DATA SHEET

OLI500: Miniature High CMR, High-Speed Logic Gate Optocoupler for Hybrid Assembly

Features

- Performance guaranteed over -55 °C to +125 °C ambient temperature range
- Guaranteed minimum Common Mode Rejection (CMR) transient immunity, >1000 V/µs
- 1500 V_{DC} electrical isolation
- Low-Power Schottky Transistor-Transistor Logic (LSTTL)/ Transistor-to-Transistor Logic (TTL) compatible
- High-speed, 10 Mbps typical
- Low input LED current
- Similar to 6N134, 6N137, and HCPL2601
- Radiation tolerant

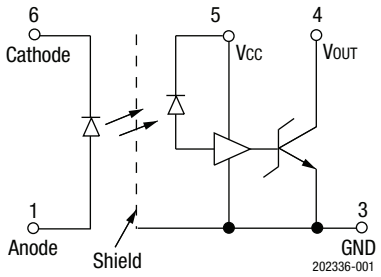

Figure 1. OLI500 Block Diagram

Description

The OLI500 is suitable for high-speed digital interfacing applications, elimination of ground loops, and input/output buffering. Each OLI500 has an LED and integrated high-speed detector mounted and coupled in a miniature custom ceramic package, that provides 1500 V_{DC} electrical isolation between the input and output.

The light from the LED is collected by the photodiode in the integrated detector and amplified by a high gain linear amplifier that drives a Schottky-clamped open collector output transistor. Typical propagation delay for the OLI500 is 60 ns. The internal shield improves common mode transient immunity to 1000 V/µs minimum.

Device mounting is achieved by a standard hybrid assembly with non-conductive epoxies. Gold or aluminum wire bonding can be used to make electrical connections for maximum placement flexibility.

***Note**: Certain cleaning processes may be harmful to this device. Contact Isolink for details.*

Figure 1 shows the OLI500 functional block diagram. Table 1 provides the OLI500 absolute maximum ratings. Table 2 provides the OLI500 electrical specifications.

Figures 2 through 5 illustrate the OLI500 typical performance characteristics. Figure 6 shows the OLI500 switching test circuit. Figure 7 provides the OLI500 package dimensions.

Table 1. OLI500 Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage[2]	V_{DC}	-1500	+1500	V
Storage temperature range	T_{STG}	-65	+150	°C
Operating temperature range	T_A	-55	+125	°C
Mounting temperature range (3 minutes maximum)			+240	°C
Total power dissipation	P_D		+170	mW
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				
Peak output current			25	mA
Supply voltage (1 minute maximum)	V_{CC}		7	V
Output collector power dissipation	P_D		40	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 and 6 shorted together, and pins 2, 3, 4, and 5 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. OLI500 Electrical Specifications[1]
(T_A = –55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Low-level output voltage[2]	V_{OL}	V_{CC} = 5.5 V, I_{OL} = 10.0 mA, I_F = 5.0 mA		0.4	0.6	V
High-level output current[2]	I_{OH}	V_{CC} = V_O = 5.5 V, I_F = 250.0 µA		5.0	250.0	µA
High-level supply current[2]	I_{CCH}	V_{CC} = 5.5 V, I_F = 0 mA		11.0	16.0	mA
Low-level supply current[2]	I_{CCL}	V_{CC} = 5.5 V, I_F = 5.0 mA		16.0	20.0	mA
Input:						
Forward voltage	V_F	I_F = 10.0 mA		1.8	2.5	V
Reverse breakdown voltage	B_{VR}	I_R = 10.0 µA	3.0			V
Output leakage current[3]	I_{I_O}	R_H ≤50%, T_A = 25 °C, V_{I_O} = 1500.0 V_{DC}			1.0	µA
Propagation delay time: [2]						
Logic high to low	t_{PHL}	I_F = 7.5 mA, V_{CC} = 5.0 V, R_L = 510.0 Ω		60.0	140.0	ns
Logic low to high	t_{PLH}	I_F = 7.5 mA, V_{CC} = 5.0 V, R_L = 510.0 Ω		60.0	140.0	ns
Common mode transient immunity: [2]						
High output level	CM_H	V_{CM} = 50.0 V peak, V_O (minimum) = 2.0 V, R_L = 510.0 Ω, I_F = 0 mA, T_A = 25 °C	1000	10,000		V/µs
Low output level	CM_L	V_{CM} = 50.0 V peak, V_O (maximum) = 0.8 V, R_L = 510.0 Ω, I_F = 5.0 mA, T_A = 25 °C	1000	10,000		V/µs

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

2 A ceramic bypass capacitor (0.01 µF to 0.1 µF) is required between pins 3 and 5 to stabilize the operation of the amplifier.

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

Typical Performance Characteristics

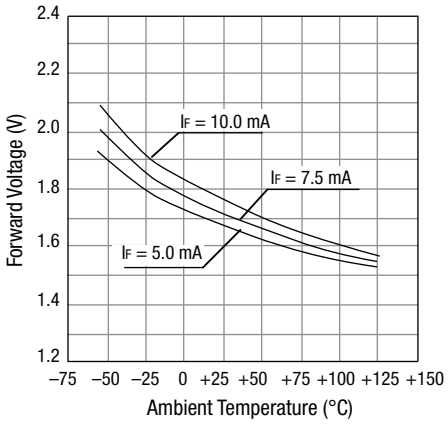

Figure 2. Input Diode Forward Voltage vs Temperature

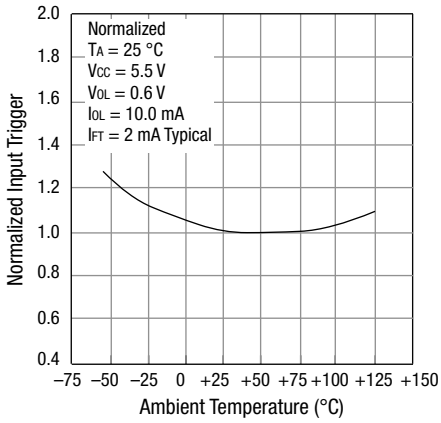

Figure 3. Normalized Input Trigger Current vs Temperature

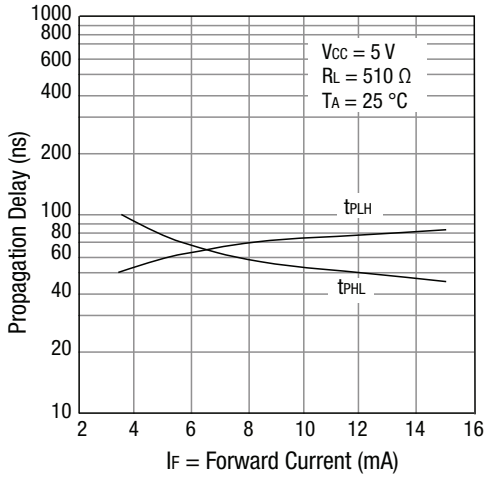

Figure 4. Propagation Delay vs Input Forward Current

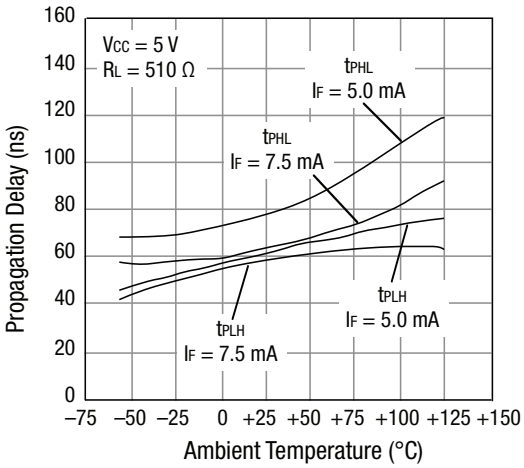

Figure 5. Propagation Delay vs Temperature

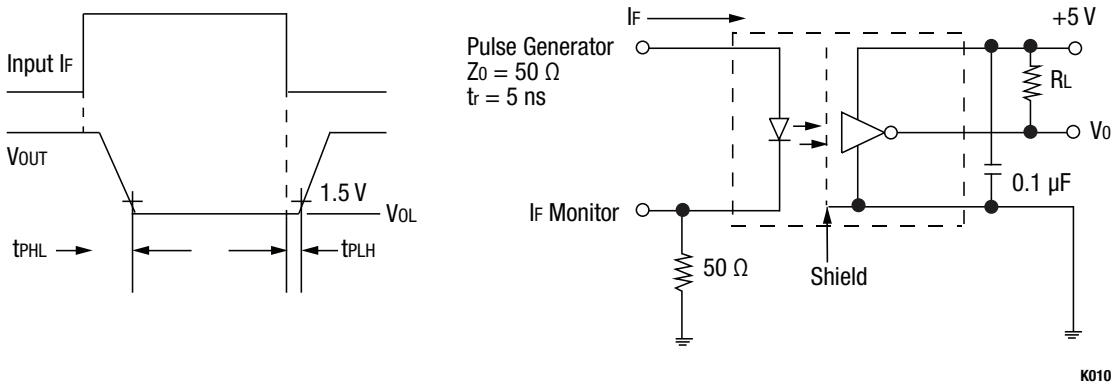

Figure 6. OLI500 Switching Test Circuit

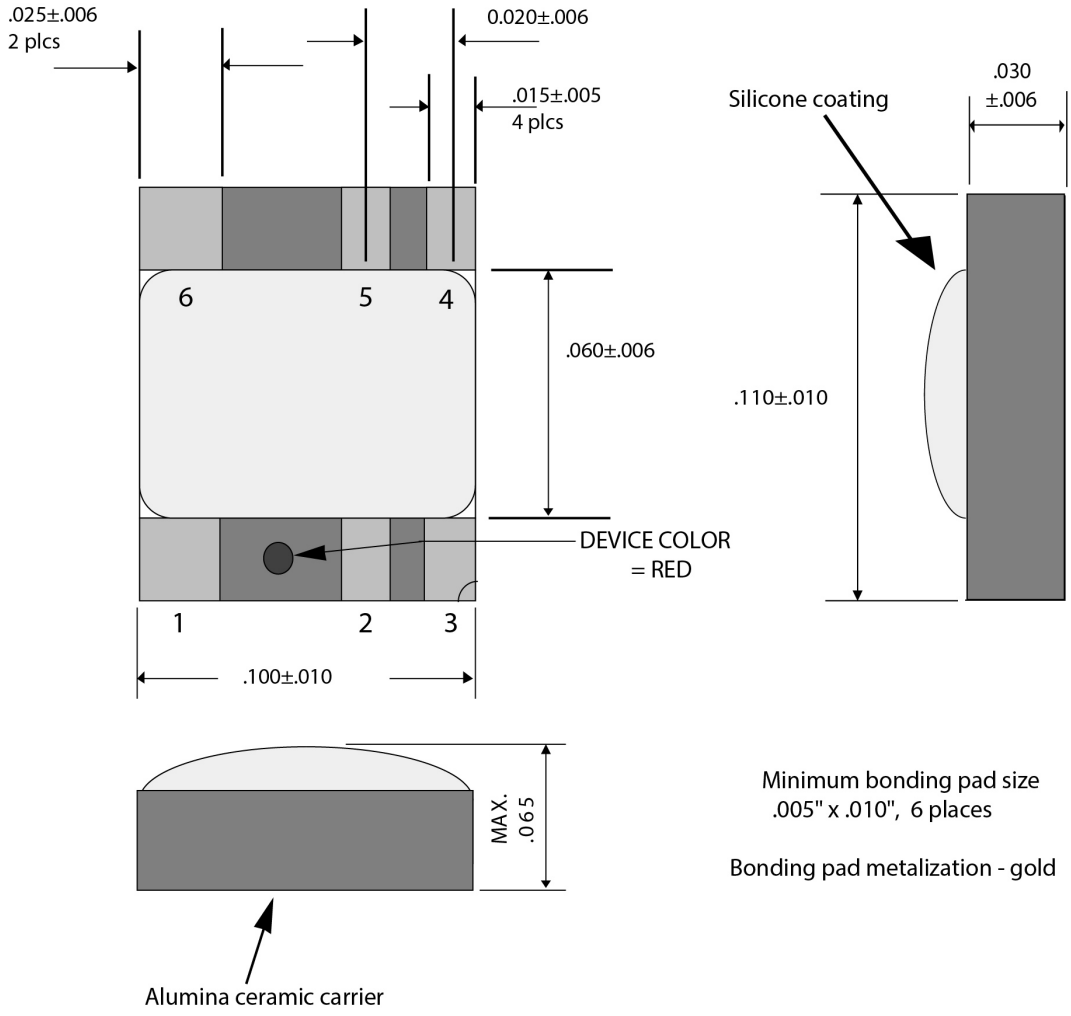

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Figure 7. OLI500 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLI500: High CMR, High-Speed Logic Gate Hermetic Optocoupler	OLI500