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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





**NEC's HIGH NOISE REDUCTION  
25 Mbps CMOS OUTPUT TYPE  
8-PIN DIP OPTOCOUPLER**

**PS9661  
PS9661L**

**DESCRIPTION**

NEC's PS9661 and PS9661L are optically coupled isolators containing a GaAlAs LED on the input side and a CMOS output IC on the output side.

These photocouplers are high common mode transient immunity (CMR), high-speed CMOS output type devices, making them ideal for high-speed logic interface circuits.

The PS9661 is in a plastic DIP (Dual In-line Package) and the PS9661L is lead bending type (Gull-wing) for surface mounting.

**FEATURES**

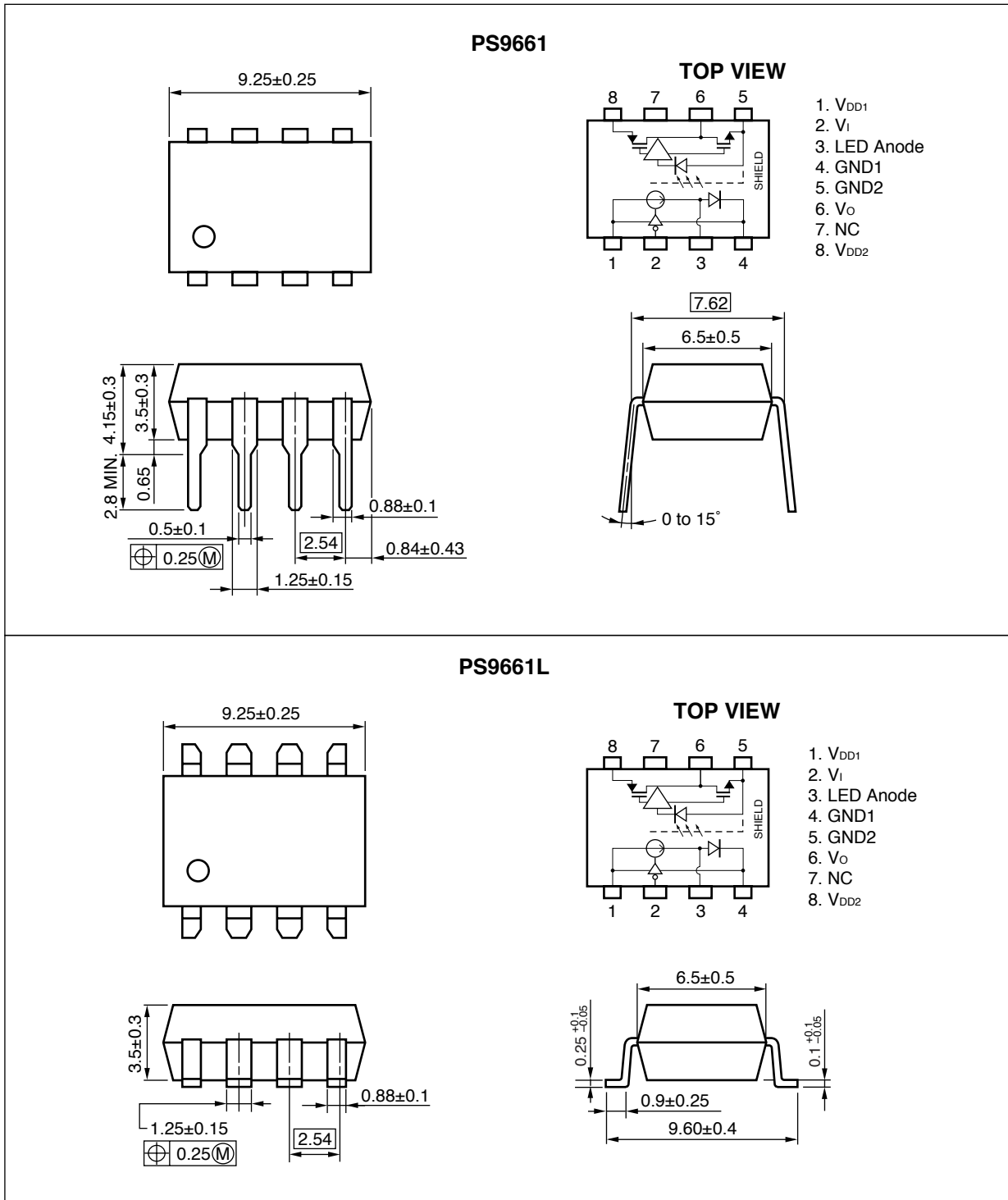
- High-speed response (25 Mbps)
- High common mode transient immunity ( $CM_H, CM_L = \pm 20 \text{ kV}/\mu\text{s}$  TYP.)
- High isolation voltage ( $BV = 3\,750 \text{ Vr.m.s.}$ )
- Pulse width distortion ( $|t_{PHL} - t_{PLH}| = 3 \text{ ns}$  TYP.)
- Ordering number of tape product: PS9661L-E3, E4: 1 000 pcs/reel

**APPLICATIONS**

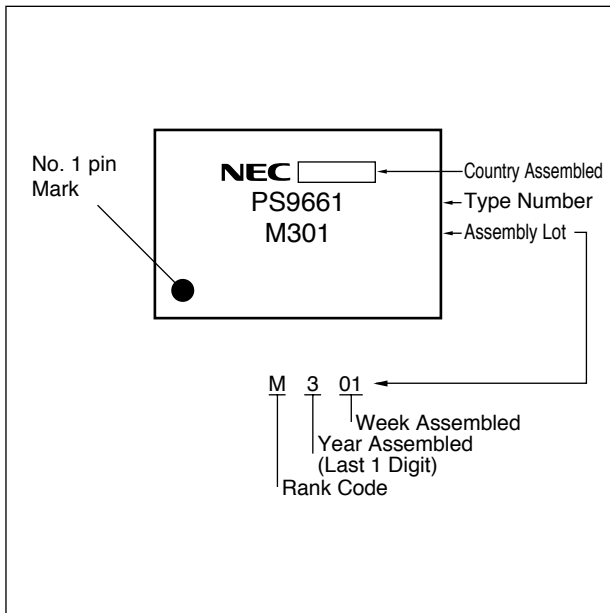
- Factory Automation Network
- Measurement equipment
- PDP

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PACKAGE DIMENSIONS (UNIT: mm)



**MARKING EXAMPLE**



# PS9661, PS9661L

## ORDERING INFORMATION

Part Number	Package	Packing Style
PS9661	8-pin DIP	Magazine case 50 pcs
PS9661L		
PS9661L-E3		Embossed Tape 1 000 pcs/reel
PS9661L-E4		

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Input Voltage	V <sub>I</sub>	-0.5 to V <sub>DD1</sub> +0.5	V
Detector	Supply Voltage	V <sub>DD1</sub> , V <sub>DD2</sub>	0 to 5.5	V
	Output Voltage	V <sub>O</sub>	-0.5 to V <sub>DD2</sub> +0.5	V
	Output Current	I <sub>O</sub>	10	mA
Isolation Voltage <sup>*1</sup>		BV	3 750	Vr.m.s.
Total Power Dissipation		P <sub>T</sub>	150	mW
Operating Ambient Temperature		T <sub>A</sub>	-40 to +85	°C
Storage Temperature		T <sub>stg</sub>	-40 to +125	°C

\*1 AC voltage for 1 minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

## RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
High Level Input Voltage	V <sub>IH</sub>	2.0		V <sub>DD1</sub>	V
Low Level Input Voltage	V <sub>IL</sub>	0		0.8	V
Supply Voltage	V <sub>DD1</sub> , V <sub>DD2</sub>	4.5	5.0	5.5	V
Rise Time	t <sub>r</sub>			100	ns
Fall Time	t <sub>f</sub>				

**ELECTRICAL CHARACTERISTICS (Recommended Operating Conditions Unless Otherwise Specified. Note That  $V_{DD1} = V_{DD2} = 5\text{ V}$ .)**

Parameter		Symbol	Conditions	MIN.	TYP.*1	MAX.	Unit	Fig.			
Diode	Low Level Supply Current	$I_{DD1L}$	$V_I = 0\text{ V}$		7.5	10.0	mA	1			
	High Level Supply Current	$I_{DD1H}$	$V_I = V_{DD1}$		0.15	3.0		2			
	Input Current	$I_I$	$V_I = 0\text{ V}$ or $V_I = V_{DD1}$	-10		10	$\mu\text{A}$	3, 4			
Detector	Output Supply Current	$I_{DD2H}$	$V_I = V_{DD1}$		7	9	mA	5			
		$I_{DD2L}$	$V_I = 0\text{ V}$		5	9		6			
	High Level Output Voltage	$V_{OH}$	$I_O = -20\ \mu\text{A}, V_I = V_{IH}$	4.4	5.0		V	7			
			$I_O = -4\ \text{mA}, V_I = V_{IH}$	4.0	4.8						
	Low Level Output Voltage	$V_{OL}$	$I_O = 20\ \mu\text{A}, V_I = V_{IL}$		0.01	0.1		8			
			$I_O = 4\ \text{mA}, V_I = V_{IL}$		0.32	1.0					
Coupled	Isolation Resistance	$R_{I-O}$	$V_{I-O} = 1\ \text{kV}_{DC}$ , RH = 40 to 60%, $T_A = 25^\circ\text{C}$	$10^{11}$			$\Omega$				
	Isolation Capacitance	$C_{I-O}$	$V = 0\text{ V}$ , $f = 1\ \text{MHz}$ , $T_A = 25^\circ\text{C}$		1.3		pF				
	Propagation Delay Time (H $\rightarrow$ L)	$t_{PHL}$	$C_L = 15\ \text{pF}$ , CMOS Signal Levels		20	40	ns	9			
	Propagation Delay Time (L $\rightarrow$ H)	$t_{PLH}$			23	40					
	Pulse Width	PW		40							
	Pulse Width Distortion (PWD)	$ t_{PHL} - t_{PLH} $			3	8					
	Propagation Delay Skew	$t_{PSK}$				20					
	Rise Time	$t_r$			9						
	Fall Time	$t_f$			8						
	Common Mode Transient Immunity at High Level Output	$CM_H$		$V_I = V_{DD1} = V_{DD2} = 5\text{V}$ , $V_O > 0.8\ V_{DD1}$ , $V_{CM} = 1\ \text{kV}$ , $T_A = 25^\circ\text{C}$	10	20				kV/ $\mu\text{s}$	10
	Common Mode Transient Immunity at Low Level Output	$CM_L$		$V_I = V_{DD1} = V_{DD2} = 5\text{V}$ , $V_I = 0\text{V}$ $V_O < 0.8\ V_{DD1}$ , $V_{CM} = 1\ \text{kV}$	10	20					

\*1 Typical values at  $T_A = 25^\circ\text{C}$

### USAGE CAUTIONS

1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. By-pass capacitor of more than 0.1  $\mu\text{F}$  is used between  $V_{\text{DD}}$  and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.

MEASUREMENT CIRCUITS FOR ELECTRICAL CHARACTERISTICS

Fig. 1  $I_{DD1L}$

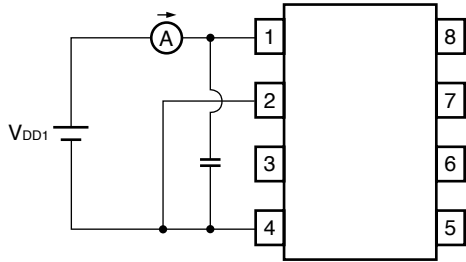


Fig. 2  $I_{DD1H}$

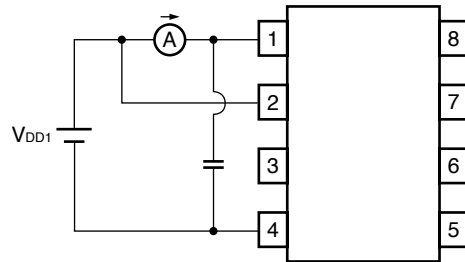


Fig. 3  $I_{IH}$

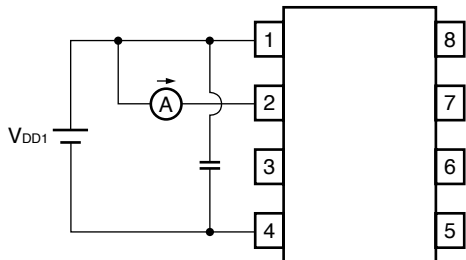


Fig. 4  $I_{IL}$

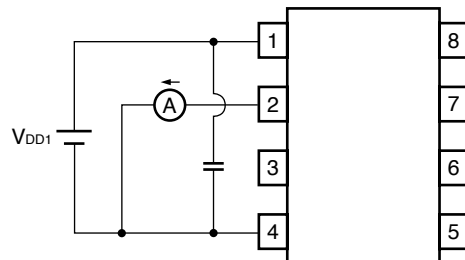


Fig. 5  $I_{DD2H}$

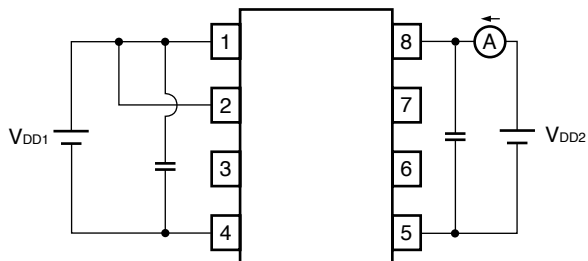


Fig. 6  $I_{DD2L}$

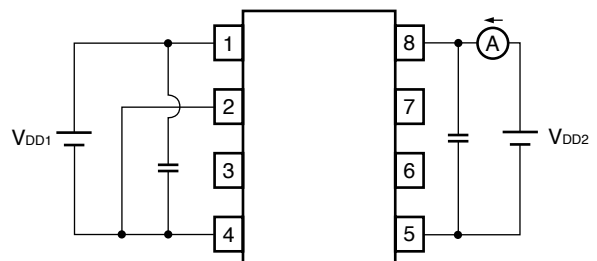


Fig. 7  $V_{OH}$

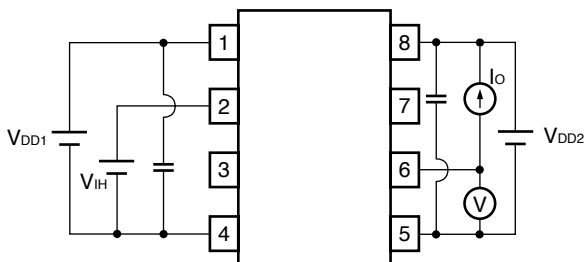
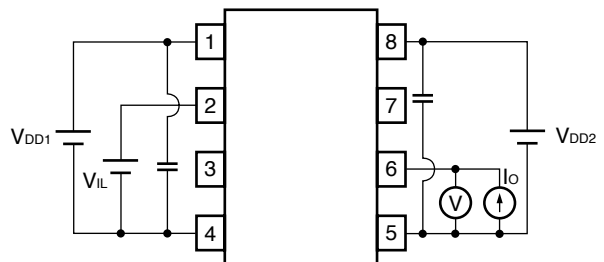
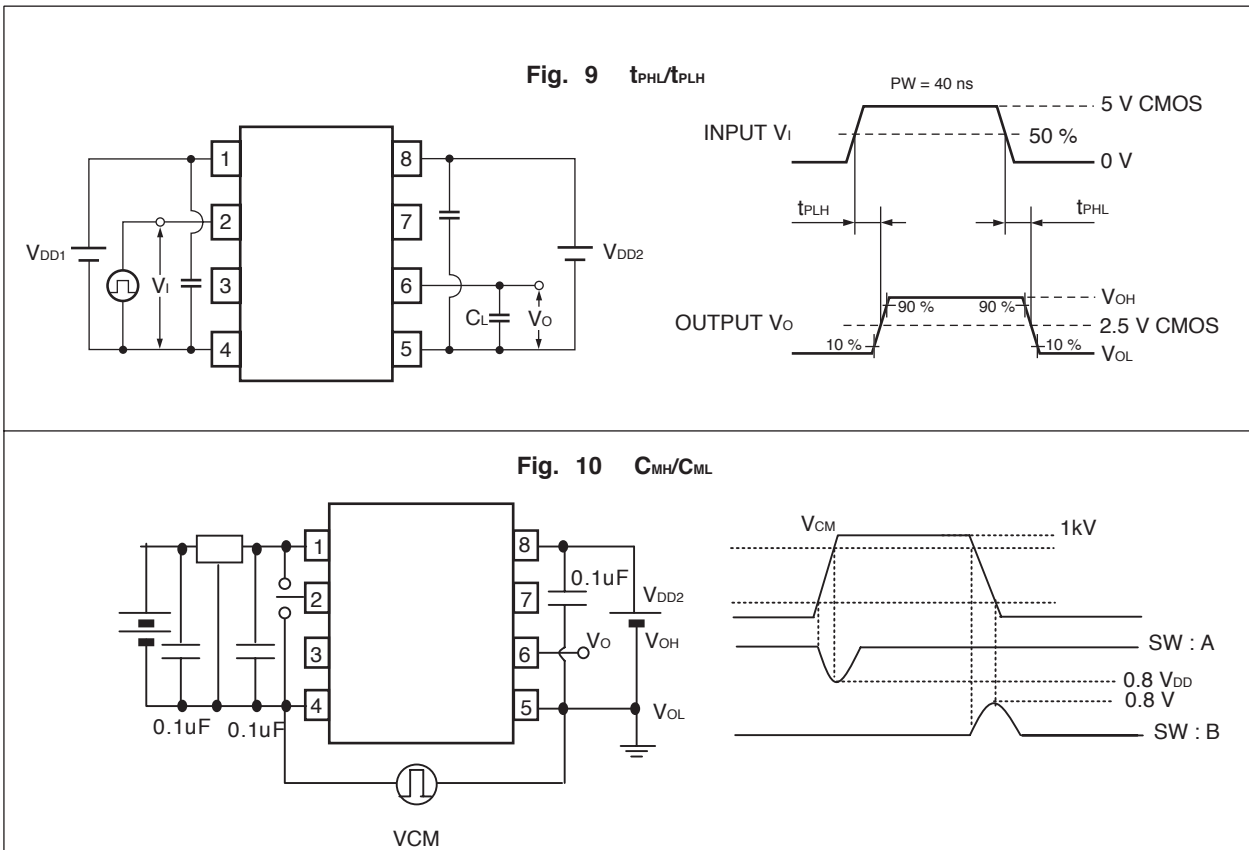


Fig. 8  $V_{OL}$







**Life Support Applications**

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 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • [www.cel.com](http://www.cel.com)

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