



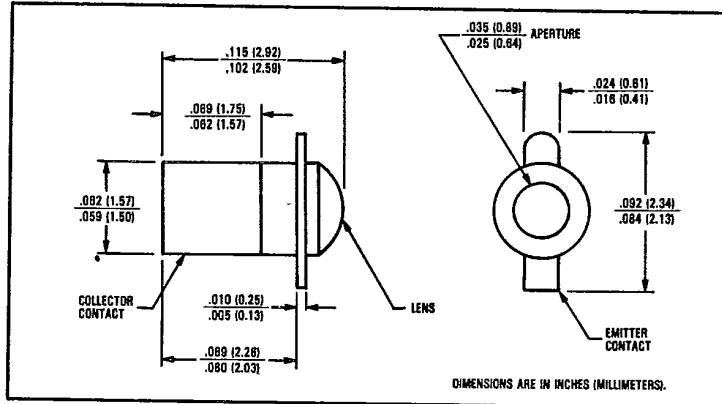
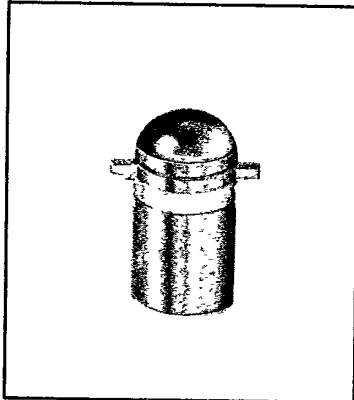
Optoelectronics Division
TRW Electronic Components Group

Product Bulletin 5131
January 1985

T-41-61

NPN Silicon Phototransistors

Types OP600-OP604, OP640-OP644



Features

- Miniature hermetically sealed package
- Wide range of collector currents
- Ideal for direct mounting in PC boards⁽¹⁾

Description

The OP600 through OP604 and OP640 through OP644 each consist of an NPN silicon phototransistor mounted in a miniature glass lensed, hermetically sealed, "Pill" package. The lensing effect allows an acceptance half angle of 18° measured from the optical axis to the half power point. Except for breakdown voltages and leakage the OP600 series and OP640 series are identical. They are also mechanically and spectrally matched to the OP123 and OP223 series of infrared emitting diodes.

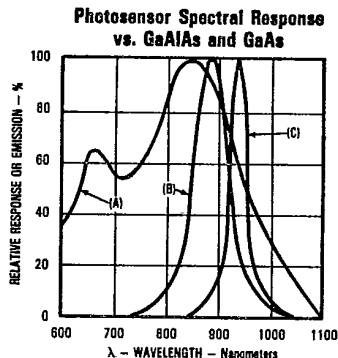
Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

| | |
|--|----------------------|
| Collector-Emitter Voltage — OP600-OP604 | 50 V |
| OP640-OP641 | 25 V |
| Emitter-Collector Voltage — OP600-OP604 | 7.0 V |
| OP640-OP641 | 5.0 V |
| Storage Temperature Range | -65°C to +150°C |
| Operating Temperature Range | -65°C to +125°C |
| Soldering Temperature (for 5 seconds with soldering iron) ⁽²⁾ | 240°C |
| Power Dissipation | 50 mW ⁽³⁾ |

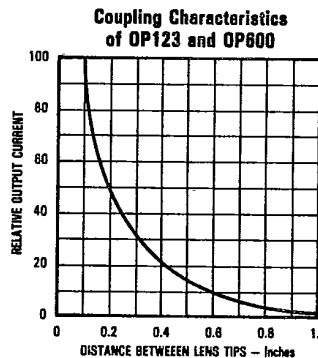
Notes:

- (1) Refer to Application Bulletin 111 which discusses proper techniques for soldering Pill type devices to PC boards.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when wave 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 or equivalent infrared source.

Typical Performance Curves



Test Conditions (LED): T_A = T_J = 25°C, I_F = 100 mA, DC = 0.1%, PW = 100 μs
Peak Wavelength - λ_{pc}: (A) XSTR - 850 ± 30 nm, (B) LED GaAlAs - 875 ± 20 nm, (C) LED GaAs - 930 ± 15 nm



Types OP600-OP604, OP640-OP644

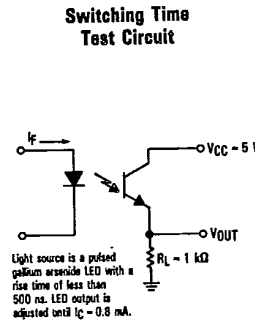
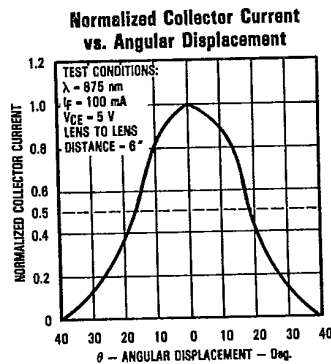
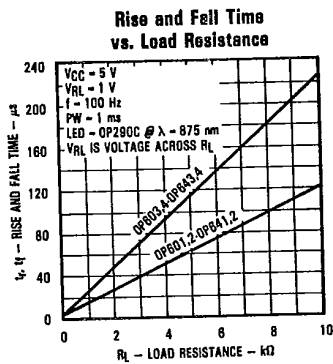
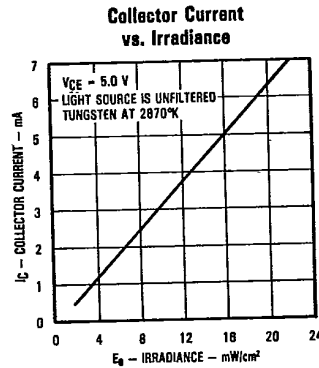
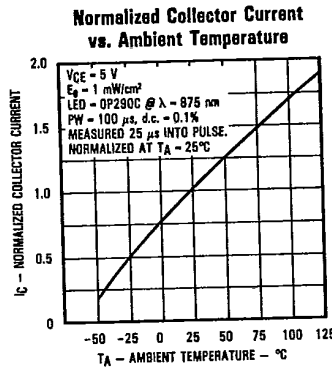
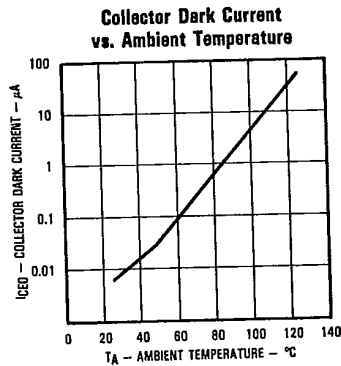
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Electrical Characteristics (T_A = 25°C unless otherwise noted)

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions | |
|-------------------------------------|--------------------------------------|-------------|------|------|-------|--|---|
| I _{C(ON)} ⁽¹⁾ | On-State Collector Current | OP600-OP640 | 0.50 | | | mA | V _{CE} = 5.0 V, E _g = 20 mW/cm ²⁽¹⁵⁾ |
| | | OP601-OP641 | 0.50 | | 3.0 | mA | V _{CE} = 5.0 V, E _g = 20 mW/cm ²⁽¹⁵⁾ |
| | | OP602-OP642 | 2.0 | | 5.0 | mA | V _{CE} = 5.0 V, E _g = 20 mW/cm ²⁽¹⁵⁾ |
| | | OP603-OP643 | 4.0 | | 8.0 | mA | V _{CE} = 5.0 V, E _g = 20 mW/cm ²⁽¹⁵⁾ |
| | | OP604-OP644 | 7.0 | | 22 | mA | V _{CE} = 5.0 V, E _g = 20 mW/cm ²⁽¹⁵⁾ |
| I _{CEO} | Collector Dark Current | OP600-OP604 | | 25 | nA | V _{CE} = 10.0 V, E _g = 0 | |
| | | OP640-OP644 | | 100 | nA | V _{CE} = 10.0 V, E _g = 0 | |
| V _{(BR)CEO} | Collector-Emitter Breakdown Voltage | OP600-OP604 | 60 | | | V | I _C = 100 μA |
| | | OP640-OP644 | 25 | | | V | I _C = 100 μA |
| V _{(BR)ECO} | Emitter-Collector Breakdown Voltage | OP600-OP604 | 7.0 | | | V | I _E = 100 μA |
| | | OP640-OP644 | 5.0 | | | V | I _E = 100 μA |
| V _{CE(SAT)} ⁽⁴⁾ | Collector-Emitter Saturation Voltage | | | 0.40 | V | I _C = 0.40 mA, E _g = 20 mW/cm ²⁽¹⁵⁾ | |
| t _r | Rise Time | | 2.5 | | μs | V _{CC} = 5.0 V, I _C = 0.80 mA | |
| t _f | Fall Time | | 2.5 | | μs | R _L = 1.00 kΩ, See Test Circuit | |



Typical Performance Curves



TRW reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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