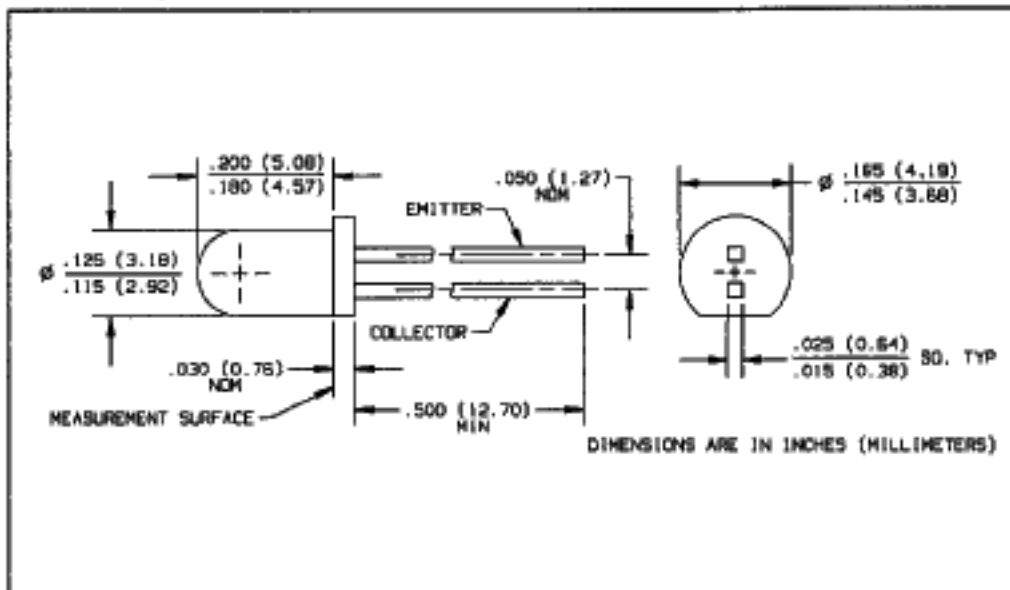
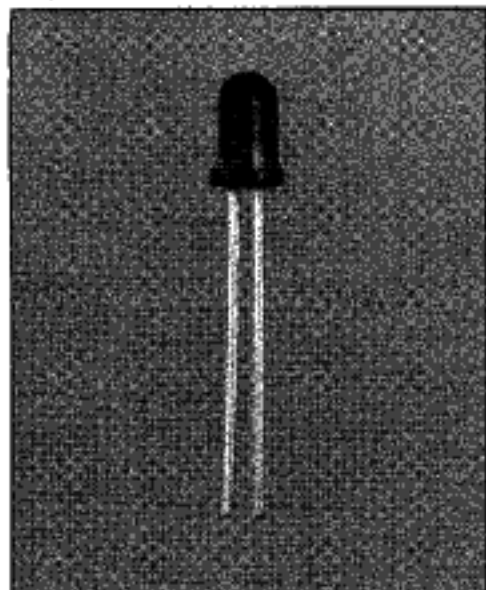


# Infrared Selected NPN Silicon Phototransistors Types OP505A, OP505B, OP505C, OP505D



## Features

- Narrow receiving angle
- Variety of sensitivity ranges
- T-1 package style
- Small package size for space limited applications

## Description

The OP505 series devices consist of NPN silicon phototransistors molded in blue tinted epoxy packages. The narrow receiving angle provides excellent on-axis coupling. These devices are 100% production tested using infrared light for close correlation with Optek's GaAs and GaAlAs emitters.

## Replaces

K5500 Series

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

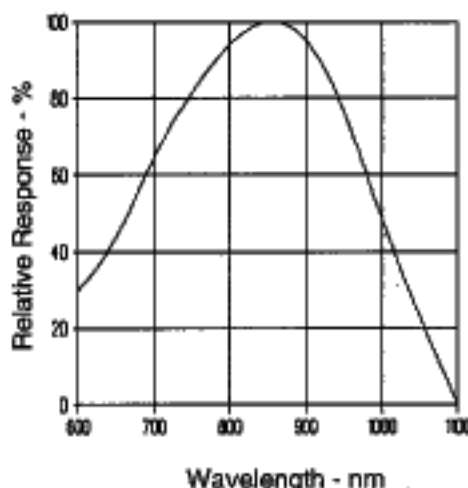
Collector-Emitter Voltage	30 V
Emitter-Collector Voltage	5.0 V
Storage and Operating Temperature Range	$-40^\circ\text{C}$ to $+100^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	$260^\circ\text{C}^{(1)}$
Power Dissipation	$100\text{ mW}^{(2)}$

### Notes:

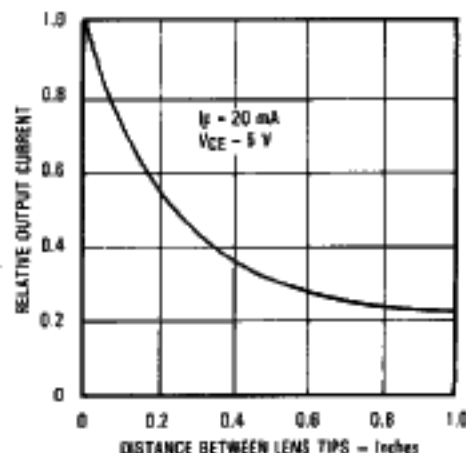
- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. Max. 20 grams force may be applied to leads when soldering.
- (2) Derate linearly  $1.33\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (3) Light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm and a radiometric intensity level which varies less than 10% over the entire lens surface of the phototransistor being tested.
- (4) To calculate typical collector dark current in  $\mu\text{A}$ , use the formula  $I_{CED} = 10^{(0.040 T_A - 3.4)}$  where  $T_A$  is ambient temperature in  $^\circ\text{C}$ .

## Typical Performance Curves

Typical Spectral Response



Coupling Characteristics  
OP165 and OP505



# Types OP505A, OP505B, OP505C, OP505D

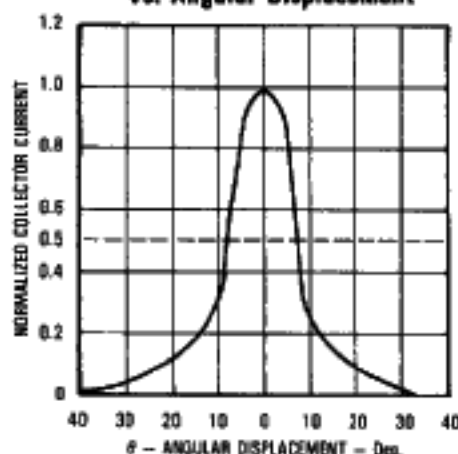
Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current	OP505D 0.55 OP505C 1.10 OP505B 2.15 OP505A 4.30		3.00 5.95	mA	$V_{CE} = 5\text{ V}$ , $E_e = 0.50\text{ mW/cm}^2$ <sup>(2)(3)</sup> $V_{CE} = 5\text{ V}$ , $E_e = 0.50\text{ mW/cm}^2$ <sup>(2)(3)</sup> $V_{CE} = 5\text{ V}$ , $E_e = 0.50\text{ mW/cm}^2$ <sup>(2)(3)</sup> $V_{CE} = 5\text{ V}$ , $E_e = 0.50\text{ mW/cm}^2$ <sup>(2)(3)</sup>
$\Delta I_C/\Delta T$	Relative $I_C$ Changes with Temperature		1.00		%/ $^\circ\text{C}$	$V_{CE} = 5\text{ V}$ , $E_e = 1.00\text{ mW/cm}^2$ $\lambda = 935\text{ nm}$
$I_{CEO}$	Collector Dark Current			100	nA	$V_{CE} = 10.0\text{ V}$ , $E_e = 0$ <sup>(4)</sup>
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30			V	$I_C = 100\text{ }\mu\text{A}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0			V	$I_E = 100\text{ }\mu\text{A}$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage			0.40	V	$I_C = 250\text{ }\mu\text{A}$ , $E_e = 0.50\text{ mW/cm}^2$ $\lambda = 935\text{ nm}$

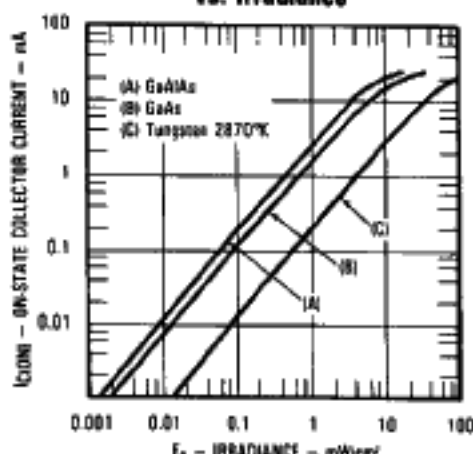
PHOTOSENSORS

## Typical Performance Curves

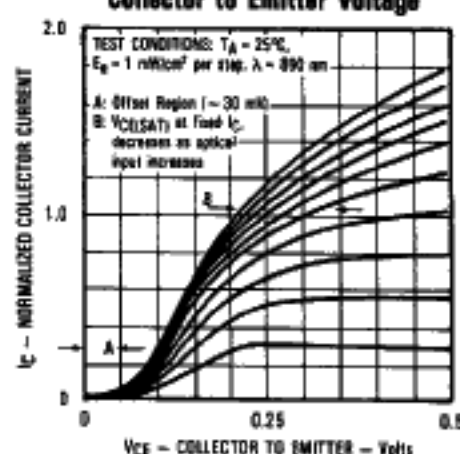
Normalized Collector Current vs. Angular Displacement



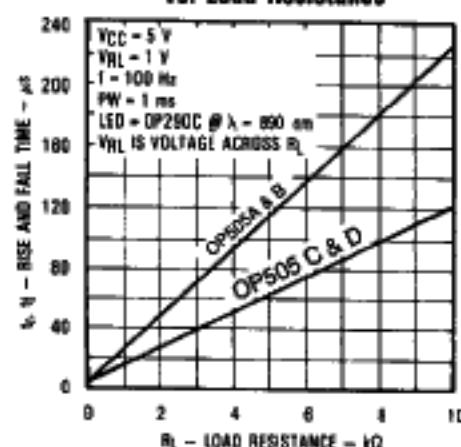
On-State Collector Current vs. Irradiance



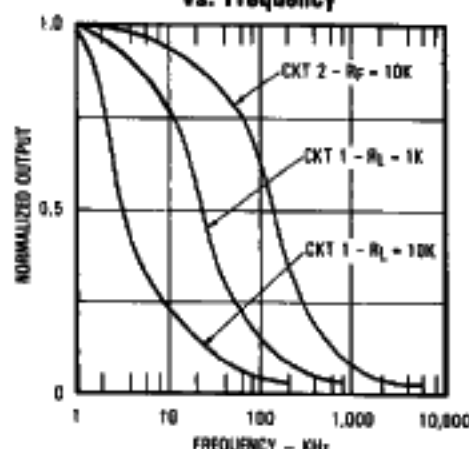
Normalized Collector Current vs. Collector to Emitter Voltage



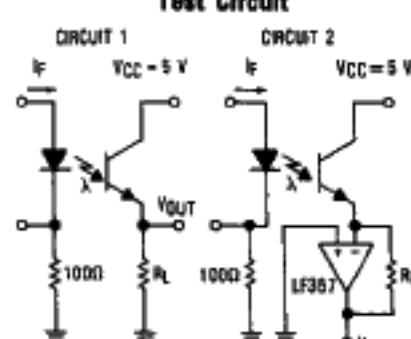
Rise and Fall Time vs. Load Resistance



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  $V_{OUT} = 1\text{ Volt}$ .