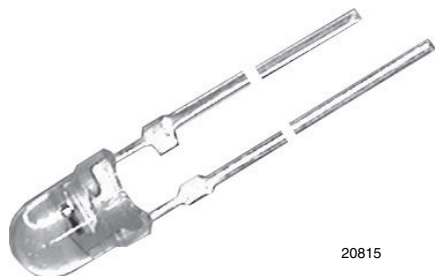


## Silicon NPN Phototransistor



### 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)



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

### 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.

### APPLICATIONS

- Detector in electronic control and drive circuits

### PRODUCT SUMMARY

| COMPONENT | $I_{ca}$ (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 ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                           | TEST CONDITION                                | SYMBOL     | VALUE       | UNIT             |
|-------------------------------------|-----------------------------------------------|------------|-------------|------------------|
| Collector emitter voltage           |                                               | $V_{CEO}$  | 70          | V                |
| Emitter collector voltage           |                                               | $V_{ECO}$  | 5           | V                |
| Collector current                   |                                               | $I_C$      | 50          | mA               |
| Collector peak current              | $t_p/T = 0.5, t_p \leq 10 \text{ ms}$         | $I_{CM}$   | 100         | mA               |
| Power dissipation                   | $T_{amb} \leq 55^\circ\text{C}$               | $P_V$      | 100         | mW               |
| Junction temperature                |                                               | $T_j$      | 100         | $^\circ\text{C}$ |
| Operating temperature range         |                                               | $T_{amb}$  | -40 to +100 | $^\circ\text{C}$ |
| Storage temperature range           |                                               | $T_{stg}$  | -40 to +100 | $^\circ\text{C}$ |
| Soldering temperature               | $t \leq 3 \text{ s}, 2 \text{ mm from case}$  | $T_{sd}$   | 260         | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | Connected with Cu wire Ø 0.14 mm <sup>2</sup> | $R_{thJA}$ | 450         | K/W              |

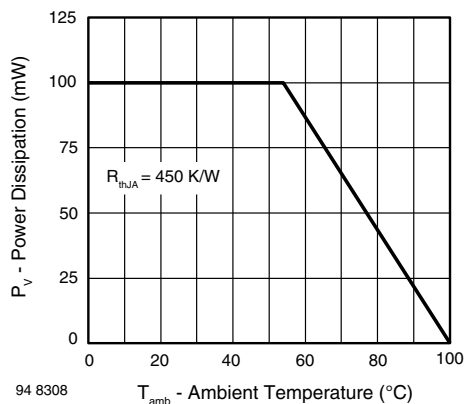


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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                                                                           |                                                                                 | $\varphi$       |      | $\pm 25$    |      | deg           |
| Wavelength of peak sensitivity                                                                      |                                                                                 | $\lambda_p$     |      | 850         |      | nm            |
| Range of spectral bandwidth                                                                         |                                                                                 | $\lambda_{0.1}$ |      | 450 to 1080 |      | nm            |
| Collector emitter saturation voltage                                                                | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$I_C = 0.1\text{ mA}$ | $V_{CEsat}$     |      |             | 0.3  | V             |
| Turn-on time                                                                                        | $V_S = 5\text{ V}$ , $I_C = 5\text{ mA}$ , $R_L = 100\text{ }\Omega$            | $t_{on}$        |      | 2.0         |      | $\mu\text{s}$ |
| Turn-off time                                                                                       | $V_S = 5\text{ V}$ , $I_C = 5\text{ mA}$ , $R_L = 100\text{ }\Omega$            | $t_{off}$       |      | 2.3         |      | $\mu\text{s}$ |
| Cut-off frequency                                                                                   | $V_S = 5\text{ V}$ , $I_C = 5\text{ mA}$ , $R_L = 100\text{ }\Omega$            | $f_c$           |      | 180         |      | kHz           |

| <b>TYPE DEDICATED CHARACTERISTICS</b> |                                                                                 |        |          |      |      |      |      |
|---------------------------------------|---------------------------------------------------------------------------------|--------|----------|------|------|------|------|
| PARAMETER                             | TEST CONDITION                                                                  | PART   | SYMBOL   | MIN. | TYP. | MAX. | UNIT |
| Collector light current               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$V_{CE} = 5\text{ V}$ | 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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

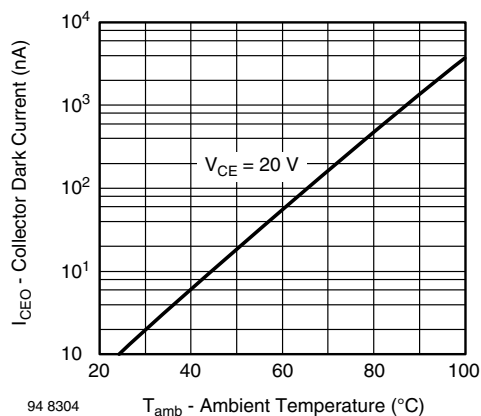


Fig. 2 - Collector Dark Current vs. Ambient Temperature

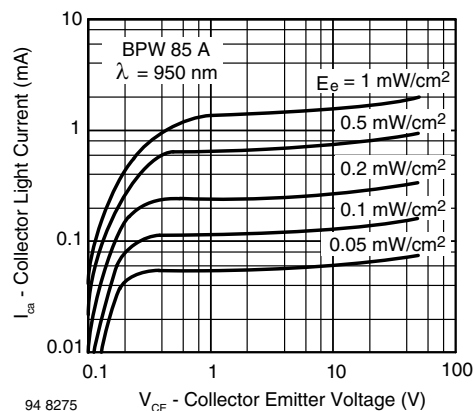


Fig. 5 - Collector Light Current vs. Collector Emitter Voltage

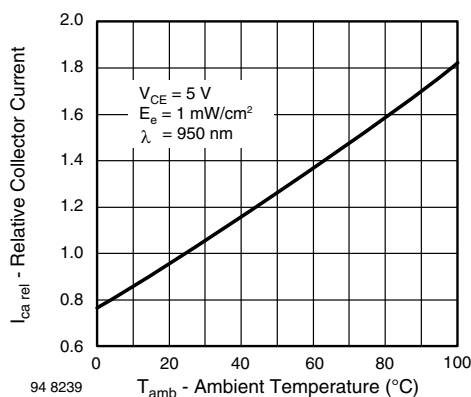


Fig. 3 - Relative Collector Current vs. Ambient Temperature

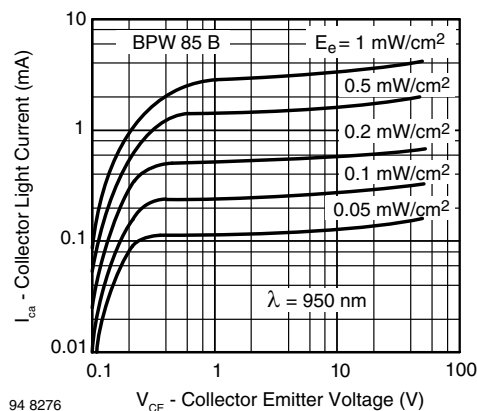


Fig. 6 - Collector Light Current vs. Collector Emitter Voltage

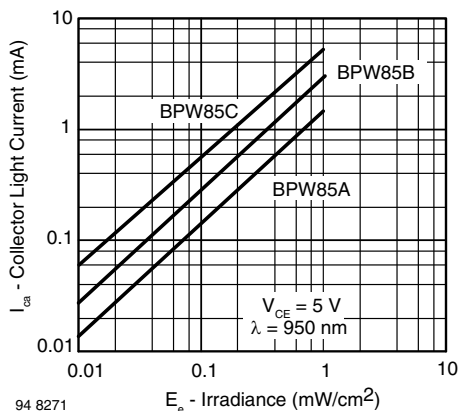


Fig. 4 - Collector Light Current vs. Irradiance

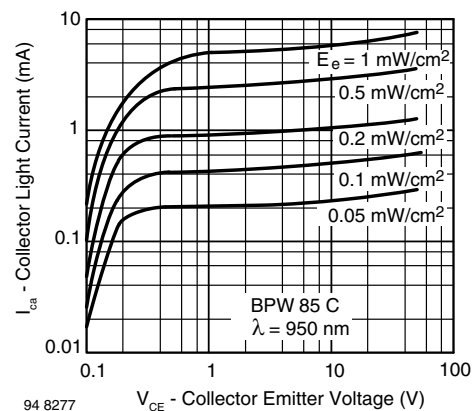


Fig. 7 - Collector Light Current vs. Collector Emitter Voltage

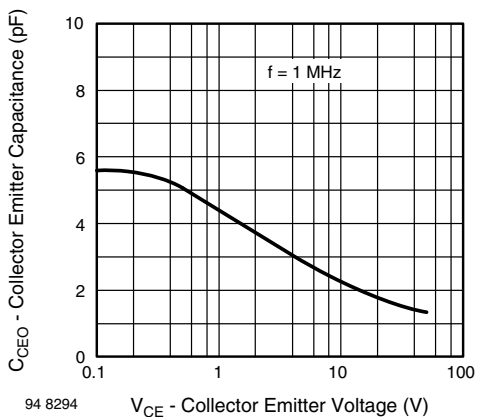


Fig. 8 - Collector Emitter Capacitance vs. Collector Emitter Voltage

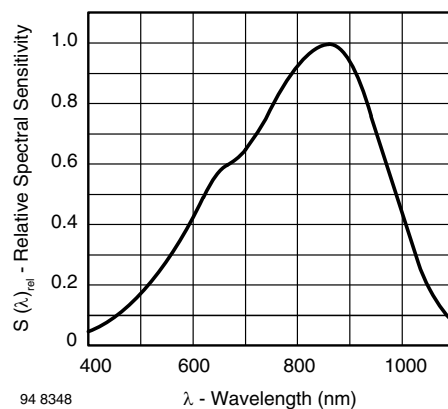


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

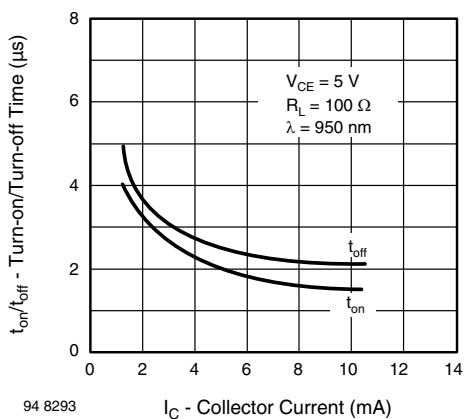


Fig. 9 - Turn-on/Turn-off Time vs. Collector Current

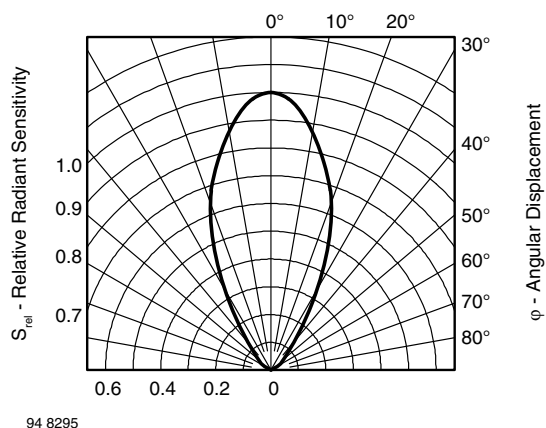
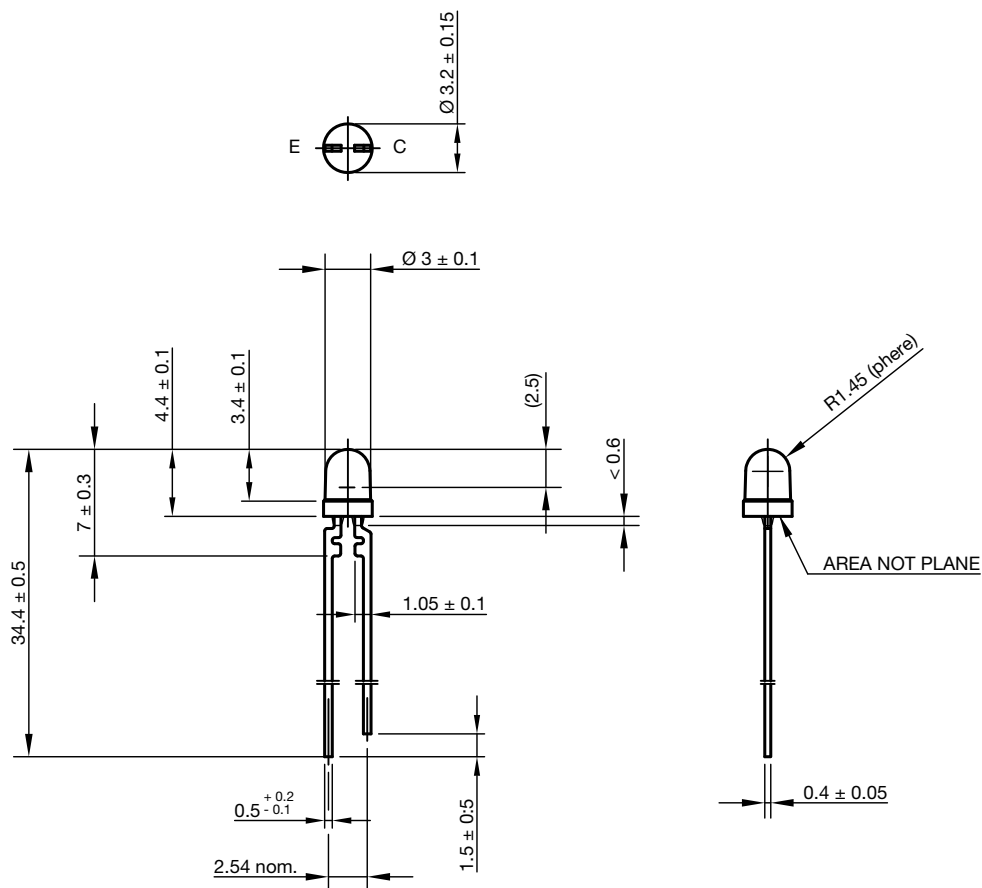


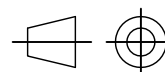
Fig. 11 - Relative Radiant Sensitivity vs. Angular Displacement



**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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