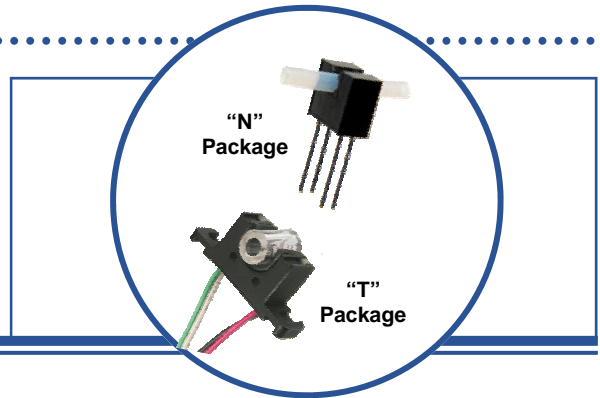


Features:

- Can identify if liquid is present in clear tubes that have an outside diameter of 1/8" (3.2mm), 3/16" (4.8mm) or 1/4" (6.3mm)
- Opaque plastic housing enhances ambient light rejection
- Printed circuit board mounting or 24" (610 mm) wires



Description:

The **OPB350** series liquid sensor is designed to work with 1/8" (3.2mm), 3/16" (4.8mm) and 1/4" (6.3mm) outside diameter clear tubes. When output reference circuitry is added, multiple output states such as "fluid present," "no fluid present" and "no tube present" can be recognized.

Clear liquid present causes the phototransistor to sink the maximum current, while dark liquid present causes it to sink the minimum current. As bubbles pass through the tube, the signal will vary between the "liquid present" and "no liquid" states. If no liquid is present, the phototransistor sinks only a small amount of current. If no tube is present, the phototransistor sinks a larger current than in the "no liquid" state.

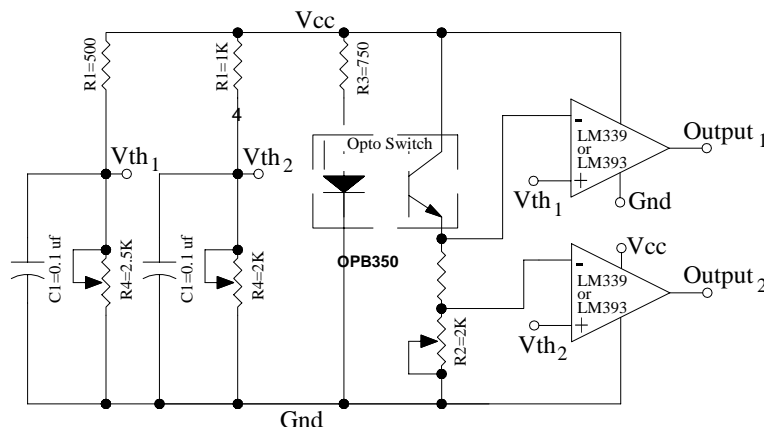
Smaller outside diameter tubes can be used when the tube is sized up to one of the standard sizes and is fitted properly in the housing opening. For example, fluid in a 1/16" (1.6mm) outside diameter tube can be sensed when a piece of tubing with a 1/8" (3.2mm) outside diameter and a 1/16" (1.6mm) inside diameter is used as an adapter.

Applications:

- Non-contact fluid sensing
- IV fluid
- Oils and other petroleum products
- Colored fluids
- Toner fluids
- Water

| Ordering Information | | | | | |
|----------------------|---------|---------------------|------------|-----------|-----------------------|
| Part Number | Package | LED Peak Wavelength | Sensor | Tube Size | Lead Length / Spacing |
| OPB350 | N | 890 nm | Transistor | 0.125" | 0.330" / 0.320" |
| OPB350L187 | | | | 0.187" | |
| OPB350L250 | | | | 0.250" | |
| OPB350W187Z | T | | | 0.187" | 24" / 26 AWG Wire |
| OPB350W250Z | | | | 0.250" | |

Typical Application Circuit

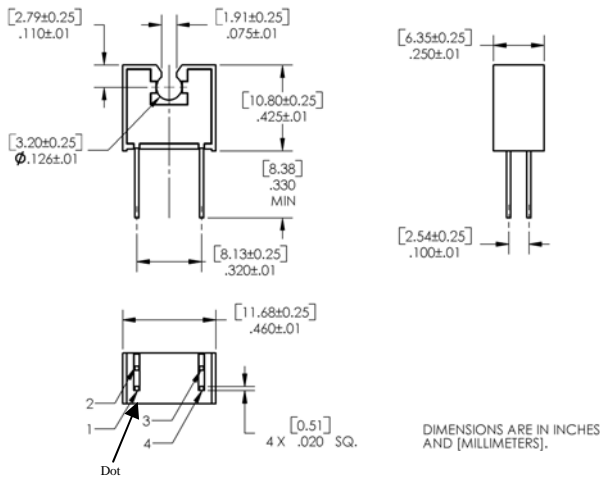


RoHS

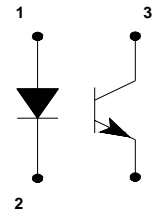
OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Tube Liquid Sensor OPB350 Series

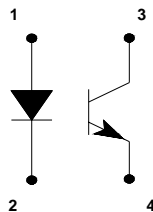
OPB350



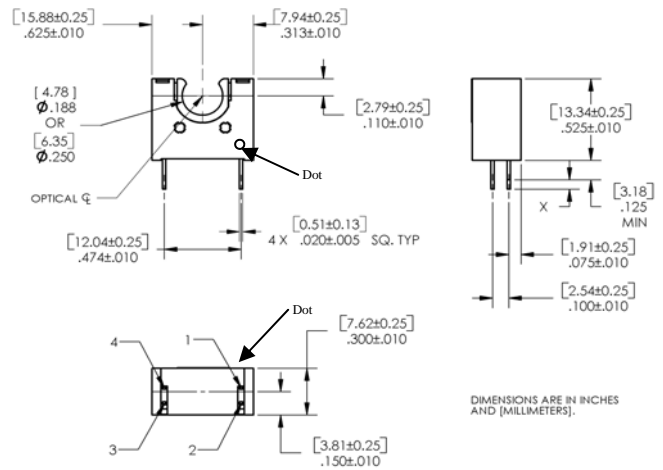
| Pin # | LED | Pin # | Transistor |
|-------|---------|-------|------------|
| 1 | Anode | 3 | Collector |
| 2 | Cathode | 4 | Emitter |



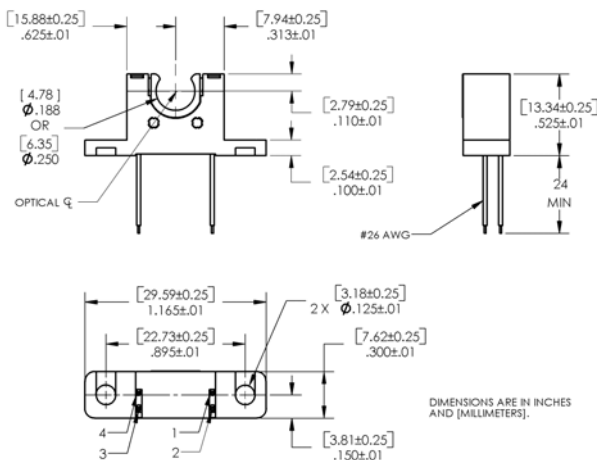
| Pin # | LED | Pin # | Transistor |
|-------|---------|-------|------------|
| 1 | Anode | 3 | Collector |
| 2 | Cathode | 4 | Emitter |



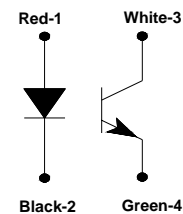
OPB350L187 and OPB350L250



OPB350W187Z and OPB350W250Z



| Pin # | LED | Pin # | Transistor |
|-------|---------|-------|------------|
| Red | Anode | White | Collector |
| Black | Cathode | Green | Emitter |



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

| | |
|--|-------------------|
| Storage Temperature | -40° C to +100° C |
| Operating Temperature | -40° C to +85° C |
| Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] ⁽²⁾ | 260° C |

LED

| | |
|---|--------|
| Forward DC Current | 50 mA |
| Peak Forward Current (2 μs pulse width, 0.1% duty cycle) | 1 A |
| Reverse DC Voltage | 2 V |
| Power Dissipation | 100 mW |

Output Phototransistor

| | |
|---------------------------|------------|
| Collector-Emitter Voltage | 25 or 30 V |
| Collector DC Current | 50 mA |
| Power Dissipation | 100 mW |

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

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

Input LED (See OPB245 for additional information — for reference only)

| | | | | | | |
|-------|-----------------|---|---|-----|---------------|-----------------------|
| V_F | Forward Voltage | - | - | 1.8 | V | $I_F = 20 \text{ mA}$ |
| I_R | Reverse Current | - | - | 100 | μA | $V_R = 2.0 \text{ V}$ |

Output Phototransistor (See OPB555 [PB350] & OP750 [-187 & -250] for additional information — for reference only)

| | | | | | | | |
|---------------|-------------------------------------|-----------------------|----------|--------|--------|----|---|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | OPB350 -187 & -250 | 30 25 | - - | - - | V | $I_C = 100 \mu\text{A}, E_E = 0 \text{ mw/cm}^2$ |
| I_{CEO} | Collector-Emitter Dark Current | | - | - | 100 | nA | $V_{CE} = 10 \text{ V}, I_F = 0, E_E = 0 \text{ mw/cm}^2$ |

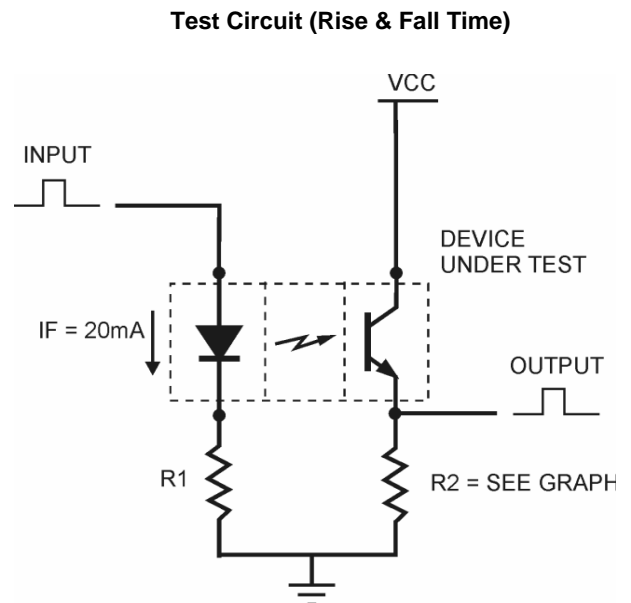
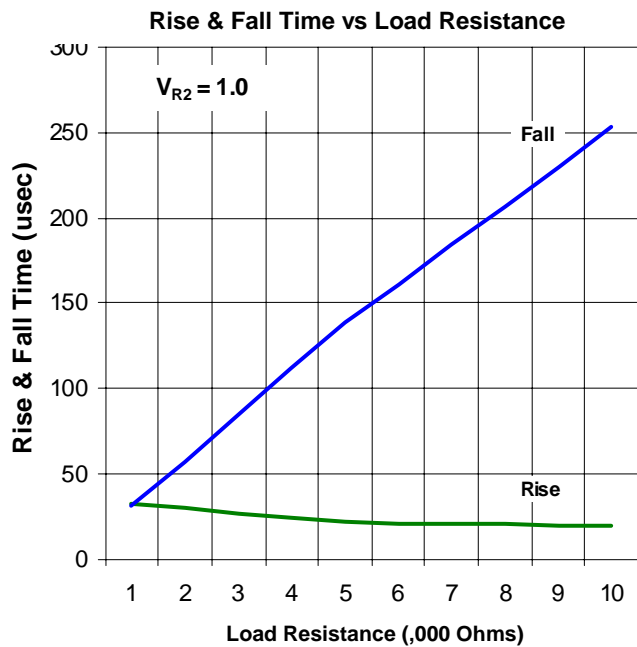
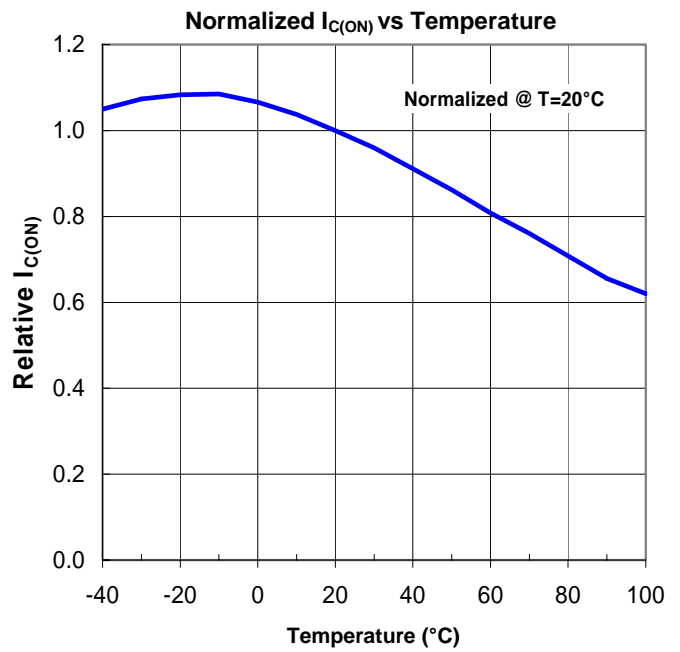
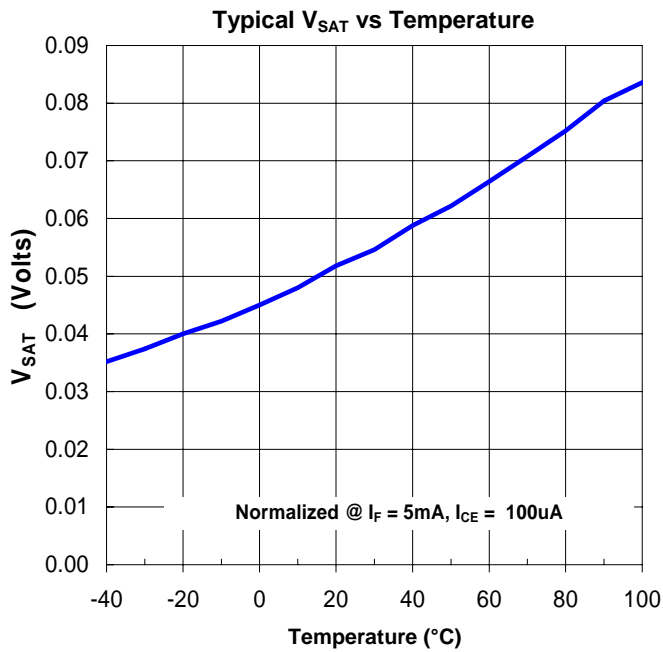
Coupled (Tested using clear 0.125" O.D., 0.062 I.D. nylon tubing)

| | | | | | | | |
|---------------|--------------------------------------|--|------|-----|-----|----|--|
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage | | - | - | 0.4 | V | $I_C = 100 \mu\text{A}, I_F = 5 \text{ mA}$ |
| $I_{C(ON)}$ | On-State Collector Current | | | | | | |
| | OPB350 | | 1 | 3.5 | 6 | mA | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}$ |
| | OPB350L187 & OPB350W187 | | 1 | 2 | 4 | mA | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}$ |
| | OPB350L250 & OPB350W250 | | 0.75 | 1.5 | 3 | mA | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}$ |
| On/Off Ratio | OPB350 | | - | 3 | - | - | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}, \text{I.D.}=0.0625''$ |
| | OPB350L187 & OPB350W187 | | - | 2.3 | - | - | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}, \text{I.D.}=0.0870''$ |
| | OPB350L250 & OPB350W250 | | - | 2.3 | - | - | $V_{CE} = 0.4 \text{ V}, I_F = 5 \text{ mA}, \text{I.D.}=0.1250''$ |

Notes:

- (1) All parameters tested using pulse technique.
- (2) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (3) Methanol or isopropanol are recommended as cleaning agents. The plastic housing is soluble in chlorinated hydrocarbons and ketones.
- (4) Derate linearly 1.33 mW/° C above 25° C.
- (5) $E_{e(APT)}$ is a measurement of the average apertured radiant energy incident upon a sensing area 0.250" (6.350 mm) in diameter, which is perpendicular to and centered to the mechanical axis of the emitting surface at a distance of 0.466" (11.837 mm). $E_{e(APT)}$ is not necessarily uniform within the measured area.

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