

# Slotted Optical Flag Switch

## Type OPB690



### Features

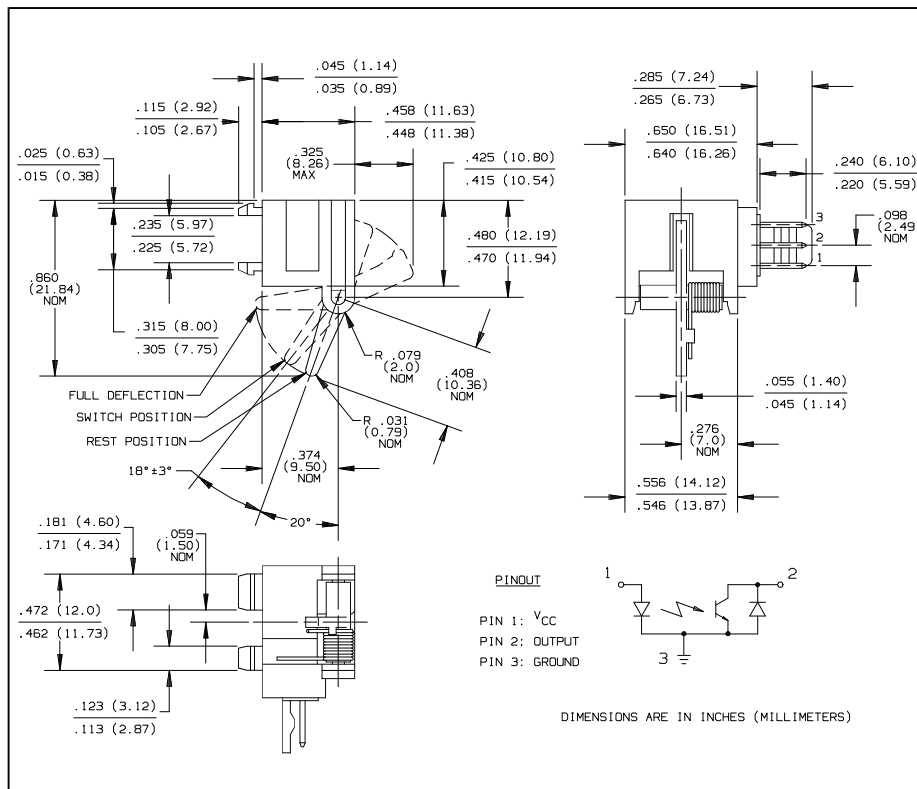
- Phototransistor output
- Mechanical switch replacement
- 3-pin connector (Ho Tien L2561-03), Molex compatible connector 5102 series housing and 5103 series terminal
- Enhanced signal to noise ratio

### Description

The OPB690 consists of an NPN phototransistor and an infrared emitting diode in a molded plastic housing. The phototransistor has an enhanced low current roll-off which improves contrast ratio and immunity to background irradiance. A lever arm actuated flag interrupts the light beam, switching the transistor output between states that can readily drive logic gates.

This switch is designed to easily snap mount into a  $0.037" \pm 0.001"$  (0.94 mm) thick material with a rectangular opening of  $0.320" \pm 0.003" \times 0.472"$  (8.13 mm x 11.99 mm) minimum. Insertion into the punched side of metal is recommended.

Customized lever arms and spring torques can be designed for specific applications.



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Storage and Operating Temperature . . . . .  $-40^\circ\text{C}$  to  $+100^\circ\text{C}$

#### Input Diode

Forward DC Current . . . . . 50 mA

Peak Forward Current (1  $\mu\text{s}$  pulse width, 300 pps) . . . . . 3.0 A

Reverse DC Voltage . . . . . 3.0 V

Power Dissipation . . . . . 100 mW<sup>(1)</sup>

#### Output Phototransistor

Collector-Emitter Voltage . . . . . 30 V

Emitter Reverse Current . . . . . 10 mA

Collector DC Current . . . . . 30 mA

Power Dissipation . . . . . 200 mW<sup>(2)</sup>

#### Notes:

- (1) Derate linearly 1.33 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (2) Derate linearly 2.0 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (3) "Off" condition exists when the lever arm is in the rest position ( $20^\circ$  from vertical) as shown in the figure.
- (4) "On" condition exists when the lever arm is deflected clockwise  $18^\circ \pm 3^\circ$  from the rest position ( $20^\circ$  from vertical) as shown in the figure.
- (5) From the rest position to the switch point, lever torque measured at the end of the arm is 1.5 grams max.

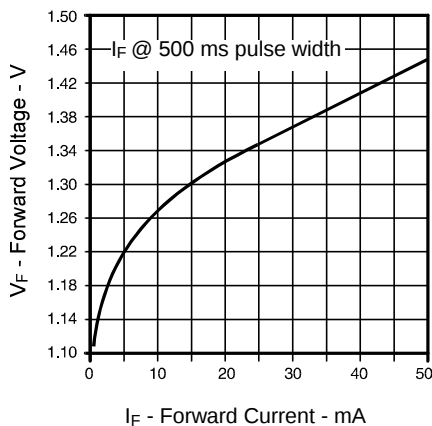
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Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

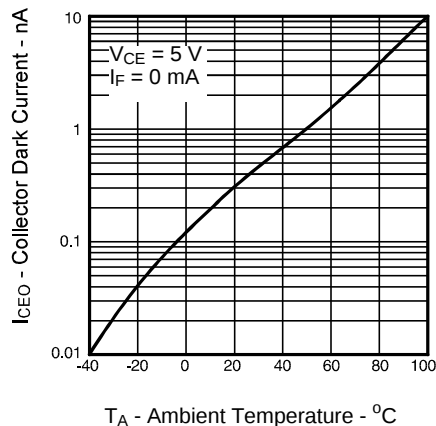
| SYMBOL                        | PARAMETER                           | MIN | MAX | UNITS         | TEST CONDITIONS                                                       |
|-------------------------------|-------------------------------------|-----|-----|---------------|-----------------------------------------------------------------------|
| <b>Input Diode</b>            |                                     |     |     |               |                                                                       |
| $V_F$                         | Forward Voltage                     |     | 1.6 | V             | $I_F = 10\text{ mA}$                                                  |
| $I_R$                         | Reverse Current                     |     | 100 | $\mu\text{A}$ | $V_R = 3.0\text{ V}$                                                  |
| <b>Output Phototransistor</b> |                                     |     |     |               |                                                                       |
| $V_{(BR)CEO}$                 | Collector-Emitter Breakdown Voltage | 30  |     | V             | $I_C = 100\text{ }\mu\text{A}$                                        |
| $I_{ECO}$                     | Emitter Reverse Current             |     | 100 | $\mu\text{A}$ | $V_{EC} = 0.4\text{ V}$                                               |
| $I_{CEO}$                     | Collector-Emitter Dark Current      |     | 100 | nA            | $V_{CE} = 5\text{ V}$                                                 |
| <b>Coupled</b>                |                                     |     |     |               |                                                                       |
| $V_{SAT}$                     | Saturation Voltage                  |     | 0.4 | V             | $I_F = 10\text{ mA}$ , $I_C = 100\text{ }\mu\text{A}$ , Gap unblocked |
| $I_{C(ON)}$                   | On-State Collector Current          | 600 |     | $\mu\text{A}$ | $I_F = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$                          |

SLOTTED  
OPTICAL  
SURFACES

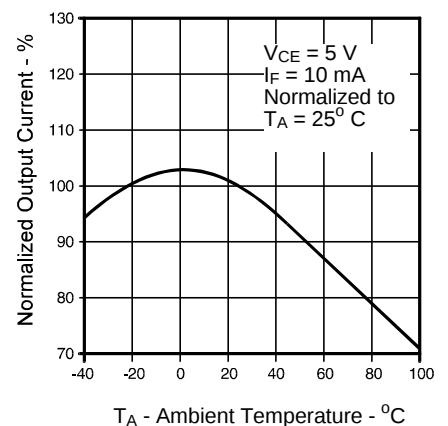
**Forward Current vs Forward Voltage Input Diode**



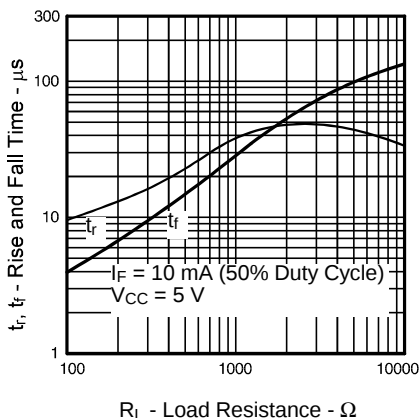
**Collector Dark Current vs Ambient Temperature**



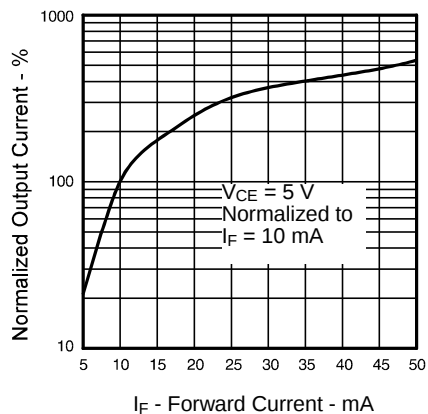
**Normalized Output Current vs Ambient Temperature**



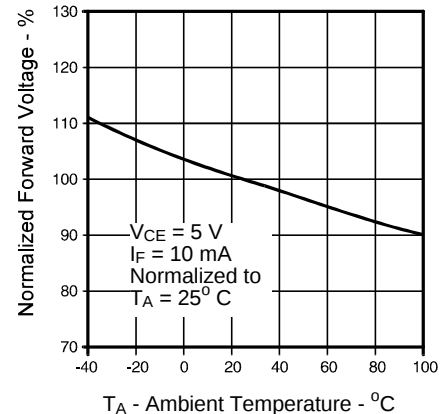
**Rise and Fall Time vs Load Resistance**



**Normalized Output Current vs Forward Current**



**Normalized Forward Voltage vs Ambient Temperature**



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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