \leq -1.0A (\leq 2.5 \mu s), I_{OPL} \leq +1.0A (\leq 2.5 \mu s)$.

*Note4: It is 2 mm or more from a lead root.

*Note5: Device is considered as a two terminal device: Pin1,2,3 and 4 shorted together, and pins 5,6,7 and 8 shorted together.

● Electrical Characteristics

(Ta = 25°C)

Parameter	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit		
Input forward voltage	V_F	—	$I_F=10mA, Ta=25^\circ C$	—	1.6	1.8	V		
Temperature coefficient of forward voltage	$\Delta V_F / \Delta Ta$	—	$I_F=10mA$	—	-2.0	—	mV/°C		
Input reverse current	I_R	—	$V_R=5V, Ta=25^\circ C$	—	—	10	μA		
Input capacitance	C_T	—	$V=0, f=1MHz, Ta=25^\circ C$	—	45	250	pF		
Output current	“H” level	I_{OPH}	3	$V_{CC}=30V$ (*A)	$I_F=10mA$ $V_b=4V$	-0.5	-1.5	—	A

	"L" level	I_{OPL}	2	$I_F=0$ $V_a=2.5V$	0.5	2	—	
Output voltage	"H" level	V_{OH}	4	$V_{CC1}=15V, V_{EE1}=-15V$ $R_L=200\Omega, I_F=5mA$	11	12.8	—	V
	"L" level	V_{OL}	5	$V_{CC1}=15V, V_{EE1}=-15V$ $R_L=200\Omega, V_F=0.8V$	—	-14.2	-12.5	
Supply current	"H" level	I_{CCH}	—	$V_{CC}=30V, I_F=10mA,$ $T_a=25^\circ C$	—	7	—	mA
				$V_{CC}=30V, I_F=10mA$	—	—	11	
	"L" level	I_{CCL}	—	$V_{CC}=30V, I_F=0mA,$ $T_a=25^\circ C$	—	7.5	—	
				$V_{CC}=30V, I_F=0mA$	—	—	11	
Threshold input current	"Output L→H"	I_{FLH}	—	$V_{CC1}=15V, V_{EE1}=-15V,$ $R_L=200\Omega, V_O>0V$	—	1.2	5	mA
Threshold input voltage	"Output H→L"	V_{FHL}	—	$V_{CC1}=15V, V_{EE1}=-15V,$ $R_L=200\Omega, V_O<0V$	0.8	—	—	V
Supply voltage		V_{CC}	—		10	—	35	V
Capacitance (input-output)		C_S	—	$V_s=0, f=1MHz, T_a=25^\circ C$	—	1.0	2.0	pF
Resistance (input-output)		R_S	—	$V_s=500V, T_a=25^\circ C,$ $R.H. \leq 60\%$	1×10^{12}	10^{14}	—	Ω

* All typical values are at $T_a=25^\circ C$ (*A): Duration of I_O time $\leq 50\mu s$

● Switching Characteristics

($T_a = 25^\circ C$)

Parameter	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit	
Propagation delay time	"L→H"	t_{PLH}	$I_F=8mA$ (Note8) $V_{CC1}=+15V, V_{EE1}=-15V$ $R_g=20\Omega, C_g=10nF$	—	0.15	0.5	μs	
	"H→L"	t_{PHL}		—	0.15	0.5		
Output rise time	t_r	6			—	—		—
Output fall time	t_f				—	—		—
Common mode transient immunity at high level output	C_{MH}	7	$V_{CM}=600V, I_F=8mA$ $V_{CC}=30V, T_a=25^\circ C$		-5	—	—	KV / μs
Common mode transient immunity at low level output	C_{ML}	7	$V_{CM}=600V, I_F=0$ $V_{CC}=30V, T_a=25^\circ C$		5	—	—	KV / μs

* All typical values are at $T_a=25^\circ C$.

*Note 8: Input signal rise time (fall time) $< 0.5\mu s$.

Fig.1 Forward Current vs. Forward Voltage

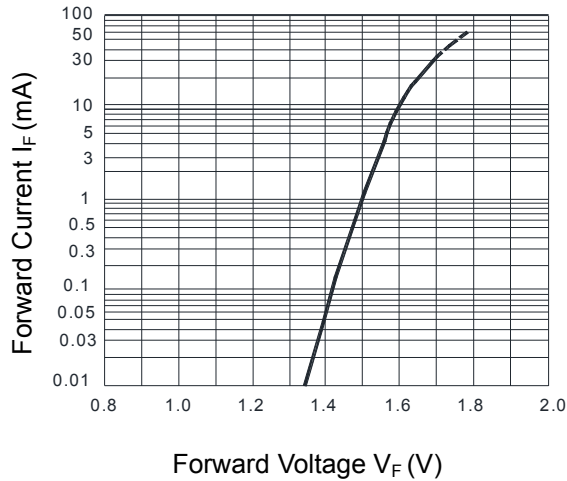


Fig.2 Forward Voltage Temperature Coefficient V_F / T_a vs. Forward Current

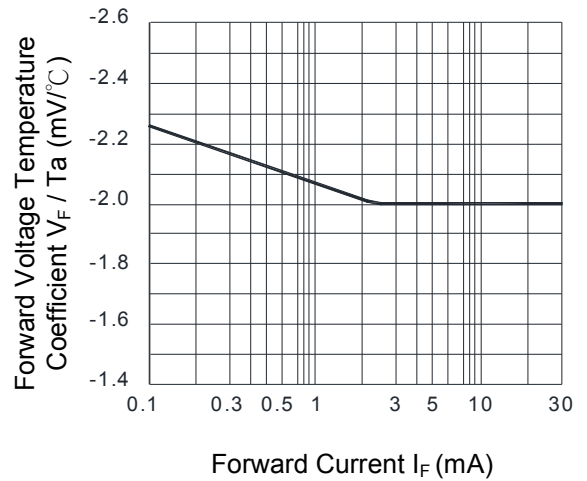


Fig.3 Allowable Peak Output Current vs. Ambient Temperature

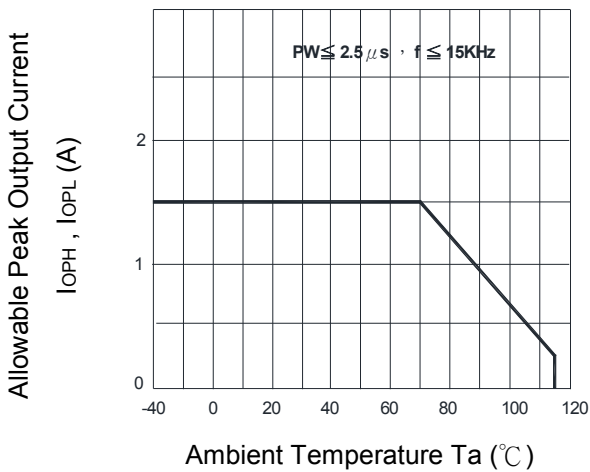


Fig.4 Allowable Forward Current vs. Ambient Temperature

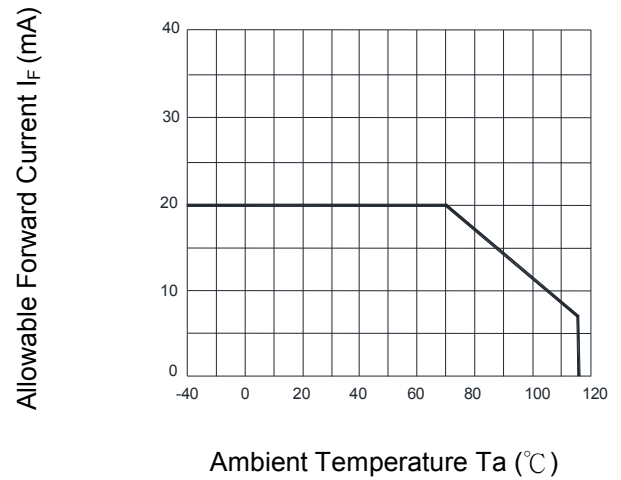
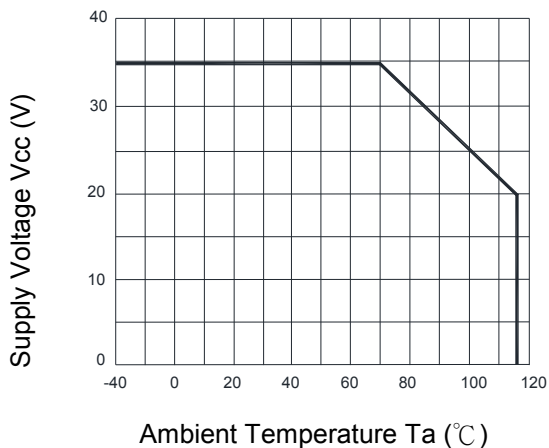
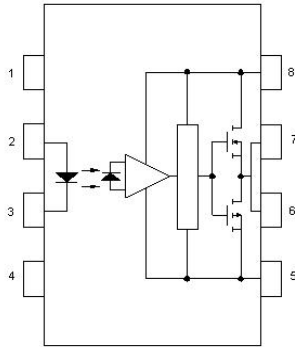


Fig.5 Supply Voltage vs. Ambient Temperature

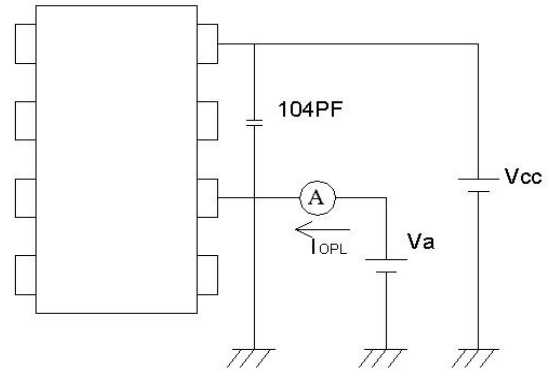


● **Test Circuit**

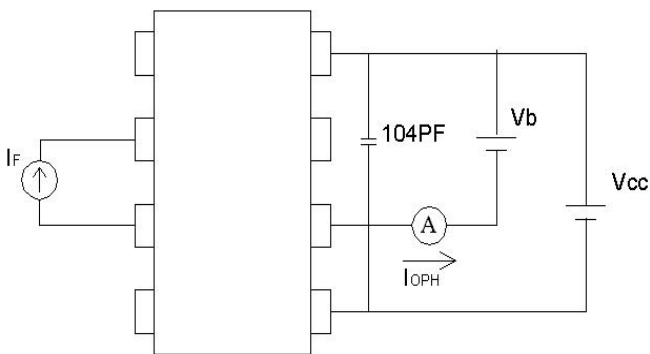
1. Top View



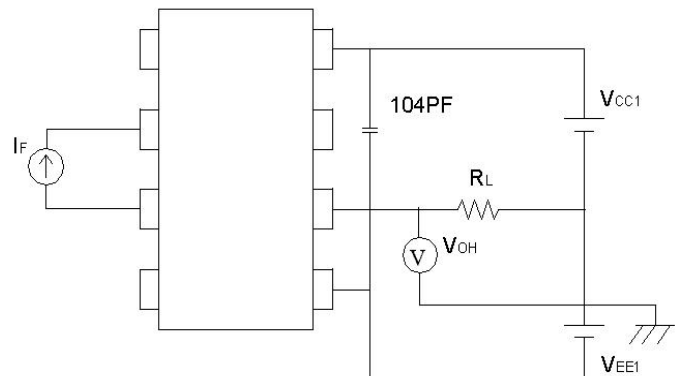
2. I_{OPL} Measure



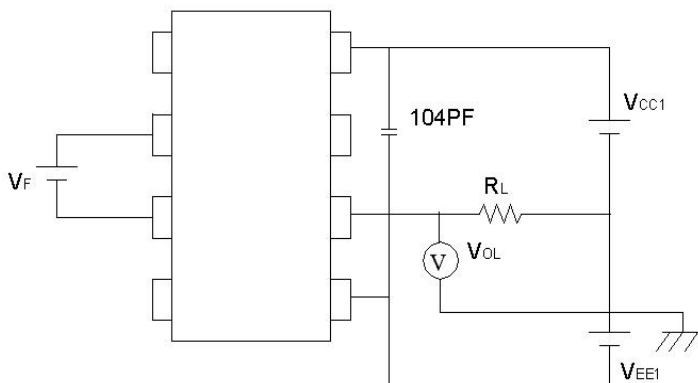
3. I_{OPH} Measure



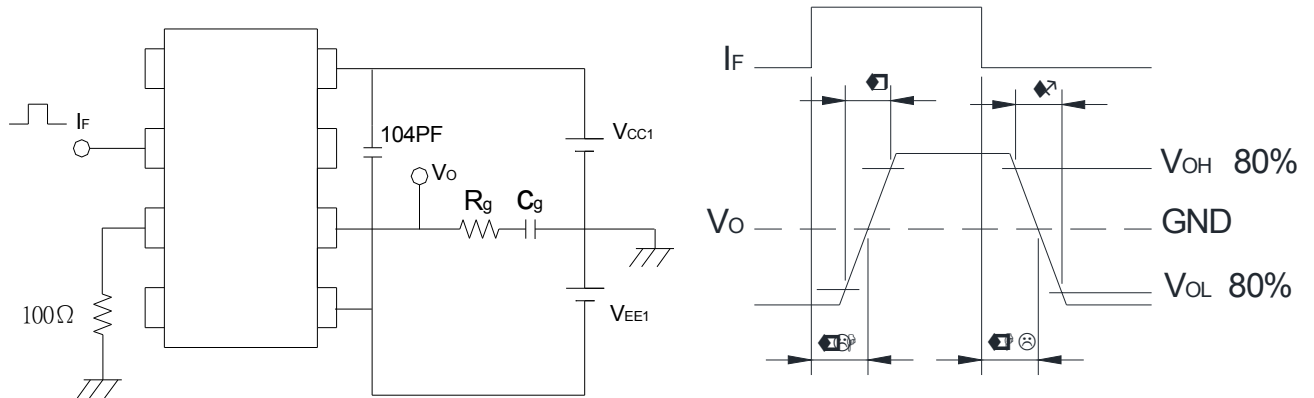
4. V_{OH} Measure



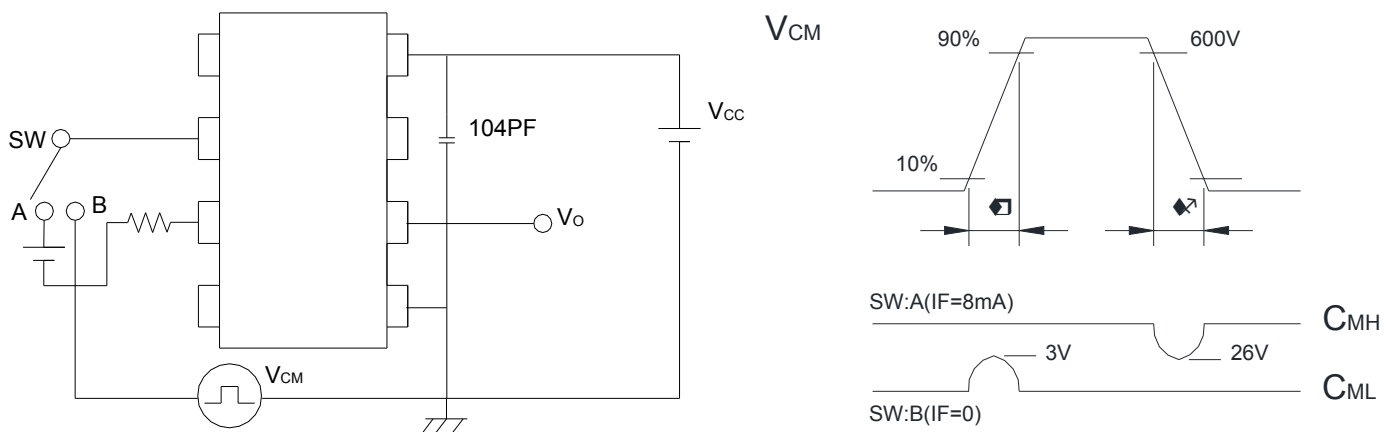
5. V_{OL} Measure



6. t_{pLH} , t_{pHL} , t_r , t_f Measure



7. C_{MH} , C_{ML} Measure



$$C_{ML} = \frac{480(V)}{t_r (\mu s)} \quad ; \quad C_{MH} = \frac{480(V)}{t_f (\mu s)}$$

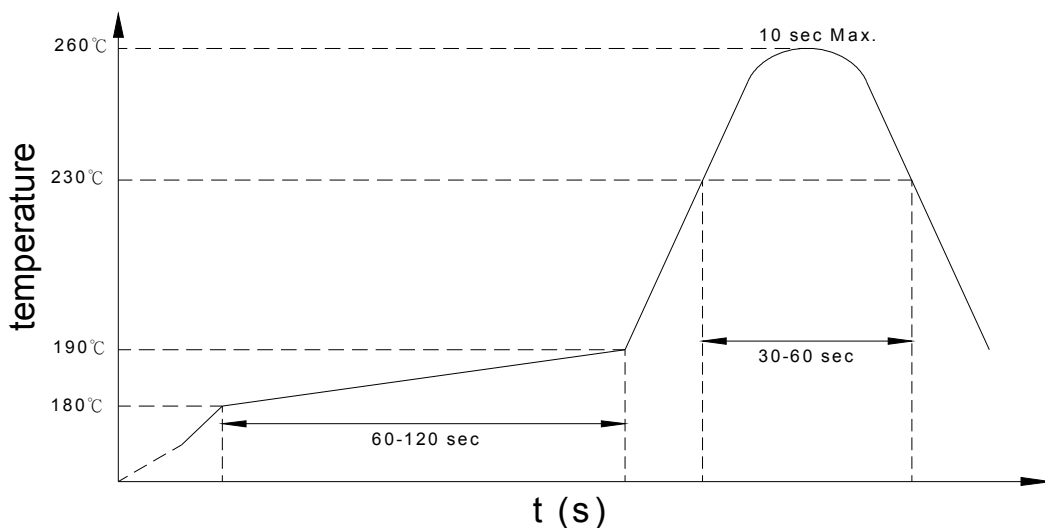
* C_{ML} (C_{MH}) is the maximum rate of rise (fall) of the common mode voltage that can be sustained with the output voltage in the low (high) state.

● Recommended Soldering Conditions

(a) Infrared reflow soldering :

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature : 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Time(s) of reflow : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

Recommended Temperature Profile of Infrared Reflow



(b) Wave soldering :

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C or below (package surface temperature)
- Time(s) of reflow : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(c) Cautions :

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

- **Numbering System**

KTLP250 X (Y)

Notes:

KP1510 = Part No.

X = Lead form option (blank · S · H · L)

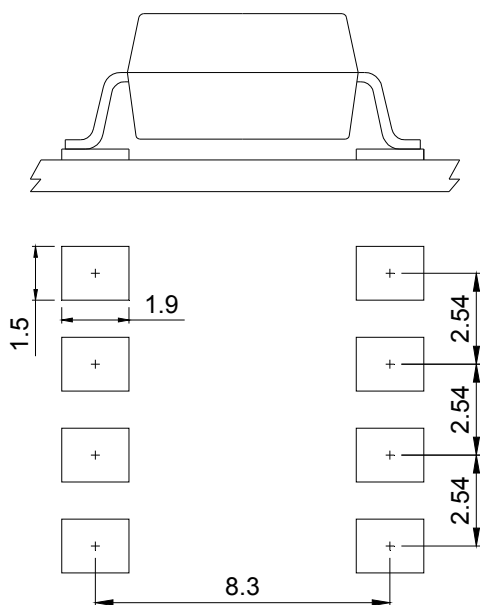
Y = Tape and reel option (TL · TR · TLD · TRU)

Option	Description	Packing quantity
S (TL)	surface mount type package + TL tape & reel option	1000 units per reel
S (TR)	surface mount type package + TR tape & reel option	1000 units per reel
L (TLD)	long creepage distance for surface mount type package + TLD tape & reel option	800 units per reel
L (TRU)	long creepage distance for surface mount type package + TRU tape & reel option	800 units per reel

- **Recommended Pad Layout for Surface Mount Lead Form**

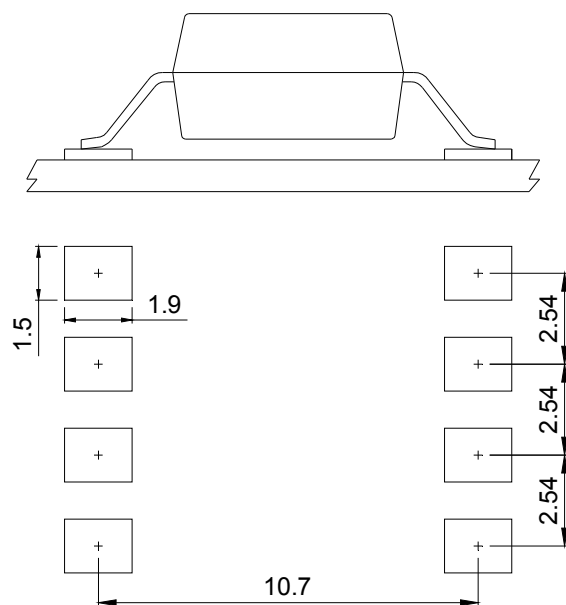
1.Surface mount type

8-pin SMD



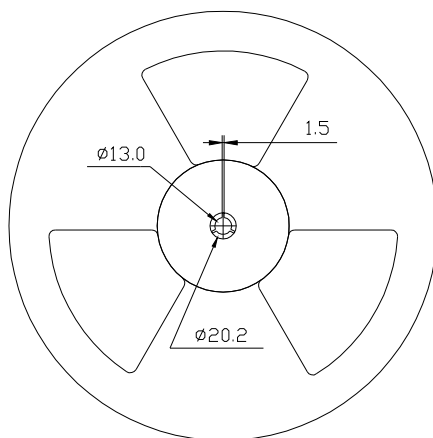
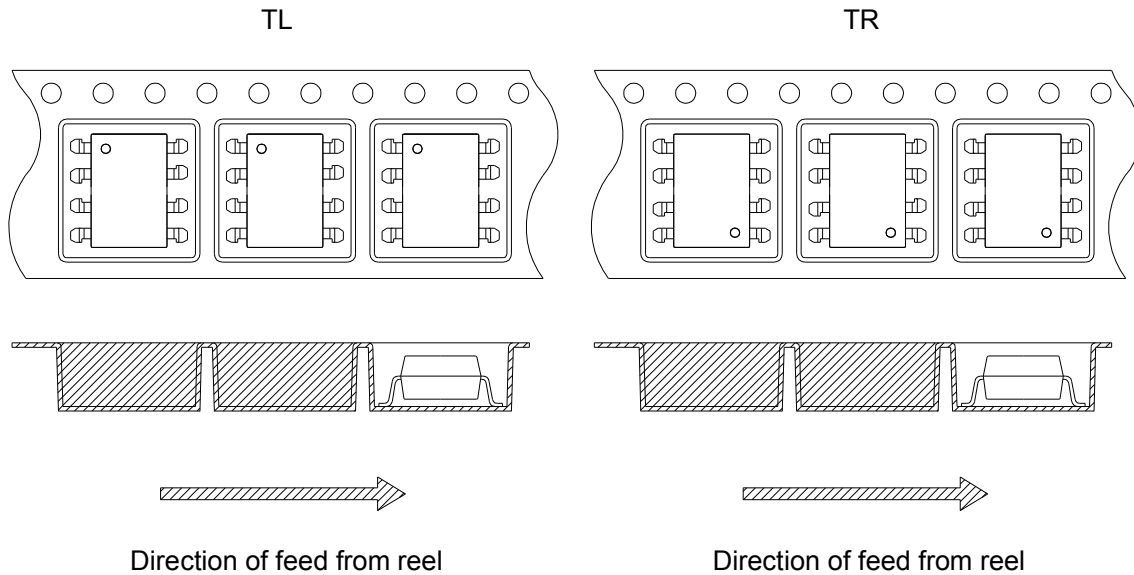
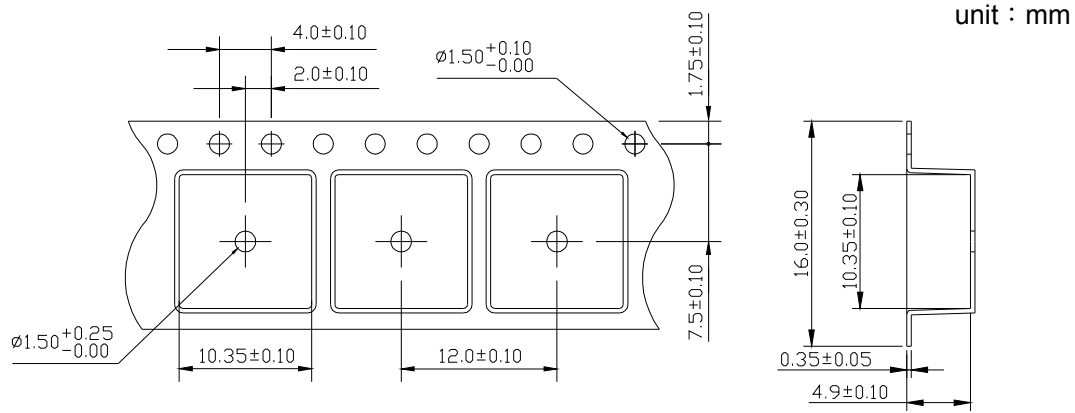
2.Long creepage distance for surface mount type

8-pin L

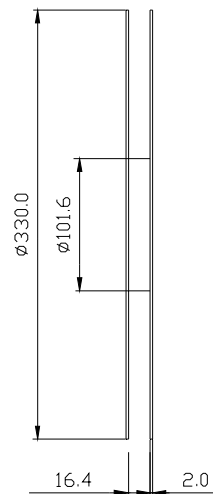


Unit :mm

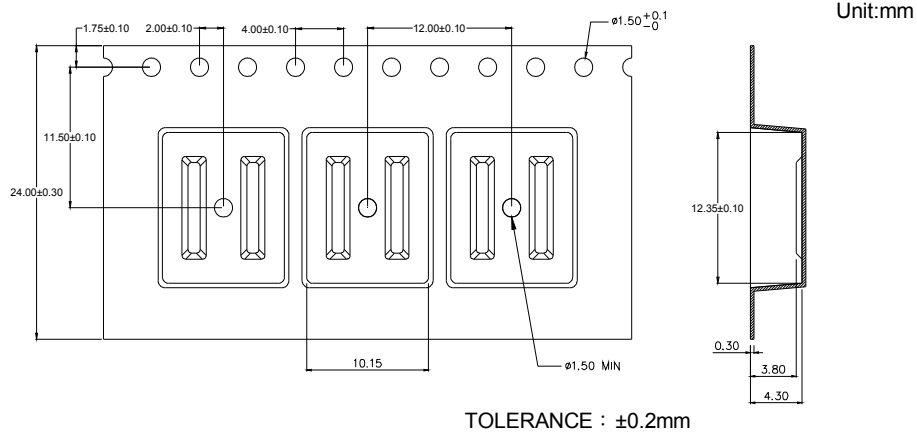
● 8-pin SMD Carrier Tape & Reel



Quantity : 1000pcs/reel

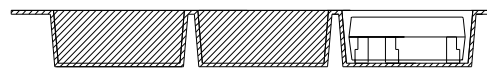
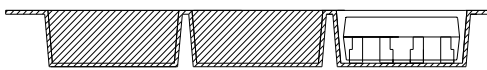
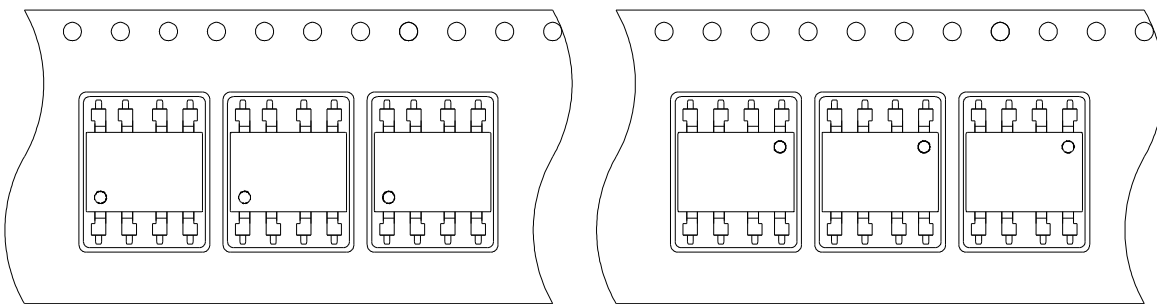


● 8-pin L Carrier Tape & Reel



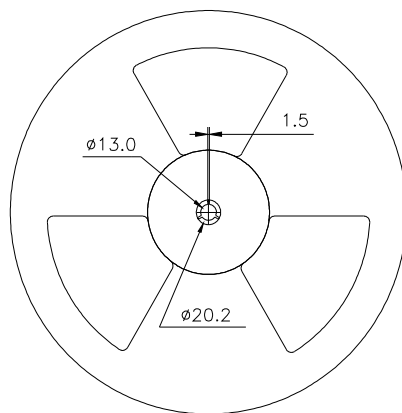
TLD

TRU

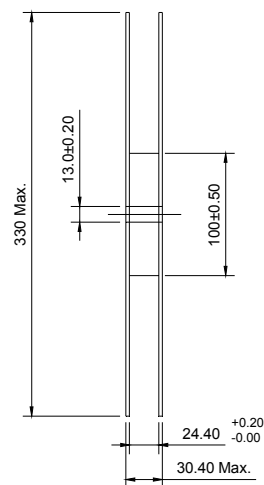


Direction of feed from reel

Direction of feed from reel



Quantity : 800pcs/reel



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- h. Telecommunication

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