DATA SHEET

OLH300: High-Speed Hermetic Optocoupler

Features

- Electrical parameters guaranteed over –55 °C to +125 °C ambient temperature range
- 1000 V_{DC} electrical isolation
- High-speed, 1 Mbps typical
- Open collector output
- 300 KHz bandwidth
- TO-5 hermetic package
- Similar to 6N135/6N136, 4N55
- Radiation tolerant
- Offers 100% high-reliability screening

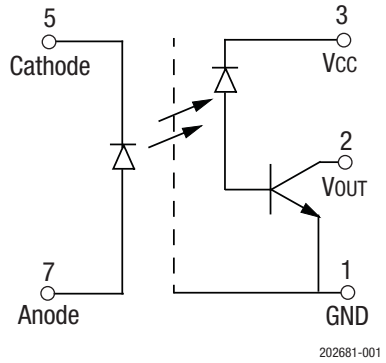

Figure 1. OLH300 Block Diagram

Description

The OLH300 is suitable for interfacing Transistor-to-Transistor Logic (TTL) to Low Power Schottky Transistor-Transistor Logic (LSTTL), TTL, or Complementary Metal Oxide Semiconductor (CMOS), as well as wide bandwidth analog applications.

Each OLH300 has an LED and an integrated photodiode transistor detector that is mounted and coupled in a ceramic substrate inside a hermetic TO-5 package, that provides 1000 V_{DC} of electrical isolation between the input and output. The integrated photodiode 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 OLH300 functional block diagram. Table 1 provides the OLH300 absolute maximum ratings. Table 2 provides the OLH300 electrical specifications.

Figures 2 through 4 illustrate the OLH300 typical performance characteristics. Figure 5 shows the OLH300 switching test circuit. Figure 6 provides the OLH300 package dimensions.

Table 1. OLH300 Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage[2]	V_{DC}	–1000	+1000	V
Storage temperature range	T_{STG}	–65	+150	°C
Operating temperature range	T_A	–55	+125	°C
Lead temperature 1.6 mm from the case for 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 the 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, and 3 shorted together, and pins 5, 6, and 7 shorted together. T_A = 25°C and duration = 1 s.

***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. OLH300 Electrical Specifications[1]
(T_A = –55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio (CTR) [2]	CTR	I_F = 10.0 mA, V_O = 0.4 V, V_{CC} = 4.5 V	20.0	45.0		%
Logic:						
Low output voltage	V_{OL}	I_F = 10.0 mA, I_{OL} = 1.5 mA, V_{CC} = 4.5 V		0.25	0.4	V
High output current	I_{OH}	I_F = 0 mA, V_O = V_{CC} = 15.0 V		0.05	100.0	µA
Low supply current	I_{CCL}	I_F = 0 mA, V_{CC} = 15.0 V, V_O = Open		0.05	10.0	µA
High supply current	I_{CCH}	I_F = 10 mA, V_{CC} = 15 V, V_O = Open		40	200	µA
Input:						
Forward voltage	V_F	I_F = 10.0 mA		1.7	2.5	V
Reverse breakdown voltage	B_{VR}	I_R = 10 µA	3			V
To output leakage current[3]	I_{I_O}	$R_H \leq$ 50%, T_A = 25 °C, V_{I_O} = 1000 V_{DC}			1	µA
Temperature coefficient of the input diode forward voltage	$\frac{\Delta V_F}{\Delta T_A}$	I_F = +5.0 mA		–2.3		$\frac{mV}{°C}$
Propagation delay time logic:						
High to low	t_{PHL}	I_F = 10.0 mA, V_{CC} = 5.0 V, R_L = 4.1 kΩ		0.3	1.0	µs
Low to high	t_{PLH}	I_F = 10.0 mA, V_{CC} = 5.0 V, R_L = 4.1 kΩ		0.5	2.0	µs

[1] Performance is guaranteed only under the conditions listed in the above table.
[2] Current transfer ratio 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, and 3 shorted together, and pins 5, 6, and 7 shorted together. T_A = 25°C and duration = 1 second.

Typical Performance Characteristics

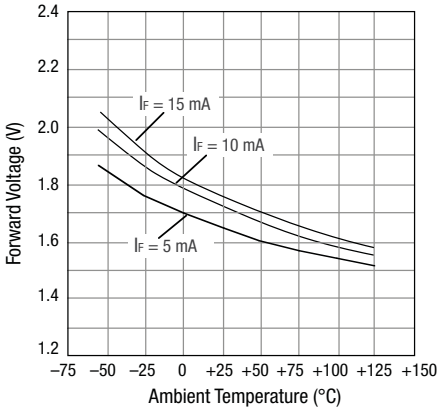

Figure 2. LED Forward Voltage vs Temperature

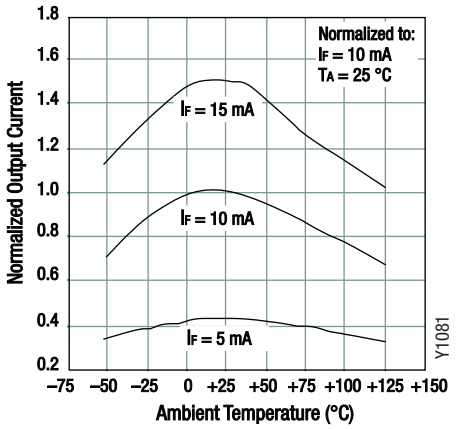

Figure 3. Normalized Output Current vs Temperature

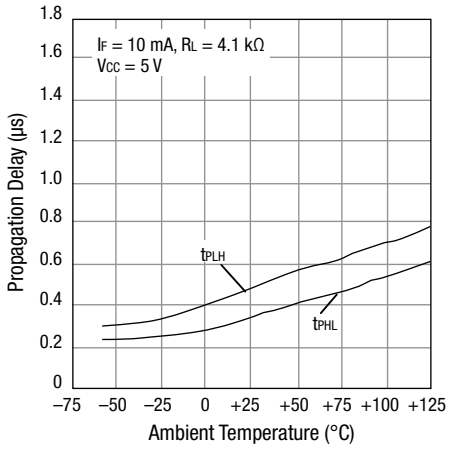

Figure 4. Propagation Delay vs Temperature

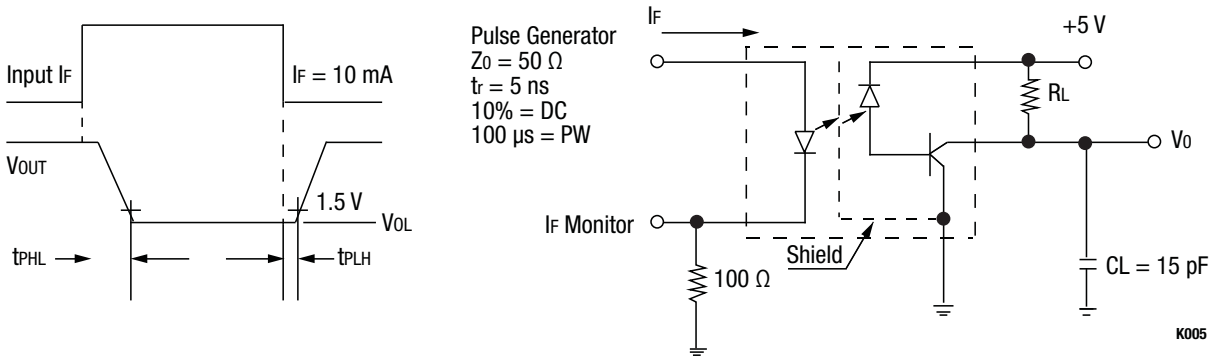

Figure 5. OLH300 Switching Test Circuit

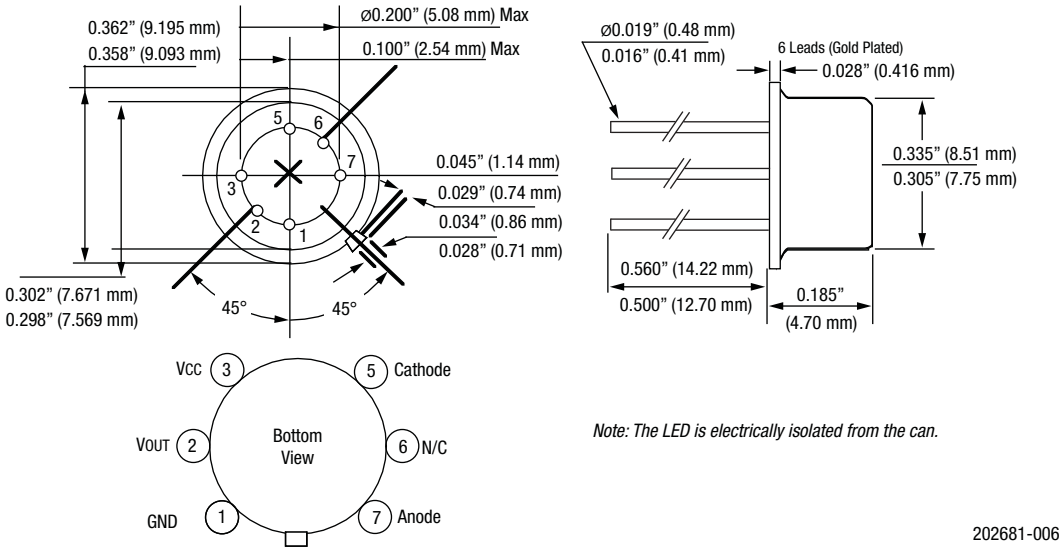

Figure 6. OLH300 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH300: High-Speed Hermetic Optocoupler	OLH300