

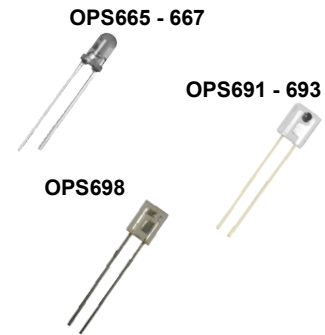
LED and Photosensor Pairs

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) |



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.

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

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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 |

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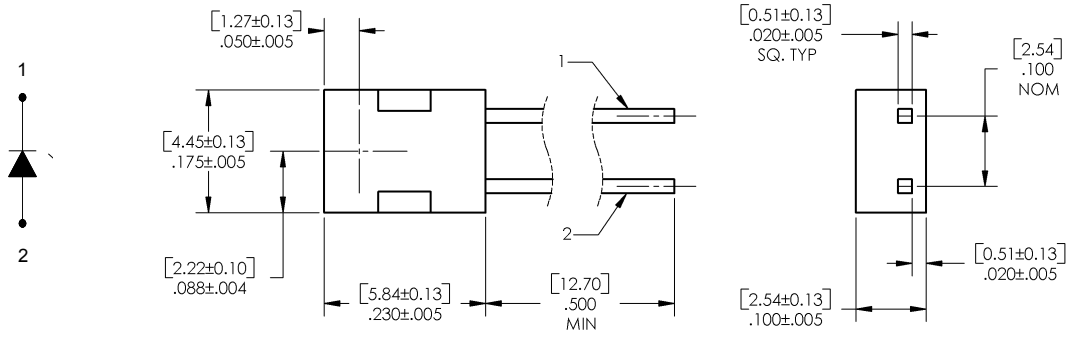
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1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
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OPS698



DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

| Pin # | Diode |
|-------|---------|
| 1 | Cathode |
| 2 | Anode |

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OPS693, OPS698



Electrical Specifications

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

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LED and Photosensor Pairs

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OPS693, OPS698



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 | - | - | 100 | nA | V _{CE} = 15 V, I _F = 0, I _E = 0 |
| | OPS665/666/667 | - | - | 100 | nA | V _{CE} = 10 V, I _F = 0, I _E = 0 |
| | OPS691/692/693 OPS698 | - | - | 100 | nA | V _{CE} = 10 V, I _F = 0, I _E = 0 |
| Combined | | | | | | |
| V _{CE(SAT)} | Collector-Emitter Saturation Voltage | - | - | - | - | - |
| | OPS665/666/667 | - | - | 0.4 | V | I _F = 20 mA, I _C = 50 µA ⁽³⁾ |
| | OPS691/692/693 OPB698 | - | - | 0.4 | V | I _F = 20 mA, I _C = 50 µA ⁽³⁾ |
| I _{C(ON)} | On-State Collector Current | - | - | - | - | - |
| | OPS665 | 0.5 | - | - | mA | V _{CE} = 5 V, I _F = 20 mA ⁽³⁾ |
| | OPS666 | 1.0 | - | - | mA | |
| | OPS667 | 5.0 | - | - | mA | |
| | OPS691 | 500 | - | - | µA | V _{CE} = 10 V, I _F = 20 mA ⁽³⁾ |
| | OPS692 OPS693, OPS698 | 1.0 2.0 | - - | - - | mA mA | |

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

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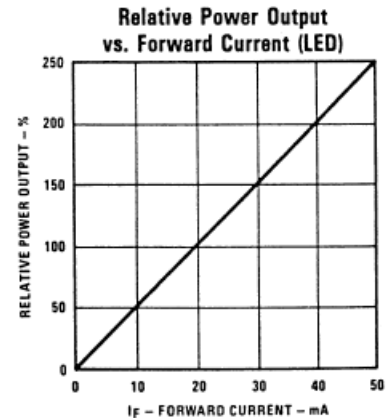
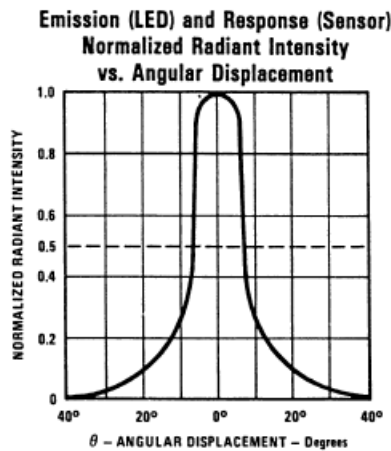
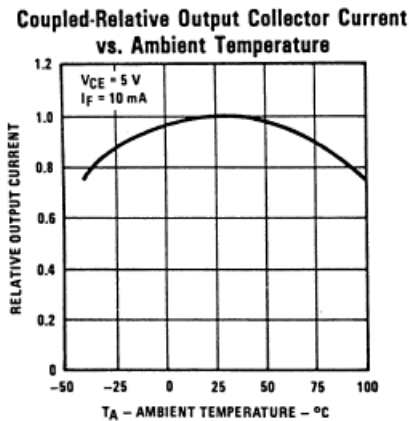
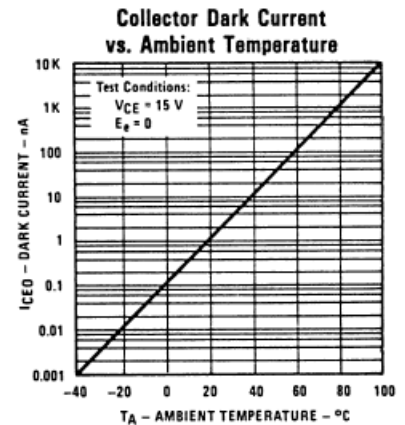
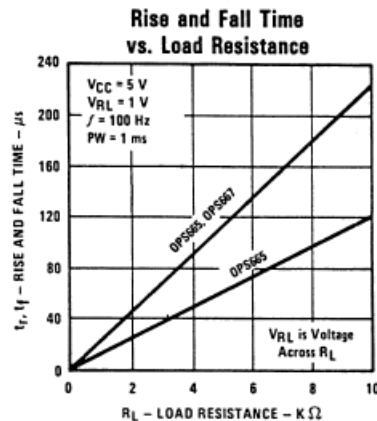
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Performance

OPS665, OPS666, OPS667



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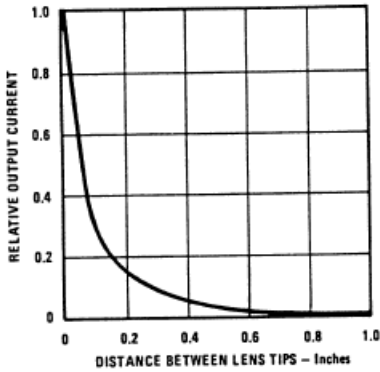
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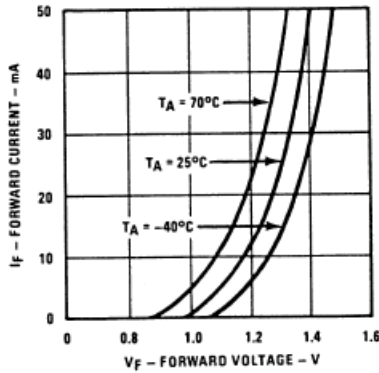
Performance

OPS691, OPS692, OPS693

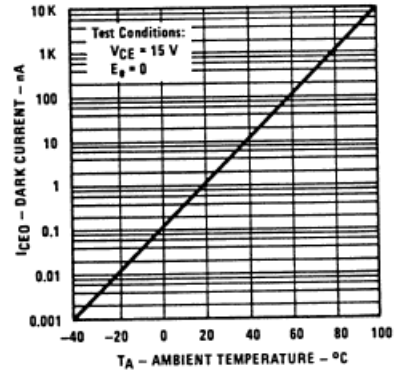
Coupling Characteristics of OP140 and OP550



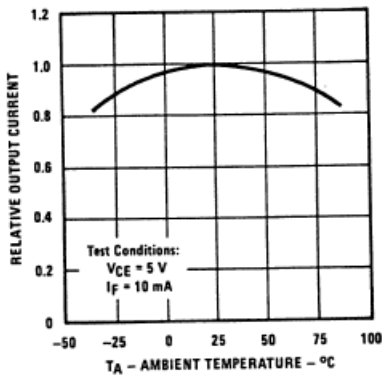
Forward Current vs Forward Voltage



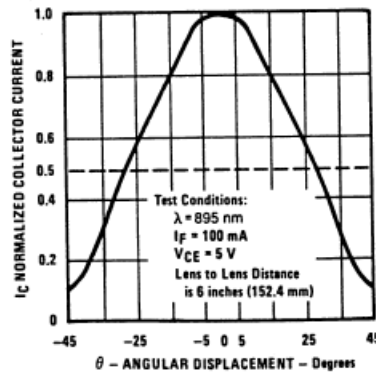
Dark Current vs Free Air Temperature



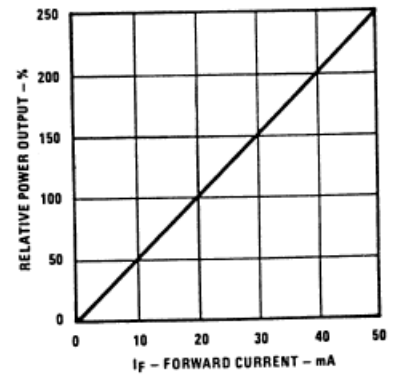
Relative Output Current vs Free Air Temperature



Normalized Collector Current vs Angular Displacement



Relative Power Output vs Forward Current (LED)



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Performance

OPS698

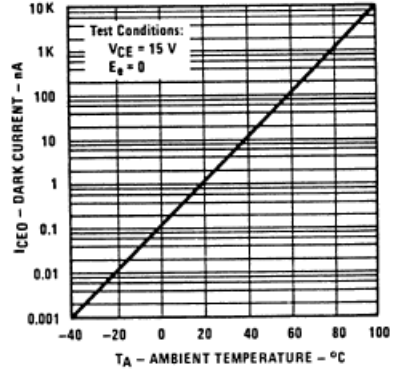
Coupling Characteristics of OP145 and OP555



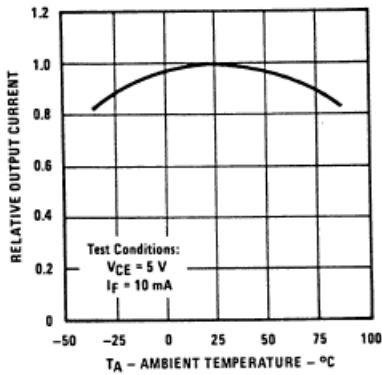
Forward Current vs Forward Voltage



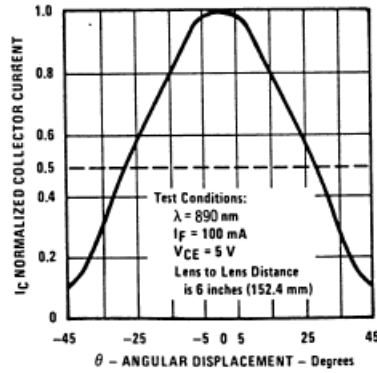
Dark Current vs Free Air Temperature



Relative Output Current vs Free Air Temperature



Normalized Collector Current vs Angular Displacement



Relative Power Output vs Forward Current (LED)



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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А