

DATA SHEET

OLI580: Opto-Isolated High-Speed Power MOSFET Driver for Hybrid Assembly

Features

- Performance guaranteed over full military temperature range
- High Common Mode Rejection (CMR), >10 kV/μs
- High speed:
 - <200 ns typical delay time
 - <45 ns typical t_r and t_f
- Under-Voltage Lock Out (UVLO) with hysteresis
- Operating range of 10 V to 18 V
- High output current

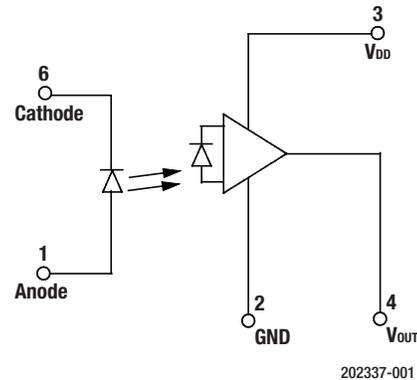


Figure 1. OLI580 Block Diagram

Description

The OLI580 is an opto-coupled non-inverting power Metal Oxide Semiconductor/Silicon Field-Effect Transistor (MOSFET) driver for the hybrid assembly of switching loads where electrical isolation is required.

Each unit consists of an LED that is optically coupled to a Bi-polar Complementary Metal Oxide Semiconductor (BiCMOS) driver integrated circuit, and packaged in a chip carrier for hybrid assembly that provides 1500 V of input/output insulation and over 10 kV/μs of CMR. The integrated driver and active pull-down circuit can drive high peak currents into a 1000 pF capacitive load (C_{LOAD}) with fast output rise and fall times. Energizing the input LED produces a logic high output.

The UVLO circuitry in the output trips at 7.5 V, and forces the output to low. The UVLO circuit with hysteresis ensures proper operation during power-up, and prevents damage during brown-out conditions.

All terminals are fully protected against up to 4 kV of electrostatic discharge (ESD). 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 shows the OLI580 functional block diagram. Table 1 provides the OLI580 absolute maximum ratings. Table 2 provides the OLI580 electrical specifications.

Figures 2 through 4 illustrate the OLI580 typical performance characteristics. Figure 5 shows the OLI580 switching test circuit. Figure 6 provides the OLI580 package dimensions.

Table 1. OLI580 Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
<i>Coupled</i>				
Input to output isolation voltage ²	V _{DC}	-1500	+3000	V
Storage temperature range	T _{STG}	-65	+150	°C
Operating temperature range	T _A	-55	+125	°C
Lead solder temperature (1.6 mm below the seating plane)			+260 for 10 sec	°C
<i>Input Diode</i>				
input current	I _{DD}		20	mA
Reverse voltage	V _R		3	V
Input power dissipation	P _D		36	mW
<i>Output Detector</i>				
Supply voltage	V _{CC}		20	V
Power dissipation	P _D		400	mW
Power dissipation derated	P _D		6.7 mW/°C above +90.0 °C	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. OLI580 Electrical Specifications ¹
(T_A = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Output voltage:						
Low level	V _{OL}	V _{DD} = 18.0 V, I _{OL} = 50.0 mA, I _F = 0 mA		0.75	1.1	V
High level	V _{OH}	V _{DD} = 18.0 V, I _{OL} = 50.0 mA, I _F = 10.0 mA	16.0	16.9		V
Peak output current ² :						
Source	I _{PK}		1.4			A
Sink			0.8			A
Power supply current:						
High level	I _{DDH}	V _{DD} = 18 V, I _F = 10 mA		4	10	mA
Low level	I _{DDL}	V _{DD} = 18 V, I _F = 0 mA		3	8	mA
Power supply voltage:						
Start-up	V _S			9	10	V
Drop-out	V _{UV}			8		V
Input:						
Forward voltage	V _F	I _F = 10.0 mA		1.65	2.3	V
Reverse breakdown voltage	B _{VR}	I _R = 10.0 μA	5.0			V
Output leakage current ³	I _{L0}	R _H ≤ 50%, T _A = 25 °C, V _{L0} = 1500.0 V _{DC} , t = 1 s			1.0	μA
Output capacitance ³	C _{L0}	f = 1 MHz		1.0		pF
Propagation delay time:						
Turn on	t _{b1}	I _F = 10 mA, V _{DD} = 15 V, C _L = 1000 pF		200		ns
Turn off	t _{b2}	I _F = 10 mA, V _{DD} = 15 V, C _L = 1000 pF		300		ns
Output time:						
Rise time (10% – 90%)	t _r	I _F = 10 mA, V _{DD} = 15 V, C _L = 1000 pF		40		ns
Fall time (90% – 10%)	t _f	I _F = 10 mA, V _{DD} = 15 V, C _L = 1000 pF		45		ns
Common mode transient immunity:						
High level	CM _H	V _{CM} = 300.0 V peak, V _O (minimum) = 2.0 V, I _F = 10.0 mA, T _A = 25 °C	5	≥10		KV/μs
Low level	CM _L	V _{CM} = 300.0 V peak, V _O (maximum) = 0.8 V, I _F = 0 mA, T _A = 25 °C	5	≥10		KV/μs

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

² 1 ms, 1% duty cycle pulse input, output shorted to V_{DD} or GND.

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

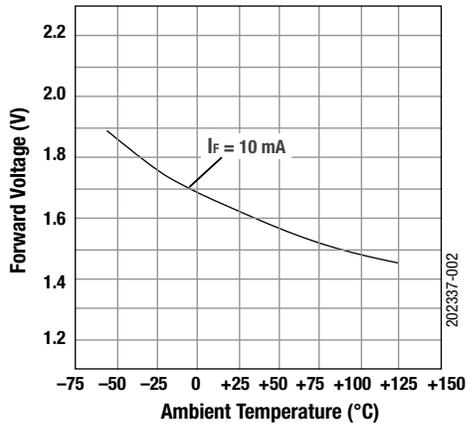


Figure 2. Forward Voltage vs Temperature

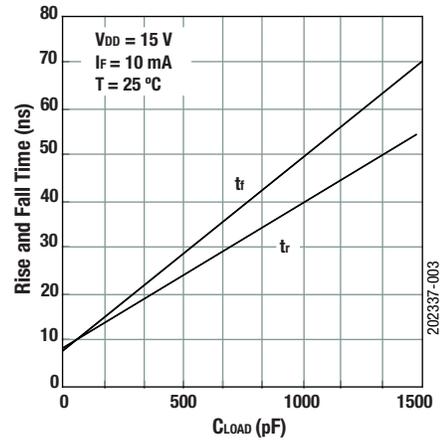


Figure 3. Rise and Fall Time vs Capacitive Load

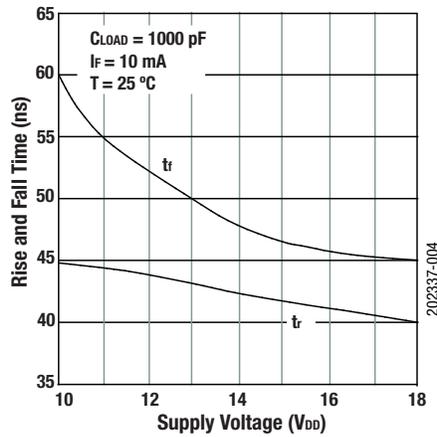


Figure 4. Rise and Fall Time vs Supply Voltage

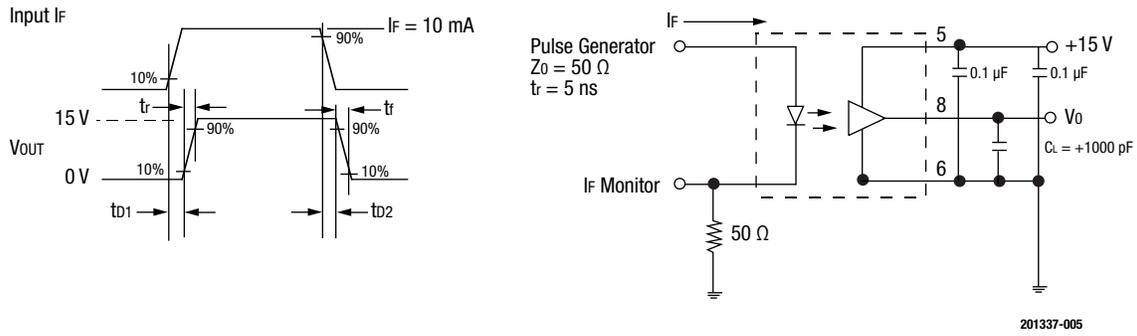


Figure 6. OLI580 Switching Test Circuit

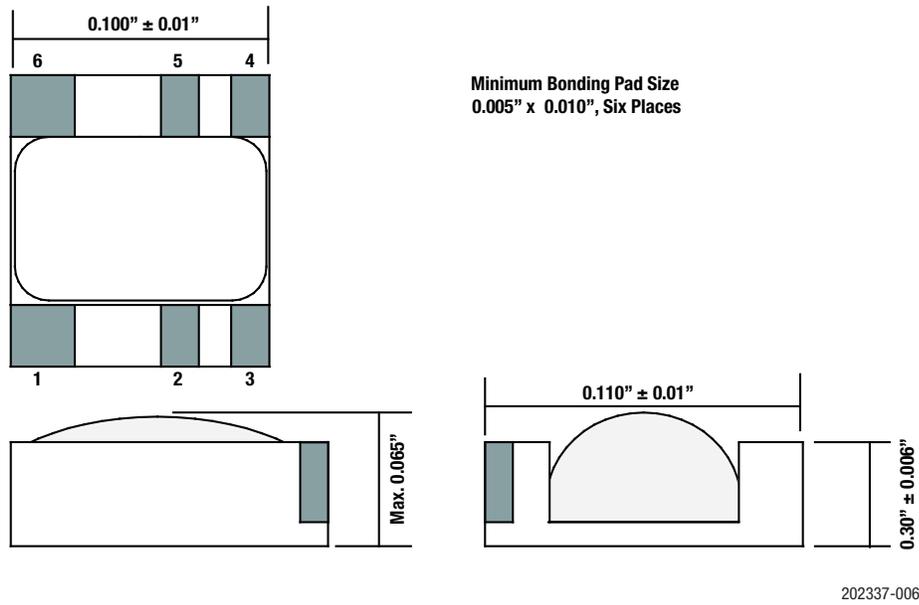


Figure 7. OLI580 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLI580: Opto-Isolated High-Speed Power MOSFET Driver for Hybrid Assembly	OLI580

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