PRODUCT SPECIFICATION

DATE:03/26/2012

cosmo ELECTRONICS CORPORATION	Photocoupler : KPC6N137	NO.60P51012	REV
		SHEET 1 OF 8	4

Super High Speed Response Photocoupler

●Features

1. Pb free and RoHS compliant.
2. Super high speed response (t_{PLH},t_{PHL}:typ.45ns at R_L=350 ohm).
3. Instantaneous common mode rejection voltage(CM_H:typ. 500V/us).
4. High isolation voltage between input and output (Viso:5000Vrms).
5. Low input current drive (I_{FHL}: Max. 5mA).
6. LSTTL and TTL compatible output.
7. Agency Approvals
   - UL approved：UL1577　No.E169586
   - CUL approved：UL1577　No.E169586
   - VDE approved：EN 60747　No.40020973

●Applications

1. High speed interfaces for computer peripherals, microcomputer systems.
2. High speed line receivers.
3. Noise reduction.
4. Interfaces for data transmission equipment.

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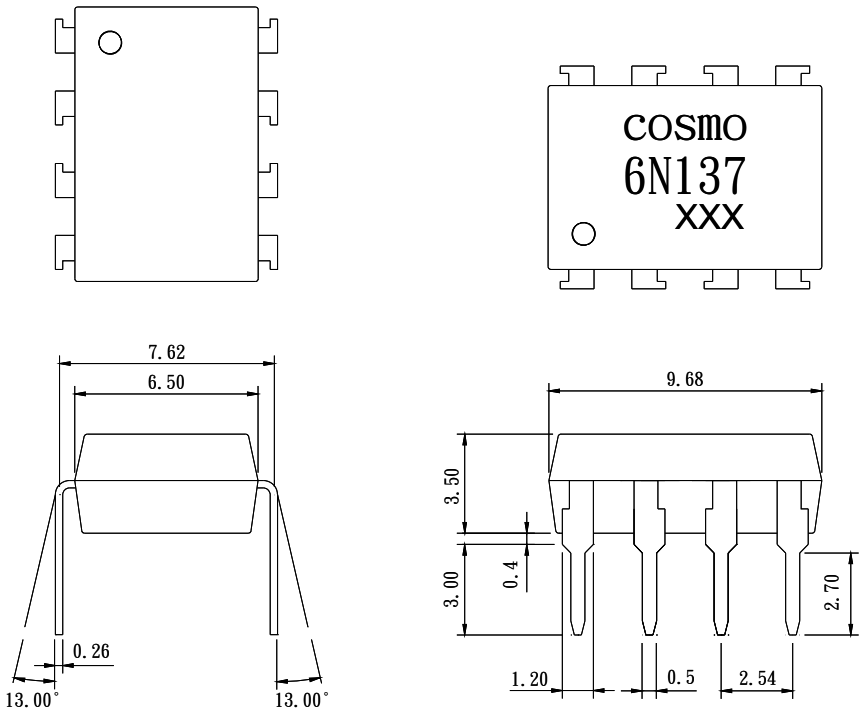
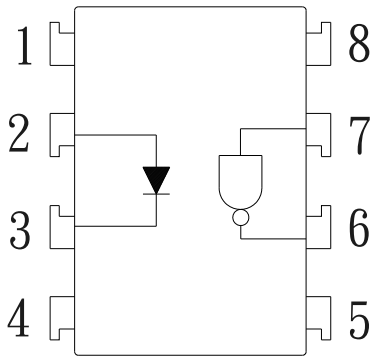
1. OUTSIDE DIMENSION : UNIT (mm)



TOLERANCE : ±0.2mm

2. SCHEMATIC : Top View



1.NC
2.Anode
3.Cathode
4.NC
5.GND
6.Vo
7.VE
8.Vcc

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●Absolute Maximum Ratings

(Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current (*1)	I_F	20	mA
	Peak forward current (*2)	I_{FM}	40	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	45	mW
Output	Supply voltage	V_{CC}	7	V
	Enable voltage	V_E	5.5	V
	High level output voltage	V_{OIL}	7	V
	Low level output current	I_{OL}	50	mA
	Output collector power dissipation	P_C	85	mW
Isolation voltage 1 minute (*3)		Viso	5000	Vrms
Operating temperature		Topr	-40 to +85	℃
Storage temperature		Tstg	-55 to +125	℃
Soldering temperature 10 second		Tsol	260	℃

●Electro-optical Characteristics

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input forward voltage (*4)	V_F	I_F=10mA,Ta=25℃	-	1.6	1.75	V
Input reverse voltage	BV_R	I_R=10uA,Ta=25℃	5	-	-	V
Input capacitance	C_{IN}	V_F=0, f=1MHz	-	60	-	pF
Logic (1) output current	I_{OH}	V_{CC}=5.5V,V_O=5.5V,I_F=250uA,V_E=2.0V	-	2	250	uA
Logic (0) output voltage	V_{OL}	V_{CC}=5.5V,V_{EH}=2V,I_F=5mA, $I_{OL(Sinking)}$=13mA	-	0.4	0.6	V
Logic (1) enable current	I_{EH}	V_{CC}=5.5V,V_E=2.0V	-	-0.8	-	mA
Logic (0) enable current	I_{EL}	V_{CC}=5.5V,V_E=0.5V	-2.0	-1.2	-	mA
Logic (1) supply current	I_{CCH}	V_{CC}=5.5V,V_E=0.5V,IF=0mA	-	7	15	mA
Logic (0) supply current	I_{CCL}	V_{CC}=5.5V,V_E=0.5V,IF=10mA	-	13	18	mA
Leak current (*5)	I_{I-O}	45%RH,Ta=25℃,t=5s,V_{I-O}=3000V_{DC}	-	-	1.0	mA
Isolation resistance (input-output) (*5)	R_{I-O}	V_{I-O}=500V, Ta=25℃	-	10^{12}	-	Ω
Capacitance (input-output) (*5)	C_{I-O}	f=1MHZ, Ta=25℃	-	0.6	-	pF
Propagation delay time Output (0)→(1) (*7)	t_{PLH}	I_F=7.5mA,V_{CC}=5V,RL=350Ω, CL=15pF,Ta=25℃	-	45	75	ns
Propagation delay time Output (1)→(0) (*7)	t_{PHL}		-	45	75	ns
Output rise-fall time (10 to 90%)	tr,tf	I_F=7.5mA,V_{CC}=5V,RL=350Ω,CL=15pF	-	30	-	ns
Enable propagation delay time Output (1)→(0) (*8)	t_{ELH}	I_F=7.5mA,RL=350Ω,CL=15pF, V_{EH}=3.0V, V_{EL}=0.5V	-	40	-	ns
Enable propagation delay time Output (0)→(1) (*8)	t_{EHL}		-	15	-	ns
Instantaneous common mode rejection voltage "output(0)" (*9)	CM_H	I_F=0mA, V_{CM}=10V,$V_{O(Min)}$=2.0V RL=350Ω	-	500	-	V/us
Instantaneous common mode rejection voltage "output(1)" (*9)	CM_L	I_F=5mA, V_{CM}=10V,$V_{O(Max)}$=0.8V RL=350Ω	-	-500	-	V/us

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Note) Typical values are all at Vcc = 5V, Ta= 25°C
*1 Ta=0 to 70°C.
*2 Pulse width <= 1ms
*3 40 to 80%RH AC for 1 minute ,f=60HZ.
*4 At Iin =10mA, VF decreases at the rate of 1.6mV/°C if the temperature goes up.*6 Ta=0 to 70°C.
*5 Measured as 2-pin element. Connect pins 2 and 3, connect pins 5, 6, 7 and 8.
*6 DC current transfer ratio is defined as the ratio of output collector current to forward bias input current.
*7 Refer to the Fig. 1.
*8 Refer to the Fig. 2.
*9 CM_H represents a common mode voltage ignorable rise time ratio that can hold logic (1) state in output.
CM_L represents a common mode voltage ignorable fall time ratio that can hold logic (0) state in output.

●Recommmended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Low level input current	I_{FL}	0	250	uA
High level input current	I_{FH}	7.0	15	mA
High level enable voltage	V_{EH}	2.0	Vcc	V
Low level enable voltage	V_{EL}	0	0.8	V
Supply voltage	V_{CC}	4.5	5.5	V
Fanout (TTL load)	N	-	8	-

Truth Table

Input	Enable	Ouput
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

Circuit Block Diagram

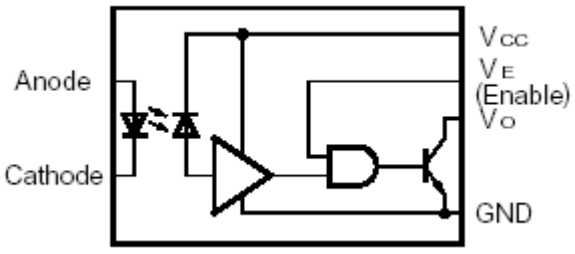

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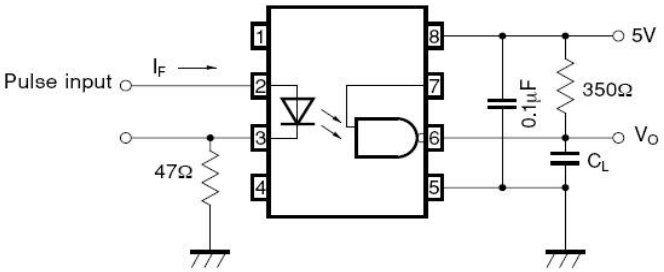
Fig.1 Test Circuit for Propagation Delay time



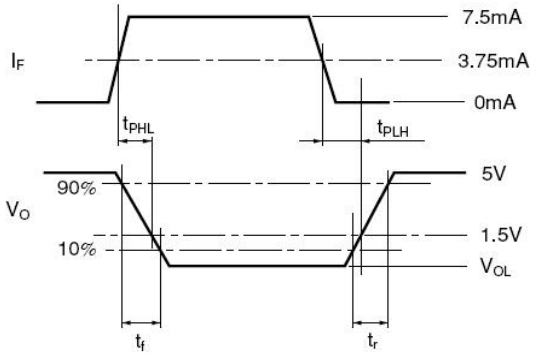
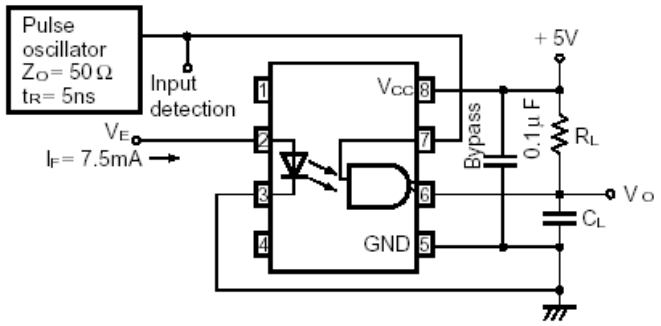


Fig.2 Test Circuit for Enable Propagation Delay Time



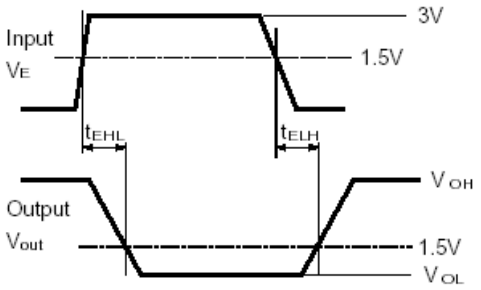
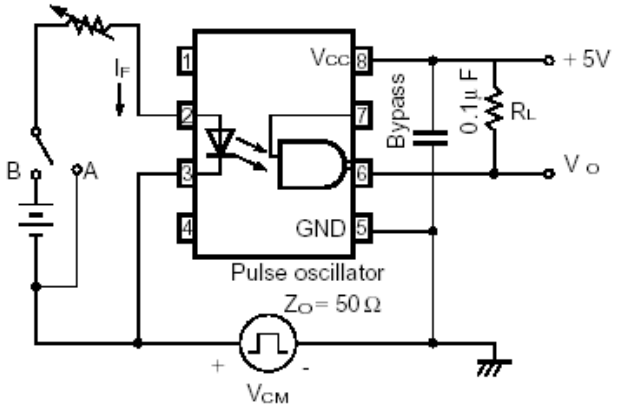


Fig.3 Test Circuit for Instantaneous Common Mode Rejection Voltage



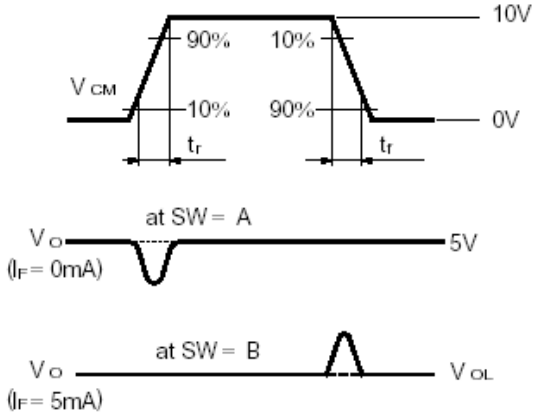


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Fig.1 Low Level Output Voltage vs. Ambient Temperature

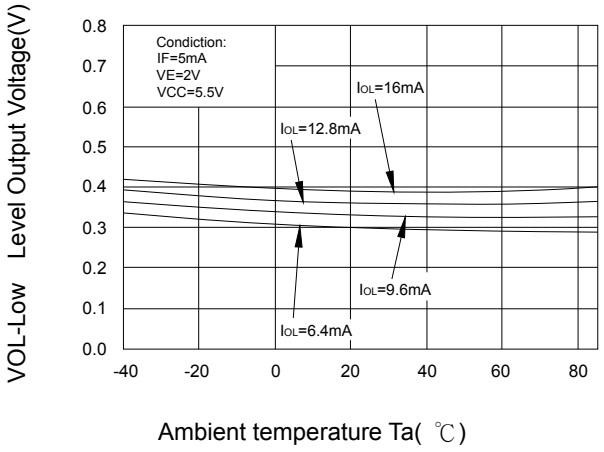

Fig.2 Input Diode Forward Voltage vs. Forward Current

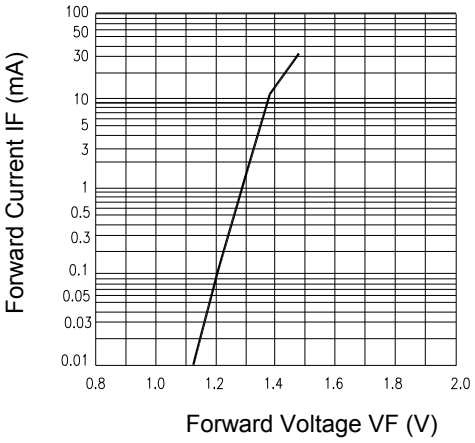

Fig.3 Switching Time vs. Forward Current

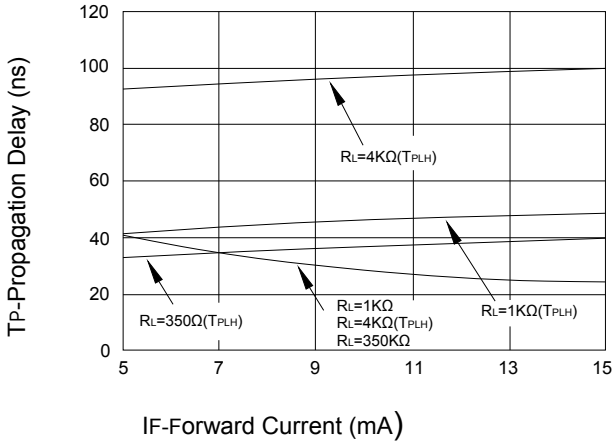

Fig.4 Low Level Output Current vs. Ambient Temperature

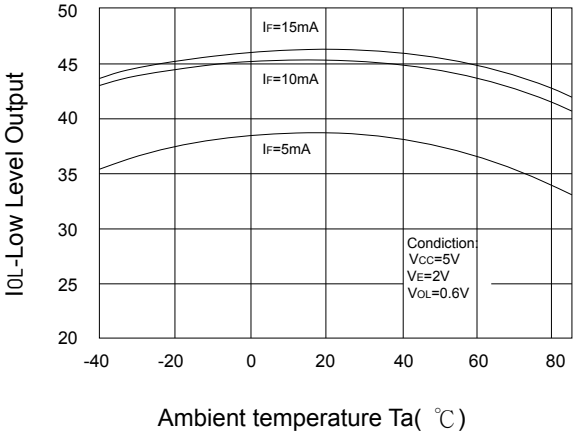

Fig.5 Input Threshold Current vs. Ambient Temperature

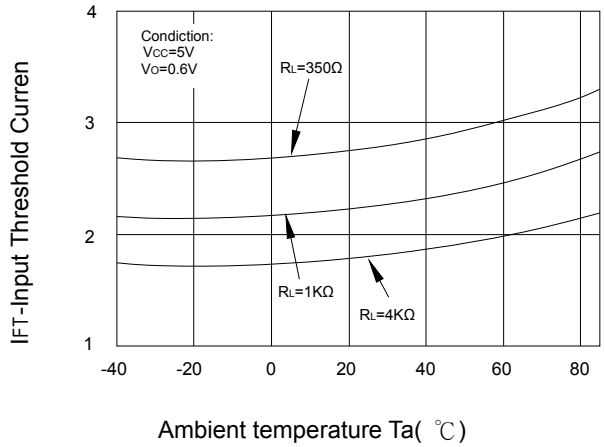

Fig.6 Output Voltage vs. Input Forward Current

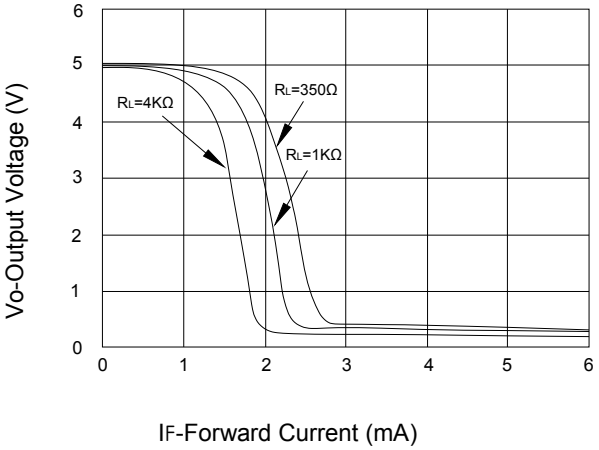

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Fig.7 Pulse Width Distortion vs. Temperatur

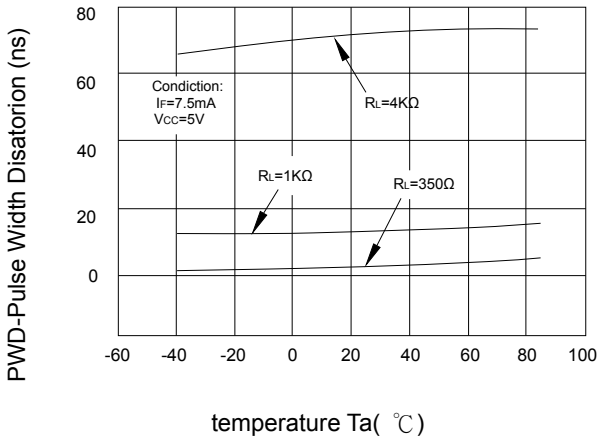


Fig.8 Rise and Fall Time vs. Temperature

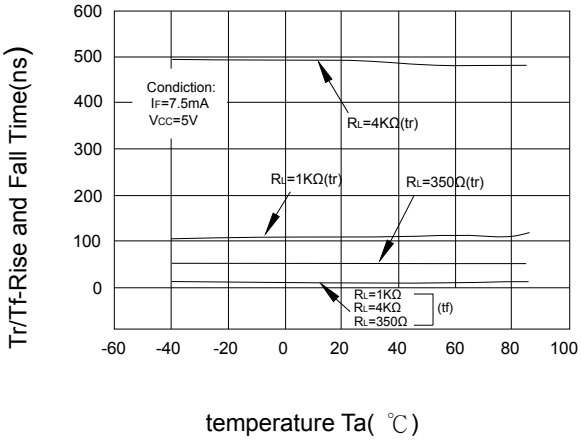


Fig.9 Switch Time vs,Temperature

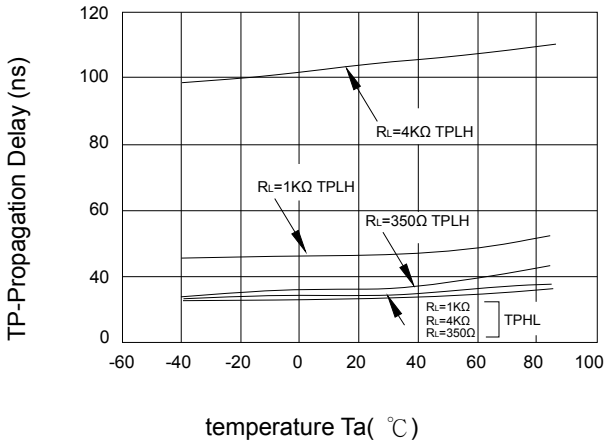
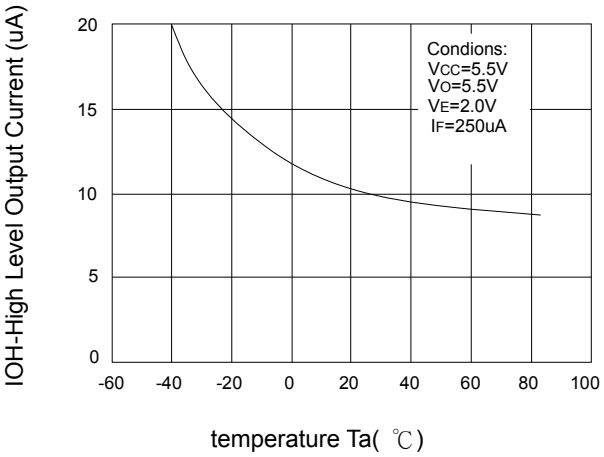


Fig.10 High Level Output Current vs. Temperature



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