

DATA SHEET

OLS300: Hermetic Surface-Mount High-Speed Optocoupler

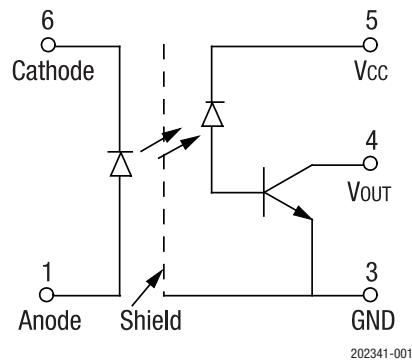
Features

- Electrical parameters guaranteed over -55°C to $+125^{\circ}\text{C}$ ambient temperature range
- 1500 V_{DC} electrical isolation
- High-speed, 1 Mbps 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 OLS300 is suitable for interfacing Transistor-to-Transistor Logic (TTL) to Low Power Schottky Transistor-Transistor Logic (LSTTL), TTL, or Complementary Metal Oxide Semiconductors (CMOSs), as well as wide bandwidth analog applications. Each OLS300 has an LED and integrated photo-diode transistor detector mounted and coupled in a custom hermetic surface mount LCC ceramic package, that provides 1500 V_{DC} of electrical isolation between the input and output. The integrated photo-diode transistor improves the switching speed by orders of magnitude as compared to standard photo-transistors by reducing the base- to-collector capacitance.

The OLS300's device mounting is achieved with reflow soldering or conductive epoxies.



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Figure 1. OLS300 Block Diagram

Figure 1 shows the OLS300 functional block diagram. Table 1 provides the OLS300 absolute maximum ratings. Table 2 provides the OLS300 electrical specifications.

Figures 2 through 4 illustrate the OLS300 typical performance characteristics. Figure 5 shows the OLS300 switching test circuit. Figure 6 provides the OLS300 package dimensions.

Table 1. OLS300 Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage ²	VDC	-1500	+1500	V
Storage temperature range	TSTG	-65	+150	°C
Operating temperature range	TA	-55	+125	°C
Mounting temperature range (3 minutes maximum)			+240	°C
Input Diode				
Average input current	IDD		20	mA
Peak forward current (≤ 1 ms duration)	IF		40	mA
Reverse voltage	VR		5	V
Power dissipation	PD		36	mW
Output Detector				
Average output current			8	mA
Peak output current			16	mA
Supply voltage	VCC	-0.5	+18.0	V
Output voltage	VOUT	-0.5	+18.0	V
Power dissipation	PD		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 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, 2, and 6 shorted together, and pins 3, 4, and 5 shorted together. TA = 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. OLS300 Electrical Specifications¹

(TA = 55 °C to + 125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Current transfer ratio ²	CTR	IF = 10.0 mA, VO = 0.4 V, VCC = 4.5 V	20.0	45.0		%
Logic:						
Low output voltage	VOL	IF = 10.0 mA, IOL = 1.5 mA, VCC = 4.5 V		0.15	0.4	V
High output current	IOH	IF = 0 mA, VO = VCC = 15.0 V		0.05	100.00	µA
Low supply current	ISSL	IF = 10 mA, VCC = 15 V, VO = open		40	200	µA
High supply current	ISCH	IF = 0 mA, VCC = 15.0 V, VO = open		0.05	10.0	µA
Input:						
Forward voltage	VF	IF = 10.0 mA	3	1.7	2.5	V
Reverse breakdown voltage	BVR	IR = 10 µA				
Output leakage current ³	IO_L	RH ≤ 50%, TA = 25 °C, VL_O = 1500.0 VDC			1.0	µA
Propagation delay time:						
Logic high to low	tPHL	IF = 10 mA, VCC = 5 V, RL = 4.1 kΩ		0.3	1.0	µs
Logic low to high	tPLH	IF = 10 mA, VCC = 5 V, RL = 4.1 kΩ		0.5	2.0	µs

¹ Performance is guaranteed only under the conditions listed in the above table.² CTR 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, 2, and 6 shorted together, and pins 3, 4, and 5 shorted together. TA = 25 °C and duration = 1 s.

Typical Performance Characteristics

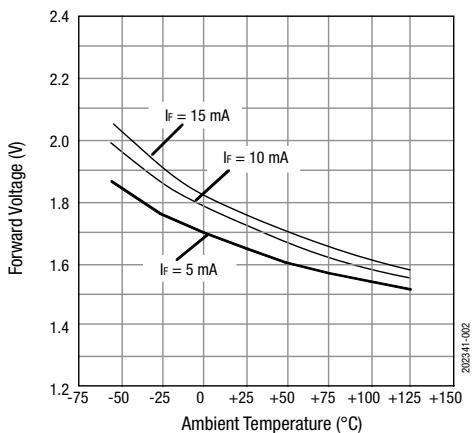


Figure 2. LED Forward Voltage vs Temperature

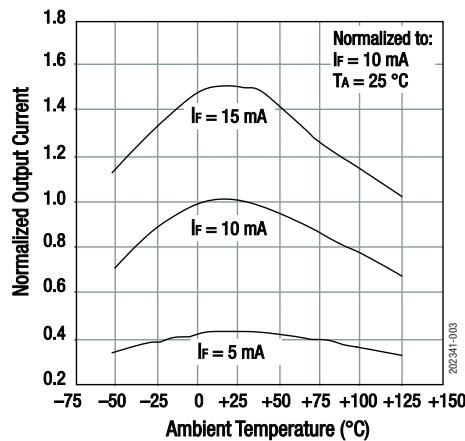


Figure 3. Normalized Output Current vs Temperature

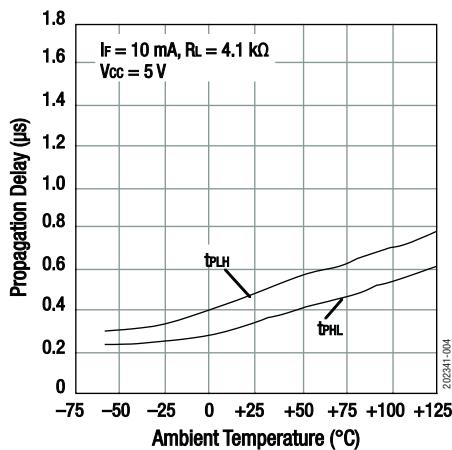


Figure 4. Propagation Delay vs Temperature

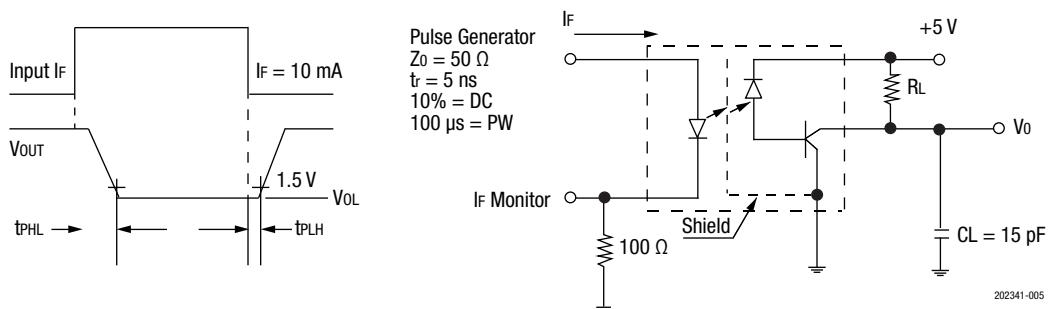


Figure 5. OLS300 Switching Test Circuit

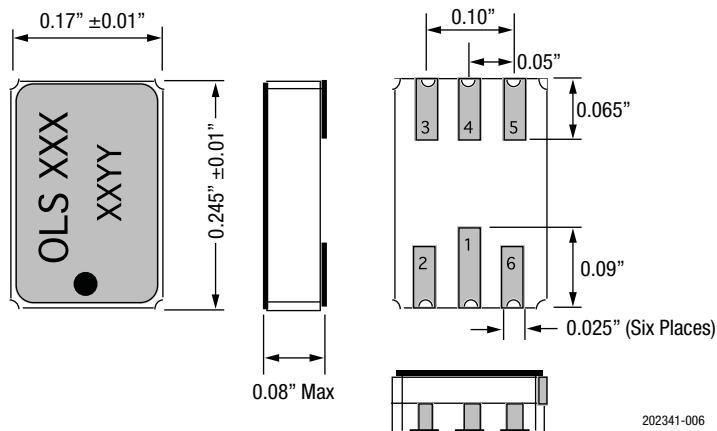


Figure 6. OLS300 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLS300: Hermetic Surface-Mount High-Speed Optocoupler	OLS300

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