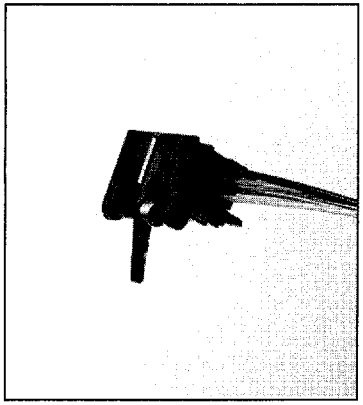
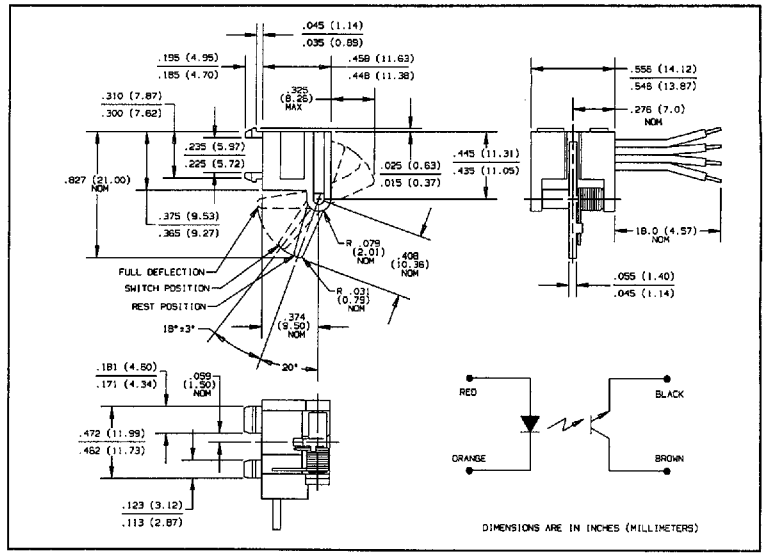
Optical Flag Switch
Type OPB850





Features

- Snap mounting
- Mechanical switch replacement
- Four wires for electrical connections

Description

The OPB850 consists of an NPN phototransistor coupled with a gallium arsenide or gallium aluminum arsenide infrared emitting diode in a molded plastic housing. A lever arm actuated flag interrupts the light beam switching the transistor output between states that can readily drive logic gates.

The OPB850 is designed to replace conventional mechanical limit switches where long life and reliability are critical. This switch is designed to easily snap mount into a 0.039 inch (1 mm) (19 ga) thick material with a rectangular opening of 0.315 X 0.472 inch (8 X 12 mm).

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

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage and Operating Temperature Range	-40° C to +80° C
Input Diode	
Reverse Voltage	2.0 V
Continuous Forward Current	50 mA
Peak Forward Current (1 µs pulse width, 300 pps)	3.0 A
Power Dissipation	100 mW(1)
Output Phototransistor	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5.0 V
Collector DC Current	30 mA
Power Dissipation	100 mW(1)

Notes:
(1) Derate linearly 1.82 mW/° C above 25° C.
(2) Methanol or isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
(3) "On" condition or switch point exists when the lever arm is deflected clockwise 18° ± 3° from the rest position (20° from vertical) as shown in the figure.
(4) "Off" condition exists when the lever arm is in the rest position (20° 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.
(6) Wires are 26 AWG, UL1061. The unterminated ends are stripped and tinned 0.150 inch (3.81 mm) nominally.
(7) Flag clearance at maximum deflection.
(8) Spring retention ribs nominally 0.015 (0.38 mm) higher.
(9) Holes in mounting bracket will accommodate 4/40 R.H.M.S.
(10) All parameters tested using pulse technique.

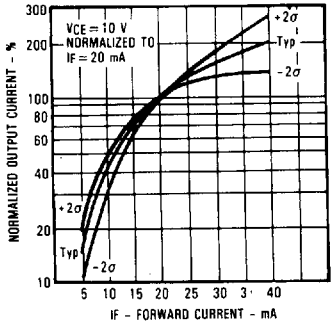
Type OPB850

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

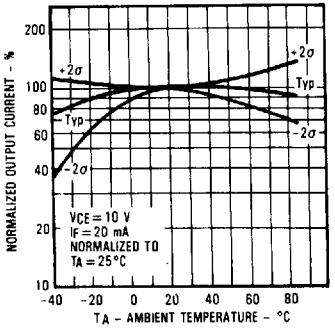
SYMBOL	PARAMETER	MIN	MAX	UNITS	TEST CONDITIONS
Input Diode					
V_F	Forward Voltage		1.7	V	I_F = 20 mA
I_R	Reverse Current		100	µA	V_R = 2 V
Output Phototransistor					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30		V	I_C = 100 µA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0		V	I_E = 100 µA
I_{CEO}	Collector-Emitter Dark Current		100	nA	V_{CE} = 10 V, I_F = 0, E_e = 0
Coupled					
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		0.4	V	I_C = 500 µA, I_F = 20 mA
$I_{C(ON)}$	On-State Collector Current	500		µA	V_{CE} = 10 V, I_F = 20 mA(3)(5)
$I_{C(OFF)}$	Off-State Collector Current		10	µA	V_{CE} = 10 V, I_F = 20 mA(4)

Typical Performance Curves

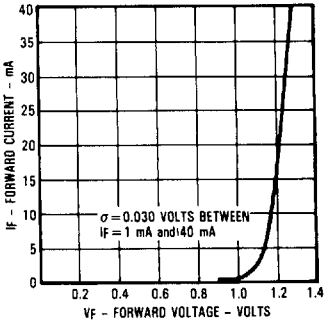
Normalized Output Current vs. Forward Current



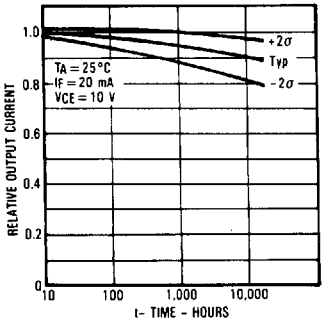
Normalized Output Current vs. Ambient Temperature



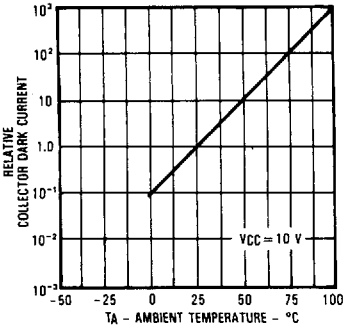
Forward Current vs. Forward Voltage



Relative Output Current vs. Time



Relative Collector Dark Current vs. Ambient Temperature



Reduction in Output Current Due to LED Heating vs. Forward Current