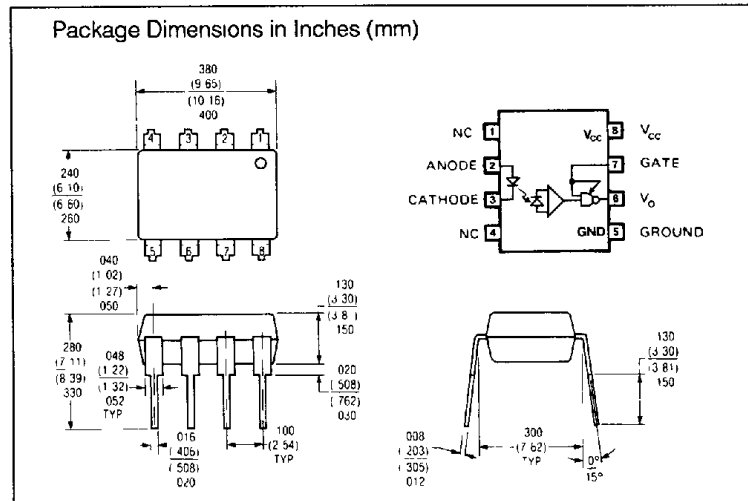
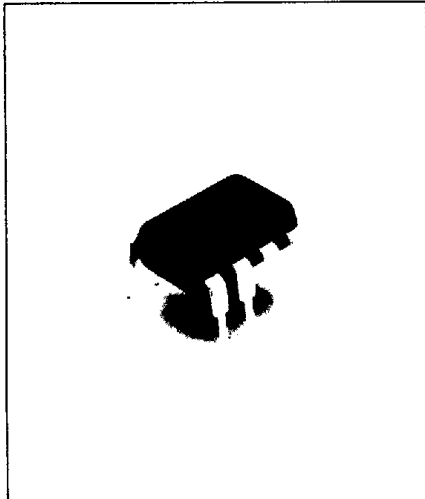


SIEMENS

T-41-89
IL101B

**HIGH SPEED
THREE STATE OPTOCOUPLER**



FEATURES

- High Speed
- Faraday Shielded Photodetector Improves Common Mode Rejection
- DTL/TTL Compatible, 5 V Supply
- Three State Output Logic for Multiplexing
- Built-in Schmitt Trigger Avoids Oscillation
- UL Approval #E52744

DESCRIPTION

IL101B is an optically coupled pair with a Gallium Arsenide Phosphide LED and a silicon monolithic integrated circuit including a photodetector. High speed digital information can be transmitted while maintaining a high degree of electrical isolation between input and output. The IL101B can be used to replace pulse transformers in many digital interface applications. A built-in Schmitt Trigger provides hysteresis reducing oscillation possibility.

Maximum Ratings

Input Diode	
Forward DC Current	25 mA
Reverse Voltage	5 V
Output IC	
Supply Voltage (V_{cc})	7 V
Enable Input Voltage (V_e)	5.5 V
(not to exceed V_{cc} by more than 500 mV)	
Output Collector Current (I_c)	100 mA
Output Collector Power Dissipation	100 mW
Output Collector Voltage (V_{out})	7 V
Isolation Voltage (Input-Output), DC	6000 V
Package	
Storage Temperature	55°C to +125°C
Operating Temperature	0°C to +70°C
Lead Solder Temperature	260°C for 10 sec

Electrical Characteristics ($T_{amb}=0^{\circ}\text{C}$ to 70°C)

Parameter	Min.	Typ.	Max.	Unit	Test Condition
$I_{in}(1)$ - Logic (1) Input Current for Logic (0) Output (Figure 1)	12			mA	
$I_{in}(0)$ - Logic (0) Input Current for Logic (1) Output (Figure 1)			250	mA	
$V_e(1)$ - Logic (1) Gate Voltage	2.0			V	
$V_e(0)$ - Logic (0) Gate Voltage			8	V	
$V_{out}(0)$ - Logic (0) Output Voltage		35	6	V	$V_{cc}=5.5\text{ V}, V_e=2.4\text{ V}, I_{in}=12\text{ mA}$ $I_{out}(\text{sinking})=16\text{ mA}$
I_{cc}		18	22	mA	$V_{cc}=5.5\text{ V}, V_e=0.5\text{ V}$ $I_{in}=0.10\text{ mA}$

Optocouplers (Optoisolators)

Switching Characteristics ($T_{amb}=25^{\circ}\text{C}$, $V_{CC}=5\text{ V}$)

Parameter	Min.	Typ.	Max.	Unit	Test Condition
$t_{pd}(1)$ - Propagation Delay Time to Logic Level (1) (Fig. 1, Note 1)	175	300		ns	$R_L=350\ \Omega$, $C_L=15\ \text{pF}$, $I_{in}=12\ \text{mA}$
$t_{pd}(0)$ - Propagation Delay Time to Logic Level (0) (Fig. 1, Note 2)	70	300		ns	$R_L=350\ \Omega$, $C_L=15\ \text{pF}$, $I_{in}=12\ \text{mA}$
t_r , $t_f(0)$ - Output Rise-Fall Time (10-90%)	15			ns	$R_L=350\ \Omega$, $C_L=15\ \text{pF}$, $I_{in}=12\ \text{mA}$

Electrical Characteristics ($T_{amb}=25^{\circ}\text{C}$)

- Input to Output

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Insulation Voltage Input-Output (BV_{io}) (Note 3)	6000	7500		VDC	$t = 1\ \text{sec.}$
Resistance, Input-Output (R_{io}) (Note 3)	10^{12}			Ω	$V_{io} = 500\ \text{V}$
Capacitance Input-Output (C_{io}) (Note 3)	0.5	0.8		pF	$f = 1\ \text{MHz}$

Electrical Characteristics ($T_{amb}=25^{\circ}\text{C}$)

- Input Diode

Parameter	Min.	Typ.	Max.	Unit	Test Condition
Forward Voltage (V_f)		1.5	1.75	V	$I_{in}=10\ \text{mA}$
Reverse Breakdown Voltage (V_{BR})	5			V	$I_{in}=10\ \text{mA}$
Capacitance (I_{cr})		10		pF	$V = 0$, $f = 1\ \text{MHz}$

OPERATING PROCEDURES AND DEFINITIONS

Logic Convention: The IL101B is defined in terms of positive logic.

Bypassing: A ceramic capacitor (.01mF min.) should be connected from pin 8 to pin 5 to stabilize the switching amplifier operation. Switching properties may be impaired by not providing for bypassing.

Polarities: All voltages are referenced to network ground (pin 5). Current flowing toward a terminal is considered positive.

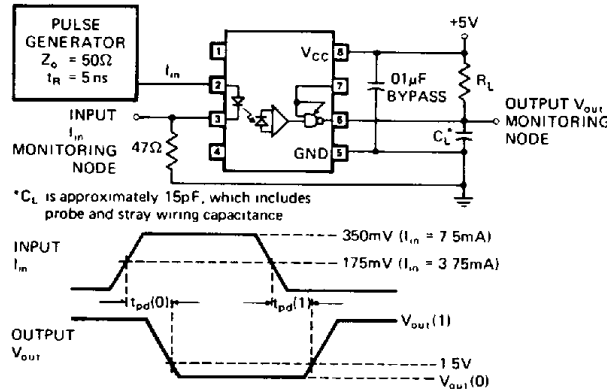
Gate input: No external pull-up required for a logic (1).

TRUTH TABLE (Positive Logic)

Input*	Enable	Output
1	1	0
0	1	1
1	0	off
0	0	off

*See definition of terms for logic state.

FIGURE 1. TEST CIRCUIT FOR $t_{pd}(0)$ AND $t_{pd}(1)$



Notes:

1. The $t_{pd}(1)$ propagation delay is measured from the 3.75 mA point on the trailing edge of the input pulse to the 1.5 V point on the trailing edge of the output pulse
2. The $t_{pd}(0)$ propagation delay is measured from the 3.75 mA point on the leading edge of the input pulse to the 1.5 V point on the leading edge of the output pulse
3. Pins 2 and 3 are shorted together, and pins 5, 6, 7, and 8 shorted together.
4. At 10 mA V_f decreases with increasing temperature at the rate of 1.6 mV/°C.