

DATA SHEET

OLI149: Radiation Tolerant, Photo-Transistor Optocoupler

Features

- Radiation tolerant
- High current transfer ratio (CTR)—guaranteed over $-55\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$ ambient temperature range
- 1500 V_{DC} electrical isolation
- High breakdown voltage, collector to emitter, base open (BV_{CE0}), >60 V
- Small surface mount size

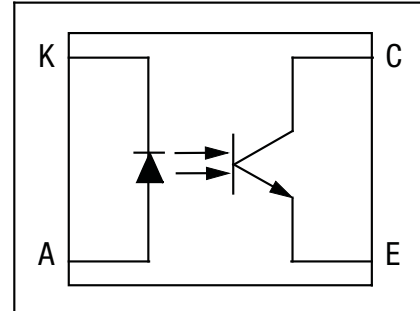
Description

The OLI149 is designed especially 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 consists of an LED and N-P-N silicon photo-transistor that is electrically isolated, but optically coupled on a ceramic Leadless Chip Carrier (LCC) surface mount package. The epoxy coating on the OLI149 allows the device to withstand normal solvent cleaning operations.

Surface mounting can be accomplished with either conductive epoxies or by reflow soldering.

Special electrical parametric selections are available upon request.



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Figure 1. OLI149 Block Diagram

A functional block diagram of the OLI149 is shown in Figure 1. The absolute maximum ratings of the OLI149 are provided in Table 1. Electrical specifications are provided in Table 2.

Typical performance characteristics of the OLI149 are illustrated in Figures 2 and 3. A rise and fall time test circuit is shown in Figure 4, and package dimensions for the OLI149 are provided in Figure 5.

Table 1. OLI149 Absolute Maximum Ratings ¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage ²	VDC	-1500	+1500	V
Storage temperature range	TSTG	-65	+150	°C
Operating temperature range	TA	-55	+125	°C
<i>Input Diode</i>				
Average input current	IDD		40	mA
Peak forward current	IF		60	mA
Reverse voltage	VR		3	V
Power dissipation	PD		70	mW
<i>Output Detector</i>				
Collector to emitter voltage	VCE		60	V
Power dissipation ³	PD		200	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 in the above table may result in permanent damage to the device.

² Measured between LED pins shorted together, and output pins shorted together. TA = 25 °C and duration = 1 s.

³ Derate linearly at 2 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. OLI149 Electrical Specifications ¹
(TA = 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	2	12	mA
		I _F = +2 mA, V _{CE} = +5 V, T _A = -55 °C	+2.8		mA
		I _F = 2 mA, V _{CE} = 5 V, T _A = 100 °C	2		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	60		V
Emitter to collector	BV _{EBO}	I _{EC} = 100 μA	5		V
Off-state leakage current collector to emitter	I _{CE_OFF}	V _{CE} = 20 V		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	+1.6	+2.2	V
		I _F = 10.0 mA	1.3	1.8	V
		I _F = 10.0 mA, T _A = 100 °C	1.2	1.6	V
Reverse current	I _R	V _R = 3 V		100	μA
Output resistance ²	R _{L_O}	V _{I-O} = ±1500 V _{DC}	10 ¹¹		Ω
Time:					
Rise	t _r	V _{CC} = 10 V, R _L = 100 Ω		25	μs
Fall	t _f	I _C = 2 mA		25	μs

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

² Measured between LED pins shorted together, and output pins shorted together. T_A = 25 °C and duration = 1 s.

Typical Performance Characteristics
 (T_A = -55 °C to +125 °C, Unless Otherwise Noted)

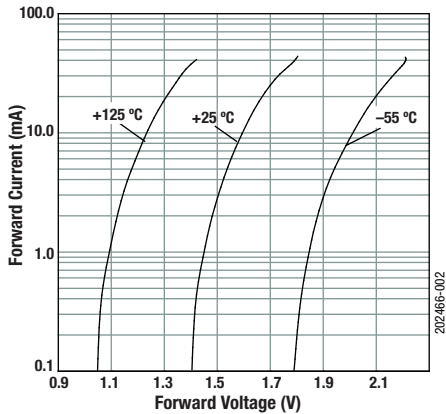


Figure 2. Forward Current vs Forward Voltage

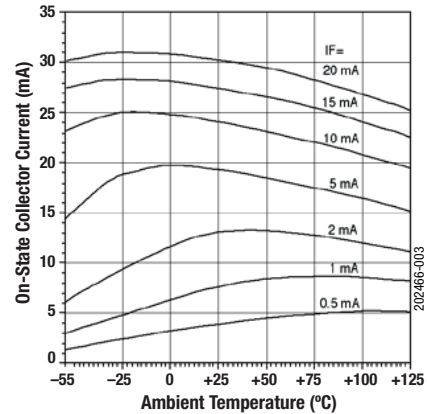


Figure 3. On-State Collector Current vs Temperature

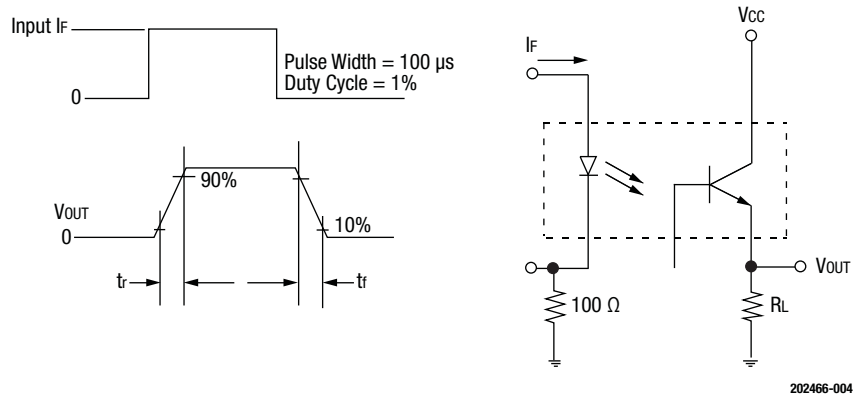


Figure 4. OLI149 Rise and Fall Time Test Circuit

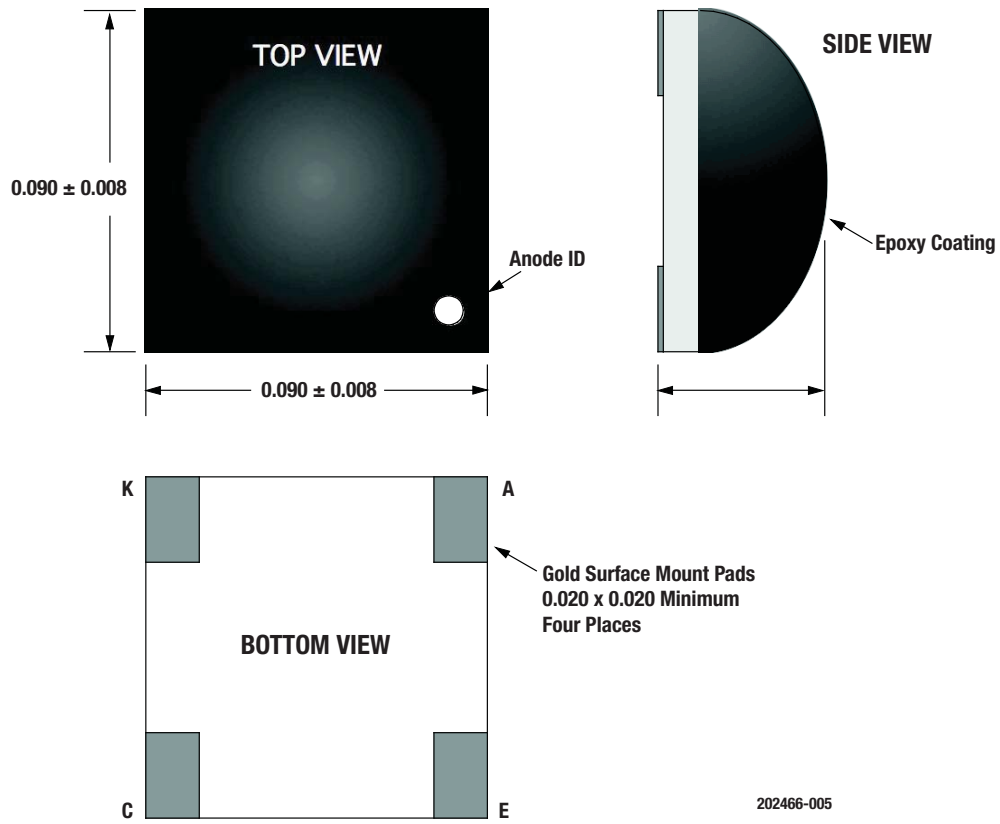


Figure 5. OLI149 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLI149: Radiation Tolerant, Photo-Transistor Optocoupler	OLI149

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