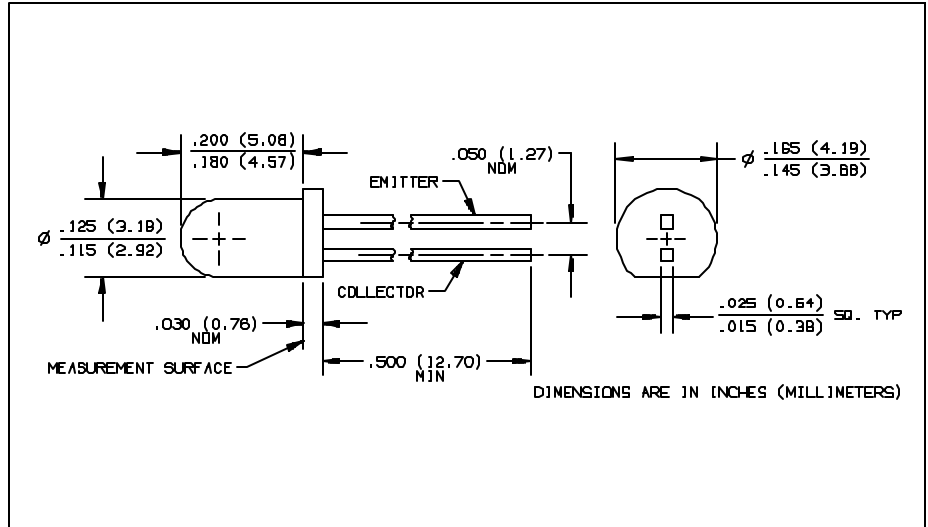
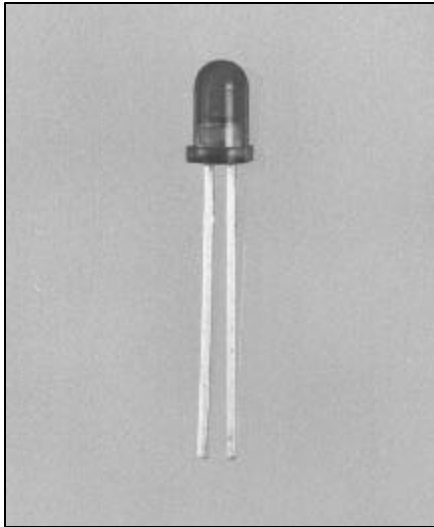


# NPN Phototransistor with Base-Emitter Resistor Types OP705A, OP705B, OP705C, OP705D



## Features

- Narrow receiving angle
- Variety of sensitivity ranges
- T-1 package style
- Small package size for space limited applications
- Base-emitter resistor provides ambient light protection

## Description

The OP705 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.

The phototransistor has an internal base-emitter resistor which provides protection from low level ambient lighting conditions. This feature is also useful when the media being detected is semi-transparent to infrared light in interruptive applications.

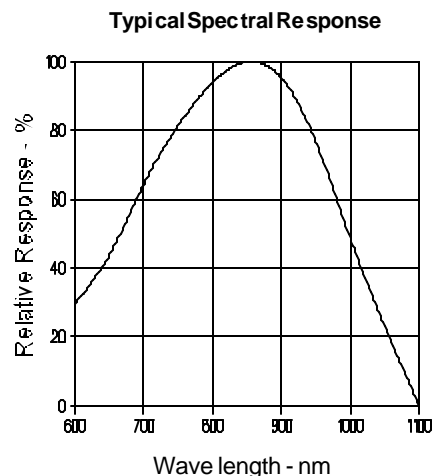
## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Collector-Emitter Voltage	30 V
Emitter Reverse Current	10 mA
Collector DC Current	30 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	100 mW <sup>(2)</sup>

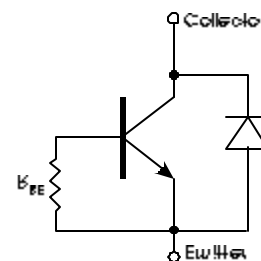
## NOTES:

- (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) The knee point irradiance is defined as the irradiance required to increase  $I_{C(ON)}$  to  $50\mu\text{A}$ .

## Typical Performance Curves



## Schematic



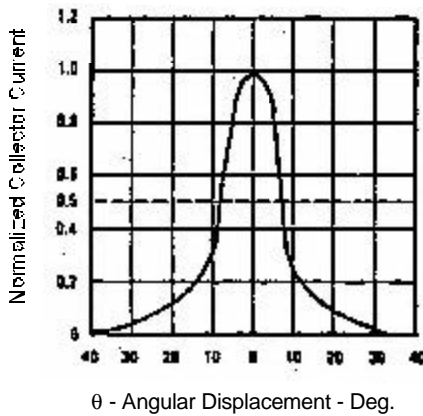
# Types OP705A, OP705B, OP705C, OP705D

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

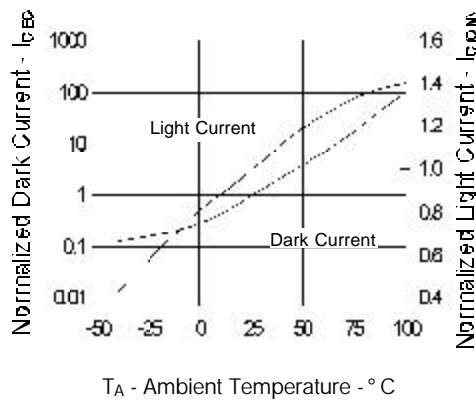
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}$	On-State Collector Current	OP705A OP705B OP705C OP705D	3.95 2.65 1.50 1.50	12.0 7.25 4.85 12.0	mA	$V_{CE} = 5\text{ V}$ , $E_e = .50\text{ mW/cm}^2(3)$
$E_{KP}$	Knee Point Irradiance		.02		$\text{mW/cm}^2$	$V_{CE} = 5\text{ V}(4)$
$I_{CEO}$	Collector-Emitter Dark Current			100	nA	$V_{CE} = 10\text{ V}$ , $E_e = 0$
$I_{ECO}$	Emitter-Reverse Current			100	$\mu\text{A}$	$V_{EC} = 0.4\text{ V}$
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30			V	$I_C = 100\ \mu\text{A}$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage			0.4	V	$I_C = 250\ \mu\text{A}$ , $E_e = .50\text{ mW/cm}^2(3)$

## Typical Performance Curves

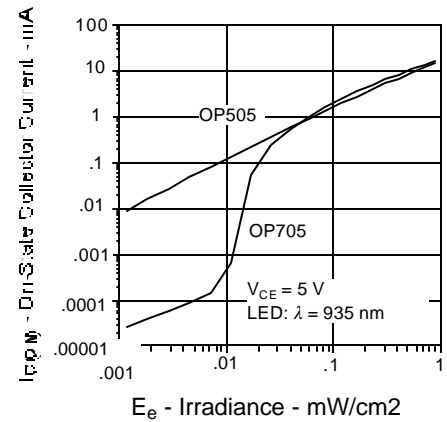
Normalized Collector Current



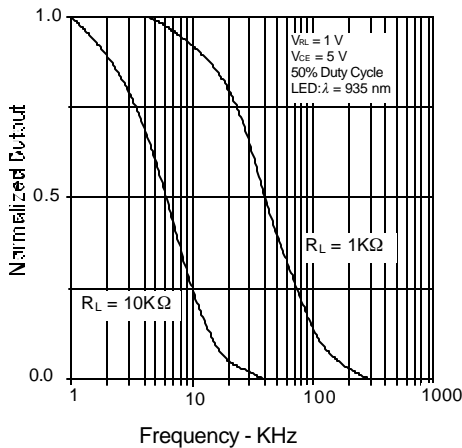
Normalized Light and Dark Current vs. Ambient Temperature



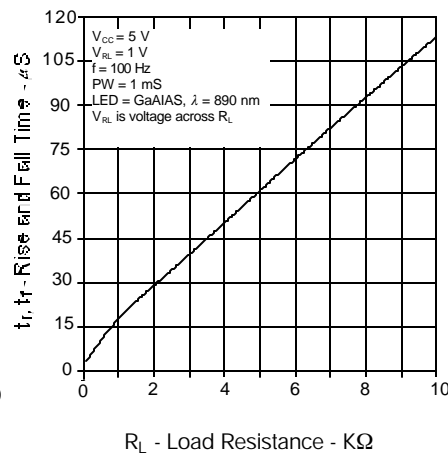
On-State Collector Current vs. Irradiance



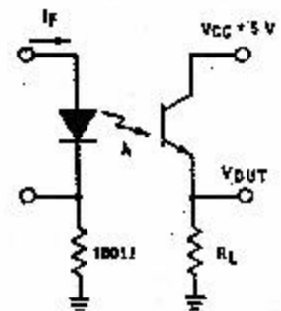
Normalized Output vs. Frequency



Typical Rise and Fall Time vs. Load Resistance



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