

OLI303: Miniature Wide Bandwidth Optocoupler for Hybrid Assembly

Features

- Electrical parameters assured over -55°C to $+125^{\circ}\text{C}$ ambient temperature range
- 1500 VDC electrical isolation
- High gain, 10 dB typical
- Open collector output
- 450 kHz bandwidth
- High reliability and rugged construction
- Similar to 6N135/136, 4N55 type optocouplers
- Radiation tolerant
- For RoHS and other product compliance information, see the [Skyworks Certificate of Conformance](#)

Description

The OLI303 is suitable for wide bandwidth analog applications. Each OLI303 has an LED and an integrated photodiode transistor detector mounted and coupled in a miniature custom ceramic package that provides 1500 VDC of electrical isolation between the input and output. The integrated photodiode transistor improves the bandwidth by orders of magnitude compared to standard photo-transistors. The internal shield provides excellent common-mode immunity performance.

Device mounting is achieved by a standard hybrid assembly with non-conductive epoxies. Gold or aluminum wire bonding can be used to make electrical connections for maximum placement flexibility.

Note: Certain cleaning processes may be harmful to this device. Contact Skyworks for details.

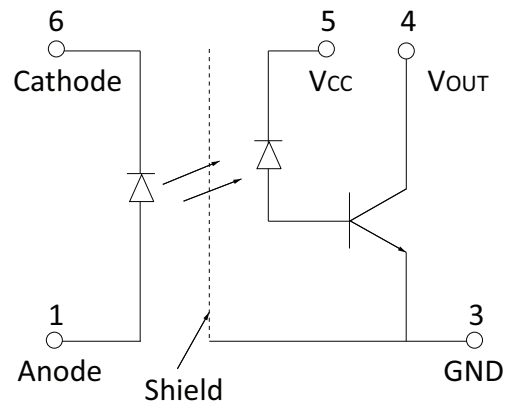


Figure 1. Functional Block Diagram

Figure 1 shows the OLI303 functional block diagram. Table 1 provides the OLI303 absolute maximum ratings. Table 2 provides the OLI303 electrical specifications.

Figures 2 through 4 illustrate the OLI303 typical performance characteristics. Figure 5 shows the OLI303 gain and bandwidth test circuit. Figure 6 provides the OLI303 package dimensions.

Electrical and Mechanical Specifications

Table 1. Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage 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
Input Diode				
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
Output Detector				
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

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

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 2. Electrical Specifications¹
 (TA = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio (CTR) ²	CTR	IF = 5.0 mA, VCE = 1.2 V	20.0	50.0	80.0	%
Gain	G	IF = 5.0 mA, VCE = 1.2 V, RC = 2.1 kΩ, f = 10.0 kHz	4.0	10.0	16.0	dB
Collector-to-Emitter						
Saturation voltage	VCE(SAT)	IF = 10.0 mA, IOL = 1.5 V, VCC = 4.5 V		0.15	0.4	V
Breakdown voltage	BVCEO	IF = 0 mA, ICE = 1 mA	18			V
Leakage current	ICEO	IF = 0 mA, VO = 15.0 V, VCC = open		0.05	100.0	V
Supply current	ICC	IF = 0 mA, VCC = 15.0 V, VO = open		0.05	10.0	μA
Input						
Forward voltage	VF	IF = 10.0 mA		1.8	2.5	V
Reverse breakdown voltage	BVR	IR = 10 μA	3			V
Output leakage current ³	II-O	RH ≤ 50%, VI-O = 1500.0 VDC			1.0	μA
Output capacitance	CI-O	VI-O = 0 VDC, f = 1 MHz		0.5	2.0	pF
Bandwidth @ 45 °C phase Shift @ -3 dB	BW	IF = 5.0 mA, VCE = 1.2 V, RC = 2.1 kΩ	150.0	300.0		kHz
				450.0		

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

2. Current transfer ratio is defined as the ratio of the output collector current IC to the forward LED current IF, multiplied by 100%.

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

Typical Performance Characteristics

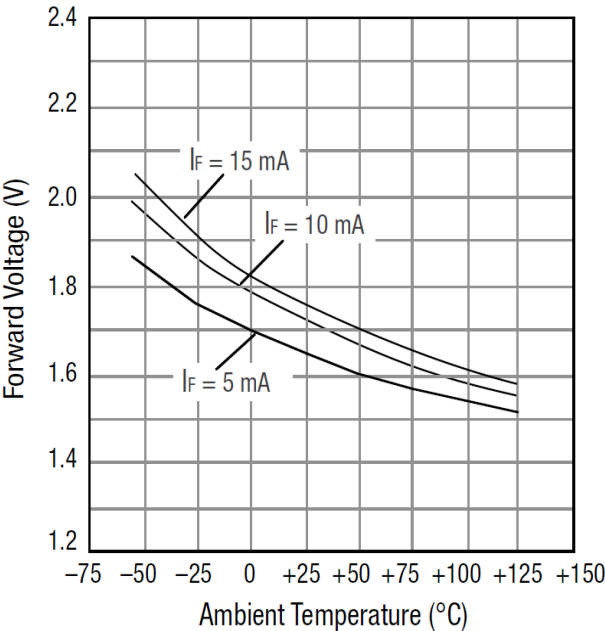


Figure 2. LED Forward Voltage vs Temperature

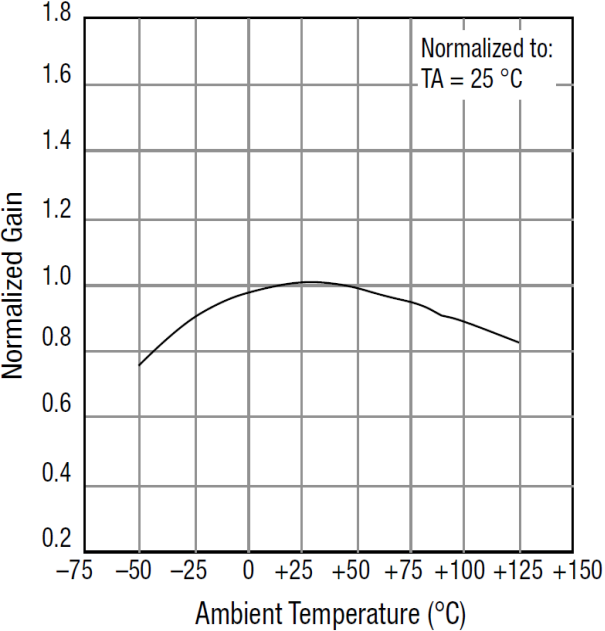


Figure 3. Normalized Gain vs Temperature

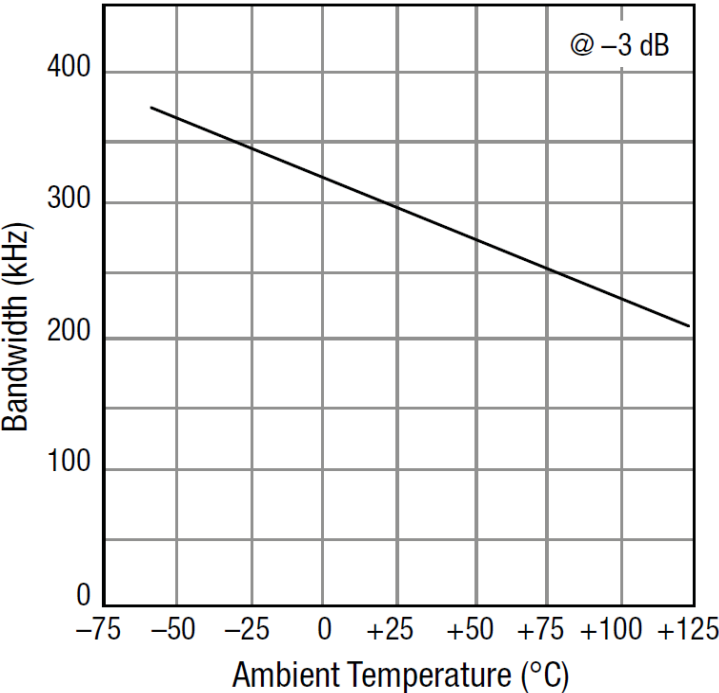


Figure 4. Bandwidth vs Temperature

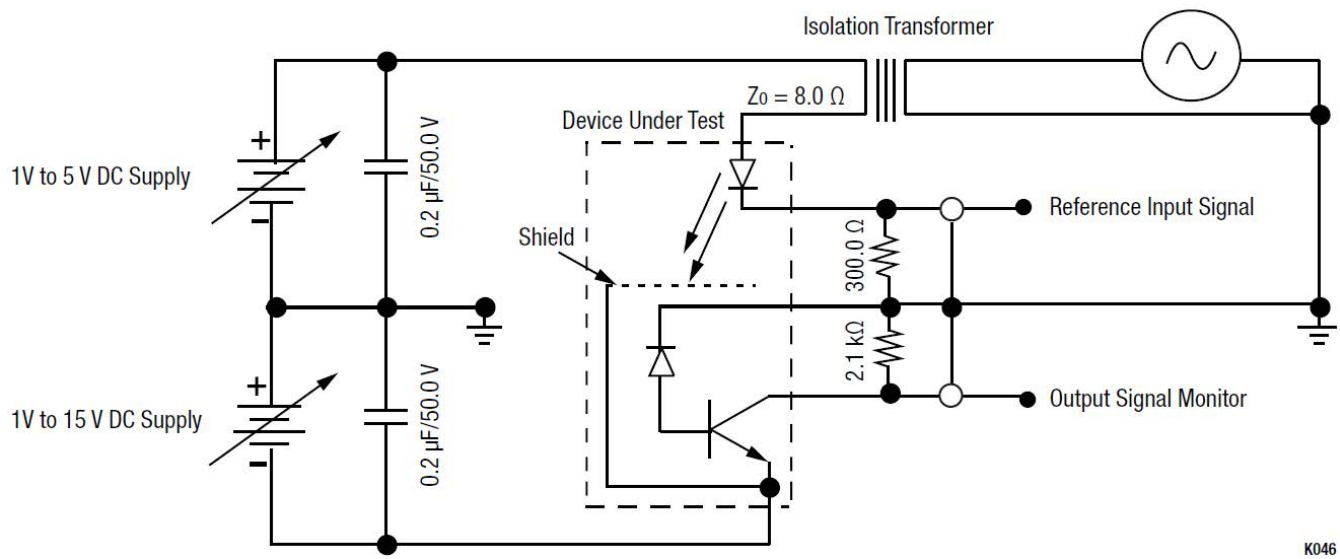


Figure 5. Gain and Bandwidth Test Circuit

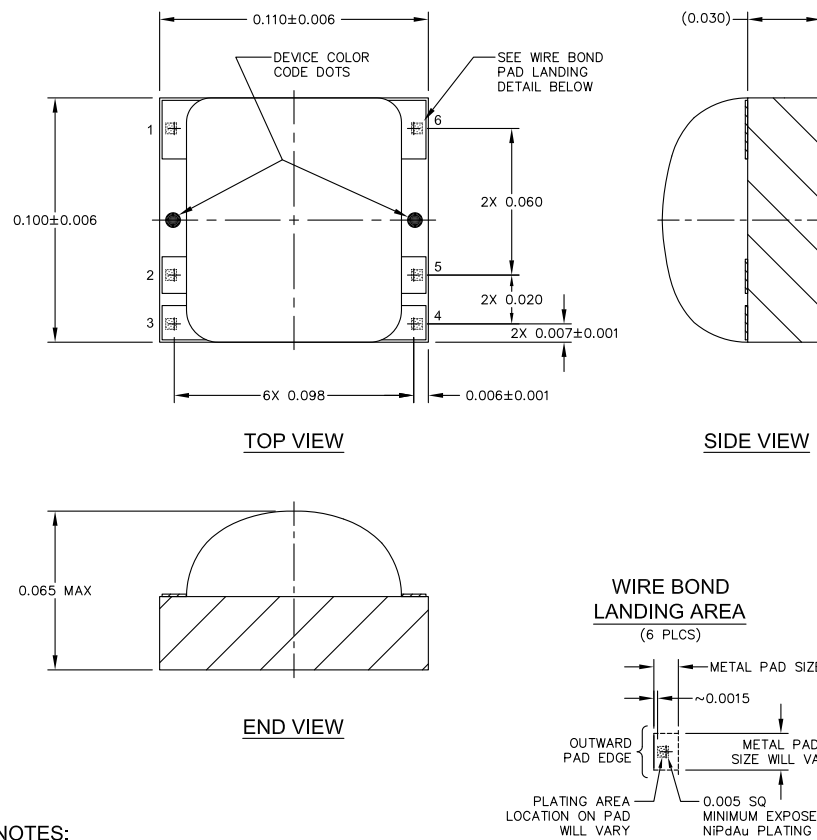


Figure 6. Package Dimensions

Ordering Information

Part Number	Description
OLI303	Miniature Wide Bandwidth Optocoupler for Hybrid Assembly

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