

Photologic® Optical Flag Switch

OPB685, OPB685-3, OPB686, OPB687,
OPB688, OPB695, OPB696, OPB697, OPB698
Series



OPB685



OPB695



Features:

- Photologic® output
- Four output options
- Mechanical switch replacement
- Printed circuit board mounting (OPB685 Series)
- 2.5mm, 3-pin connector mates with Molex connector 5051 series housing and 4809 series terminal for OPB695 Series

Description:

Each **OPB685** and **OPB695** series flag switch consists of an infrared emitting diode and a monolithic integrated circuit that incorporates a photodiode, 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** series is designed to easily snap mount into a 0.037" $\pm$ 0.001" (0.940 mm $\pm$ 0.025 mm) thick material with a rectangular opening of 0.320" $\pm$ 0.003" x 0.472" (8.13 mm x 11.99 mm) minimum. Insertion into the punched side of metal is recommended.

Devices in these series feature TTL/LSTTL compatible logic level output that can drive up to 10 TTL loads over a voltage range from 4.5 V to 16 V.

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

Custom electrical, wire, cabling and connectors are available. Contact your local representative or OPTEK for more information.

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		
OPB685	890 nm	10K Pull-Up	59°	0.100" / 0.275"		
OPB686		Open Collector				
OPB687		Inv. 10K Pull-Up				
OPB688		Inv. Open Collector				
OPB695AZ		10K Pull-Up	70°	Mates with 3 Pin—Molex 5051 (22-01-1032) Housing & 4809 (08-70-0069) Terminals		
OPB695BZ						
OPB695CZ		Open Collector				
OPB696AZ						
OPB696BZ		Inv. 10K Pull-Up				
OPB696CZ						
OPB697AZ		Inv. Open Collector				
OPB697BZ						
OPB697CZ						
OPB698AZ						
OPB698BZ						
OPB698CZ						



General Note
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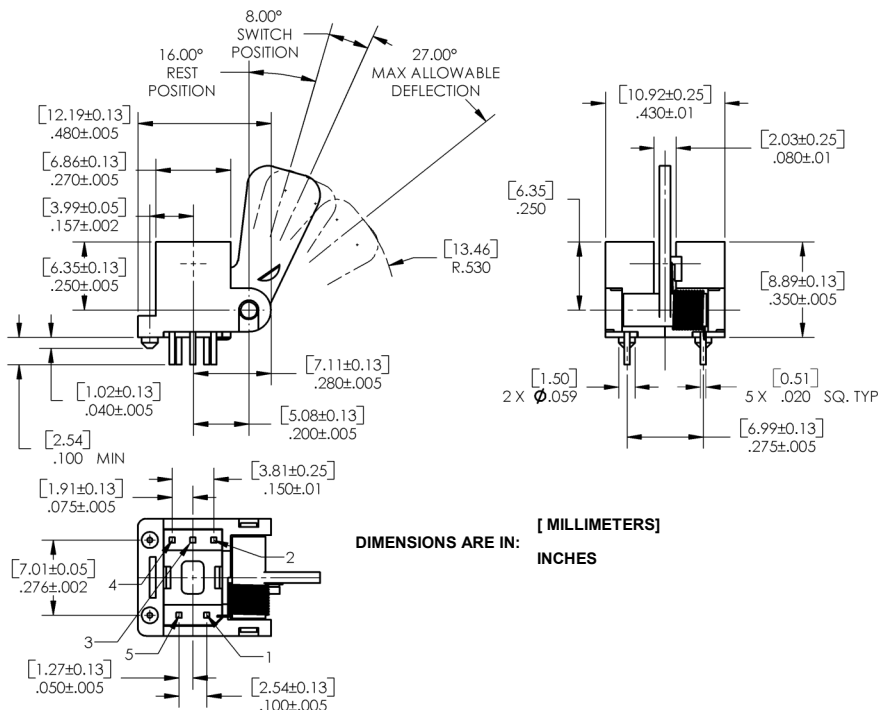
OPTEK Technology, Inc.
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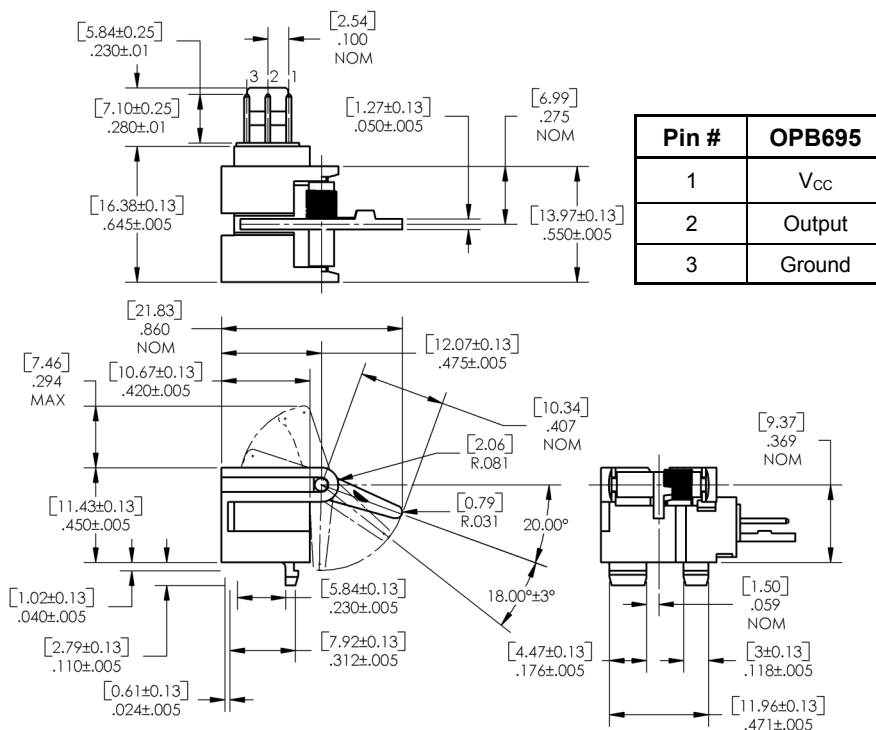


Pin #	Description
1	Anode
5	Cathode
2	Ground
3	Output
4	V _{CC}

OPB695, OPB696, OPB697, OPB698

Part Number	Max. Torque (Grams)
OPB685	1.5
OPB685-3	3.0
OPB686	1.5
OPB687	1.5
OPB688	1.5
OPB695	1.5
OPB696	1.5
OPB697	1.5
OPB698	1.5

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



Pin #	OPB695
1	V _{CC}
2	Output
3	Ground

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Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)	
Storage & Operating Temperature Range	-40°C to $+100^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] ⁽¹⁾	260°C
Input Diode	
Reverse Voltage	2.0 V
Continuous Forward Current	50 mA
Peak Forward Current	3.0 A
Total Device Power Dissipation ⁽²⁾	100 mW
Output Photologic®	
Supply Voltage, V_{CC}	18 V
Duration of Output Short to V_{CC}	1 second
Voltage at Output	30 V
Low Level Output Current (sinking)	16 mA
Power Dissipation ^{(3) (4)}	240 mW

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.33 mW/ $^\circ\text{C}$ above 25°C .
- (3) Derate linearly 2.00 mW/ $^\circ\text{C}$ above 25°C (OPB680, OPB680-20, OPB690Z).
- (4) Derate linearly 2.50 mW/ $^\circ\text{C}$ above 25°C (OPB685, OPB686, OPB687, OPB688, OPB695, OPB696, OPB697, OPB698).

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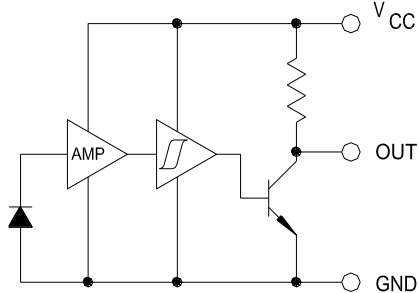
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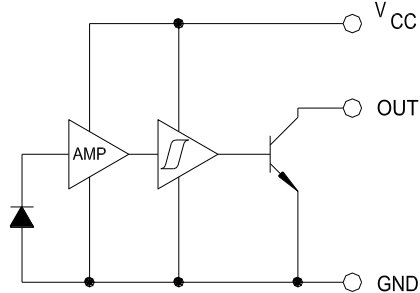


OPB685 and OPB695 Series

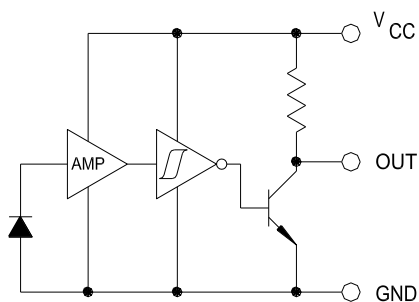
OPB685, OPB695 Buffered 10K Pull-Up



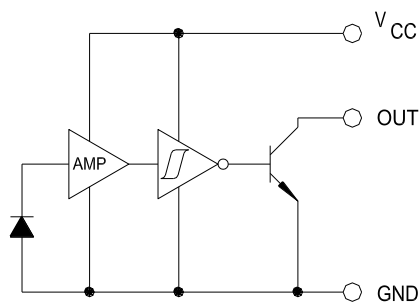
OPB686, OPB696 Buffered Open-Collector



OPB687, OPB697 Inverted 10K Pull-Up



OPB688, OPB698 Inverted Open-Collector



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Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode							
V _F	Forward Voltage		-	-	1.6	V	I _F = 10 mA
I _R	Reverse Current		-	-	100	μA	V _R = 3 V
Output Photologic® Sensor							
V _{CC}	Operating DC Supply Voltage OPB685 Series OPB695-698A OPB695-698B OPB695-698C		4.5 4.5 8.0 13.5	- 5.0 12.0 15.0	16.0 8.0 13.5 16.0	V	
I _{CC}	Operating DC Supply Voltage OPB695-698A/B/C		-	20	30	mA	
I _{CCL}	Low Level Supply Current: Buffered 10k Pull-Up Buffered Open-Collector	OPB685 OPB686	- -	5.5 4.0	12 12	mA	V _{CC} = 16 V, I _F = 0 mA (no load on output)
	Inverted 10k Pull-Up Inverted Open-Collector	OPB687 OPB688	- -	6.5 5.0	12 12	mA	V _{CC} = 16 V, I _F = 10 mA (no load on out-put)
I _{CCH}	High Level Supply Current: Buffered 10k Pull-Up Buffered Open-Collector	OPB685 OPB686	-	5.0	12	mA	V _{CC} = 16 V, I _F = 10 mA (no load on out-put)
	Inverted 10k Pull-Up Inverted Open-Collector	OPB687 OPB688	-	4.0	12	mA	V _{CC} = 16 V, I _F = 0 mA (no load on output)
V _{OL}	Low Level Output Voltage ⁽¹⁾ : Buffered 10k Pull-Up	OPB685	-	-	0.4	V	V _{CC} = 4.5 V, I _{OL} = 16 mA, I _F = 0
		OPB686	-	-	0.4		V _{CC} = 4.5 V to 8 V, I _{OL} = 16 mA
	Buffered Open-Collector	OPB695	-	-	0.4	V	V _{CC} = 8.5 V to 13 V, I _{OL} = 16 mA
		OPB696A/B/C	-	-	0.4		V _{CC} = 13.5 V to 16 V, I _{OL} = 16 mA
	Inverted 10k Pull-Up ⁽²⁾	OPB685	-	-	0.4	V	V _{CC} = 4.5 V, I _{OL} = 16 mA, I _F = 0
		OPB686	-	-	0.4		V _{CC} = 4.5 V to 8 V, I _{OL} = 16 mA
	Inverted Open-Collector	OPB695	-	-	0.4		V _{CC} = 8.5 V to 13 V, I _{OL} = 16 mA
		OPB696A/B/C	-	-	0.4		V _{CC} = 13.5 V to 16 V, I _{OL} = 16 mA
V _{OH}	High Level Output Voltage ⁽²⁾ : Buffered 10k Pull-Up		V _{CC} -1.5	-	-	V	I _{OH} = 100 μA, I _F = 10 mA
	Inverted 10k Pull-Up ⁽¹⁾ Inverted Open-Collector		V _{CC} -1.5	-	-	V	I _{OH} = 100 μA, I _F = 0 mA
I _{OH}	High Level Output Voltage ⁽²⁾ : Buffered Open-Collector	OPB686	-	-	100	μA	V _{CC} = 16 V, I _F = 10 mA, V _{CH} = 30 V
		OPB696A	-	-	100		V _{CC} = 4.5 V to 8 V, V _{OH} = 30 V
		OPB696B	-	-	100		V _{CC} = 8.5 V to 13 V, V _{OH} = 30 V
		OPB696C	-	-	100		V _{CC} = 13.5 V to 16 V, V _{OH} = 30 V
	Inverted 10k Pull-Up ⁽¹⁾	OPB688	-	-	100	μA	V _{CC} = 16 V, I _F = 10 mA, V _{CH} = 30 V ⁽¹⁾
		OPB698A	-	-	100		V _{CC} = 4.5 V to 8 V, V _{OH} = 30 V ⁽¹⁾
		OPB698B	-	-	100		V _{CC} = 8.5 V to 13 V, V _{OH} = 30 V ⁽¹⁾
		OPB698C	-	-	100		V _{CC} = 13.5 V to 16 V, V _{OH} = 30 V ⁽¹⁾

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Electrical Characteristics (T _A = 25° C unless otherwise noted)						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output Photologic® Sensor (continued)						
I _{F(+)}	LED Positive-Going Threshold Current OPB685-688	0.1	1.8	10	mA	V _{CC} = 5 V
I _{F(+)} /I _{F(-)}	Hysteresis OPB685/688	1.0	1.2	1.6	mA	V _{CC} = 5 V
t _r , t _f	Rise Time, Fall Time	-	30	-	ns	V _{CC} = 5 V, I _F = 0 or 10 mA R _L = 300 Ω, DC = 50% f = 10 kHz
t _{PLH} , t _{PHL}	Propagation Delay Low-High & High-Low: Buffer, 10k Pull-Up OPB685	-	1 _(LH)	-	μs	
	Buffer, Open-Collector OPB686	-	2 _(HL)	-	μs	
	Inverter, 10k Pull-Up OPB687	-	2 _(LH)	-	μs	
	Inverter, Open-Collector OPB688	-	1 _(HL)	-	μs	

Notes:

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

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