

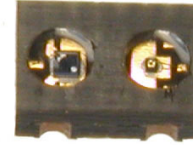
Minature SMD Reflective Sensor

OPR5005



Features:

- High temperature operation
- Surface mountable
- Compact size
- Excellent ambient light protection



Description:

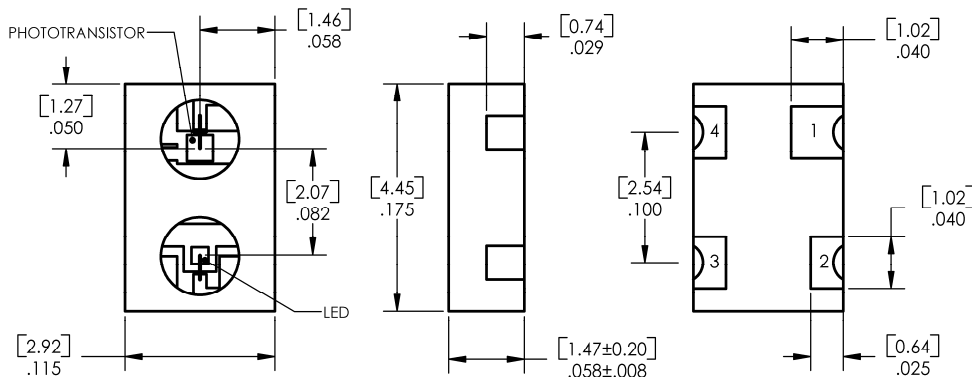
The **OPR5005** is a miniature reflective sensor that combines a silicon phototransistor with a GaAlAs LED in a high-temperature opaque polyamide chip carrier. It is designed to sense the motion or proximity of diffuse reflective surfaces in space-limited applications. The opaque package insures very low cross-talk and shields the phototransistor from ambient light sources, while the silicone encapsulated package allows operation over a wide temperature range. The gold-plated wraparound solder pads offer exceptional storage and wetting characteristics.

See Application Bulletin 237 for handling instructions.

Applications:

- Motion sensors
- Space-limited applications
- Applications requiring ambient light protection
- Can be stored in dirty environments

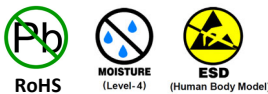
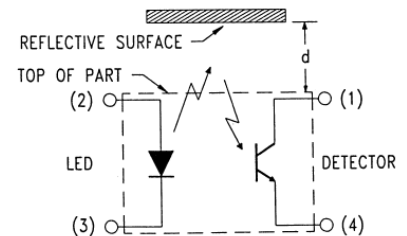
| Ordering Information | | | | | | | |
|-------------------------------|---------------------|-----------------|---------------|-----------------------------|-------------------------------|---------------------------|-----------|
| Reflective Switch Part Number | LED Peak Wavelength | Sensor | # of Elements | I _{C(ON)} (μA) Min | I _F (mA) Typ / Max | V _{CE} Typ / Max | Packaging |
| OPR5005 | 890 nm | Phototransistor | 2 | 725 | 20 / 50 | 5 / 30 | Chip Tray |



TOLERANCE IS ± .005 [0.13]
 DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

Warning: Front Windows are pressure sensitive. Do not apply pressure or high vacuum to window.

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



General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

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Electrical Specifications

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

| | |
|--|-----------------|
| Storage and Operating Temperature | -55°C to +125°C |
| Solder reflow time within 5°C of peak temperature is 20 to 40 seconds ⁽¹⁾ | 250°C |
| LED | |
| Forward DC Current | 50 mA |
| Peak Forward Current (1 μs pulse; .03% duty cycle) | 1.0 A |
| Reverse DC Voltage | 2.0 V |
| Power Dissipation ⁽²⁾ | 75 mW |
| Phototransistor | |
| Collector-Emitter Voltage | 30 V |
| Emitter-Collector Voltage | 5.0 V |
| Collector DC Current | 25 mA |
| Power Dissipation ⁽²⁾ | 75 mW |

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

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|------------------------|---|-----|-----|-----|-------|--|
| LED | | | | | | |
| V_F | Forward Voltage | - | - | 1.7 | V | $I_F = 20\text{ mA}$ |
| I_R | Reverse Current | - | - | 100 | μA | $V_R = 2.0\text{ V}$ |
| Phototransistor | | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | 30 | - | - | V | $I_C = 100\text{ μA}$ |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | 5 | - | - | V | $I_E = 100\text{ μA}$ |
| I_{CEO} | Collector Dark Current | - | - | 100 | nA | $V_{CE} = 5.0\text{ V}, I_F = 0,$ $E_e = \leq 0.10\text{ μW/cm}^2$ |
| Combined | | | | | | |
| $I_{C(ON)}$ | On-State Collector Current ⁽⁴⁾ | 725 | - | - | μA | $V_{CE} = 5.0\text{ V}, I_F = 20\text{ mA},$ $d = 0.050'' (1.27\text{ mm})^{(3)}$ |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage ⁽⁴⁾ | - | - | 0.4 | V | $I_F = 20\text{ mA}, I_C = 100\text{ μA},$ $d = 0.050'' (1.27\text{ mm})^{(3)}$ |
| I_{CX} | Crosstalk ⁽⁵⁾ | - | - | 75 | μA | $I_F = 20\text{ mA}, V_{CE} = 5\text{ V}$ |

Notes:

- (1) Solder time less than 5 seconds at temperature extreme.
- (2) Derate linearly 0.75 mW/°C above 25°C.
- (3) Distance from the assembly face to the reflective surface is "d".
- (4) Measured using Eastman Kodak neutral white test card with 90% white diffuse reflectance as a reflecting surface.
- (5) Crosstalk (I_{CX}) is the collector current measured using the indicated current and using a Munsell N2.25 black test card against the face of the part.

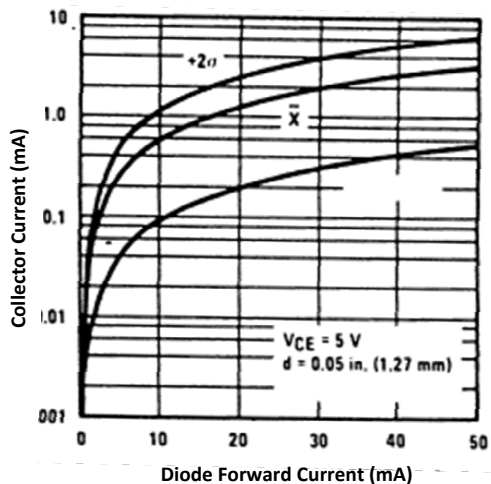
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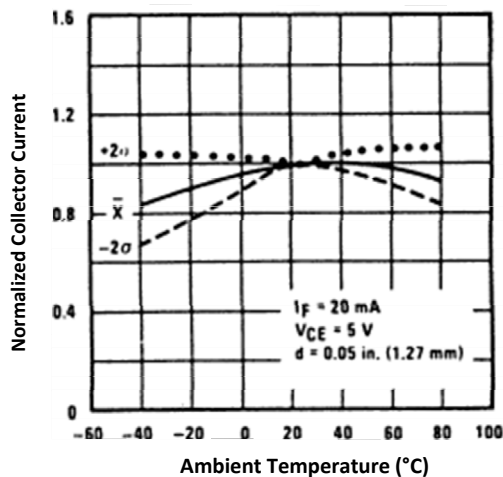
Performance

OPR5005

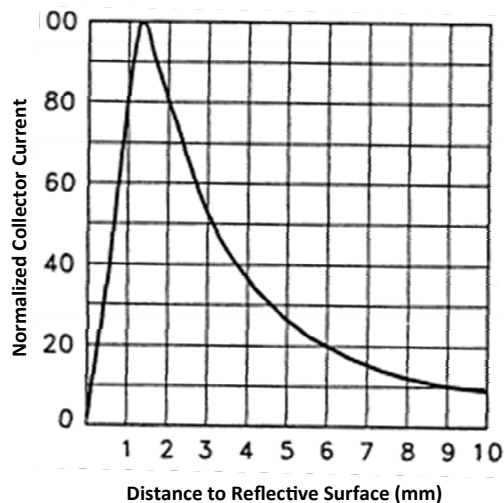
Collector Current vs Diode Forward Current



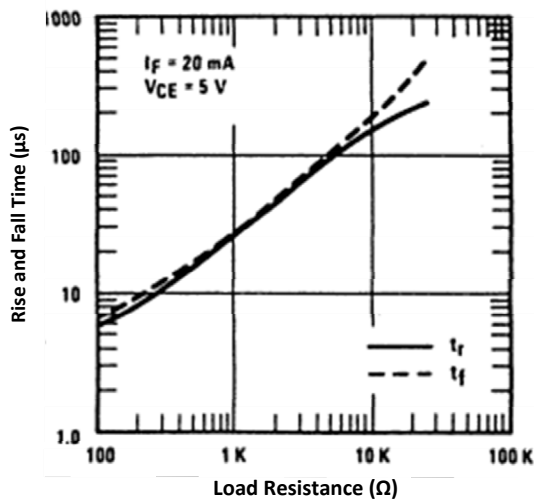
Normalized Collector Current vs Ambient Temperature



Normalized Collector Current vs Object Distance



Rise and Fall Time vs Load Resistance



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