

DATA SHEET

OLI303: Miniature Wide Bandwidth Optocoupler for Hybrid Assembly

Features

- Electrical parameters guaranteed over -55 °C to +125 °C ambient temperature range
- 1500 V_{DC} 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

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 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 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 Isolink for details.*

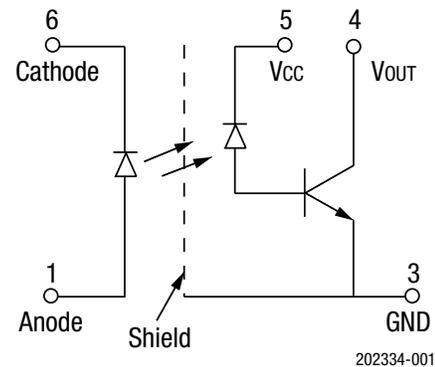


Figure 1. OLI303 Block Diagram

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.

Table 1. OLI303 Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
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
<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

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: *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. OLI303 Electrical Specifications¹
(T_A = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio (CTR) 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 V, 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 = 0 mA, V _O = 15.0 V, V _{CC} = 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	B _{VR}	I _R = 10 μA	3			V
Output leakage current 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	B _w	I _F = 5.0 mA, V _{CE} = 1.2 V, R _C = 2.1 kΩ	150.0	300.0		kHz
Shift @ -3 dB	B _w	I _F = 5.0 mA, V _{CE} = 1.2 V, R _C = 2.1 kΩ		450.0		kHz

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 I_C to the forward LED current I_F, multiplied by 100%.
³ 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.

Typical Performance Characteristics

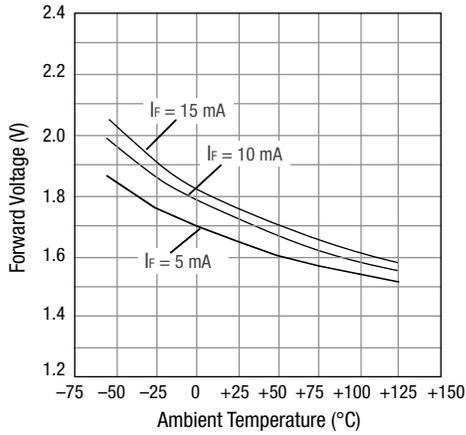


Figure 2. LED Forward Voltage vs Temperature

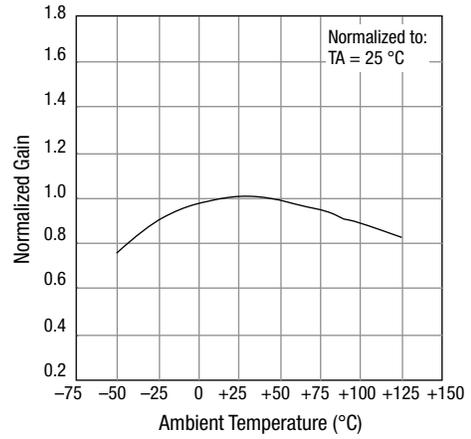


Figure 3. Normalized Gain vs Temperature

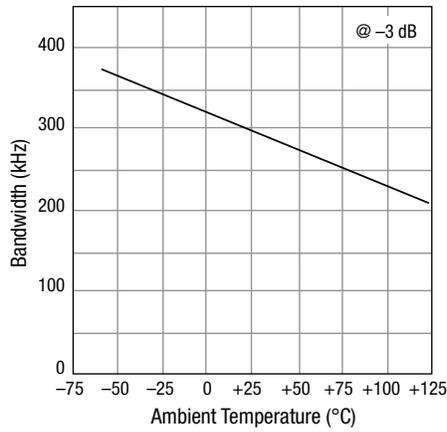


Figure 4. Bandwidth vs Temperature

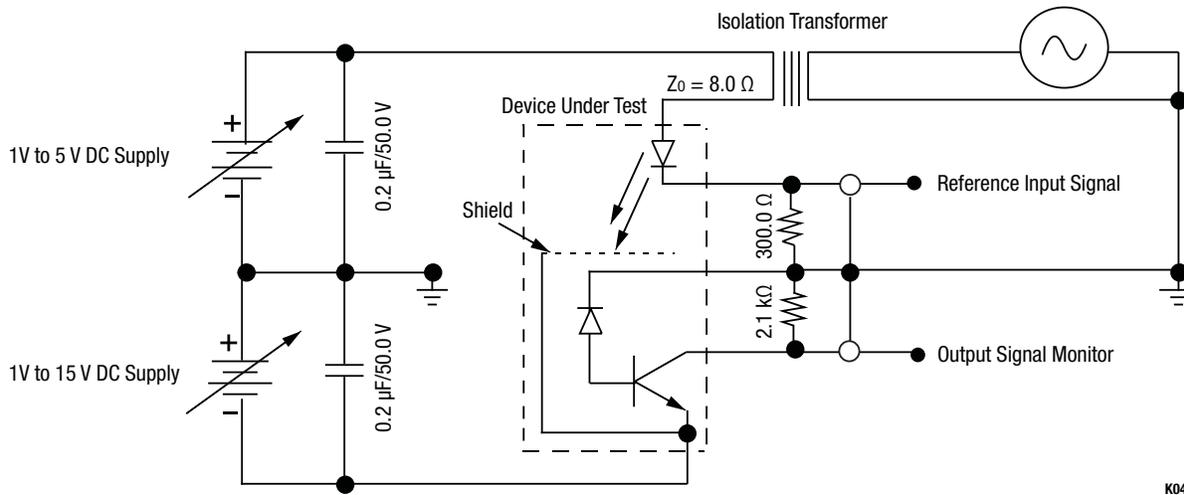


Figure 5. OLI303 Gain and Bandwidth Test Circuit

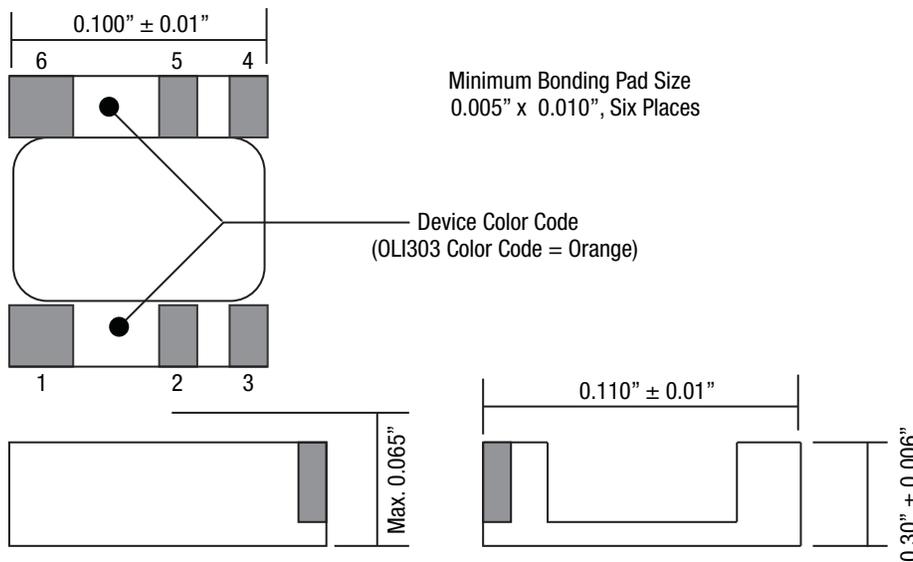


Figure 6. OLI303 Package Dimensions

202334-006

Ordering Information

Model Name	Manufacturing Part Number
OLI303: Miniature Wide Bandwidth Optocoupler for Hybrid Assembly	OLI303

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