Product Bulletin OPL820
January 1996

Photologic® Hermetic Sensor
Types OPL820, OPL821 Series

Features
- High sensitivity
- Built in voltage regulator
- Direct TTL/STTL interface
- TO-18 hermetic package
- Mechanically and spectrally matched to OP130 and OP231 series LED's
- Data rate to 200 kbaud

Description
The OPL820, OPL820-OC, OPL821, and OPL821-OC consist of a photodiode, a linear amplifier, and a Schmitt trigger on a single monolithic silicon chip. The output is an NPN transistor with either a 10k pull-up resistor to VCC or an open collector (-OC versions). The output polarity is either a buffer (OPL820 versions, output is high when the detector illuminated) or an inverter (OPL821 versions, output is low when the detector is illuminated). The package is a standard glass lensed hermetic TO-18. The output is capable of directly driving 10 TTL loads.

Absolute Maximum Ratings (TA = 25°C unless otherwise noted.)
Supply Voltage .................................................. 18 V
Storage Temperature Range .................................. -55°C to +125°C
Operating Temperature Range ............................. -40°C to +100°C
Lead Soldering Temperature ................................. 240°C
Power Dissipation .............................................. 200 mW
Duration of Output Short to VCC ......................... 1 sec
Output Voltage (High State) ................................. 30 V
Output Current Sink (Low State) ......................... 16 mA

Notes:
(1) RMA flux is recommended. Soldering time may be extended to 10 seconds when flow soldering. Max 20 grams of force may be applied to leads while at soldering temperatures.
(2) Derate linearly 5.7 mW/°C above 90°C.
(3) Light measurements are made with an LED source having a wavelength of 935 nm.

Schematic

OPL820 Buffer/10KΩ PU

OPL821 Inverter/10KΩ PU

OPL820-OC Buffer/OC

OPL821-OC Inverter/OC

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Electrical Characteristics (T_A = 25°C unless otherwise noted)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
<th>TEST CONDITIONS</th>
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</thead>
<tbody>
<tr>
<td>VCC</td>
<td>Operating Supply Voltage</td>
<td>4.5</td>
<td>16.0</td>
<td>V</td>
<td></td>
<td></td>
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<tr>
<td>E_T(+)</td>
<td>Positive Going Threshold Irradiance</td>
<td>0.002</td>
<td>0.015</td>
<td>0.035</td>
<td>mW/cm²</td>
<td>See Note 3</td>
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<tr>
<td>E_T(-)</td>
<td>Hysteresis Ratio</td>
<td>1.05</td>
<td>1.20</td>
<td>1.60</td>
<td>V</td>
<td>See Note 3</td>
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<tr>
<td>I_{CH}</td>
<td>High State Supply Current</td>
<td>5.0</td>
<td>12.0</td>
<td>mA</td>
<td>Note 4</td>
<td></td>
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<tr>
<td>I_{CL}</td>
<td>Low State Supply Current</td>
<td>4.0</td>
<td>12.0</td>
<td>mA</td>
<td>Note 5</td>
<td></td>
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<tr>
<td>V_{OH}</td>
<td>High State Output Voltage</td>
<td>V_{CC-1.5}</td>
<td>V_{CC}</td>
<td>V</td>
<td>IOH = -100 μA, Note 4</td>
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<tr>
<td>V_{OL}</td>
<td>Low State Output Voltage</td>
<td>0.4</td>
<td>V</td>
<td>IOL = 16 mA, Note 5</td>
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<tr>
<td>I_{OH}</td>
<td>High State Output Current</td>
<td>100</td>
<td>μA</td>
<td>V_{OH} = 30 V, Note 4</td>
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<tr>
<td>t_{r}, t_{f}</td>
<td>Output Rise Time, Output Fall Time</td>
<td>60</td>
<td>ns</td>
<td>RL = 390 Ω</td>
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<tr>
<td>t_{PLH}</td>
<td>Propagation Delay Low to High State</td>
<td>1.0</td>
<td>μs</td>
<td>RL = 390 Ω, E_e = 0.1 mW/cm²</td>
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<tr>
<td>t_{PHL}</td>
<td>Propagation Delay High to Low State</td>
<td>2.1</td>
<td>μs</td>
<td>RL = 390 Ω, E_e = 0.1 mW/cm²</td>
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<td>Data Rate</td>
<td>Data Rate Using NRZ Format</td>
<td>100</td>
<td>kHZ</td>
<td>RL = 390 Ω, E_e = 0.1 mW/cm²</td>
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<td></td>
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</table>

(4) High output state limits are valid for 4.5 V < V_{CC} < 16 V and E_e > 0.035 mW/cm² (OPL820, OPL820-OC), E_e < 0.001 mW/cm² (OPL821, OPL821-OC).

(5) Low output state limits are valid for 4.5 V < V_{CC} < 16 V and E_e > 0.035 mW/cm² (OPL821, OPL821-OC), E_e < 0.001 mW/cm² (OPL820, OPL820-OC).

Typical Performance Curves

- Normalized Threshold Irradiance vs. Ambient Temperature
- Angular Displacement From Package Mechanical Axis
- Normalized Spectral Response

Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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Typical Performance Curves

Normalized Supply Current vs. Ambient Temperature

Normalized High Level Output Voltage vs. Ambient Temperature

Low Level Output Voltage vs. Ambient Temperature

Propagation Time vs. Ambient Temperature

Propagation Time vs. Irradiance

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