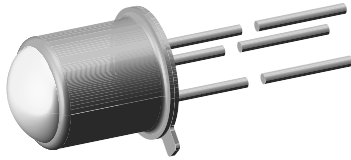


Silicon NPN Phototransistor, RoHS Compliant



94 8401

DESCRIPTION

BPW77 is a silicon NPN phototransistor with high radiant sensitivity in hermetically sealed TO-18 package with base terminal and glass lens. It is sensitive to visible and near infrared radiation.

FEATURES

- Package type: leaded
- Package form: TO-18
- Dimensions (in mm): \varnothing 4.7
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 10^\circ$
- Base terminal connected
- Hermetically sealed package
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT

APPLICATIONS

- Detector in electronic control and drive circuits

| PRODUCT SUMMARY | | | |
|-----------------|---------------|-----------------|----------------------|
| COMPONENT | I_{ca} (mA) | φ (deg) | $\lambda_{0.1}$ (nm) |
| BPW77NA | 7.5 to 15 | ± 10 | 450 to 1080 |
| BPW77NB | > 10 | ± 10 | 450 to 1080 |

Note

Test condition see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|-----------|------------------------------|--------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| BPW77NA | Bulk | MOQ: 1000 pcs, 1000 pcs/bulk | TO-18 |
| BPW77NB | Bulk | MOQ: 1000 pcs, 1000 pcs/bulk | TO-18 |

Note

MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS | | | | |
|-------------------------------------|--|------------|---------------|------|
| PARAMETER | TEST CONDITION | 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 |
| Collector peak current | $t_p/T = 0.5, t_p \leq 10$ ms | I_{CM} | 100 | mA |
| Total power dissipation | $T_{amb} \leq 25$ °C | P_V | 250 | mW |
| Junction temperature | | T_j | 125 | °C |
| Operating temperature range | | T_{amb} | - 40 to + 125 | °C |
| Storage temperature range | | T_{stg} | - 40 to + 125 | °C |
| Soldering temperature | $t \leq 5$ s | T_{sd} | 260 | °C |
| Thermal resistance junction/ambient | Connected with Cu wire, 0.14 mm ² | R_{thJA} | 400 | K/W |
| Thermal resistance junction/gase | | R_{thJC} | 150 | K/W |

Note

$T_{amb} = 25$ °C, unless otherwise specified

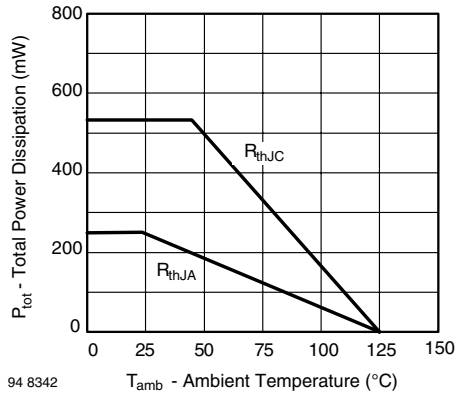


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS | | | | | | |
|--------------------------------------|---|-----------------|------|-------------|------|---------------|
| 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 | 100 | nA |
| Collector emitter capacitance | $V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}, E = 0$ | C_{CEO} | | 6 | | pF |
| Angle of half sensitivity | | ϕ | | ± 10 | | deg |
| Wavelength of peak sensitivity | | λ_p | | 850 | | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | | 450 to 1080 | | nm |
| Collector emitter saturation voltage | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, I_C = 1 \text{ mA}$ | V_{CEsat} | | 0.15 | 0.3 | V |
| 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 |

Note

$T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

| TYPE DEDICATED CHARACTERISTICS | | | | | | | |
|--------------------------------|---|---------|----------|------|------|------|------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Collector light current | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CE} = 5 \text{ V}$ | BPW77NA | I_{ca} | 7.5 | | 15 | mA |
| | | BPW77NB | I_{ca} | 10 | | | mA |

BASIC CHARACTERISTICS

$T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

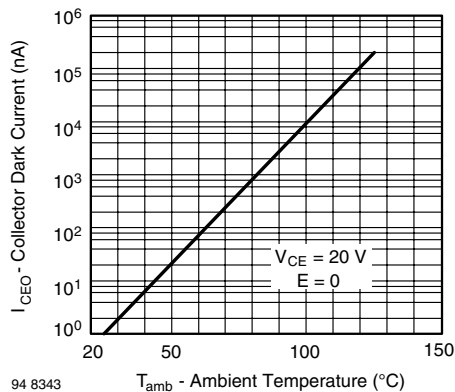


Fig. 2 - Collector Dark Current vs. Ambient Temperature

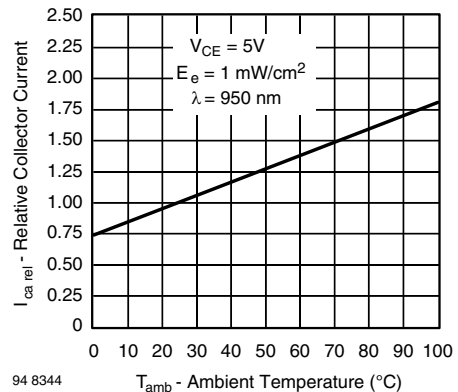


Fig. 3 - Relative Collector Current vs. Ambient Temperature

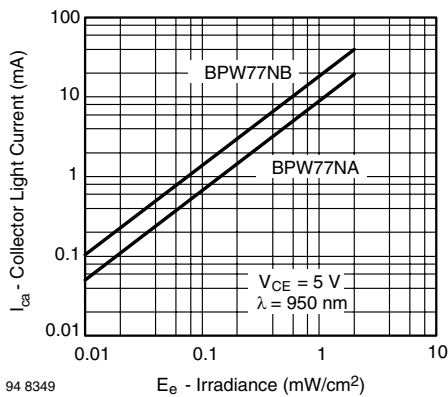


Fig. 4 - Collector Light Current vs. Irradiance

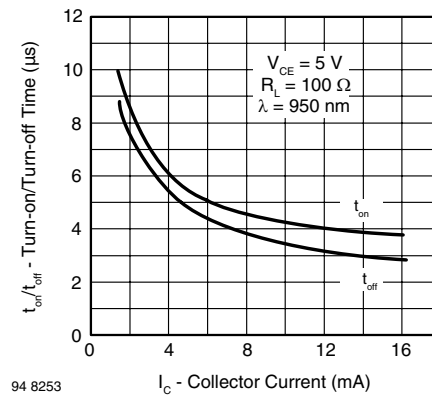


Fig. 7 - Turn-on/Turn-off Time vs. Collector Current

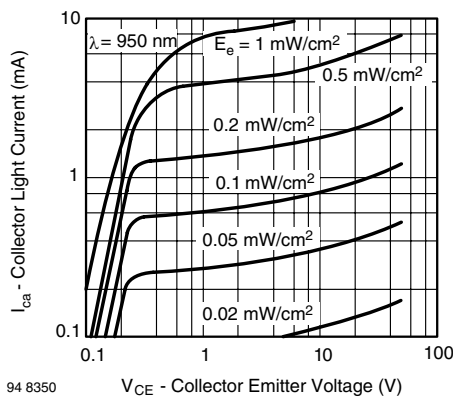


Fig. 5 - Collector Light Current vs. Collector Emitter Voltage

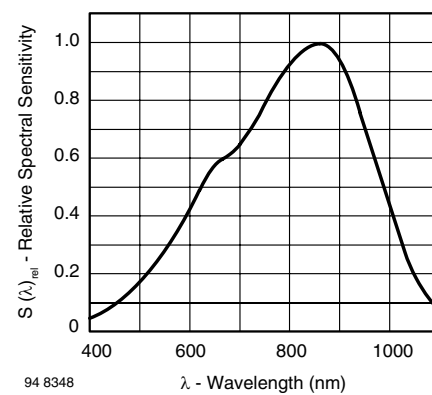


Fig. 8 - Relative Spectral Sensitivity vs. Wavelength

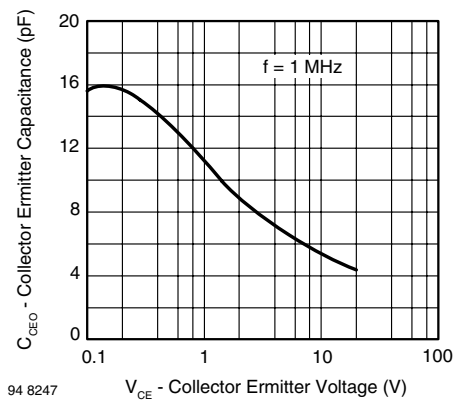


Fig. 6 - Collector Emitter Capacitance vs. Collector Emitter Voltage

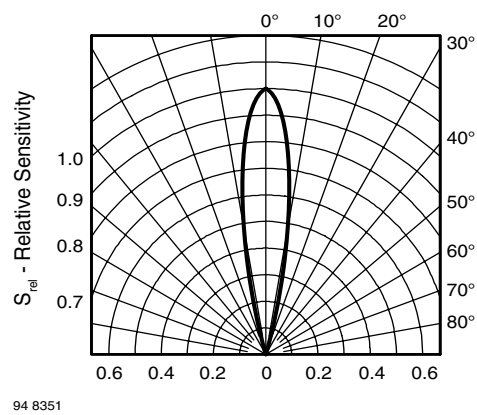


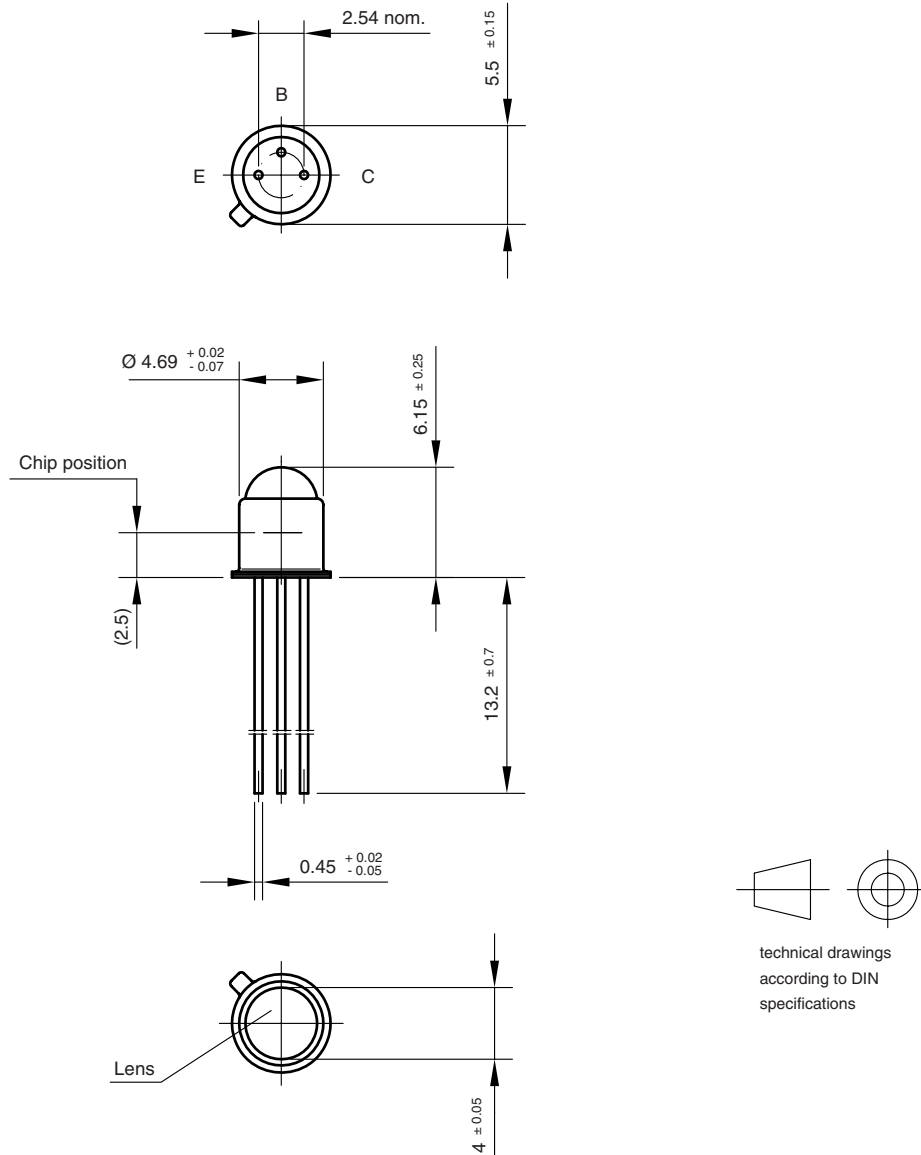
Fig. 9 - Relative Radiant Sensitivity vs. Angular Displacement



BPW77NA, BPW77NB

Silicon NPN Phototransistor, RoHS Compliant Vishay Semiconductors

PACKAGE DIMENSIONS in millimeters



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