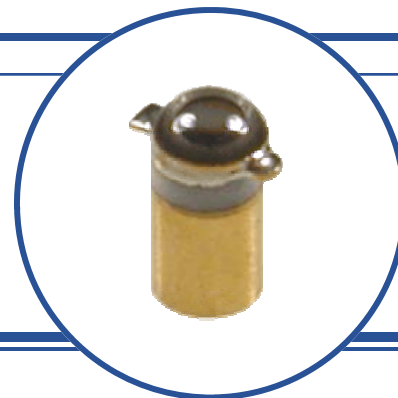


Features:

- Narrow receiving angle
- Variety of sensitivity ranges
- Enhanced temperature range
- PCBoard mounting
- Mechanically and spectrally matched to OP123 and OP223 LEDs



Description:

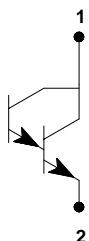
Each device in this series is a NPN silicon photodarlington in a hermetically sealed pill package with a narrow receiving angle that provides excellent on-axis coupling. Photodarlington's are normally used in applications with low light signal levels, where more current gain is needed than phototransistors can provide.

Components in the OP300 series are mechanically and spectrally matched to the OP123 and OP223 series.

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data, and to Application Bulletin 202 for pill-type soldering to PCBoard.

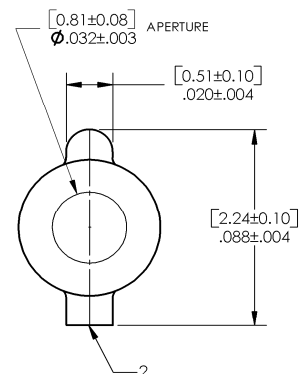
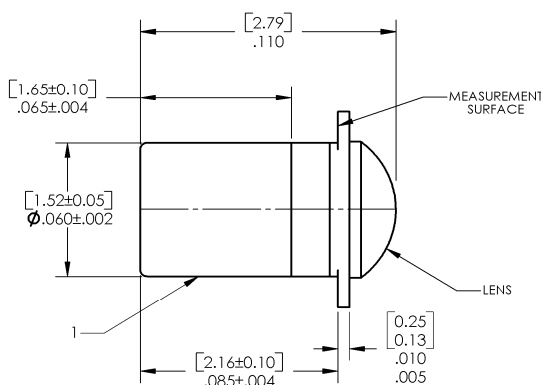
Applications:

- Non-contact reflective object sensor
- Machine safety
- Assembly line automation
- End of travel sensor
- Machine automation
- Door sensor



| Pin # | Sensor |
|-------|-----------|
| 1 | Collector |
| 2 | Emitter |

| Ordering Information | | | | |
|----------------------|------------|---|---|---------------|
| Part Number | Sensor | Light Current I _{C(ON)} (mA) Min / Max | Input Power E _E (mW/cm ²) | Viewing Angle |
| OP300SL | Darlington | 0.8 / NA | 1.0 with 2870°K or 0.4 with 890nm | 35° |
| OP301SL | | 0.8 / 2.4 | | |
| OP302SL | | 1.8 / 5.4 | | |
| OP303SL | | 3.6 / 12.0 | | |
| OP304SL | | 7.0 / 21.0 | | |
| OP305SL | | 14.0 / NA | | |



DIMENSIONS ARE IN: [MILLIMETERS]
 INCHES



RoHS

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

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

| | |
|---|---|
| Collector-Emitter Voltage | 15.0 V |
| Emitter-Collector Voltage | 5.0 V |
| Storage Temperature Range | -65°C to $+150^{\circ}\text{C}$ |
| Operating Temperature Range | -65°C to $+125^{\circ}\text{C}$ |
| Soldering Temperature (5 seconds with soldering iron) | $260^{\circ}\text{C}^{(1)(2)}$ |
| Power Dissipation | 50 mW ⁽³⁾ |
| Continuous Collector Current | 50 mA |

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

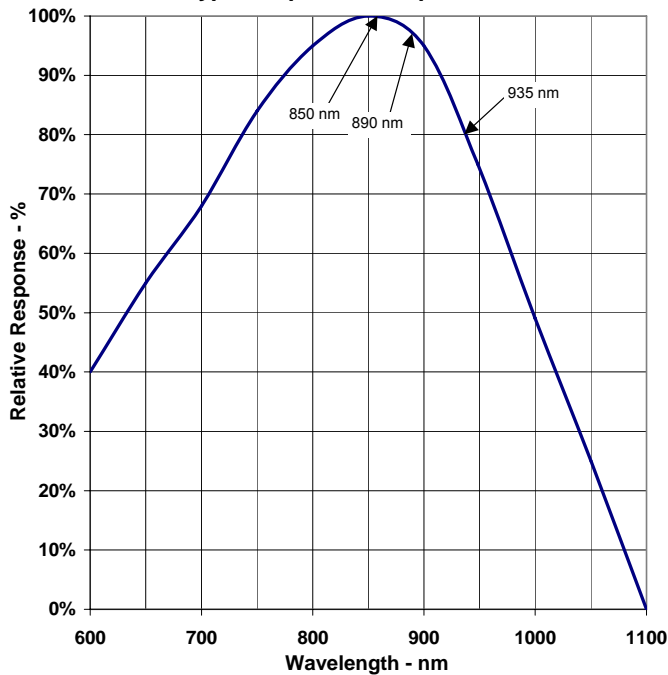
| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---------------------|--------------------------------------|------|-----|------|---------------|--|
| $I_{C(ON)}^{(4)}$ | On-State Collector Current | 0.8 | - | - | mA | $V_{CE} = 5.0\text{ V}$, $E_E = 1.0$ or $0.4\text{ mW/cm}^2^{(5)}$ |
| | OP300SL | 0.8 | - | 2.4 | | |
| | OP301SL | 1.8 | - | 5.4 | | |
| | OP302SL | 3.6 | - | 12.0 | | |
| | OP303SL | 7.0 | - | 21.0 | | |
| | OP304SL | 14.0 | - | - | | |
| I_{CEO} | Collector-Dark Current | - | - | 1.0 | μA | $V_{CE} = 10\text{ V}$, $E_E = 0$ |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | 15.0 | - | - | V | $I_C = 100\text{ }\mu\text{A}$ |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | 5.0 | - | - | V | $I_E = 100\text{ }\mu\text{A}$ |
| $V_{CE(SAT)}^{(4)}$ | Collector-Emitter Saturation Voltage | - | - | 1.1 | V | $I_C = 0.4\text{ mA}$, $E_E = 1.0$ or $0.4\text{ mW/cm}^2^{(5)}$ $I_C = 1.0\text{ mA}$, $E_E = 1.0$ or $0.4\text{ mW/cm}^2^{(5)}$ |
| | OP300SL, OP301SL | - | - | 1.1 | | |
| | OP302SL through OP305SL | - | - | 1.1 | | |

Notes:

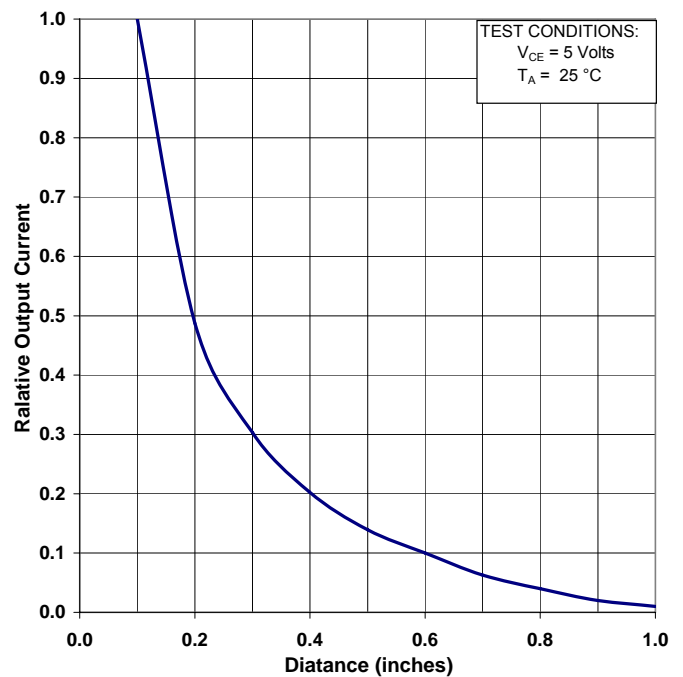
- (1) Refer to Application Bulletin 202, which discusses proper techniques for soldering pill-type devices to PCBoards.
- (2) No clean or low solids. RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (3) Derate linearly 0.5 mW/ $^{\circ}\text{C}$ above 25°C .
- (4) Junction temperature maintained at 25°C .
- (5) Light source is an unfiltered tungsten bulb operating at $CT = 2870^{\circ}\text{K}$ at $E_E = 1.0\text{ mW/cm}^2$ or 890nm at $E_E = 0.4\text{ mW/cm}^2$.

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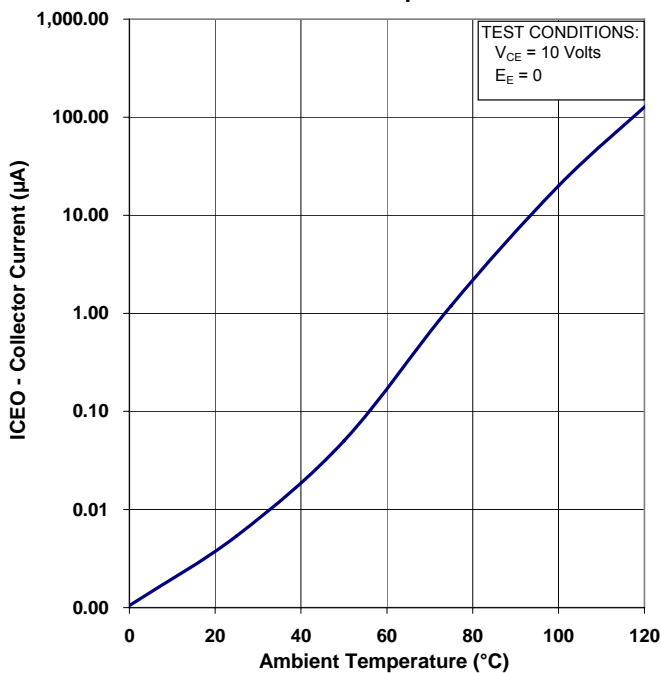
Typical Spectral-Response



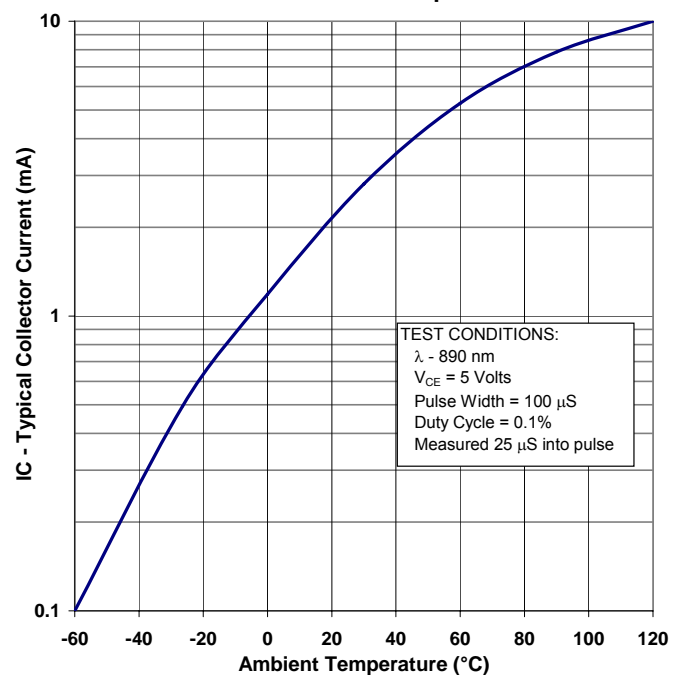
Coupling Characteristics of OP123 & OP300SL



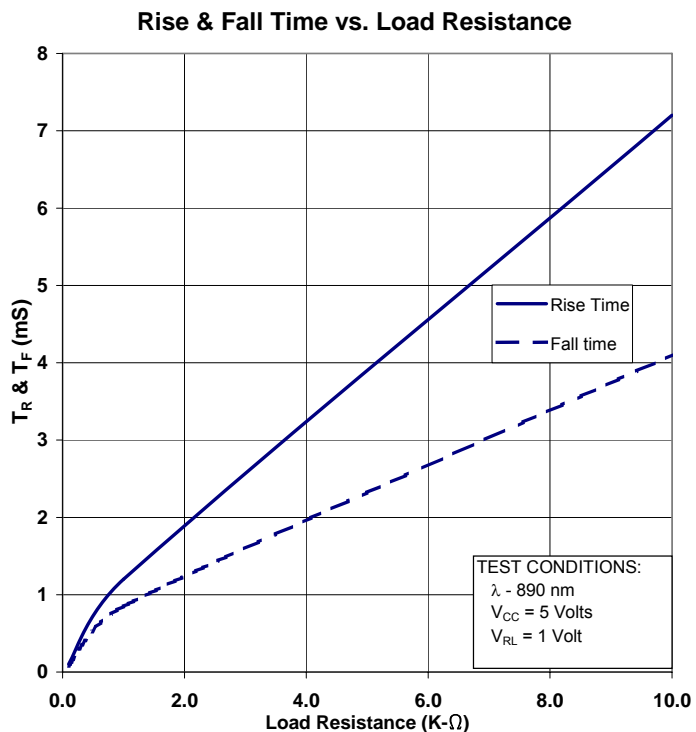
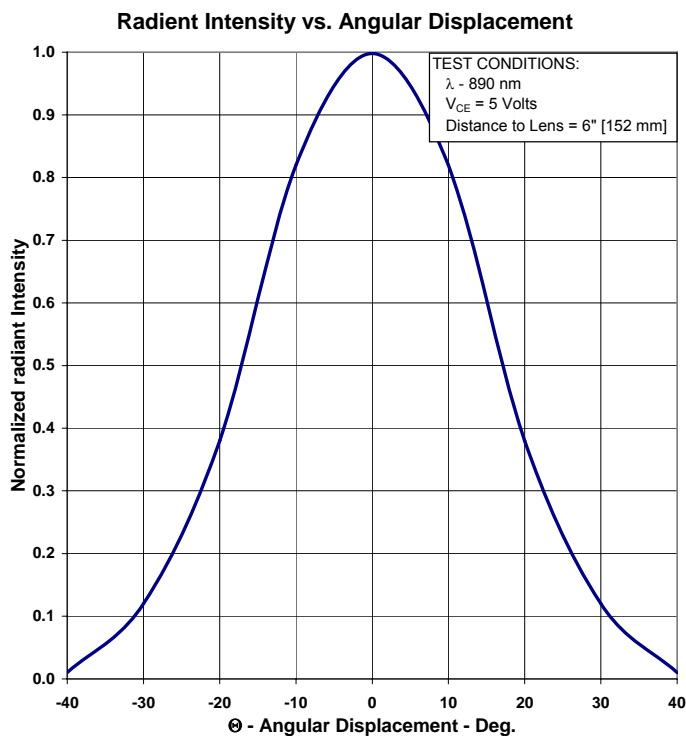
Dark Current vs Temperature



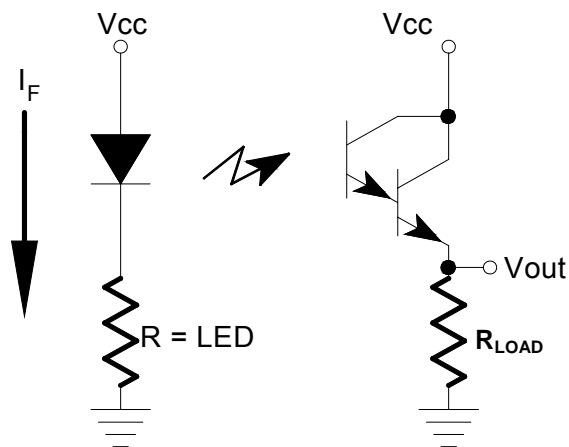
Collector Current vs Temperature



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Switching time Circuit



The light source is a pulsed LED with a rise time of less than 500 nS.
 The LED output is adjusted for $I_C = 0.8$ mA.