

# Photologic® Optical Flag Switch

## Types OPB695, OPB696, OPB697, OPB698 Series



### Features

- Photologic® output
- Four output options
- Mechanical switch replacement
- 3-pin connector (Ho Tien L2561-03), Molex compatible connector 5102 series housing and 5103 series terminal

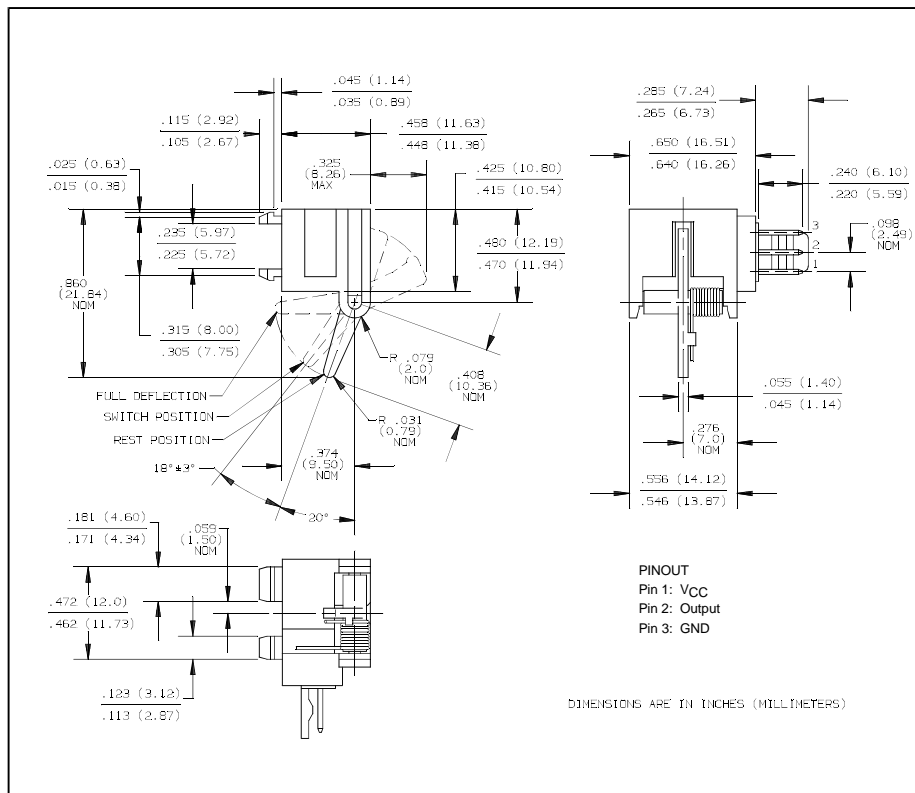
### Description

The OPB695 series flag switches consist of an infrared emitting diode and a monolithic integrated circuit, which incorporates a photodiode, a linear amplifier, and a Schmitt trigger. A lever arm actuated flag interrupts the light beam switching the 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.

The device features TTL/LSTTL compatible logic level output which can drive up to 10 TTL loads over a voltage range from 4.5 V to 16 V.



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

Storage Temperature Range	$-40^\circ\text{C}$ to $+100^\circ\text{C}$
Operating Temperature Range	$-40^\circ\text{C}$ 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 Photologic®

Supply Voltage, $V_{CC}$	18 V
Duration of Output Short To $V_{CC}$	1.00 sec
Voltage at Output	30 V
Low Level Output Current (sinking)	16 mA
Power Dissipation	240 mW <sup>(2)</sup>

### Notes:

- (1) Derate linearly 1.33 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .  
 (2) Derate linearly 2.50 mW/ $^\circ\text{C}$  above  $30^\circ\text{C}$ .



RoHS

For RoHS compliant devices add "Z" to the end of the part number: OPB695Z

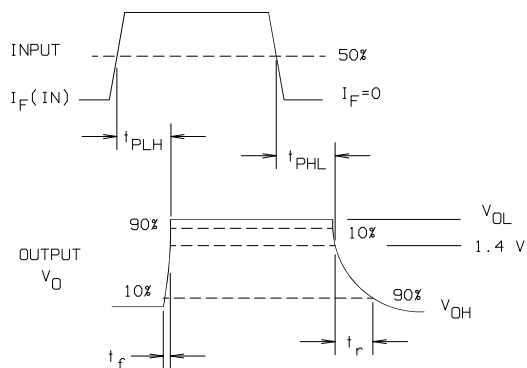
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Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	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 Photologic<sup>®</sup> Sensor</b>						
$V_{CC}$	Operating D.C. Supply Voltage					
	OPB695A, 696A, 697A, 698A	4.5	5.0	8.0	V	
	OPB695B, 696B, 697B, 698B	8.0	12.0	13.5	V	
	OPB695C, 696C, 697C, 698C	13.5	15.0	16.0	V	
$I_{CC}$	Operating Supply Current		20.0	30.0	mA	
$V_{OH}$	High Level Output Voltage:					
	Buffer, 10K Pull-up OPB695A/B/C Inverter, 10K Pull-up OPB697A/B/C	$V_{CC}-1.5$ $V_{CC}-1.5$			V	$I_{OH} = 100\text{ }\mu\text{A}$ , Unblocked $I_{OH} = 100\text{ }\mu\text{A}$ , Blocked <sup>(4)</sup>
$I_{OH}$	High Level Output Current:					
	Buffer, Open-Collector OPB696A			100	$\mu\text{A}$	$V_{CC} = 4.5\text{ to }8\text{ V}$ , $V_{OH} = 30\text{ V}$ , Unblocked
	OPB696B			100	$\mu\text{A}$	$V_{CC} = 8\text{ to }13.5\text{ V}$ , $V_{OH} = 30\text{ V}$ , Unblocked
	OPB696C			100	$\mu\text{A}$	$V_{CC} = 13.5\text{ to }16\text{ V}$ , $V_{OH} = 30\text{ V}$ , Unblocked
	Inverter, Open-Collector OPB698A			100	$\mu\text{A}$	$V_{CC} = 4.5\text{ to }8\text{ V}$ , $V_{OH} = 30\text{ V}$ , Blocked <sup>(4)</sup>
	OPB698B			100	$\mu\text{A}$	$V_{CC} = 8\text{ to }13.5\text{ V}$ , $V_{OH} = 30\text{ V}$ , Blocked <sup>(4)</sup>
	OPB698C			100	$\mu\text{A}$	$V_{CC} = 13.5\text{ to }16\text{ V}$ , $V_{OH} = 30\text{ V}$ , Blocked <sup>(4)</sup>
$V_{OL}$	Low Level Output Voltage:					
	Buffer, 10K Pull-up OPB695A/B/C			0.4	V	$V_{CC} = 4.5\text{ to }8\text{ V}$ , $I_{OL} = 16\text{ mA}$ , Blocked <sup>(4)</sup>
	Buffer, Open-Collector OPB696A/B/C			0.4	V	$V_{CC} = 8\text{ to }13.5\text{ V}$ , $I_{OL} = 16\text{ mA}$ , Blocked <sup>(4)</sup>
	Inverter, 10K Pull-up OPB697A/B/C			0.4	V	$V_{CC} = 4.5\text{ to }8\text{ V}$ , $I_{OL} = 16\text{ mA}$ , Unblocked
	Inverter, Open-Collector OPB698A/B/C			0.4	V	$V_{CC} = 8\text{ to }13.5\text{ V}$ , $I_{OL} = 16\text{ mA}$ , Unblocked
						$V_{CC} = 13.5\text{ to }16\text{ V}$ , $I_{OL} = 16\text{ mA}$ , Unblocked

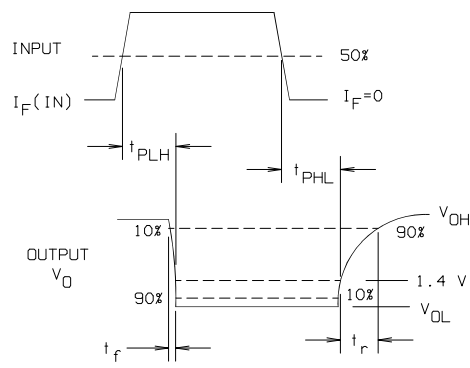
(4) Test requires lever arm in "blocked" position.

SWITCHING TEST CURVE FOR BUFFERS



LED:  $f=10\text{ kHz}$ , D.C.=50%

SWITCHING TEST CURVE FOR INVERTERS



LED:  $f=10\text{ kHz}$ , D.C.=50%

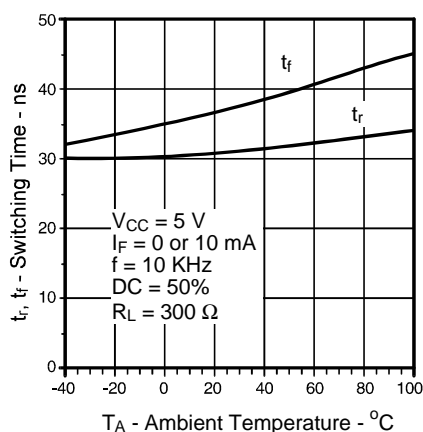
Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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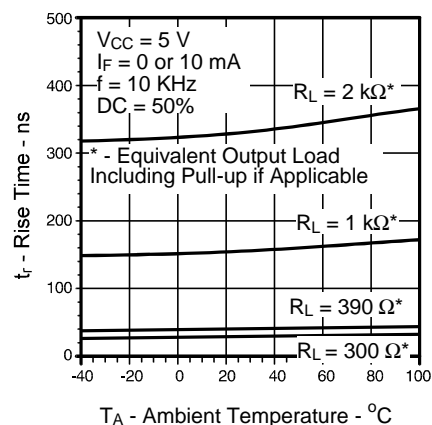
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## Typical Performance Curves

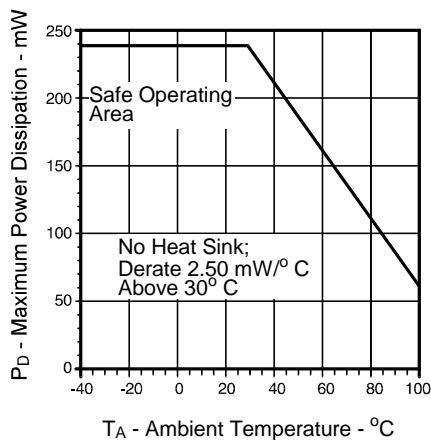
Switching Time vs Ambient Temperature



Rise Time vs Output Load vs Ambient Temperature



Typical Thermal Derating Curve

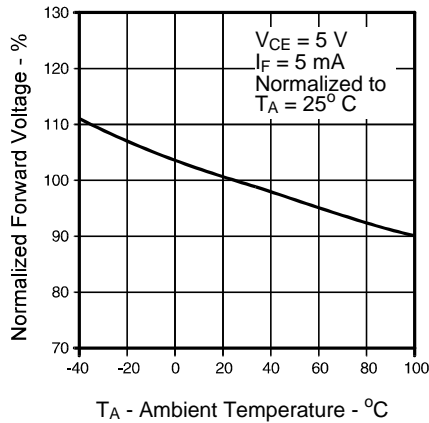


SLOTTED  
OPTICAL  
SURFACES

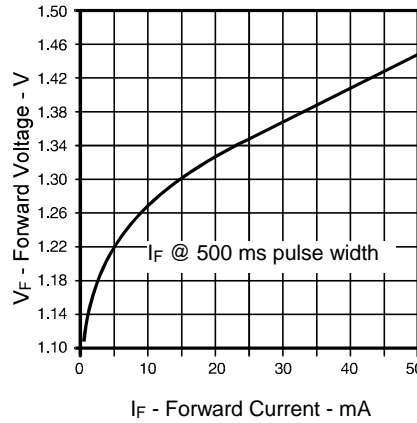
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## Typical Performance Curves

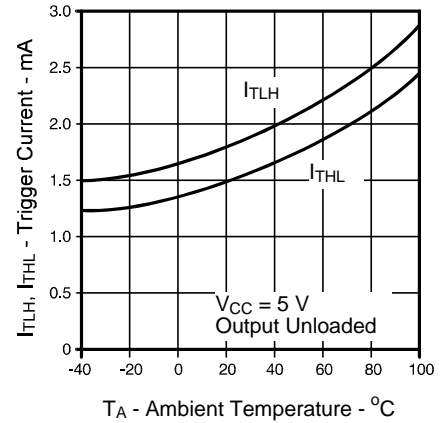
**Normalized Forward Voltage vs Ambient Temperature**



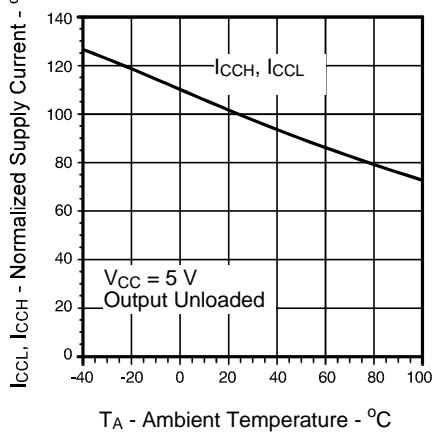
**Forward Current vs Forward Voltage Input Diode**



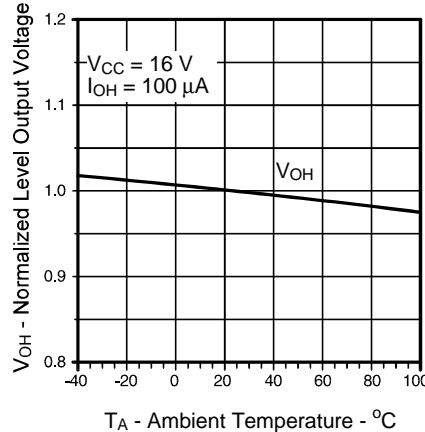
**Trigger Current vs Ambient Temperature**



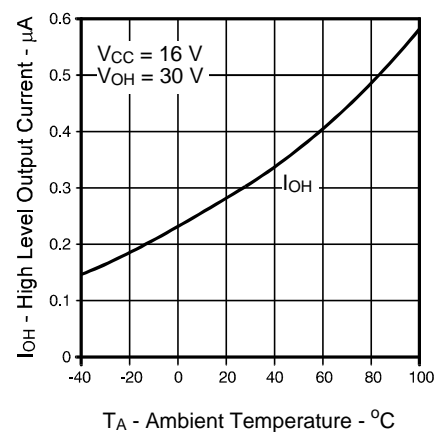
**Normalized Supply Current vs Ambient Temperature**



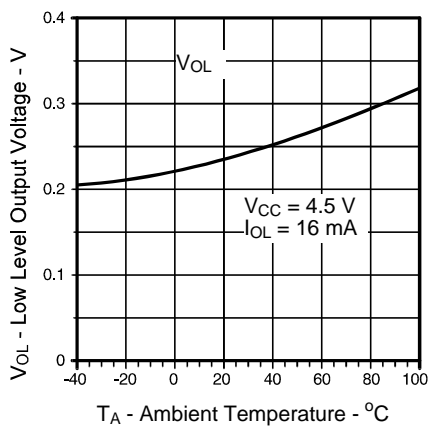
**OPB695, OPB697 Normalized High Level Output Voltage vs Ambient Temperature**



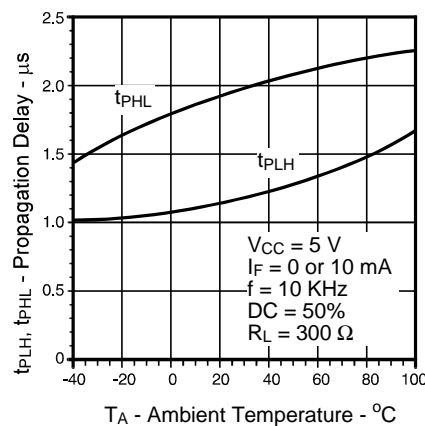
**OPB696, OPB698 High Level Output Current vs Ambient**



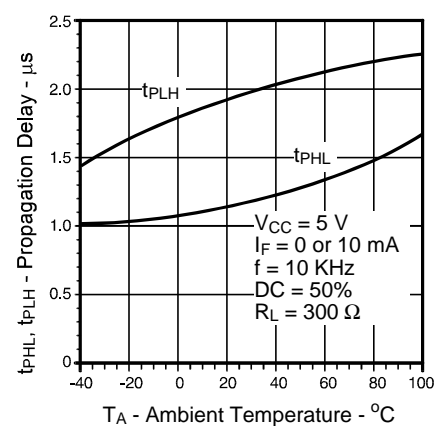
**Low Level Output Voltage vs Ambient Temperature**



**OPB695, OPB696 Propagation Delay vs Ambient Temperature**



**OPB697, OPB698 Propagation Delay vs Ambient Temperature**



## PART NUMBER GUIDE

OPB 6 9 X X

Operating D.C. Supply Voltage:

A -  $4.5V \leq V_{CC} \leq 8.0V$

B -  $8.0V \leq V_{CC} \leq 13.5V$

C -  $13.5V \leq V_{CC} \leq 16.0V$

Electrical Specification Variations:

5 - Buffer, 10K Pull-up

6 - Buffer, Open-Collector

7 - Inverter, 10K Pull-up

8 - Inverter, Open-Collector

### Schematics

