DATA SHEET

OLS010: Phototransistor Hermetic Surface Mount Optocoupler

Features

- Miniature hermetic surface mount package
- High current transfer ratio (CTR) guaranteed over –55 °C to +125 °C ambient temperature range
- 1000 V_{DC} electrical isolation
- High reliability screening is available

Description

The OLS010 is specifically designed for high reliability applications that require optical isolation with a high CTR and low saturation V_{CE}. Each optocoupler consists of an LED and N-P-N silicon phototransistor that is electrically isolated, but optically coupled inside a hermetic, four-pin Leadless Chip Carrier (LCC) package.

Electrical parameters are similar to the JEDEC registered 4N49U optocoupler. The OLS010 has 100 percent high reliability screened parts available.

The device mounting for the OLS010 is achieved with reflow soldering or conductive epoxies.

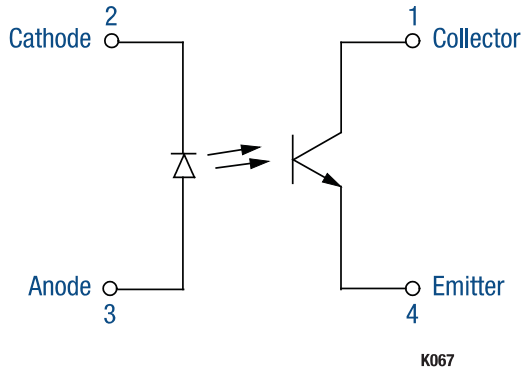

Figure 1. OLS010 Block Diagram

A functional block diagram of the OLS010 is shown in Figure 1. The absolute maximum ratings of the OLS010 are provided in Table 1. Electrical specifications are provided in Table 2.

Typical performance characteristics of the OLS010 are illustrated in Figures 2 through 4. A typical switching test circuit is shown in Figure 5 and package dimensions for the OLS010 are provided in Figure 6.

Table 1. OLS010 Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage (Note 2)	V_{DC}	–1000	+1000	V
Storage temperature range	T_{STG}	–65	+150	°C
Operating temperature range	T_A	–55	+125	°C
Soldering temperature (heated collet, 5 seconds)			260	°C
Soldering temperature (vapor phase reflow, 30 seconds)			215	°C
Input Diode				
Average input current	I_{DD}		40	mA
Peak forward current (≤1 ms duration)	I_F		1	A
Reverse voltage	V_R		2	V
Power dissipation (Note 3)	P_D		60	mW
Output Detector				
Collector to emitter voltage	V_{CE}		60	V
Emitter to collector voltage	V_{EC}		5	V
Continuous collector current	I_{CC}		50	mA
Power dissipation (Note 4)	P_D		300	mW

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.

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

Note 3: Derate linearly at 1 mW/°C above 65 °C.

Note 4: Derate linearly at 3 mW/°C above 25 °C.

***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. OLS010 Electrical Specifications (Note 1)
(T_A = –55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Max	Units
On-state collector current	I_{C_ON}	I_F = 1 mA, V_{CE} = 5 V	1		mA
		I_F = 10 mA, V_{CE} = 5 V	1		mA
Saturation voltage	V_{CE_SAT}	I_F = 10.0 mA, I_C = 2.0 mA		0.3	V
Breakdown voltage:					
Collector to emitter	BV_{CEO}	I_{CE} = 1 mA, T_A = 25 °C	60		V
Emitter to collector	BV_{ECO}	I_{EC} = 100 µA, T_A = 25 °C	5		V
Leakage current, collector to emitter	I_{CE_OFF}	V_{CE} = 20 V, T_A = 25 °C		100	nA
		V_{CE} = 20 V, T_A = 100 °C		100	µA
Input:					
Forward voltage	V_F	I_F = +10.0 mA, T_A = –55 °C	+1.1	+1.8	V
		I_F = 10.0 mA, T_A = 25 °C	0.9	1.6	V
		I_F = 10.0 mA, T_A = 100 °C	0.7	1.3	V
Reverse current	I_R	V_R = 2 V		100	µA
Output resistance (Note 2)	R_{I_O}	V_{I_O} = ±1000 V_{DC}	10^{11}		Ω
Output capacitance (Note 2)	C_{I_O}	V_{I_O} = 0 V, f = 1 MHz		5	pF
Time:					
Rise (Note 3)	t_r	V_{CC} = 10 V, R_L = 100 Ω		20	µs
Fall	t_f	I_F = 10 mA		20	µs

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

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

Note 3: Value applies for Pw ≤1 µs, PRR ≤300 pps.

Typical Performance Characteristics

(T_A = –55 °C to +125 °C, Unless Otherwise Noted)

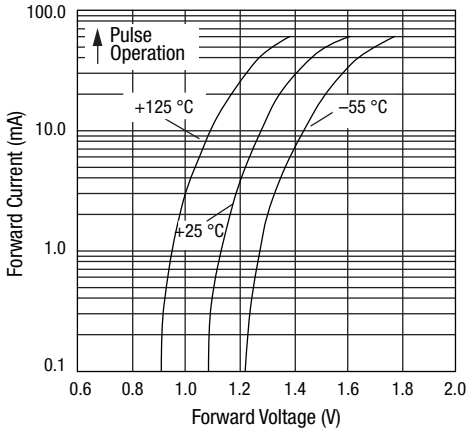

Figure 2. Forward Current vs Forward Voltage

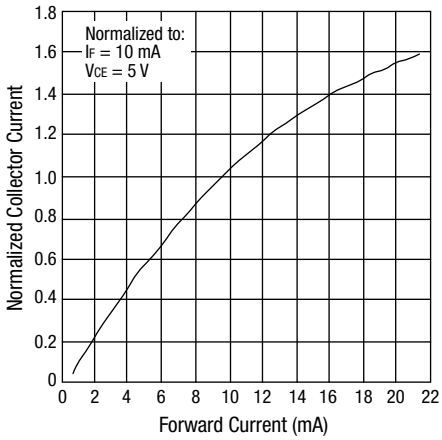

Figure 3. Normalized Collector Current vs Forward Current

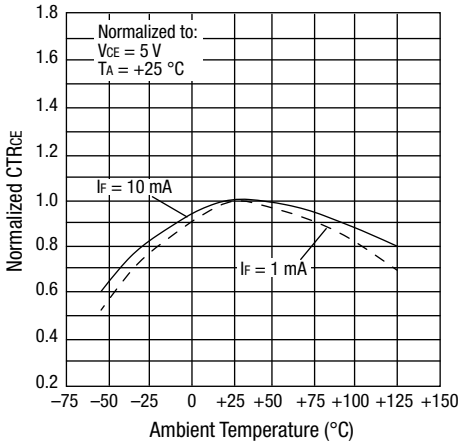

Figure 4. Normalized CTR_{CE} vs Temperature

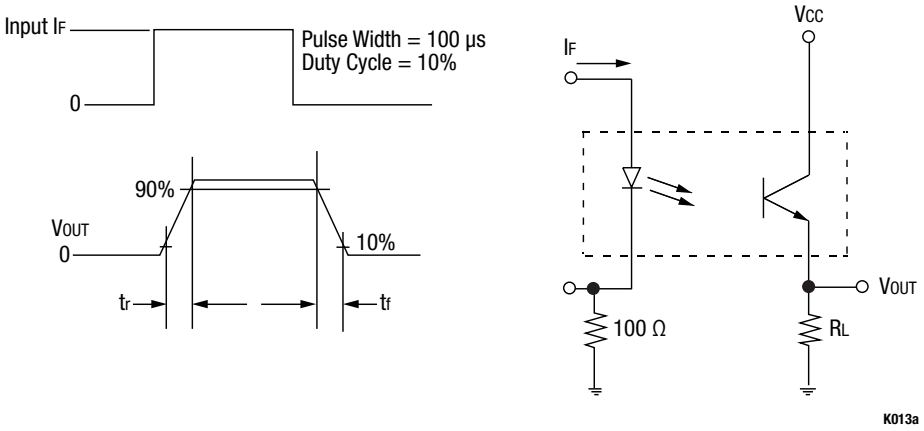

Figure 5. OLS010 Switching Test Circuit

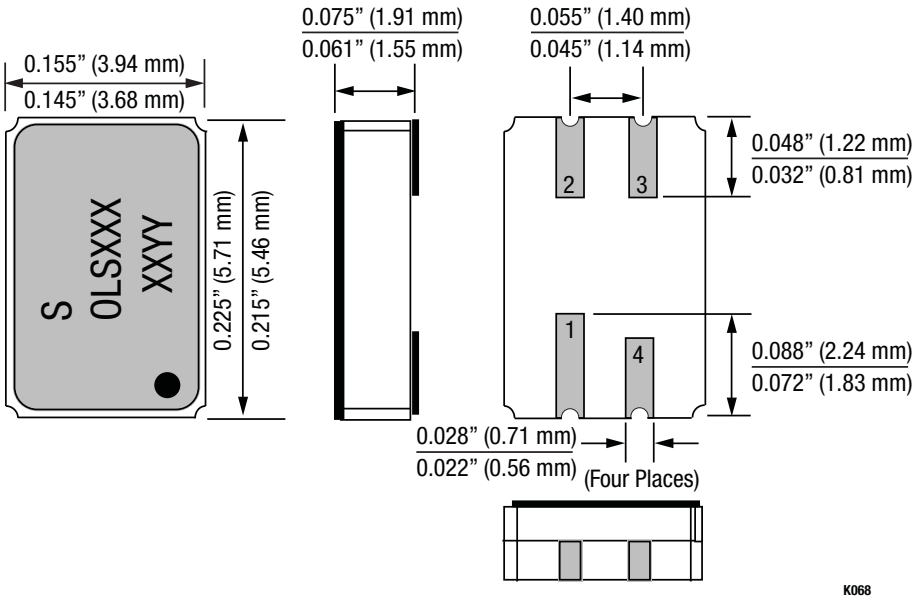

Figure 6. OLS010 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLS010: Phototransistor Hermetic Surface Mount Optocoupler	OLS010