

PS9601, PS9601L

HIGH ISOLATION VOLTAGE HIGH SPEED PHOTOCOUPLER

PS9601, PS9601L are optically coupled isolators containing a GaAlAs LED on light emitting side (input side) and a photodiode and a signal processing circuit on light receiving side (output side) on one chip.

PS9601 is in a plastic DIP (Dual In-line Package) and PS9601L is lead bending type (Gull-wing) for surface mount.

FEATURES

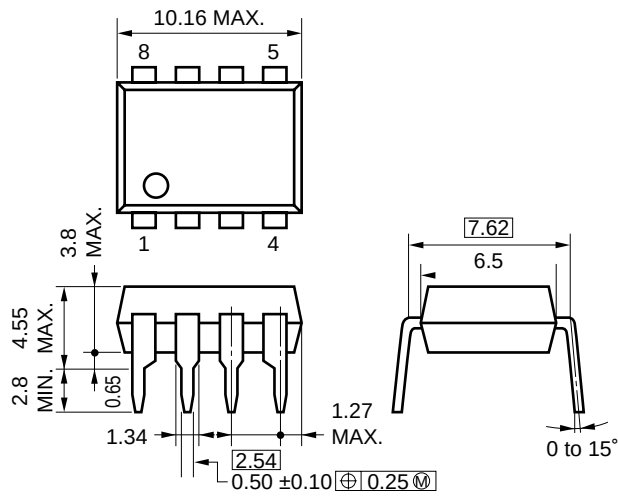
- High isolation voltage BV: 5 000 V_{r.m.s.} MIN.
- High Propagation delay time t_{PHL} , t_{PLH} : 50 ns TYP.
- Low input current I_{FHL} : 2.5 mA TYP.
- Can be soldered by infrared reflow soldering
- Taping product number PS9601L-E3, E4
- UL recognized File No. E72422 (S)

APPLICATIONS

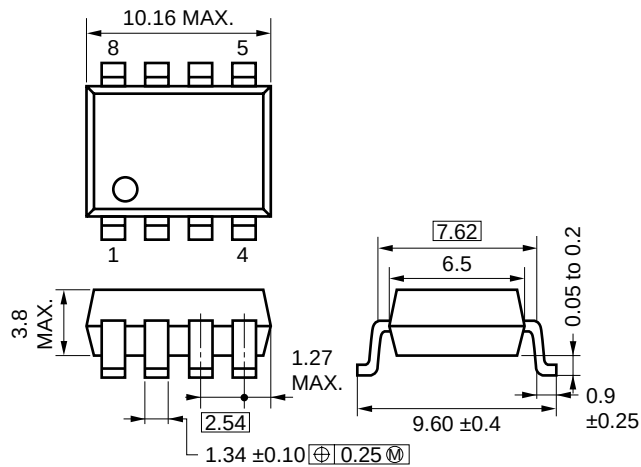
- Computer and peripheral memory
- Electronic instrument
- Audio-visual

PACKAGE DIMENSIONS (Unit: mm)

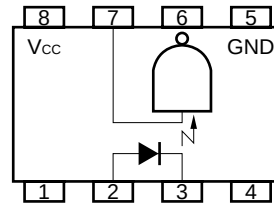
PS9601



PS9601L



PIN CONNECTIONS (Top View)



	PIN	Function
INPUT	1.	NC
	2.	Anode
	3.	Cathode
	4.	NC
OUTPUT	5.	GND
	6.	V _O
	7.	V _E *
	8.	V _{CC}

*V_E is pulled-up to

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)**Diode**

Forward Current	I _F	30	mA
Reverse Voltage	V _R	5	V
Power Dissipation	P _D	60	mW

Detector

Supply Voltage	V _{CC}	7	V
Output Voltage	V _O	7	V
Output Current	I _O	50	mA
Enable Voltage	V _E	5.5	V
Power Dissipation	P _C	85	mW
Isolation Voltage *1	BV	5 000	V _{r.m.s.}
Operating Temperature	T _{opt}	−40 to +85	°C
Storage Temperature	T _{stg}	−55 to +125	°C

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

RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Low Level Input Current	I _{FL}	0		250	μA
High Level Input Current	I _{FH}	7	10	15	mA
High Level Enable Voltage	V _{EH}	2		V _{CC}	V
High Level Enable Voltage	V _{EL}	0		0.8	V
Supply Voltage	V _{CC}	4.5	5	5.5	V
Operating Temperature	T _{opt}	0	25	70	°C

* By-pass capacitor of more than 0.1 μF is used between V_{CC} and GND near device.

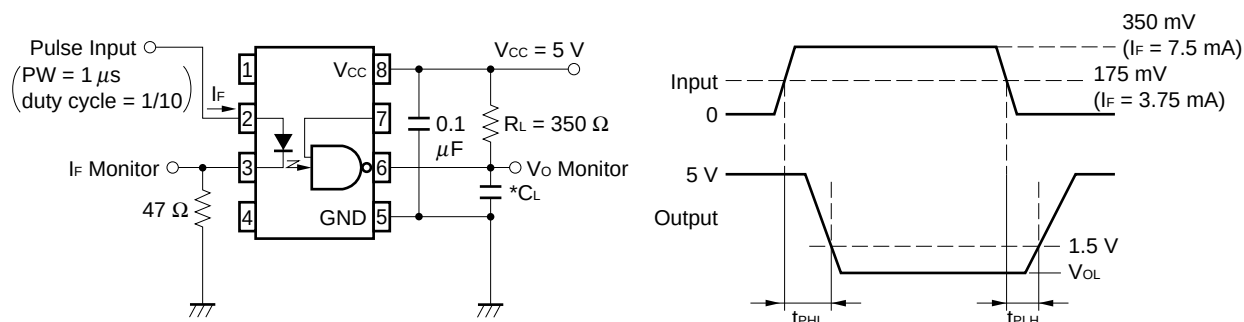
ELECTRICAL CHARACTERISTICS (T_A = −40 to +85 °C)

	PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode	Forward Voltage	V _F	1.4	1.65	1.9	V	I _F = 10 mA, T _A = 25 °C
	Reverse Current	I _R			10	μA	V _R = 5 V, T _A = 25 °C
	Capacitance	C _t		60		pF	V = 0, f = 1 MHz, T _A = 25 °C
Detector	High Level Output Current	I _{OH}		2	250	μA	V _{CC} = V _O = 5.5 V, I _F = 250 μS, V _E = 2 V
	Low Level Output Voltage	V _{OL}		0.2	0.6	V	V _{CC} = 5.5 V, I _F = 5 mA, V _E = 2 V, I _O = 13 mA
	High Level Supply Current	I _{CCH}	5	7	10	mA	V _{CC} = 5.5 V, V _E = 0.5 V, I _F = 0
	Low Level Supply Current	I _{CCL}	10	13	18	mA	V _{CC} = 5.5 V, V _E = 2 V, I _F = 10 mA
	High Level Enable Current	I _{EH}	−0.7	−1	−1.5	mA	V _{CC} = 5.5 V, V _{EH} = 2 V
	Low Level Enable Current	I _{EL}	−1	−1.4	−2	mA	V _{CC} = 5.5 V, V _{EL} = 0.5 V

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

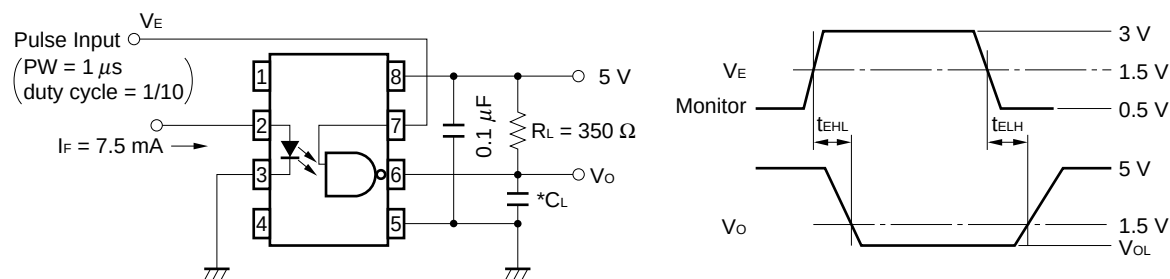
	PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Coupled	Threshold Input Current High $\rightarrow$ Low	I_{FHL}	0.5	2.5	5	mA	$V_{CC} = 5\text{ V}$, $V_E = 2\text{ V}$, $T_A = -40\text{ to } +85\text{ }^{\circ}\text{C}$ $V_O = 0.8\text{ V}$, $R_L = 350\text{ }\Omega$
	Isolation Resistance	R_{1-2}	10^{11}			Ω	$V_{in-out} = 1\text{ kV}_{DC}$, RH 40 to 60 %
	Isolation Capacitance	C_{1-2}		0.6		pF	$V = 0$, $f = 1\text{ MHz}$
	Propagation Delay Time* ² High $\rightarrow$ Low	t_{PHL}		50	75	ns	$V_{CC} = 5\text{ V}$, $I_F = 7.5\text{ mA}$ $R_L = 350\text{ }\Omega$, $C_L = 15\text{ pF}$
	Propagation Delay Time* ² Low $\rightarrow$ High	t_{PLH}		50	75	ns	
	Rise Time	t_r		20		ns	
	Fall Time	t_f		10		ns	
	Enable Propagation Delay Time* ³ High $\rightarrow$ Low	t_{EHL}		10		ns	$V_{CC} = 5\text{ V}$, $I_F = 7.5\text{ mA}$ $V_{EH} = 3\text{ V}$, $V_{EL} = 0.5\text{ V}$ $R_L = 350\text{ }\Omega$, $C_L = 15\text{ pF}$
	Enable Propagation Delay Time* ³ Low $\rightarrow$ High	t_{ELH}		25		ns	

*² Test Circuit for Propagation delay time

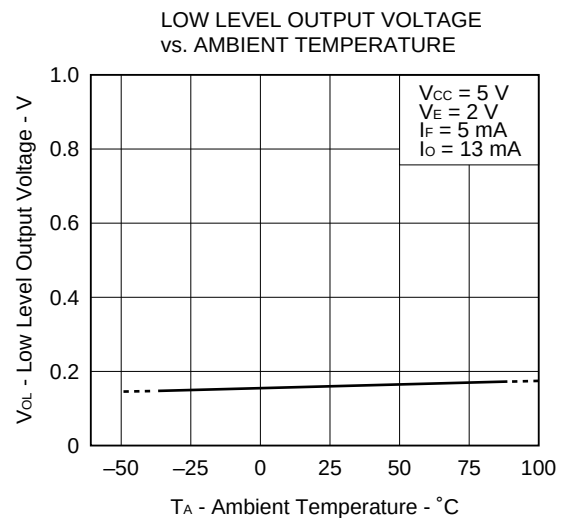
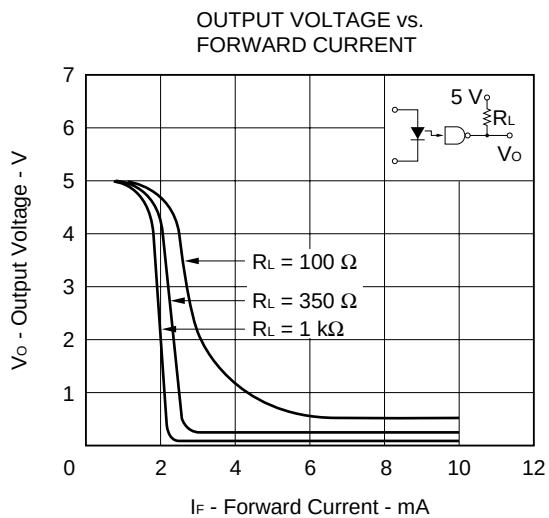
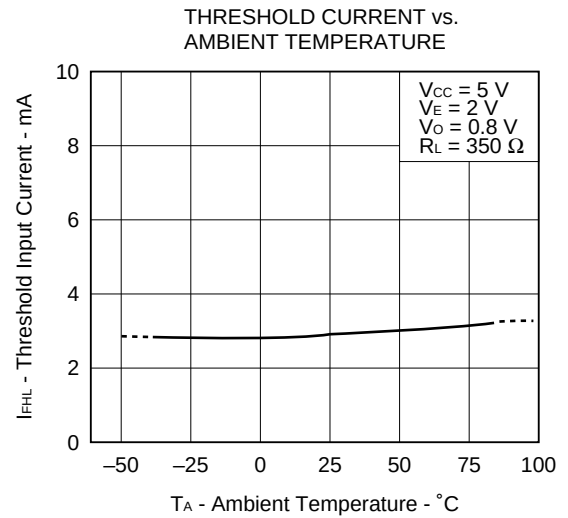
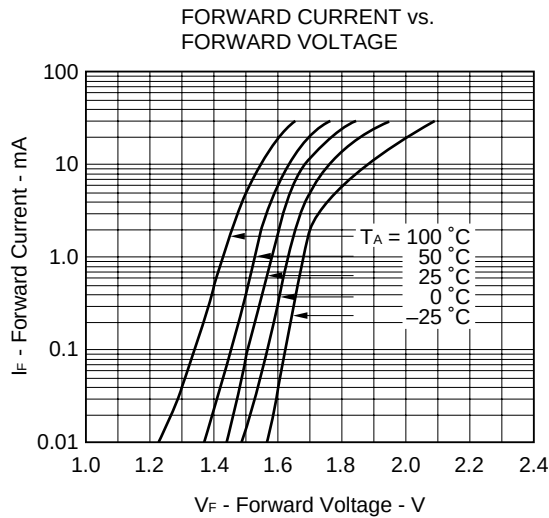
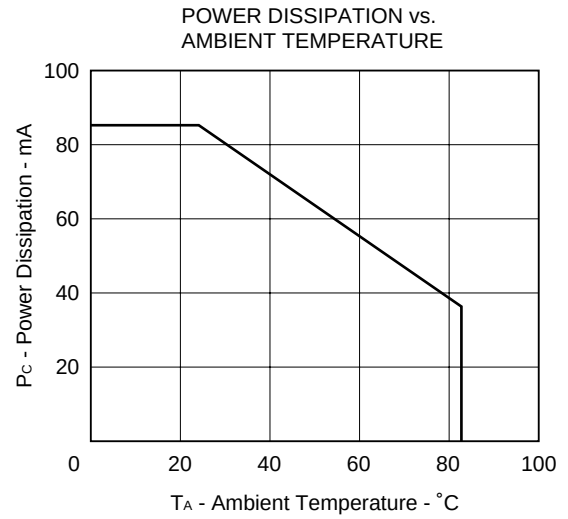
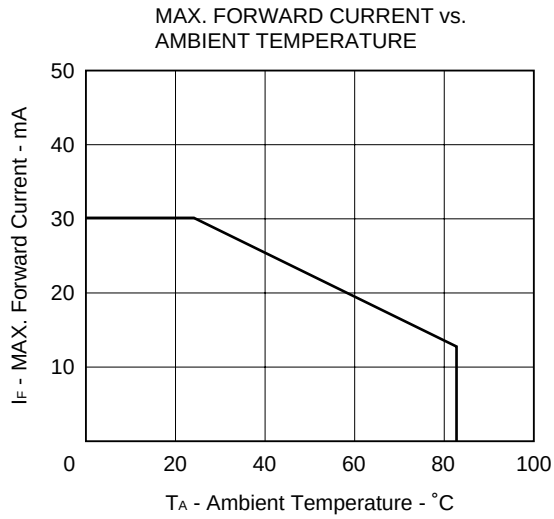


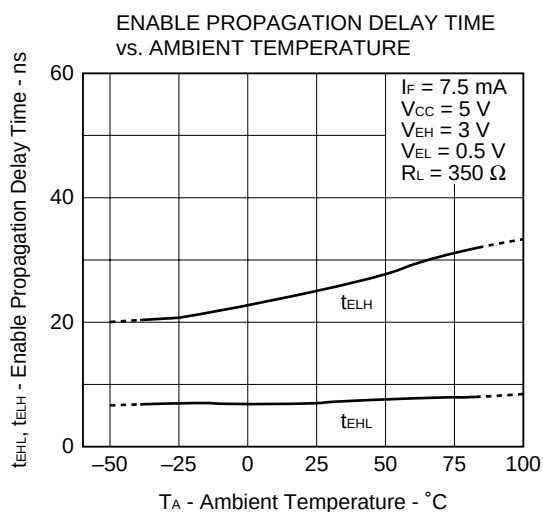
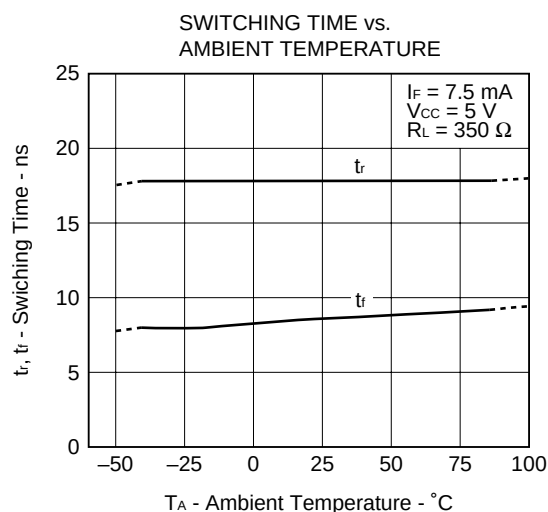
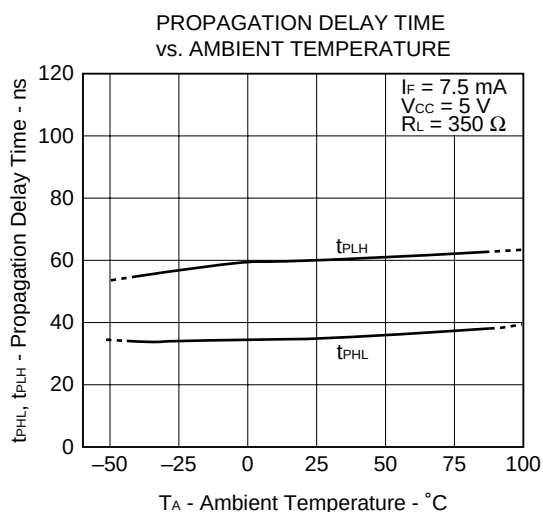
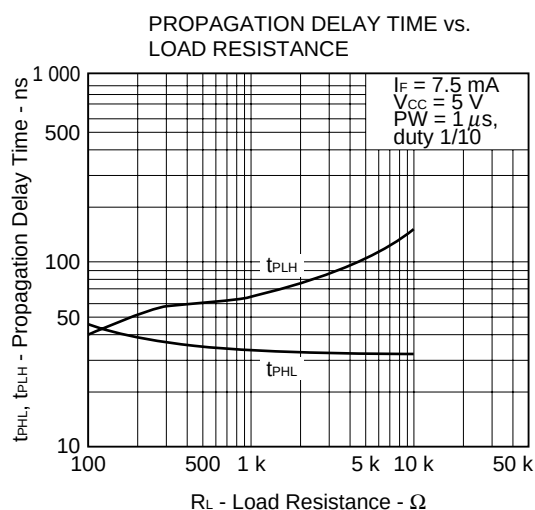
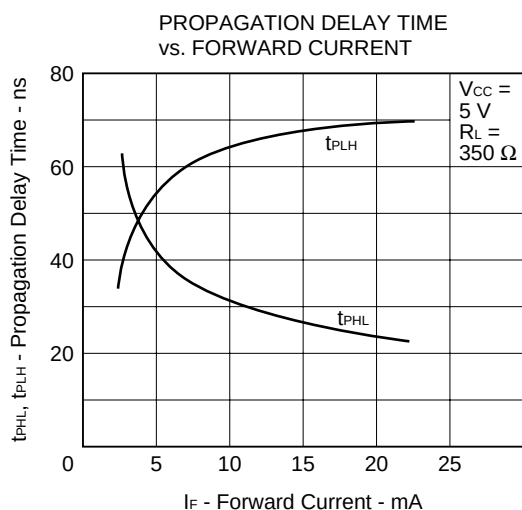
* C_L is approximately 15 pF, which includes probe and stray wiring capacitance.

*³ Test Circuit for enable Propagation delay time



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



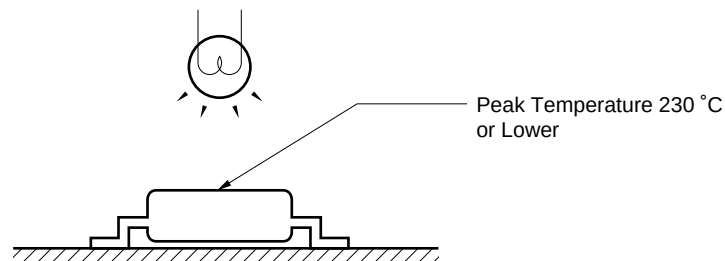
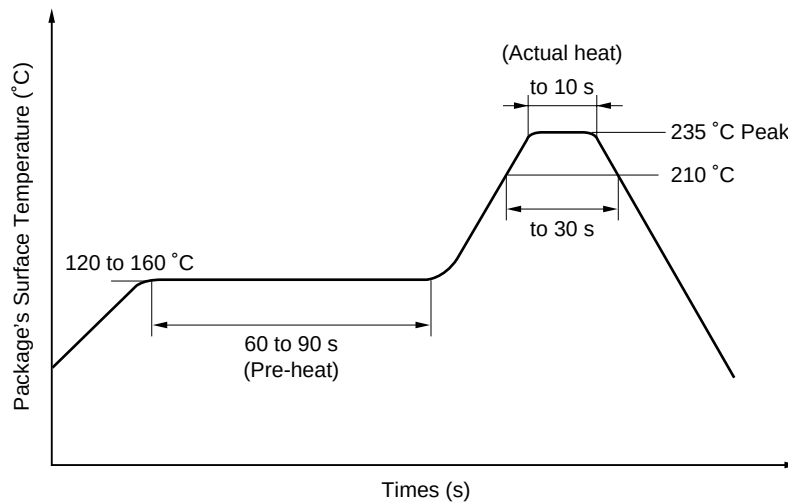


PRECAUTIONS IN MOUNTING THE DEVICE

(1) Precautions in mounting the device by infrared reflow soldering

- Peak reflow temperature : 235 °C or below (Plastic surface temperature)
- Reflow time : 30 seconds or less (Time period during which the plastic surface temperature is 210 °C)
- Number of reflow processes: One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

INFRARED RAY REFLOW TEMPERATURE PROFILE



(2) Precautions in mounting the device in solder dip method

- Temperature : 260 °C or lower
- Time : 10 sec. or less
- Flux : Rosin group flux, where the amount of chloride component is small.

Caution

The Great Care must be taken in dealing with the devices in this guide.

The reason is that the material of the devices is GaAs (Gallium Arsenide), which is designated as harmful substance according to the law concerned.

Keep the law concerned and so on, especially in case of removal.

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Anti-radioactive design is not implemented in this product.