PRELIMINARY DATA SHEET

CEL

PS9661, PS9661L

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

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 = ±20 kV/μs TYP.)
- High isolation voltage (BV = 3 750 Vr.m.s.)
- Pulse width distortion ($|t_{PHL} - t_{PLH}|$ = 3 ns TYP.)
- Ordering number of tape product: PS9661L-E3, E4: 1 000 pcs/reel

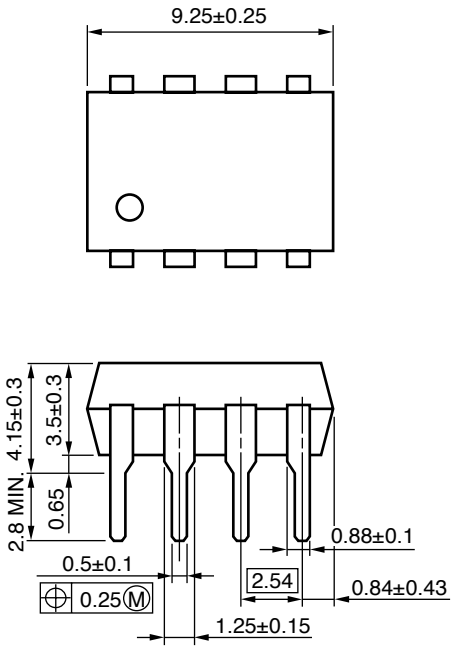
APPLICATIONS

- Factory Automation Network
- Measurement equipment
- PDP

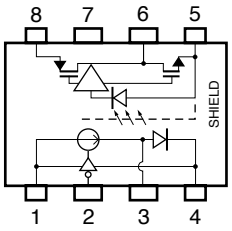
Date Published: August 2005

PACKAGE DIMENSIONS (UNIT: mm)

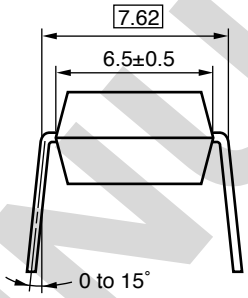
PS9661



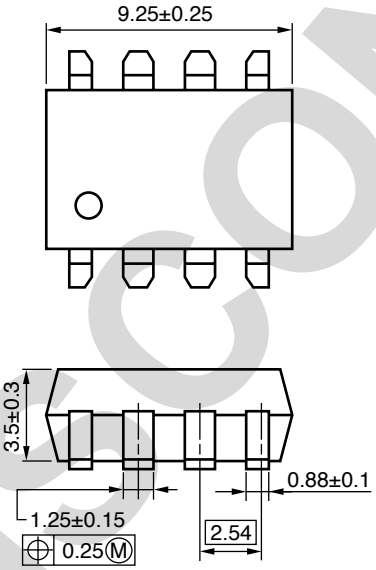
TOP VIEW



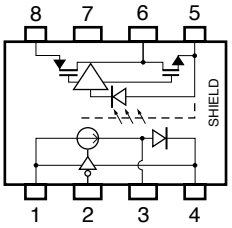
1. V_{DD1}
2. V_I
3. LED Anode
4. GND1
5. GND2
6. V_O
7. NC
8. V_{DD2}



PS9661L



TOP VIEW



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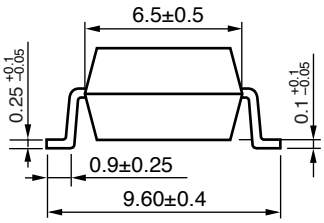
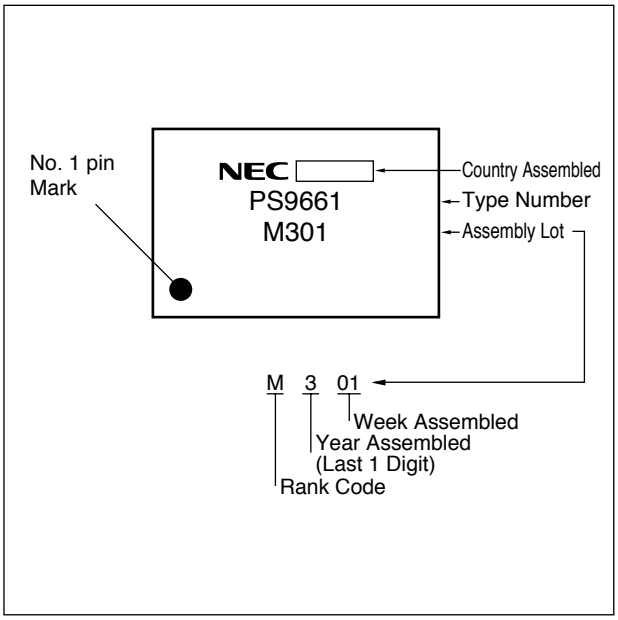


MARKING EXAMPLE



ORDERING INFORMATION (Solder Contains Lead)

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

ORDERING INFORMATION (Pb-Free)

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

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 V.)

Parameter		Symbol	Conditions	MIN.	TYP.*1	MAX.	Unit	Fig.
Diode	Low Level Supply Current	I_{DD1L}	V_I = 0 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 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 V		5	9		6
	High Level Output Voltage	V_{OH}	I_O = –20 μA, V_I = V_{IH}	4.4	5.0		V	7
			I_O = –4 mA, V_I = V_{IH}	4.0	4.8			
	Low Level Output Voltage	V_{OL}	I_O = 20 μA, V_I = V_{IL}		0.01	0.1		8
			I_O = 4 mA, V_I = V_{IL}		0.32	1.0		
Coupled	Isolation Resistance	R_{I-O}	V_{I-O} = 1 kV_{DC}, RH = 40 to 60%, T_A = 25°C	10^{11}			Ω	
	Isolation Capacitance	C_{I-O}	V = 0 V, f = 1 MHz, T_A = 25°C		1.3		pF	
	Propagation Delay Time (H → L)	t_{PHL}	C_L = 15 pF, CMOS Signal Levels		20	40	ns	9
	Propagation Delay Time (L → H)	t_{PLH}			23	40		
	Pulse Width	PW		40				
	Pulse Width Distortion (PWD)	$\lvert t_{PHL}-t_{PLH} \rvert$			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} = 5V, V_O > 0.8 V_{DD1}, V_{CM} = 1 kV, T_A = 25°C	10	20		kV/μs	10
	Common Mode Transient Immunity at Low Level Output	CM_L	V_I = V_{DD1} = V_{DD2} = 5V, V_I =0V V_O < 0.8 V_{DD1}, V_{CM} = 1 kV	10	20			

***1** Typical values at T_A = 25°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}

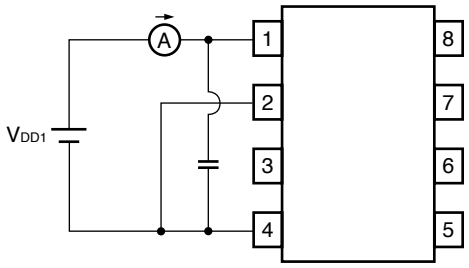


Fig. 2 I_{DD1H}

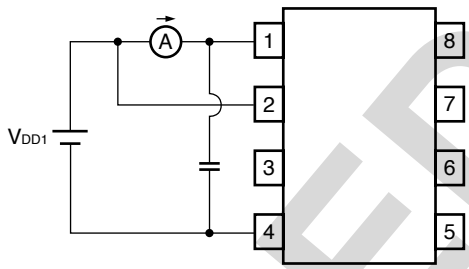


Fig. 3 I_{IH}

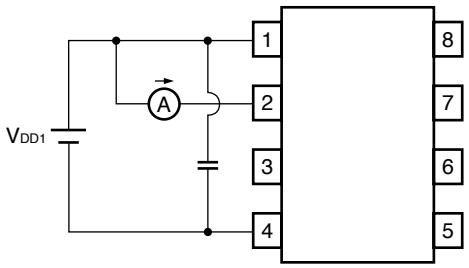


Fig. 4 I_{IL}

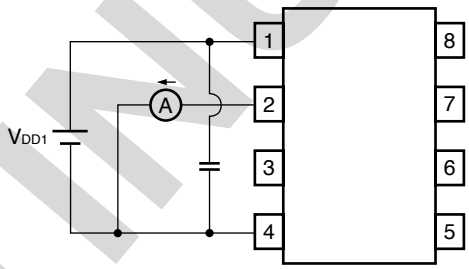


Fig. 5 I_{DD2H}

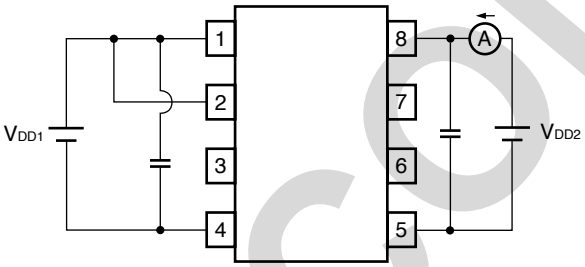


Fig. 6 I_{DD2L}

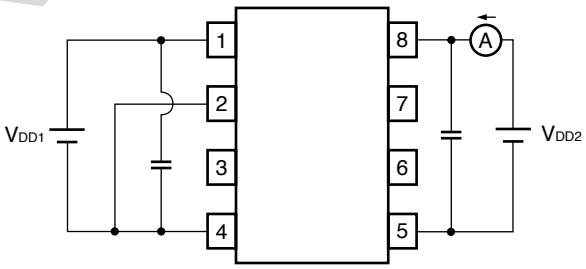


Fig. 7 V_{OH}

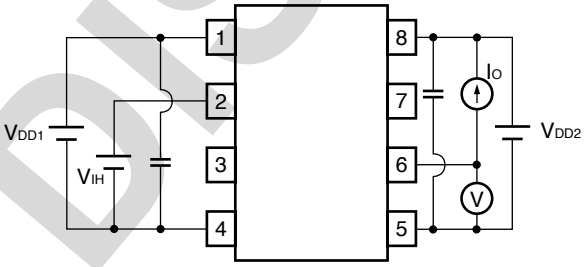


Fig. 8 V_{OL}

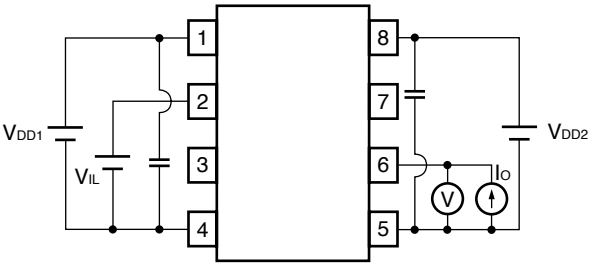


Fig. 9 t_{PHL}/t_{PLH}

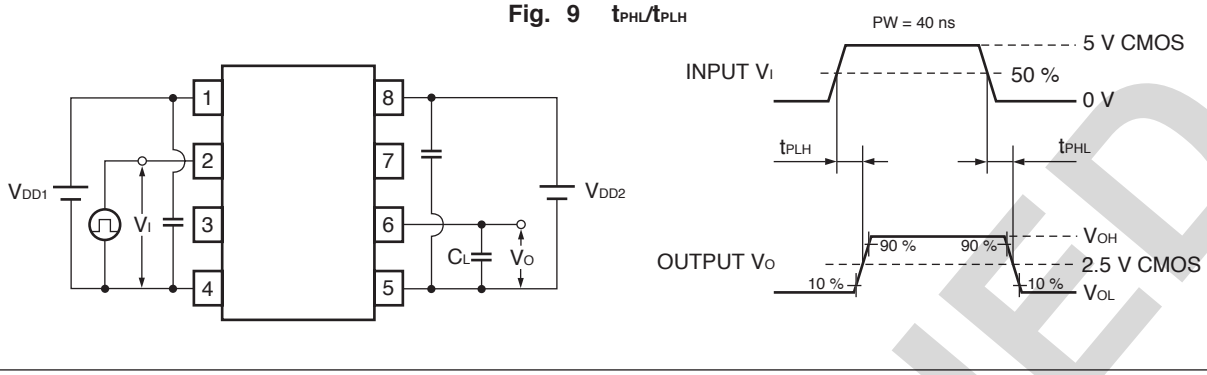
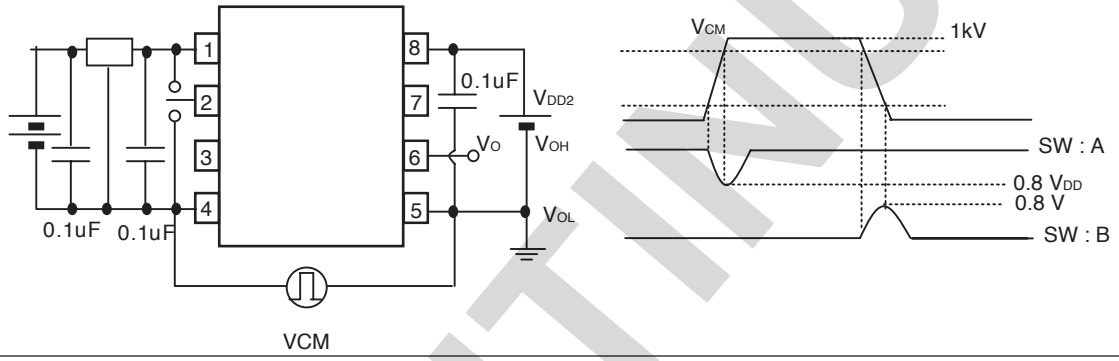


Fig. 10 C_{MH}/C_{ML}



Life Support Applications
These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.