NPN Plastic Silicon Phototransistor

OP593, OP598 Series

Features:

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

Description:

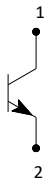
Each device in this series consists of an NPN silicon phototransistor molded in a dark blue epoxy packages. The wide receiving angle (130°) of the **OP593** series devices provides relatively even reception over a large area. The narrow receiving angle (25°) of the **OP598** series devices provides a relatively small reception area.

These devices are 100% production tested using infrared light for close correlation with OPTEK's GaAs and GaAlAs emitters.

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.

Applications:

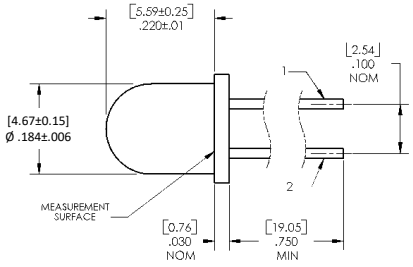
- Non-contact reflective or slotted sensor
- Assembly line automation
- Machine automation
- Machine Safety
- End of travel sensor
- Door sensor
- Safety Curtain



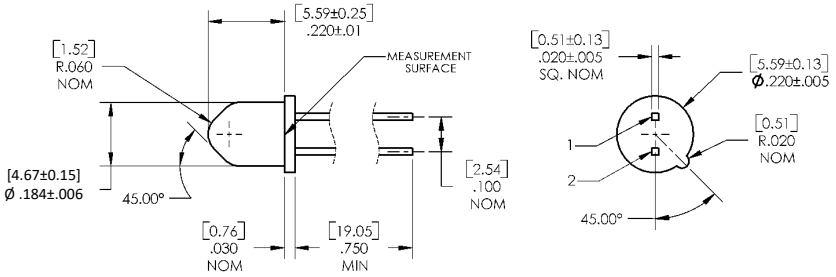
Pin #	Sensor
1	Collector
2	Emitter

Ordering Information			
Part Number	**Sensor**	**Viewing Angle**	**Lead Length**
OP593A	Transistor	130°	0.75”
OP593B			
OP593C (Obsolete)			
OP598A		25°	
OP598B			
OP598C			
OP798A (Obsolete)	R_{BE} Transistor	25°	
OP798B (Obsolete)			
OP798C (Obsolete)			
OP798D (Obsolete)			

OP593



OP598



RoHS

DIMENSIONS ARE IN: **[MILLIMETERS]** **INCHES**

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Electrical Specifications

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

Storage and Operating Temperature Range	-40° C to +100° C
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5 V
Continuous Collector Current	50 mA
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron]	260° C(1)
Power Dissipation	250 mW(2)

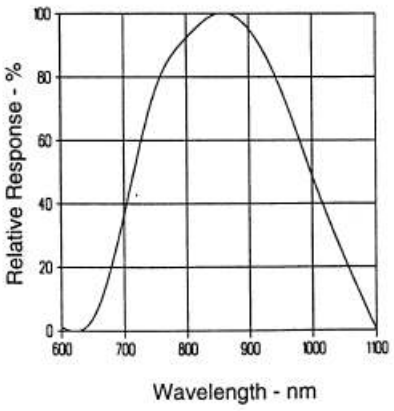
Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current OP593A OP593B OP598A OP598B OP598C	 3.0 2.0 7.5 5.0 2.5	 - - - - -	 4 4 10 10 10	mA	V_{CE} = 5 V. Light source is an unfiltered GaAlAs LED with a peak emission wavelength of 890 nm and $E_{e(APT)}$ of 1.7 mW/cm^2 average within a .250" diameter aperture.
I_{CEO}	Collector-Dark Current	-	-	100	nA	V_{CE} = 10 V, E_E = 0
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30	-	-	V	I_C = 100 µA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5	-	-	V	I_E = 100 µA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.40	V	I_C = 0.4 mA, E_E = 1.7 mW/cm^2

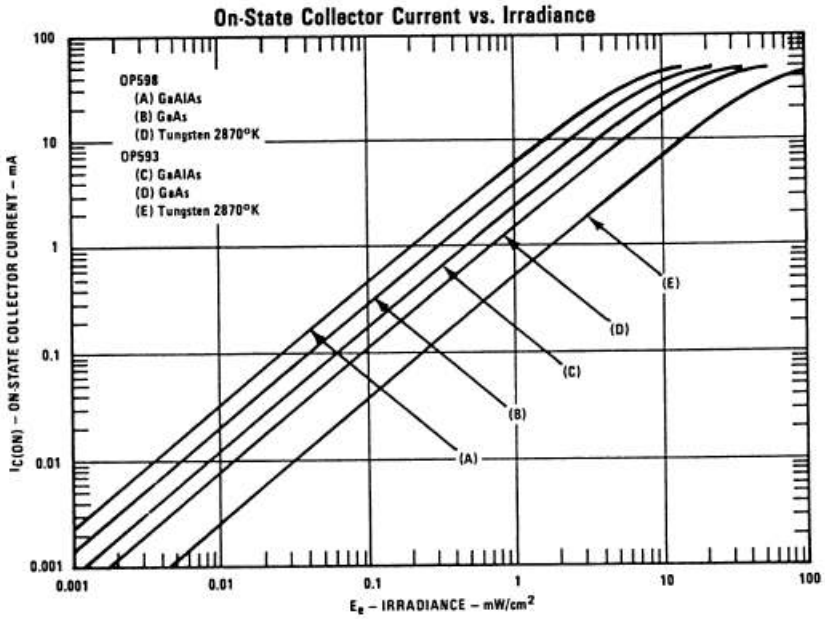
Performance

OP593, OP598

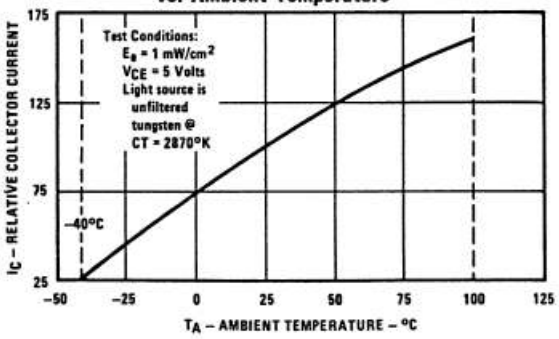
Typical Spectral Response



On-State Collector Current vs. Irradiance



Normalized Collector Current vs. Ambient Temperature



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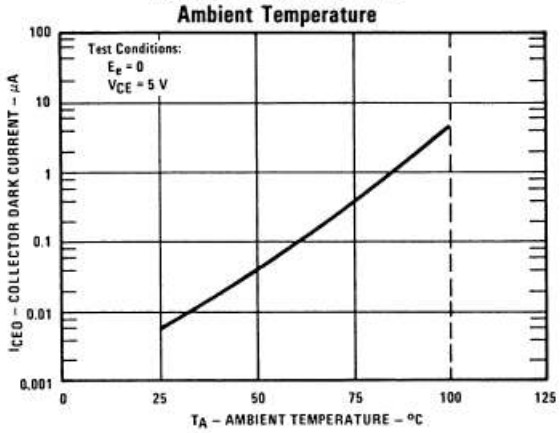
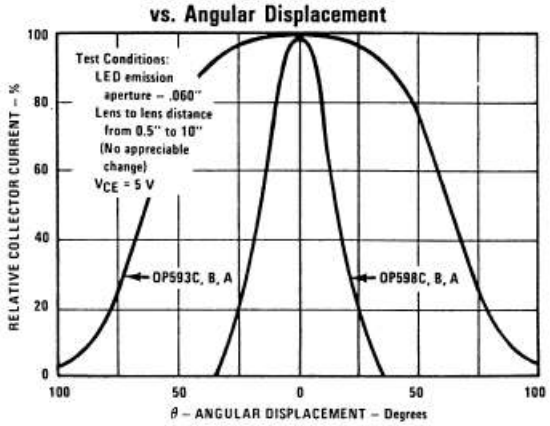
Performance

OP593, OP598

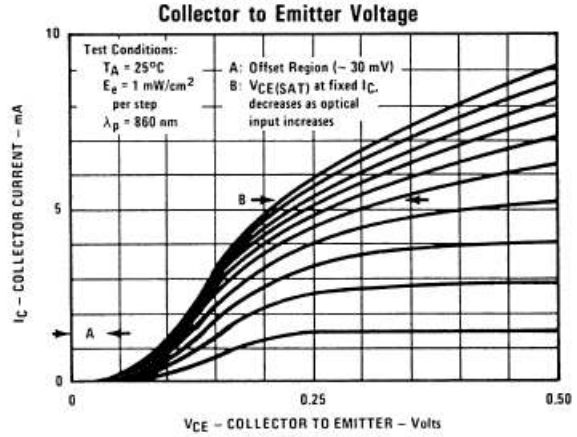
Collector Dark Current vs. Ambient Temperature



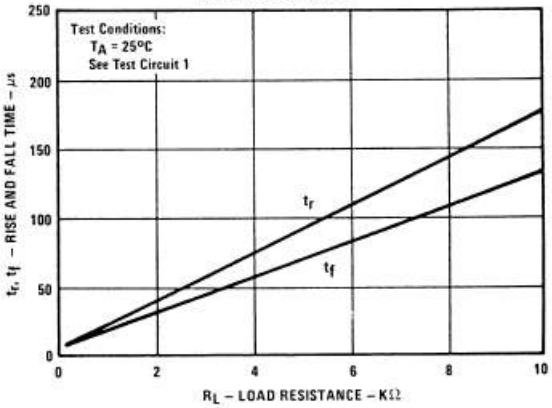
Relative Collector Current vs. Angular Displacement



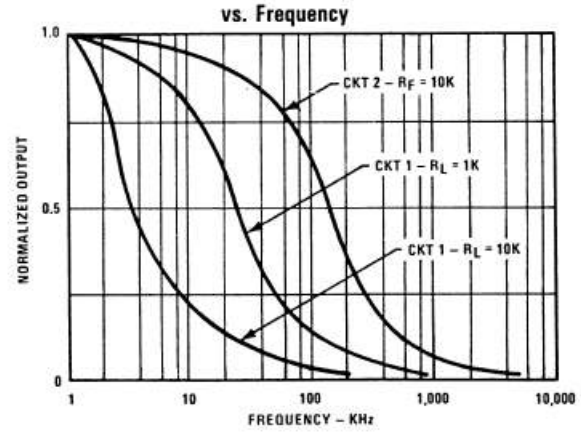
Collector Current vs. Collector to Emitter Voltage



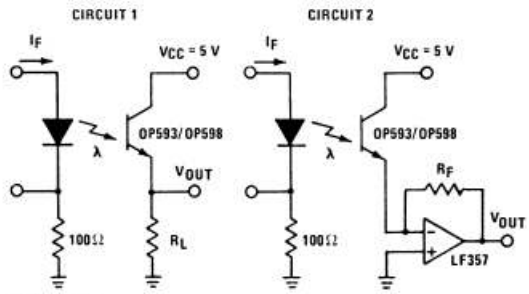
Rise and Fall Time vs. Load Resistance



Normalized Output vs. Frequency



Switching Time Test Circuit

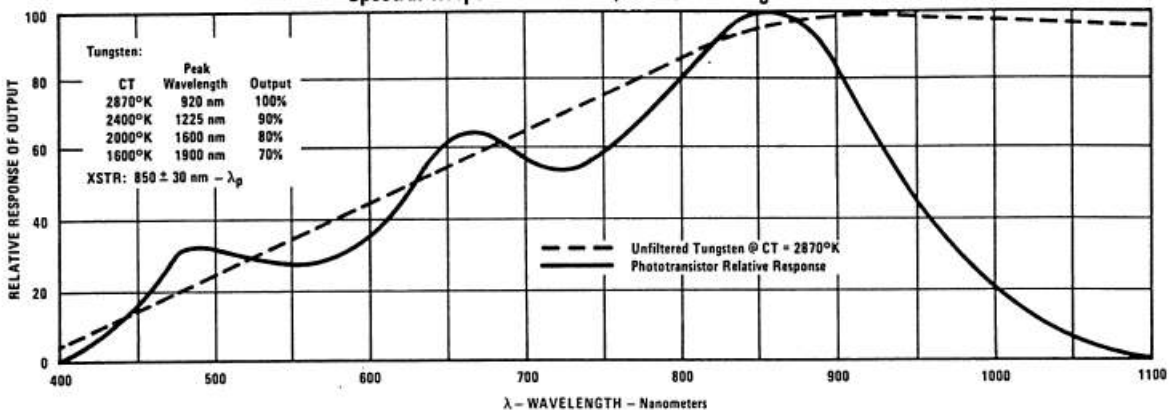


Test Conditions:
Light source is pulsed LED with t_r and $t_f \leq 500$ ns.
I_F is adjusted for $V_{OUT} = 1$ Volt.

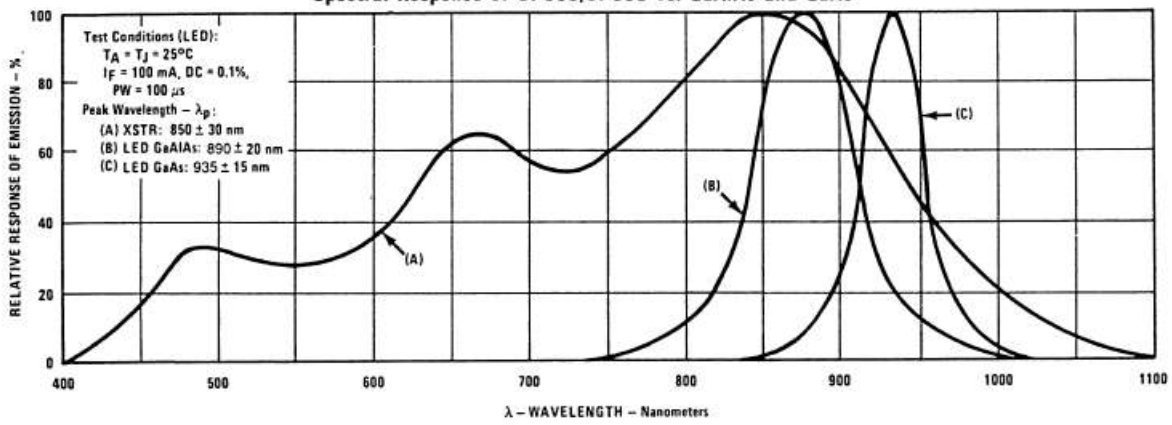
Performance

OP593, OP598

Spectral Response of OP593/OP598 vs. Tungsten



Spectral Response of OP593/OP598 vs. GaAlAs and GaAs



Coupling Characteristics of OP293/OP593 and OP298/OP598