

DATA SHEET

OLS303: Hermetic Surface Mount Wide Bandwidth Optocoupler

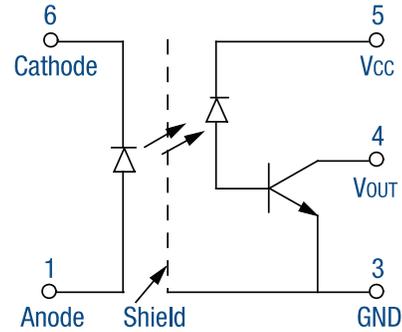
Features

- Electrical parameters guaranteed over $-55\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ ambient temperature range
- 1500 V_{DC} electrical isolation
- High gain, 10 dB typical
- Open collector output
- High reliability and rugged construction
- Similar to 6N135/136, 4N55 type optocouplers
- Radiation tolerant
- High reliability screenings are available

Description

The OLS303 is suitable for wide bandwidth analog applications. Each OLS303 has an LED and integrated photodiode transistor detector mounted and coupled in a custom hermetic surface mount Leadless Chip Carrier (LCC) ceramic package, that provides 1500 V_{DC} of electrical isolation between the input and output. The integrated photodiode transistor improves the bandwidth by orders of magnitude as compared to standard phototransistors. The internal shield provides excellent common-mode immunity performance.

Device mounting is achieved with reflow soldering or conductive epoxies.



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Figure 1. OLS303 Block Diagram

Figure 1 shows the OLS303 functional block diagram. Table 1 provides the OLS303 absolute maximum ratings. Table 2 provides the OLS303 electrical specifications.

Figures 2 through 4 illustrate the OLS303 typical performance characteristics. Figure 5 shows the OLS303 gain and bandwidth test circuit. Figure 6 provides the OLS303 package dimensions.

Table 1. OLS303 Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage (Note 2)	V _{DC}	-1500	+1500	V
Storage temperature range	T _{STG}	-65	+150	°C
Operating temperature range	T _A	-55	+125	°C
Mounting temperature range (3 minutes maximum)			+240	°C
<i>Input Diode</i>				
Average input current	I _{DD}		20	mA
Peak forward current (≤1 ms duration)	I _F		40	mA
Reverse voltage	V _R		5	V
Power dissipation	P _D		36	mW
<i>Output Detector</i>				
Average output current			8	mA
Peak output current			16	mA
Supply voltage	V _{CC}	-0.5	+18.0	V
Output voltage	V _{OUT}	-0.5	+18.0	V
Power dissipation	P _D		50	mW
Derate linearly from 100 °C			1.4	mW/°C

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, and 6 shorted together, and pins 3, 4, and 5 shorted together. T_A = 25°C and duration = 1 s.

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. OLS303 Electrical Specifications (Note 1)
(T_A = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio (CTR) (Note 2)	CTR	I _F = 5.0 mA, V _{CE} = 1.2 V	20.0	50.0	80.0	%
Gain	G	I _F = 5.0 mA, V _{CE} = 1.2 V, R _C = 2.1 K, f = 10.0 kHz	4.0	10.0	16.0	dB
Collector-to-emitter:						
Saturation voltage	V _{CE(SAT)}	I _F = 10.0 mA, I _{OL} = 1.5 mA, V _{CC} = 4.5 V		0.15	0.4	V
Breakdown voltage	BV _{CEO}	I _F = 0 mA, I _{CE} = 1 mA	18			V
Leakage current	I _{CEO}	I _F = 10 mA, V _{CC} = 15.0 V, V _O = open		0.05	100.0	μA
Supply current	I _{CC}	I _F = 0 mA, V _{CC} = 15.0 V, V _O = open		0.05	10.0	μA
Input:						
Input forward voltage	V _F	I _F = 10.0 mA		1.8	2.5	V
Reverse breakdown voltage	BV _R	I _R = 10 μA	3			V
Output leakage current (Note 3)	I _{I-O}	R _H ≤ 50%, V _{I-O} = 1500.0 V _{DC}			1.0	μA
Output capacitance	C _{I-O}	V _{I-O} = 0 V _{DC} , f = 1 MHz		0.5	2.0	pF
Bandwidth @ 45 °C phase	BW	I _F = 5.0 mA, V _{CE} = 1.2 V, R _C = 2.1 kΩ	150.0	300.0		kHz
Shift @ -3 dB	BW	I _F = 5.0 mA, V _{CE} = 1.2 V, R _C = 2.1 kΩ		450.0		kHz

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

Note 2: CTR is defined as the ratio of the output collector current I_C to the forward LED current I_F, multiplied by 100%.

Note 3: Measured between pins 1, 2, and 6 shorted together, and pins 3, 4, and 5 shorted together. T_A = 25°C and duration = 1 s.

Typical Performance Characteristics

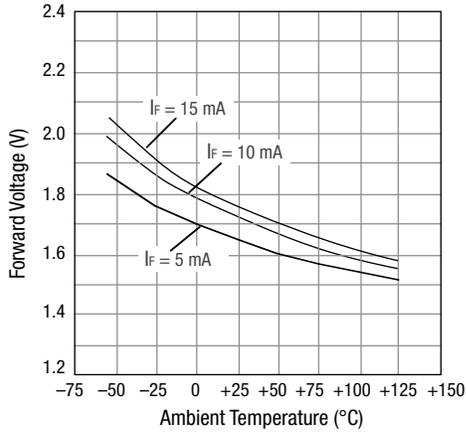


Figure 2. LED Forward Voltage vs Temperature

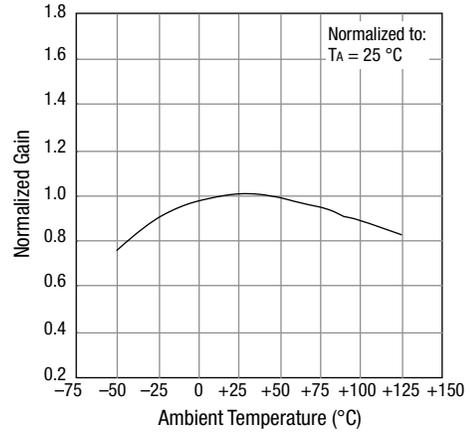


Figure 3. Normalized Gain vs Temperature

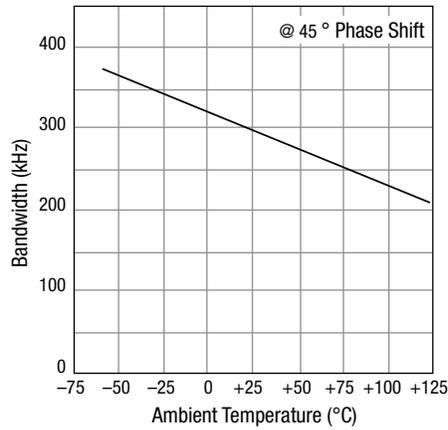
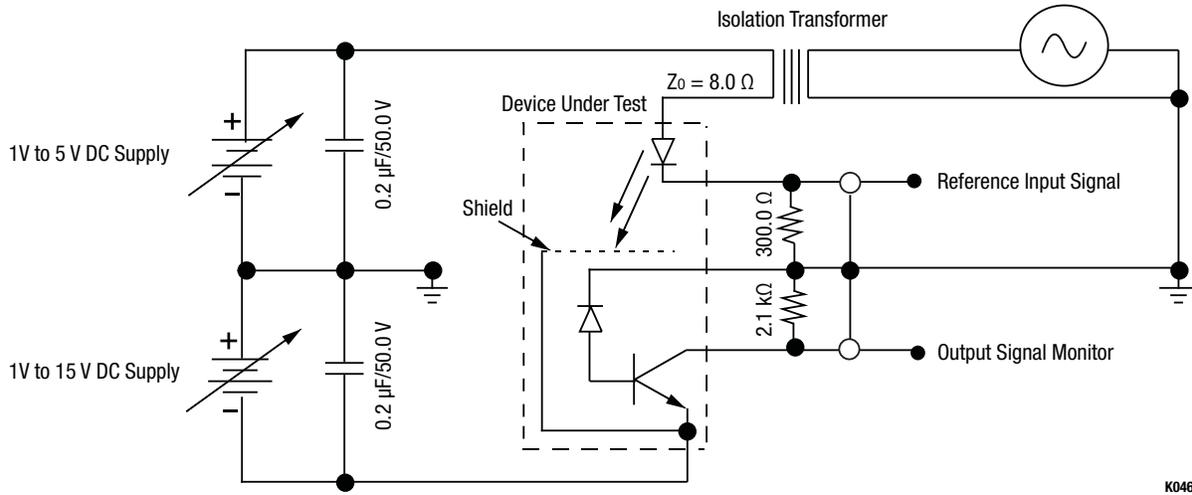
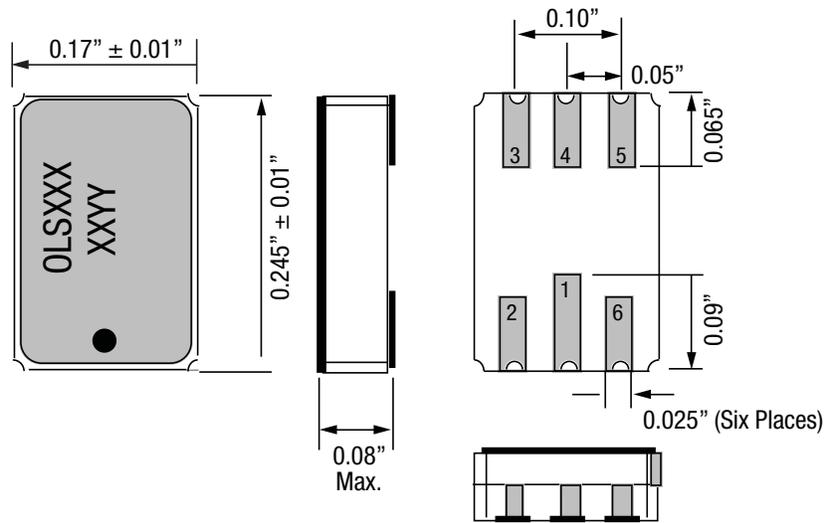


Figure 4. Bandwidth vs Temperature



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Figure 5. OLS303 Gain and Bandwidth Test Circuit



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Figure 6. OLS303 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLS303: Hermetic Surface Mount Wide Bandwidth Optocoupler	OLS303

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