

Silicon NPN Phototransistor

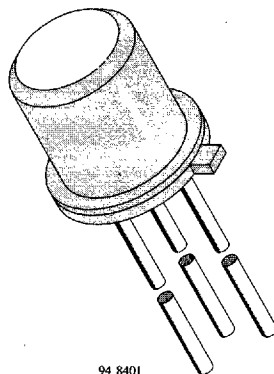
Description

BPW13 is a high speed silicon NPN epitaxial planar phototransistor in a standard TO-18 hermetically sealed metal case.

Its flat glass window makes it ideal for applications with external optics. A base terminal is available to enable biasing and sensitivity control.

Features

- Hermetically sealed case
- Flat window
- Very wide viewing angle $\phi = \pm 40^\circ$
- Exact central chip alignment
- Long range light barrier with an additional optics
- Base terminal available
- Fast response times
- 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}	32	V
Collector Emitter Voltage		V _{CEO}	32	V
Emitter Base Voltage		V _{EB0}	5	V
Collector Current		I _C	50	mA
Peak Collector Current	t _p /T = 0.5, t _p ≤ 10 ms	I _{CM}	100	mA
Total Power Dissipation	T _{amb} ≤ 25 °C	P _{tot}	310	mW
Junction Temperature		T _j	150	°C
Storage Temperature Range		T _{stg}	-55...+150	°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}	32			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}		5.7		pF
Collector Base Capacitance	V _{CB} = 5 V, f = 1 MHz, E=0	C _{CBO}		6.5		pF
Angle of Half Sensitivity		φ		±40		deg
Wavelength of Peak Sensitivity		λ _p		780		nm
Range of Spectral Bandwidth		λ _{0.5}		520...950		nm
Collector Emitter Saturation Voltage	I _C = 0.1 mA, I _B = 10 µA	V _{CEsat}			0.3	V
Turn-On Time	V _S =5V, I _C =5mA, R _L =100Ω	t _{on}		3.2		µs
Turn-Off Time	V _S =5V, I _C =5mA, R _L =100Ω	t _{off}		2.7		µs
Cut-Off Frequency	V _S =5V, I _C =5mA, R _L =100Ω	f _c		170		kHz

Type Dedicated Characteristics

T_{amb} = 25°C

Parameter	Type	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Light Current	BPW13A	E _e =1mW/cm ² , λ=950nm, V _{CE} =5V	I _{ca}	0.07	0.10	0.14	mA
	BPW13B	E _e =1mW/cm ² , λ=950nm, V _{CE} =5V	I _{ca}	0.10	0.15	0.20	mA
	BPW13C	E _e =1mW/cm ² , λ=950nm, V _{CE} =5V	I _{ca}	0.17	0.30		mA

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

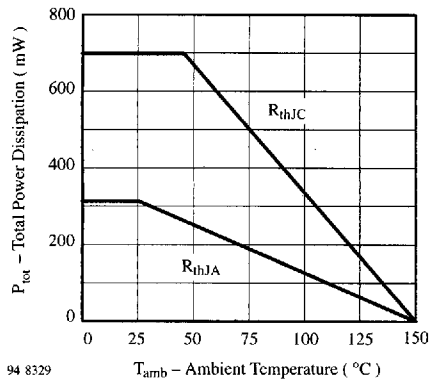


Figure 1 : Total Power Dissipation vs. Ambient Temperature

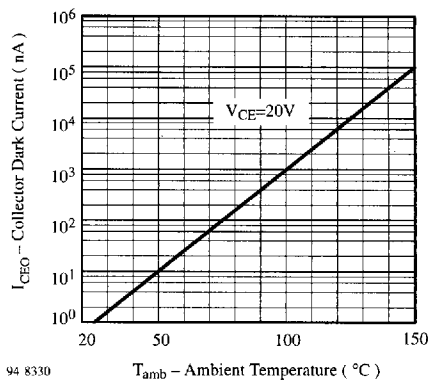


Figure 2 : Collector Dark Current vs. Ambient Temperature

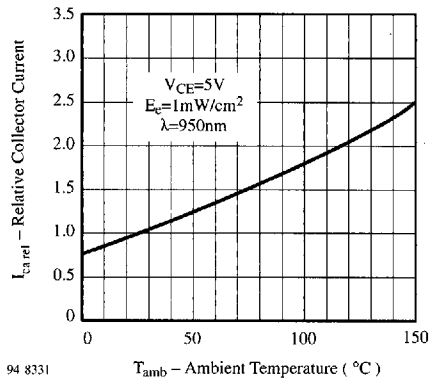


Figure 3 : Relative Collector Current vs. Ambient Temperature

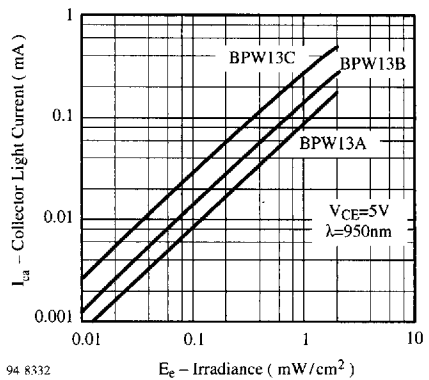


Figure 4 : Collector Light Current vs. Irradiance

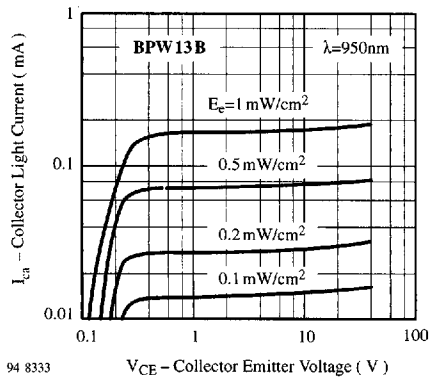


Figure 5 : Collector Light Current vs. Collector Emitter Voltage

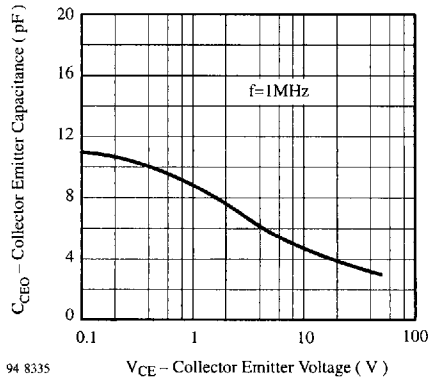
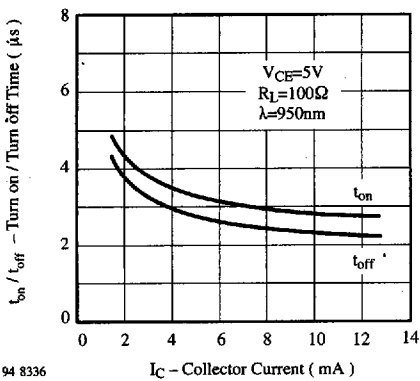
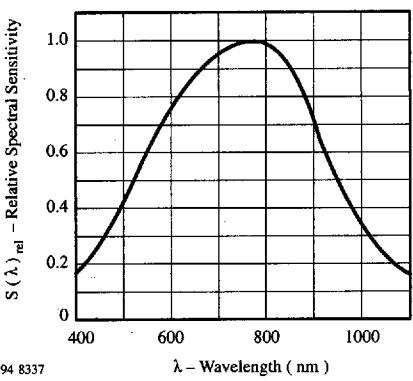


Figure 6 : Collector Emitter Capacitance vs. Collector Emitter Voltage



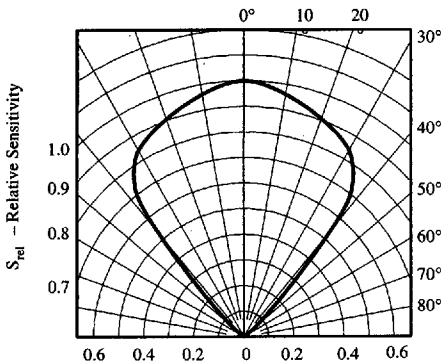
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Figure 7 : Turn On/Turn Off Time vs. Collector Current



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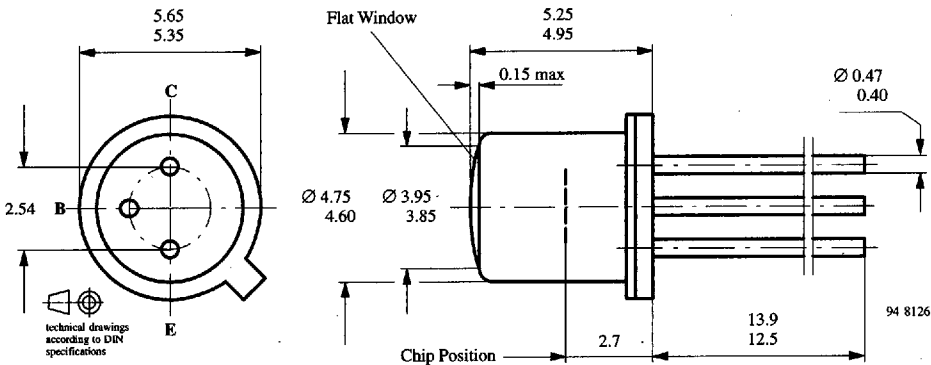
Figure 8 : Relative Spectral Sensitivity vs. Wavelength



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Figure 9 : Relative Radiant Sensitivity vs. Angular Displacement

Dimensions in mm



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