



THE DATASHEET OF PS9661-A





**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

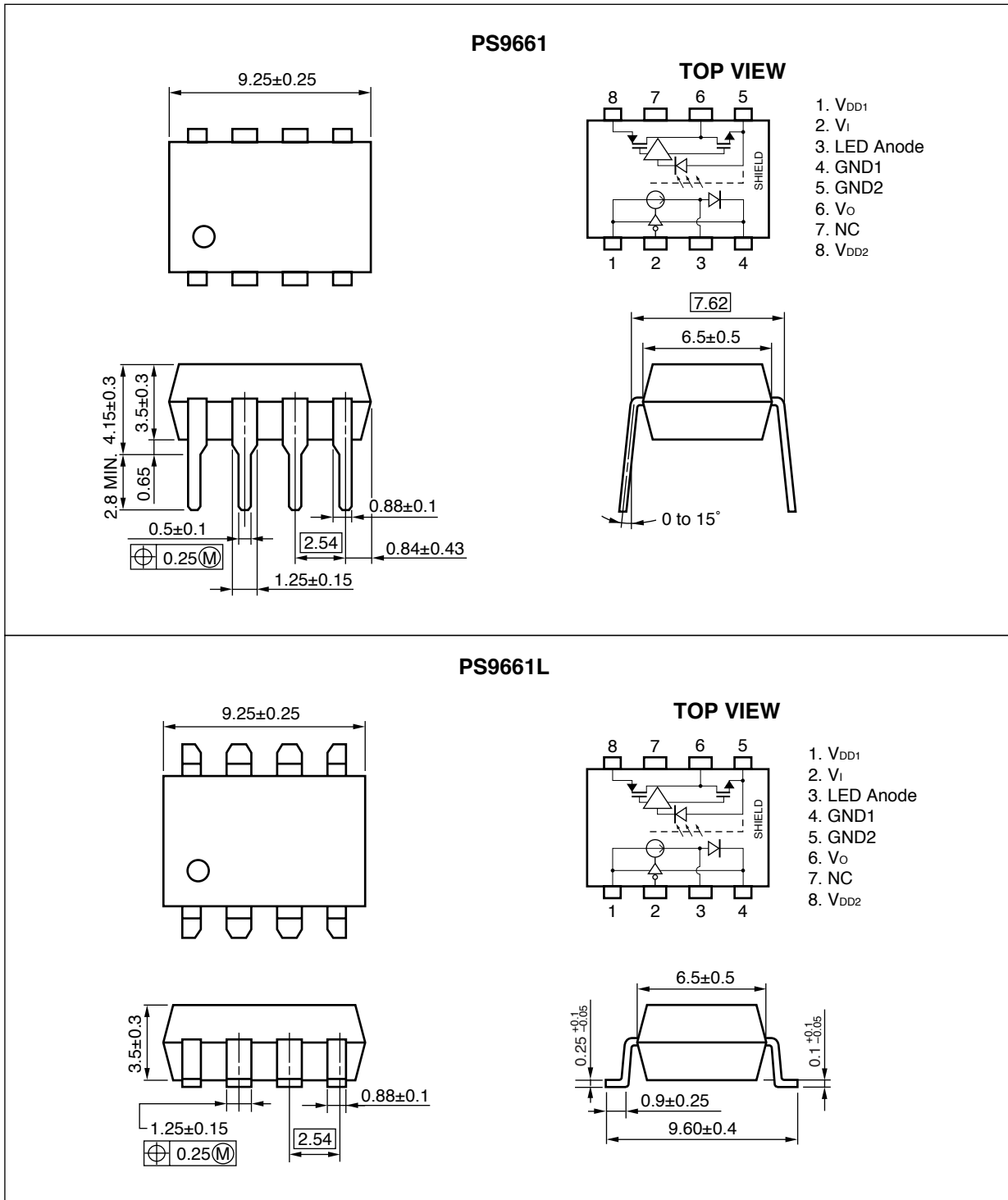
- High-speed response (25 Mbps)
- High common mode transient immunity ($CM_H, CM_L = \pm 20 \text{ kV}/\mu\text{s}$ TYP.)
- High isolation voltage ($BV = 3\,750 \text{ Vr.m.s.}$)
- Pulse width distortion ($|t_{PHL} - t_{PLH}| = 3 \text{ ns}$ TYP.)
- Ordering number of tape product: PS9661L-E3, E4: 1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

APPLICATIONS

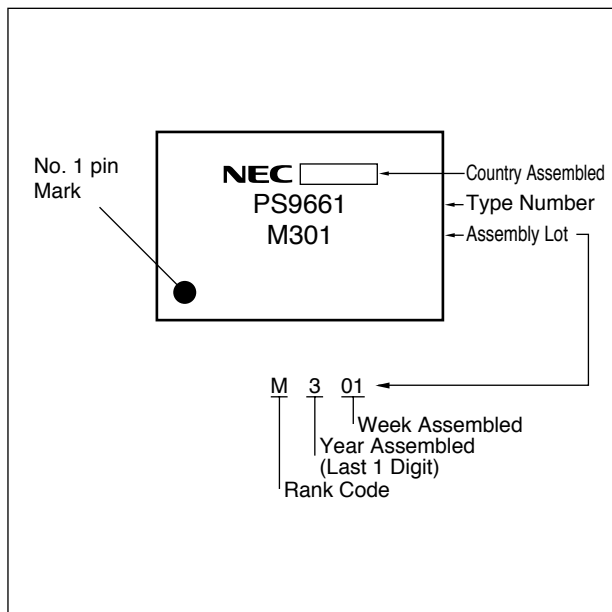
- Factory Automation Network
- Measurement equipment
- PDP

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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_A = 25°C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Input Voltage	V _I	-0.5 to V _{DD1} +0.5	V
Detector	Supply Voltage	V _{DD1} , V _{DD2}	0 to 5.5	V
	Output Voltage	V _O	-0.5 to V _{DD2} +0.5	V
	Output Current	I _O	10	mA
Isolation Voltage ^{*1}		BV	3 750	Vr.m.s.
Total Power Dissipation		P _T	150	mW
Operating Ambient Temperature		T _A	-40 to +85	°C
Storage Temperature		T _{stg}	-40 to +125	°C

*1 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
High Level Input Voltage	V _{IH}	2.0		V _{DD1}	V
Low Level Input Voltage	V _{IL}	0		0.8	V
Supply Voltage	V _{DD1} , V _{DD2}	4.5	5.0	5.5	V
Rise Time	t _r			100	ns
Fall Time	t _f				

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	μA	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}	$V_{I-O} = 1\ \text{kV}_{DC}$, $R_H = 40\ \text{to}\ 60\%$, $T_A = 25^\circ\text{C}$	10^{11}			Ω				
	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/ μs	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 μF is used between V_{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}

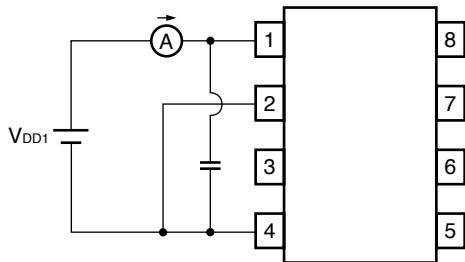


Fig. 2 I_{DD1H}

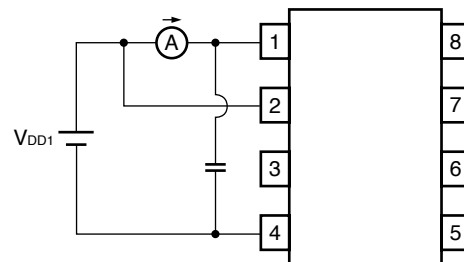


Fig. 3 I_{IH}

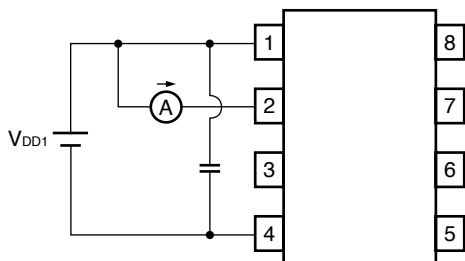


Fig. 4 I_{IL}

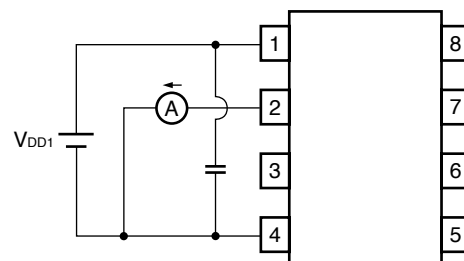


Fig. 5 I_{DD2H}

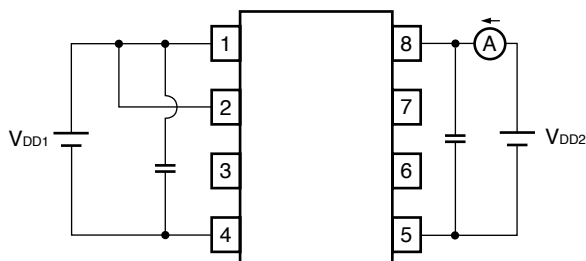


Fig. 6 I_{DD2L}

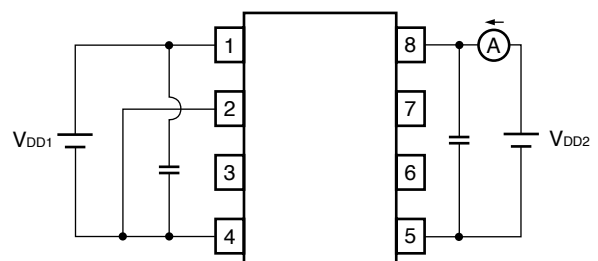


Fig. 7 V_{OH}

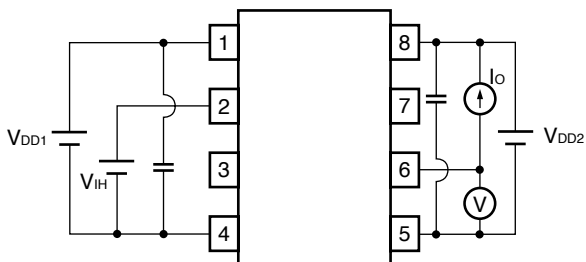
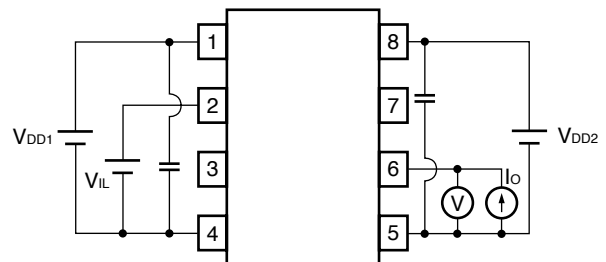
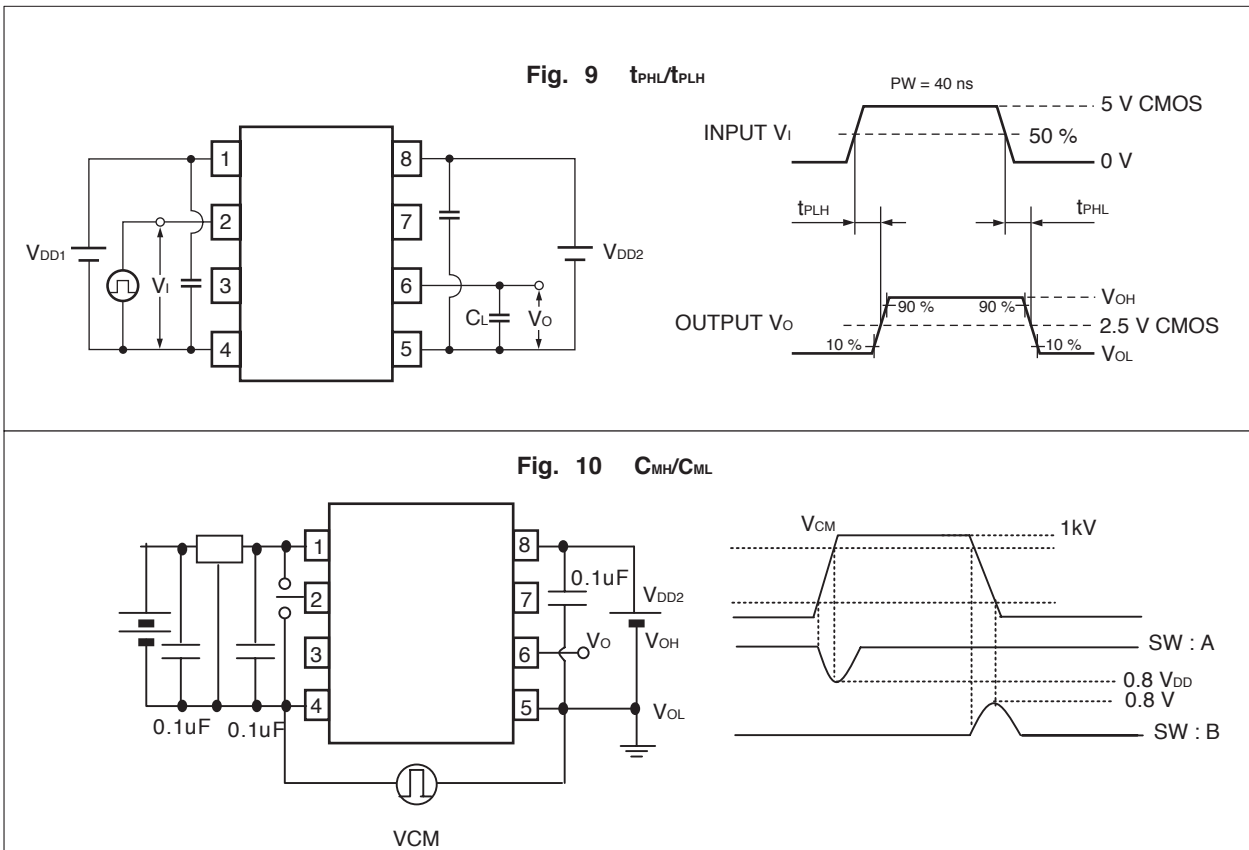


Fig. 8 V_{OL}





Life Support Applications

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