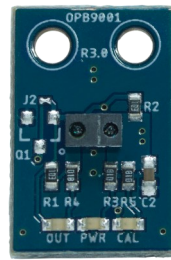


Reflective Optical Sensor

OPB9001 Series



Features:

- Wide operating supply voltage range up to 4.5 V - 30 V
- Detecting distance 2.5 mm to 50 mm
- Ambient light rejection 25k+ lux
- Programmable output configuration and sensitivity level
- Integrated 4-pin connector
- -40°C to +85°C operating temperature range
- Small dimensions L 18 mm X W 12 mm X H 5 mm

Description:

The OPB9001 PCB module includes the versatile OPB9000 reflective sensor and eliminates the need for peripheral circuitry like resistors, regulators and capacitors as everything is integrated into a robust, small package. The 4 pin connectors included in the assembly make the OPB9001 easy to program and operate (Note 1). This sensor can withstand a wide voltage range and extensive temperature range of -40°C to +85°C, making it ideal for the harshest environments. LEDs provide visual monitoring of operation.

Factory calibrated for a 12 mm distance and a white reflective surface to offer plug and play detection, the OPB9001 can be re-calibrated in a matter of milliseconds with a single command for specific application requirements. An interface cable can be purchased separately to calibrate the OPB9001 Series using the OPB9000-KIT.

Note 1: For additional information on how to program OPB9000, see the datasheet: <https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Optoelectronics/Datasheets/OPB9000.pdf>

Applications:

- Non-contact position presence applications
- Industrial printing and high-speed paper detection
- Manufacturing and Factory automation
- Automated sewing machines
- Automated banking machines
- Medical equipment
- Automatic dispensing
- Material handling and asset tracking

Additional Features:

- 6ms response time
- Wide operating supply voltage range
 - 4.5 V to 30 V (OPB9001A/AC)
 - 4.5 V to 24 V (OPB9001B)
 - 3.3 V to 5.5 V (OPB9001C)
- Reverse voltage protection
- Single-command calibration with on-chip EPROM
- Temperature-compensated LED drive
- Eliminate the need for peripheral circuitry

Part Number Guide — OPB9001

OP9001 Reflective Assembly	<u>OPB9001 X</u>	VDD Voltage Range A - 4.5 V to 30 V B - 4.5 V to 24 V C - 3.3 V to 5.5 V AC - 4.5 V to 30 V CE / UL
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Ordering Part Number	Voltage Output Configuration	VCC Range	Features
OPB9001AC	N.O. NPN	4.5 V to 30 V	OPB9000 with indicators, voltage regulator + NPN Transistor 30 V +ESD TVS diodes and CE and UL Certifications and connector
OPB9001A	N.O. NPN	4.5 V to 30 V	OPB9000 with indicators, voltage regulator + NPN Transistor 30 V and connector
OPB9001B	N.O. NPN	4.5 V to 24 V	OPB9000 with indicators, voltage regulator + NPN Transistor 24 V and connector
OPB9001C	TTL CMOS	3.3 V to 5.5 V	OPB9000 with indicators and connector
OPB9001-4CB	N/A	N/A	1m interface cable with connector

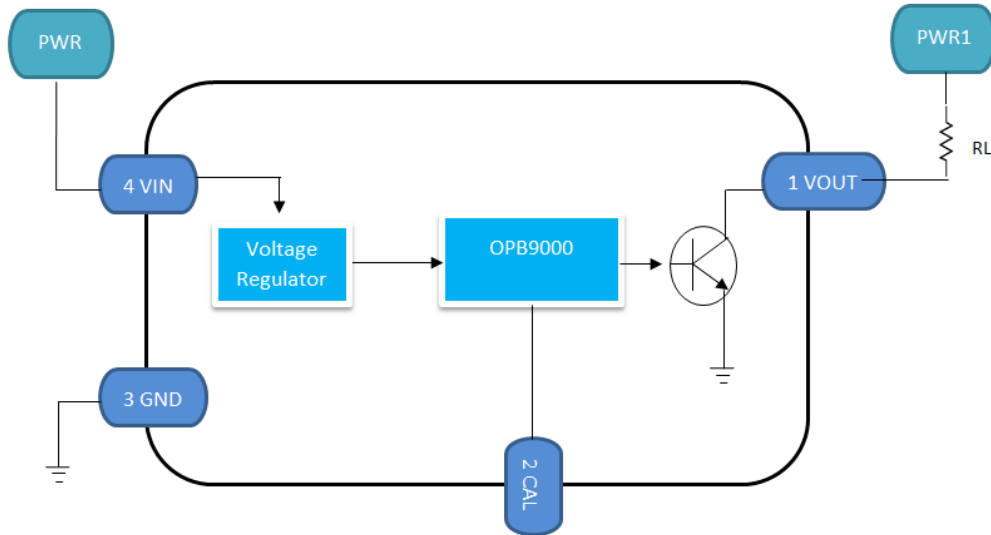
General Note

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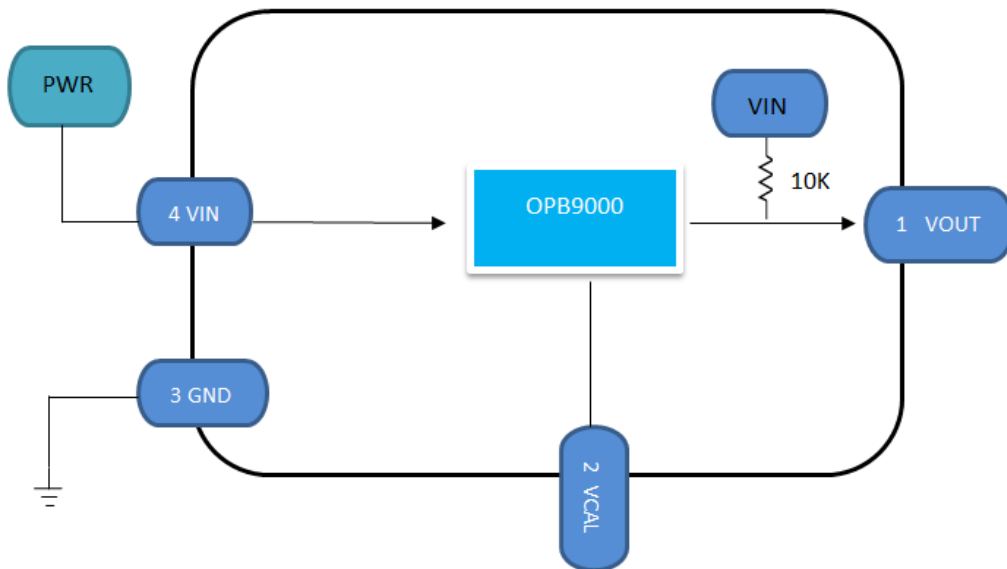
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Recommended Circuit Application

OPB9001A/AC/B



OPB9001C



General Note

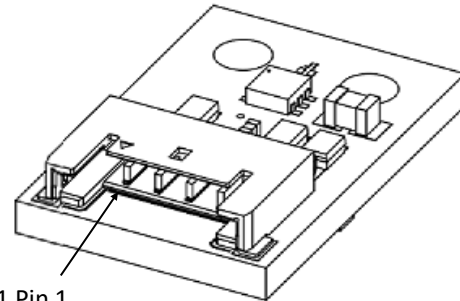
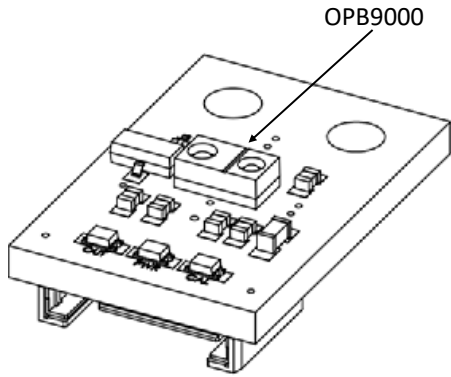
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Reflective Optical Sensor

OPB9001AC, OPB9001A, OPB9001B,
OPB9001C

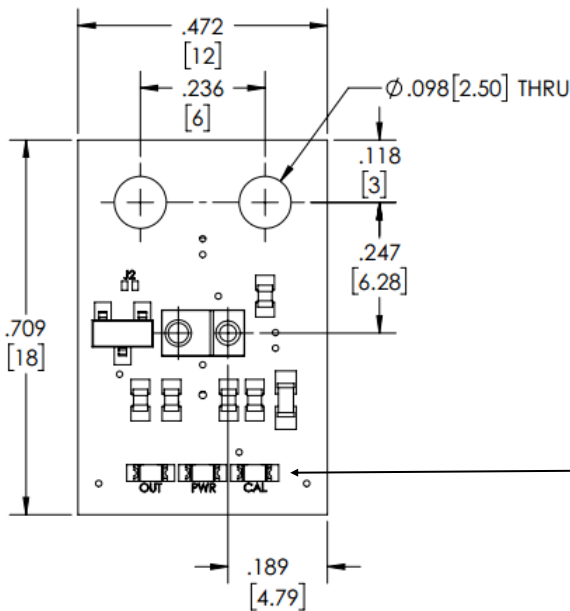


Package Outline—OPB9001XX (For reference)

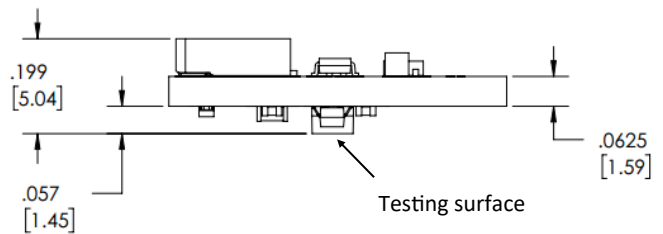


P1 Pin 1

P1—Molex connector P/N 504050-0491
Molex matting connector P/N 5040510401
with terminals 5040520098



3-Color Indicator
Red: Power on
Orange: Output high
Green: Flashing while calibrating



Pin #	Name	Description
1	VOUT	Logic Output, also used as a digital output to read register bits
2	CAL	Calibrate input/status output (to verify successful calibration)
3	GND	Ground Connection
4	VIN	Positive supply power input

Dimensions are in inches [mm]. Tolerances are: +/- 10% unless otherwise specified

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OPB9001XX Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Part Number	Maximum	Units
DC supply voltage	V_{IN}	OPB9001A/AC OPB9001B OPB9001C	32 24 6	V
Storage Temperature Range	T_{STG}	ALL	-40 to +100	$^\circ\text{C}$
Operating Temperature Range	T_{OPR}	ALL	-40 to +85	$^\circ\text{C}$
Ambient/background light	I_x	ALL	25	kLux
ESD immunity (human body model)		OPB9001AC OPB9001A/B/C	8, contact discharge 2, contact discharge	KV
Maximum reverse voltage	V_{RRM}	ALL	30	V
Load current (Collector current) (I_L)	I_{OL}	OPB9001A/AC	40	mA
Maximum Open collector output voltage		OPB9001A/AC	40	V
Current out of any pin other than GND,		OPB9001C	20	mA
Current into or out of GND , V_{in}	I_{CC}	OPB9001C	150	mA

Note: Permanent damage to the device may occur if operated outside the Absolute maximum specifications. Proper function and reliability of the device at these or any other conditions outside the recommended operating conditions may also be adversely affected

Reflective Optical Sensor

OPB9001AC, OPB9001A, OPB9001B,
OPB9001C



Specifications

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	NOTES
V_{IN}	Supply Voltage					
	OPB9001A/AC	4.5		30		
	OPB9001B	4.5	-	24	V	
	OPB9001C	3.3		5.5		
I_{SS}	Current Consumption	-		16	mA	$R_L = 10K\Omega$
R_L	Pull up resistor (OUT pin)					
	OPB9001A/AC OPB9001B	1		10	$K\Omega$	$4.5V < V_{CC} < 30V$ $4.5V < V_{CC} < 24V$
	Sensing Distance Range	2.5		50	mm	
	Output type	NPN open collector				
OUT	Output indicator	Orange LED (ON when output high, OFF when output low)				
PWR	Power indicator	Red LED (ON when V_{IN} min is met)				
CAL	Calibration indicator	Green LED (Flashing while it is being calibrated)				

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
VOL	Output voltage (low)					
	OPB9001A/AC	-	-	0.4	V	$V_{IN} = 30$ or $V_{IN} = 4.5$ no target $V_{IN} = 24$ or $V_{IN} = 4.5$ no target $V_{IN} = 5V$, target at $d = 6mm$ Target = 90 % diffuse white test surface
	OPB9001B OPB9001C					
VOH	Output voltage (high)					
	OPB9001A/AC/B(Note 2)	$0.95 * V_{IN}$	-	V_{IN}	V	Target at $d = 6mm$ Target = 90 % diffuse white test surface
	OPB9001C	$V_{IN} - 1$				$V_{IN} = 5V$, no target
I_L	Load current OPB9001A/AC/B		V_{IN}/R_L		mA	

Note 1: [OP,DS] = 'b11'; [CA] = 'b1'; photodiode DARK, push pull configuration .For additional specifications, configuration and calibration information refer to the OPB9000 datasheet

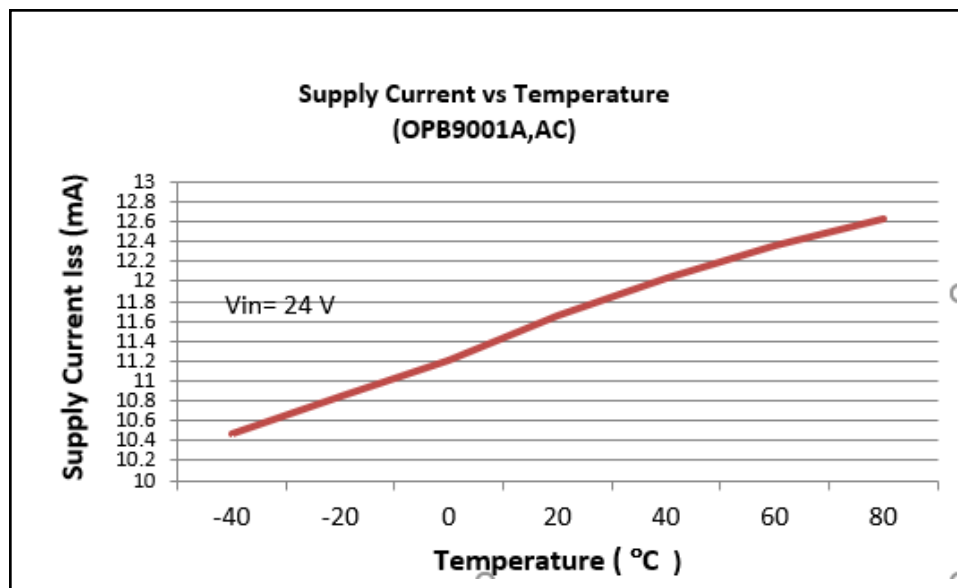
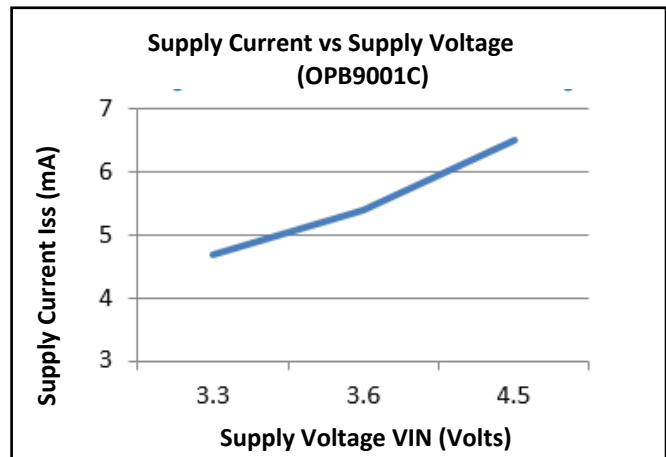
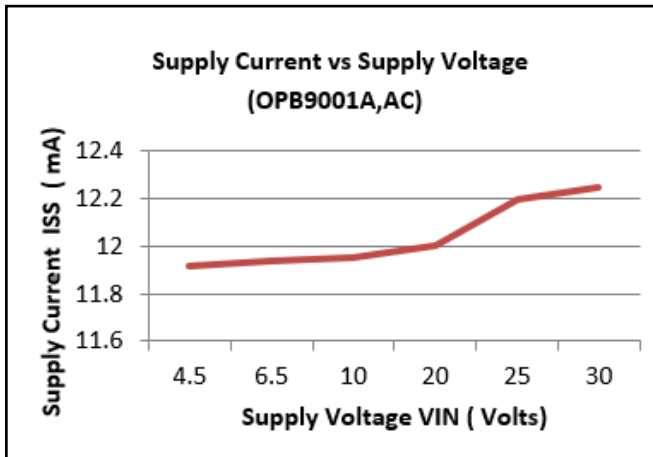
Note 2 : Using a external pull out resistor .

General Note

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Typical Characteristics (TA = 25 °C unless noted otherwise)



Note: Refer to OPB9000 datasheet for additional performance graphs.

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Optoelectronics/Datasheets/OPB9000.pdf>