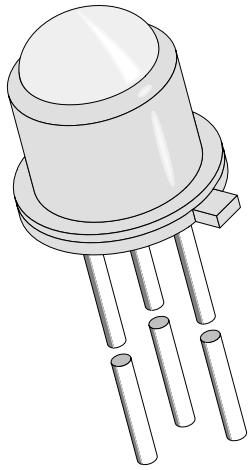
Silicon NPN Phototransistor

Description

BPW77N is a very high sensitive silicon NPN epitaxial planar phototransistor in a standard TO–18 hermetically sealed metal case.
Its glass lens featuring a viewing angle of ±10˚ makes it insensible to ambient straylight.
A base terminal is available to enable biasing and sensitivity control.



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Features

- Hermetically sealed case
- Lens window
- Narrow viewing angle $\varphi = \pm 10^{\circ}$
- Exact central chip alignment
- Base terminal available
- High photo sensitivity
- Suitable for visible and near infrared radiation
- Selected into sensitivity groups

Applications

Detector in electronic control and drive circuits

Absolute Maximum Ratings

T_{amb} = 25°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, $t_p \leqq$ 10 ms	I_{CM}	100	mA
Total Power Dissipation	$T_{amb} \leqq$ 25 ˚C	P_{tot}	250	mW
Junction Temperature		T_j	125	˚C
Storage Temperature Range		T_{stg}	–55...+125	˚C
Soldering Temperature	t ≦ 5 s	T_{sd}	260	˚C
Thermal Resistance Junction/Ambient		R_{thJA}	400	K/W
Thermal Resistance Junction/Case		R_{thJC}	150	K/W

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	I_C = 1 mA	$V_{(BR)CEO}$	70			V
Collector Dark Current	V_{CE} = 20 V, E = 0	I_{CEO}		1	100	nA
Collector Emitter Capacitance	V_{CE} = 5 V, f = 1 MHz, E=0	C_{CEO}		6		pF
Angle of Half Sensitivity		φ		±10		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 mW/cm^2, λ=950nm, I_C=1 mA	V_{CEsat}		0.15	0.3	V
Turn–On Time	V_S=5V, I_C=5mA, R_L=100Ω	t_{on}		6		µs
Turn–Off Time	V_S=5V, I_C=5mA, R_L=100Ω	t_{off}		5		µs
Cut–Off Frequency	V_S=5V, I_C=5mA, R_L=100Ω	f_c		110		kHz

Type Dedicated Characteristics

T_{amb} = 25°C

Parameter	Type	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Light Current	BPW77NA	E_e=1mW/cm^2, λ=950nm, V_{CE}=5V	I_{ca}	7.5	10	15	mA
	BPW77NB	E_e=1mW/cm^2, λ=950nm, V_{CE}=5V	I_{ca}	10	20		mA

Typical Characteristics (T_{amb} = 25°C unless otherwise specified)

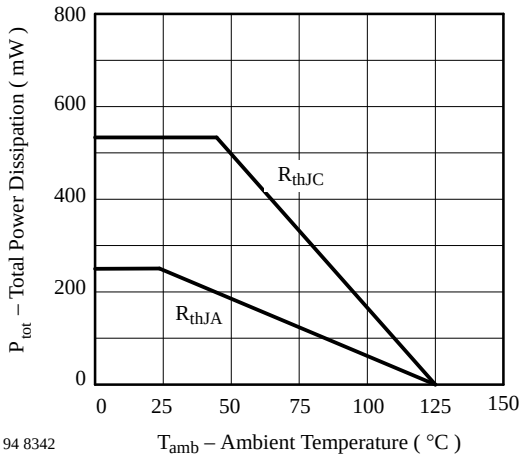


Figure 1 : Total Power Dissipation vs. Ambient Temperature

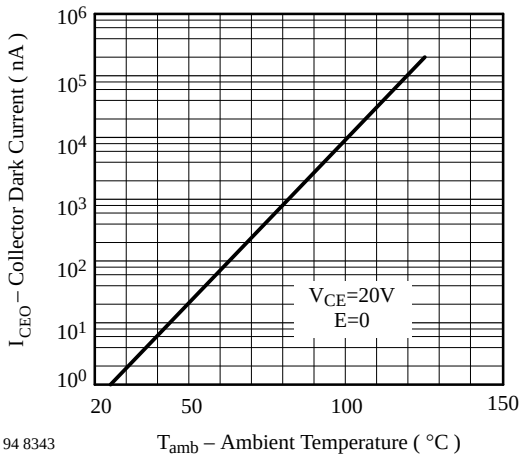


Figure 2 : Collector Dark Current vs. Ambient Temperature

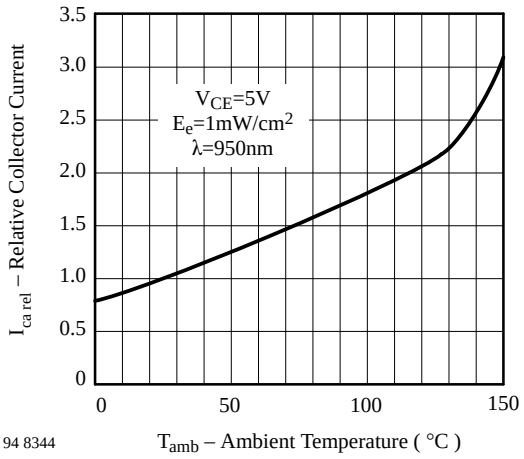


Figure 3 : Relative Collector Current vs. Ambient Temperature

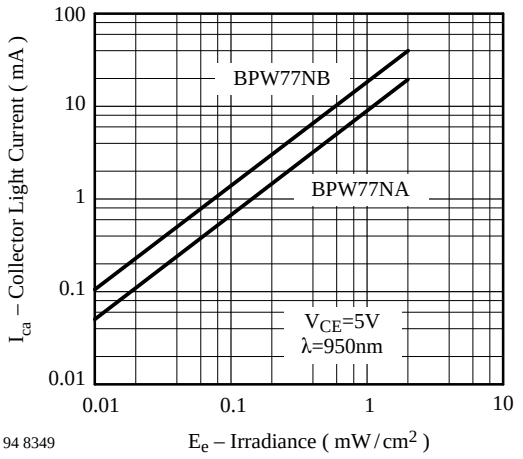


Figure 4 : Collector Light Current vs. Irradiance

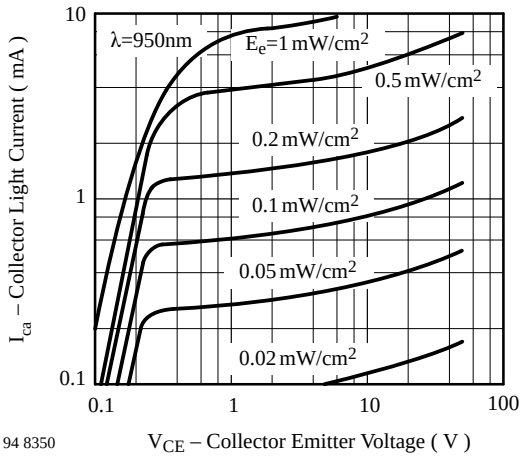


Figure 5 : Collector Light Current vs. Collector Emitter Voltage

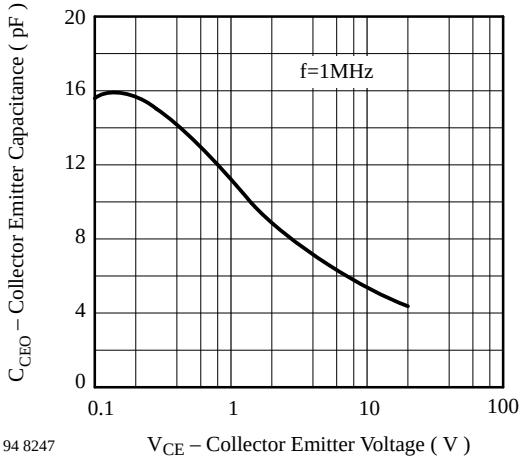


Figure 6 : Collector Emitter Capacitance vs. Collector Emitter Voltage

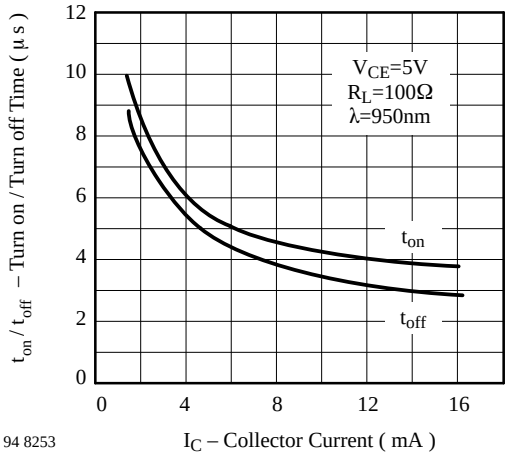


Figure 7 : Turn On/Turn Off Time vs. Collector Current

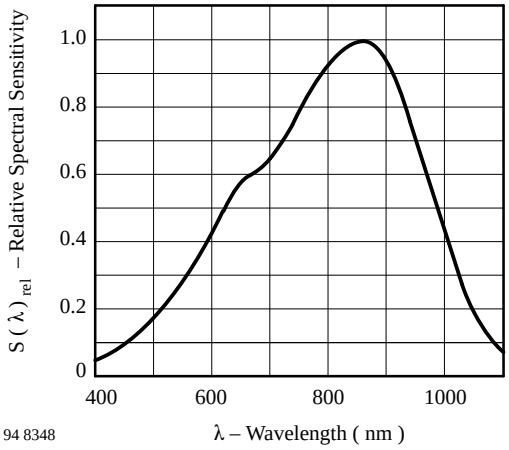


Figure 8 : Relative Spectral Sensitivity vs. Wavelength

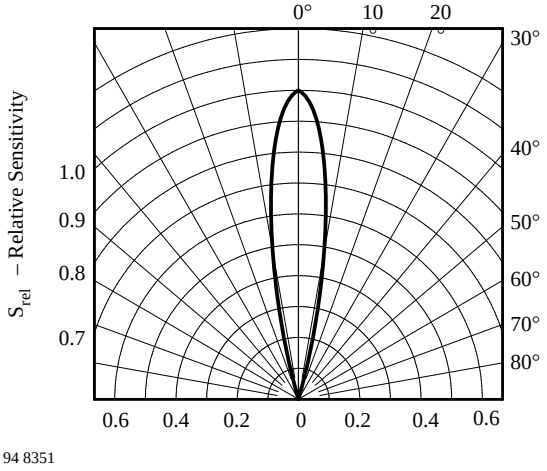
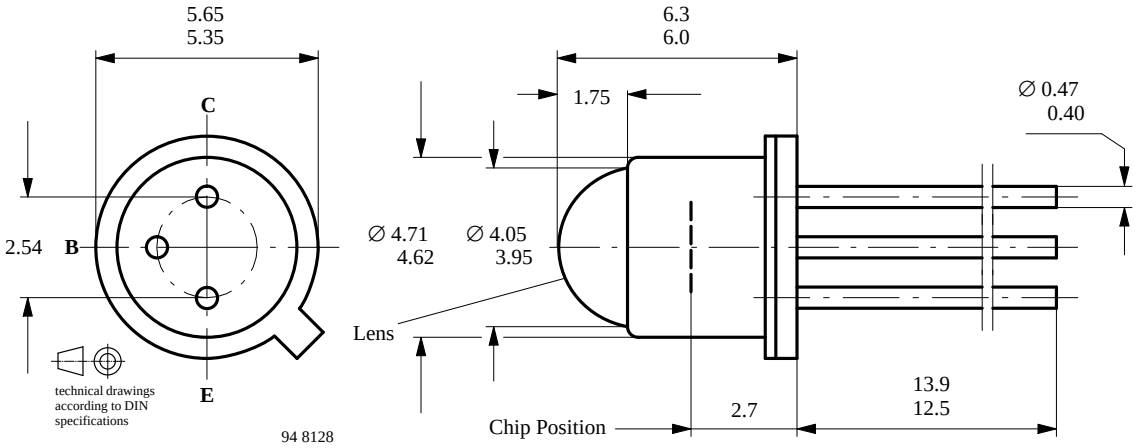


Figure 9 : Relative Radiant Sensitivity vs. Angular Displacement

Dimensions in mm



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