

DATA SHEET

OLI400: Miniature Low Input Current Optocoupler for Hybrid Assembly

Features

- Electrical parameters guaranteed over -55 °C to +125 °C ambient temperature range
- 1500 V_{DC} electrical isolation
- Low input current, 0.5 mA
- Low output V_{CE-SAT}, 0.1 V typical
- High Current Transfer Ratio (CTR), 1000% typical
- Low power consumption
- Similar to industry standard parts 6N138/6N139 in plastic, and 6N140 in hermetic Dual Inline Packages (DIPs)
- Radiation tolerant design

Description

The OLI400 has a high CTR at low input currents, which makes it ideal for applications such as Metal Oxide Semiconductors (MOSs), Complementary Metal Oxide Semiconductors (CMOSs), and low power logic interface/RS-232C data transmission systems.

Each OLI400 has an LED and integrated photodiode Darlington detector IC mounted and coupled in a miniature custom ceramic package, that provides 1500 V_{DC} electrical isolation between the input and output. The Darlington detector has an integrated base-emitter resistor for superior high temperature performance. The split Darlington design permits lower output saturation voltage and higher switching speed operation than possible with conventional photodarlington designs.

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.

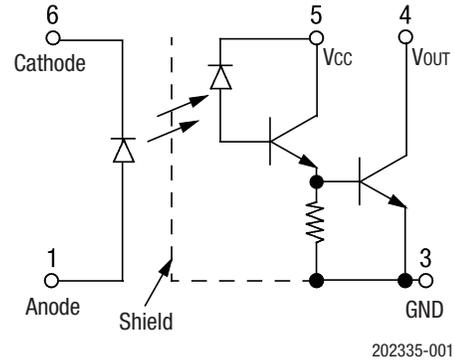


Figure 1. OLI400 Block Diagram

Figure 1 shows the OLI400 functional block diagram. Table 1 provides the OLI400 absolute maximum ratings. Table 2 provides the OLI400 electrical specifications.

Figures 2 through 5 illustrate the OLI400 typical performance characteristics. Figure 6 shows the OLI400 switching test circuit. Figure 7 provides the OLI400 package dimensions.

Table 1. OLI400 Absolute Maximum Ratings ¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage ¹	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
<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		5	V
Power dissipation	P _D		36	mW
<i>Output Detector</i>				
Average output current			+40	mA
Supply voltage	V _{CC}	-0.5	+20.0	V
Output voltage	V _{OUT}	-0.5	+20.0	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 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. OLI400 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	300.0			%
		I _F = 1.6 mA, V _O = 0.4 V, V _{CC} = 4.5 V	300.0			%
		I _F = 5.0 mA, V _O = 0.4 V, V _{CC} = 4.5 V	200.0			%
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
High output current	I _{OH}	I _F = 0.5 mA, I _{OL} = 10.0 mA, V _{CC} = 4.5 V		0.2	0.4	V
Low supply current	I _{CCL}	I _F = 0 mA, V _O = V _{CC} = 18 V		0.005	250.0	μA
High supply current	I _{CCH}	I _F = 1.6 mA, V _{CC} = 18 V		0.6	2.0	mA
Input:						
Forward voltage	V _F	I _F = 1.6 mA		1.65	2.0	V
Reverse breakdown voltage	B _{VR}	I _R = 10 μA	3.0			V
Output leakage current ³	I _{L_O}	R _H ≤ 50%, T _A = 25 °C, V _{L_O} = 1500 V _{DC}			1.0	μA
Propagation delay time:						
Logic high to low	t _{PHL}	I _F = 0.5 mA, R _L = 4.7 kΩ		26	100	μs
		I _F = 5.0 mA, R _L = 680.0 Ω		2	10	μs
Logic low to high	t _{PLH}	I _F = 0.5 mA, R _L = 4.7 kΩ		28	60	μs
		I _F = 5.0 mA, R _L = 680.0 Ω		10	30	μs

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

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

Typical Performance Characteristics

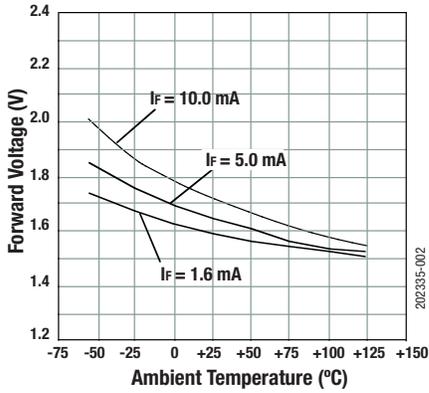


Figure 2. Forward Voltage vs Temperature

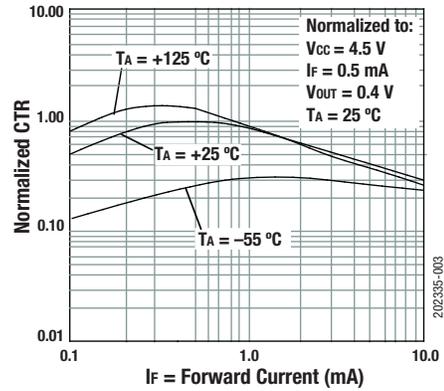


Figure 3. Normalized CTR vs Input Diode Forward Current

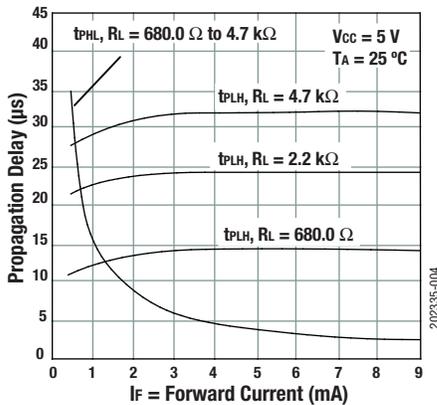


Figure 4. Propagation Delay vs Input Diode Forward Current

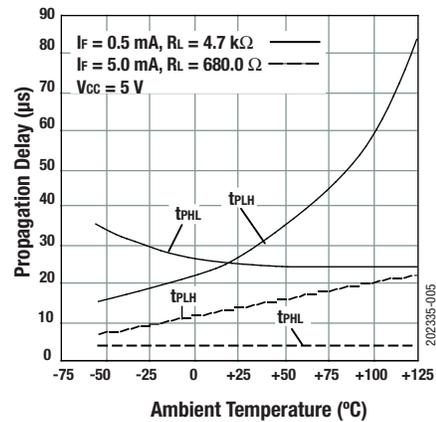


Figure 5. Propagation Delay vs Temperature

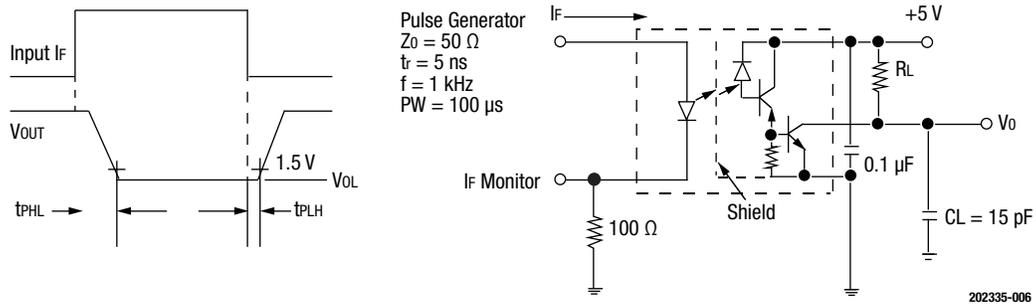


Figure 6. OLI400 Switching Test Circuit

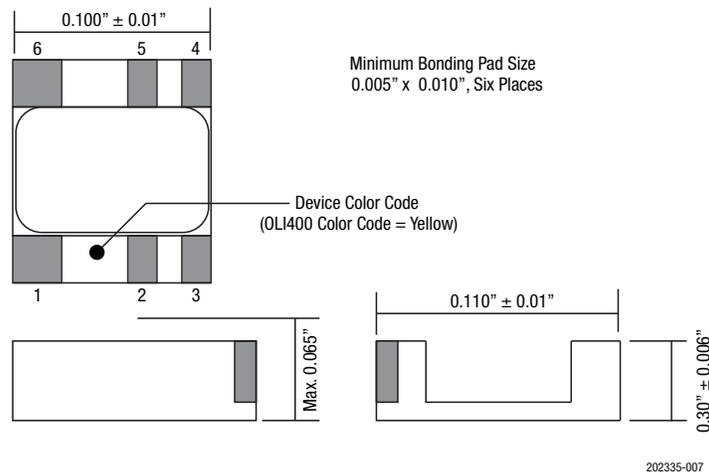


Figure 7. OLI400 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLI400: Miniature Low Input Current Optocoupler for Hybrid Assemby	OLI400

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