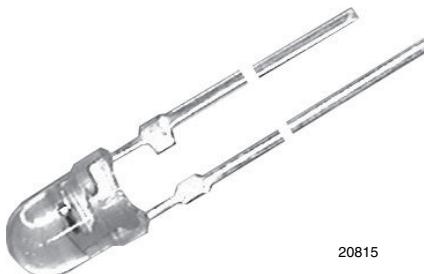


## Silicon NPN Phototransistor



20815

### FEATURES

- Package type: leaded
- Package form: T-1
- Dimensions (in mm): Ø 3
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 25^\circ$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



e4

**RoHS**  
COMPLIANT  
**HALOGEN FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

- Detector in electronic control and drive circuits

### DESCRIPTION

BPW85 is a silicon NPN phototransistor with high radiant sensitivity in clear, T-1 plastic package. It is sensitive to visible and near infrared radiation.

### PRODUCT SUMMARY

COMPONENT	I <sub>ca</sub> (mA)	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
BPW85	0.8 to 8	$\pm 25$	450 to 1080
BPW85A	0.8 to 2.5	$\pm 25$	450 to 1080
BPW85B	1.5 to 4	$\pm 25$	450 to 1080
BPW85C	3 to 8	$\pm 25$	450 to 1080

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
BPW85	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1
BPW85A	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1
BPW85B	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1
BPW85C	Bulk	MOQ: 5000 pcs, 5000 pcs/bulk	T-1

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V <sub>CEO</sub>	70	V
Emitter collector voltage		V <sub>ECO</sub>	5	V
Collector current		I <sub>C</sub>	50	mA
Collector peak current	t <sub>p</sub> /T = 0.5, t <sub>p</sub> ≤ 10 ms	I <sub>CM</sub>	100	mA
Power dissipation	T <sub>amb</sub> ≤ 55 °C	P <sub>V</sub>	100	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	-40 to +100	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Soldering temperature	t ≤ 3 s, 2 mm from case	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	Connected with Cu wire Ø 0.14 mm <sup>2</sup>	R <sub>thJA</sub>	450	K/W

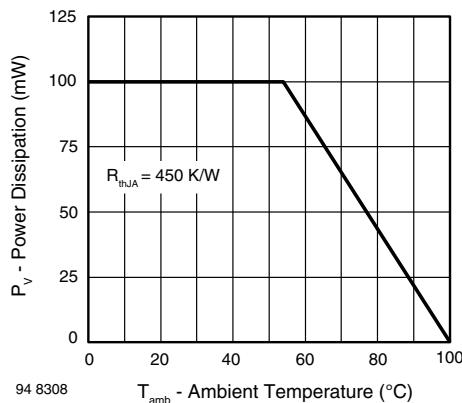


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

#### **BASIC CHARACTERISTICS** ( $T_{amb} = 25 \text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector emitter breakdown voltage	$I_C = 1 \text{ mA}$	$V_{(BR)CEO}$	70			V
Collector emitter dark current	$V_{CE} = 20 \text{ V}$ , $E = 0$	$I_{CEO}$		1	200	nA
Collector emitter capacitance	$V_{CE} = 5 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_{CEO}$		3		pF
Angle of half sensitivity		$\phi$		$\pm 25$		deg
Wavelength of peak sensitivity		$\lambda_p$		850		nm
Range of spectral bandwidth		$\lambda_{0.1}$		450 to 1080		nm
Collector emitter saturation voltage	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $I_C = 0.1 \text{ mA}$	$V_{CEsat}$			0.3	V
Turn-on time	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$t_{on}$		2.0		μs
Turn-off time	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$t_{off}$		2.3		μs
Cut-off frequency	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$f_c$		180		kHz

#### **TYPE DEDICATED CHARACTERISTICS**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_{CE} = 5 \text{ V}$	BPW85	$I_{ca}$	0.8		8.0	mA
		BPW85A	$I_{ca}$	0.8		2.5	mA
		BPW85B	$I_{ca}$	1.5		4.0	mA
		BPW85C	$I_{ca}$	3.0		8.0	mA

### BASIC CHARACTERISTICS ( $T_{amb} = 25$ °C, unless otherwise specified)

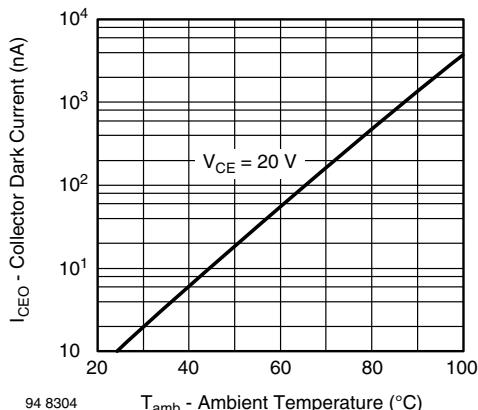


Fig. 2 - Collector Dark Current vs. Ambient Temperature

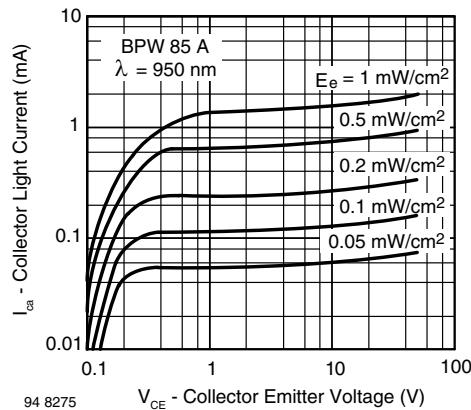


Fig. 5 - Collector Light Current vs. Collector Emitter Voltage

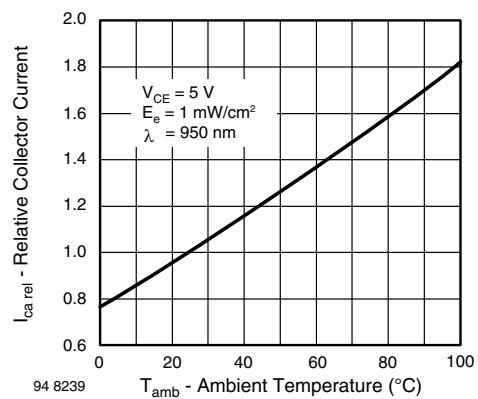


Fig. 3 - Relative Collector Current vs. Ambient Temperature

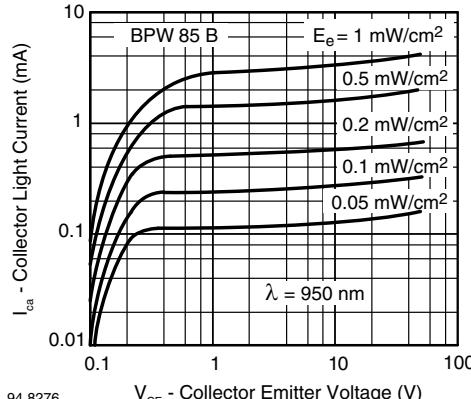


Fig. 6 - Collector Light Current vs. Collector Emitter Voltage

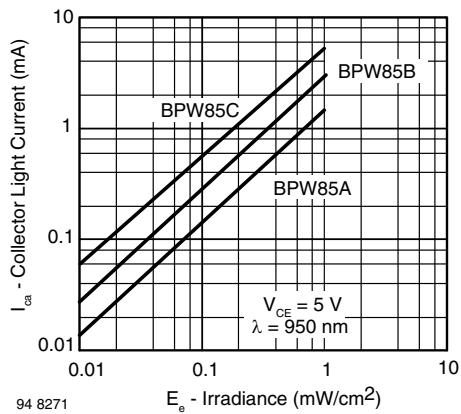


Fig. 4 - Collector Light Current vs. Irradiance

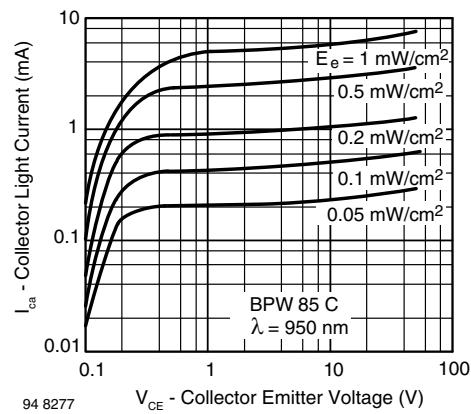


Fig. 7 - Collector Light Current vs. Collector Emitter Voltage

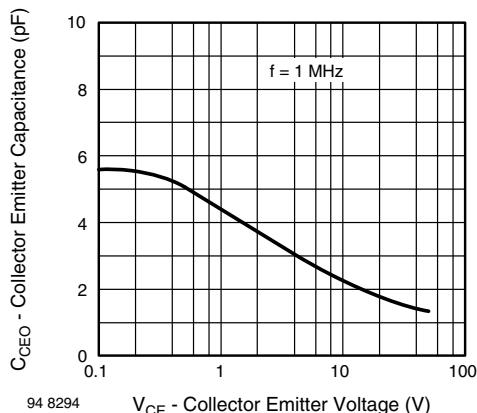


Fig. 8 - Collector Emitter Capacitance vs. Collector Emitter Voltage

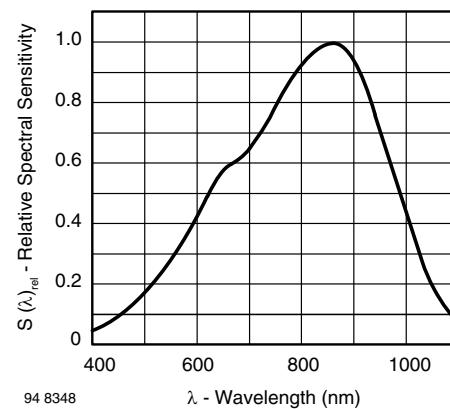


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

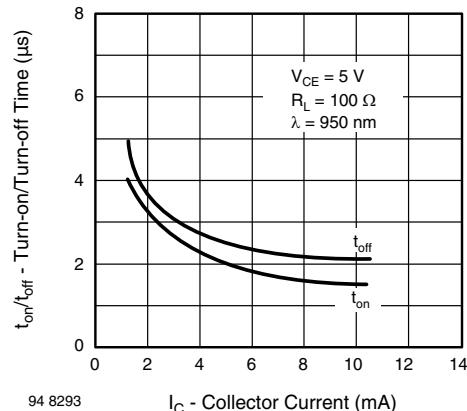


Fig. 9 - Turn-on/Turn-off Time vs. Collector Current

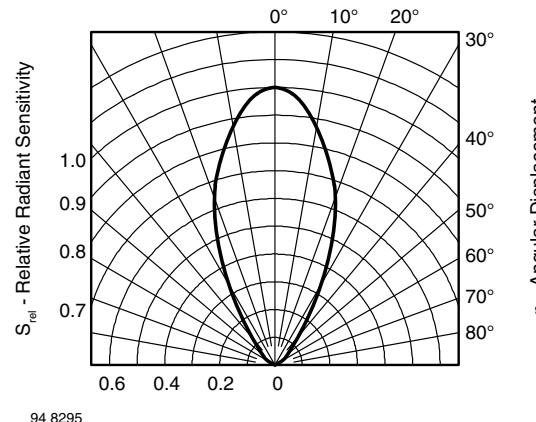
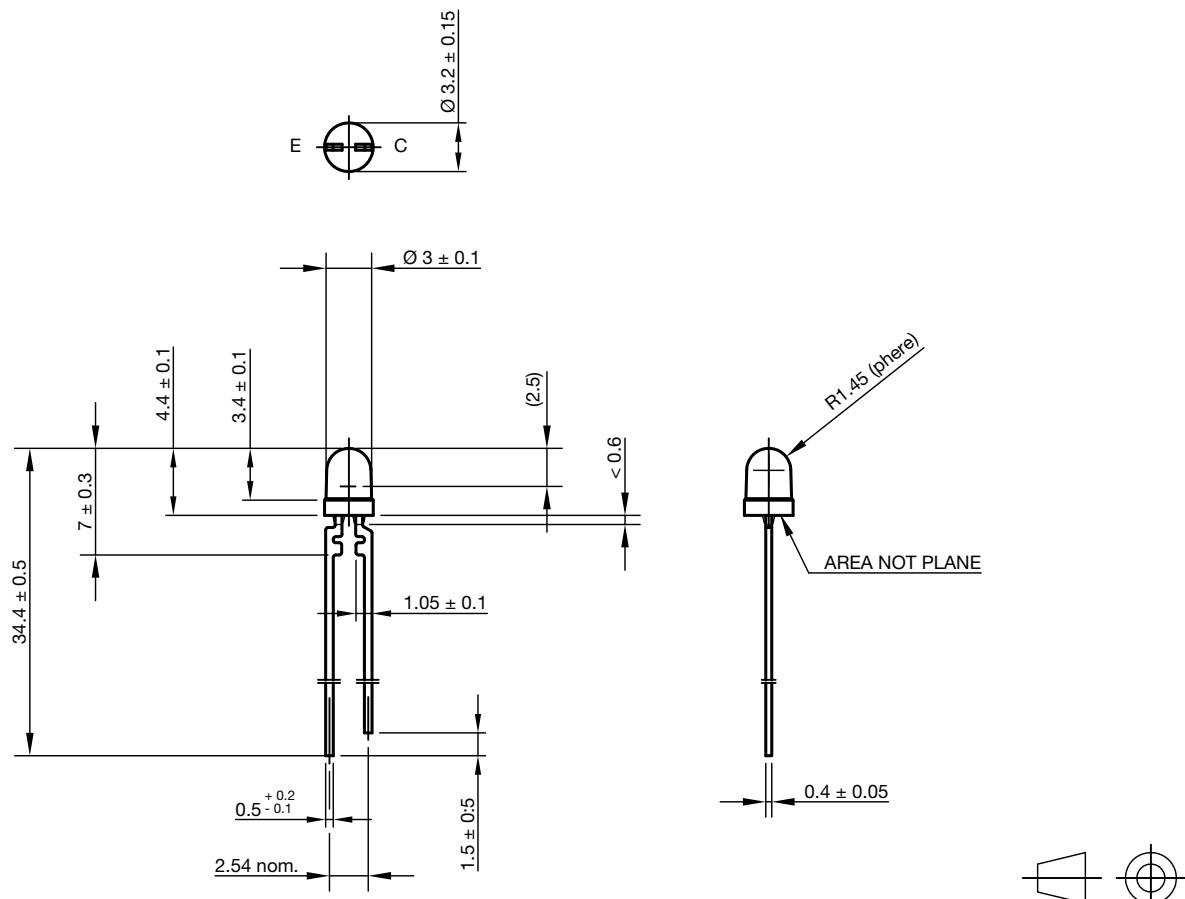


Fig. 11 - Relative Radiant Sensitivity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters


Drawing-No.: 6.544-5054.01-4

Issue: 5; 28.07.14

technical drawings  
according to DIN  
specifications

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