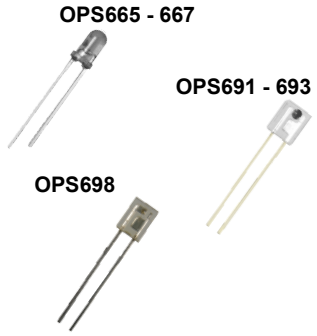
LED and Photosensor Pairs

OPS665, OPS666, OPS667, OPS691, OPS692, OPS693, OPS698



Features:

- High current transfer ratio
- Low-cost plastic package
- Lateral side-looking clear plastic package (OPS691, OPS692, OPS693 and OPS698)

Description:

Each LED/Photosensor pair in the series consists of a gallium arsenide infrared emitting diode and a NPN silicon phototransistor, mounted in a T-1 package **(OPS665, OPS666, OPS667)** or in a matched lateral side-looking plastic package **(OPS691, OPS692, OPS693 and OPS698)**.

Matched pairs are desirable where the application is unique and the quantity required does not justify assembly tooling costs. If separation between the LED and sensor is greater than two times the specified $IC_{(ON)}$ distance, proper alignment becomes critical. Although sold as pairs, emitters and sensors are packaged separately for handling ease.

Please note that the sensor is sensitive to ambient light.

Applications:

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

Ordering Information

Part Number	Output	Package Style	Description	Lead Length
OPS665	Transistor	T-1	Gallium arsenide infrared emitting diode (OP165) NPN silicon phototransistor (OP505)	0.50" (`1.700 mm)
OPS666	Transistor	T-1	Gallium arsenide infrared emitting diode (OP165) NPN silicon phototransistor (OP505)	0.50" (`1.700 mm)
OPS667	Transistor	T-1	Gallium arsenide infrared emitting diode (OP165) NPN silicon phototransistor (OP505)	0.50" (`1.700 mm)
OPS691	Transistor	Lateral Side-looking	Gallium arsenide infrared emitting diode (OP140) NPN silicon phototransistor (OP550)	0.50" (`1.700 mm)
OPS692	Transistor	Lateral Side-looking	Gallium arsenide infrared emitting diode (OP140) NPN silicon phototransistor (OP550)	0.50" (`1.700 mm)
OPS693	Transistor	Lateral Side-looking	Gallium arsenide infrared emitting diode (OP140) NPN silicon phototransistor (OP550)	0.50" (`1.700 mm)
OPS698	Transistor	Lateral Side-looking	Gallium arsenide infrared emitting diode (OP145) NPN silicon phototransistor (OP555)	0.50" (`1.700 mm)

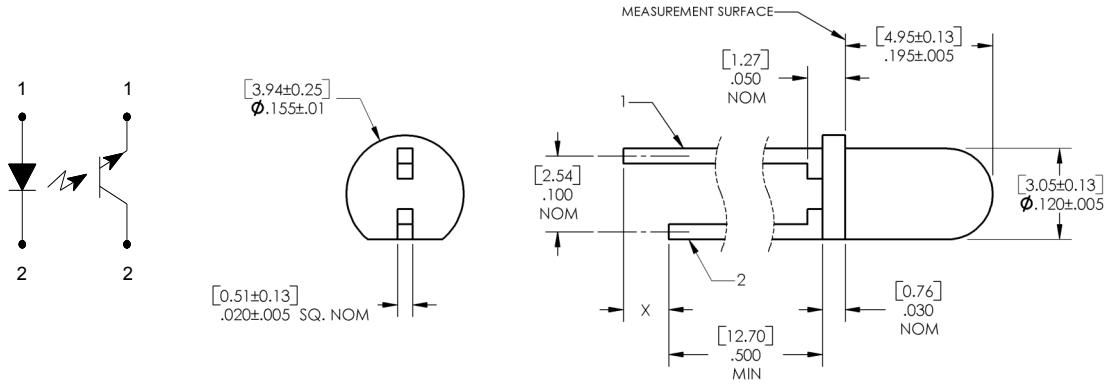
RoHS

TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

LED and Photosensor Pairs

OPS665, OPS666, OPS667, OPS691, OPS692, OPS693, OPS698

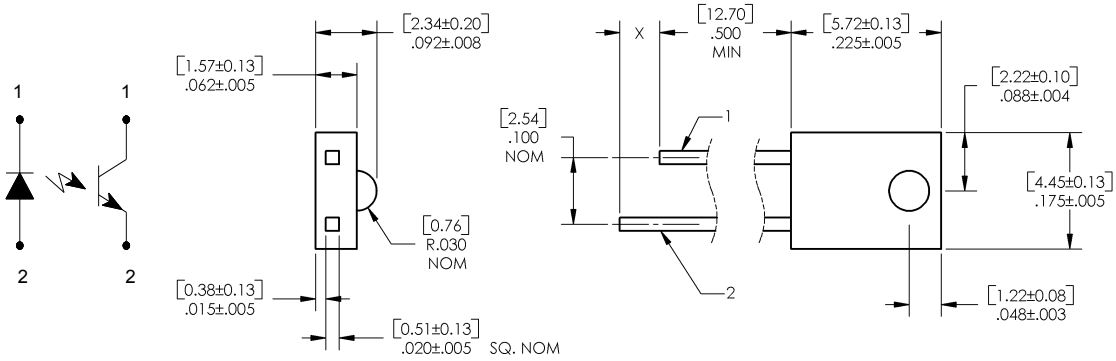
OPS665, OPS666, OPS667



DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

Pin #	LED & Diode X=0.060" (1.5	Transistor X=0" (0.0 mm)
1	Anode	Emitter
2	Cathode	Collector

OPS691, OPS692, OPS693

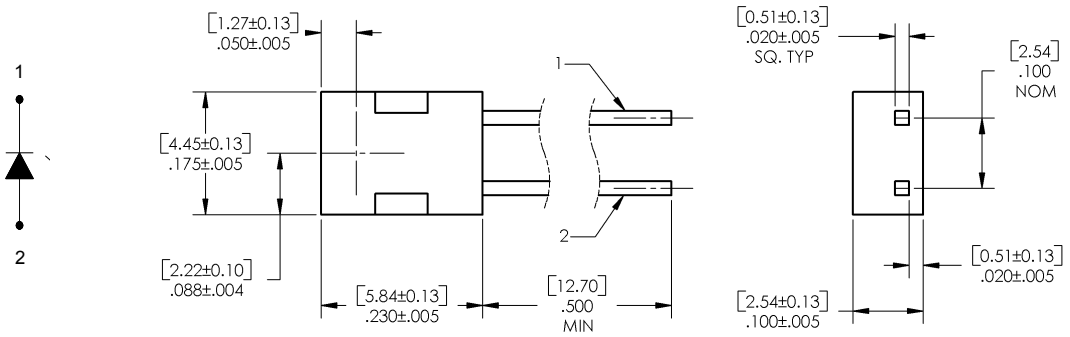


DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

Pin #	LED X=0.060" (1.5	Sensor X=0" (0.0 mm)
1	Cathode	Emitter/Anode
2	Anode	Collector/Cathode

TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

OPS698



DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

Pin #	Diode
1	Cathode
2	Anode

TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

Electrical Specifications

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)	
Storage & Operating Temperature Range	-40°C to +100°C
Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron]	260°C(1)
Input Diode	
Forward DC Current	50 mA
Peak Forward Current (1 µs pulse width, 300 pps)	3.0 A
Reverse DC Voltage	2.0 V
Power Dissipation	100 mW(2)
Output Photosensor (OPS665/666/667) or Output Phototransistor (691/692/693/698)	
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Power Dissipation	100 mW(2)

TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

Electrical Specifications

Electrical Characteristics (T_A = 25° C unless otherwise noted)						
SYMBOL	**PARAMETER**	**MIN**	**TYP**	**MAX**	**UNITS**	**TEST CONDITIONS**
Input Diode						
V_F	Forward Voltage	-	-	1.6	V	I_F = 20 mA
I_R	Reverse Current	-	-	100	µA	V_R = 2 V
Output Phototransistor						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30	-	-	V	I_C = 100 µA, E_E = 0
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0	-	-	V	I_E = 100 µA, E_E = 0
I_{CEO}	Collector-Emitter Dark Current OPS665/666/667 OPS691/692/693 OPS698	 - - -	 - - -	 100 100 100	 nA nA nA	 V_{CE} = 15 V, I_F = 0, I_E = 0 V_{CE} = 10 V, I_F = 0, I_E = 0 V_{CE} = 10 V, I_F = 0, I_E = 0
Combined						
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage OPS665/666/667 OPS691/692/693 OPB698	 - - -	 - - -	 - 0.4 0.4	 - V V	 - I_F = 20 mA, I_C = 50 µA(3) I_F = 20 mA, I_C = 50 µA(3)
$I_{C(ON)}$	On-State Collector Current OPS665 OPS666 OPS667 OPS691 OPS692 OPS693, OPS698	 0.5 1.0 5.0 500 1.0 2.0	 - - - - - -	 - - - - - -	 mA mA mA µA mA mA	 V_{CE} = 5 V, I_F = 20 mA(3) V_{CE} = 10 V, I_F = 20 mA(3)

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.

(2) Derate linearly 1.33 mW/° C above 25° C.

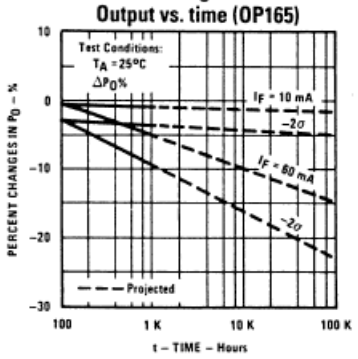
(3) Distance from lens tip to lens tip is 0.250" (6.35 mm) - OPS665, OPS666, OPS667
Distance from lens tip to lens tip is 0.125" (3.175 mm) - OPS691 thru OPS698

TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

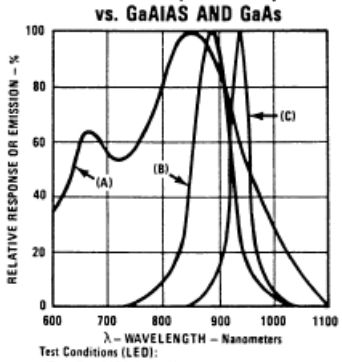
Performance

OPS665, OPS666, OPS667

Percent Changes in Power Output vs. time (OP165)

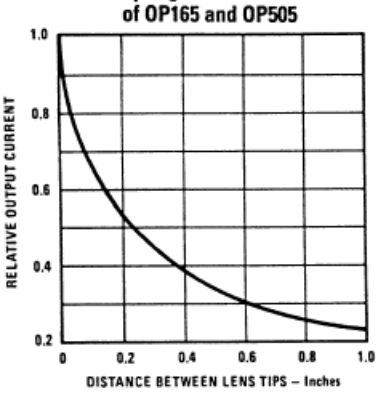


Photosensor Spectral Response vs. GaAlAS AND GaAs

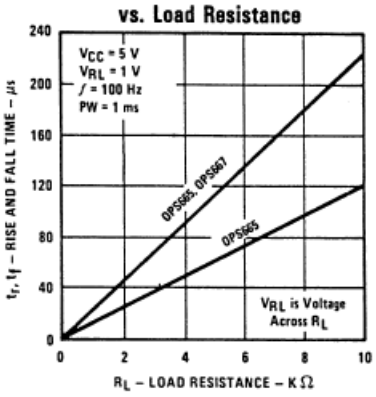


Test Conditions (LED):
$T_A = T_J = 25°C$; I_F = 100 mA, DC = 0.1%, PW = 100 µs
Peak Wavelength - λp: (A) XSTR – 850 ± 30 nm
(B) LED GaAlAs – 890 ± 20 nm
(C) LED GaAs – 930 ± 15 nm

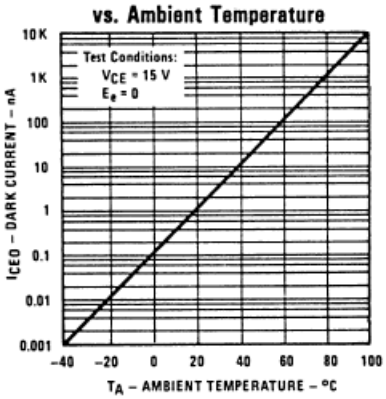
Coupling Characteristics of OP165 and OP505



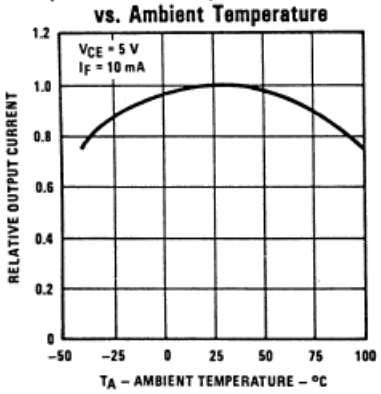
Rise and Fall Time vs. Load Resistance



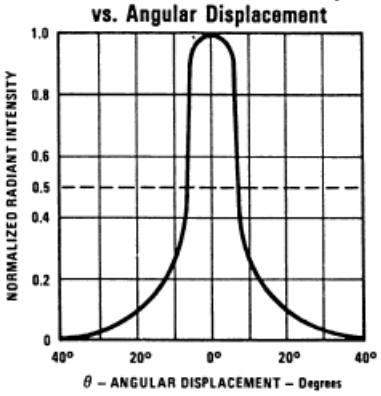
Collector Dark Current vs. Ambient Temperature



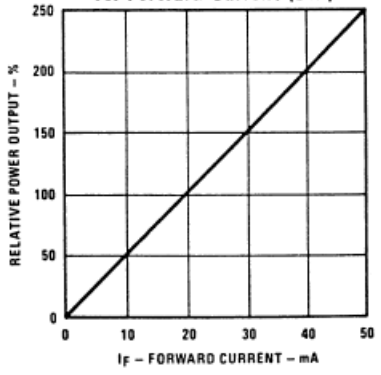
Coupled-Relative Output Collector Current vs. Ambient Temperature



Emission (LED) and Response (Sensor) Normalized Radiant Intensity vs. Angular Displacement



Relative Power Output vs. Forward Current (LED)

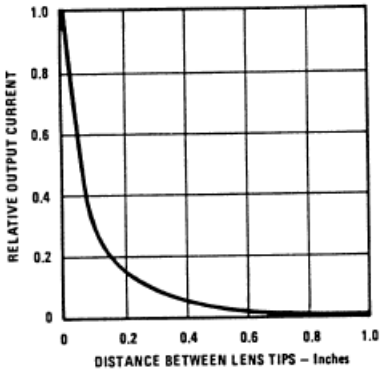


TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

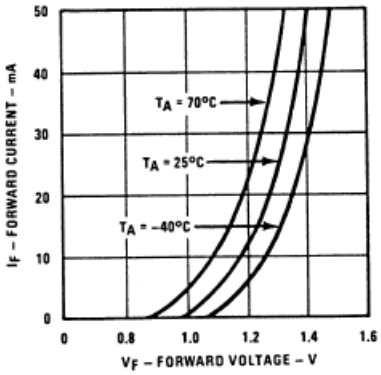
Performance

OPS691, OPS692, OPS693

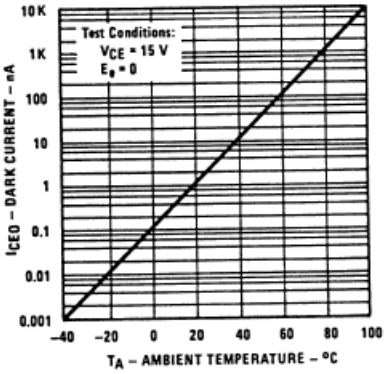
Coupling Characteristics of OP140 and OP550



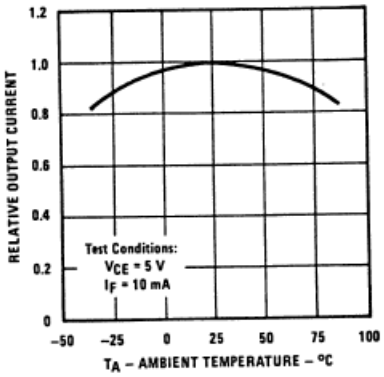
Forward Current vs Forward Voltage



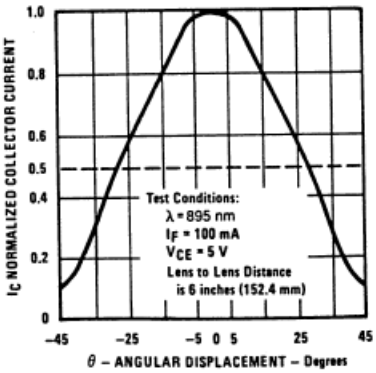
Dark Current vs Free Air Temperature



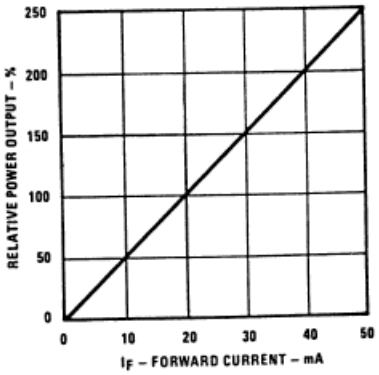
Relative Output Current vs Free Air Temperature



Normalized Collector Current vs Angular Displacement



Relative Power Output vs Forward Current (LED)

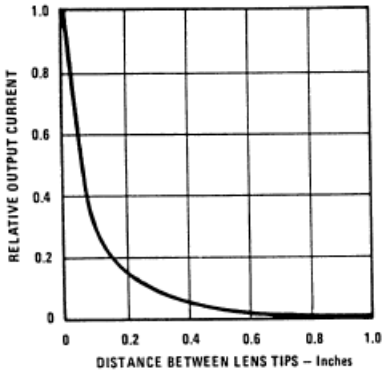


TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com

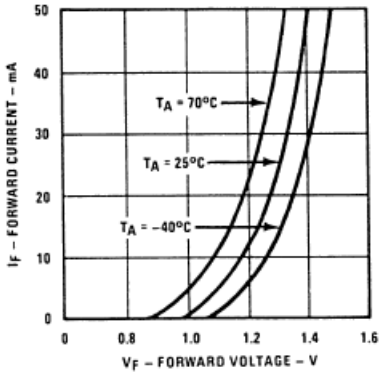
Performance

OPS698

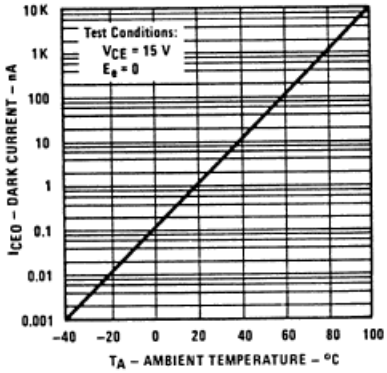
Coupling Characteristics of OP145 and OP555



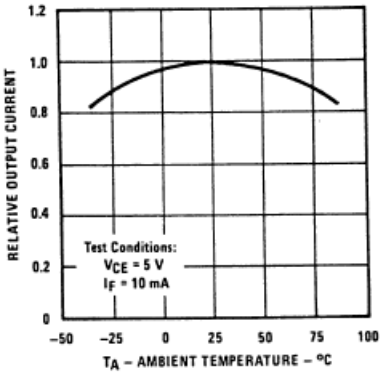
Forward Current vs Forward Voltage



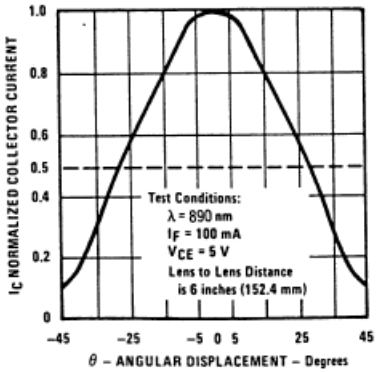
Dark Current vs Free Air Temperature



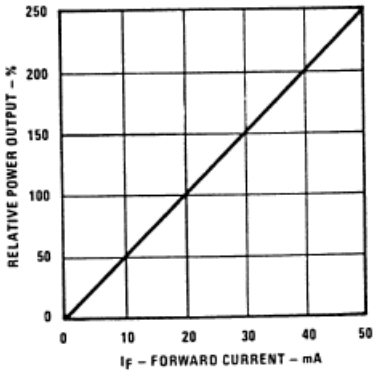
Relative Output Current vs Free Air Temperature



Normalized Collector Current vs Angular Displacement



Relative Power Output vs Forward Current (LED)



TT Electronics | OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006|Ph: +1 972 323 2200
sensors@ttelectronics.com | www.ttelectronics.com