

# Photologic® Optical Flag Switch

OPB695AZ, OPB696AZ



OPB695



## Features:

- Photologic® output
- Two output options
- Mechanical switch replacement
- 2.5 mm, 3-pin connector mates with Molex connector 5051 series housing and 4809 series terminal for OPB695AZ & OPB696AZ

## Description:

Each **OPB695** and **OPB696** flag switch consists of an infrared emitting diode, with a current limiting resistor, and a monolithic integrated circuit that incorporates a photodiode, a voltage regulator, a linear amplifier and a Schmitt trigger. A lever arm actuated flag interrupts the light beam, which switches the output between states that can readily drive logic gates.

The **OPB695** and **OPB696** is designed to easily snap mount into a  $0.037'' \pm 0.001''$  ( $0.940 \text{ mm} \pm 0.025 \text{ mm}$ ) thick material with a rectangular opening of  $0.320'' \pm 0.003'' \times 0.472''$  ( $8.13 \text{ mm} \times 11.99 \text{ mm}$ ) minimum. Insertion into the punched side of metal is recommended.

Both devices feature TTL/LSTTL compatible logic level output that can drive up to 10 TTL loads over a voltage range from 4.5 V to 8 V.

Customized lever arms and spring torques can be designed for specific applications for each of the devices.

## Applications:

- Mechanical switch replacement
- Speed indication (tachometer)
- Mechanical limit indication
- Edge sensing

| Ordering Information |                     |                    |                         |                                                                                |
|----------------------|---------------------|--------------------|-------------------------|--------------------------------------------------------------------------------|
| Part Number          | LED Peak Wavelength | Sensor Photologic® | Flag Travel Degrees Max | Lead Length / Spacing or Connector                                             |
| OPB695AZ             | 890 nm              | 10K Pull-Up        | 70°                     | Mates with 3 Pin—Molex 5051 (22-01-1032) Housing & 4809 (08-70-0069) Terminals |
| OPB696AZ             |                     | Open Collector     |                         |                                                                                |



RoHS

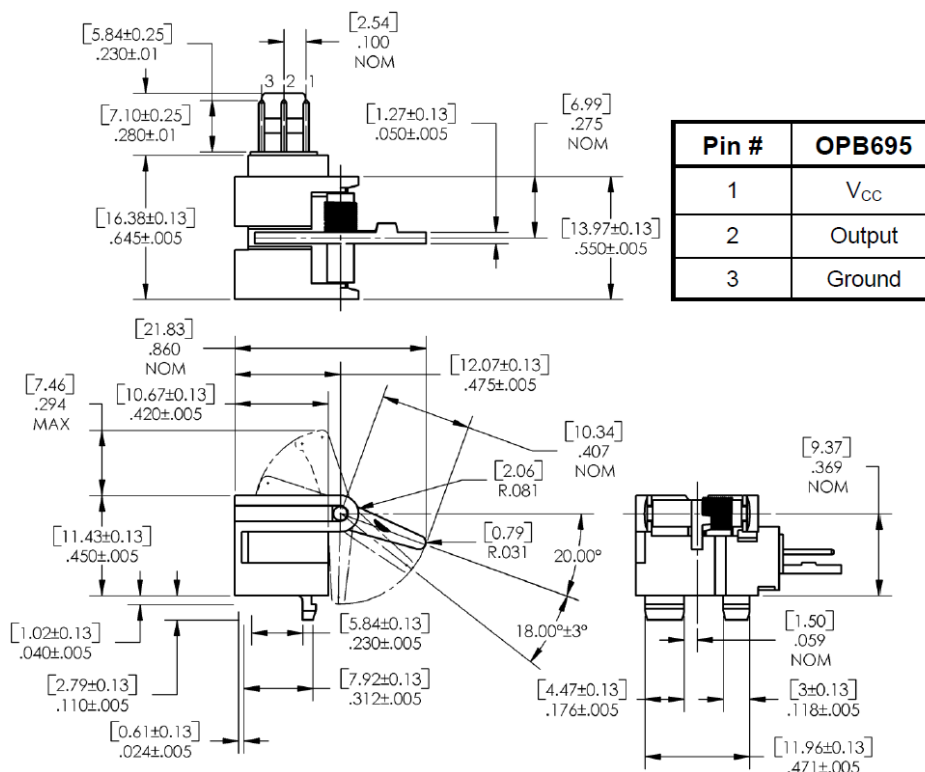
## General Note

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| Part Number | Max. Torque (Grams) |
|-------------|---------------------|
| OPB695AZ    | 1.5                 |
| OPB696AZ    | 1.5                 |

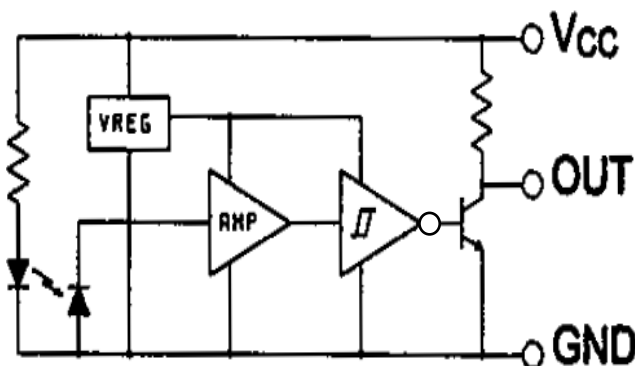
OPB695AZ, OPB696AZ



Torque is measured at the end of the arm from the resting position to the switching point of

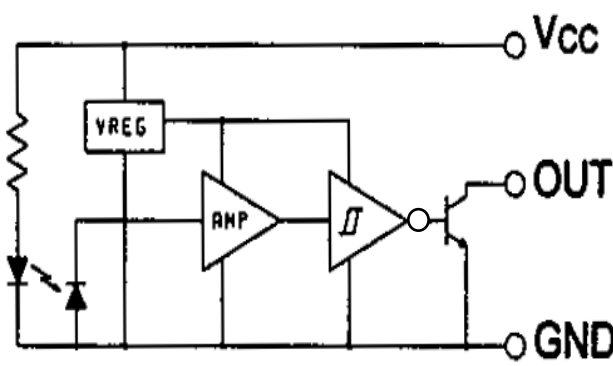
### OPB695AZ Buffered 10K Pull-Up

With Light - Output - High



### OPB696AZ Buffered Open-Collector

With Light - Output - High



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### Electrical Specifications

#### Absolute Maximum Ratings (T<sub>A</sub> = 25° C unless otherwise noted)

|                                               |                   |
|-----------------------------------------------|-------------------|
| Storage & Operating Temperature Range         | -40° C to +100° C |
| Supply Voltage, V <sub>CC</sub>               | 8 V               |
| Voltage at Output (OPB696AZ)                  | 30 V              |
| Low Level Output Current (sinking) (OPB696AZ) | 16 mA             |
| Power Dissipation <sup>(1)</sup> (OPB696AZ)   | 240 mW            |

Notes:

(1) Derate linearly 2.50 mW/° C above 25° C.

#### Electrical Characteristics (T<sub>A</sub> = 25° C unless otherwise noted)

| SYMBOL                               | PARAMETER                                                           | MIN | TYP    | MAX | UNITS | TEST CONDITIONS                                                                                      |
|--------------------------------------|---------------------------------------------------------------------|-----|--------|-----|-------|------------------------------------------------------------------------------------------------------|
| <b>Input Diode</b>                   |                                                                     |     |        |     |       |                                                                                                      |
| V <sub>F</sub>                       | Forward Voltage                                                     | 1.0 | -      | 1.6 | V     | I <sub>F</sub> = 10 mA                                                                               |
| I <sub>R</sub>                       | Reverse Current                                                     | -   | -      | 100 | μA    | V <sub>R</sub> = 2 V                                                                                 |
| <b>Output Photologic® Sensor</b>     |                                                                     |     |        |     |       |                                                                                                      |
| V <sub>CC</sub>                      | Operating DC Supply Voltage<br>OPB695AZ-696AZ                       | 4.5 | 5.0    | 8.0 | V     |                                                                                                      |
| I <sub>CC</sub>                      | Operating DC Supply Current<br>OPB695AZ-696AZ                       | -   | 20     | 30  | mA    |                                                                                                      |
| I <sub>CCL</sub>                     | Low Level Supply Current:<br>Buffered 10k Pull-Up                   | -   | 5.5    | 12  | mA    | V <sub>CC</sub> = 16 V, I <sub>F</sub> = 0 mA (no load on output)                                    |
|                                      | Buffered Open-Collector                                             |     | 4.0    | 12  |       |                                                                                                      |
| I <sub>CCH</sub>                     | High Level Supply Current:<br>Buffered 10k Pull-Up                  | -   | 5.0    | 12  | mA    | V <sub>CC</sub> = 16 V, I <sub>F</sub> = 10 mA (no load on output)                                   |
|                                      | Buffered Open-Collector                                             |     |        |     |       |                                                                                                      |
| V <sub>OL</sub>                      | Low Level Output Voltage <sup>(1)</sup><br>Buffered 10k Pull-Up     | -   | -      | 0.4 | V     | V <sub>CC</sub> = 8 V, I <sub>OL</sub> = 16 mA                                                       |
|                                      | Buffered Open-Collector                                             |     |        |     |       |                                                                                                      |
| I <sub>OH</sub>                      | High Level Output Voltage <sup>(2)</sup><br>Buffered Open-Collector | -   | -      | 100 | μA    | V <sub>CC</sub> = 4.5 V to 8 V, V <sub>OH</sub> = 30 V                                               |
|                                      |                                                                     |     |        |     |       |                                                                                                      |
| I <sub>F(+)</sub>                    | LED Positive-Going Threshold Current                                | 0.1 | 1.8    | 10  | mA    | V <sub>CC</sub> = 5 V                                                                                |
| I <sub>F(+)</sub> /I <sub>F(-)</sub> | Hysteresis                                                          | 1.0 | 1.2    | 1.6 | mA    | V <sub>CC</sub> = 5 V                                                                                |
| t <sub>r</sub> /t <sub>f</sub>       | Rise Time, Fall Time                                                | -   | 30     | -   | ns    |                                                                                                      |
| t <sub>PLH</sub> /t <sub>PHL</sub>   | Propagation Delay Low-High & High-Low:<br>Buffer, 10k Pull-Up       | -   | 1 (LH) | -   | μs    | V <sub>CC</sub> = 5 V, I <sub>F</sub> = 0 or 10 mA<br>R <sub>L</sub> = 300 Ω, DC = 50%<br>f = 10 kHz |
|                                      | Buffer, Open-Collector                                              |     | 2 (HL) | -   | μs    |                                                                                                      |

Notes:

- (1) Test requires lever arm in “blocked” position.  
(2) Test requires lever arm in “unblocked” position.

#### General Note

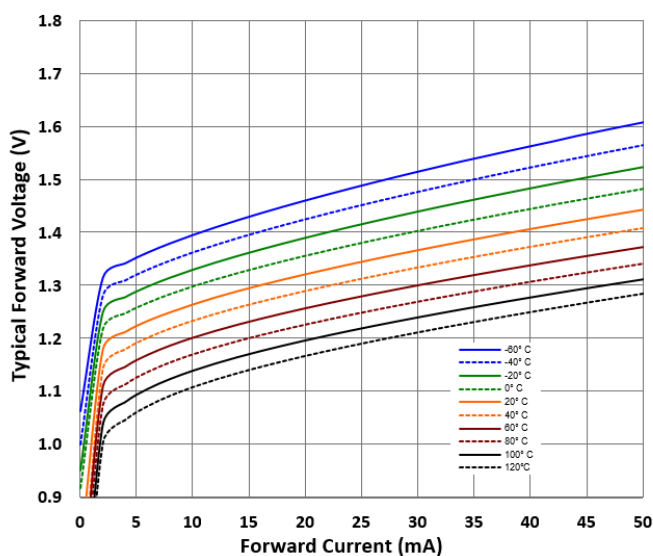
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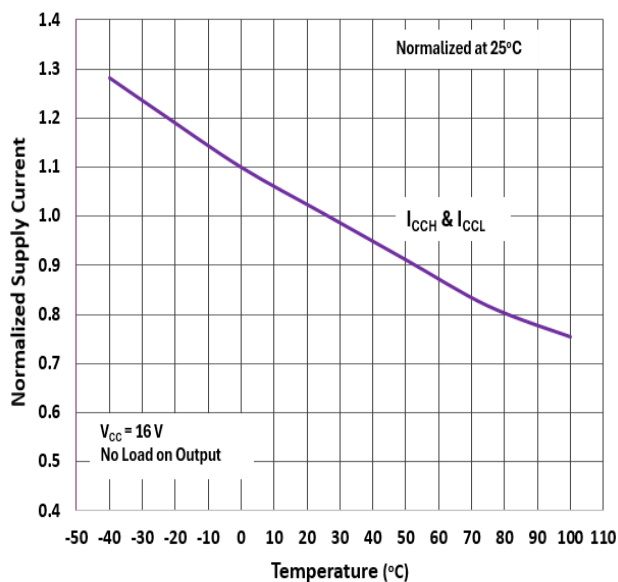
### Typical Performance

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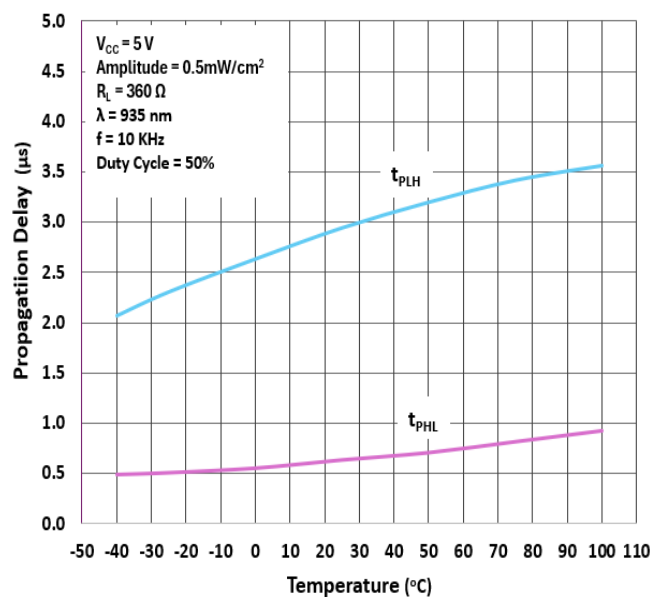
LED Forward Voltage vs  $I_F$  vs Temp



Supply Current vs Temperature



Propagation Delay vs Temperature



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