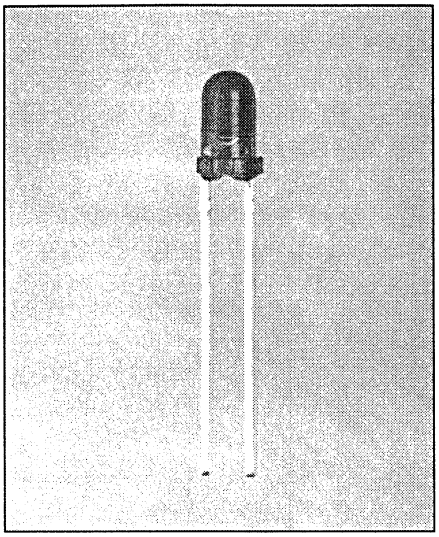
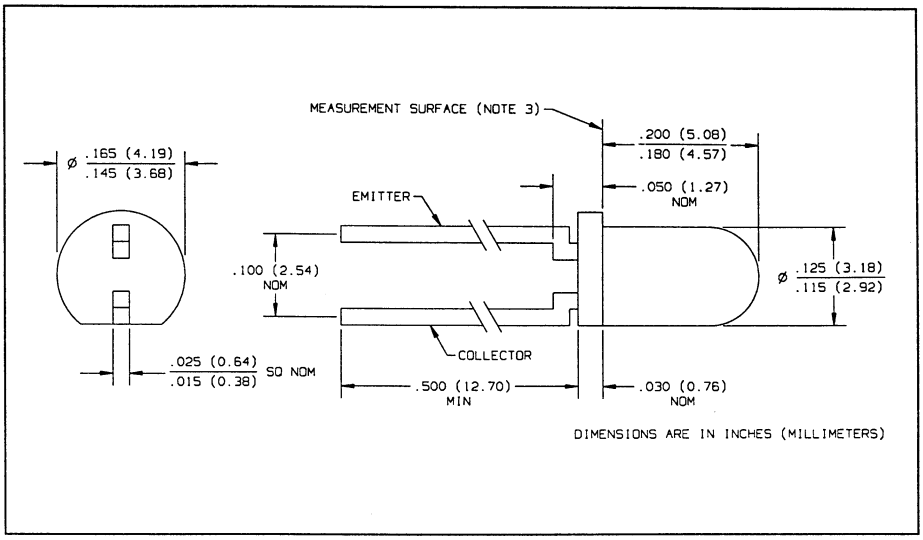
NPN Silicon Phototransistors
Types OP506A, OP506B, OP506C, OP506D





Features

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

Description

The OP506 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. Lead spacing is 0.100" (2.54mm).

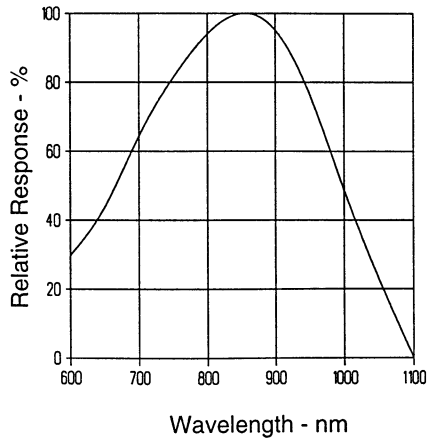
Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

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

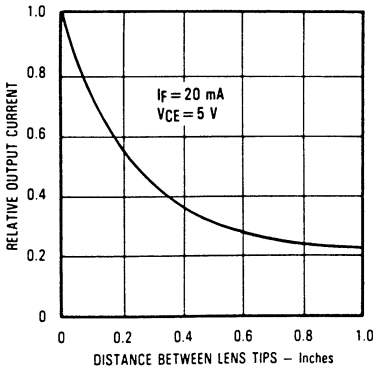
Notes:
(1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. Max. 20 grams force may be applied to leads when soldering.
(2) Derate linearly 1.33 mW/° C above 25° C.
(3) Light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm and a radiometric 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 μA, use the formula $I_{CED} = 10^{(0.040\,T_A - 3.4)}$ where T_A is ambient temperature in ° C.

Typical Performance Curves

Typical Spectral Response



Coupling Characteristics of OP166 and OP506



Types OP506A, OP506B, OP506C, OP506D

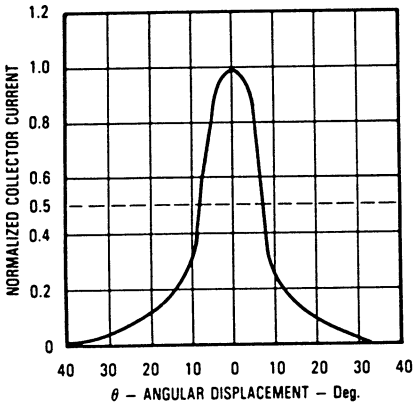
Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current	OP506D	0.55			mA	V_{CE} = 5 V, E_e = 0.50 mW/cm^2[2(4)]
		OP506C	1.10		3.00	mA	V_{CE} = 5 V, E_e = 0.50 mW/cm^2[2(4)]
		OP506B	2.15		5.95	mA	V_{CE} = 5 V, E_e = 0.50 mW/cm^2[2(4)]
		OP506A	4.30			mA	V_{CE} = 5 V, E_e = 0.50 mW/cm^2[2(4)]
$\Delta I_C/\Delta T$	Relative I_C Changes with Temperature			1.00		%/° C	V_{CE} = 5 V, E_e = 1.0 mW/cm^2
I_{CEO}	Collector Dark Current				100	nA	V_{CE} = 10 V, E_e = 0[4]
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage		30			V	I_C = 100 µA
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage		5.0			V	I_E = 100 µA
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage				0.40	V	I_C = 250 mA, E_e = 0.50 mW/cm^2, λ = 935 nm[3]

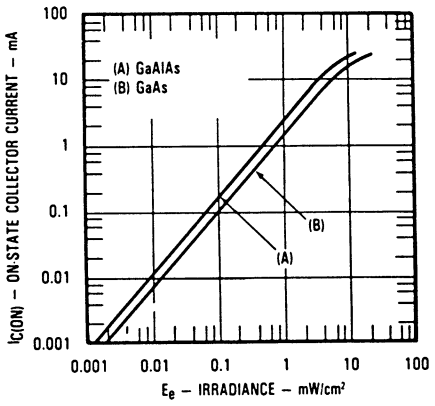
PHOTOSENSORS

Typical Performance Curves

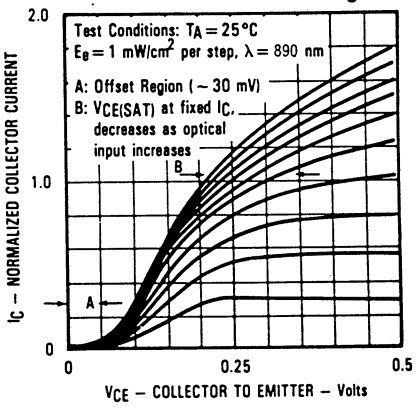
Normalized Collector Current vs Angular Displacement



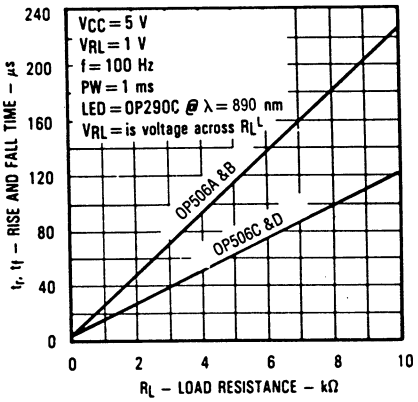
On-State Collector Current vs Irradiance



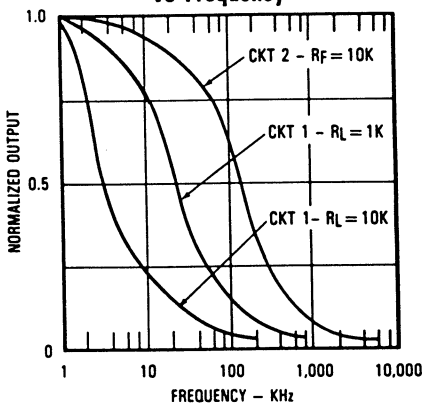
Normalized Collector Current vs Collector-to-Emitter Voltage



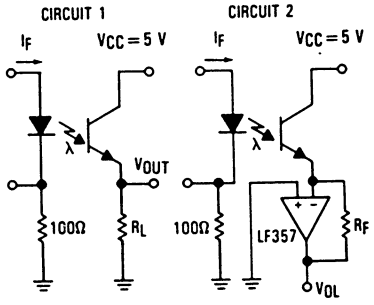
Rise and Fall Time vs Load Resistance



Normalized Output vs Frequency



Switching Time Test Circuit



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

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