



**NEC's HIGH CMR,
10 Mbps 3.3V OPEN COLLECTOR
OUTPUT TYPE SO8 OPTOCOUPLER**

PS9821-1/-2

DESCRIPTION

NEC's PS9821 is an optically coupled high-speed isolator containing a GaAlAs LED on the input side and a photodiode and a signal processing circuit on the output side on one chip.

FEATURES

- Supply Voltage 3.3V
- Open collector output
- High common mode transient immunity ($CM_H, CM_L = \pm 15 \text{ kV}/\mu\text{s}$ Min.)
- Small package (SO8)
- High-speed (10 Mbps)
- High isolation voltage ($BV = 2500 \text{ V r.m.s.}$)

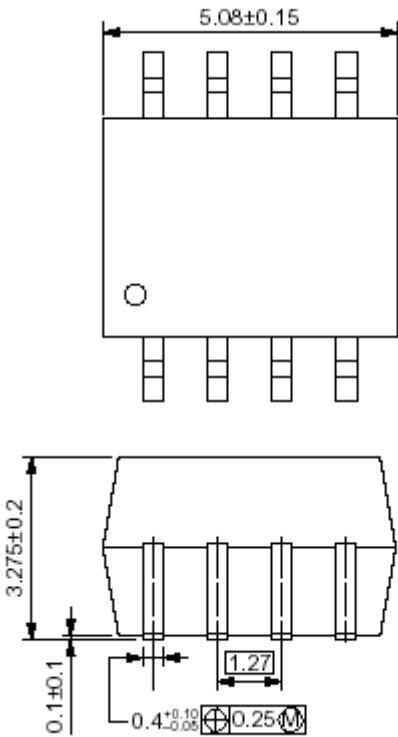
APPLICATIONS

- Factory Automation Network
- Measurement equipment
- PDP

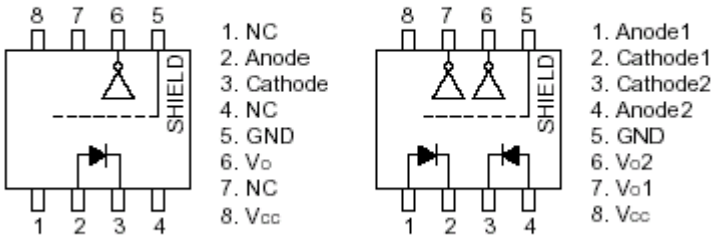
The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

PACKAGE DIMENSIONS (UNIT: mm)

PS9821-1/-2



TOP VIEW



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current	I _F	20	mA
	Reverse Voltage	V _R	5	V
Detector	Supply Voltage	V _{CC}	7	V
	Output Voltage	V _O	7	V
	Output Current	I _O	25	mA
	Power Dissipation	P _C	40	mW
Isolation Voltage ^{*1}		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T _A	−40 to +85	°C
Storage Temperature		T _{stg}	−55 to +125	°C

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

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Low Level Input Voltage	V _{FL}	0		0.8	V
High Level Input Current	I _{FH}	6.3		12.5	mA
Supply Voltage	V _{CC}	2.7	-	3.6	V
TTL (R _L = 1 kΩ, loads)	N			5	
Pull-up resistor	R _L	330		4 k	Ω

ELECTRICAL CHARACTERISTICS ($T_A = -40$ to $+85^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Conditions	MIN.	TYP.* ¹	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = 10\text{ mA}$, $T_A = 25^\circ\text{C}$	1.4	1.65	1.8	V
	Reverse Current	I_R	$V_R = 3\text{ V}$, $T_A = 25^\circ\text{C}$			10	μA
	Terminal Capacitance	C_t	$V = 0\text{ V}$, $f = 1\text{ MHz}$, $T_A = 25^\circ\text{C}$		30		pF
Detector	High Level Output Current	I_{OH}	$V_{CC} = V_O = 3.3\text{ V}$, $V_F = 0.8\text{ V}$		0.3	50	μA
	Low Level Output Voltage* ²	V_{OL}	$V_{CC} = 3.3\text{ V}$, $I_F = 5\text{ mA}$, $I_{OL} = 8\text{ mA}$		0.3	0.6	V
	High Level Supply Current	I_{CCH}	$V_{CC} = 3.3\text{ V}$, $I_F = 0\text{ mA}$		4.5	7	mA
	Low Level Supply Current	I_{CCL}	$V_{CC} = 3.3\text{ V}$, $I_F = 10\text{ mA}$		7.0	10	mA
Coupled	Threshold Input Current ($H \rightarrow L$)	I_{FHL}	$V_{CC} = 3.3\text{ V}$, $V_O = 0.8\text{ V}$, $R_L = 350\ \Omega$		3	5	mA
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1\text{ kV}_{DC}$, $R_H = 40$ to 60% , $T_A = 25^\circ\text{C}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{ V}$, $f = 1\text{ MHz}$, $T_A = 25^\circ\text{C}$		0.9		pF
	Propagation Delay Time ($H \rightarrow L$)* ³	t_{PHL}	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$ $T_A = 25^\circ\text{C}$		-	75	ns
	Propagation Delay Time ($L \rightarrow H$)* ³	t_{PLH}	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$ $T_A = 25^\circ\text{C}$			90	ns
	Rise Time	t_r	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$		20		
	Fall Time	t_f	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$		10		
	Pulse Width Distortion (PWD)* ³	$ t_{PHL} - t_{PLH} $	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$ $T_A = 25^\circ\text{C}$		-	25	ns
	Propagation Delay Skew	t_{PSK}	$V_{CC} = 3.3\text{ V}$, $R_L = 350\ \Omega$, $I_F = 7.5\text{ mA}$ $T_A = 25^\circ\text{C}$			40	
	Common Mode Transient Immunity at High Level Output* ⁴	CM_H	$R_L = 350\ \Omega$, $T_A = 25^\circ\text{C}$, $I_F = 0\text{ mA}$, $V_{O(MIN.)} = 2\text{ V}$, $V_{CM} = 50\text{ V}$	15			kV/ μs
	Common Mode Transient Immunity at Low Level Output* ⁴	CM_L	$R_L = 350\ \Omega$, $T_A = 25^\circ\text{C}$, $I_F = 7.5\text{ mA}$, $V_{O(MAX.)} = 0.8\text{ V}$, $V_{CM} = 50\text{ V}$	15			kV/ μs

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.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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

DATA SUBJECT TO CHANGE WITHOUT NOTICE

08/30/2004

Preliminary Data Sheet

NEC
A Business Partner of NEC Compound Semiconductor Devices, Ltd.