

DATA SHEET

OLH1047/1048/1049: Phototransistor Hermetic Optocouplers

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
- High CTR at low input current
- Base lead available for transistor biasing
- Offers 100% high-reliability screenings

Description

The OLH1047/48/49 are designed especially for high-reliability applications that require optical isolation with high CTR and low saturation V_{CE}. Each optocoupler consists of an LED and N-P-N silicon phototransistor, mounted and coupled in an 8-pin hermetically sealed DIP package. The low input current makes the OLH1047/48/49 compatible for direct CMOS to Low-Power Schottky Transistor-Transistor Logic (LSTTL)/ Transistor-to-Transistor Logic (TTL) interfaces.

All electrical parameters are identical to the JEDEC registered 4N47/48/49. The OLH1047/48/49 have 100 percent high-reliability screenings available.

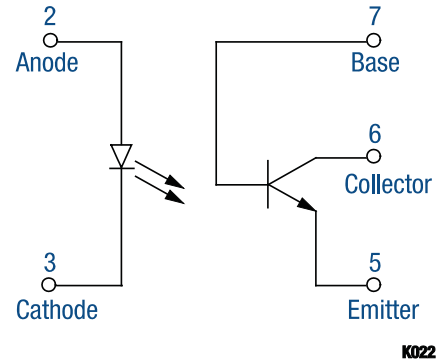


Figure 1. OLH1047/48/49 Block Diagram

Figure 1 shows the OLH1047/48/49 functional block diagram. Table 1 provides the OLH1047/48/49 absolute maximum ratings. Table 2 provides the OLH1047/48/49 electrical specifications.

Figures 2 through 4 illustrate the OLH1047/48/49 typical performance characteristics. Figure 5 shows the OLH1047/48/49 switching test circuit. Figure 6 provides the OLH1047/48/49 package dimensions.

Table 1. OLH1047/48/49 Absolute Maximum Ratings (Note 1)

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

Note 1: Derate linearly 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. OLH1047/48/49 Electrical Specifications (Note 1)
(T_A = 25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	1047			1048			1049			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
On-state collector current	I _{CC(ON)}	I _F = 1 mA, V _{CE} = 5 V										
		I _F = 2 mA, V _{CE} = 5 V, T _A = -55 °C	0.5			1.0		5.0	2.0		10	mA
		I _F = 2 mA, V _{CE} = 5 V, T _A = +100 °C	0.7			1.4			2.8			mA
			0.5			1.0		2.0			mA	
On-state collector base current	I _{CCB(ON)}	I _F = 10 mA, V _{CB} = 5 V	30			30		30				µA
Saturation voltage	V _{CE_SAT}	I _F = 2 mA, I _{CC} = 0.5 mA			0.3							V
		I _F = 2 mA, I _{CC} = 1.0 mA					0.3					V
		I _F = 2 mA, I _{CC} = 2.0 mA								0.3		V
Breakdown voltage:												
Collector to emitter	BV _{CEO}	I _{CE} = 1 mA	40			40			40			V
Collector to base	BV _{CBO}	I _{CB} = 100 µA	45			45			45			V
Emitter to base	BV _{EBO}	I _{EB} = 100 µA	7			7			7			V
Off-state:												
Collector to emitter	I _{CE(OFF)}	V _{CE} = 20 V			100			100			100	nA
		V _{CE} = 20 V, T _A = 100 °C			100			100			100	µA
Collector to base	I _{CB(OFF)}	V _{CB} = 20 V			10			10			10	nA
Input forward voltage	V _F	I _F = 10 mA, T _A = -55 °C	1.0		1.7	1.0		1.7	1.0		1.7	V
		I _F = 10 mA	0.8		1.5	0.8		1.5	0.8		1.5	V
		I _F = 10 mA, T _A = +100 °C	0.7		1.3	0.7		1.3	0.7		1.3	V
Input reverse current	I _R	V _R = 2 V			100			100			100	µA
Input to output resistance (Note 2)	R _{I_0}	V _{I_0} = ± 1000 V _{DC}	10 ¹¹			10 ¹¹			10 ¹¹			Ω
Input to output capacitance (Note 2)	C _{I_0}	V _{I_0} = 0 V, f = 1 MHz			5			5			5	pF
Rise time	t _R	V _{CC} = 10 V, R _L = 100 Ω		10	20		10	20		15	25	µs
Fall time	t _F	I _F = 5 mA		10	20		10	20		15	25	µs

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 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_A = 25 °C and duration = 1 second.

Typical Performance Characteristics

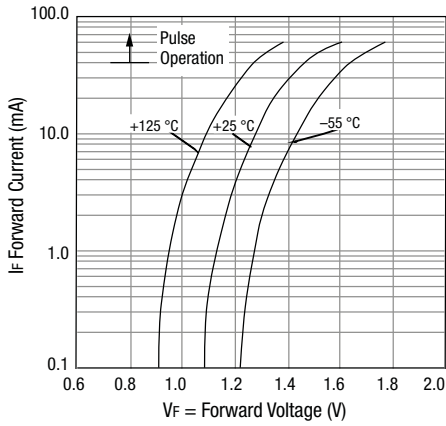


Figure 2. Forward Current vs Diode Forward Voltage

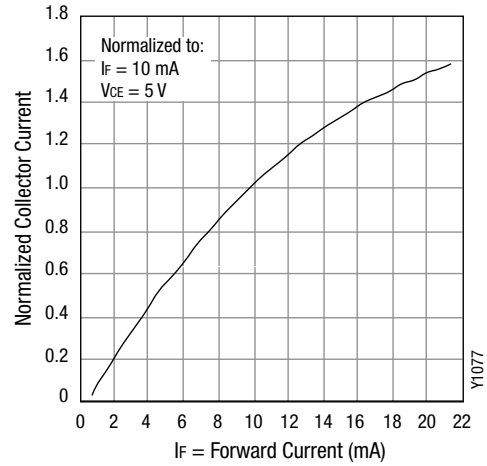


Figure 3. Normalized Collector Current vs Forward Current

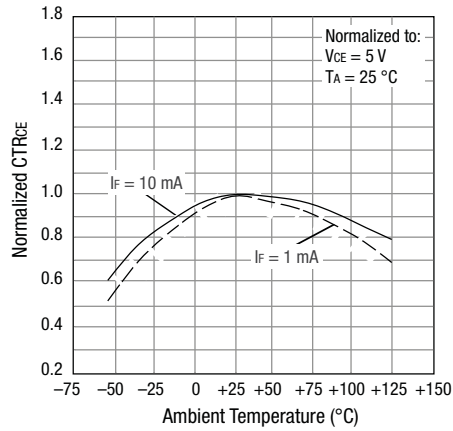
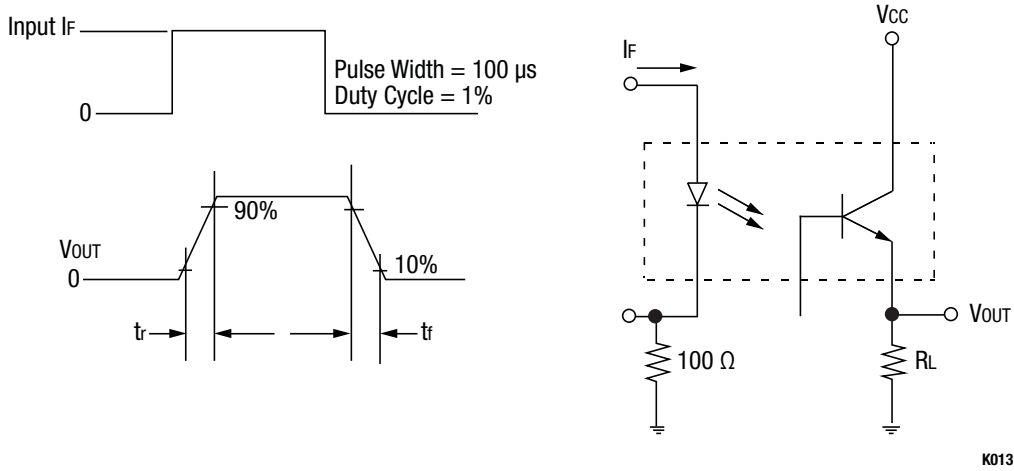
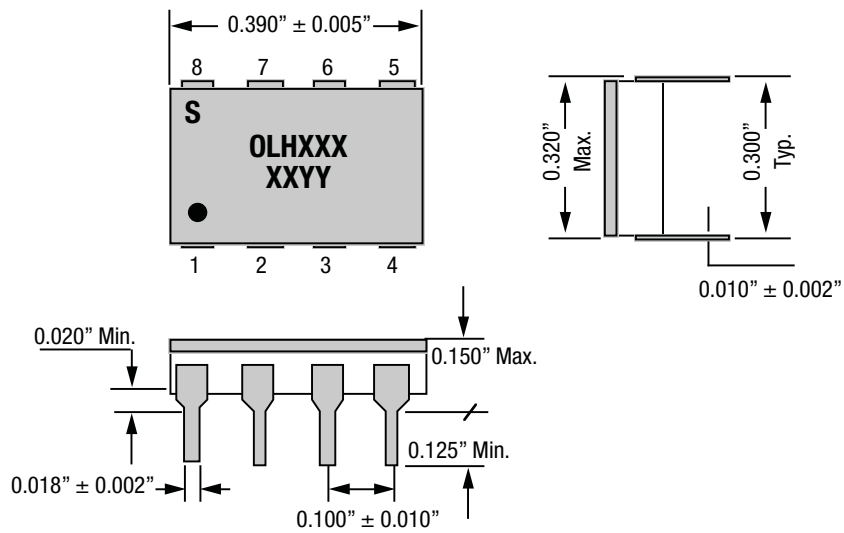


Figure 4. Normalized CTR_{CE} vs Temperature



K013

Figure 5. OLH1047/48/49 Switching Test Circuit



K021

Figure 6. OLH1047/48/49 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLH1047/48/49: Phototransistor Hermetic Optocouplers	OLH1047/1048/1049

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