Photologic® V
OPB9000 Reflective Sensor
Real World Challenges

Sensors are exposed to a wide-range of ambient light levels

Reliable presence detection is needed to optimize efficiency

Detecting small changes in contrast or reflected light in various media is critical

Standard analog circuits are extremely complex with added component costs

Reliable performance across a wide temperature range and dirty environments is critical

Space is limited as devices become smaller
Introducing the OPB9000

Robust optical sensor operates well from bright sunlight to dark rooms

Integrated 850nm IR LED and synchronous LED driver

Small surface mount package fits in tight spaces

Industrial grade resin capable of -40 to +85°C temperature range

2.2mm

1.46mm

Embedded IC capable of being programmed easily and quickly

4.0mm

8-pin package provides application versatility

Integrated design simplifies analog and digital circuit complexity

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OPB9000 Features

- Robust IR LED and optical sensor with digital output
- Surface mount package L 4.0mm x W 2.2mm x H 1.46mm
- Superior ambient light immunity range up to full daylight
- Fully-integrated analog front-end and digital interface
- Programmable Output and Sensitivity Level
- Self calibration and automatic gain control
- Temperature-compensated LED drive
OPB9000 Value Proposition

- Photologic® design heritage with over 35+ years and 10M+ units sold globally
- Robust, field-proven edge and presence detection avoids false readings

- 80% reduction in circuit complexity and board space requirements
- Eliminates need for circuit and sensor shielding
- Reduces number of sensors required in the system

- Improves design efficiency with wide ambient light operational range
- Automatic gain control avoids the need to constantly recalibrate the device as the LED ages

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Case Study – Production Floor

Manufacturing and assembly machinery with dirty and high-temp conditions benefit from auto-calibration.

Logistics require reliable presence detection for accurate routing.

Engineers need smaller and simpler circuit designs with flexibility.

Packaging, printing, and labeling equipment require robust presence detect from various media with low-contrast reflectivity.

Widely varying ambient lighting with bright/dark periods, including full daylight.
## Competitive Landscape

<table>
<thead>
<tr>
<th>Technical Specifications</th>
<th>TT Electronics</th>
<th>Sharp</th>
<th>Hamamatsu</th>
<th>Vishay</th>
<th>Avago</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambient Light Immunity (lux)</strong></td>
<td>25k+</td>
<td>3k</td>
<td>10k</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Operating Temp Range (°C)</strong></td>
<td>-40 to +85</td>
<td>10 to +60</td>
<td>-25 to +60</td>
<td>-25 to +85</td>
<td>-30 to +85</td>
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<tr>
<td><strong>Self Calibration &amp; Automatic Gain Control</strong></td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>LED only</td>
<td>None</td>
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<tr>
<td><strong>Temperature Compensation Circuit</strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Programmable Contrast Sensitivity</strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Calibration/Set-Up Time (ms)</strong></td>
<td>32</td>
<td>-</td>
<td>-</td>
<td>&gt;100</td>
<td>708</td>
</tr>
<tr>
<td><strong>Response Time (us)</strong></td>
<td>6</td>
<td>1000</td>
<td>800</td>
<td>&gt;3000</td>
<td>&gt;3000</td>
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<tr>
<td><strong>Core Application</strong></td>
<td>Industrial</td>
<td>Industrial</td>
<td>Industrial</td>
<td>Consumer</td>
<td>Consumer</td>
</tr>
<tr>
<td><strong>Dynamic Range</strong></td>
<td>1400:1</td>
<td>1:27</td>
<td>-</td>
<td>2000:1</td>
<td>2000:1</td>
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<tr>
<td><strong>Supply Voltage Range (V)</strong></td>
<td>2.7 to 5.5</td>
<td>4.75 to 5.25</td>
<td>4.5 to 16</td>
<td>2.5 to 3.6</td>
<td>2.5 to 3.6</td>
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<tr>
<td><strong>Dimensions (mm)</strong></td>
<td>4.0 x 2.2 x 1.5</td>
<td>33 x 10.0 x 9.0</td>
<td>21.7 x 5.2 x 2.0</td>
<td>4.9 x 2.4 x 0.83</td>
<td>3.94 x 2.36 x 1.35</td>
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<tr>
<td><strong>Supply Current (mA)</strong></td>
<td>3</td>
<td>30</td>
<td>11</td>
<td>4</td>
<td>3</td>
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<tr>
<td><strong>Communication Interface</strong></td>
<td>2-wire*</td>
<td>-</td>
<td>-</td>
<td>I²C</td>
<td>I²C</td>
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<tr>
<td><strong>Reflective Sensing Range (mm)</strong></td>
<td>50</td>
<td>9</td>
<td>-</td>
<td>200</td>
<td>100</td>
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</tbody>
</table>

*One wire for 2-way communication based on Manchester interface protocol and one wire for output

A field-proven, reliable reflective sensor for industrial and medical applications

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Application Versatility – Industrial

**Printing & Dispensing**
- Media presence
- Ink level and high-speed paper detection
- Maintenance notification

**Manufacturing**
- Asset tracking
- Fault detection
- Non-contact position & edge sensing

**Security**
- Intrusion detection
- Anti-tampering
- Media presence & currency/ticket dispensing
## Application Versatility – Medical

### Hospital & Lab Equip.
- Blood analysis
- Media detection
- Bubble or contamination detection

### Portable Equipment
- Bubble or contamination detection
- Cartridge and media presence
- Low contrast detection

### Dispensing
- Anti-tampering
- Counting
- Low reflectivity object detection

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Thank You