

PRODUCT SPECIFICATION

DATE:11/28/2006

cosmo
ELECTRONICS CORPORATION

Photocoupler:
KTLP250

No.60P32001

REV

SHEET 1 OF 8

1

※THE KTLP250 BUILT- IN DIRECT DRIVE CIRCUIT FOR GATE DRIVING
CIRCUIT OF IGBT OR POWER MOSFET.

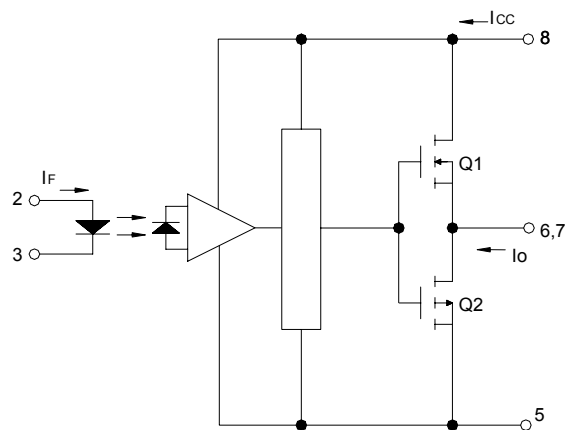
• Feature:

- 1.This unit is 8.lead DIP package.
- 2.Input threshold current: $I_F=5\text{mA}(\text{max.})$
- 3.Supply current (I_{CC}): $11\text{mA}(\text{max.})$
- 4.Supply voltage (V_{CC}): $10 - 35\text{V}$
- 5.Output current (I_O): $\pm 1.5\text{A}(\text{max.})$
- 6.Switching time (t_{pLH}/t_{pHL}): $0.5\mu\text{s}(\text{max.})$
- 7.Isolation voltage: $2500\text{Vrms}(\text{min.})$

• Applications:

- 1.Transistor Inverter
- 2.Inverter For Air Conditionor
- 3.IGBT Gate Drive
- 4.Power MOS FET Gate Drive

■ Functional Diagram



■ Truth Table

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

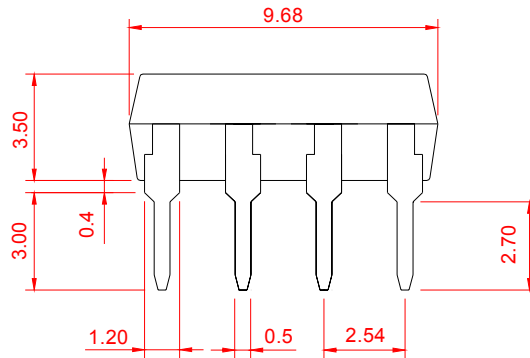
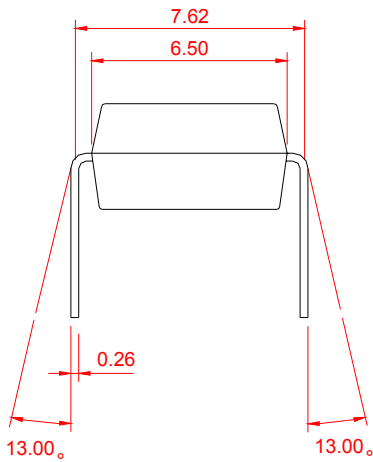
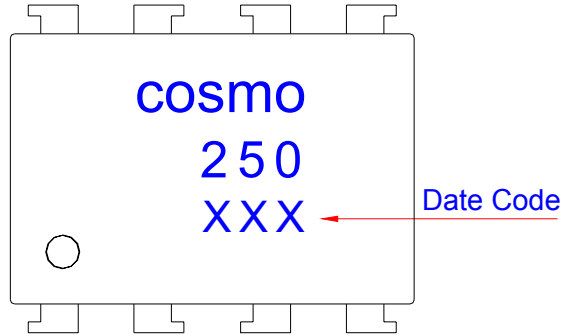
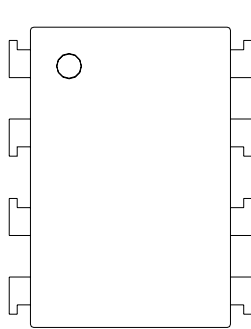
* The use of a $0.1\mu\text{F}$ bypass capacitor must be connected between pins 8 and 5 is recommended.

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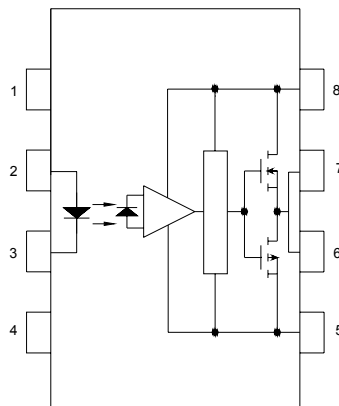
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1. Output Dimensions : Unit (mm)



TOLERANCE : ± 0.2 mm

2.KTLP250 Top View:



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

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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		T_{opr}	-20~85	°C	
Storage Temperature Range		T_{stg}	-55~125	°C	
Lead Soldering Temperature(10s) (*Note 4)		T_{sol}	260	°C	
Isolation Voltage (AC, 1min., R.H ≤ 60%) (*Note 5)		BVs	2500	Vrms	

*Note1:Pulse width Pw ≤ 1μs,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 considered a two terminal device: Pin1,2,3 and 4 shorted together,
and pins 5,6,7 and 8 shorted together.

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Electrical Characteristics (Ta = -20~70°C, unless otherwise specified)

Parameter	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit	
Input forward voltage	V _F	—	IF=10mA, Ta=25°C	—	1.6	1.8	V	
Temperature coefficient of forward voltage	$\Delta V_F / \Delta T_a$	—	IF=10mA	—	-2.0	—	mV/°C	
Input reverse current	I _R	—	VR=5V, Ta=25°C	—	—	10	μA	
Input capacitance	C _T	—	V=0, f=1MHz, Ta=25°C	—	45	250	pF	
Output current	"H" level	I _{OPH}	3	VCC=30V (*A)	IF=10mA Vb=4V	-0.5	-1.5	A
	"L" level	I _{OPL}	2		IF=0 Va=2.5V	0.5	2	
Output voltage	"H" level	V _{OH}	4	VCC1=15V, VEE1=-15V RL=200Ω, IF=5mA	11	12.8	—	V
	"L" level	V _{OL}	5	VCC1=15V, VEE1=-15V RL=200Ω, VF=0.8V	—	-14.2	-12.5	
Supply current	"H" level	I _{CCH}	—	VCC=30V, IF=10mA, Ta=25°C	—	7	—	mA
				VCC=30V, IF=10mA	—	—	11	
	"L" level	I _{CCL}	—	VCC=30V, IF=0mA, Ta=25°C	—	7.5	—	
				VCC=30V, IF=0mA	—	—	11	
Threshold input current	"Output L→H"	I _{FLH}	—	VCC1=15V, VEE1=-15V, RL=200Ω, VO>0V	—	1.2	5	mA
Threshold input voltage	"Output H→L"	V _{FHL}	—	VCC1=15V, VEE1=-15V, RL=200Ω, VO<0V	0.8	—	—	V
Supply voltage	V _{CC}	—	—	10	—	35	V	
Capacitance (input-output)	C _S	—	Vs=0, f=1MHz, Ta=25°C	—	1.0	2.0	pF	
Resistance (input-output)	R _S	—	Vs=500V, Ta=25°C, R.H. ≤ 60%	1*10 ¹²	10 ¹⁴	—	Ω	

* All typical values are at Ta=25°C (*A): Duration of I_O time ≤ 50μs

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■ Switching Characteristics (Ta = -20~70°C, unless otherwise specified)

Parameter	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time	"L→H"	t_{pLH}	IF=8mA (Note8) VCC1=+15V, VEE1=-15V Rg=20Ω, Cg=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, Ta=25°C	-5	—	—	KV / μs
Common mode transient immunity at low level output	C_{ML}	7	V _{CM} =600V, I _F =0 V _{CC} =30V, Ta=25°C	5	—	—	KV / μs

* All typical values are at Ta=25°C.

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

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Test Circuit:

Fig.1 : Top View

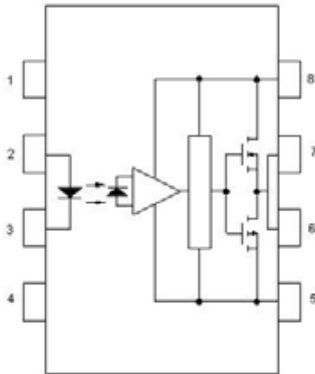


Fig.2 : I_{OPL} Measure.

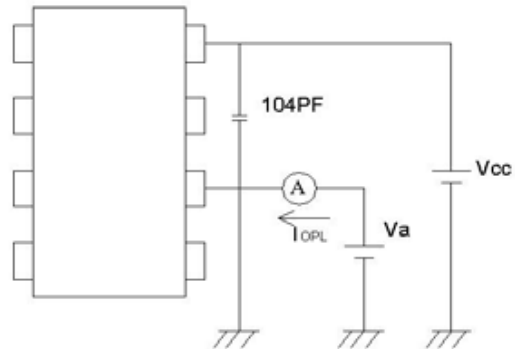


Fig.3 : I_{OPH} Measure.

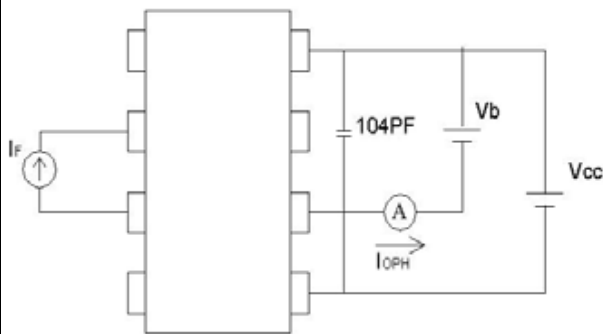


Fig.4 : V_{OH} Measure.

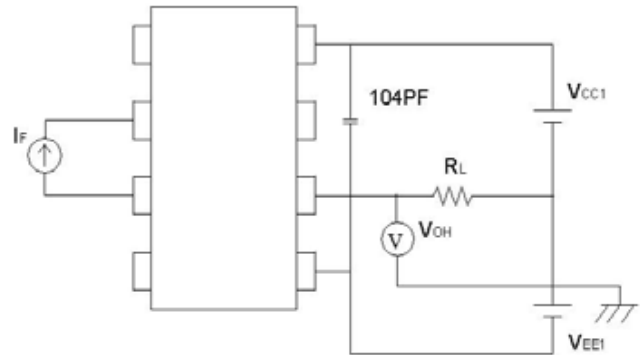
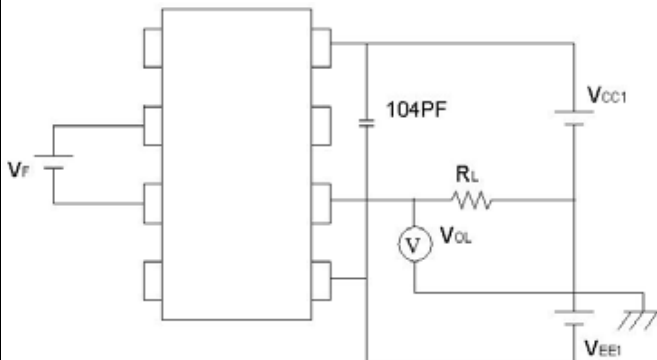


Fig.5 : V_{OL} Measure.



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

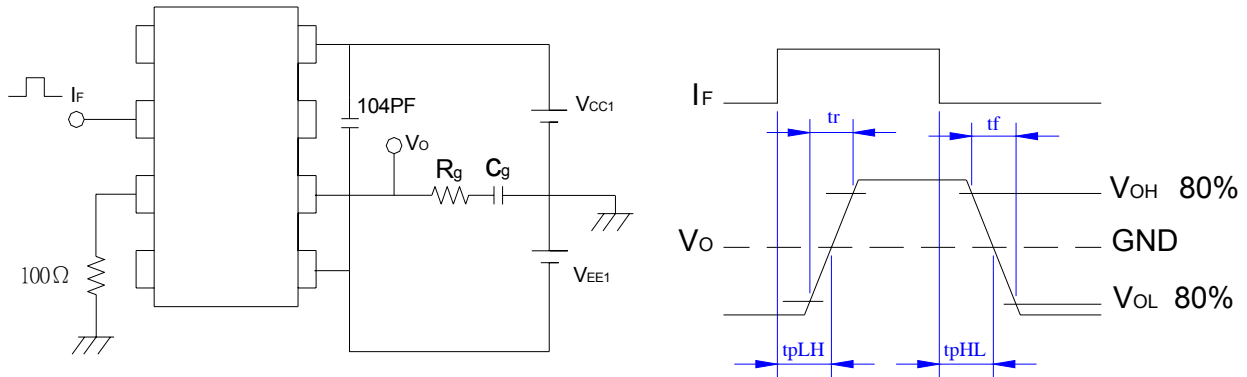
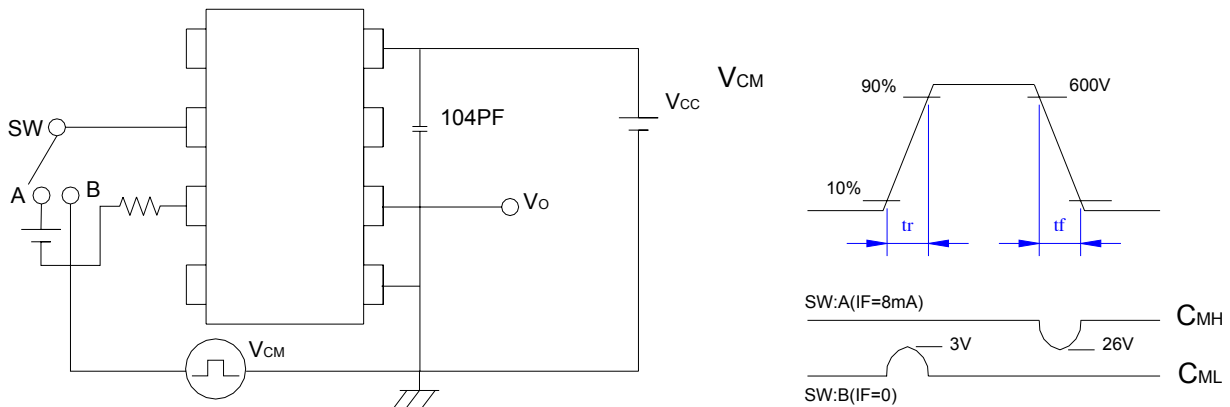


Fig.7: C_{MH} , C_{ML} .



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

* 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.

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Fig.8:

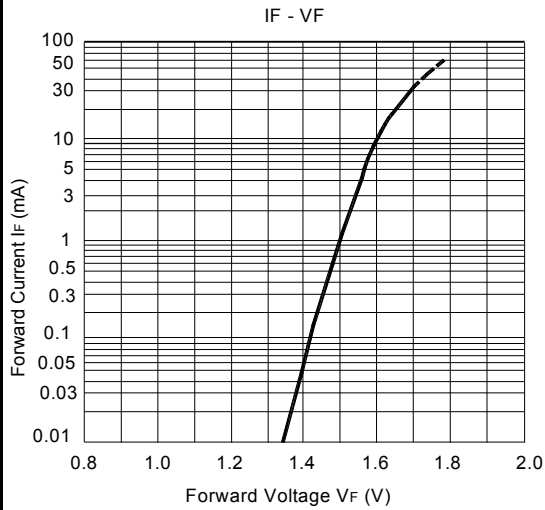


Fig.9 :

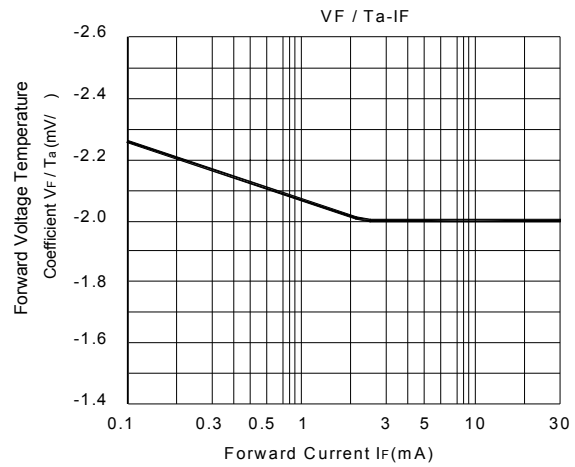


Fig.10 :

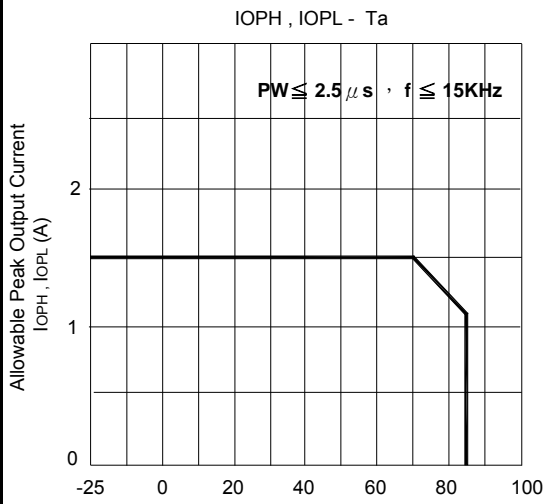


Fig.11:

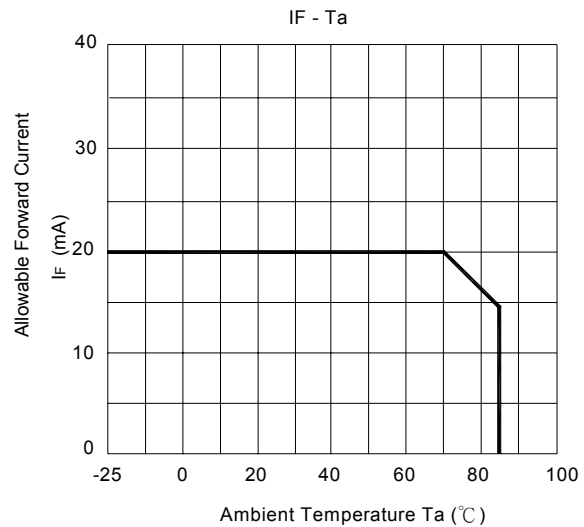


Fig.12:

