

DATA SHEET

OLI920: Hybrid Smart Photovoltaic Optocoupler

Features

- Isolated MOSFET/IGBT gate drive
- Fast turn-off circuitry
- dV/dt protection circuitry
- Performance guaranteed over -55 °C to +125 °C ambient temperature range
- 2500 V_{DC} electrical isolation
- High open-circuit voltage
- High short-circuit current
- Small size for hybrid assembly
- High reliability construction
- Radiation tolerant

Description

The OLI920 consists of a pair of LEDs that are optically coupled to a dielectrically isolated photovoltaic diode array, packaged on a thick film ceramic substrate. When the LED is energized, the infrared emission is detected by the photovoltaic array and a DC output voltage is generated. This electrically isolated voltage can be used to drive the gates of Metal Oxide Semiconductor (MOS) devices. Additional control circuitry provides fast turn-off, protection for false turn-on, and gate protection.

Surface mounting can be accomplished with conductive epoxies or reflow soldering.

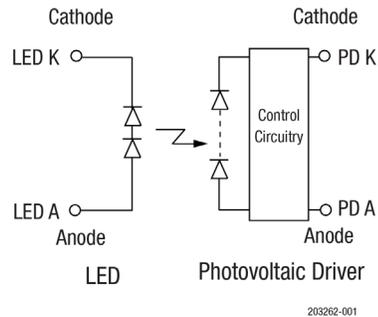


Figure 1. OLI920 Block Diagram

Figure 1 shows the OLI920 functional block diagram. Table 1 provides the OLI920 absolute maximum ratings. Table 2 provides the OLI920 electrical specifications.

Figures 2 through 6 illustrate the OLI920 typical performance characteristics. Figure 7 shows the OLI920 package dimensions.

Table 1. OLI920 Absolute Maximum Ratings¹

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}		100	mA
Peak forward current (≤1 ms duration)	I _F		180	mA
Reverse voltage	V _R		5	V
Power dissipation	P _D		200	mW
Output Detector				
Forward voltage	V _F		14	V
Reverse voltage	V _R		15	V

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 LED pins shorted together and output pins 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. OLI920 Electrical Specifications¹
(T_A = -55 °C to +125 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Open circuit voltage	V _{OC}	I _F = 10 mA	7.5	10		V
Short circuit current	I _{SC}	I _F = 10 mA	-7	-20		μA
Input:						
Forward voltage	V _F	I _F = 10 mA, T _A = 25 °C I _F = 10 mA, T _A = -55 °C I _F = 10 mA, T _A = 125 °C	2.4 2.8 2.2	2.8	3.4 3.85 3.0	V V V
Reverse breakdown voltage	B _{VR}	I _R = 10 μA	5			V
Output leakage current ²	I _{L_O}	R _H ≤ 50%, 1500 V _{DC} , T _A = 25 °C, Duration = 1 s			1	μA
Time:						
Turn-on	t _{ON}	I _F = 10 mA, PW = 100 μs, f = 1 kHz, C = 15 pf, T _A = 25 °C, R _L = 10 MΩ		60		μs
Turn-off	t _{OFF}	t _{ON} = 0% to 90% t _{OFF} = 100% to 10%		30		μs

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

² Measured between LED pins shorted together and output pins shorted together. T_A = 25°C and duration = 1 s.

Typical Performance Characteristics

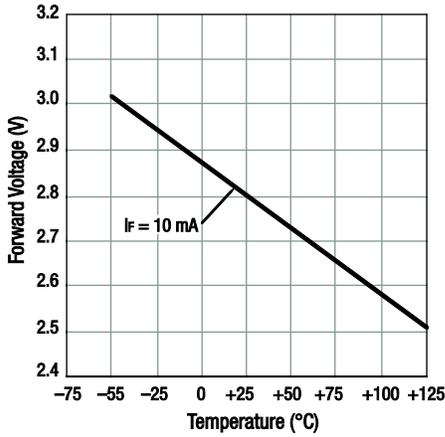


Figure 2. LED Forward Voltage vs Temperature

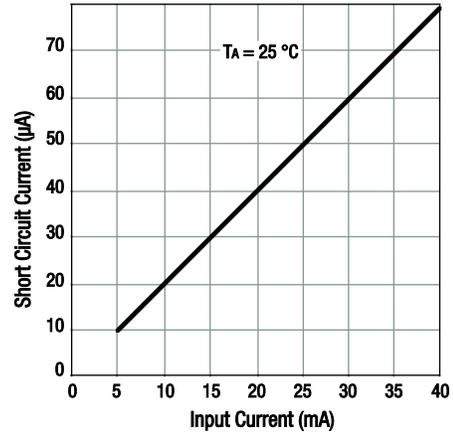


Figure 3. Short Circuit Current vs Input Current

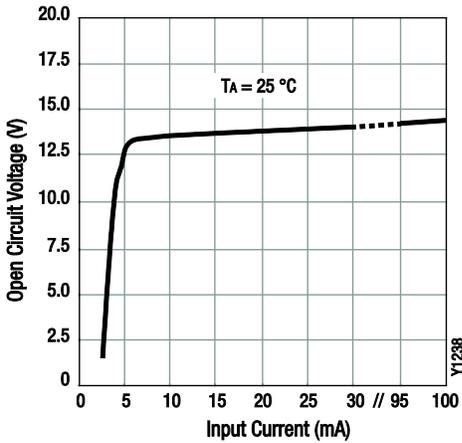


Figure 4. Open Circuit Voltage vs Input Current

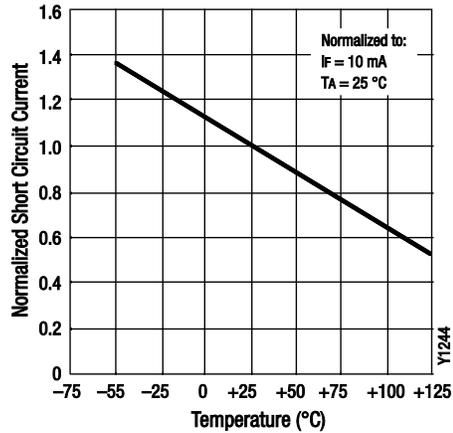


Figure 5. Normalized Short Circuit Current vs Temperature

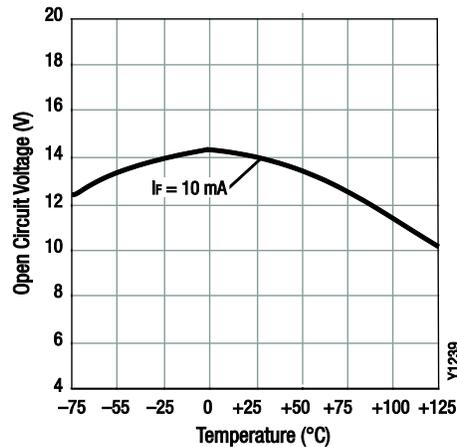


Figure 6. Open Circuit Voltage vs Temperature

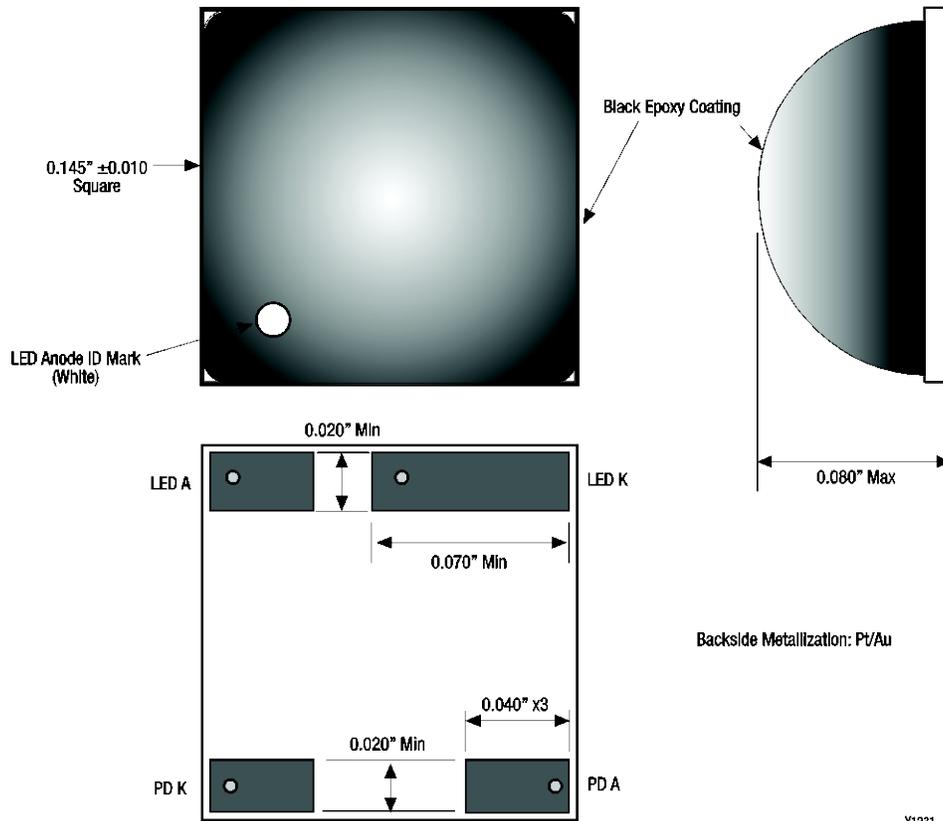


Figure 7. OLI920 Package Dimensions

Ordering Information

Part Number	Product Description	Manufacturing Part Number
OLI920	Hybrid Smart Photovoltaic Optocoupler	OLI920

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