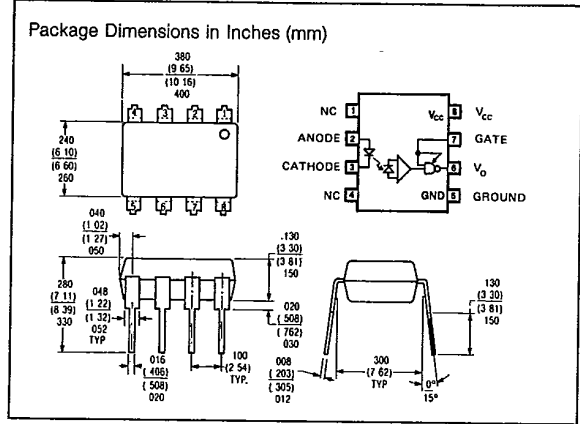
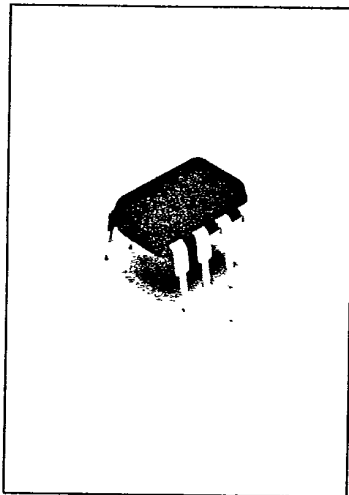


SIEMENS

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)

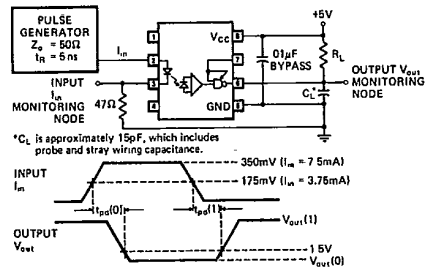
| Parameter | Min. | Typ. | Max. | Units | Test | |
|---|------|------|------|-------|--|-----------|
| | | | | | Conditions | Fig. Note |
| I _{in} (1): Logic (1) Input Current to Ensure Logic (0) Output | 5 | | | mA | | 1 - |
| I _{in} (0): Logic (0) Input Current to Ensure Logic (1) Output | | | 250 | 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:**
- 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.
 - 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.
 - Pins 2 and 3 shorted together, and pins 5, 6, 7, and 8 shorted together.
 - At 10 mA V_F decreases with increasing temperature at the rate of 1.6mV/ $^\circ C$.



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