DATA SHEET

OLI303: Miniature Wide Bandwidth Optocoupler for Hybrid Assembly

Features

- Electrical parameters assured over –55 °C to +125 °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.

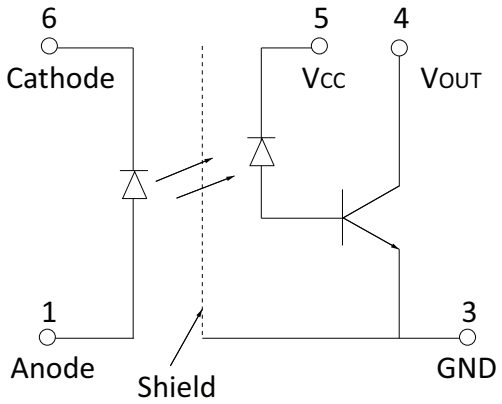

Figure 1. Functional Block Diagram

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 Ratings[1]

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. TA = 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 Specifications[1]

(TA = –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 kΩ, 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	V
Supply current	I_{CC}	I_F = 0 mA, V_{CC} = 15.0 V, V_O = open		0.05	10.0	µA
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 Shift @ –3 dB	BW	I_F = 5.0 mA, V_{CE} = 1.2 V, R_C = 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

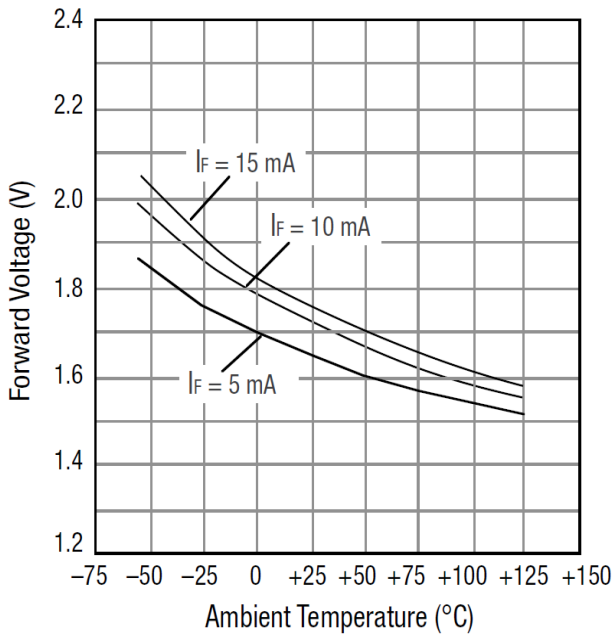

Figure 2. LED Forward Voltage vs Temperature

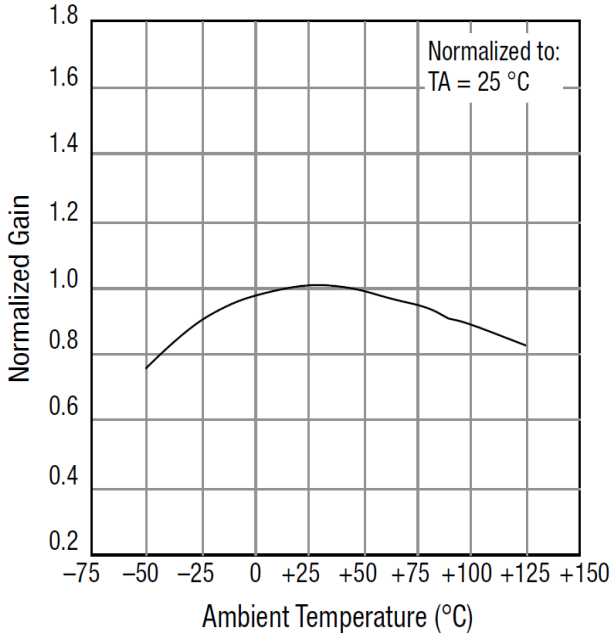

Figure 3. Normalized Gain vs Temperature

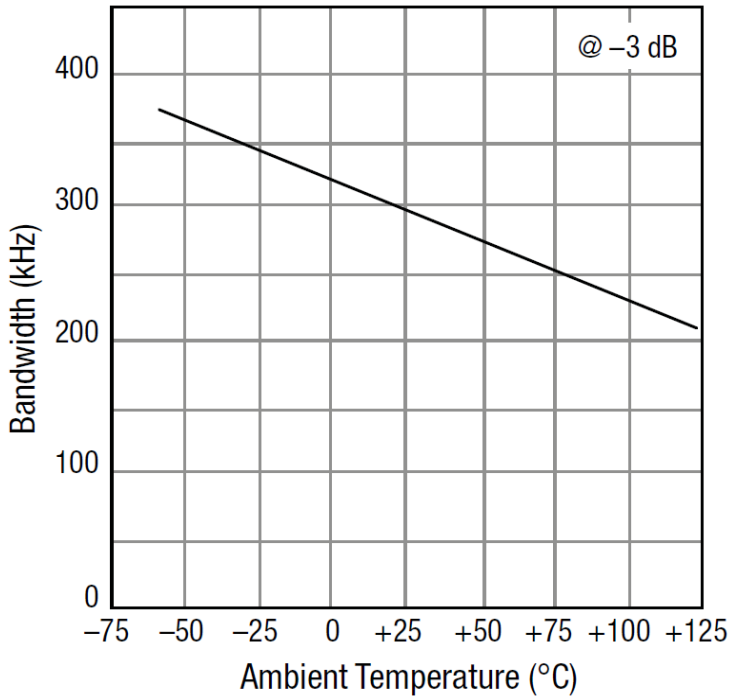

Figure 4. Bandwidth vs Temperature

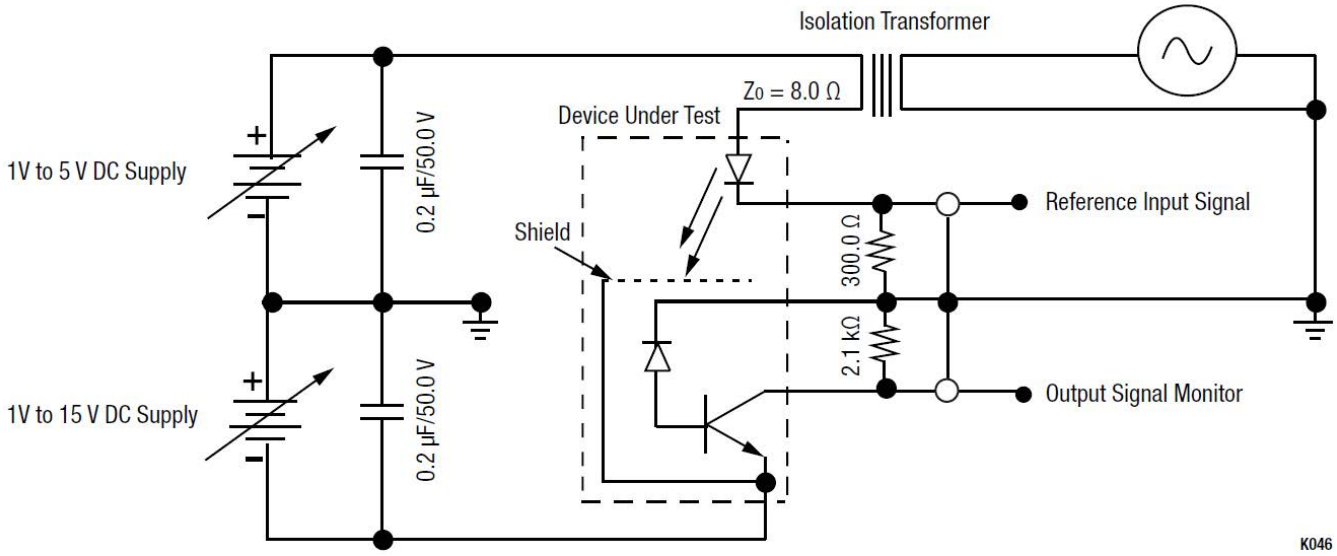

Figure 5. Gain and Bandwidth Test Circuit

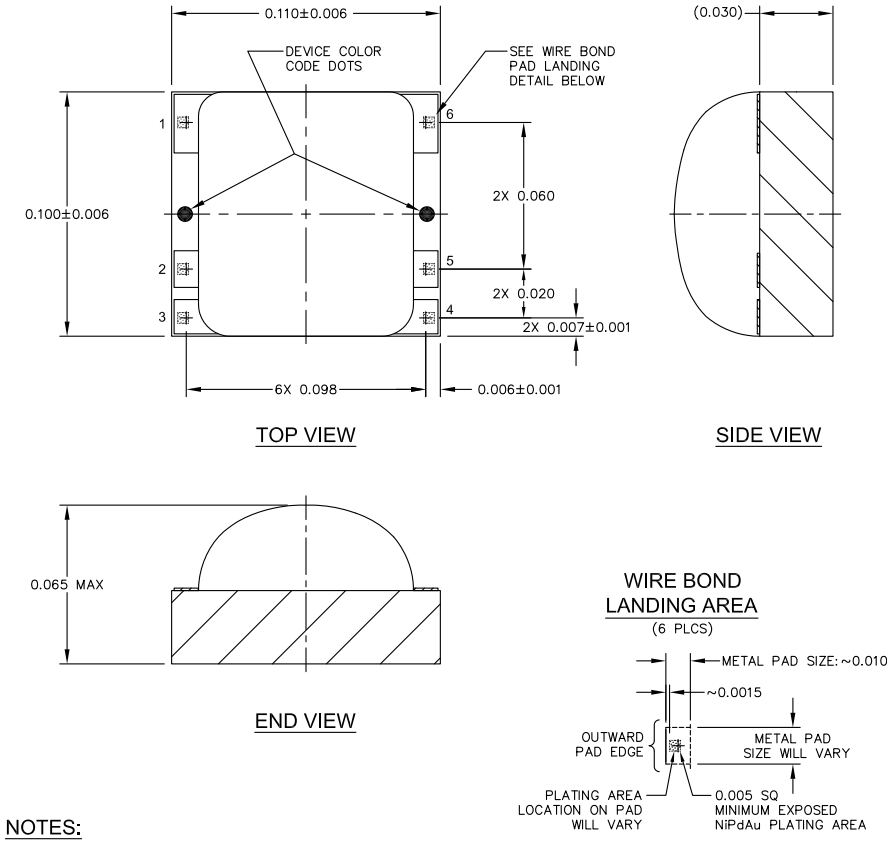

Figure 6. Package Dimensions

Ordering Information

Part Number	Description
OLI303	Miniature Wide Bandwidth Optocoupler for Hybrid Assembly