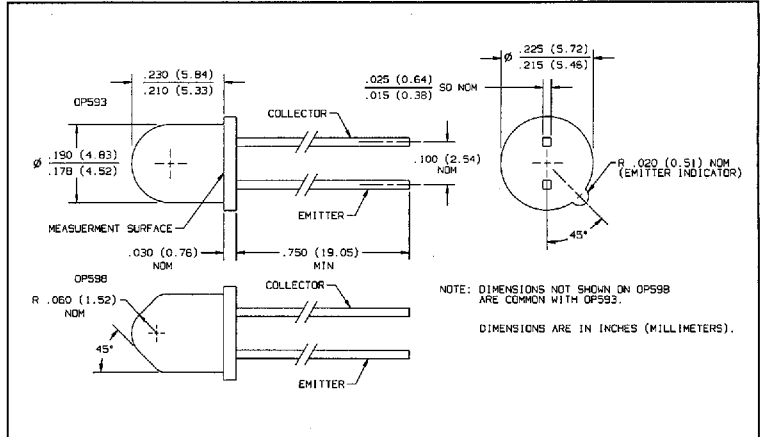
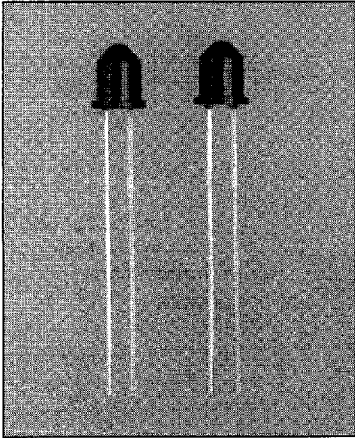


# NPN Plastic Silicon Phototransistors

## Types OP593, OP598 Series



### Features

- Wide receiving angle
- Variety of sensitivity ranges
- TO-18 equivalent package style

### Description

The OP593/598 series consist of NPN silicon phototransistors molded in dark blue epoxy packages. The wide receiving angle provides relatively even reception over a large area. These devices are 100% production tested using infrared light for close correlation with Optek's GaAs and GaAlAs emitters.

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

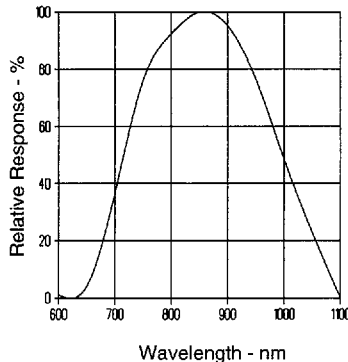
|  |   |
|--|---|
| Collector-Emitter Voltage .....  | 30 V  |
| Emitter-Collector Voltage .....  | 5.0 V                                       |
| Continuous Collector Current .....   | 50 mA                                       |
| Storage and Operating Temperature Range .....  | $-40^\circ\text{C}$ to $+100^\circ\text{C}$ |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] ..... | $260^\circ\text{C}^{(1)}$                   |
| Power Dissipation .....  | $250\text{ mW}^{(2)}$                       |

#### Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. Max. 20 grams force may be applied to leads when soldering.
- (2) Derate linearly  $3.33\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (3)  $V_{CE} = 5\text{ V}$ . Light source is an unfiltered GaAlAs emitting diode operating at peak emission wavelength of 890 nm and  $E_E(\text{APT})$  of  $1.7\text{ mW}/\text{cm}^2$  average within a .250" dia. aperture.
- (4) This dimension is held to within  $\pm 0.005''$  on the flange edge and may vary up to  $\pm 0.020''$  in the area of the leads.

### Typical Performance Curves

#### Typical Spectral Response



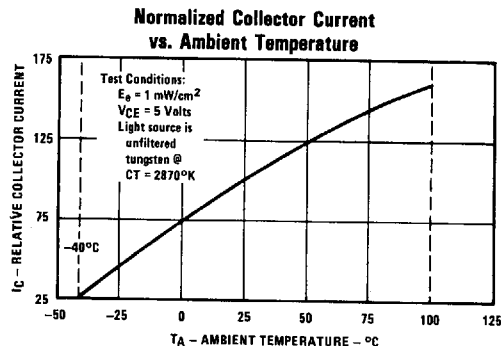
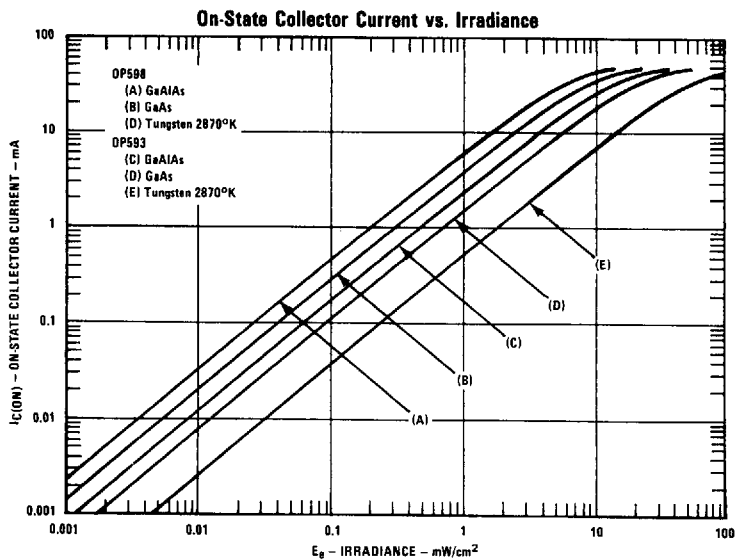
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# Types OP593, OP598 Series

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

| SYMBOL        | PARAMETER                            | MIN    | TYP | MAX  | UNITS | TEST CONDITIONS                                    |
|---------------|--------------------------------------|--------|-----|------|-------|--|
| $I_{C(ON)}$   | On-State Collector Current           | OP593C | 1.0 |      |       | mA<br>See Note (3)                                 |
|               |                                      | OP593B | 2.0 |      | 4.0   |  |
|               |                                      | OP593A | 3.0 |      |       |  |
|               |                                      | OP598C | 2.5 |      |       | mA<br>See Note (3)                                 |
|               |                                      | OP598B | 5.0 |      | 10    |  |
|               |                                      | OP598A | 7.5 |      |       |  |
| $I_{CEO}$     | Collector Dark Current               |        |     | 100  | nA    | $V_{CE} = 10\text{ V}, E_e = 0$                    |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage  | 30     |     |      | V     | $I_C = 100\ \mu\text{A}$                           |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage  | 5      |     |      | V     | $I_E = 100\ \mu\text{A}$                           |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage |        |     | 0.40 | V     | $I_C = 0.4\text{ mA}, E_e = 1.7\text{ mW/cm}^2(3)$ |

## Typical Performance Curves



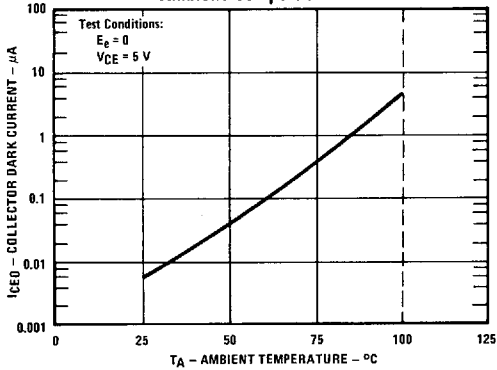
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Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.  
 Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (972)323-2200 Fax (972)323-2396

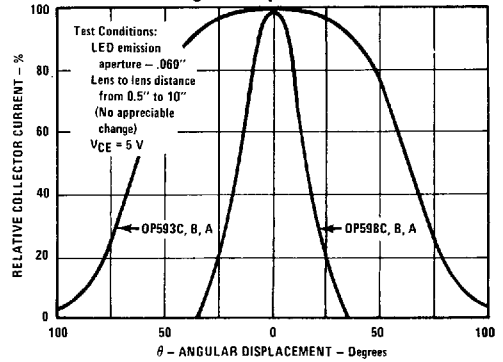
PHOTOSENSORS

## Typical Performance Curves

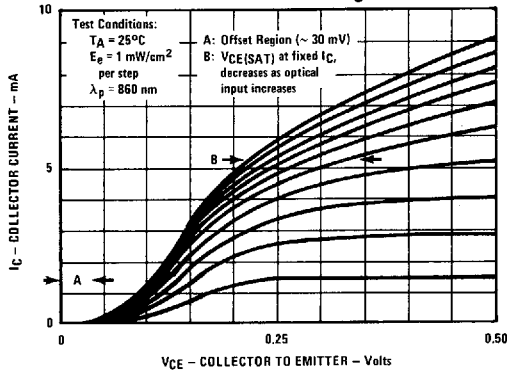
### Collector Dark Current vs. Ambient Temperature



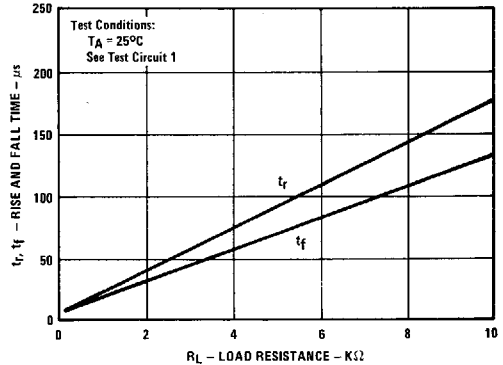
### Relative Collector Current vs. Angular Displacement



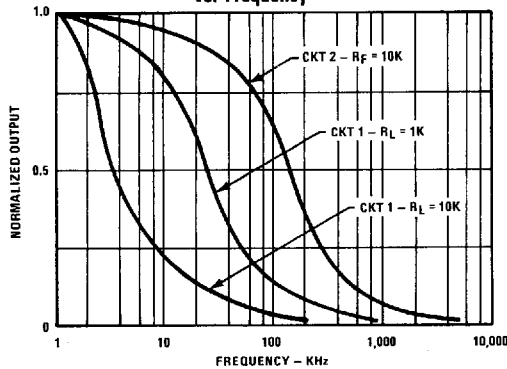
### Collector Current vs. Collector to Emitter Voltage



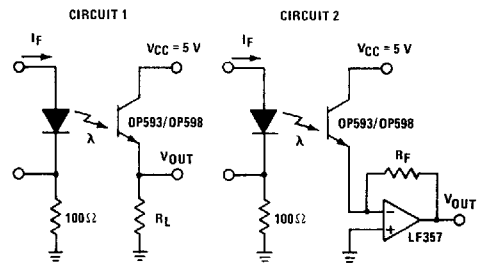
### Rise and Fall Time vs. Load Resistance



### Normalized Output vs. Frequency



### Switching Time Test Circuit

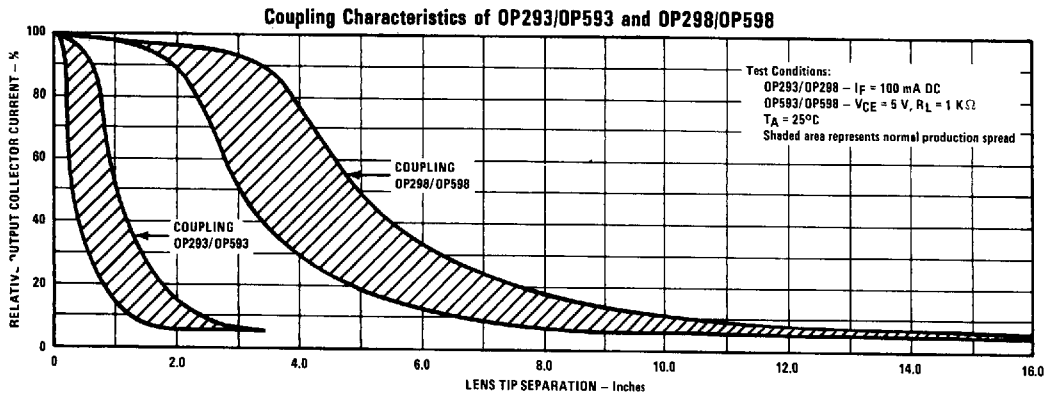
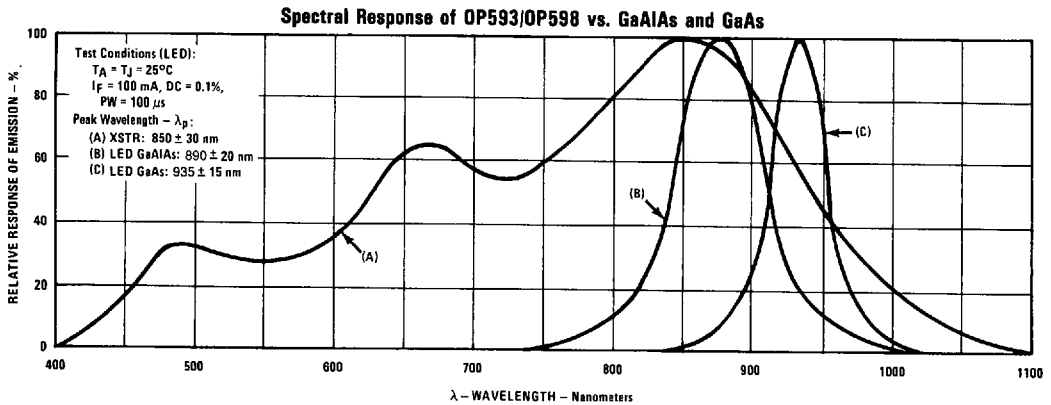
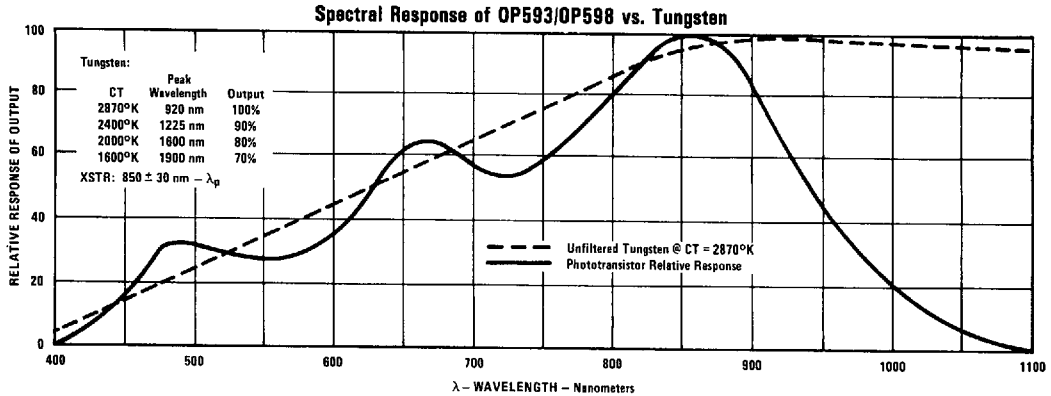


Test Conditions:  
 Light source is pulsed LED with  $t_r$  and  $t_f \leq 500\text{ ns}$ .  
 $I_F$  is adjusted for  $V_{OUT} = 1\text{ Volt}$ .

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# Types OP593, OP598 Series

## Typical Performance Curves



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