

DATA SHEET

OLH1249: Radiation-Tolerant Phototransistor Hermetic Optocoupler

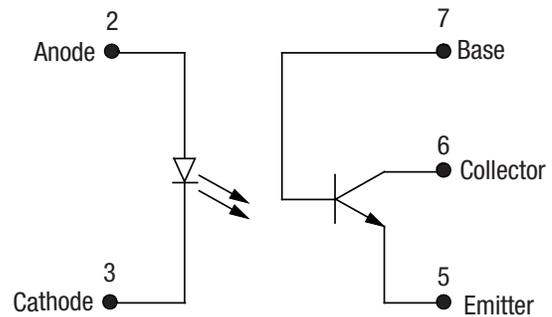
Features

- Current transfer ratio (CTR) guaranteed over $-55\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$ ambient temperature range
- 3000 V_{DC} electrical isolation
- Standard 8-pin DIP configuration
- Radiation tolerant version of OLH1049

Description

The OLH1249 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} . The OLH1249 consists of an LED and N-P-N silicon phototransistor mounted and coupled in an 8-pin hermetically sealed DIP package. Electrical parameters are similar to the OLH1049 and 4N49, but have much better CTR degradation characteristics due to radiation exposure.

High-reliability screening and special CTR selections are available (contact Isolink for more information).



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Figure 1. OLH1249 Block Diagram

Figure 1 shows the OLH1249 functional block diagram. Table 1 provides the OLH1249 absolute maximum ratings. Table 2 provides the OLH1249 electrical specifications.

Figures 2 through 4 illustrate the OLH1249 typical performance characteristics. Figure 5 shows the OLH1249 switching test circuit. Figure 6 provides the OLH1249 package dimensions.

Table 1. OLH1249 Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage	V _{DC}	-3000	+3000	V
Storage temperature range	T _{STG}	-65	+150	°C
Operation temperature range	T _A	-55	+125	°C
Lead temperature 1.6 mm from the case for 10 seconds			+240	°C
<i>Input Diode</i>				
Average input current	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}		40	V
Emitter to base voltage	V _{EB}		7	V
Collector to base voltage	V _{CB}		45	V
Continuous collector current			50	mA
Power dissipation (Note 1)	P _D		300	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 here may result in permanent damage to the device.

² Derate linearly at 3.0 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. OLH1249 Electrical Specifications¹
(T_A = 25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Maximum	Units
On-state collector current	I _{CC(ON)}	I _F = 1 mA, V _{CE} = 5 V	2.0	12.0	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	2.0		mA
On-state collector base current	I _{CCB(ON)}	I _F = 10 mA, V _{CB} = 5 V	30		μA
Saturation voltage	V _{CE_SAT}	I _F = 2 mA, I _{CC} = 2 mA		0.3	V
Breakdown voltage:					
Collector to emitter	BV _{CEO}	I _{CE} = 1 mA	40		V
Collector to base	BV _{CBO}	I _{CB} = 100 μA	45		V
Emitter to base	BV _{EBO}	I _{EB} = 100 μA	7		V
Off-state leakage current:					
Collector to emitter	I _{CE(OFF)}	V _{CE} = 20 V V _{CE} = 20 V, T _A = 100 °C		100 100	nA μA
Collector to base	I _{CB(OFF)}	V _{CB} = 20 V		10	nA
Input forward voltage	V _F	I _F = 10 mA, T _A = -55 °C I _F = 10 mA I _F = 10 mA, T _A = +100 °C	1.4 1.2 1.1	2.0 1.8 1.7	V V V
Input reverse current	I _R	V _R = 2 V		100	μA
Input to output resistance ²	R _{I_0}	V _{I_0} = ±3000 V _{DC}	10 ¹¹		Ω
Input to output capacitance ²	C _{I_0}	V _{I_0} = 0 V, f = 1 MHz		5	pF
Rise time	t _R	V _{CC} = 10 V, R _L = 100 Ω		25	μs
Fall time	t _F	I _F = 5 mA		25	μs

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 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 second.

Typical Performance Characteristics

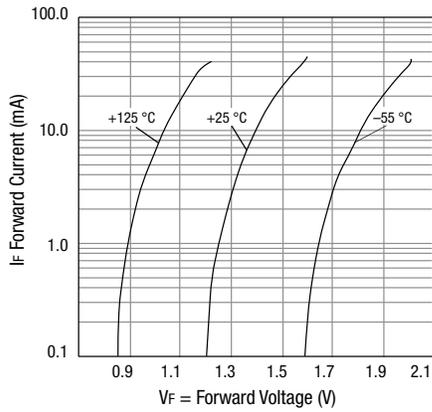


Figure 2. Forward Current vs Diode Forward Voltage

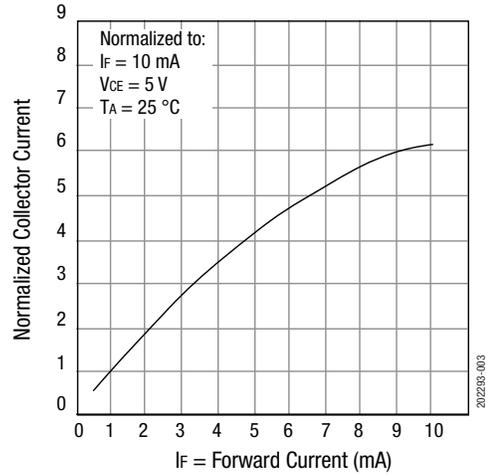


Figure 3. Normalized Collector Current vs Forward Current

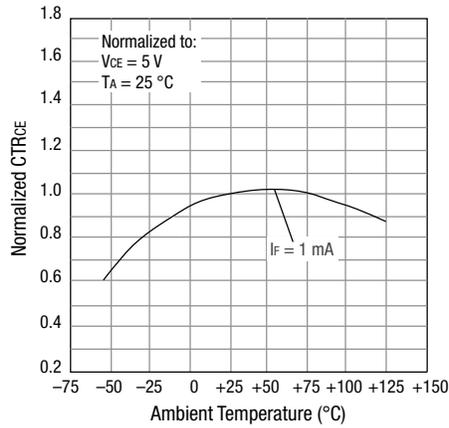
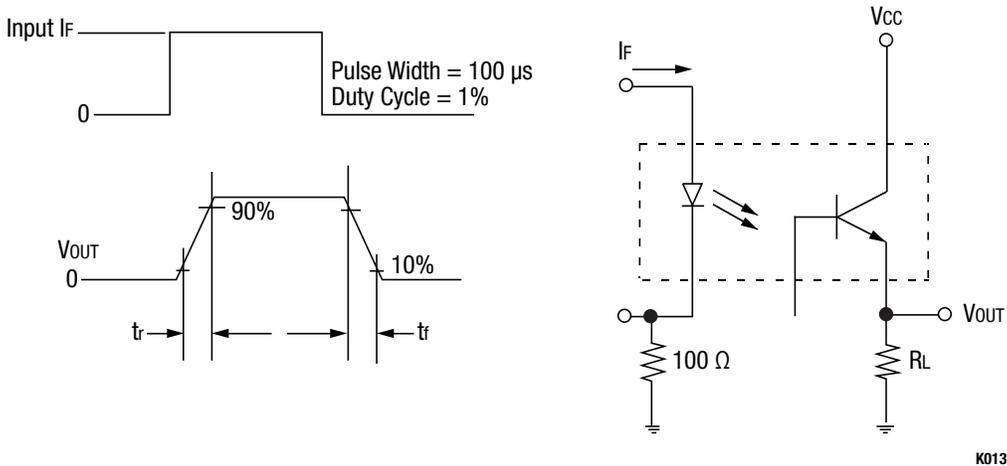
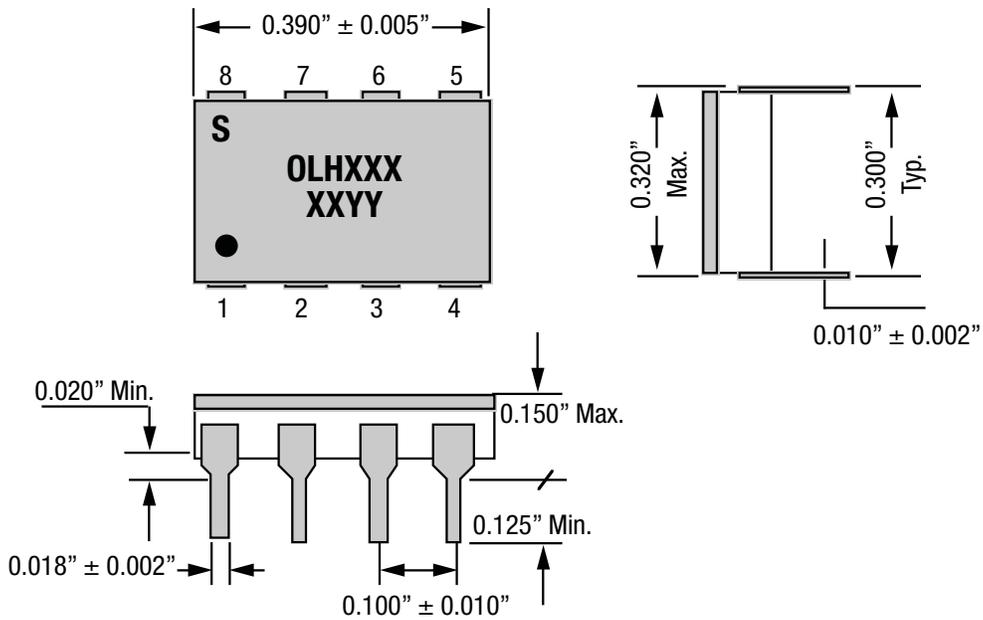


Figure 4. Normalized CTR_{CE} vs Temperature



K013

Figure 5. OLH1249 Switching Test Circuit



K021

Figure 6. OLH1249 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH1249: Radiation-Tolerant Phototransistor Hermetic Optocoupler	OLH1249

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