NPN Silicon Photodarlington

OP300SL Series



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. Photodarlingtons 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.

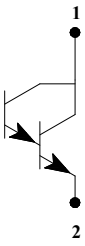
Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data, and to Application Bulletin 202 for pill-type soldering to PCBoard.

Applications:

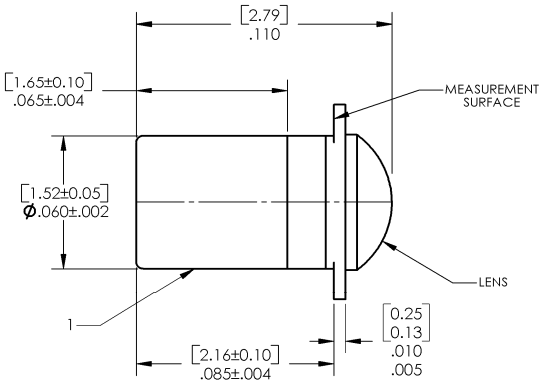
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

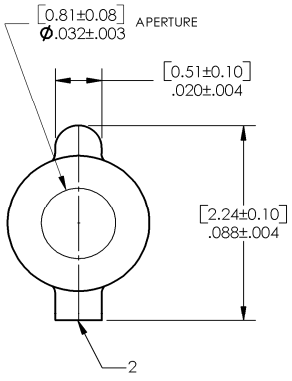
Ordering Information

Part Number	Sensor	Light Current $I_{C(ON)}$ (mA) Min / Max	Input Power E_E (mW/cm²)	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		



Pin #	Sensor
1	Collector
2	Emitter





DIMENSIONS ARE IN: [MILLIMETERS] INCHES

RoHS

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° C unless otherwise noted)	
Collector-Emitter Voltage	15.0 V
Emitter-Collector Voltage	5.0 V
Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-65° C to +125° C
Soldering Temperature (5 seconds with soldering iron)	260° C[(1)(2)]
Power Dissipation	50 mW[(3)]
Continuous Collector Current	50 mA

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

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

Notes:

(1) Refer to Application Bulleting 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/° C above 25° C.

(4) Junction temperature maintained at 25° C.

(5) Light source is an unfiltered tungsten bulb operating at CT = 2870° K at E_E =1.0 mW/cm^2 or 890nm at E_E =0.4 mW/cm^2 .

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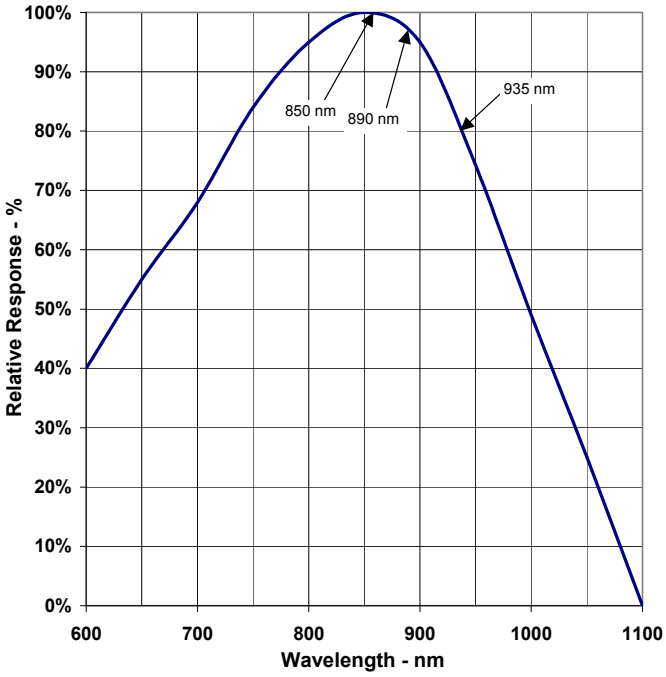
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NPN Silicon Photodarlington

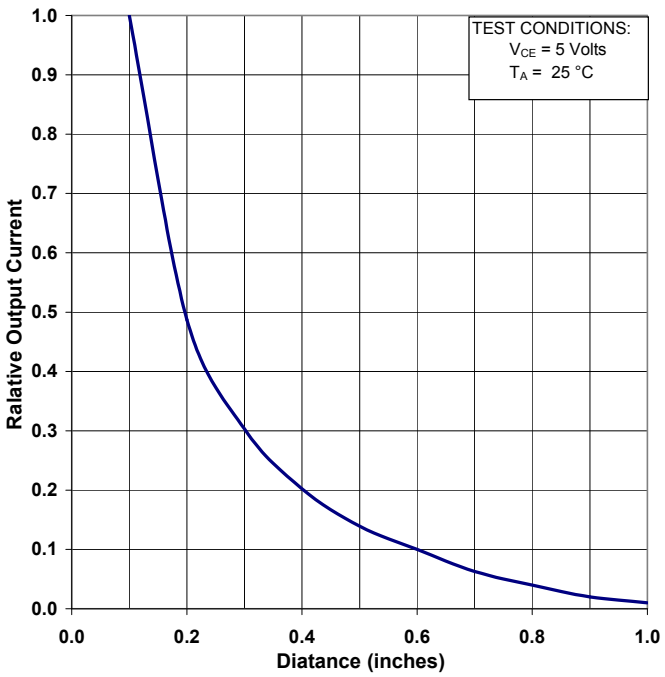
OP300SL Series

Performance

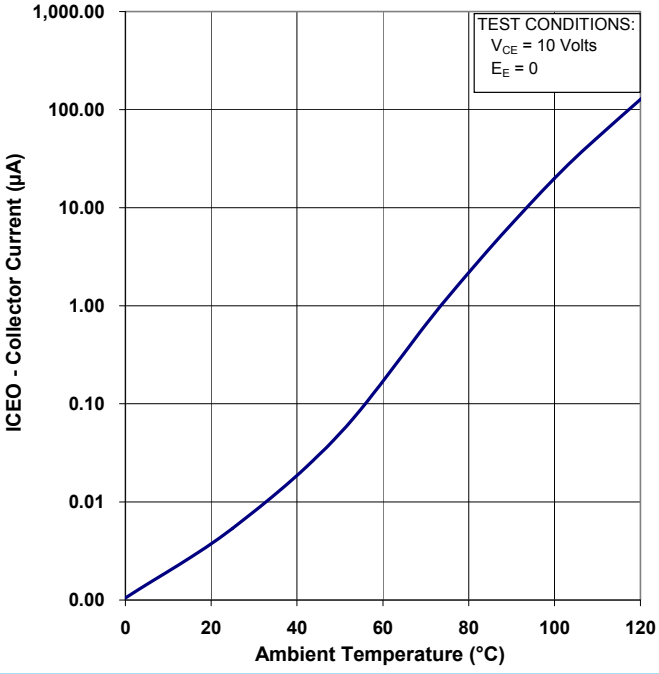
Typical Spectral-Response



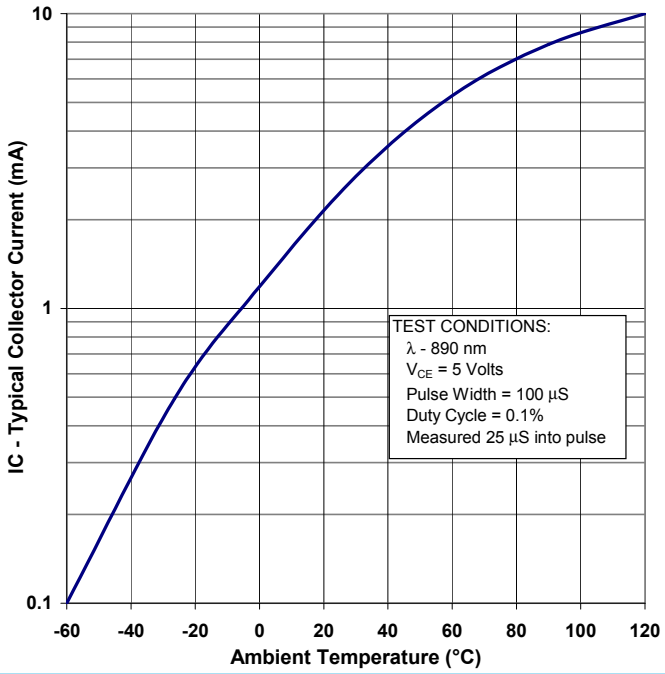
Coupling Characteristics of OP123 & OP300SL



Dark Current vs Temperature



Collector Current vs Temperature



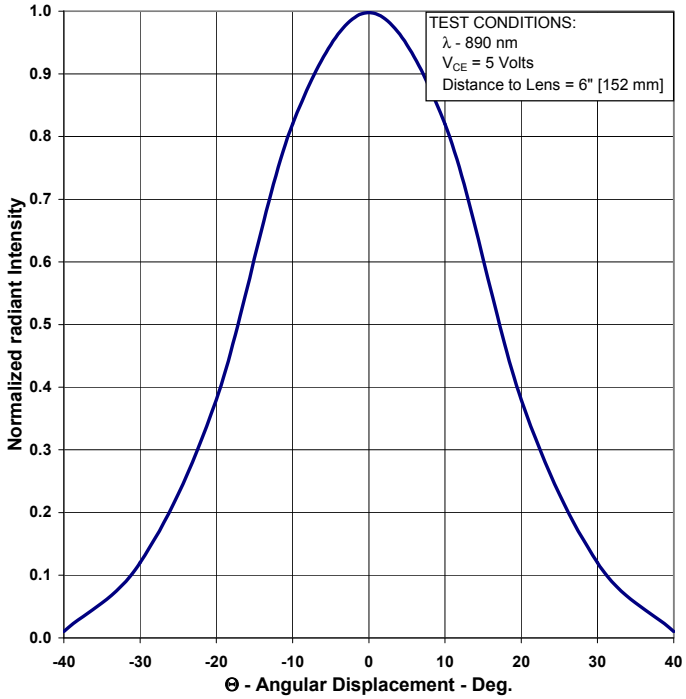
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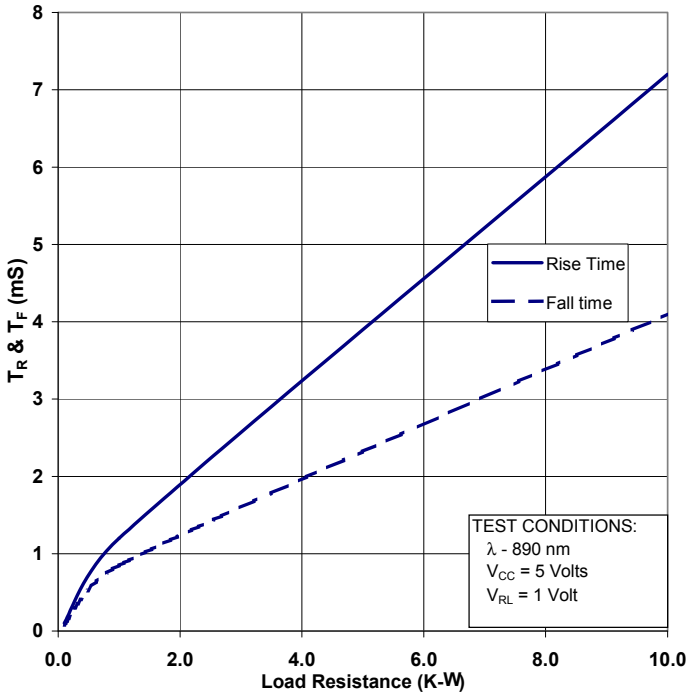
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Performance

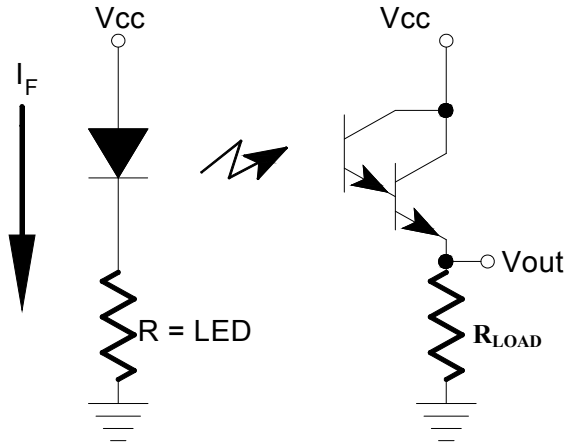
Radient Intensity vs. Angular Displacement



Rise & Fall Time vs. Load Resistance



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.

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