

DATA SHEET

OLF449: Radiation Tolerant, Phototransistor Hermetic Surface Mount Optocoupler

Features

- Hermetic SMT package
- Compliant surface mounting leads
- High Current Transfer Ratio (CTR)
- Small package size
- High reliability and rugged construction
- High-reliability screening is available
- Radiation tolerant

Description

The OLF449 consists of an LED that is optically coupled to an N-P-N silicon phototransistor, mounted in an eight-pin hermetic surface mount flat package. The leads can be formed to provide compliant solder connections to the mounting substrate.

Electrical parameters are similar to the JEDEC registered 4N49 optocoupler, but with much better CTR degradation characteristics due to radiation exposure. Special electrical parametric selections are available on request.

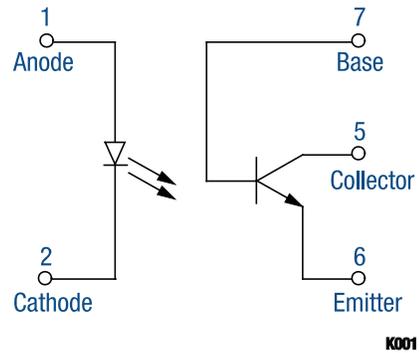


Figure 1. OLF449 Block Diagram

A functional block diagram of the OLF449 is shown in Figure 1. The absolute maximum ratings of the OLF449 are provided in Table 1. Electrical specifications are provided in Table 2.

Typical performance characteristics of the OLF449 are illustrated in Figures 2 through 4. A typical switching test circuit is shown in Figure 5 and package dimensions for the OLF449 are provided in Figure 6.

Table 1. OLF449 Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage (Note 2)	V _{DC}	-1000	+1000	V
Storage temperature range	T _{STG}	-65	+150	°C
Operating temperature range	T _A	-55	+125	°C
Mounting temperature range (10 seconds maximum)	T _{MTG}		240	°C
Input Diode				
Average input current (Note 3)	I _{DD}		40	mA
Peak forward current (Note 4)	I _F		1	A
Reverse voltage	V _R		2	V
Output Detector				
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 5)	P _D		300	mW

Note 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.

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: Derate linearly to 125 °C free-air temperature at 0.67 mA/°C above 65 °C.

Note 4: For pulse width ≤ 1 μs, pulse repetition rate ≤ 300 pps.

Note 5: Derate linearly to 125 °C free-air temperature at 3.0 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. OLF449 Electrical Specifications (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 mA, V _{CE} = +5 V, T _A = -55 °C I _F = 1 mA, V _{CE} = 5 V, T _A = 100 °C	15 7 7	40	mA mA mA
Collector base current	I _{CB_ON}	I _F = 10 mA, V _{CB} = 5 V	300		μA
Saturation voltage	V _{CE_SAT}	I _F = 1.0 mA, I _C = 5.0 mA		0.3	V
Breakdown voltage:					
Collector to emitter	BV _{CEO}	I _{CE} = 1 mA	65		V
Collector to base	BV _{CBO}	I _{CB} = 100 μA	65		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 = +10.0 mA, T _A = -55 °C I _F = 10.0 mA I _F = 10.0 mA, T _A = 100 °C	+1.3 1.2 1.1	+1.9 1.7 1.6	V V V
Reverse current	I _R	V _R = 2 V		100	μA
Output resistance (Note 2)	r _{l_O}	V _{I-O} = ±1000 V _{DC}	10 ¹¹		Ω
Output capacitance (Note 2)	C _{l_O}	V _{I-O} = 0 V, f = 1 MHz		5	pF
Times:					
Rise	t _r	V _{CC} = 10 V, R _L = 100 Ω		25	μs
Fall	t _f	I _F = 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_A = 25 °C and duration = 1 s.

Typical Performance Characteristics
 ($T_A = -55\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$, Unless Otherwise Noted)

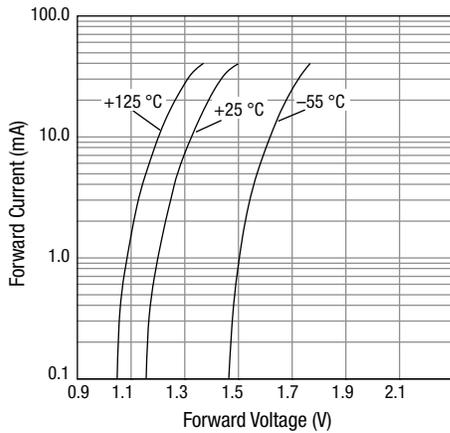


Figure 2. Forward Current vs Forward Voltage

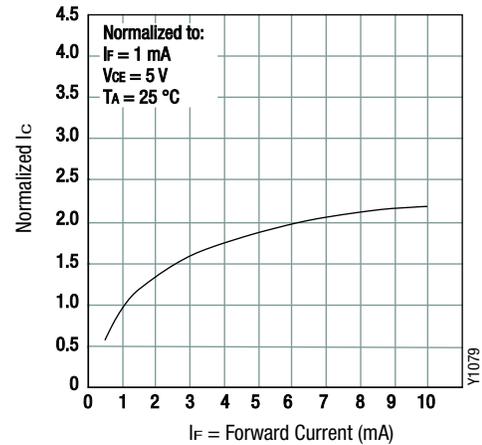


Figure 3. Normalized Collector Current vs Forward Current

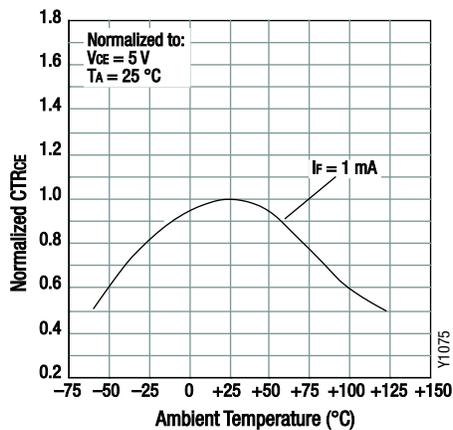


Figure 4. Normalized CTR_{CE} vs Temperature

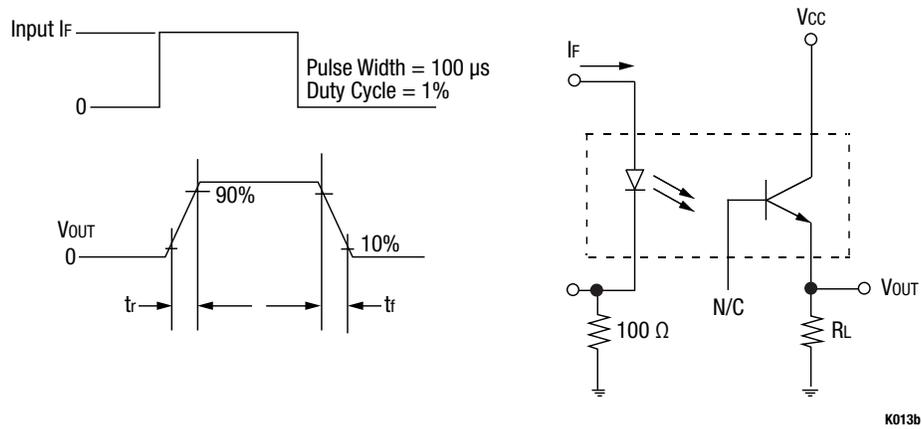


Figure 5. OLF449 Switching Test Circuit

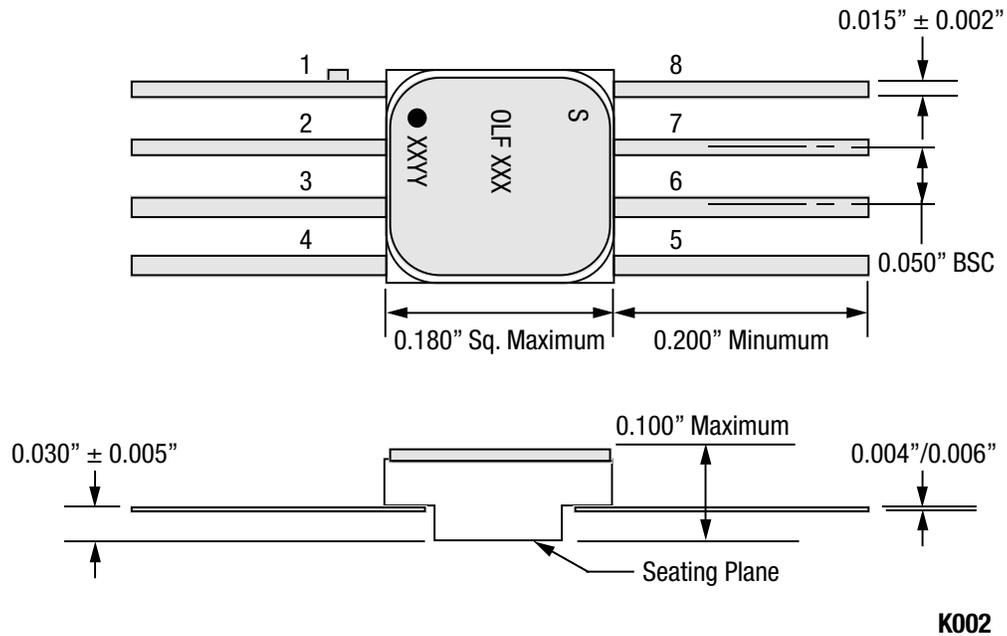


Figure 6. OLF449 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLF449: Radiation Tolerant, Phototransistor Hermetic Surface Mount Optocoupler	OLF449

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