
Silicon NPN Phototransistor

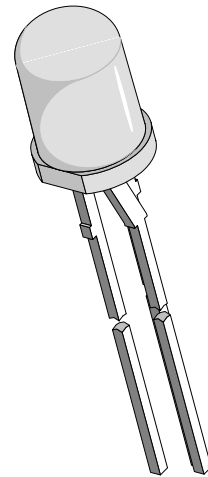
Description

BPV11 is a very high sensitive silicon NPN epitaxial planar phototransistor in a standard T-1 $\frac{3}{4}$ plastic package.

Due to its waterclear epoxy lens the device is sensitive to visible and near infrared radiation.

The viewing angle of $\pm 15^\circ$ makes it insensitive to ambient straylight.

A base terminal is available to enable biasing and sensitivity control.



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Features

- Very high photo sensitivity
- Standard T-1 $\frac{3}{4}$ (\varnothing 5 mm) package with clear lens
- Angle of half sensitivity $\varphi = \pm 15^\circ$
- Base terminal available

Applications

Detector for industrial electronic circuitry, measurement and control

Absolute Maximum Ratings

 $T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Value	Unit
Collector Base Voltage		V_{CBO}	80	V
Collector Emitter Voltage		V_{CEO}	70	V
Emitter Base Voltage		V_{EBO}	5	V
Collector Current		I_C	50	mA
Peak Collector Current	$t_p/T = 0.5, t_p \leq 10 \text{ ms}$	I_{CM}	100	mA
Total Power Dissipation	$T_{amb} \leq 47^{\circ}\text{C}$	P_{tot}	150	mW
Junction Temperature		T_j	100	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55...+100	$^{\circ}\text{C}$
Soldering Temperature	$t \leq 5 \text{ s}, 2 \text{ mm from body}$	T_{sd}	260	$^{\circ}\text{C}$
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

Basic Characteristics

 $T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	$I_C = 1 \text{ mA}$	$V_{(BR)CEO}$	70			V
Collector Dark Current	$V_{CE} = 10 \text{ V}, E = 0$	I_{CEO}		1	50	nA
DC Current Gain	$V_{CE} = 5 \text{ V}, I_C = 5 \text{ mA}, E = 0$	h_{FE}		700		
Collector Emitter Capacitance	$V_{CE} = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	C_{CEO}		15		pF
Collector Base Capacitance	$V_{CB} = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	C_{CBO}		19		pF
Collector Light Current	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CE} = 5 \text{ V}$	I_{ca}	3	10		mA
Angle of Half Sensitivity		ϕ		± 15		deg
Wavelength of Peak Sensitivity		λ_p		850		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		620...980		nm
Collector Emitter Saturation Voltage	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, I_C = 1 \text{ mA}$	V_{CEsat}		130	300	mV
Turn-On Time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	t_{on}		6		μs
Turn-Off Time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	t_{off}		5		μs
Cut-Off Frequency	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	f_c		110		kHz

Typical Characteristics ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

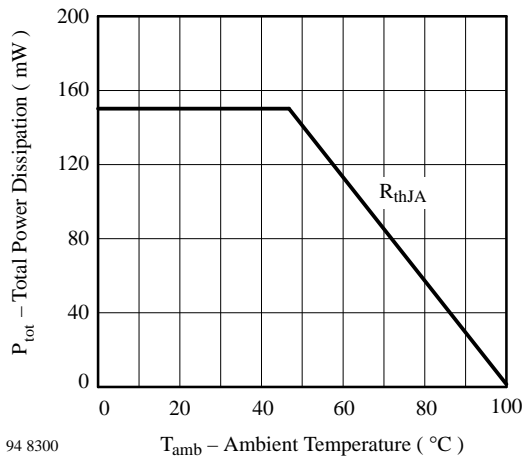


Figure 1 : Total Power Dissipation vs. Ambient Temperature

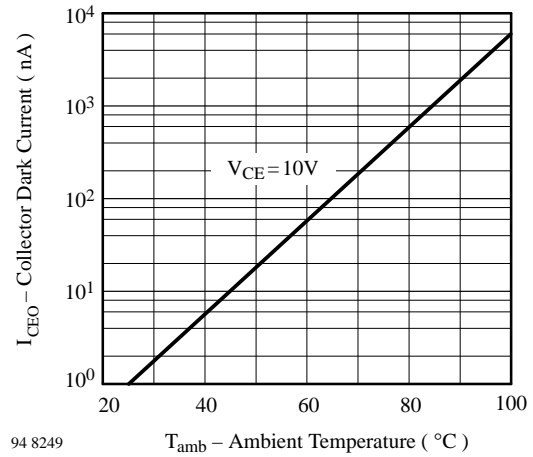


Figure 2 : Collector Dark Current vs. Ambient Temperature

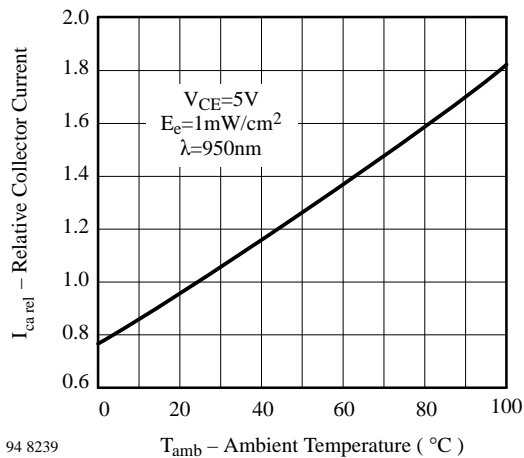


Figure 3 : Relative Collector Current vs. Ambient Temperature

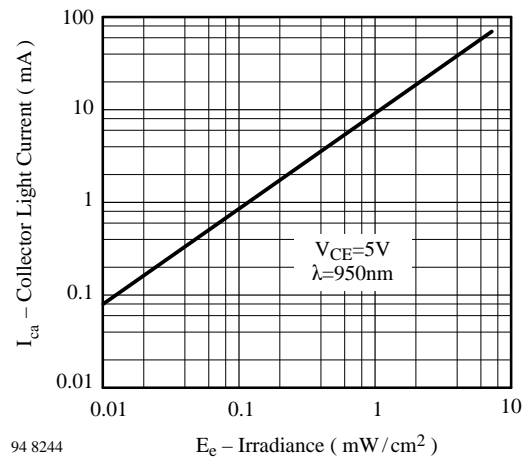


Figure 4 : Collector Light Current vs. Irradiance

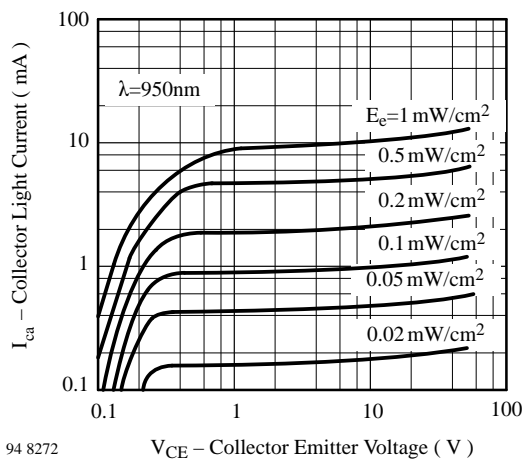


Figure 5 : Collector Light Current vs. Collector Emitter Voltage

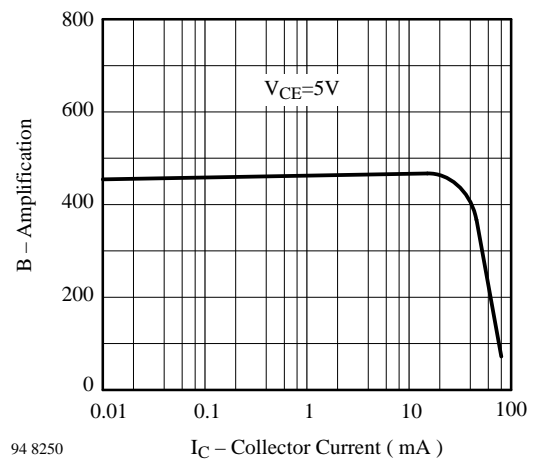


Figure 6 : Amplification vs. Collector Current

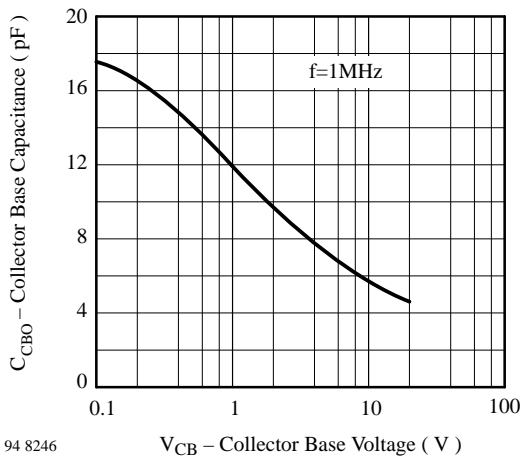


Figure 7 : Collector Base Capacitance vs. Collector Base Voltage

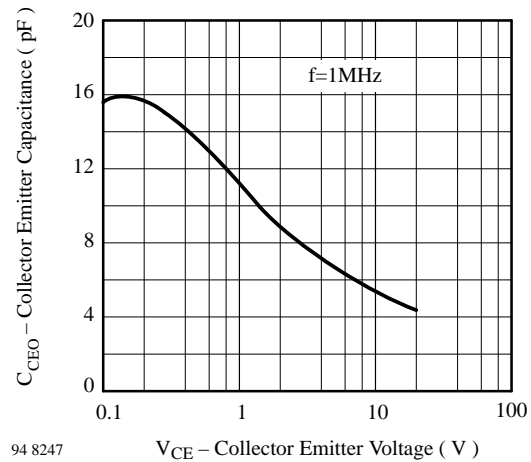


Figure 8 : Collector Emitter Capacitance vs. Collector Emitter Voltage

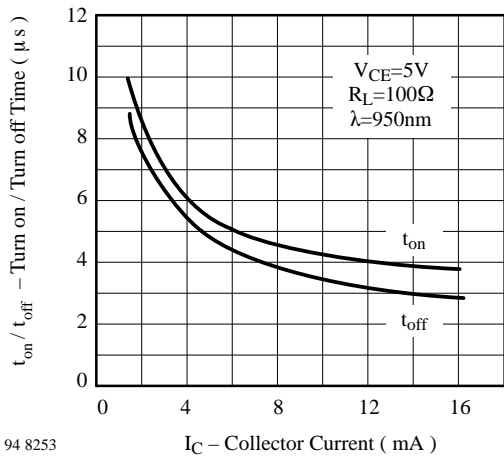


Figure 9 : Turn On/Turn Off Time vs. Collector Current

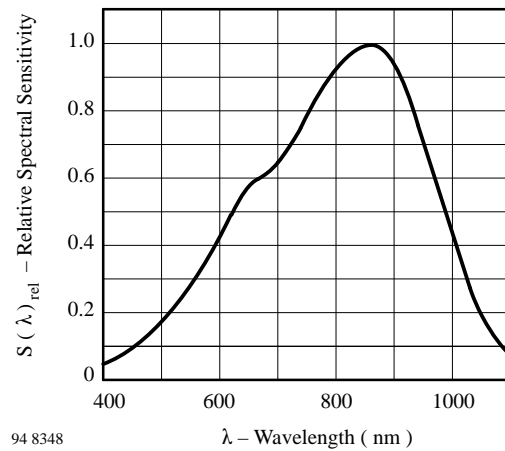


Figure 10 : Relative Spectral Sensitivity vs. Wavelength

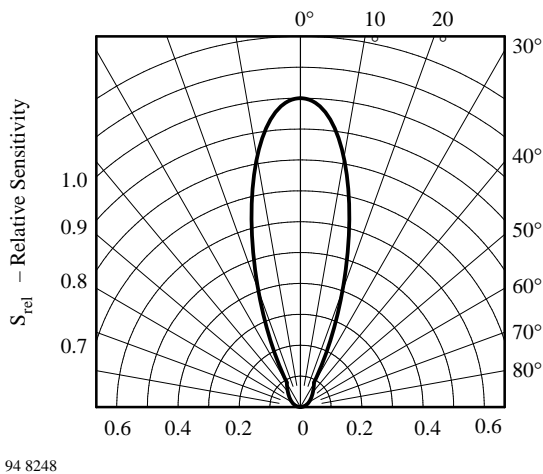


Figure 11 : Relative Radiant Sensitivity vs. Angular Displacement

