

DATA SHEET

OLH5500/5501: Hermetic High-Speed Optocouplers

Features

- Rugged, reliable hermetic Dual Inline Package (DIP)
- Performance guaranteed over full military temperature range
- High isolation voltage, 3000 V_{DC}
- High-speed, 400 Kbps typical
- Open collector output
- High common mode transient immunity >10,000 V/μs at V_{CM} = 350 V
- Radiation tolerant design

Description

The OLH5500/5501 are hermetic 8-pin DIP optocouplers for wide bandwidth analog applications, as well as for interfacing Transistor-to-Transistor Logic (TTL) to Low-Power Schottky Transistor-Transistor Logic (LSTTL) or Complementary Metal Oxide Semiconductors (CMOS). The OLH5501 product is a 100 percent high-reliability screened version of the OLH5500.

Each unit consists of an Aluminum Gallium Arsenide (AlGaAs) LED optically coupled to an integrated photodiode transistor detector. The separate photodiode and transistor configuration improves speed performance significantly over phototransistors. The base of the transistor is available for gain and bandwidth adjustments.

The OLH5500/5501 products are functionally compatible to 6N135, 6N136, 4N55, and HCPL5500/5501 optocouplers, but with better common mode transient immunity. Special Current Transfer Ratio (CTR) selection or no-transistor base connection versions for improved noise immunity is available upon request.

The performance of the OLH5500/5501 under a radiation environment is significantly improved over standard phototransistors.

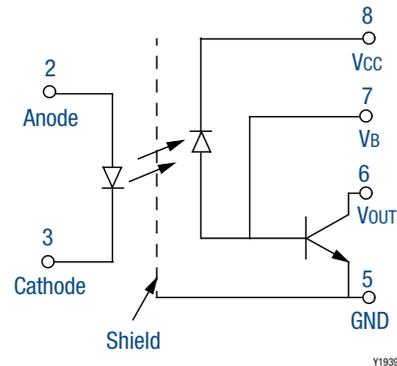


Figure 1. OLH5500/5501 Block Diagram

Figure 1 shows the OLH5500/5501 functional block diagram. Table 1 provides the OLH5500/5501 absolute maximum ratings. Table 2 provides the OLH5500/5501 electrical specifications.

Figures 2 through 4 illustrate the OLH5500/5501 typical performance characteristics. Figure 5 shows the OLH5500/5501 switching test circuit. Figure 6 provides the OLH5500/5501 package dimensions.

Table 1. OLH5500/5501 Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage	V _{DC}	-3000	+3000	V
Storage temperature range	T _{STG}	-65	+150	°C
Operating temperature range	T _A	-55	+125	°C
Lead temperature (1.6 mm below seating plane)			+260 for 10 sec	°C
<i>Input Diode</i>				
Average input current	I _{DD}		20	mA
Peak forward current (≤1 ms duration)	I _F		40	mA
Reverse voltage	V _R		3	V
Input power dissipation	I _P D		36	mW
<i>Output Detector</i>				
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
Emitter base reverse voltage	V _{EBR}		3	V
Base current			5	mA

Note 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.

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. OLH5500/5501 Electrical Specifications (Note 1)
(T_A = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio (Note 2)	CTR	I _F = 16 mA, V _O = 0.4 V, V _{CC} = 4.5 V	12	25		%
Logic high output current	I _{OH}	I _F = 0 mA, V _O = V _{CC} = 18 V		5	100	μA
Logic low supply current	I _{CCL}	I _F = 16 mA, V _{CC} = 18 V		35	250	μA
Logic high supply current	I _{CCH}	I _F = 0 mA, V _{CC} = 18 V		0.1	10.0	μA
Input forward voltage	V _F	I _F = 10 mA		1.75	2.5	V
Input reverse breakdown voltage	B _{VR}	I _R = 10 μA	3			V
Input to output leakage current (Note 3)	I _{L_O}	Relative humidity ≤ 45%, T _A = 25 °C, V _{L_O} = 3000 V _{DC} , t = 1s			1	μA
Propagation Delay Time:						
Logic high to low	t _{PHL}	I _F = 16 mA, R _L = 8.2 kΩ, V _{CC} = 5 V, C _L = 50 pF		0.3	1.0	μs
Logic low to high	t _{PLH}	I _F = 16 mA, R _L = 8.2 kΩ, V _{CC} = 5 V, C _L = 50 pF		0.8	3.0	μs
Common mode transient immunity:						
Logic high level	C _{MH}	I _F = 0 mA, R _L = 8.2 kΩ, V _{CM} = 350 V p-p, T _A = 25 °C	5	>10		kV/μs
Logic low level	C _{ML}	I _F = 16 mA, R _L = 8.2 kΩ, V _{CM} = 350 V p-p, T _A = 25 °C	5	>10		kV/μs

Note 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.

Note 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%.

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

Typical Performance Characteristics

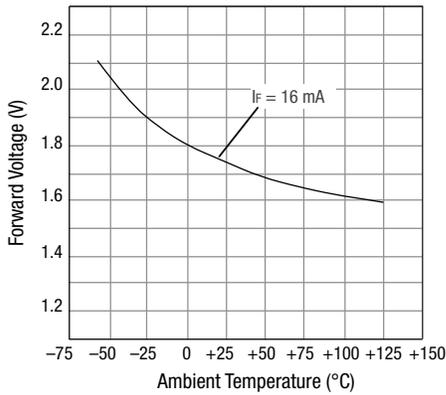


Figure 2. LED Forward Voltage vs Temperature

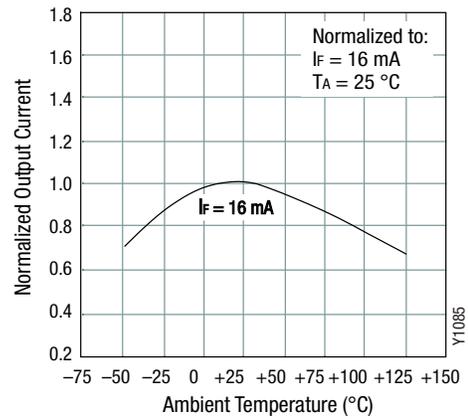


Figure 3. Normalized Output Current vs Temperature

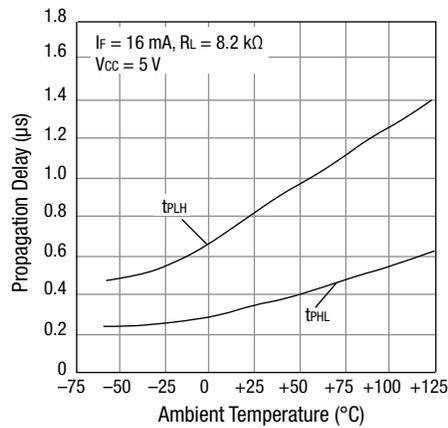


Figure 4. Propagation Delay vs Temperature

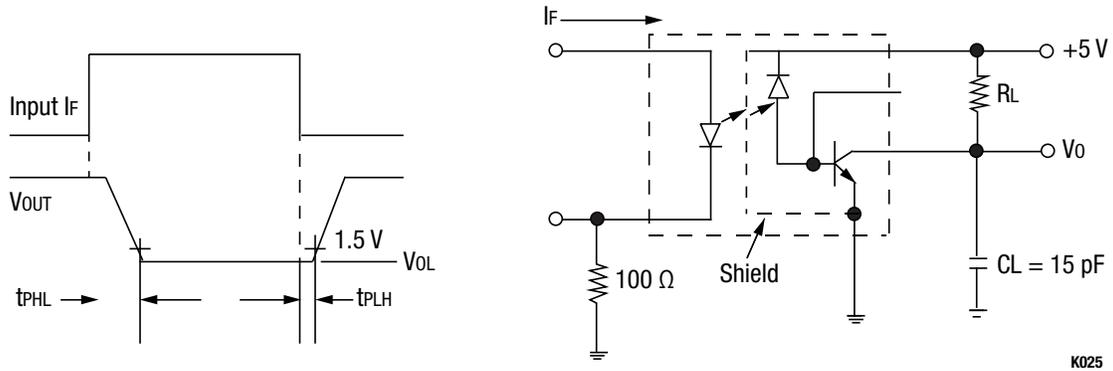
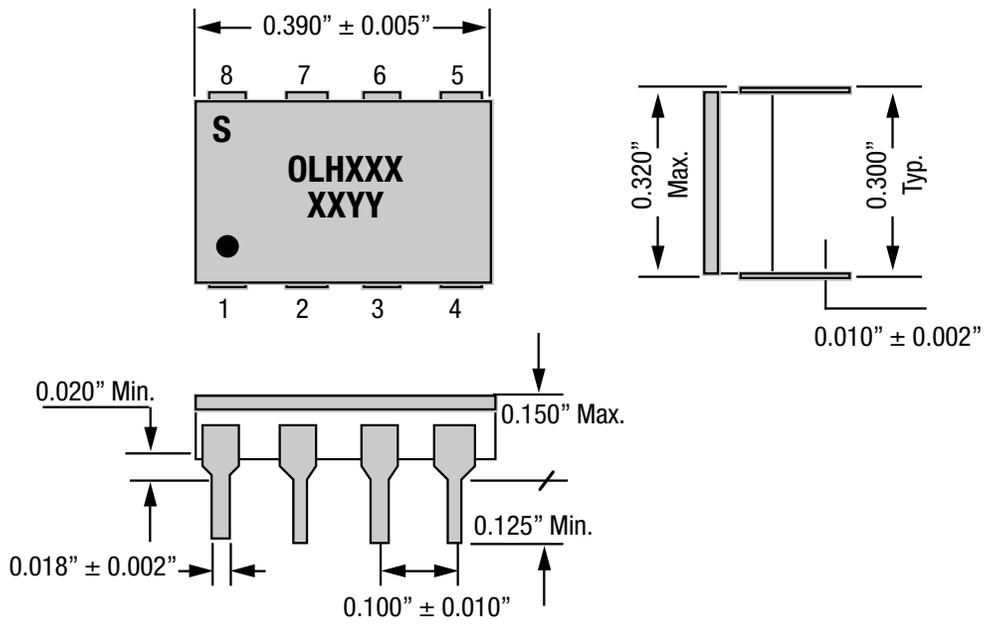


Figure 5. OLH5500/5501 Switching Test Circuit



K021

Figure 6. OLH5500/5501 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH5500/5501: Hermetic High-Speed Optocouplers	OLH5500/5501

Copyright © 2012, 2014-2015, 2017 Isolink, Inc. All Rights Reserved.

Information in this document is provided in connection with Isolink, Inc. ("Isolink"), a wholly-owned subsidiary of Skyworks Solutions, Inc. These materials, including the information contained herein, are provided by Isolink as a service to its customers and may be used for informational purposes only by the customer. Isolink assumes no responsibility for errors or omissions in these materials or the information contained herein. Isolink may change its documentation, products, services, specifications or product descriptions at any time, without notice. Isolink makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Isolink assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Isolink products, information or materials, except as may be provided in Isolink Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. ISOLINK DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. ISOLINK SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Isolink products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Isolink products could lead to personal injury, death, physical or environmental damage. Isolink customers using or selling Isolink products for use in such applications do so at their own risk and agree to fully indemnify Isolink for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Isolink products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Isolink assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Isolink products outside of stated published specifications or parameters.

Isolink is a trademark of Isolink Inc. in the United States and other countries. Skyworks and the Skyworks symbol are trademarks or registered trademarks of Skyworks Solutions, Inc., in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners.