9DATA SHEET

OLH5700/5701: Hermetic Low Input Current Optocouplers

Features

- Rugged and reliable hermetic Dual Inline Package (DIP)
- Performance guaranteed over full military temperature range
- High isolation voltage, 3000 V_{DC}
- Low input current, 0.5 mA
- Low power consumption
- High Common Mode Rejection (CMR)
- Radiation tolerant design

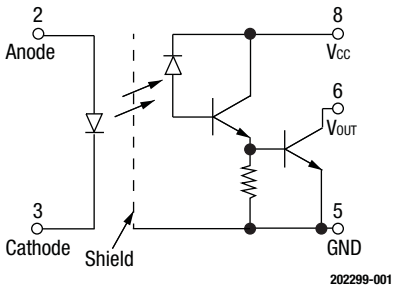

Figure 1. OLH5700/5701 Block Diagram

Description

The OLH5700/5701 are hermetic 8-pin DIP optocouplers for low input current applications. The OLH5701 product is a 100 percent high-reliability screened version of the OLH5700.

Each unit consists of an Aluminum Gallium Arsenide (AlGaAs) LED optically coupled to an integrated photo-diode, split-Darlington detector. The AlGaAs LED provides superior low current performance. The split-Darlington open collector output results in high gain and low saturation voltage.

The OLH5700/5701 products are functionally compatible to 6N138, 6N139, and 6N140A optocouplers. The performance of the OLH5700/5701 products under a radiation environment is significantly improved over standard photo-transistors.

Special low input current or Current Transfer Ratio (CTR) selection are available upon request.

Figure 1 shows the OLH5700/5701 functional block diagram. Table 1 provides the OLH5700/5701 absolute maximum ratings. Table 2 provides the OLH5700/5701 electrical specifications.

Figures 2 through 5 illustrate the OLH5700/5701 typical performance characteristics. Figure 6 shows the OLH5700/5701 switching test circuit. Figure 7 provides the OLH5700/5701 package dimensions.

Table 1. OLH5700/5701 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage [1]	V_{DC}	–3000	+3000	V
Storage temperature range	T_{STG}	–65	+150	°C
Operating temperature range	T_A	–55	+125	°C
Lead solder temperature (1.6 mm below the seating plane)			+260 for 10 sec	°C
Input Diode				
Average input current [2]	I_{DD}		10	mA
Peak forward current (≤1 ms duration)	I_F		20	mA
Reverse voltage	V_R		5	V
Output Detector				
Average output current			+40	mA
Supply voltage	V_{CC}	–0.5	+18.0	V
Output voltage	V_{OUT}	–0.5	+18.0	V
Power dissipation [3]	P_D		+50	mW

[1] Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together.

[2] Derate I_F at 0.33 mA/°C above 110 °C.

[3] Output power is the collector output power plus the total supply power. Derate at 1.66 mW/°C above 110 °C.

***CAUTION**: 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. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.*

Table 2. OLH5700/5701 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 = 0.5 mA, V_O = 0.4 V, V_{CC} = 4.5 V	300			%
		I_F = 1.6 mA, V_O = 0.4 V, V_{CC} = 4.5 V	300			%
		I_F = 5.0 mA, V_O = 0.4 V, V_{CC} = 4.5 V	200			%
Logic low output voltage	V_{OL}	I_F = 0.5 mA, I_{OL} =1.5 mA, V_{CC} = 4.5 V		0.1	0.4	V
		I_F = 1.6 mA, I_{OL} =4.8 mA, V_{CC} = 4.5 V		0.1	0.4	V
		I_F = 5.0 mA, I_{OL} =10 mA, V_{CC} = 4.5 V		0.2	0.4	V
Logic high output current	I_{OH}	I_F = 0 mA, V_O = V_{CC} = 18 V		0.005	250.0	µA
Logic low supply current	I_{CCL}	I_F = 1.6 mA, V_{CC} = 18 V		1.0	2.0	mA
Logic high supply current	I_{CCH}	I_F = 0 mA, V_{CC} = 18 V		0.01	40.0	µA
Input forward voltage	V_F	I_F = 1.6 mA	1.0	1.65	2.0	V
Input reverse breakdown voltage	B_{VR}	I_R = 10 µA	3			V
Input to output leakage current [3]	I_{I_O}	R_H ≤50%, T_A = 25 °C, V_{I_O} = 3000 V_{DC}, t = 1 s			1	µA
Propagation Delay Time:						
Logic high to low	t_{PHL}	I_F = 0.5 mA, R_L = 4.7 kΩ, V_{CC} = 5.0 V, T_A = 25 °C		26	100	µs
		I_F = 1.6 mA, R_L = 2.2 kΩ, V_{CC} = 5.0 V, T_A = 25 °C		5	30	µs
		I_F = 5.0 mA, R_L = 680.0 Ω, V_{CC} = 5.0 V, T_A = 25 °C		2	10	µs
Logic low to high	t_{PLH}	I_F = 0.5 mA, R_L = 4.7 kΩ, V_{CC} = 5.0 V, T_A = 25 °C		28	60	µs
		I_F = 1.6 mA, R_L = 2.2 kΩ, V_{CC} = 5.0 V, T_A = 25 °C		15	50	µs
		I_F = 5.0 mA, R_L = 680.0 Ω, V_{CC} = 5.0 V, T_A = 25 °C		10	30	µs
Common mode transient immunity:						
Logic high level	CM_H	I_F = 0 mA, V_{CC} = 5.0 V, T_A = 25 °C, R_L = 1.5 kΩ, V_{CM} = 300.0 V_{P-P}	5	≥10		KV/µs
Logic low level	CM_L	I_F = 1.6 mA, V_{CC} = 5.0 V, T_A = 25 °C, R_L = 1.5 kΩ, V_{CM} = 300.0 V_{P-P}	5	≥10		KV/µs

[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] 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.

Typical Performance Characteristics

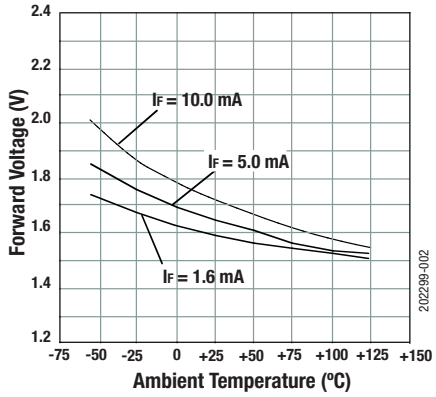

Figure 2. Forward Voltage vs Temperature

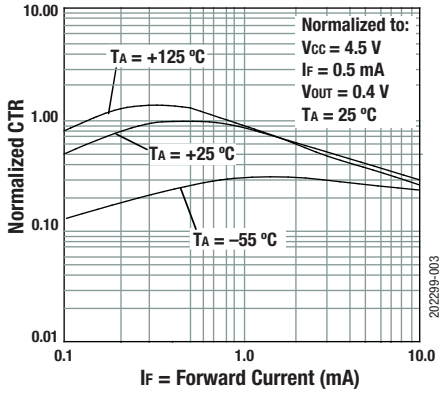

Figure 3. Normalized CTR vs Input Diode Forward Current

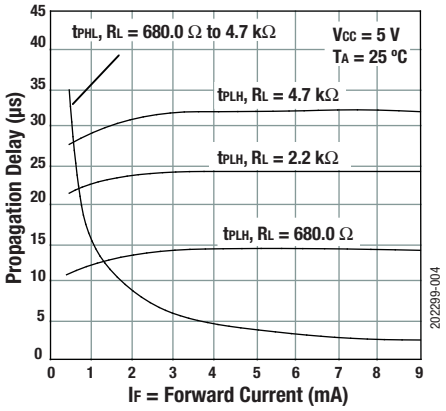

Figure 4. Propagation Delay vs Input Diode Forward Current

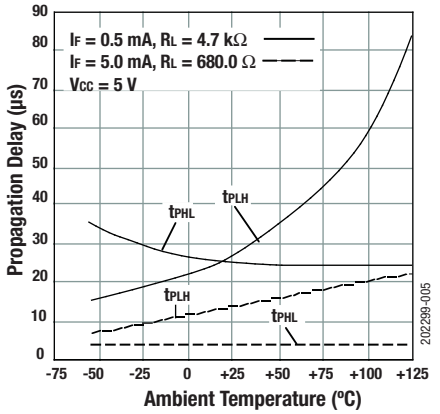

Figure 5. Propagation Delay vs Temperature

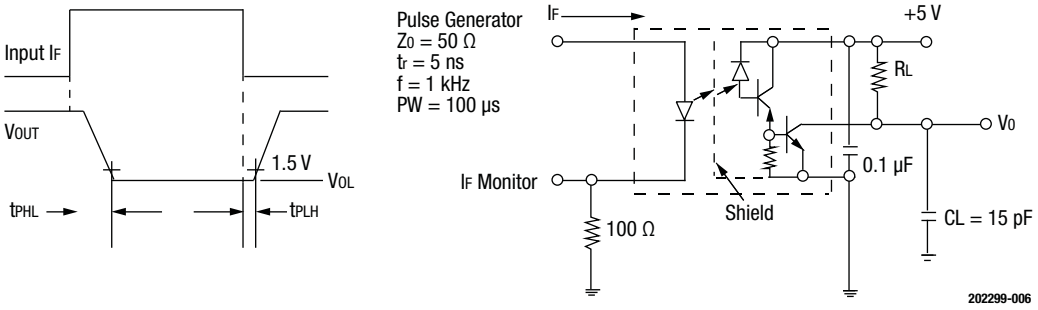

Figure 6. OLH5700/5701 Switching Test Circuit

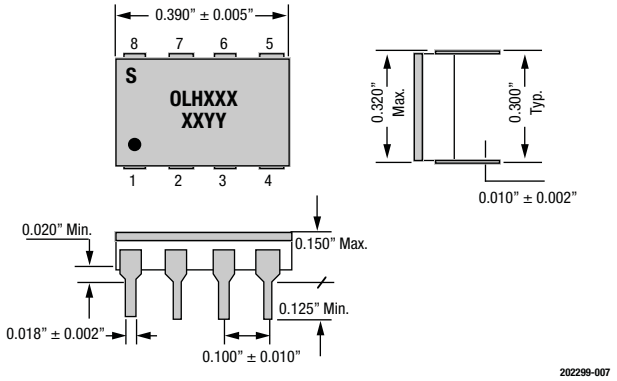

Figure 7. OLH5700/5701 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH5700/5701: Hermetic Low Input Current Optocouplers	OLH5700/5701