

# PRODUCT SPECIFICATION

DATE : 03/26/2012

<b>cosmo</b> ELECTRONICS CORPORATION	Photocoupler : <b>KPC6N136H</b>	NO.62P51001	REV.
		SHEET 1 OF 5	2

## General Purpose Type Photocoupler

### ● Features

1. Pb free and RoHS compliant.
2. High speed response  $t_{PHL}$ ,  $t_{PLH}$   
( MAX. 0.8us at  $RL=1.9K\Omega$  )
3. High common mode rejection voltage  
(  $CM_H$  : TYP. 1KV/us )
4. Compact surface mount type package
5. Agency Approvals  
UL approved : UL1577 , No.E169586  
CUL approved : C22.2 No.1 & NTC No.5 , No.E169586  
VDE approved : EN60747 , No.40006080  
FIMKO approved : EN 60065 No. FI 25798  
EN 60950 No. FI 25798

### ● Application :

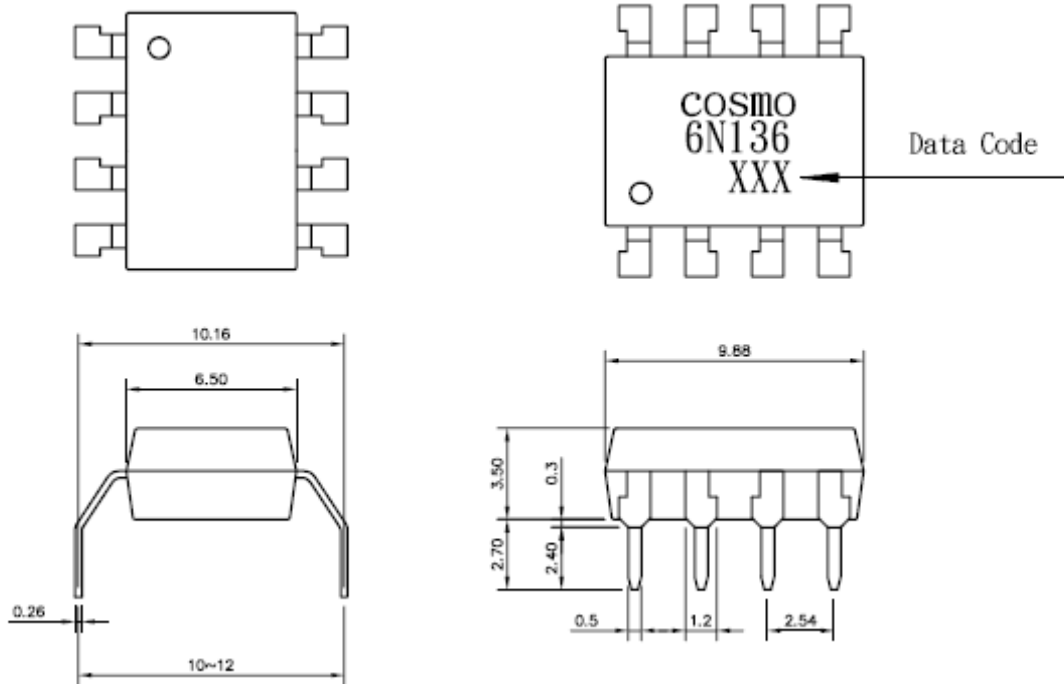
1. Computers, measuring instruments, control equipment.
2. High speed line receivers, high speed logic.
3. Telephone sets.
4. Signal transmission between circuits of different Potentials and impedances.

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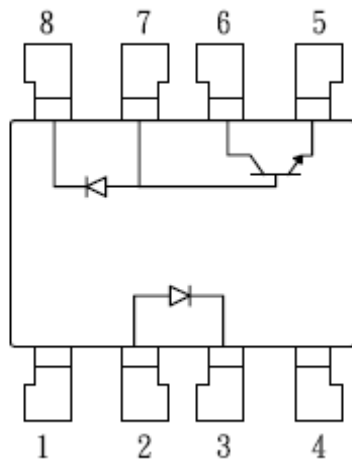
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## ● Outside Dimension : Unit ( mm )



TOLERANCE :  $\pm 0.2\text{mm}$

## ● Schematic : Top View



- 1. NC
- 2. Anode
- 3. Cathode
- 4. NC
- 5. GND
- 6.  $V_O$
- 7.  $V_B$
- 8.  $V_{CC}$

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## ● Absolute Maximum Ratings

( Ta=25°C )

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	25	mA
	*1 Peak forward current	$I_F$	50	mA
	*2 Peak transient forward current	$I_{FM}$	1	A
	Reverse voltage	$V_R$	5	V
	Power dissipation	$P$	45	mW
Output	Supply voltage	$V_{CC}$	-0.5 to 15	V
	Output voltage	$V_O$	-0.5 to 15	V
	Emitter-base reverse with stand voltage ( Pin5 to 7 )	$V_{EBO}$	5	V
	Average output current	$I_O$	8	mA
	Peak output current	$I_{OP}$	16	mA
	Base current ( Pin7 )	$I_B$	5	mA
	Power dissipation	$P_O$	100	mW
*3 Isolation voltage 1 minute		$V_{iso}$	5000	Vrms
Operating temperature		$T_{opr}$	-55 to +100	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
*4 Soldering temperature 10 second		$T_{sol}$	260	°C

\*1 50% duty cycle, Pulse width : 1mS

Decreases at the rate of 1.6mA/°C if the external temperature is 70°C or more.

\*2 Pulse width  $\leq$  1uS, 300pulse/sec

\*3 40 to 60% RH, AC for 1 minute

\*4 For 10 seconds

## ● Electro-optical Characteristics

( Ta=0 to +70°C unless otherwise specified )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*5 Current transfer ratio	CTR(1)	Ta=25°C, $I_F=16mA$ $V_O=0.4V, V_{CC}=4.5V$	19	40	-	%
	CTR(2)	$I_F=16mA$ $V_O=0.5V, V_{CC}=4.5V$	15	43	-	%
Logic ( 0 ) output voltage	$V_{OL}$	*6 $V_{CC}=4.5V, I_F=16mA$	-	0.1	0.4	V
Logic ( 1 ) output current	$I_{OH}(1)$	Ta=25°C, $I_F=0$ $V_O=V_{CC}=5.5V$	-	3.0	500	nA
	$I_{OH}(2)$	Ta=25°C, $I_F=0$ $V_O=V_{CC}=15V$	-	0.01	1.0	uA
	$I_{OH}(3)$	$V_{CC}=V_O=15V, I_F=0$	-	-	50	uA
Logic ( 0 ) supply current	$I_{CCL}$	$I_F=16mA$ $V_O=open, V_{CC}=15V$	-	200	-	uA
Logic ( 1 ) supply current	$I_{CCH}(1)$	Ta=25°C, $I_O=0$ $V_F=open, V_{CC}=15V$	-	0.02	1.0	uA
	$I_{CCH}(2)$	$I_O=0$ $V_O=open, V_{CC}=15V$	-	-	2.0	uA
Input forward voltage	$V_F$	Ta=25°C, $I_F=16mA$	-	1.7	1.95	V
Input forward voltage temperature coefficient	$\Delta V_F/\Delta Ta$	$I_F=16mA$	-	-1.9	-	mV/°C
Input reverse voltage	$BV_R$	Ta=25°C, $I_R=10uA$	5.0	-	-	V
Input capacitance	$C_{IN}$	$V_F=0, f=1MHz$	-	60	-	pF
*7 Leak current ( input-output )	$I_{I-O}$	Ta=25°C, 45%RH $V_{I-O}=3KVDC, t=5s$	-	-	1.0	uA
*7 Isolation resistance ( input-output )	$R_{I-O}$	$V_{I-O}=500VDC$	-	$10^{12}$	-	$\Omega$
*7 Capacitance ( input-output )	$C_{I-O}$	$f=1MHz$	-	0.6	-	pF
Transistor current amplification factor	$h_{FE}$	$V_O=5V, I_O=3mA$	-	70	-	

\*5 Current transfer ratio is the ratio of input current and output current expressed in %

\*6  $I_O=2.4mA$

\*7 Measured as 2-pin element ( Short 1, 2, 3, 4 and 5, 6, 7, 8 )

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## ● Switching Characteristics

( Ta=25°C, V<sub>CC</sub>=5V, I<sub>F</sub>=16mA )

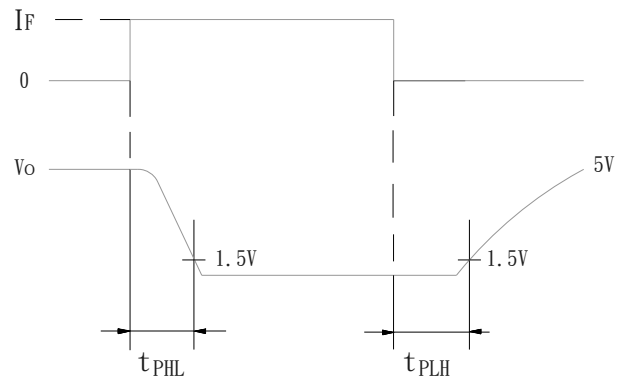
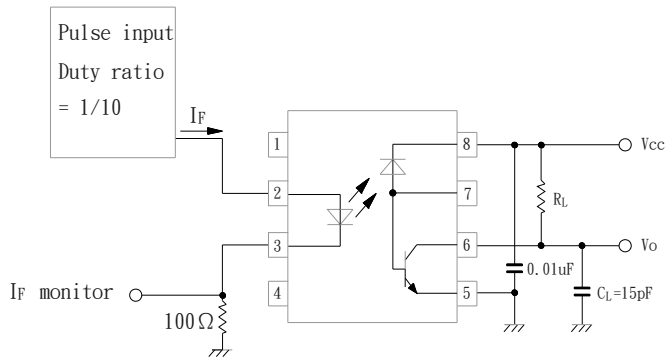
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*8 Propagation delay time *9 Output (1) → (0)	t <sub>PHL</sub>	R <sub>L</sub> =1.9KΩ	-	0.3	0.8	uS
*8 Propagation delay time *9 Output (0) → (1)	t <sub>PLH</sub>	R <sub>L</sub> =1.9KΩ	-	0.3	0.8	uS
*10 Instantaneous common mode rejection voltage *11 " Output (1) "	CM <sub>H</sub>	I <sub>F</sub> =0, V <sub>CM</sub> =10V <sub>P-P</sub>	-	1000	-	V/uS
*10 Instantaneous common mode rejection voltage *11 " Output (0) "	CM <sub>L</sub>	I <sub>F</sub> =16mA, V <sub>CM</sub> =10V <sub>P-P</sub>	-	-1000	-	V/uS
*12 Bandwidth	BW	R <sub>L</sub> =100Ω	-	2.0	-	MHz

\*8 R<sub>L</sub>=1.9KΩ is equivalent to one LSTTL and 5.6KΩ pull-up resistor.

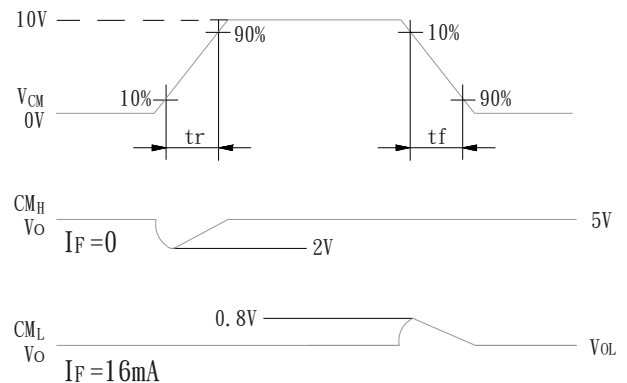
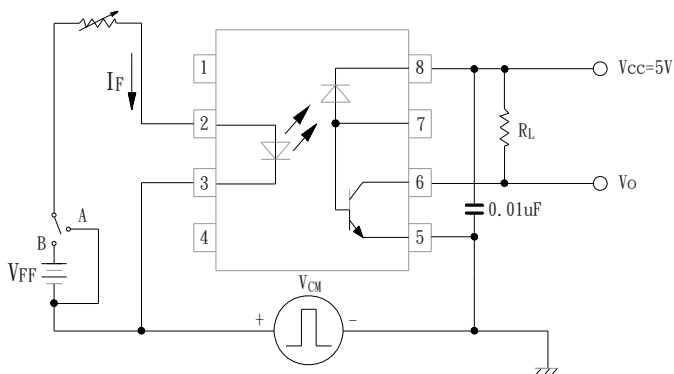
\*10 Instantaneous common mode rejection voltage " output (1) " represents a common mode voltage variation that can hold the output above (1) level ( V<sub>o</sub> > 2.0V )  
Instantaneous common mode rejection voltage " output (0) " represents a common mode voltage variation that can hold the output above (0) level ( V<sub>o</sub> < 0.8V )

\*12 Bandwidth represents a point where AC input goes down by 3dB.

### \*9 Test Circuit Propagation Delay Time



### \*11 Test Circuit for Instantaneous Common Mode Rejection Voltage



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