

# PRODUCT SPECIFICATION

DATE : 03/26/2012

<b>cosmo</b> ELECTRONICS CORPORATION	Photocoupler : <b>KPC6N139H</b>	NO.62P51004	REV.
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## General Purpose Type Photocoupler

### ● Features

1. Pb free and RoHS compliant.
2. High current transfer ratio  
( CTR : MIN. 500% at  $I_F=1.6\text{mA}$  )
3. High speed response  
(  $t_{PHL}$  : TYP. 0.2us at  $R_L=270\Omega$  )
4. High common mode rejection voltage  
(  $CM_H$  : TYP. 500V/us )
5. TTL compatible output
6. 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. Interfaces for computer peripherals.
2. Electronic calculators, measuring instruments, control equipment.
3. Telephone sets.
4. Signal transmission between circuits of different Potentials and impedances.

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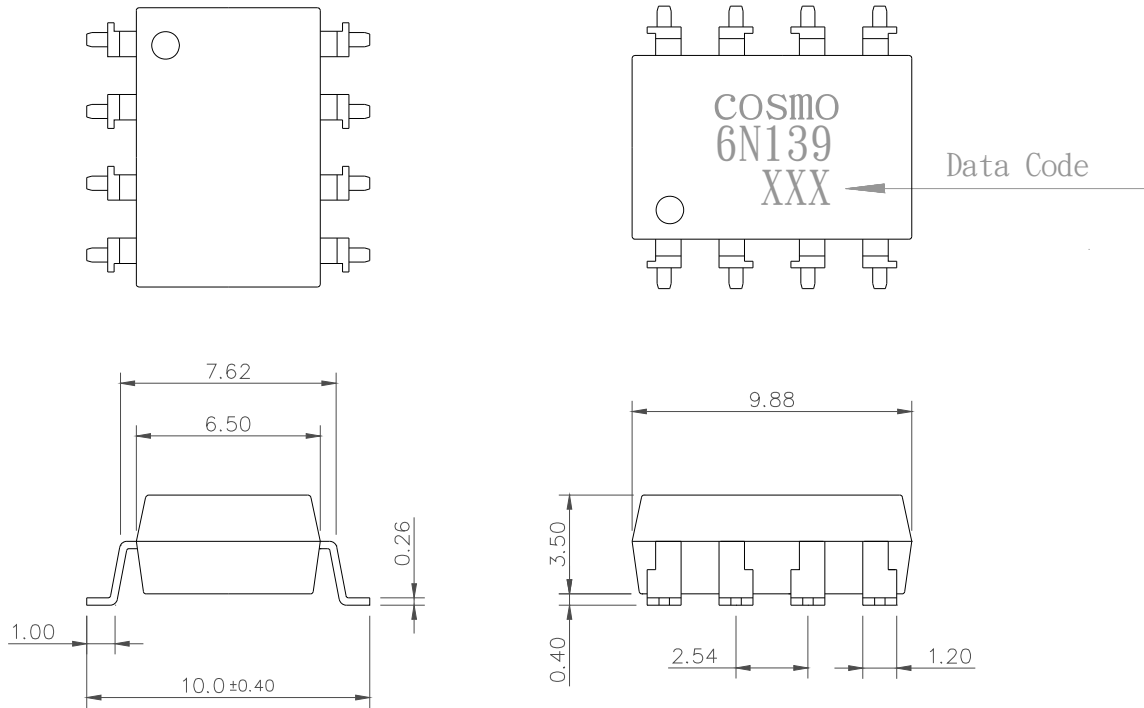
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Photocoupler :  
**KPC6N139H**

NO.62P51004  
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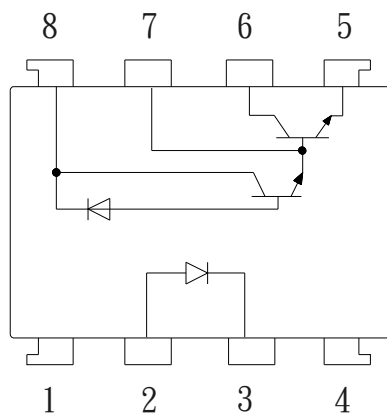
REV.  
2

## ● Outside Dimension : Unit ( mm )



**TOLERANCE : ±0.2mm**

## ● Schematic : Top View



- 1. NC
- 2. Anode
- 3. Cathode
- 4. NC
- 5. GND
- 6. V<sub>O</sub>
- 7. V<sub>B</sub>
- 8. V<sub>CC</sub>

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## ● Absolute Maximum Ratings

( Ta=25°C )

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	20	mA
	*1 Peak forward current	$I_F$	40	mA
	*2 Peak transient forward current	$I_{FM}$	1	A
	Reverse voltage	$V_R$	5	V
	Power dissipation	$P$	35	mW
Output	Supply voltage	$V_{CC}$	-0.5 to 18	V
	Output voltage	$V_O$	-0.5 to 18	V
	Emitter-base reverse with stand voltage ( Pin5 to 7 )	$V_{EBO}$	0.5	V
	*3 Average output current	$I_O$	60	mA
	Power dissipation	$P_O$	100	mW
*4 Isolation voltage 1 minute		$V_{iso}$	5000	Vrms
Operating temperature		$T_{opr}$	0 to +100	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
*5 Soldering temperature 10 second		$T_{sol}$	260	°C

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

\*2 Pulse width  $\leq$  1us, 300pps

\*3 Decreases at the rate of 0.7mA/°C if the external temperature is more than 25°C.

\*4 40 to 60% RH, AC for 1 minute

\*5 For 10 seconds

## ● Electro-optical Characteristics

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*6 Current transfer ratio	CTR(1)	$I_F=0.5mA, V_O=0.4V, V_{CC}=4.5V$	400	1800	-	%
	CTR(2)	$I_F=1.6mA, V_O=0.4V, V_{CC}=4.5V$	500	1600	-	%
Logic ( 0 ) output voltage	$V_{OL}(1)$	$I_F=6.4mA, I_O=1.6mA, V_{CC}=4.5V$	-	0.1	0.4	V
	$V_{OL}(2)$	$I_F=5mA, I_O=15mA, V_{CC}=4.5V$	-	0.1	0.4	V
	$V_{OL}(3)$	$I_F=12mA, I_O=24mA, V_{CC}=4.5V$	-	0.1	0.4	V
Logic ( 1 ) output current	$I_{OH}$	$I_F=0, V_O=V_{CC}=18V$	-	0.05	100	uA
Logic ( 0 ) supply current	$I_{CCL}$	$I_F=1.6mA, V_O=open, V_{CC}=5V$	-	0.5	-	mA
Logic ( 1 ) supply current	$I_{CCH}$	$I_F=0, V_F=open, V_{CC}=5V$	-	10	-	nA
Input forward voltage	$V_F$	Ta=25°C, $I_F=1.6mA$	-	1.5	1.7	V
Input forward voltage temperature coefficient	$\Delta V_F/\Delta Ta$	$I_F=1.6mA$	-	-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

\*6 Current transfer ratio is the ratio of input current and output current expressed in %.

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

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## Switching Characteristics

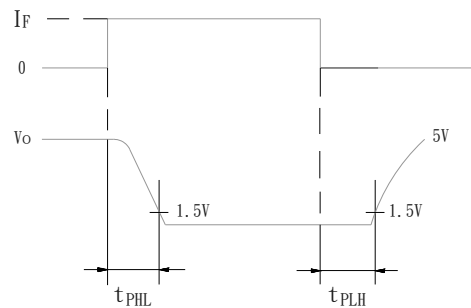
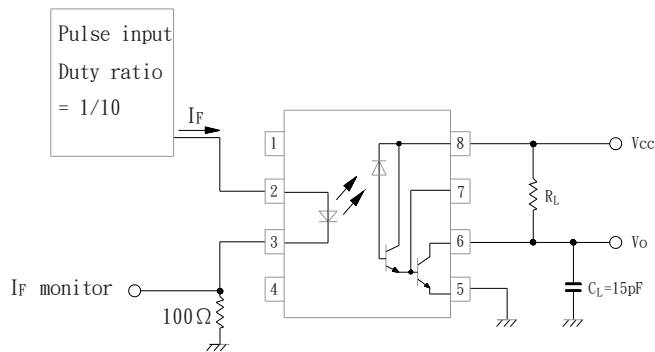
( Ta=25°C, V<sub>CC</sub>=5V )

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
*8 Propagation delay time Output (1) → (0)	t <sub>PHL</sub>	R <sub>L</sub> =4.7KΩ, I <sub>F</sub> =0.5mA	-	5	25	uS
		R <sub>L</sub> =270Ω, I <sub>F</sub> =12mA	-	0.3	1	uS
*8 Propagation delay time Output (0) → (1)	t <sub>PLH</sub>	R <sub>L</sub> =4.7KΩ, I <sub>F</sub> =0.5mA	-	10	60	uS
		R <sub>L</sub> =270Ω, I <sub>F</sub> =12mA	-	1.5	7	uS
*9 Instantaneous common mode rejection voltage “ Output (1) “	CM <sub>H</sub>	I <sub>F</sub> =0, V <sub>CM</sub> =10V <sub>P-P</sub> , R <sub>L</sub> =2.2KΩ	-	500	-	V/uS
*9 Instantaneous common mode rejection voltage “ Output (0) “	CM <sub>L</sub>	I <sub>F</sub> =1.6mA, V <sub>CM</sub> =10V <sub>P-P</sub> , R <sub>L</sub> =2.2KΩ	-	-500	-	V/uS

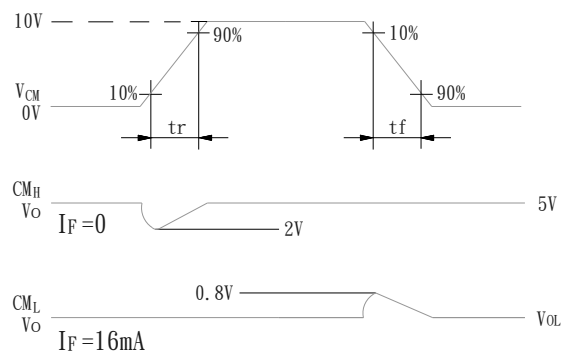
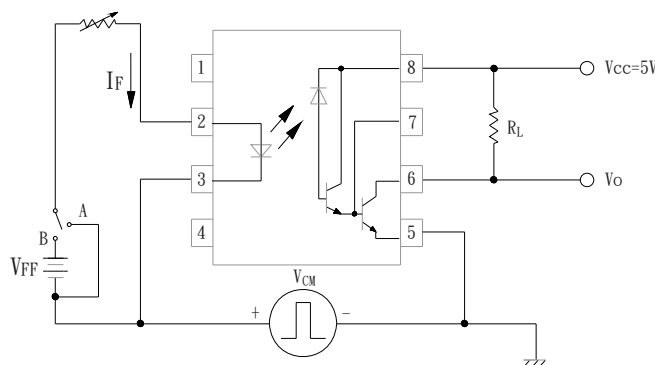
\*9 Instantaneous common mode rejection voltage “ output (1) “ represents a common mode voltage variation that can hold the output above (1) level ( V<sub>o</sub> > 2.0V )

\*10 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 )

### \*8 Test Circuit Propagation Delay Time



### \*10 Test Circuit for Instantaneous Common Mode Rejection Voltage



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