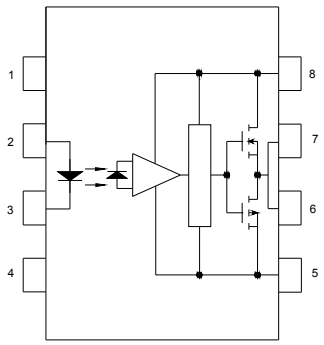
KTLP350 Series

8PIN IGBT GATE DRIVE PHOTOCOUPLER

Description

The KTLP350 series consists of an GaAlAs light emitter diode and an integrated. This unit is 8-lead DIP package. KTLP350 series is suitable for gate driving circuit of IGBT or power MOSFET.

Schematic



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

Features

1. This unit is 8.lead DIP package.
2. Input threshold current: I_F=5mA(max.)
3. Supply current (Icc): 3 mA (max.)
4. Supply voltage (Vcc): 10 – 30V
5. Output current (IO): ±2.5A (max.)
6. Switching time (tpLH/tpHL): 0.5μs(max.)
7. Isolation voltage: 5000Vrms(min.)
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
- IH(Induction Heating)

Truth Table

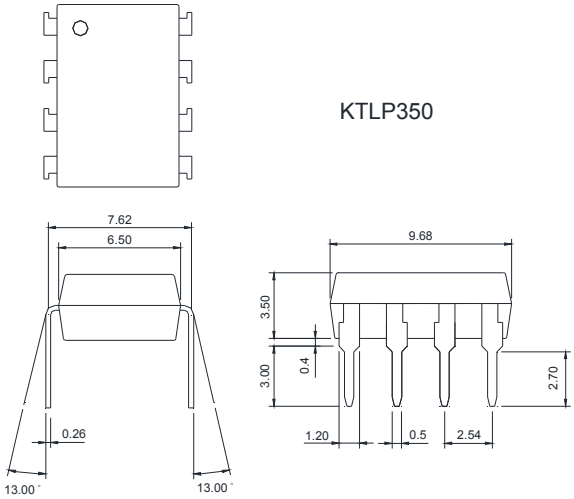
LED	OUTPUT	Q1	Q2
ON	HIGH LEVEL	ON	OFF
OFF	LOW LEVEL	OFF	ON

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

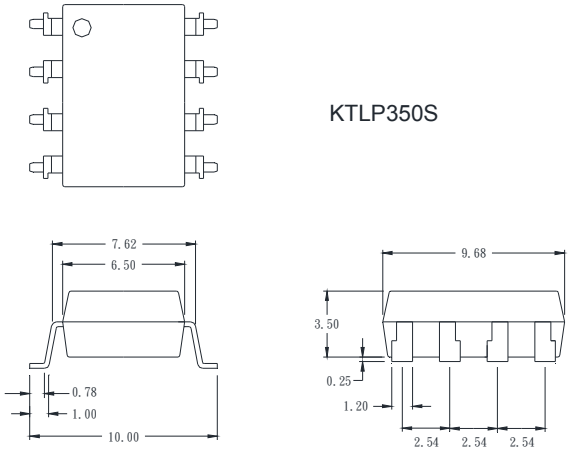
Outside Dimension

Unit : mm

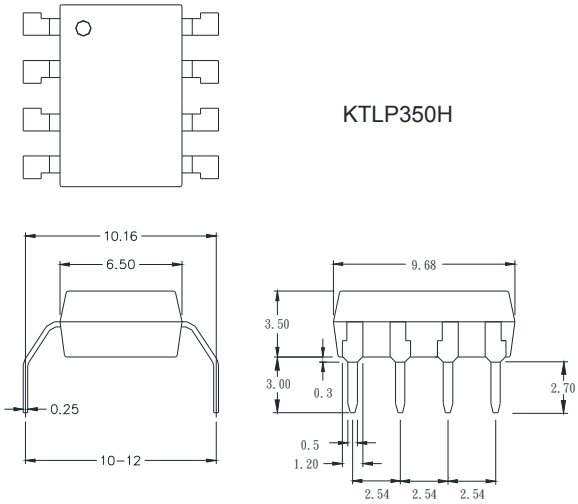
1.Dual-in-line type



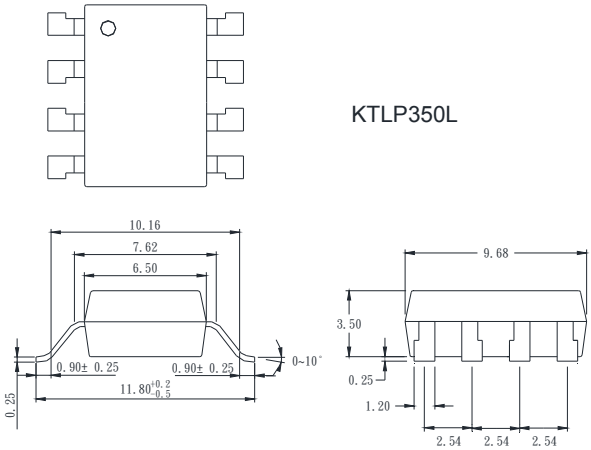
2.Surface mount type



3.Long creepage distance type

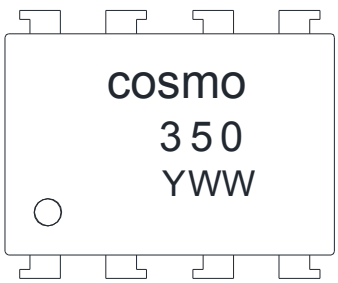


4.Long creepage distance
for surface mount type



TOLERANCE: ±0.2mm

Device Marking



Notes:

cosmo
350
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℃)		$\Delta I_F / \Delta Ta$	-0.54	mA/℃
	Peak transient forward current (*Note 1)		I_{FPT}	1	A
	Reverse voltage		V_R	5	V
	Junction temperature		Tj	125	℃
Output	"H" Peak output current (*Note 2)		I_{OPH}	-2.5	A
	"L"Peak output current (*Note 2)		I_{OPL}	+2.5	A
	Output voltage	(Ta< 95℃)	V_O	35	V
	Supply voltage	(Ta< 95℃)	Vcc	35	V
	Output voltage derating (Ta≧95℃)		$\Delta V_O / \Delta Ta$	-1.0	V / ℃
	Supply Voltage derating(Ta≧95℃)		$\Delta V_{CC} / \Delta Ta$	-1.0	V / ℃
	Junction temperature		Tj	125	℃
Operating frequency		(*Note 3)	f	50	KhZ
Operating temperature range			Topr	-40~115	℃
Storage temperature range			Tstg	-55~125	℃
Lead soldering temperature(10s)		(*Note 4)	Tsol	260	℃
Isolation voltage (AC,1min.,R.H≦60%)		(*Note 5)	BVs	5000	Vrms

*Note1: Pulse width Pw ≦ 1μs,300pps.
*Note2: Exporenential waveform pulse width Pw≦0.3us,f≦15kHz.
*Note3: Exporenential waveform,IOPH ≧ -2.0A (≦0.3μs),IOPL ≦ +2.0A (≦0.3μs).
*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℃)

Parameter		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Input forward voltage		V_F	—	I_F=10mA,Ta=25℃	—	1.6	1.8	V
Temperature coefficient of forward voltage		$\triangle V_F / \triangle Ta$	—	I_F=10mA	—	-2.0	—	mV/℃
Input reverse current		I_R	—	VR=5V,Ta=25℃	—	—	10	μA
Input capacitance		C_T	—	V=0,f=1MHz,Ta=25℃	—	45	250	pF
Output current	"H" level	I_{OPH}	3	V_{CC}=30V I_F=5mA Vb=3.5V	—	-1.6	-1.0	A
				V_{CC}=15V I_F=5mA Vb=7.0V	—	—	-2.0	

	"L" level	I_{OPL}	2	V_{CC}=30V I_F=0mA Va=2.5V	1.0	1.6	—	
				V_{CC}=15V I_F=0mA Va=7.5V	2.0	—	—	
Output voltage	"H" level	V_{OH}	4	V_{CC}1=15V,V_{EE1}=-15V R_L=200Ω,I_F=5mA	11	13.7	—	V
	"L" level	V_{OL}	5	V_{CC1}=15V,V_{EE1}=-15V R_L=200Ω,V_F=0.8V	—	-14.9	-12.5	
Supply current	"H" level	I_{CCH}	—	V_{CC}=30V,I_F=10mA, Ta=25℃	—	2	3.0	mA
	"L" level	I_{CCL}	—	V_{CC}=30V,I_F=0mA, Ta=25℃	—	2	3.0	
Threshold input current	"Output L→H"	I_{FLH}	—	V_{CC1}=15V, Vo>1V,Io=0mA	—	1.8	5	mA
Threshold input voltage	"Output H→L"	V_{FHL}	—	V_{CC1}=15V, Vo>1V,Io=0mA	0.8	—	—	V
Supply voltage		V_{CC}	—		10	—	30	V
Capacitance (input-output)		C_S	—	Vs=0,f=1MHz,Ta=25℃	—	1.0	2.0	pF
Resistance (input-output)		R_S	—	Vs=500V,Ta=25℃, R.H.≦60%	$1*10^{12}$	10^{14}	—	Ω

＊All typical values are at Ta=25℃ (*A):Duration of I_O time ≦ 50μs(1 Pulse)

● Switching Characteristics

(Ta = 25℃)

Parameter		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time	"L→H"	t_{pLH}	6	IF=5mA (Note8) VCC=30V Rg=20Ω,Cg=10nF	50	260	500	ns
	"H→L"	t_{pHL}			50	260	500	
Output rise time		t_r			—	15	—	
Output fall time		t_f			—	8	—	
Common mode transient immunity at high level output		C_{MH}	7	V_{CM}=1000Vp-p,I_F=5mA V_{CC}=30V,Vo(min)=26V Ta=25℃	-15	—	—	KV / μs
Common mode transient immunity at low level output		C_{ML}	7	V_{CM}=1000Vp-p,I_F=0 V_{CC}=30V, Vo(max)=1V Ta=25℃	15	—	—	KV / μs

＊All typical values are at Ta=25℃.

*Note 8: Input signal rise time (fall time) < 0.5μs.

Fig.1 Forward Current vs. Forward Voltage

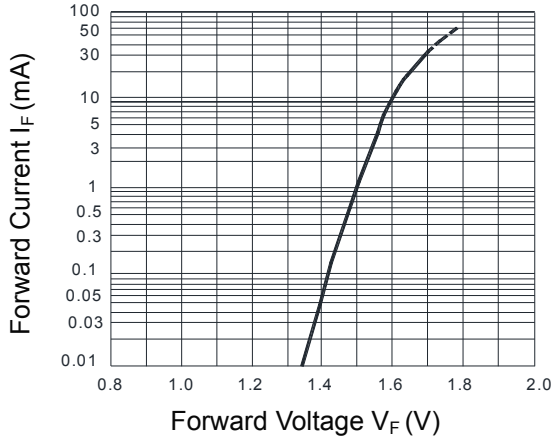


Fig.2 Output Voltage vs. Forward Current

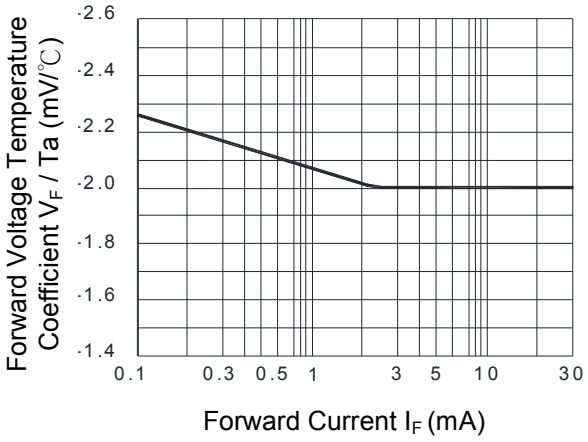


Fig.3 Allowable Forward Current vs. Ambient Temperature

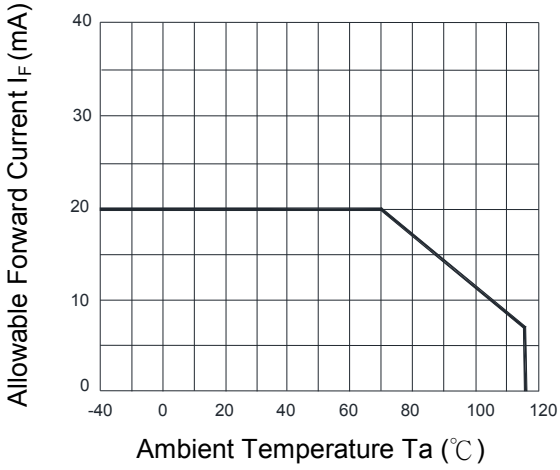


Fig.4 Supply Voltage vs. Ambient Temperature

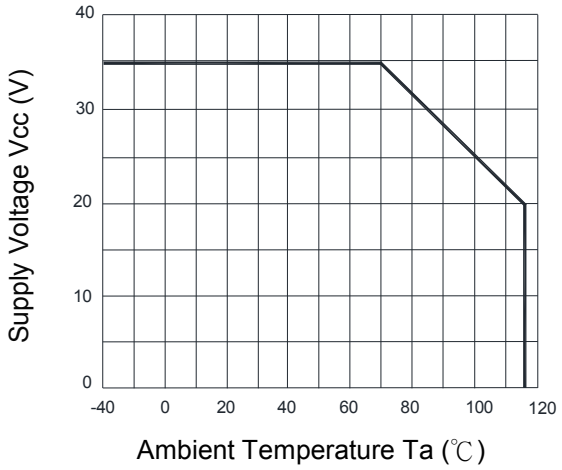


Fig.5 Low Level Output Voltage vs. Ambient Temperature

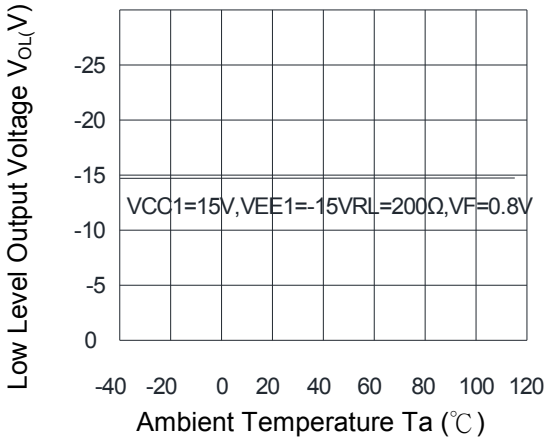


Fig.6 High Level Output Voltage vs. Ambient Temperature

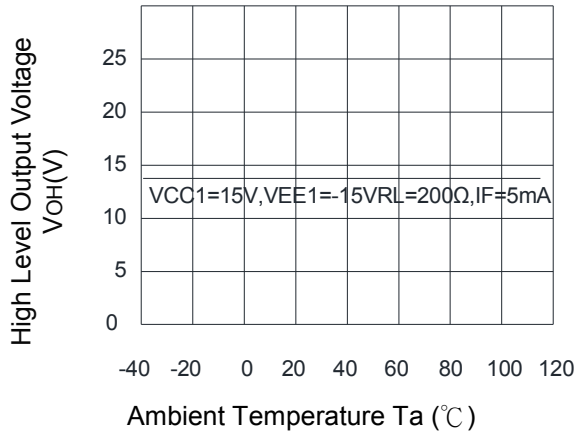


Fig.7 Low Level Supply Current vs. Ambient Temperature

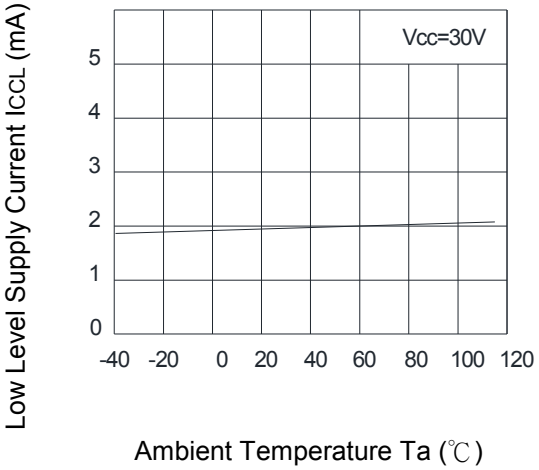


Fig.8 High Level Supply Current vs. Ambient Temperature

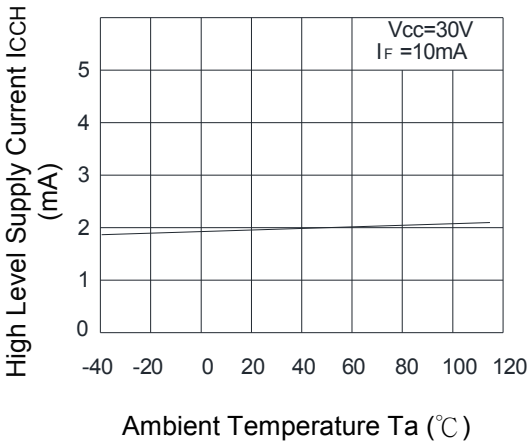
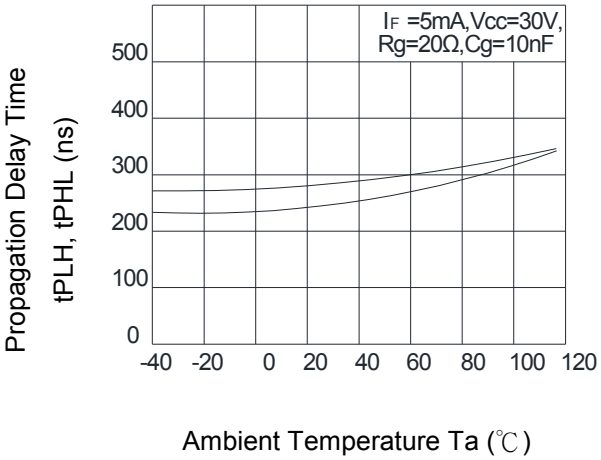
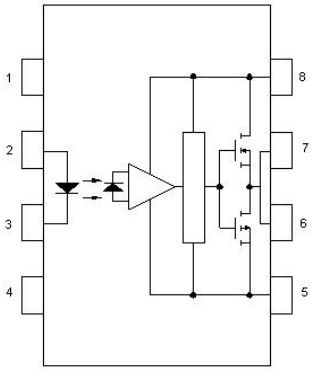


Fig.9 Propagation Delay Time vs. Ambient Temperature

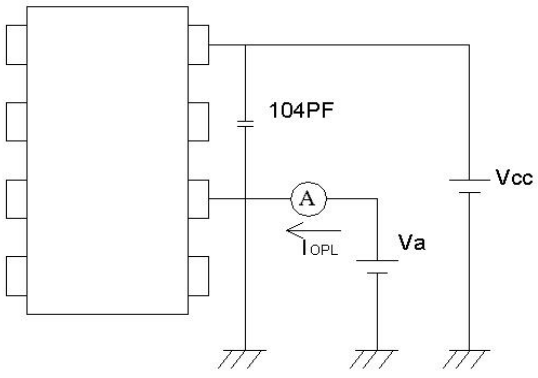


● Test Circuit

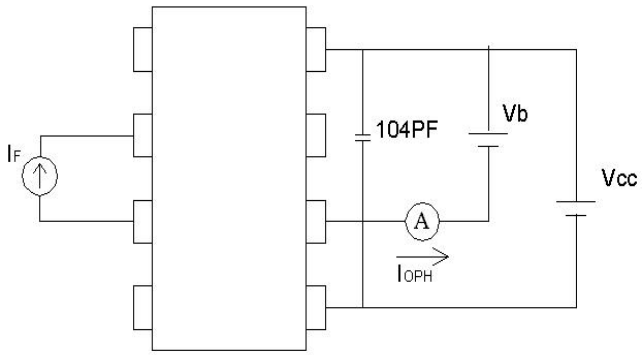
1. Top View



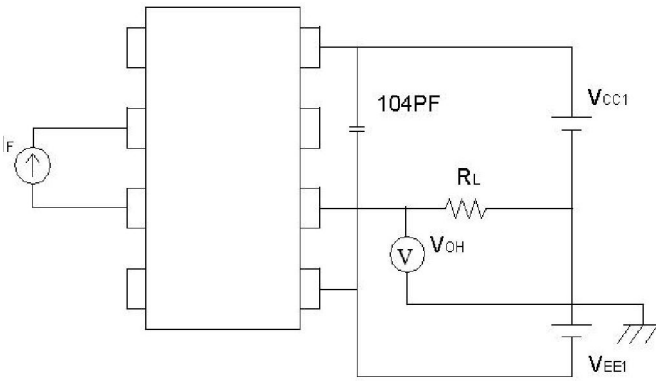
2. I_{OPL} Measure



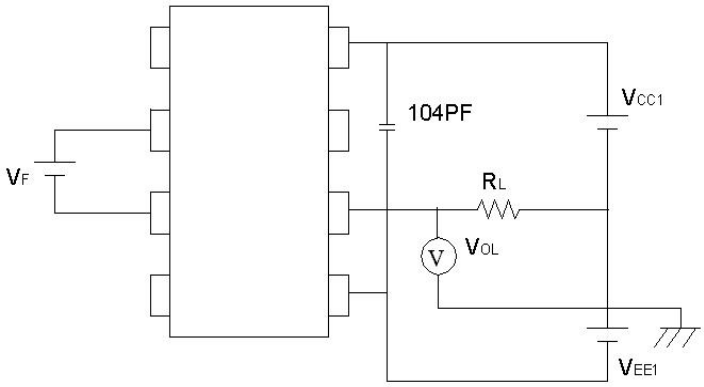
3. I_{OPH} Measure



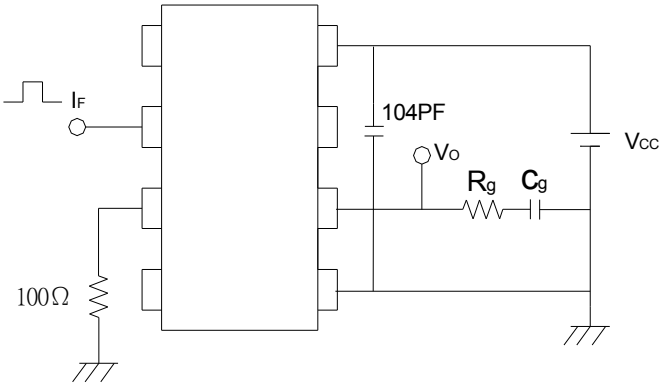
4. V_{OH} Measure

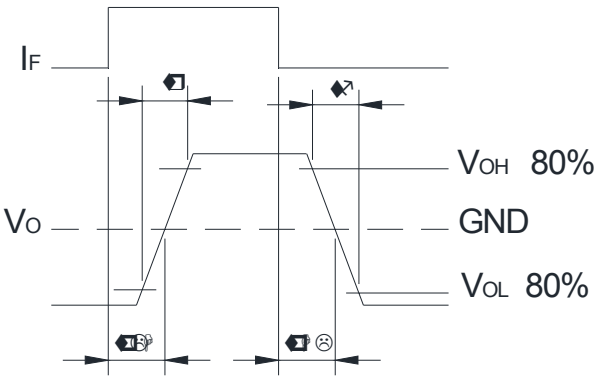


5. V_{OL} Measure

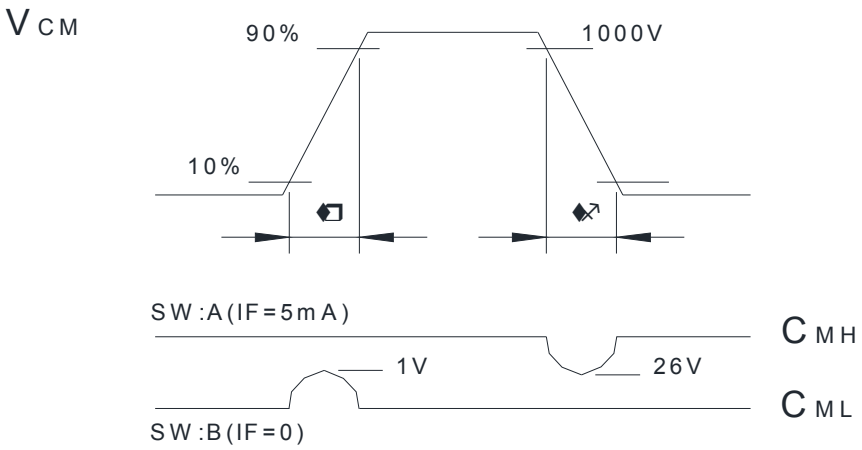


6. tp_{LH}, tp_{HL}, t_r, t_f,Measure





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



$$C_{ML}=\frac{800(V)}{t_{r}(\mu s)} \quad ; \quad C_{MH}=\frac{800(V)}{t_{f}(\mu s)}$$

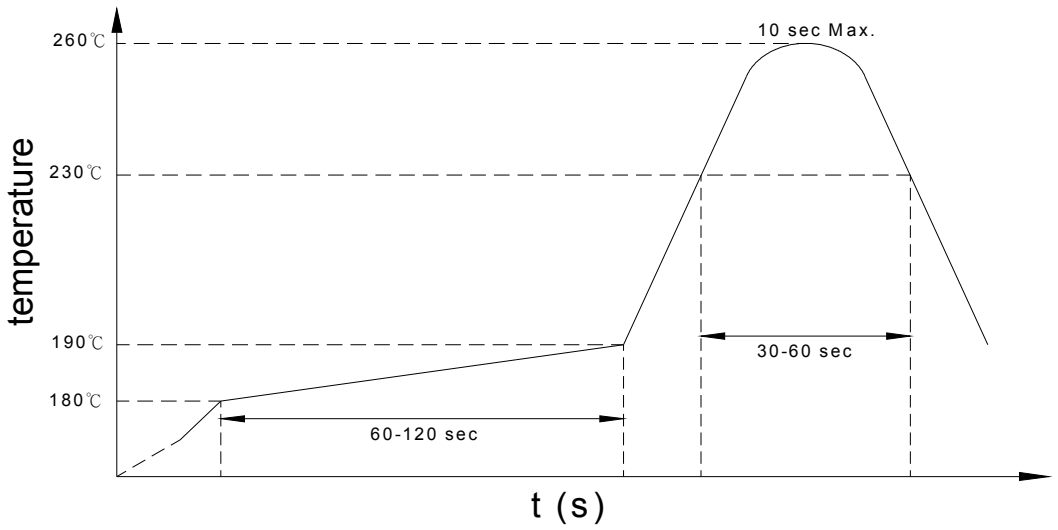
*C_{ML}(C_{MH}) is the maximum rate of rise (fall) of the common mode voltage that can be sustained with the output voltage in the low (high) state.

Recommended Soldering Conditions

(a) Infrared reflow soldering：

- Peak reflow soldering： 260℃ or below (package surface temperature)
- Time of peak reflow temperature： 10 sec
- Time of temperature higher than 230℃： 30-60 sec
- Time to preheat temperature from 180~190℃： 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℃ or below (molten solder temperature)
- Time： 10 seconds or less
- Preheating conditions： 120℃ 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

KTLP350 X (Y)

Notes:

KTLP350 = Part No.

X = Lead form option (blank、S、H、L)

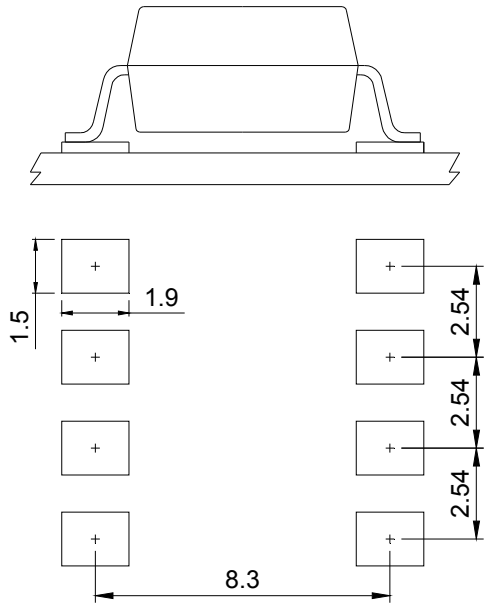
Y = Tape and reel option (TL、TR、TLD、TRU)

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

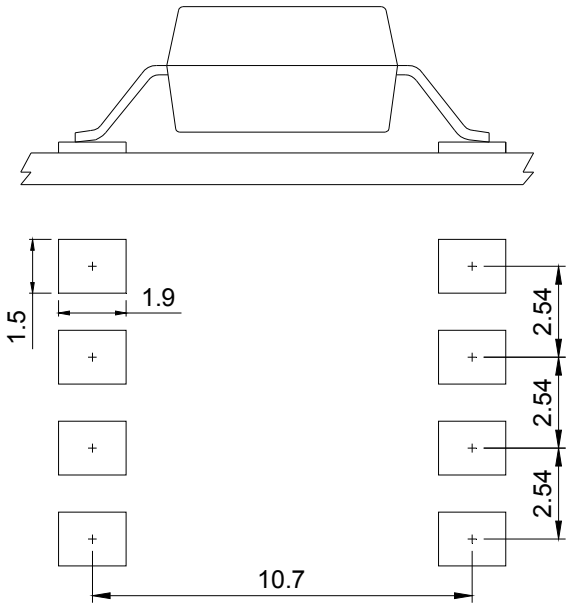
1.Surface mount type

8-pin SMD



2.Long creepage distance for surface mount type

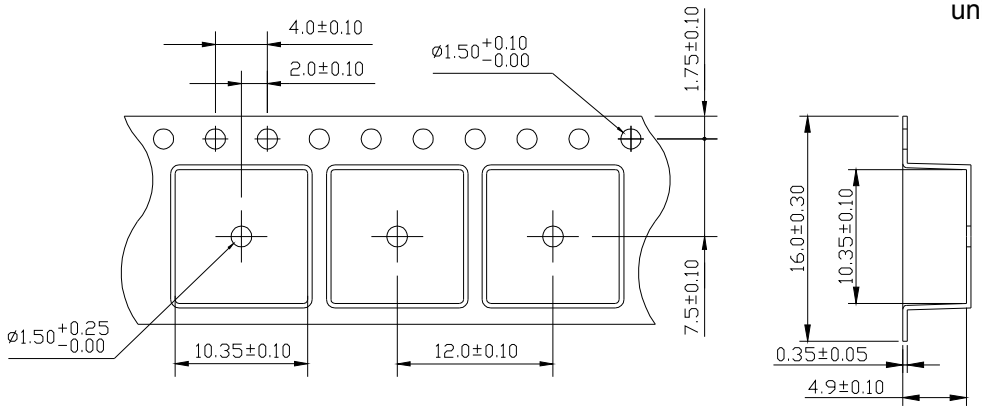
8-pin L



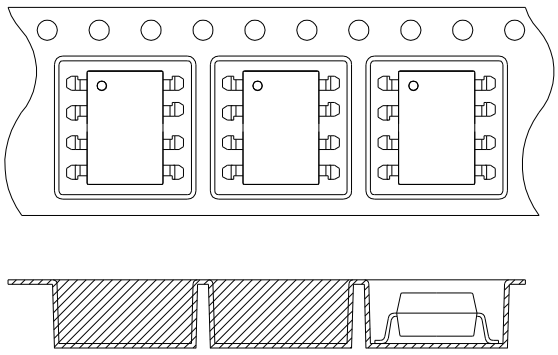
Unit :mm

● 8-pin SMD Carrier Tape & Reel

unit：mm

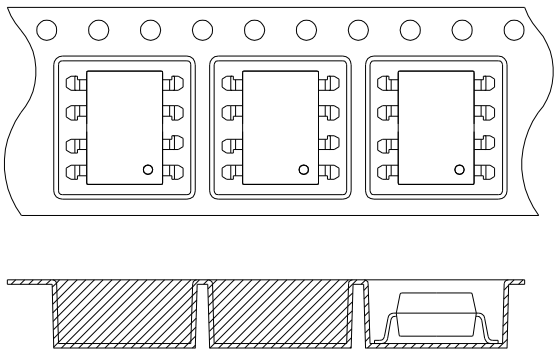


TL

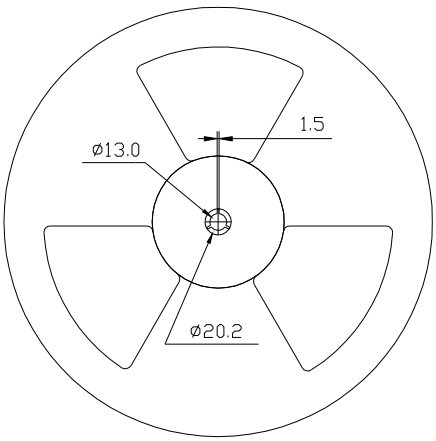


Direction of feed from reel

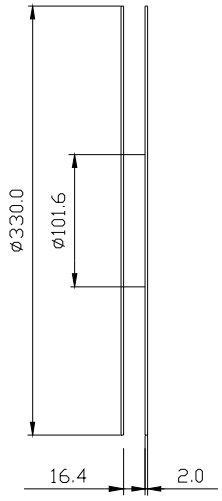
TR



Direction of feed from reel

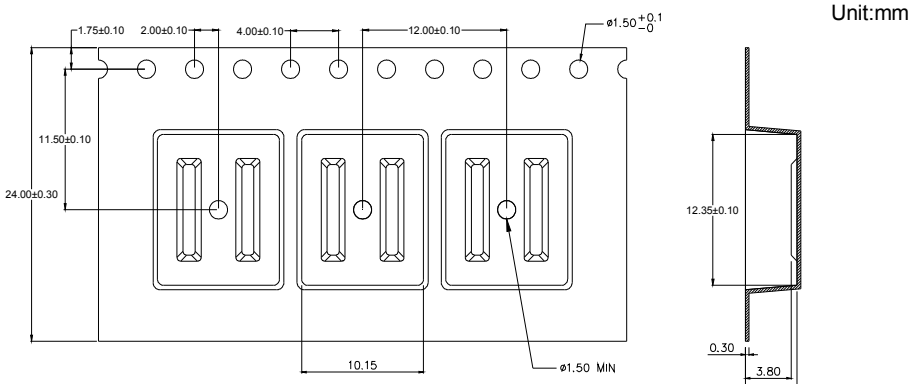


Quantity：1000pcs/reel



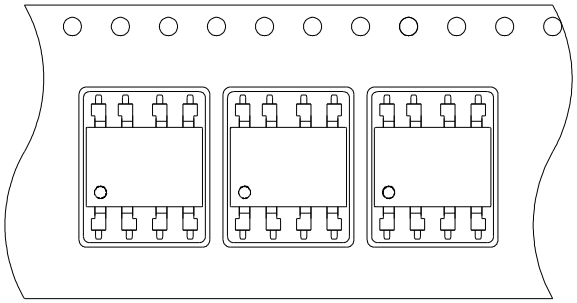
● 8-pin L Carrier Tape & Reel

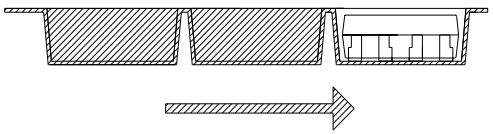
Unit:mm



TOLERANCE：±0.2mm

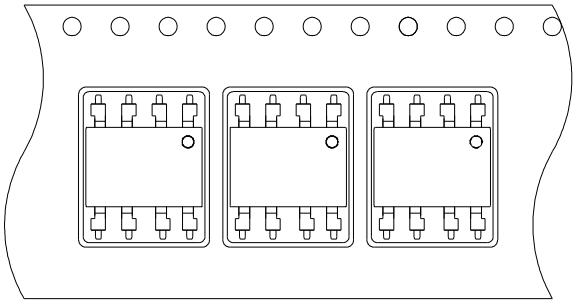
TLD

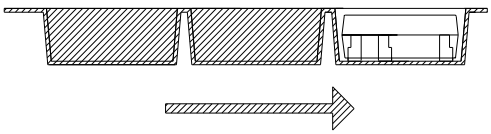




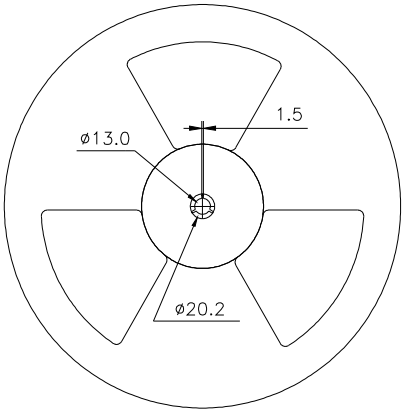
Direction of feed from reel

TRU

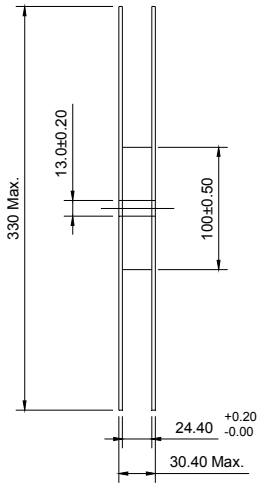




Direction of feed from reel



Quantity：800pcs/reel



Application Notice

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It would be required to comply with the absolute maximum ratings listed in the specification. cosmo has no liability and responsibility to the damage caused by improper use of the products.

cosmo products are intended to be designed for use in general electronics application list below:

a. Personal computer
b. OA machine
c. Audio / Video
d. Instrumentation
e. Electrical application
f. Measurement equipment
g. Consumer electronics
h. Telecommunication

cosmo devices shall not be used or related with equipment requiring higher level of quality / reliability, or malfunction, or failure which may cause loss of human life, bodily injury, includes, without limitation:

a. Medical and other life supporting equipments
b. Space application
c. Telecommunication equipment (trunk lines)
d. Nuclear power control
e. Equipment used for automotive vehicles, trains, ships...etc.

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