DATA SHEET

OLF300ET: Extended Temperature High-Speed Hermetic Surface-Mount Optocoupler

Features

- Hermetic SMT package
- Thermal shock rated to –130 °C
- Electrical parameters guaranteed over –55 °C to +125 °C ambient temperature range
- 1000 V_{DC} electrical isolation
- High-speed, 1 Mbps typical
- Open collector output
- 300 kHz bandwidth
- Similar to 6N135/136, 4N55
- Radiation tolerant
- Offers 100% high reliability screenings

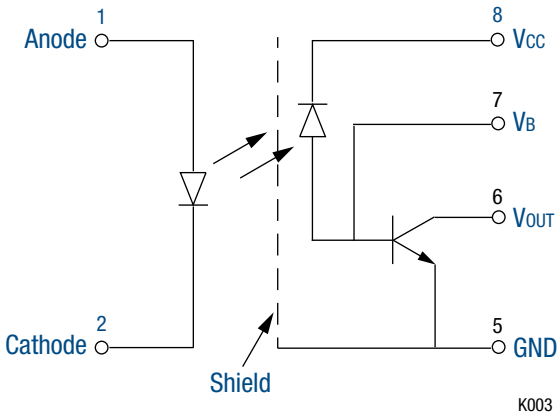

Figure 1. OLF300ET Block Diagram

Description

The OLF300ET is suitable for interfacing TTL to LSTTL, TTL, or CMOS, as well as wide bandwidth analog applications. Each OLF300ET has an LED and an integrated photodiode transistor detector mounted and coupled in a custom 8-pin hermetic flat-pack package, providing 1000 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 internal shield provides excellent common-mode immunity performance.

Figure 1 shows the OLF300ET functional block diagram. Table 1 provides the OLF300ET absolute maximum ratings. Table 2 provides the OLF300ET electrical specifications.

Figures 2 through 5 illustrate the OLF300ET typical performance characteristics. Figure 6 shows the OLF300ET switching test circuit. Figure 7 provides the OLF300ET package dimensions.

Table 1. OLF300ET Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage (Note 2)	V_{DC}		±1000	V
Storage temperature	T_{STG}	–130	+150	°C
Operating temperature	T_A	–55	+125	°C
Lead temperature (1.6 mm from case for 10 seconds)			+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

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, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. T_A = 25°C and duration = 1 second.

***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. OLF300ET 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 (Note 2)	CTR	I_F = 16 mA, V_{OUT} = 0.4 V, V_{CC} = 4.5 V	5	11		%
Logic high output current	I_{OH}	I_F = 0 mA, V_O = V_{CC} = 15 V		0.27	100.0	µA
Logic low supply current	I_{CCL}	I_F = 10 mA, V_{CC} = 15 V, V_{OUT} = open		9	200	µA
Logic high supply current	I_{CCH}	I_F = 0 mA, V_{CC} = 15 V, V_{OUT} = open		0.4	10.0	µA
Input forward voltage	V_F	I_F = 10 mA		1.7	2.5	V
Input reverse breakdown voltage	B_{VR}	I_R = 10 µA	3			V
Input to output leakage current (Note 3)	I_{I_O}	Relative humidity ≤ 45%, T_A = 25 °C, V_{I_O} = 1000 V_{DC}			1	µA
Propagation delay time:						
Logic high to low	t_{PHL}	I_F = 16 mA, V_{CC} = 5 V		0.3	2.0	µs
Logic low to high	t_{PLH}	R_L = 8.2 kΩ, C_L = 50 pF		0.8	6.0	µs
Common mode transient immunity:						
Logic high level	CM_H	I_F = 0, R_L = 8.2 kΩ, V_{CM} = 10 V p-p		> 1		kV
Logic low level	CM_L	I_F = 16, R_L = 8.2 kΩ, V_{CM} = 10 V p-p		> 1		kV

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: Current transfer ratio is defined as the ratio of the output collector current Ic to the forward LED current If, multiplied by 100%.

Note 3: Measured between pins 1, 2, 3, and 4 shorted together, and pins 5, 6, 7, and 8 shorted together. Ta = 25°C and duration = 1 second.

Typical Performance Characteristics

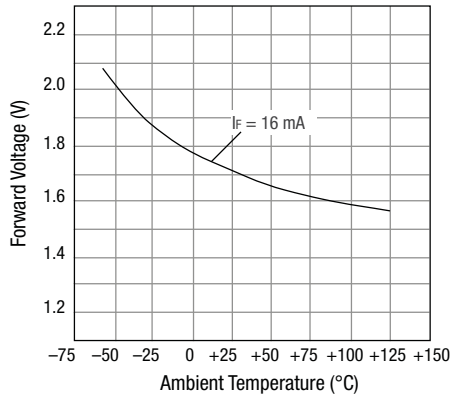

Figure 2. LED Forward Voltage vs Temperature

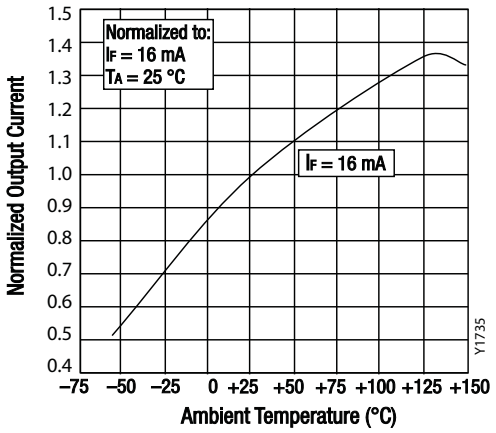

Figure 3. Normalized Output Current vs Temperature

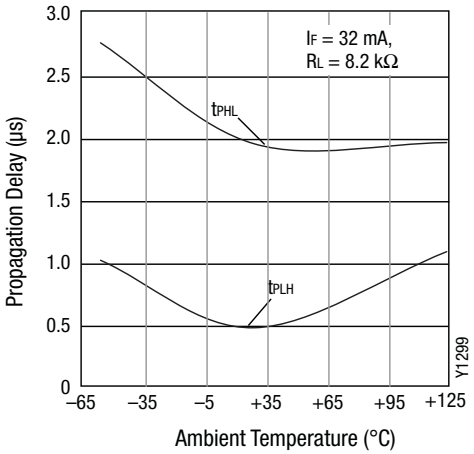

Figure 4. Propagation Delay vs Temperature (I_F = 32 mA, R_L = 8.2 kΩ, V_{CC} = 5 V)

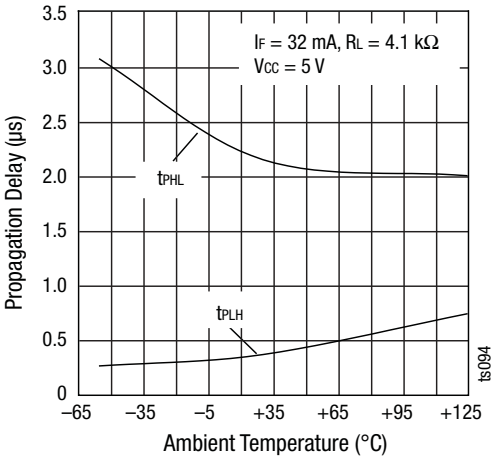

Figure 5. Propagation Delay vs Temperature (I_F = 32 mA, R_L = 4.1 kΩ, V_{CC} = 5 V)

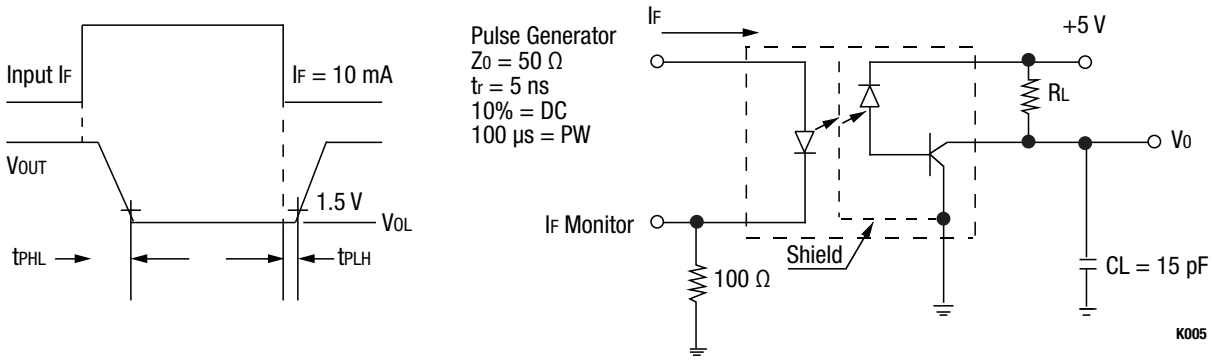

Figure 6. OLF300ET Switching Test Circuit

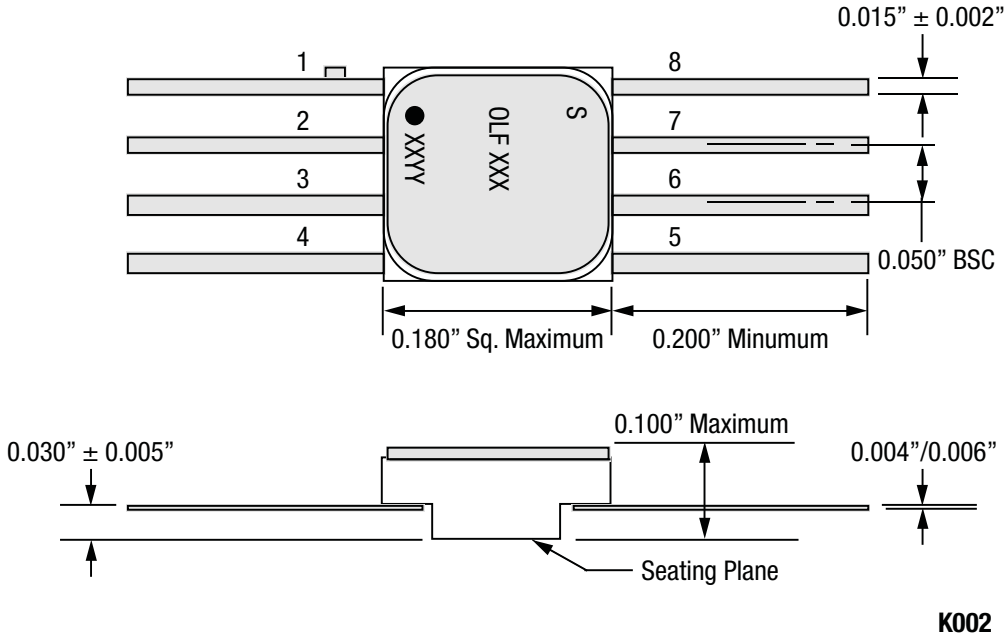

Figure 7. OLF300ET Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLF300ET: High-Speed Hermetic Surface-Mount Optocoupler	OLF300ET