

DATA SHEET

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

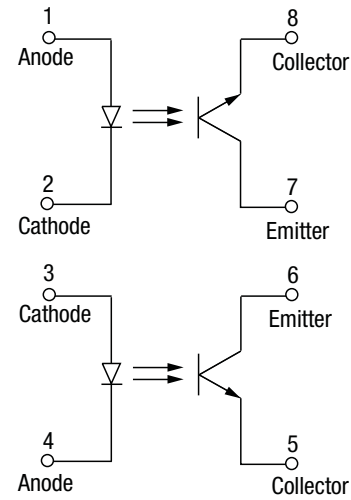
Features

- Dual channels of OLS049/OLS249
- CTR guaranteed over $-55\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$ 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 phototransistor 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).



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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 Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage ²	V _{DC}	-1500	+1500	V
Channel to channel isolation voltage 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
<i>Input Diode</i>				
Average input current ⁴	I _{DD}		40	mA
Peak forward current	I _F		1	A
Reverse voltage	V _R		2	V
Power dissipation	P _D		70	mW
<i>Output Detector</i>				
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 ⁵	P _D		300	mW

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.

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.

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.

⁴ Value applies for P_w ≤ 1 μs, PRR ≤ 300 pps.

⁵ Derate linearly at 3 mW/°C above 25 °C.

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. OLS2249 Electrical Specifications (Each Channel)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 = 2 mA, V _{CE} = 5 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	BV _{CEO}	I _{CE} = 1 mA	65		V
Emitter to collector	BV _{ECO}	I _{EC} = 100 μA	5		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 ²	R _{L_O}	V _{L_O} = ±1000 V _{DC}	10 ¹¹		Ω
Output capacitance ²	C _{L_O}	V _{L_O} = 0 V, f = 1 MHz		5	pF
Time:					
Rise	t _r	V _{CC} = 10 V, R _L = 100 Ω		25	μs
Fall	t _f	I _F = 5 mA		25	μs

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

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

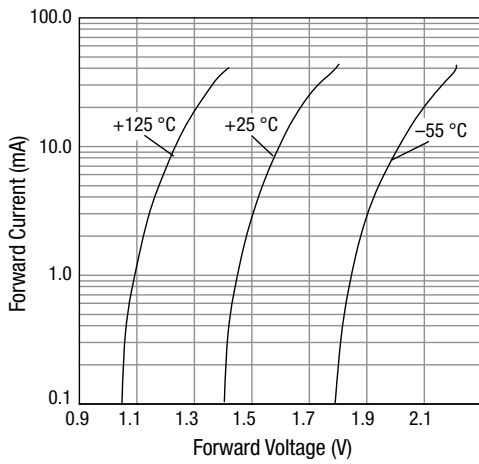


Figure 2. Forward Current vs Diode Forward Voltage

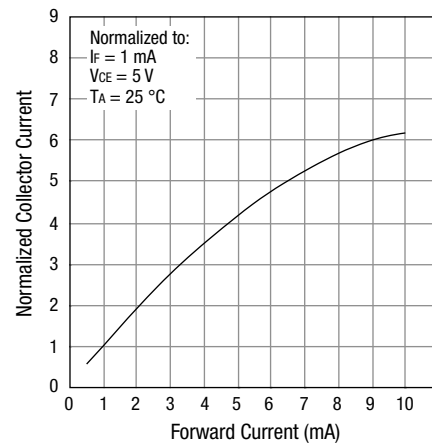


Figure 3. Normalized Collector Current vs Forward Current

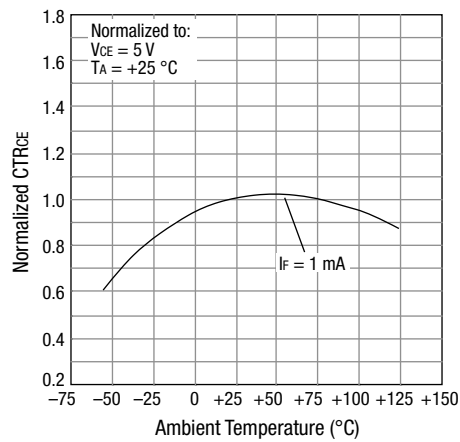


Figure 4. Normalized CTRCE vs Temperature

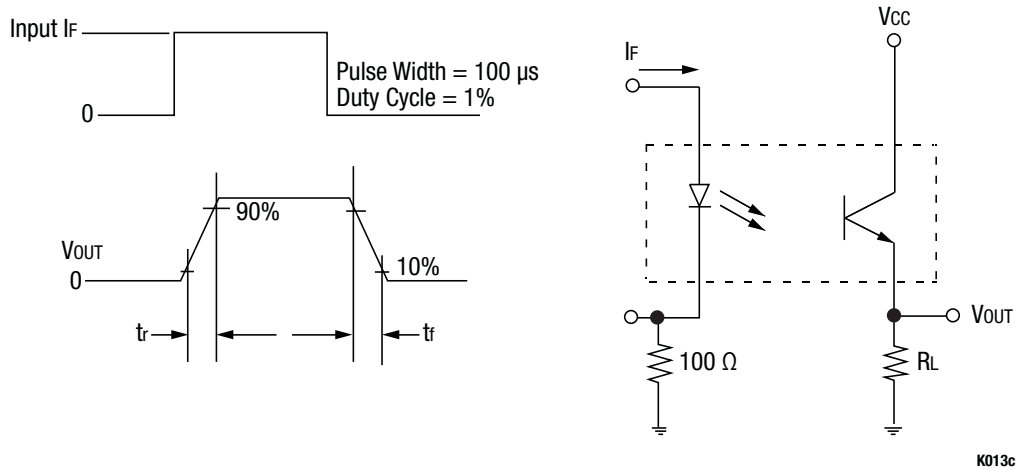


Figure 5. OLS2249 Switching Test Circuit

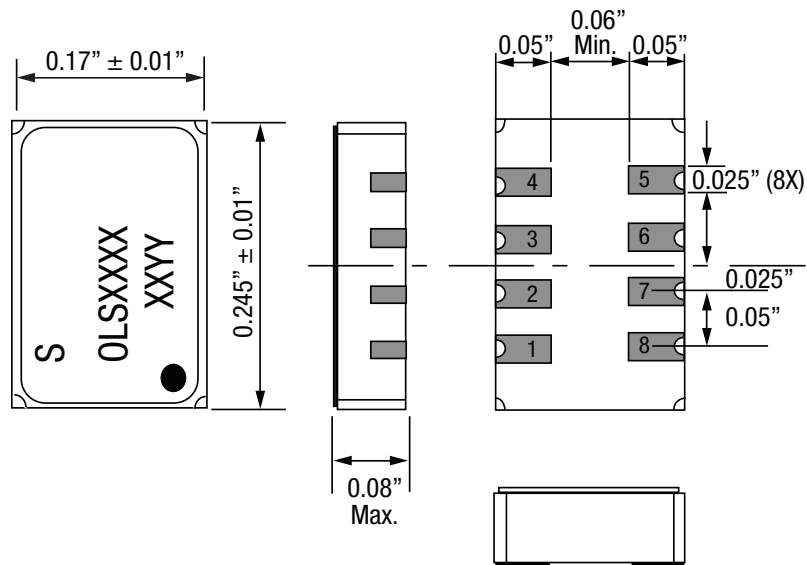


Figure 6. OLS2249 Package Dimensions

Ordering Information

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

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