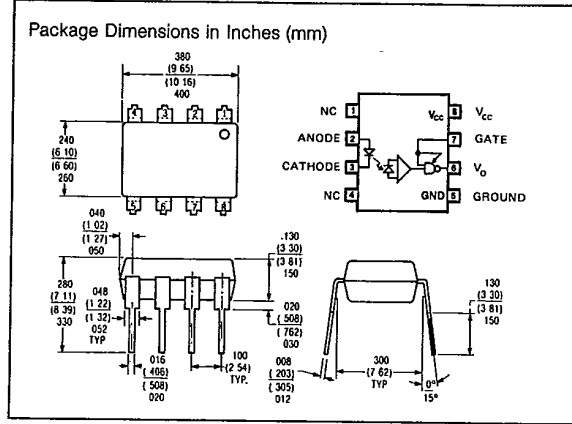
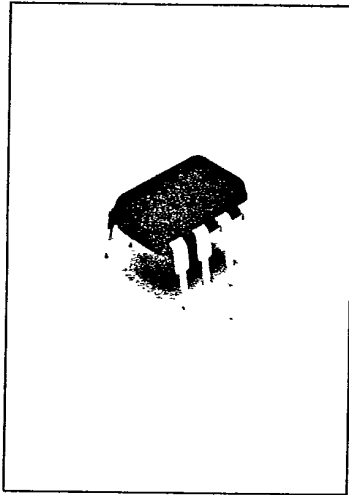


SIEMENS

IL101

**HIGH SPEED
THREE STATE
OPTOCOUPLER**



FEATURES

- High Speed
- Faraday Shielded Photodetector for Improved Common Mode Rejection
- DTL/TTL Compatible -5V supply
- Three State Output Logic for Multiplexing
- Built-in Schmitt Trigger to Avoid Oscillation
- Underwriters Lab Approval #E52744

DESCRIPTION

IL101 is an optically coupled pair employing a Gallium Arsenide Phosphide LED and a silicon monolithic integrated circuit including a photodetector. High speed digital information can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The IL101 can be used to replace pulse transformers in many digital interface applications. A built-in Schmitt Trigger provides hysteresis to reduce the possibility of oscillation.

Absolute Maximum Ratings

| | |
|---|---|
| Storage Temperature | -55°C to +125°C |
| Operating Temperature | 0°C to +70°C |
| Lead Solder Temperature | 260°C for 10 Sec. |
| Input Diode | |
| Forward DC Current | 10 mA |
| Reverse Voltage | 5V |
| Output - IC | |
| Supply Voltage - V _{CC} | 7V |
| Enable Input Voltage - V _E | 5.5V (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} | 7V |
| Isolation Voltage (Input-Output) - DC | 6000V |

Electrical Characteristics

Over Recommended Temperature (T_A = 0°C - 70°C)

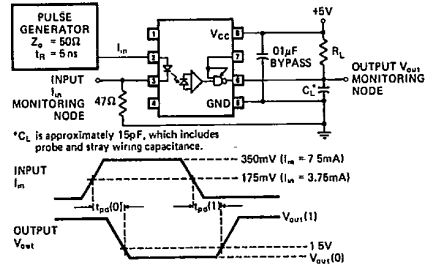
| Parameter | Min. | Typ. | Max. | Units | Test | |
|---|------|------|------|-------|--|-----------|
| | | | | | Conditions | Fig. Note |
| I _{in} (1): Logic (1) Input Current to Ensure Logic (0) Output | 5 | | | mA | | 1 - |
| I _{in} (0): Logic (0) Input Current to Ensure Logic (1) Output | | | 250 | µA | | 1 - |
| V _G (1): Logic (1) Gate Voltage | 2.0 | | | V | | - - |
| V _G (0): Logic (0) Gate Voltage | | | .8 | V | | - - |
| V _{out} (0): Logic (0) Output Voltage | .35 | .6 | | V | V _{CC} = 5.5 V, V _G = 2.4 V, I _{in} = 5 mA, I _{out} (Sinking) = 16 mA | |
| I _{CC} | 18 | 22 | | mA | V _{CC} = 5.5V V _G = 0.5V I _{in} = 0.10 mA | |

Specifications are subject to change without notice.

Optocouplers (Optoisolators)

Switching Characteristics at $T_A = 25^\circ$, $V_{CC} = 5V$

| Parameter | Min. | Typ. | Max. | Units | Conditions | Fig. | Note |
|---|------|------|------|-------|--|------|------|
| $t_{pd}(1)$: Propagation Delay Time to Logical (1) Level | 175 | 300 | | ns | $R_L = 350\Omega$, $C_L = 15pF$, $I_{in} = 7.5 mA$ | 1 | 1 |
| $t_{pd}(0)$: Propagation Delay Time to Logical (0) Level | 70 | 100 | | ns | $R_L = 350\Omega$, $C_L = 15pF$, $I_{in} = 7.5 mA$ | 1 | 2 |
| t_{R-F} : Output Rise-Fall Time (10 90%) | 15 | | | ns | $R_L = 350\Omega$, $C_L = 15pF$, $I_{in} = 7.5 mA$ | - | - |



Test Circuit for $t_{pd}(0)$ and $t_{pd}(1)$.

Fig. 1

Electrical Characteristics—Input-Output at $T_A = 25^\circ C$

| Parameter | Symbol | Min. | Typ. | Max. | Units | Conditions | Fig. | Note |
|-----------------------------------|------------|-----------|------|------|----------|------------------|------|------|
| Insulation Voltage (Input-Output) | BV_{1-0} | 6000 | 7500 | | VDC | $t = 1 Sec.$ | - | 3 |
| Resistance (Input-Output) | R_{1-0} | 10^{12} | | | Ω | $V_{1-0} = 500V$ | - | 3 |
| Capacitance (Input-Output) | C_{1-0} | 0.5 | 0.8 | | pF | $f = 1MHz$ | - | 3 |

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.

Electrical Characteristics—Input Diode at $T_A = 25^\circ C$

| Parameter | Symbol | Min. | Typ. | Max. | Units | Conditions | Fig. | Note |
|----------------------------|----------|------|------|------|-------|-------------------------|------|------|
| Forward Voltage | V_F | 1.5 | 1.75 | | V | $I_{in} = 10 mA$ | - | 4 |
| Reverse Break-down Voltage | V_{BR} | 5 | | | V | $I_R = 10\mu A$ | - | - |
| Capacitance | C_n | | 10 | | pF | $V = 0$, $f = 1MHz$ | - | - |

Operating Procedures and Definitions

Logic Convention. The IL-101 is defined in terms of positive logic.

Bypassing. A ceramic capacitor (.01 μF min.) should be connected from pin 8 to pin 5. Its purpose is to stabilize the operation of the switching amplifier. Failure to provide the bypassing may impair the switching properties.

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).

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 1.5V 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 input pulse to the 1.5V point on the leading edge of the output pulse.
3. Pins 2 and 3 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 1.6mV/ $^\circ C$.