

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

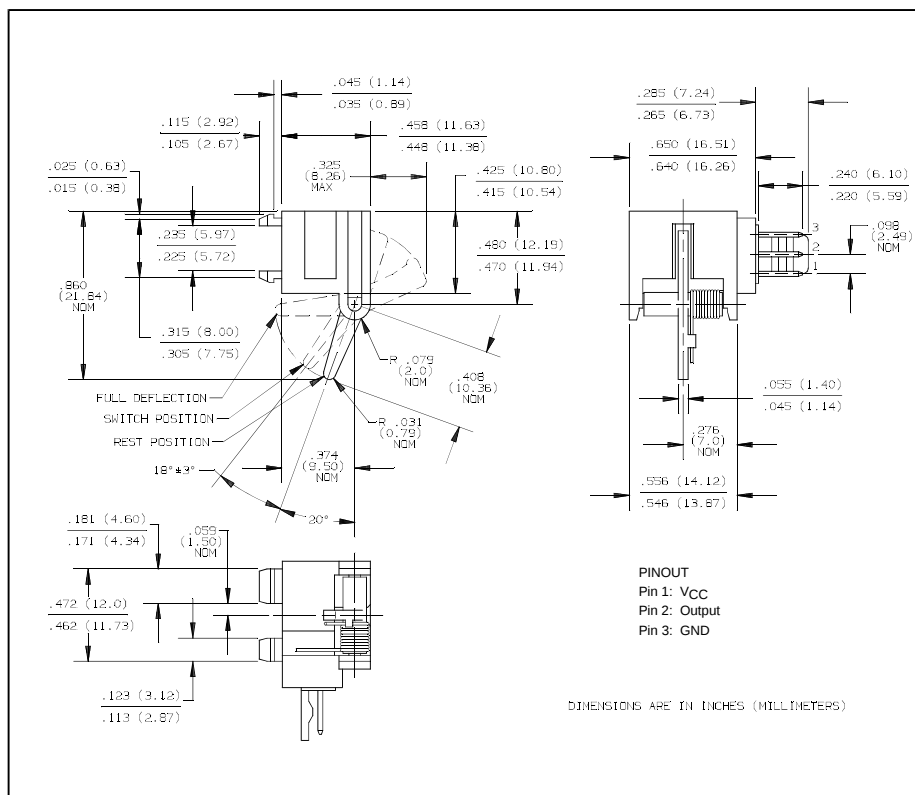
Description

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

Input Diode

Forward DC Current	50 mA
Peak Forward Current (1 μs pulse width, 300 pps)	3.0 A
Reverse DC Voltage	3.0 V
Power Dissipation	100 mW ⁽¹⁾

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 ⁽²⁾

Notes:

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

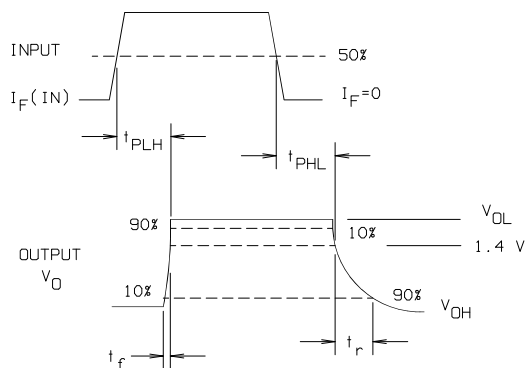
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Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage			1.6	V	$I_F = 10\text{ mA}$
I_R	Reverse Current			100	μA	$V_R = 3.0\text{ V}$
Output Photologic® Sensor						
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 ⁽⁴⁾
I_{OH}	High Level Output Current:					
	Buffer, Open-Collector OPB696A			100	μA	$V_{CC} = 4.5\text{ to }8\text{ V}$, $V_{OH} = 30\text{ V}$, Unblocked
				100	μA	$V_{CC} = 8\text{ to }13.5\text{ V}$, $V_{OH} = 30\text{ V}$, Unblocked
				100	μA	$V_{CC} = 13.5\text{ to }16\text{ V}$, $V_{OH} = 30\text{ V}$, Unblocked
	Inverter, Open-Collector OPB698A			100	μA	$V_{CC} = 4.5\text{ to }8\text{ V}$, $V_{OH} = 30\text{ V}$, Blocked ⁽⁴⁾
				100	μA	$V_{CC} = 8\text{ to }13.5\text{ V}$, $V_{OH} = 30\text{ V}$, Blocked ⁽⁴⁾
				100	μA	$V_{CC} = 13.5\text{ to }16\text{ V}$, $V_{OH} = 30\text{ V}$, Blocked ⁽⁴⁾
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 ⁽⁴⁾
	Buffer, Open-Collector OPB696A/B/C			0.4	V	$V_{CC} = 8\text{ to }13.5\text{ V}$, $I_{OL} = 16\text{ mA}$, Blocked ⁽⁴⁾
				0.4	V	$V_{CC} = 13.5\text{ to }16\text{ V}$, $I_{OL} = 16\text{ mA}$, Blocked ⁽⁴⁾
	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
				0.4	V	$V_{CC} = 13.5\text{ to }16\text{ V}$, $I_{OL} = 16\text{ mA}$, Unblocked

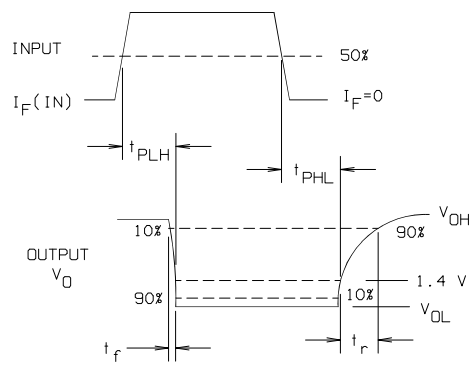
(4) Test requires lever arm in "blocked" position.

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%

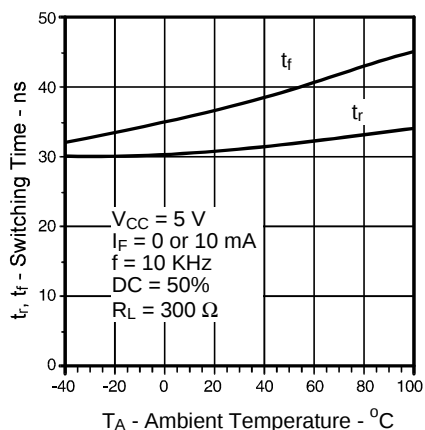
Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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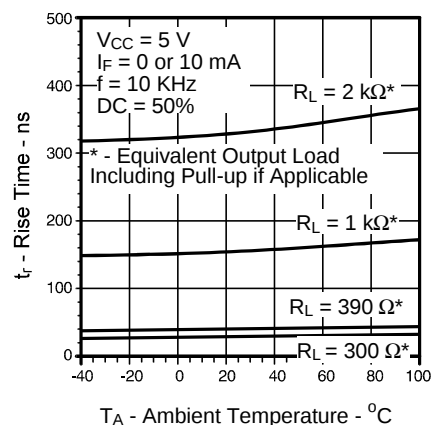
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Typical Performance Curves

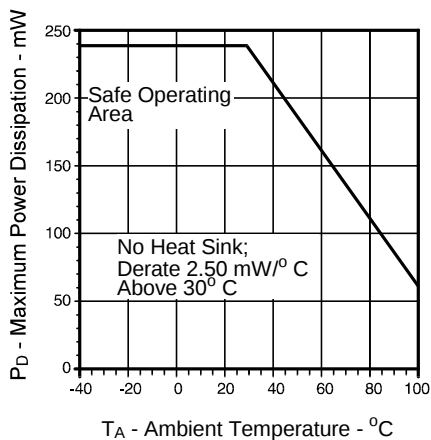
Switching Time vs Ambient Temperature



Rise Time vs Output Load vs Ambient Temperature



Typical Thermal Derating Curve

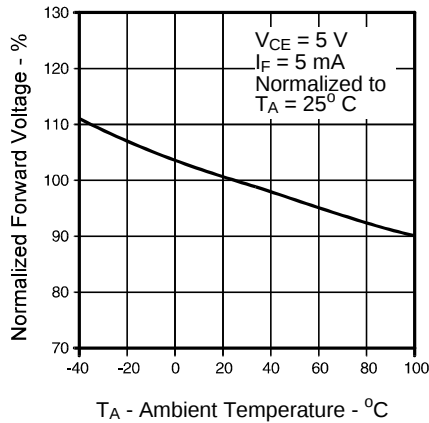


SLOTTED
OPTICAL
SURFACES

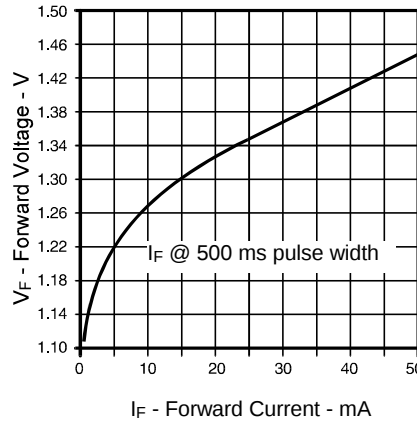
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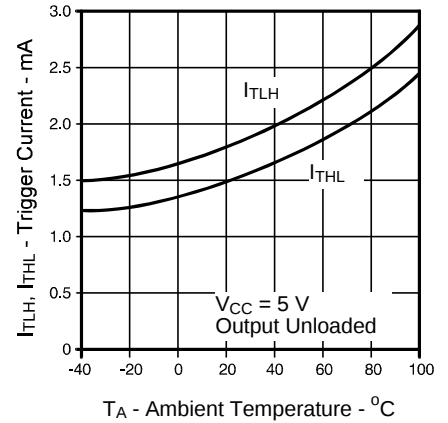
Normalized Forward Voltage vs Ambient Temperature



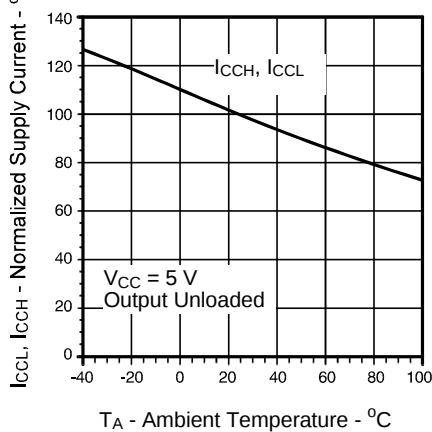
Forward Current vs Forward Voltage Input Diode



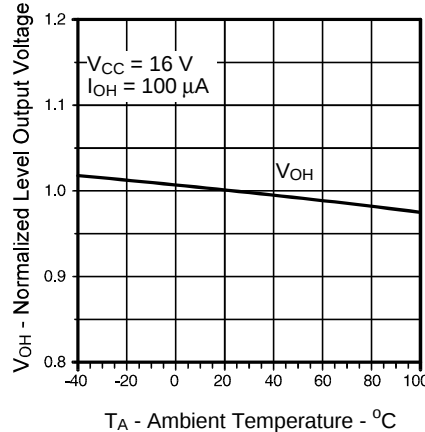
Trigger Current vs Ambient Temperature



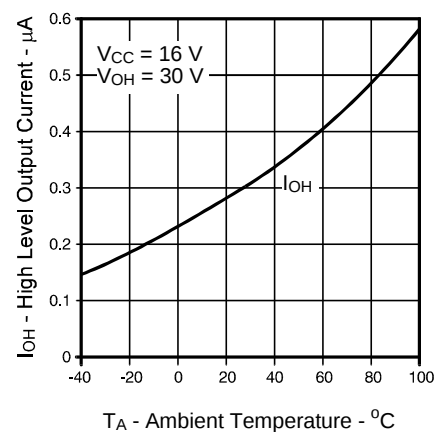
Normalized Supply Current vs Ambient Temperature



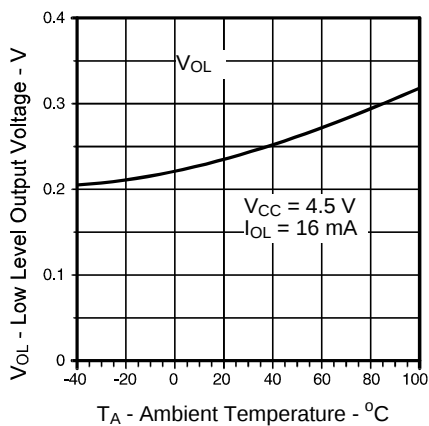
OPB695, OPB697 Normalized High Level Output Voltage vs Ambient Temperature



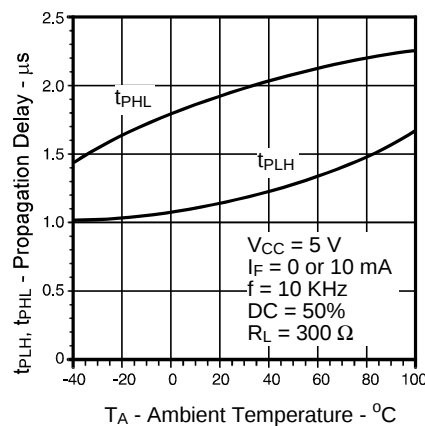
OPB696, OPB698 High Level Output Current vs Ambient



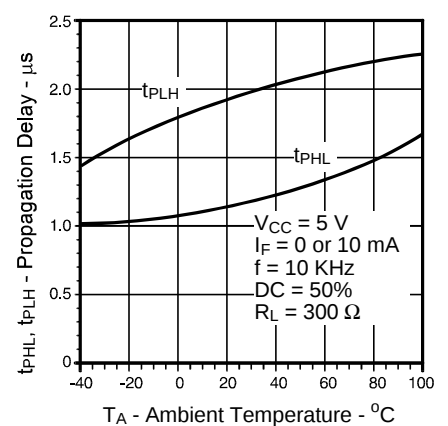
Low Level Output Voltage vs Ambient Temperature



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

