

DATA SHEET

OLH5530/5531: Hermetic High-Speed Transistor Dual-Channel Optocoupler

Features

- Dual-channel, 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 OLH5530/5531 are dual-channel 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 OLH5531 product is a 100 percent high-reliability screened version of the OLH5530.

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 OLH5530/5531 products are functionally compatible to 6N135, 6N136, 4N55, and HCPL5530/5531 optocouplers, but with better common mode transient immunity. Special Current Transfer Ratio (CTR) selection is available upon request.

The performance of the OLH5530/5531 under a radiation environment is significantly improved over standard phototransistors.

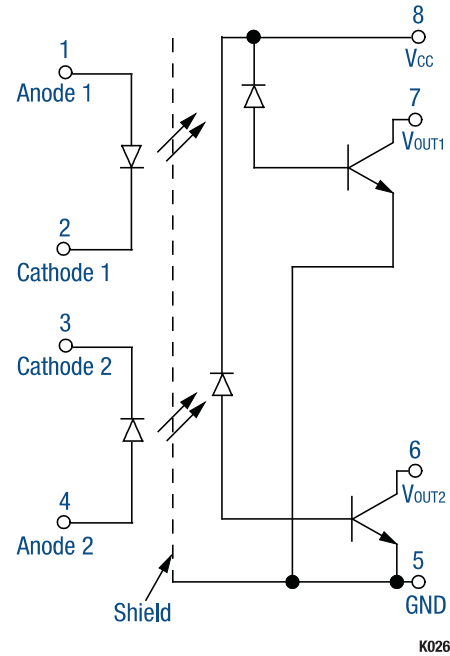


Figure 1. OLH5530/5531 Block Diagram

Figure 1 shows the OLH5530/5531 functional block diagram. Table 1 provides the OLH5530/5531 absolute maximum ratings. Table 2 provides the OLH5530/5531 electrical specifications.

Figures 2 through 4 illustrate the OLH5530/5531 typical performance characteristics. Figure 5 shows the OLH5530/5531 switching test circuit. Figure 6 provides the OLH5530/5531 package dimensions.

Table 1. OLH5530/5531 Absolute Maximum Ratings

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

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. OLH5530/5531 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 _{F1} = 100 μA, I _{F2} = 20 mA, V _O = V _{CC} = 18 V		30	250	μA
Logic low supply current	I _{CC(L)}	I _{F1} = I _{F2} = 16 mA, V _{CC} = 18 V		70	500	μA
Logic high supply current	I _{CC(H)}	I _{F1} = 0mA, I _{F2} = 16 mA, V _{CC} = 18 V		0.2	20.0	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 leakage current (Note 3):						
Output	I _{L(O)}	V _{L(O)} = 3000 V _{DC} , R _H ≤45%, T _A = 25 °C, t = 1 s			1.0	μA
Input	I _{L(I)}	V _{L(I)} = 500 V _{DC} , R _H ≤45%, T _A = 25 °C, t = 1 s		0.5		nA
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

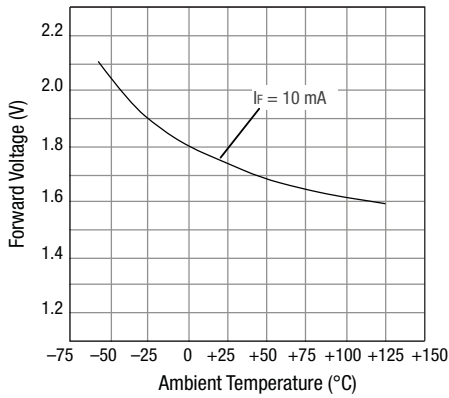


Figure 2. LED Forward Voltage vs Temperature

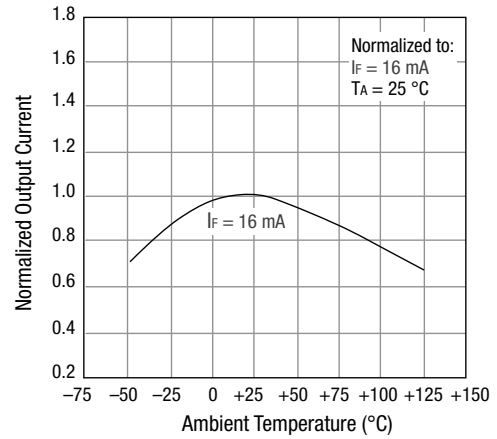


Figure 3. Normalized Output Current vs Temperature

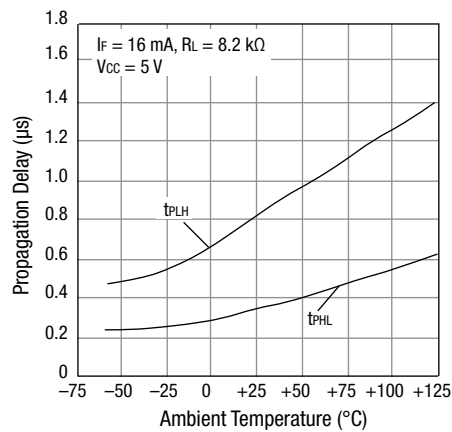
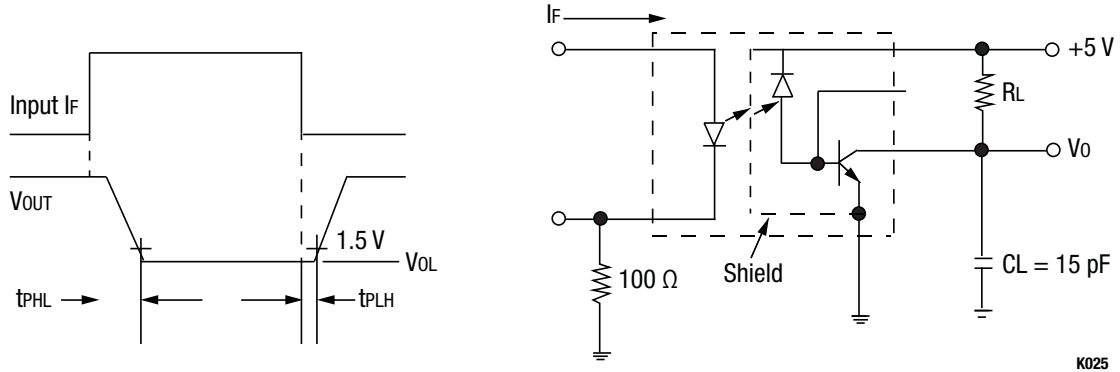
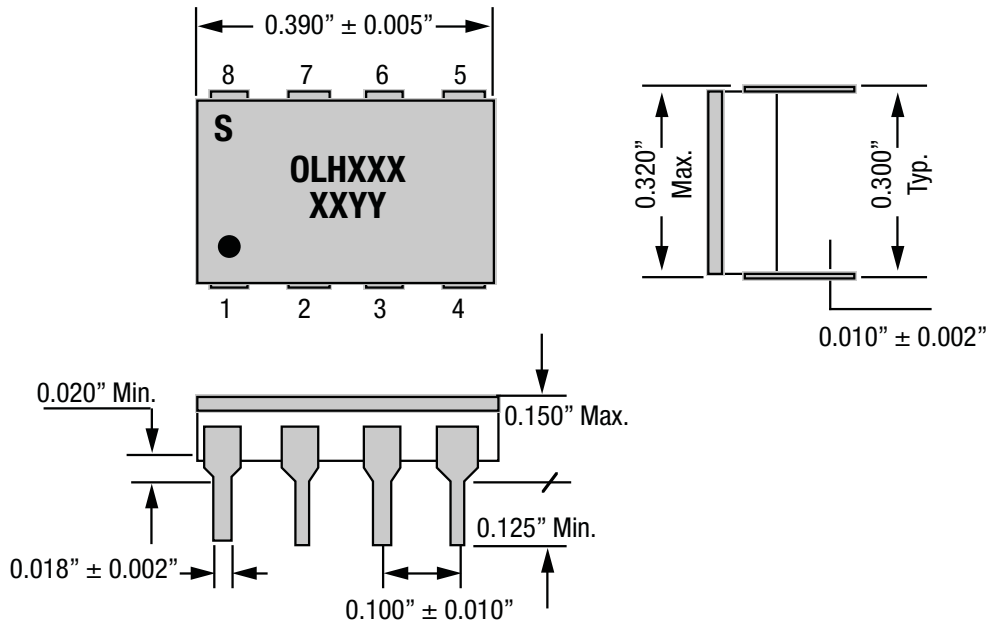


Figure 4. Propagation Delay vs Temperature



K025

Figure 5. OLH5530/5531 Switching Test Circuit



K021

Figure 6. OLH5530/5531 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH5530/5531: Hermetic High-Speed Transistor Dual Channel Optocouplers	OLH5530/5531

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