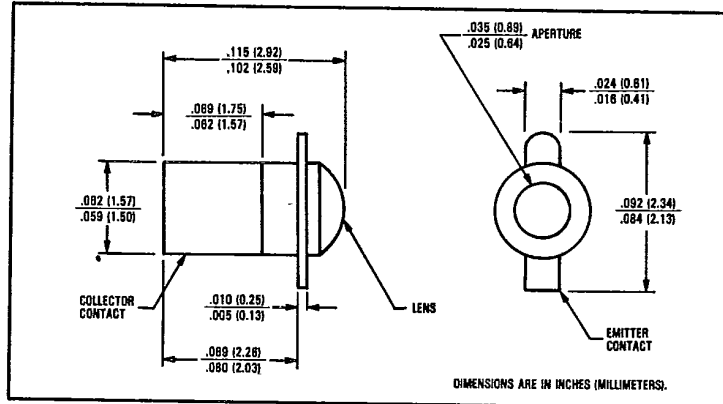
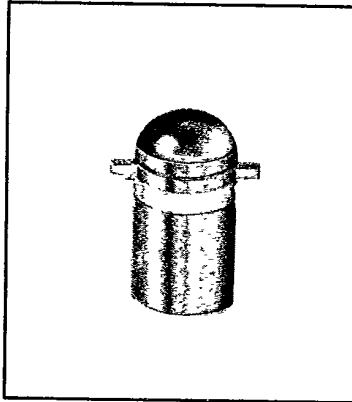


**NPN Silicon Phototransistors**  
**Types OP600-OP604, OP640-OP644****Features**

- Miniature hermetically sealed package
- Wide range of collector currents
- Ideal for direct mounting in PC boards<sup>1)</sup>

**Description**

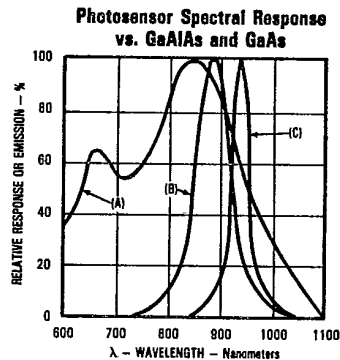
The OP600 through OP604 and OP640 through OP644 each consist of an NPN silicon phototransistor mounted in a miniature glass lensed, hermetically sealed, "Pill" package. The lensing effect allows an acceptance half angle of 18° measured from the optical axis to the half power point. Except for breakdown 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** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

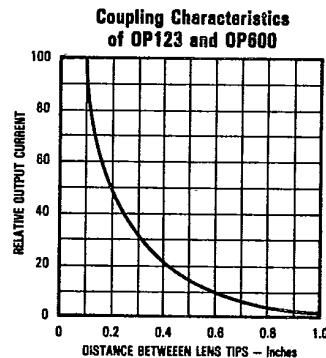
Collector-Emitter Voltage — OP600-OP604	50 V
OP640-OP641	25 V
Emitter-Collector Voltage — OP600-OP604	7.0 V
OP640-OP641	5.0 V
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	-65°C to +125°C
Soldering Temperature (for 5 seconds with soldering iron) <sup>2)</sup>	240°C
Power Dissipation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

**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  $T = 2870^\circ\text{K}$  or equivalent infrared source.

**Typical Performance Curves**

Test Conditions (LED):  $T_A = T_J = 25^\circ\text{C}$ ,  $I_F = 100\text{ mA}$ ,  
DC = 0.1%, PW = 100  $\mu\text{s}$   
Peak Wavelength —  $\lambda_{PC}$ : (A) XSTR —  $850 \pm 30\text{ nm}$ , (B) LED  
GaAlAs —  $675 \pm 20\text{ nm}$ , (C) LED GaAs —  $930 \pm 15\text{ nm}$



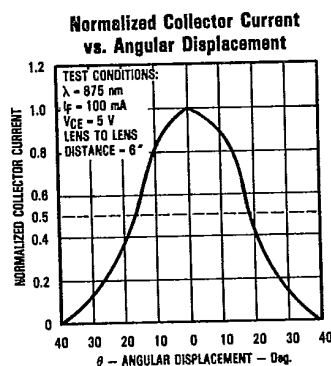
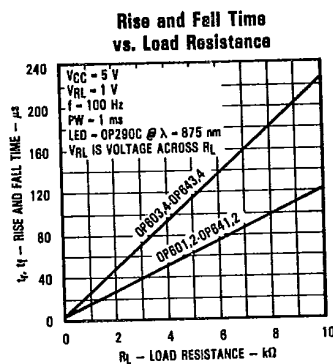
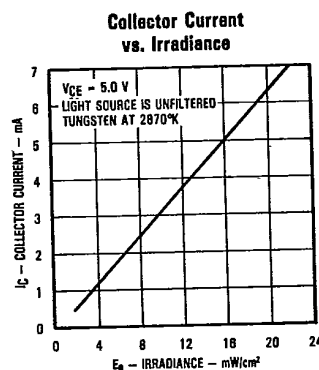
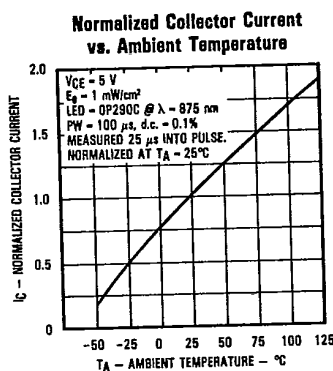
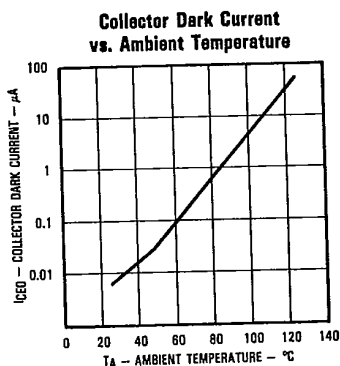
# Types OP600-OP604, OP640-OP644

T-41-61

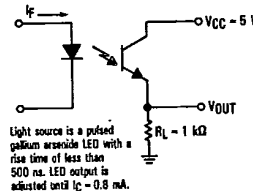
## Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_{C(ON)}$ <sup>(1)</sup>	On-State Collector Current	OP600-OP640	0.50		mA	$V_{CE} = 5.0\text{ V}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
		OP601-OP641	0.50	3.0	mA	$V_{CE} = 5.0\text{ V}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
		OP602-OP642	2.0	5.0	mA	$V_{CE} = 5.0\text{ V}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
		OP603-OP643	4.0	8.0	mA	$V_{CE} = 5.0\text{ V}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
		OP604-OP644	7.0	22	mA	$V_{CE} = 5.0\text{ V}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
$I_{CEO}$	Collector Dark Current	OP600-OP604		25	nA	$V_{CE} = 10.0\text{ V}$ , $E_g = 0$
		OP640-OP644		100	nA	$V_{CE} = 10.0\text{ V}$ , $E_g = 0$
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	OP600-OP604	50		V	$I_C = 100\text{ }\mu\text{A}$
		OP640-OP644	25		V	$I_C = 100\text{ }\mu\text{A}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	OP600-OP604	7.0		V	$I_E = 100\text{ }\mu\text{A}$
		OP640-OP644	5.0		V	$I_E = 100\text{ }\mu\text{A}$
$V_{CE(SAT)}$ <sup>(4)</sup>	Collector-Emitter Saturation Voltage			0.40	V	$I_C = 0.40\text{ mA}$ , $E_g = 20\text{ mW/cm}^2$ <sup>(2)</sup>
$t_r$	Rise Time		2.5		$\mu\text{s}$	$V_{CC} = 5.0\text{ V}$ , $I_C = 0.80\text{ mA}$
$t_f$	Fall Time		2.5		$\mu\text{s}$	$R_L = 1.00\text{ k}\Omega$ , See Test Circuit

## Typical Performance Curves



## Switching Time Test Circuit



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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