

# High Reliability NPN Silicon Phototransistor

OP804, OP805 (TX, TXV)



## Features:

- TO-18 hermetically sealed package
- Lensed for high sensitivity
- Narrow acceptance angle
- Processed after MIL-PRF-19500
- Mechanically and spectrally matched to high reliability IREDS in the OP235 and OP236 series

## Description:

Each device in this series consists of a high reliability NPN silicon phototransistor mounted in a hermetically sealed TO-18 package, which offers high power dissipation and superior hostile environment operation. Device lensing creates a  $\pm 12^\circ$  angle when measured from the optical axis to the half power point.

These devices can be matched with a solid state infrared source (such as the high resolution OP235 and OP236 series of IREDS), or can be used to sense infrared content in a visible light source (such as a tungsten bulb or sunlight) for automatic brightness control.

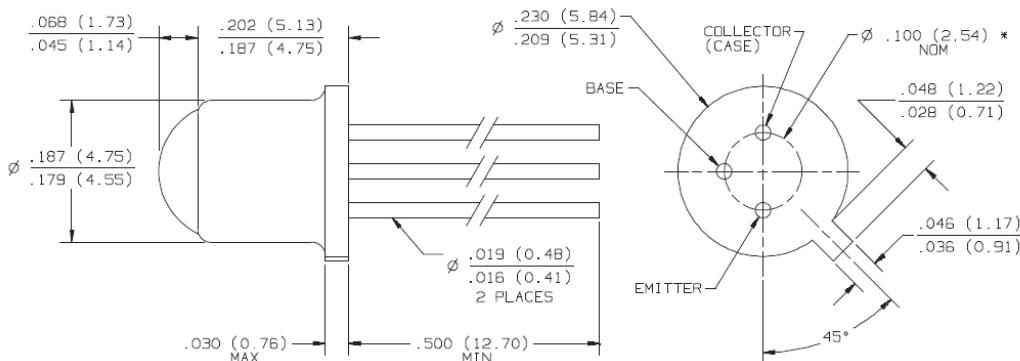
*TX and TXV devices are processed to MIL-PRF-19500.*

*Please refer to Application Bulletin 210 for additional thermal design information.*

## Applications:

- Space-limited applications
- Hostile environment applications
- High reliability applications

Ordering Information						
Part Number	Sensor	Light Current $I_{C(ON)}$ (mA) Min / Max	$V_{CE}$ (V) Typ/Max	Input Power $E_E$ (mW/cm <sup>2</sup> )	Viewing Angle	Lead Length
OP804TX	Transistor	7.00 / 22.00	5/30	5.0	25°	0.50"
OP804TXV		15.00 / NA				
OP805TX	Transistor	7.00 / 22.00	5/30	5.0	25°	0.50"
OP805TXV		15.00 / NA				



\* THIS DIMENSION CONTROLLED AT HOUSING SURFACE.  
DIMENSIONS ARE IN INCHES (MILLIMETERS)

## General Note

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### Electrical Specifications

**Absolute Maximum Ratings** ( $T_A = 25^\circ C$  unless otherwise noted)

Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-55° C to +125° C
Collector-Base Voltage	30 V
Collector-Emitter Voltage	30 V
Emitter-Base Voltage	5 V
Emitter-Collector Voltage (applies to all OP800 and OP830 devices)	5 V
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] <sup>(1)</sup>	260° C
Power Dissipation <sup>(2)</sup>	250 mW

**Electrical Characteristics** ( $T_A = 25^\circ C$  unless otherwise noted)

Input Diode						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_{C(ON)}^{(3)}$	On-State Collector Current OP804 (TX, TXV) OP805 (TX, TXV)	7.0 15.0	-	8 22	mA	$V_{CE} = 5.0$ V, $E_e = 20$ mW/cm <sup>2</sup>
$I_{CEO}$	Collector-Emitter Dark Current	-	-	100	nA	$V_{CE} = 10.0$ V, $E_e = 0$
		-	-	100	μA	$V_{CE} = 30.0$ V, $E_e = 0$ , $T_A = 100^\circ C$
$V_{(BR)CEO}$	Collector-Base Breakdown Voltage	30	-	-	V	$I_C = 100$ μA, $I_B = 0$ , $E_e = 0$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	7.0	-	-	V	$I_C = 100$ μA, $E_e = 0$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	-	-	0.40	V	$I_C = 0.4$ mA, $E_e = 20$ mW/cm <sup>2</sup>
$t_r$	Rise Time OP804 (TX, TXV) OP805 (TX, TXV)	-	-	10.0 15.0	μs	$V_{CC} = 30$ V, $I_C = 1.00$ mA, $R_L = 100$ Ω
$t_f$	Fall Time OP804 (TX, TXV) OP805 (TX, TXV)	-	-	10.0 15.0		

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 2.30 mW/° C above 25° C.
- (3) Light source is an unfiltered tungsten lamp operated at a temperature of 2870 K.

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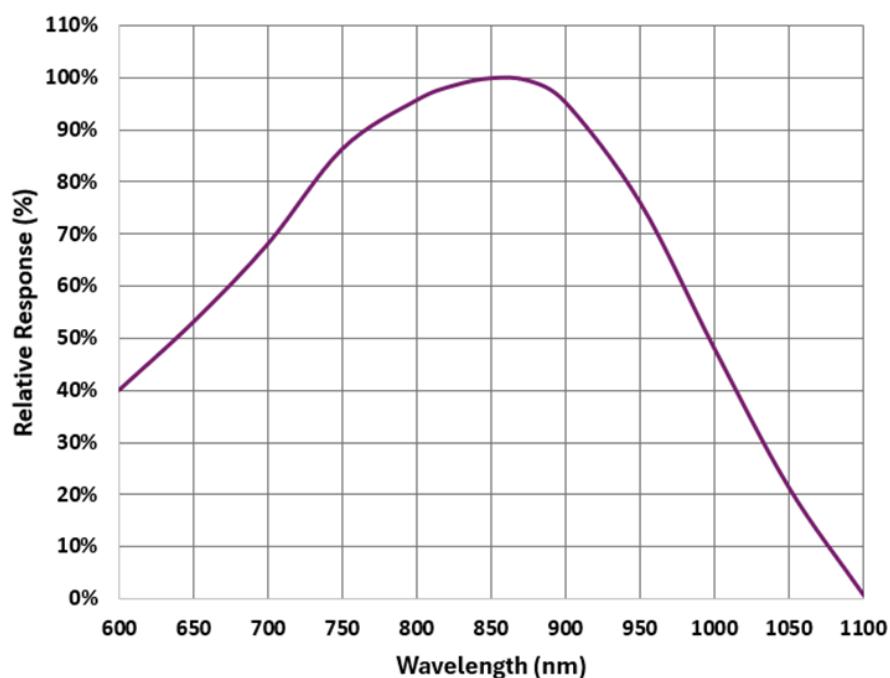
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### Typical Performance

#### Typical Spectral Response



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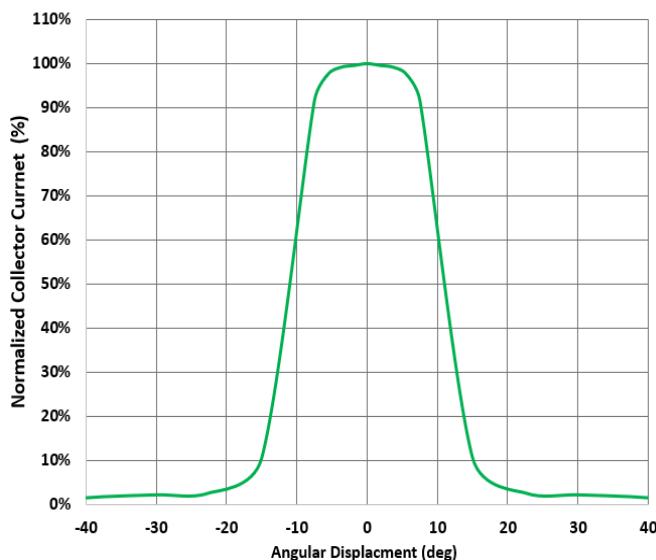
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## OP804, OP805 (TX, TXV)

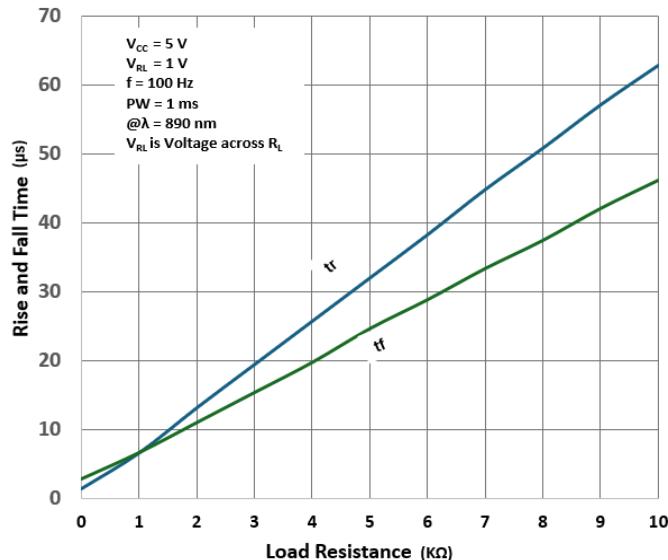


### Typical Performance

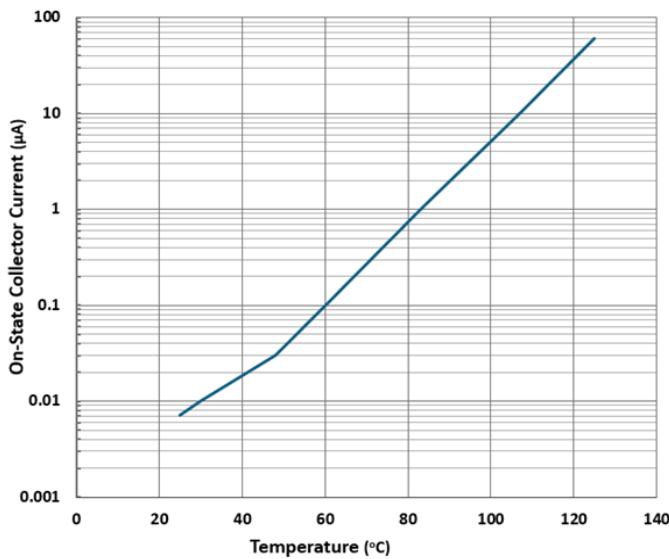
Normalized Collector Current vs Angular Displacement



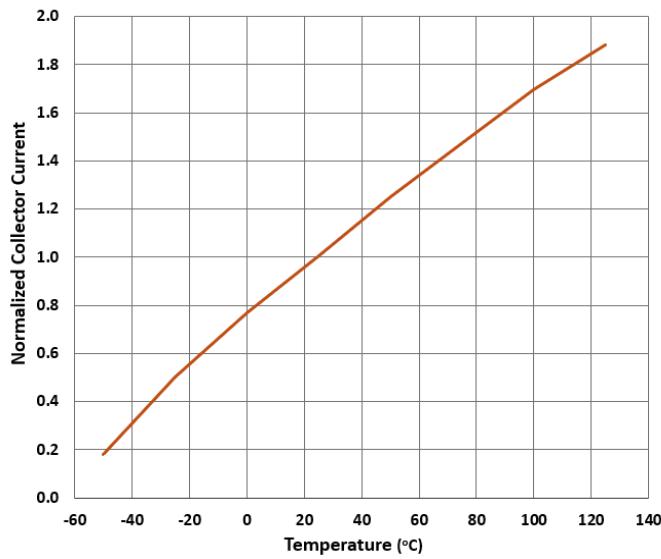
Rise and Fall Times vs Load Resistance



Collector Dark Current vs Temperature



Normalized Collector Current vs Temperature



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