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OP755A

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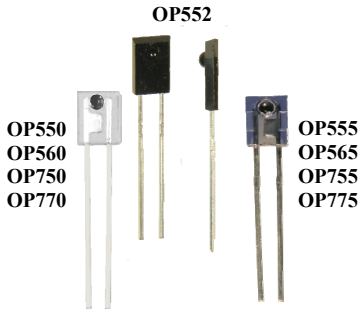
NPN Silicon Phototransistor

OP550, OP552, OP555, OP560, OP565, OP750, OP755 Series



Features:

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

Description:

OP550, OP552, OP555, OP750, OP755, OP770 and **OP775** 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, OP755, OP770** and **OP775** have additional circuitry to enhance the operation of the device for stray light levels.

OP560 and **OP565** 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 PCBoard mounting of slotted optical switches or optical interrupt detectors.

The **OP550, OP560, OP750** and **OP770** devices have an external lens in a clear epoxy package.

The **OP552** device has an integral lens in an opaque plastic package that is optically transparent to infrared light but opaque to visible wavelengths. This feature allows the device to be used under high ambient light conditions – or anywhere external light sources could interfere with the intended sensing application (visible light immunity).

The **OP555, OP565, OP755** and **OP775** devices have 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 GaAIAs emitters. All of these sensors are mechanically and spectrally matched to the **OP140, OP142, 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.

Applications:

- Applications requiring wide receiving angle
- Applications requiring PCBoard 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}
77 = Phototransistor with C_{CE}

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

0 = Extended Lens - Clear Package
2 = Extended Lens - Blue Tinted Package
5 = Integral Lens - Blue Tinted Package

Available Part Numbers								
OP550A	OP552A	OP555A	OP560A	OP565A	OP750A	OP755A	OP770A	OP775A
OP550B	OP552B	OP555B	OP560B	OP565B	OP750B	OP755B	OP770B	OP775B
OP550C	OP552C	OP555C	OP560C	OP565C	OP750C	OP755C	OP770C	OP775C
OP550D	OP552D	OP555D			OP750D	OP755D	OP770D	OP775D

RoHS

General Note
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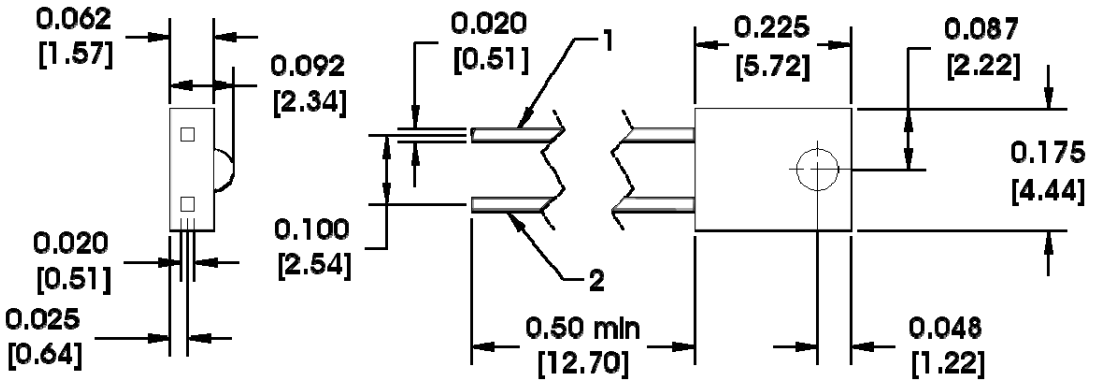
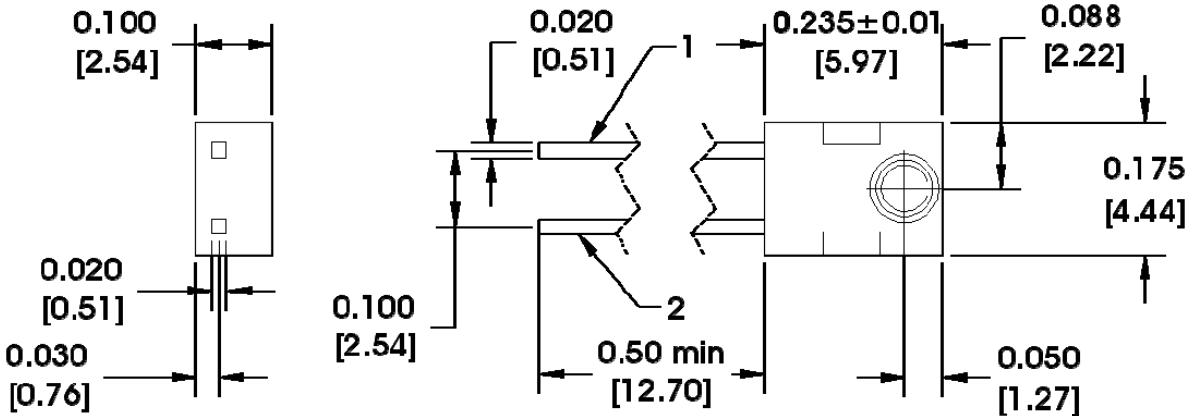
OP550, OP552, OP560, OP750, OP770 (A, B, C, D)



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OP555, OP565, OP755 , OP775 (A, B, C, D)



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.

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, OP555 and OP565, derate linearly 1.33 mW/° C above 25° C. For OP552, derate linearly 1.25 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

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)	
Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	
OP550, OP555, OP560, OP565, OP750, OP755	-40° C to +100° C
OP552	-40° C to +85° C
Collector-Emitter Voltage	
OP550, OP552, OP555, OP560, OP750, OP755	30 V
OP565	15 V
Emitter-Collector Voltage	5 V
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C(1)
Power Dissipation	
OP550, OP552, OP555, OP560, OP565, OP755	100 mW(2)
OP750	200 mW(2)

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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				mA	
	OP550A, OP552A, OP555A	2.55	-	-		V_{CE} = 5.0 V, E_E = 1.0 mW/cm$^{2(3)}$
	OP550B, OP552B, OP555B	1.30	-	4.70		
	OP550C, OP552C, OP555C	0.25	-	2.40		
	OP550D, OP552D, OP555D	0.25	-	-		
	OP560A, OP565A	6.6	-	-		V_{CE} = 2.0 V, E_E = 0.1 mW/cm$^{2(3)}$
	OP560B, OP565B	3.3	-	9.8		
	OP560C, OP565C	1.1	-	-		
	OP750A	2.25	-	7.00		V_{CE} = 5.0 V, E_E = 1.0 mW/cm$^{2(3)}$
	OP750B	1.50	-	4.20		
	OP750C	0.85	-	2.80		
	OP750D	0.85	-	7.00		
	OP755A	1.80	-	5.50		
	OP755B	1.20	-	3.40		
	OP755C	0.70	-	2.25		
	OP755D	0.70	-	5.50		
	OP770A	2.25	-	7.00		
	OP770B	1.50	-	4.20		
	OP770C	0.85	-	2.80		
	OP770D	0.85	-	7.00		
	OP775A	1.80	-	5.50		
	OP775B	1.20	-	3.40		
	OP775C	0.70	-	2.25		
	OP775D	0.70	-	5.50		
$I_C/\Delta T$	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				V	
	OP550, OP552, OP555, OP750, OP755, OP770, OP775	30	-	-		I_C = 100 µA, E_E = 0$^{(4)}$
	OP560, OP565	15	-	-		I_C = 1 mA, E_E = 0$^{(4)}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0	-	-	V	I_E = 100 µA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage				V	
	OP550, OP552, OP555, OP750, OP755, OP770, OP775	-	-	0.40		I_C = 100 µA, E_E = 1.0 mW/cm$^{2(3)}$
	OP560, OP565	-	-	1.10		I_C = 0.4 mA, E_E = 0.1 mW/cm$^{2(3)}$

See page 2 for Notes

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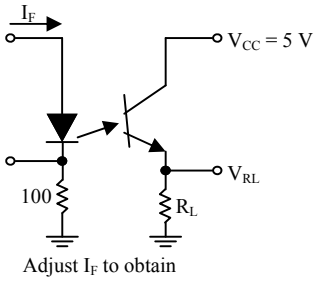
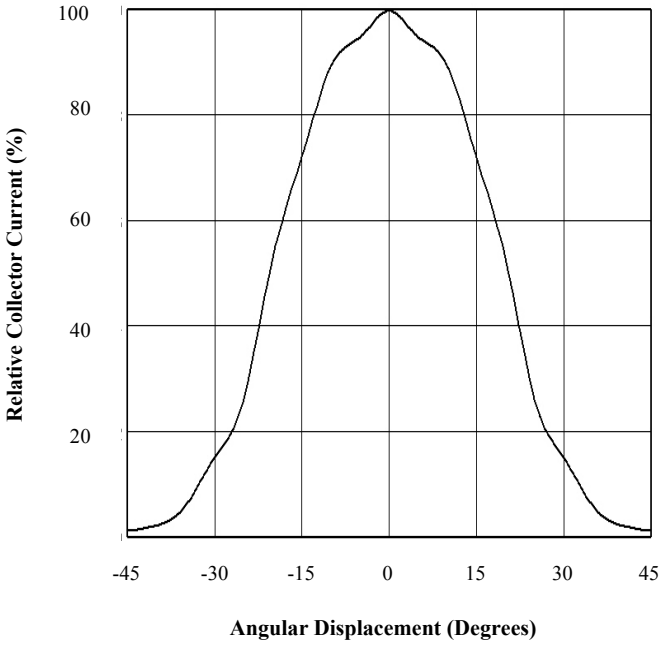
Performance

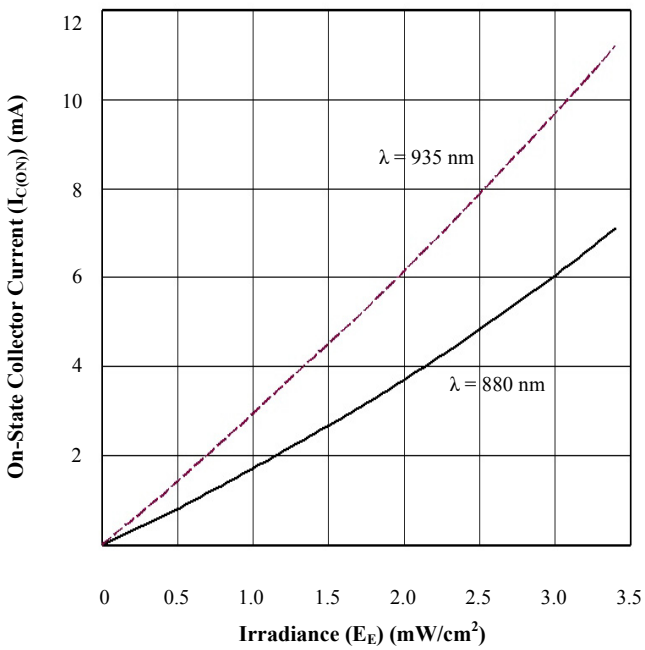
Switching Test Circuit



OP552 - Angular Response



OP552 - On-State Collector Current vs Irradiance



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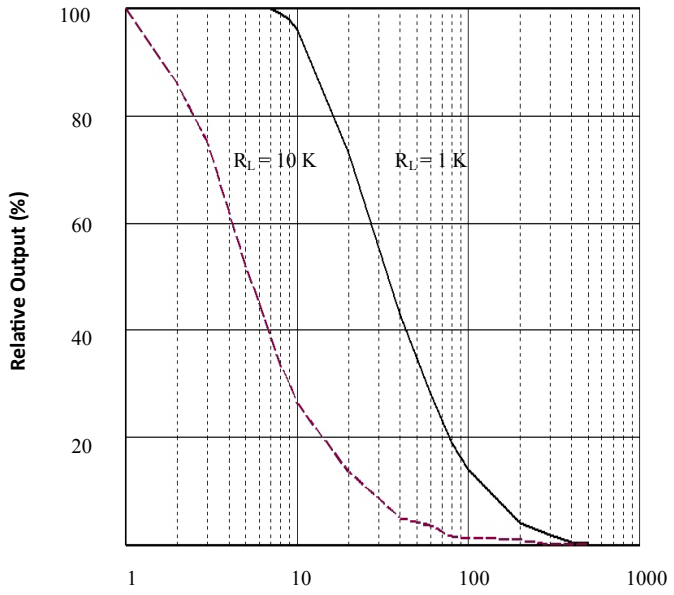
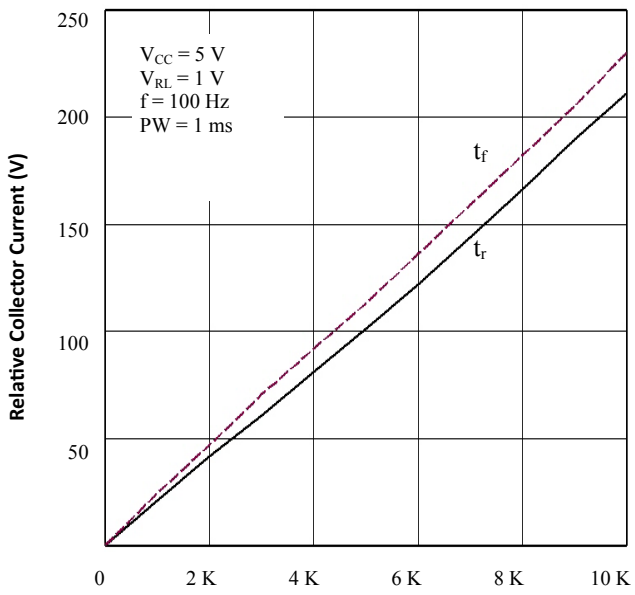
Performance

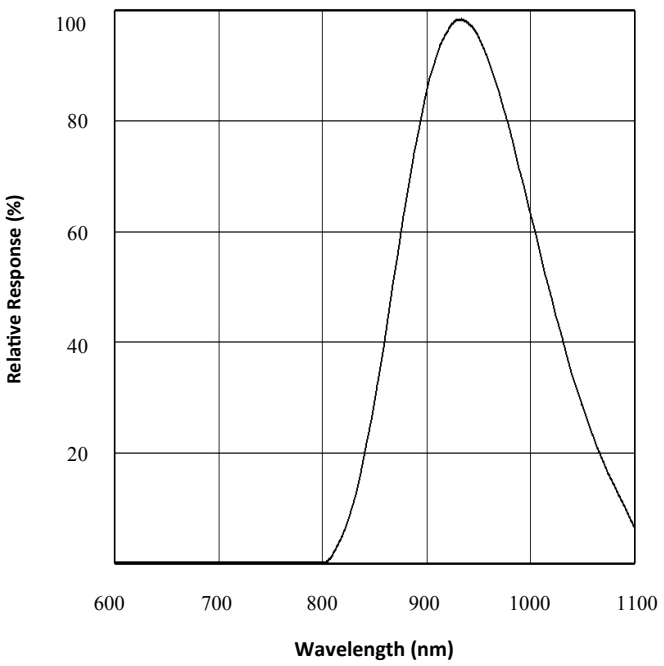
OP552 - Output Vs Frequency



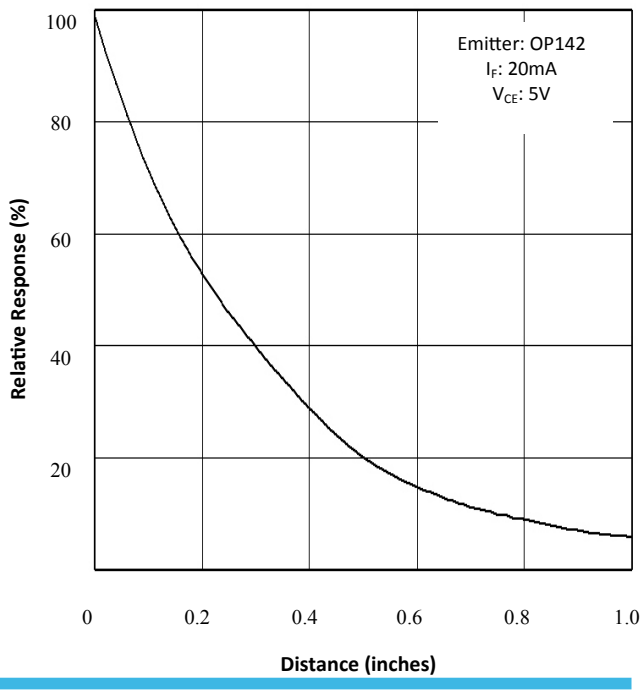
OP552 - Rise and Fall Time vs Load Resistance



OP552 - Typical Spectral Response



OP552 - Coupling Characteristic



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