DATA SHEET

OLS2249: Dual Channel, Radiation Tolerant, Photo-Transistor Hermetic Surface Mount Optocoupler

Features

- Dual channels of OLS049/OLS249
- CTR guaranteed over –55 °C to +100 °C ambient temperature range
- 1500 V_{DC} electrical isolation
- Radiation tolerant
- High-reliability screening is available

Description

The OLS2249 is specifically designed for high-reliability applications that require optical isolation in radiation environments such as gamma, neutron, and proton radiation with high Current Transfer Ratio (CTR) and low saturation V_{CE}. Each optocoupler channel consists of an LED and N-P-N silicon photo-transistor that is electrically isolated, but optically coupled inside a hermetic eight-pin Leadless Chip Carrier (LCC) package.

The OLS2249 has 100 percent high-reliability screening parts available (contact Isolink for more information).

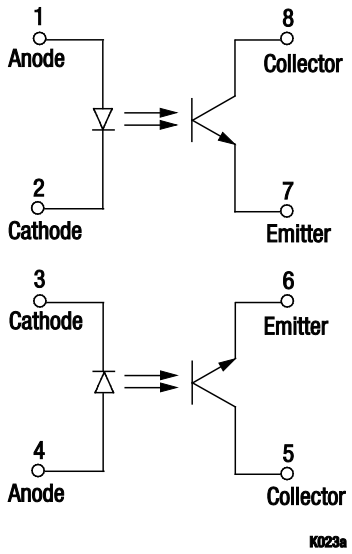

Figure 1. OLS2249 Block Diagram

Figure 1 shows the OLS2249 functional block diagram. Table 1 provides the OLS2249 absolute maximum ratings. Table 2 provides the OLS2249 electrical specifications.

Figures 2 through 4 illustrate the OLS2249 typical performance characteristics. Figure 5 shows the OLS2249 switching test circuit. Figure 6 provides the OLS2249 package dimensions.

Table 1. OLS2249 Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage (Note 2)	V_{DC}	–1500	+1500	V
Channel to channel isolation voltage (Note 3)		–500	+500	V
Storage temperature range	T_{STG}	–65	+150	°C
Operation temperature range	T_A	–55	+125	°C
Lead temperature for 10 seconds			240	°C
Input Diode				
Average input current (Note 4)	I_{DD}		40	mA
Peak forward current	I_F		1	A
Reverse voltage	V_R		2	V
Power dissipation	P_D		70	mW
Output Detector				
Collector to emitter voltage	V_{CE}		65	V
Emitter to collector voltage	V_{EC}		7	V
Continuous collector current	I_{CC}		50	mA
Power dissipation (Note 5)	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, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. T_A = 25 °C and duration = 1 s.

Note 3: Measured between pins 1, 2, 7, and 8 shorted together, and pins 3, 4, 5, and 6 shorted together. T_A = 25 °C and duration = 1 s.

Note 4: Value applies for Pw ≤ 1 µs, PRR ≤ 300 pps.

Note 5: 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. OLS2249 Electrical Specifications (Each Channel) (Note 1)
(T_A = 25 °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 I_F = +1.0 mA, V_{CE} = +5.0 V, T_A = –55 °C I_F = 2 mA, V_{CE} = 5 V, T_A = 100 °C	2 +2.8 2	12	mA
Saturation voltage	V_{CE_SAT}	I_F = 2.0 mA, I_C = 2.0 mA		0.3	V
Breakdown voltage:					
Collector to emitter Emitter to collector	BV_{CEO} BV_{ECO}	I_{CE} = 1 mA I_{EC} = 100 µA	65 5		V V
Off-state leakage current, collector to emitter	I_{CE_OFF}	V_{CE} = 20 V V_{CE} = 20 V, T_A = 100 °C	100 50		nA µA
Input:					
Forward voltage	V_F	I_F = +10.0 mA, T_A = –55 °C I_F = 10.0 mA I_F = 10.0 mA, T_A = 100 °C	+1.4 1.2 1.1	+2.0 1.8 1.7	V V 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 Fall	t_r t_f	V_{CC} = 10 V, R_L = 100 Ω I_F = 5 mA		25 25	µs µs

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

Note 2: Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. T_A = 25 °C and duration = 1 s.

Typical Performance Characteristics

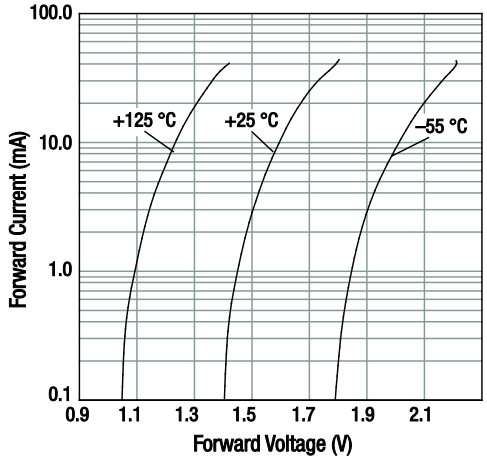

Figure 2. Forward Current vs Diode Forward Voltage

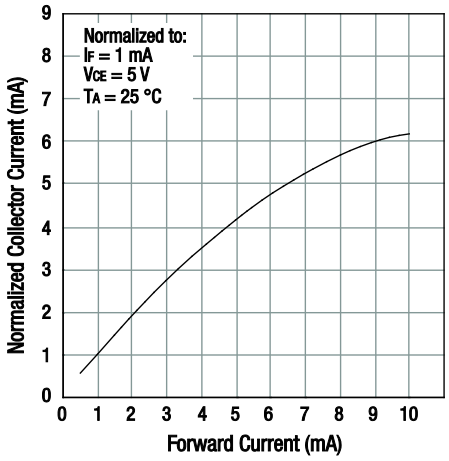

Figure 3. Normalized Collector Current vs Forward Current

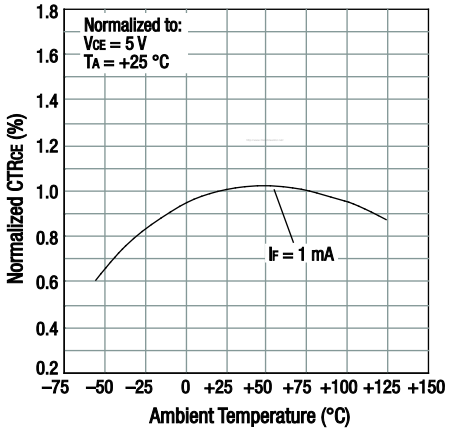

Figure 4. Normalized CTRCE vs Temperature

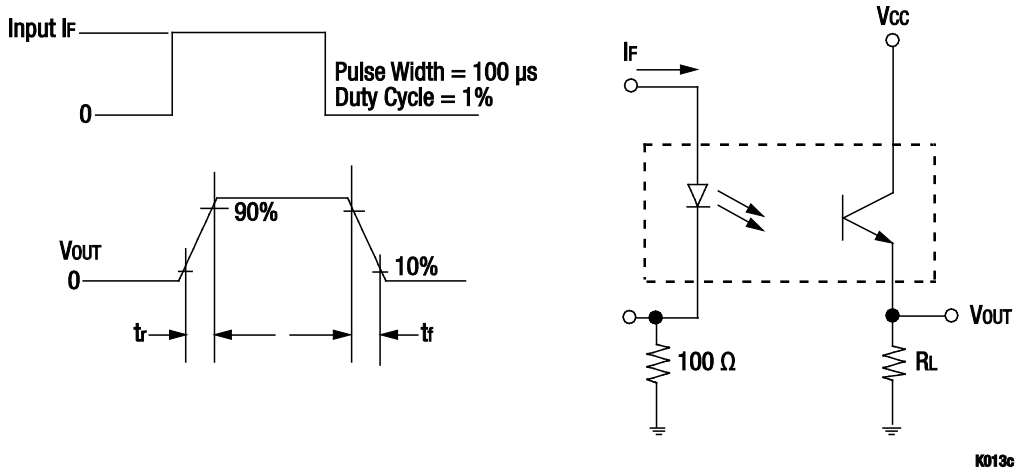

Figure 5. OLS2249 Switching Test Circuit

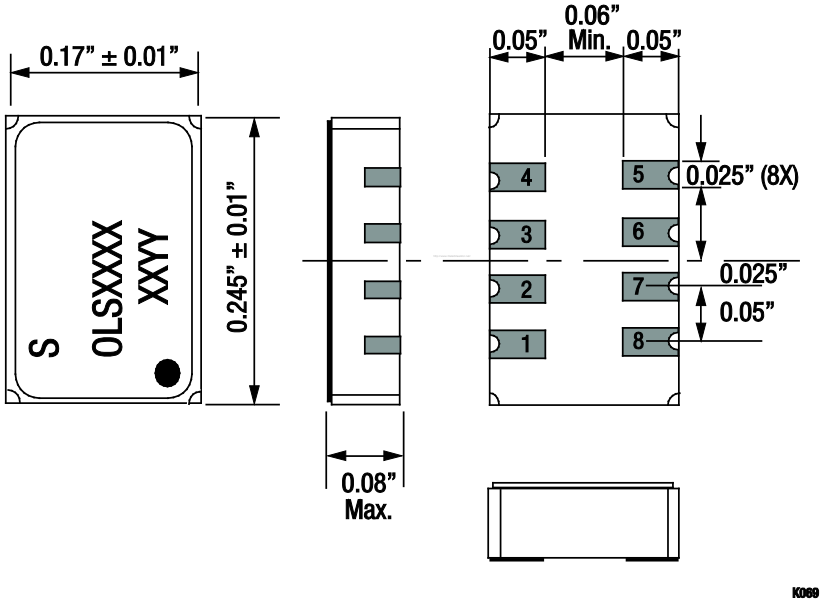

Figure 6. OLS2249 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLS2249: Dual Channel, Radiation Tolerant, Photo-Transistor Hermetic Surface Mount Optocoupler	OLS2249

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