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 VDC electrical isolation
- Low input current, 0.5 mA
- Low output VCE-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 is 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 VDC electrical isolation between 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.*

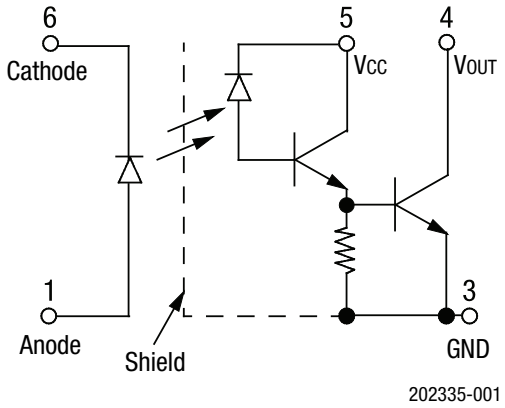

Figure 1. OLI400 Block Diagram

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.

Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04–0074.

Table 1. 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	℃
Operating temperature range	T_A	-55	+125	℃
Mounting temperature range (3 minutes maximum)			+240	℃
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				
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. TA =25 °C and duration = 1 s.

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 2. OLI400 Electrical Specifications [1]

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio[2]	CTR	IF = 0.5 mA, VO = 0.4 V, VCC = 4.5 V	300.0			%
		IF = 1.6 mA, VO = 0.4 V, VCC = 4.5 V	300.0			%
		IF = 5.0 mA, VO = 0.4 V, VCC = 4.5 V	200.0			%
Logic						
Low output voltage	VOL	IF = 0.5 mA, IOL =1.5 mA, VCC = 4.5 V		0.1	0.4	V
		IF = 5 mA, IOL =10.0 mA, VCC = 4.5 V		0.2	0.4	V
High output current	IOH	IF = 0 mA, VO = VCC = 18 V		0.005	250.0	µA
Low supply current	ICCL	IF = 1.6 mA, VCC = 18 V		0.6	2.0	mA
High supply current	ICCH	IF = 0 mA, VCC = 18 V		0.01	40.0	µA
Input						
Forward voltage	VF	IF = 1.6 mA		1.65	2.0	V
Reverse breakdown voltage	BVR	IR = 10 µA	3.0			V
Output leakage current [3]	II_O	RH ≤50%, TA = 25 °C, VI_O = 1500 VDC			1.0	µA
Propagation delay time						
Logic high to low	tPHL	IF = 0.5 mA, RL = 4.7 kΩ		26	100	µs
		IF = 5.0 mA, RL = 680.0Ω		2	10	µs
Logic low to high	tPLH	IF = 0.5 mA, RL = 4.7 kΩ		28	60	µs
		IF = 5.0 mA, RL = 680.0Ω		10	30	µs

1. Performance is guaranteed only under the conditions listed in this table.
2. CTR is defined as the ratio of the output collector current IC to the forward LED current IF, multiplied by 100%.
3. Measured between pins 1 and 6 shorted together, and pins 2, 3, 4, and 5 shorted together. TA =25°C and duration = 1s.

Typical Performance Characteristics

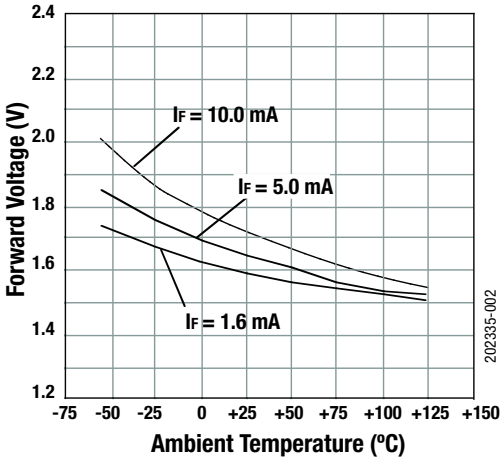

Figure 2. Forward Voltage vs Temperature

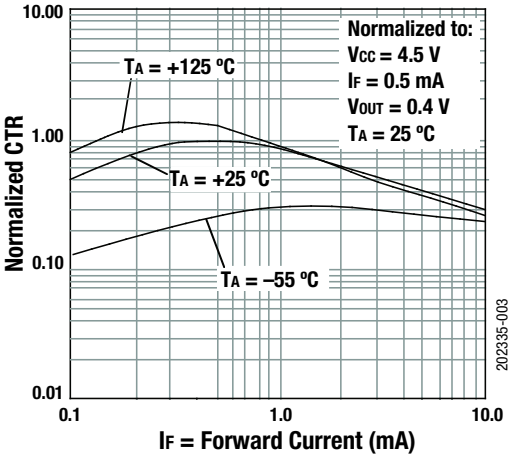

Figure 3. Normalized CTR vs Input Diode Forward Current

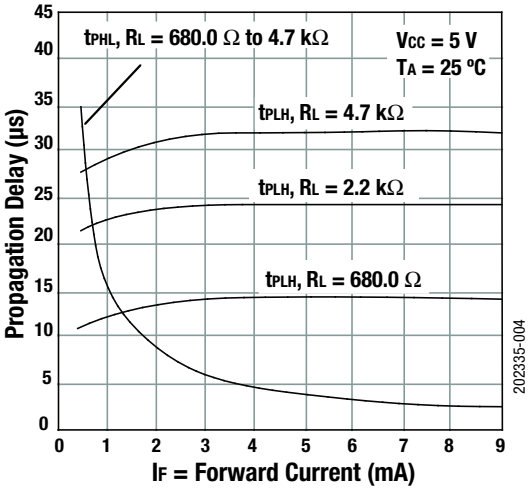

Figure 4. Propagation Delay vs Input Diode Forward Current

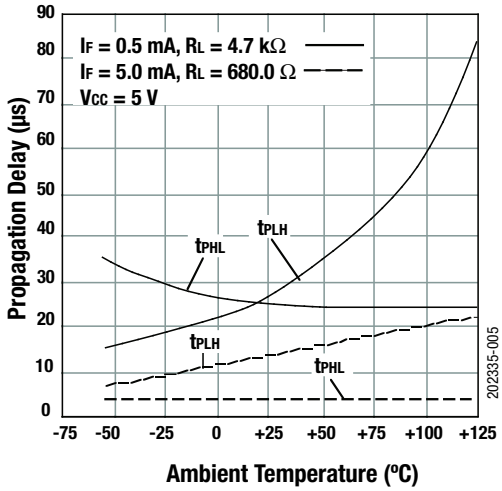

Figure 5. Propagation Delay vs Temperature

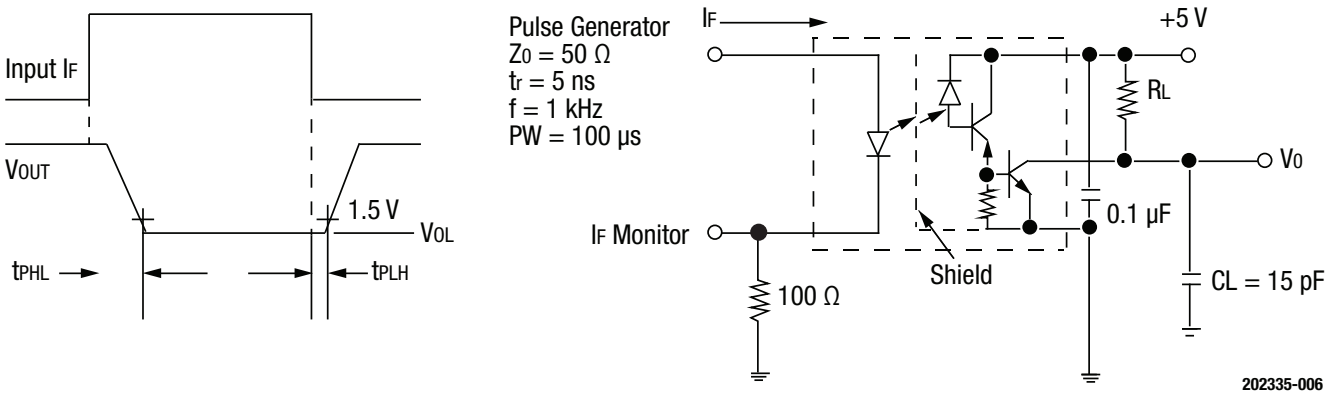

Figure 6. OLI400 Switching Test Circuit

Package Dimensions

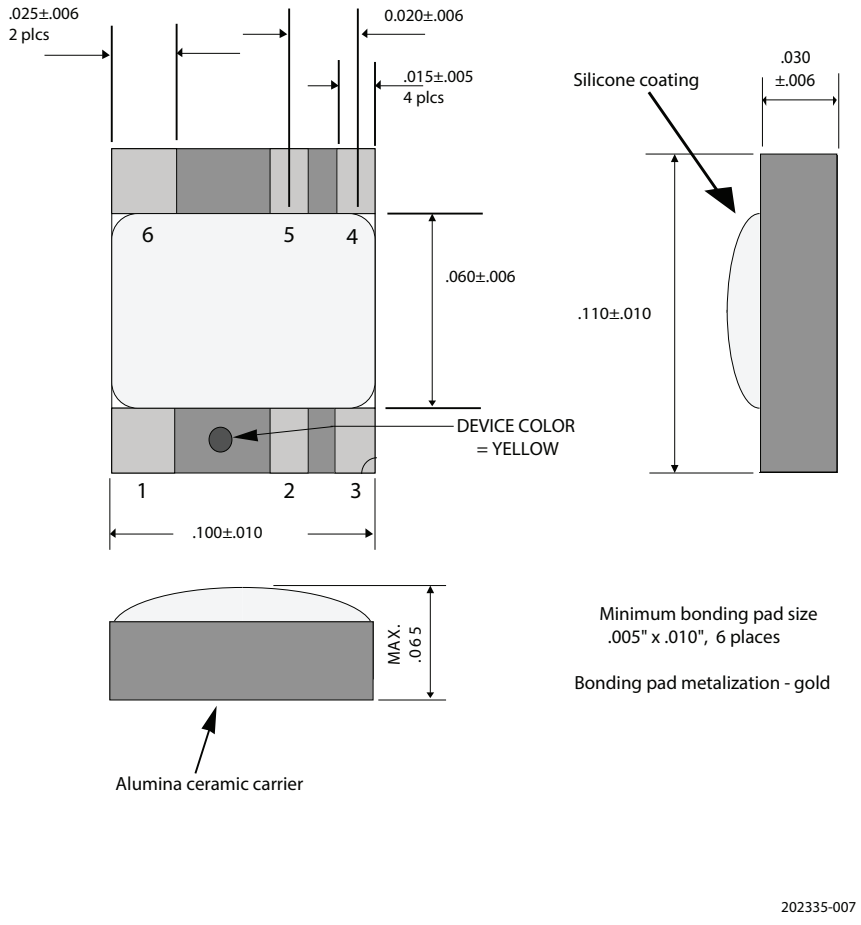

Figure 7. OLI400 Package Dimensions

Ordering Information

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