

DATA SHEET

# OLS2449: Dual Channel, Radiation Tolerant, Phototransistor Hermetic Surface Mount Optocoupler

## Features

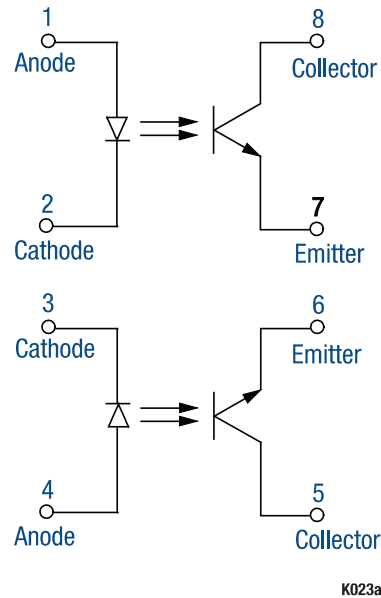
- Same reliable processing and construction as the OLS049, but with a higher current transfer ratio (CTR)
- CTR is:
  - Guaranteed over  $-55\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$  ambient temperature range
  - High at low LED currents
- High  $BV_{CE0}$ , 65V minimum
- 1500  $V_{DC}$  electrical isolation
- High-reliability screening is available

## Description

The OLS2449 is specifically designed for high-reliability applications that require optical isolation in radiation environments such as gamma, neutron, and proton radiation with high 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 electrical parameters are similar the JEDEC registered 4N49U optocoupler, but with a higher CTR and better CTR degradation characteristics due to radiation exposure.

The OLS2449 has 100 percent high-reliability screening parts available (contact Isolink for more information).



**Figure 1. OLS2449 Block Diagram**

Figure 1 shows the OLS2449 functional block diagram. Table 1 provides the OLS2449 absolute maximum ratings. Table 2 provides the OLS2449 electrical specifications.

Figures 2 through 4 illustrate the OLS2449 typical performance characteristics. Figure 5 shows the OLS2449 switching test circuit. Figure 6 provides the OLS2449 package dimensions.

**Table 1. OLS2449 Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Minimum	Maximum	Units
<b>Coupled</b>				
Input to output isolation voltage (Note 2)	V <sub>DC</sub>	-1500	+1500	V
Channel to channel isolation voltage (Note 3)		-500	+500	V
Storage temperature range	T <sub>STG</sub>	-65	+150	°C
Operation temperature range	T <sub>A</sub>	-55	+125	°C
Lead temperature for 10 seconds			240	°C
<b>Input Diode</b>				
Average input current (Note 4)	I <sub>DD</sub>		40	mA
Peak forward current	I <sub>F</sub>		1	A
Reverse voltage	V <sub>R</sub>		2	V
Power dissipation	P <sub>D</sub>		70	mW
<b>Output Detector</b>				
Collector to emitter voltage	V <sub>CE</sub>		65	V
Emitter to collector voltage	V <sub>EC</sub>		5	V
Continuous collector current	I <sub>CC</sub>		50	mA
Power dissipation (Note 5)	P <sub>D</sub>		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<sub>A</sub> = 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<sub>A</sub> = 25 °C and duration = 1 s.

**Note 4:** Value applies for P<sub>w</sub> ≤ 1 μs, PRR ≤ 300 pps.

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

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**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.

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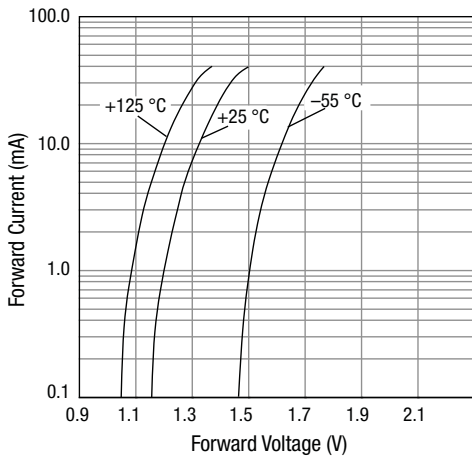
**Table 2. OLS2449 Electrical Specifications (Each Channel) (Note 1)**  
**(T<sub>A</sub> = 25 °C, Unless Otherwise Noted)**

Parameter	Symbol	Test Condition	Min	Max	Units
On-state collector current	I <sub>C_ON</sub>	I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V	15	40	mA
		I <sub>F</sub> = +1 mA, V <sub>CE</sub> = +5 V, T <sub>A</sub> = -55 °C	+7		mA
		I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V, T <sub>A</sub> = 100 °C	7		mA
Saturation voltage	V <sub>CE_SAT</sub>	I <sub>F</sub> = 1.0 mA, I <sub>C</sub> = 5.0 mA		0.3	V
Breakdown voltage:					
Collector to emitter	BV <sub>CEO</sub>	I <sub>CE</sub> = 1 mA	65		V
Emitter to collector	BV <sub>ECO</sub>	I <sub>EC</sub> = 100 μA	5		V
Off-state leakage current, collector to emitter	I <sub>CE_OFF</sub>	V <sub>CE</sub> = 20 V	100		nA
			V <sub>CE</sub> = 20 V, T <sub>A</sub> = 100 °C	50	
Input:					
Forward voltage	V <sub>F</sub>	I <sub>F</sub> = +10.0 mA, T <sub>A</sub> = -55 °C	+1.3	+1.9	V
		I <sub>F</sub> = 10.0 mA	1.2	1.7	V
		I <sub>F</sub> = 10.0 mA, T <sub>A</sub> = 100 °C	1.1	1.6	V
Reverse current	I <sub>R</sub>	V <sub>R</sub> = 2 V		100	μA
Output resistance (Note 2)	R <sub>L_0</sub>	V <sub>L_0</sub> = ±1500 V <sub>DC</sub>	10 <sup>11</sup>		Ω
Output capacitance (Note 2)	C <sub>L_0</sub>	V <sub>L_0</sub> = 0 V, f = 1 MHz		5	pF
Time:					
Rise	t <sub>r</sub>	V <sub>CC</sub> = 10 V, R <sub>L</sub> = 100 Ω		25	μs
Fall	t <sub>f</sub>	I <sub>F</sub> = 5 mA		25	μs

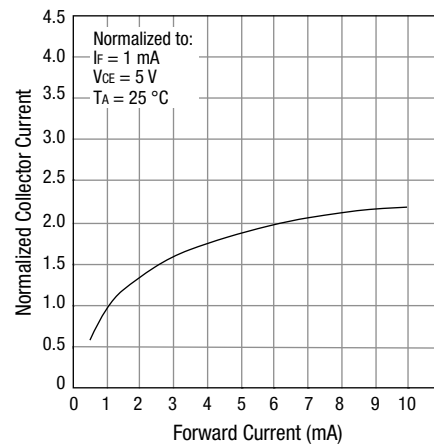
**Note 1:** Performance is guaranteed only under the conditions listed in the above table.

**Note 2:** Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. T<sub>A</sub> = 25 °C and duration = 1 s.

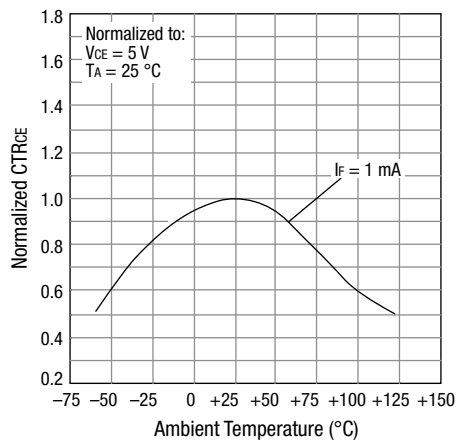
## Typical Performance Characteristics



**Figure 2. Forward Current vs Diode Forward Voltage**



**Figure 3. Normalized Collector Current vs Forward Current**



**Figure 4. Normalized CTRce vs Temperature**

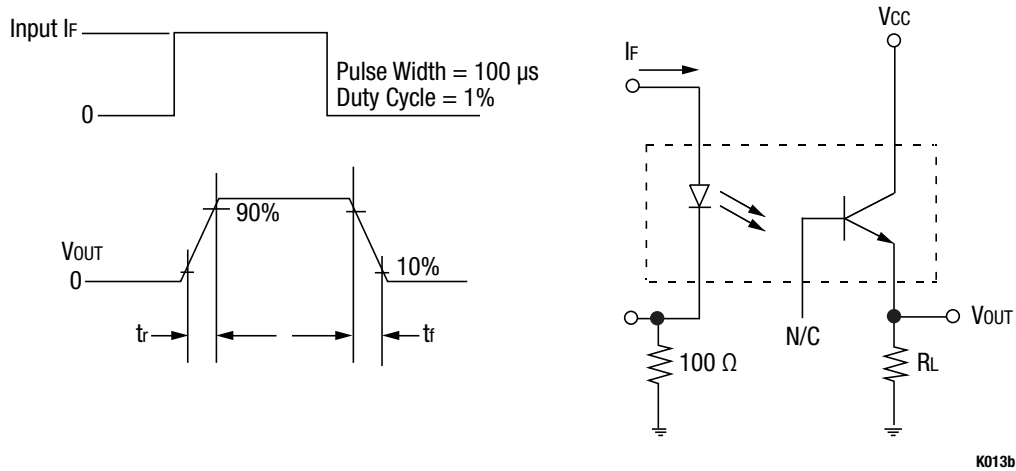


Figure 5. OLS2449 Switching Test Circuit

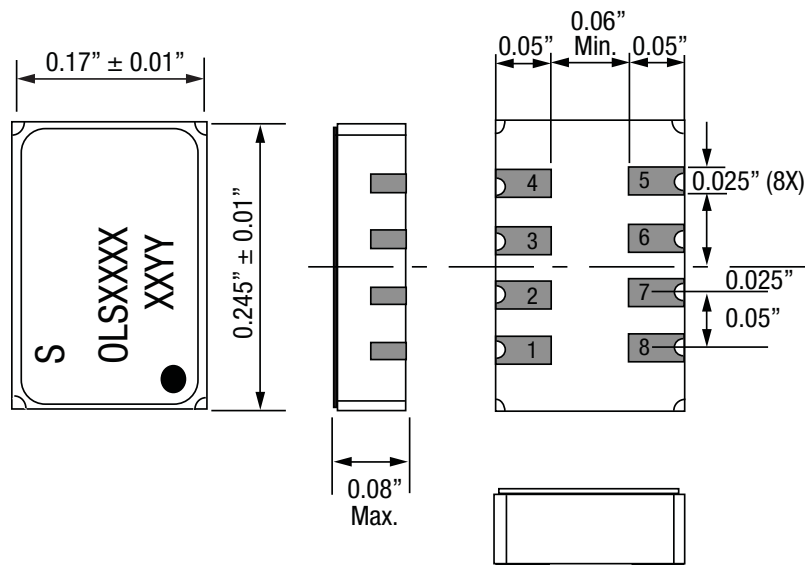


Figure 6. OLS2449 Package Dimensions

## Ordering Information

Model Name	Manufacturing Part Number
OLS2449: Dual Channel, Radiation Tolerant, Phototransistor Hermetic Surface Mount Optocoupler	OLS2449

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