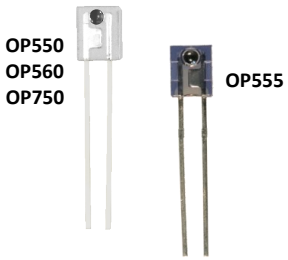
NPN Silicon Phototransistor

OP550, OP555, OP560, OP750 Series



Features:

- Wide receiving angle
- Four sensitivity ranges
- Side-looking package
- Ideal for space-limited applications
- Ideal for PC Board mounting
- Choice of clear or blue-tinted package

Description:

OP550, OP555 and OP750 series consists of a NPN silicon phototransistor molded in an epoxy package with a wide receiving angle that provides relatively even reception over a large area. The **OP750** series have additional circuitry to enhance the operation of the device for stray light levels.

The **OP560** series consists of a NPN silicon photodarlington transistor molded in an epoxy package with a wide receiving angle that provides relatively even reception over a large area.

The side-looking package design allows easy PC Board mounting of slotted optical switches or optical interrupt detectors.

The **OP550, OP560 and OP750** devices have an external lens in a clear epoxy package.

The **OP555** device has an internal lens in a blue-tinted package. The lensing effect of this package allows an acceptance half-angle of 28° when measured from the optical axis to the half-power point.

*These devices are 100% production tested using infrared light for close correlation with OPTEK's GaAs and GaAlAs emitters. All of these sensors are mechanically and spectrally matched to the **OP140, OP145, OP240** and **OP245** series of infrared emitting diodes.*

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.

For custom versions please contact your OPTEK representative.

Compliant to EU RoHS 2 Directive 2011/65/EU.

Applications:

- Applications requiring wide receiving angle
- Applications requiring PC Board mounting
- Space-limited applications
- Optical switches
- Optical interrupt detectors
- Optical encoders
- Non-contact position sensing
- Machine automation

OP

55 = Phototransistor
56 = Photodarlington
75 = Phototransistor with R_{BE}

A = Highest sensitivity level
B = Sensitivity Level with Min. Max.
C = Middle Sensitivity Level
D = Lowest Sensitivity Level

0 = Extended Lens - Clear Package

5 = Integral Lens - Blue Tinted Package

Available Part Numbers			
OP550A	OP555A	OP560A	OP750A
OP550B	OP555B	OP560C	OP750B
OP550C	OP555C (Obsolete)	OP565B (Obsolete)	OP750D (Obsolete)
OP550D (Obsolete)			OP770A (Obsolete)

RoHS

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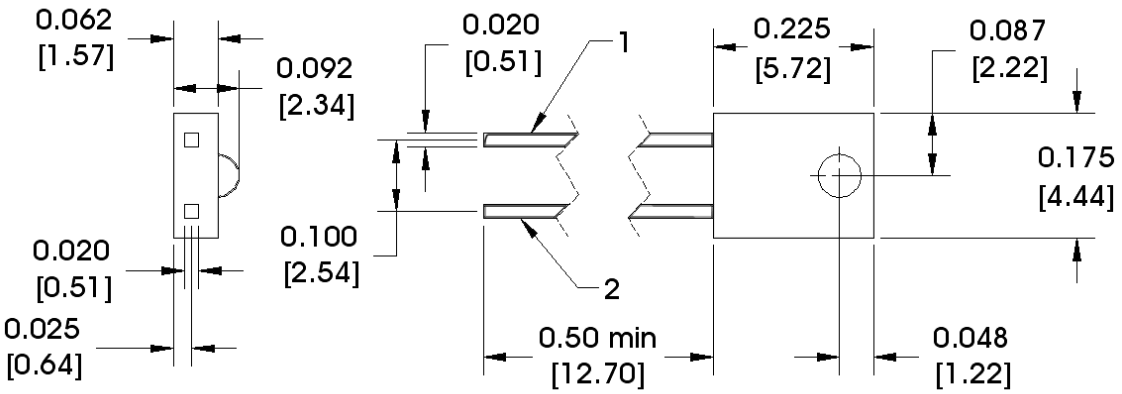
NPN Silicon Phototransistor

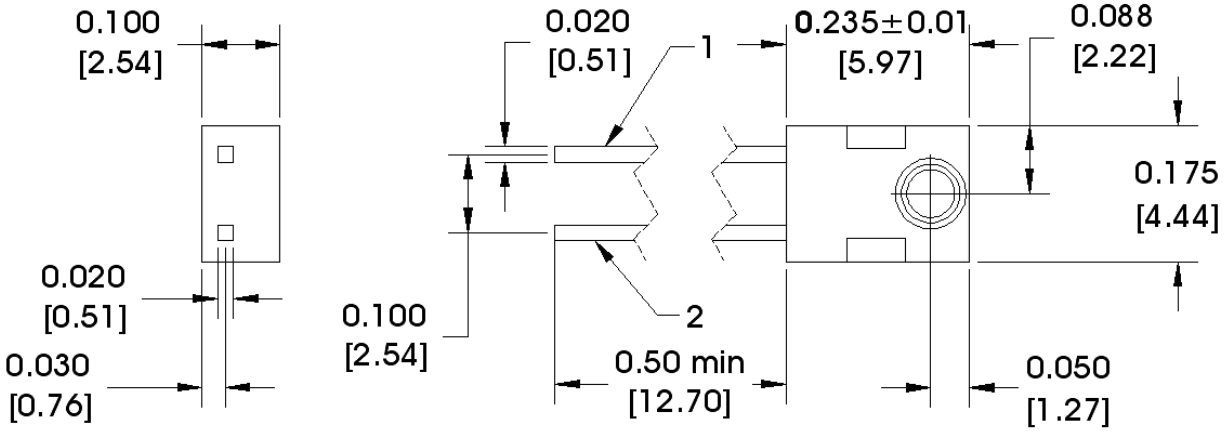
OP550, OP555, OP560, OP750 Series

OP550 (A, B, C), OP560 (A, C), OP750 (A, B)



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OP555 (A, B)



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

Pin #	Sensor
1	Emitter
2	Collector

OP555 - CONTAINS POLYSULFONE

To avoid stress cracking, we suggest using ND Industries' **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK'S molded plastics.

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Electrical Specifications

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	
OP550, OP555, OP560, OP750	-40° C to +100° C
Collector-Emitter Voltage	
OP550, OP555, OP750	30 V
OP560	15 V
Emitter-Collector Voltage	
OP550, OP555, OP560	5 V
OP750	0.4 V
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C(1)
Power Dissipation	
OP550, OP555, OP560	100 mW(2)
OP750	200 mW(2)

Notes:

1. RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum 20 grams force may be applied to the leads when soldering.
2. For OP550, OP560 and OP555, derate linearly 1.33 mW/° C above 25° C.
3. For all phototransistors in this series, the light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm. For OP550 and OP555 only, a radiometric intensity level that varies less than 10% over the entire lens surface of the phototransistor being tested applies.
4. To calculate typical collector dark current in µA, use the formula $I_{CEO}=10^{(0.040\,T_A\,-\,3.4)}$, where T_A is ambient temperature in ° C.

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Electrical Specifications

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current OP550A, OP555A OP550B, OP555B OP550C	 2.55 1.30 0.25	 - - -	 - 4.70 2.40	mA	V_{CE} = 5.0 V, E_E = 1.0 mW/cm$^{2(3)}$
	OP560A OP560C	6.6 1.1	- -	- -		V_{CE} = 2.0 V, E_E = 0.1 mW/cm$^{2(3)}$
	OP750A OP750B	2.25 1.50	- -	7.00 4.20		V_{CE} = 5.0 V, E_E = 1.0 mW/cm$^{2(3)}$
$I_C/\Delta T$	Relative I_C Charge with Temperature	-	1.00	-	%/° C	V_{CE} = 5.0 V, E_E = 1.0 mW/cm^2, λ = 935 nm
I_{CEO}	Collector-Dark Current	-	-	100	nA	V_{CE} = 10.0 V, E_E = 0$^{(4)}$
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage OP550, OP555, OP750 OP560	 30 15	 - -	 - -	V	I_C = 100 µA, E_E = 0$^{(4)}$ I_C = 1 mA, E_E = 0$^{(4)}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage OP550, OP555, OP560 OP750	 5.0 0.4	 -	 -	V	I_E = 100 µA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage OP550, OP555, OP750 OP560	 - -	 - -	 0.40 1.10	V	I_C = 100 µA, E_E = 1.0 mW/cm$^{2(3)}$ I_C = 0.4 mA, E_E = 0.1 mW/cm$^{2(3)}$

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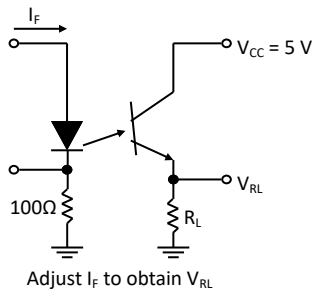
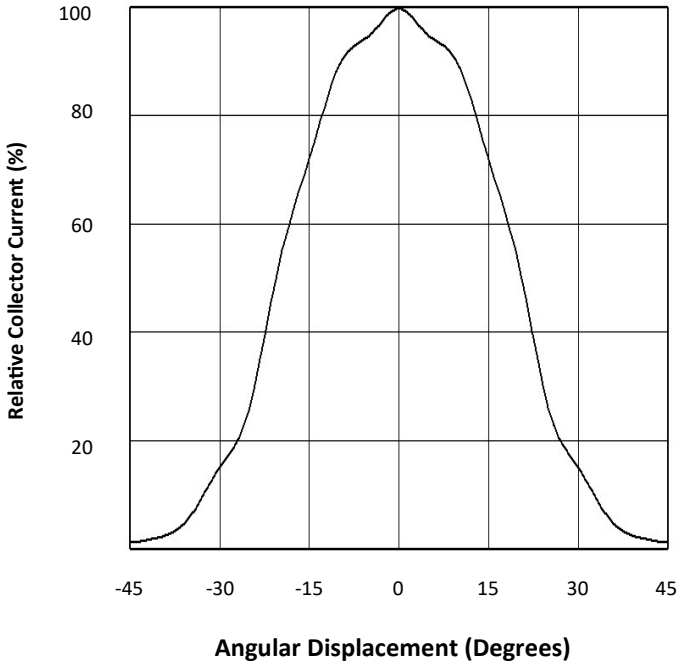
Performance

Switching Test Circuit

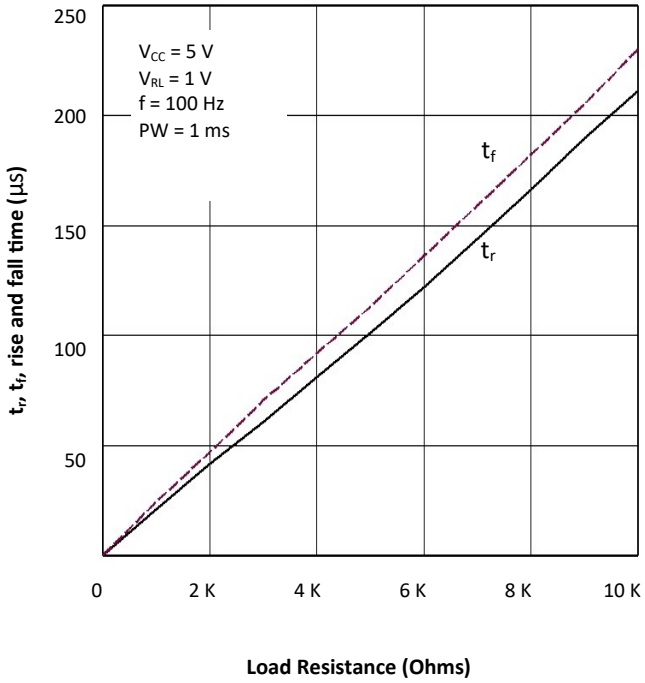


Adjust I_F to obtain V_{RL}

Angular Response



Rise and Fall Time vs Load Resistance



Performance