DATA SHEET

# OLF300: Hermetic Surface-Mount High-Speed Optocoupler

## Features

- Hermetic SMT package
- Electrical parameters guaranteed over –55 °C to +125°C ambient temperature range
- 1000 VDC electrical isolation
- High-speed, 1 Mbps typical
- Open collector output
- 300 kHz bandwidth
- Similar to 6N135/136, 4N55
- Radiation tolerant
- Offers 100% high-reliability screenings

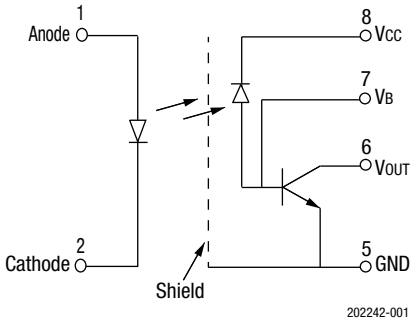


**Figure 1. OLF300 Block Diagram**

## Description

The OLF300 is suitable for interfacing TTL to LSTTL, TTL, or CMOS, as well as wide bandwidth analog applications. Each OLF300 has an LED and an integrated photo-diode transistor detector mounted and coupled in a custom 8-pin hermetic flat-pack package, providing 1000 Voe of electrical isolation between the input and output. The integrated photo-diode transistor improves the switching speed by orders of magnitude as compared to standard photo transistors by reducing the base-to-collector capacitance. The internal shield provides excellent common-mode immunity performance.

Figure 1 shows the OLF300 functional block diagram. Table 1 provides the OLF300 absolute maximum ratings. Table 2 provides the OLF300 electrical specifications.

Figures 2 through 4 illustrate the OLF300 typical performance characteristics. Figure 5 shows the OLF300 switching test circuit. Figure 6 provides the OLF300 package dimensions.

**Table 1. OLF300 Absolute Maximum Ratings[1]**

| Parameter | Symbol | Minimum | Maximum | Units |
|---|---|---|---|---|
| ***Coupled*** | | | | |
| Input to output isolation voltage[2] | $V_{DC}$ | | ±1000 | V |
| Storage temperature range | $T_{STG}$ | –65 | +150 | °C |
| Operating temperature range | $T_A$ | –55 | +125 | °C |
| Lead temperature (1.6 mm from case from 10 seconds) | | | +240 | °C |
| ***Input Diode*** | | | | |
| Average input current | $I_{DD}$ | | 20 | mA |
| Peak forward current (≤1 ms duration) | $I_F$ | | 40 | mA |
| Reverse voltage | $V_R$ | | 5 | V |
| Power dissipation | $P_D$ | | 36 | mW |
| ***Output Detector*** | | | | |
| Average output current | | | 8 | mA |
| Peak output current | | | 16 | mA |
| Supply voltage | $V_{CC}$ | –0.5 | +18.0 | V |
| Output voltage | $V_{OUT}$ | –0.5 | +18.0 | V |
| Power dissipation | $P_D$ | | 50 | mW |

1 Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

2 Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. $T_A$ = 25 °C and duration = 1 second.

***ESD HANDLING**: Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.*

**Table 2. OLF300 Electrical Specifications[1]**
**($T_A$ = 55 °C to + 125 °C, Unless Otherwise Noted)**

| Parameter | Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|---|
| Current transfer ratio[2] | CTR | $I_F$ = 16 mA, $V_O$ = 0.4 V, $V_{CC}$ = 4.5 V | 20.0 | 45.0 | | % |
| Logic: | | | | | | |
| High output current | $I_{OH}$ | $I_F$ = 0 mA, $V_O$ = $V_{CC}$ = 15.0 V | | 0.05 | 100.00 | µA |
| Low supply current | $I_{CCL}$ | $I_F$ = 10 mA, $V_{CC}$ = 15 V, $V_O$ = open | | 40 | 200 | µA |
| High supply current | $I_{CCH}$ | $I_F$ = 0 mA, $V_{CC}$ = 15.0 V, $V_O$ = open | | 0.05 | 10.0 | µA |
| Input: | | | | | | |
| Forward voltage | $V_F$ | $I_F$ = 10.0 mA | | 1.7 | 2.5 | V |
| Reverse breakdown voltage | $BV_R$ | $I_R$ = 10 µA | 3 | | | V |
| Input to output leakage current[3] | $I_{I\_O}$ | $R_H$ ≤45%, $T_A$ = 25 °C, $V_{I\_O}$ = 1000.0 $V_{DC}$ | | | 1.0 | µA |
| Propagation delay time: | | | | | | |
| Logic high to low | $t_{PHL}$ | $I_F$ = 16 mA, $V_{CC}$ = 5 V | | 0.3 | 2.0 | µs |
| Logic low to high | $t_{PLH}$ | $R_L$ = 8.2 kΩ, $C_L$ = 50 pF | | 0.8 | 6.0 | µs |
| Common mode transient immunity:[2] | | | | | | |
| Logic high level | $CM_H$ | $I_F$ = 0, $R_L$ = 8.2 Ω, VCM = 10 Vp-p | | > 1 | | kV |
| Logic low level | $CM_L$ | $I_F$ = 16, $R_L$ = 8.2 Ω, VCM = 10 Vp-p | | > 1 | | kV |

1 Performance is guaranteed only under the conditions listed in the above table.

2 CTR is defined as the ratio of the output collector current $I_C$ to the forward LED current $I_F$, multiplied by 100%.

3 Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. $T_A$ = 25 °C and duration = 1 second.

## Typical Performance Characteristics

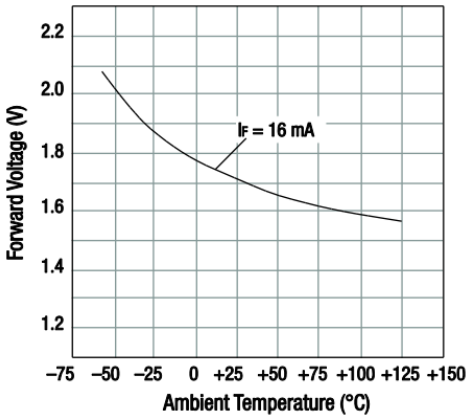


**Figure 2. LED Forward Voltage vs Temperature**

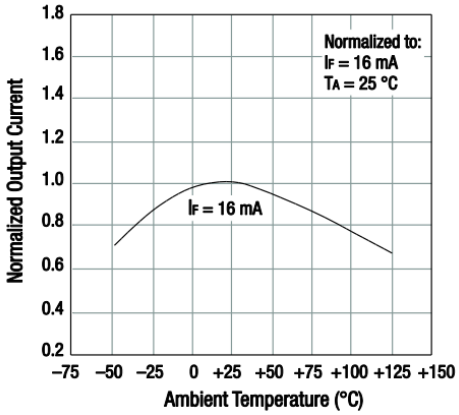


**Figure 3. Normalized Output Current vs Temperature**

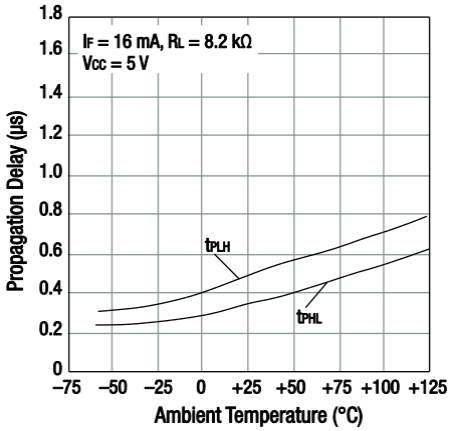


**Figure 4. Propagation Delay vs Temperature**

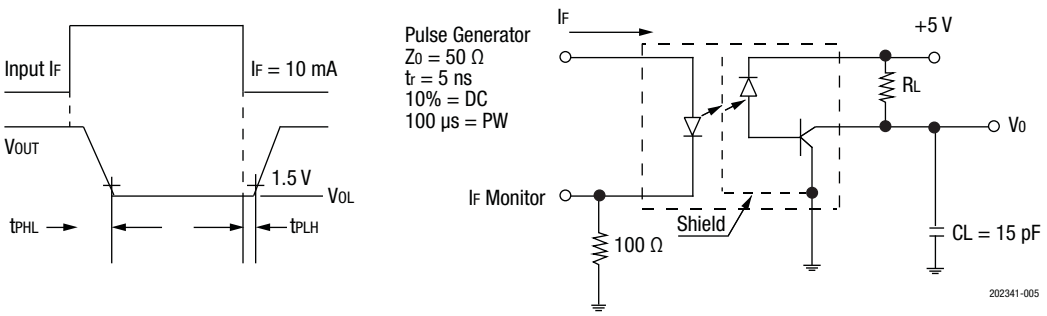


**Figure 5. OLF300 Switching Test Circuit**

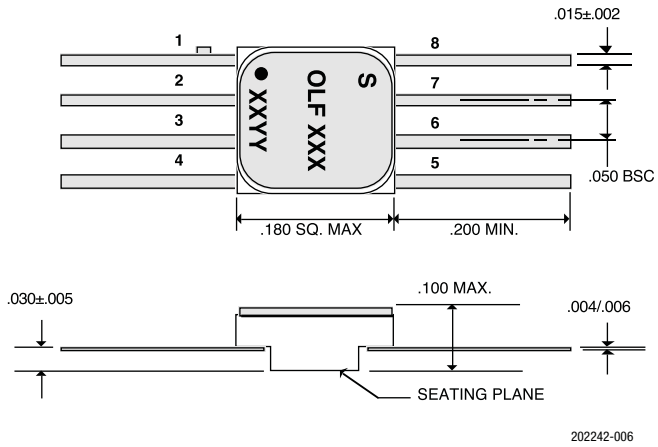


**Figure 6. OLF300 Package Dimensions**

## Ordering Information

| Model Name | Manufacturing Part Number |
|---|---|
| OLF300: Hermetic Surface-Mount High-Speed Optocoupler | OLF300 |