

# Silicon NPN Phototransistor

## Version 1.3

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### BPY 62



#### Features:

- **Spectral range of sensitivity:** (typ) 400 ... 1100 nm
- **Package:** Metal Can (TO-18), hermetically sealed
- **Special:** Base connection
- Suitable up to 125 °C
- High photosensitivity
- Available in groups

#### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

#### Ordering Information

| Type:      | Photocurrent<br>$I_{PCE}$ [ $\mu$ A]<br>$\lambda = 950 \text{ nm}$ , $E_e = 0.5 \text{ mW/cm}^2$ ,<br>$V_{CE} = 5 \text{ V}$ | Ordering Code |
|------------|--|---------------|
| BPY 62     | $\geq 500$   | Q60215Y0062   |
| BPY 62-3/4 | 800 ... 2500   | Q62702P5198   |
| BPY 62-4   | 1250 ... 2500  | Q60215Y1113   |

*Note:* Only one bin within one packing unit (variation less than 2:1)

**Maximum Ratings** ( $T_A = 25\text{ °C}$ )

| Parameter   | Symbol            | Values      | Unit |
|---|-------------------|-------------|------|
| Operating and storage temperature range                           | $T_{op}; T_{stg}$ | -40 ... 125 | °C   |
| Collector-emitter voltage   | $V_{CE}$          | 35          | V    |
| Collector current   | $I_C$             | 100         | mA   |
| Collector surge current<br>( $\tau < 10\ \mu\text{s}$ )           | $I_{CS}$          | 200         | mA   |
| Emitter-collector voltage   | $V_{EC}$          | 7           | V    |
| Total Power dissipation   | $P_{tot}$         | 200         | mW   |
| ESD withstand voltage<br>(acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM) | $V_{ESD}$         | 2000        | V    |

**Characteristics** ( $T_A = 25\text{ °C}$ )

| Parameter   |             | Symbol             | Values                | Unit            |
|---|-------------|--------------------|-----------------------|-----------------|
| Wavelength of max. sensitivity  | (typ)       | $\lambda_{S\ max}$ | 830                   | nm              |
| Spectral range of sensitivity   | (typ)       | $\lambda_{10\%}$   | (typ) 400<br>... 1100 | nm              |
| Radiant sensitive area  | (typ)       | A                  | 0.11                  | mm <sup>2</sup> |
| Dimensions of chip area   | (typ)       | L x W              | (typ) 0.55 x<br>0.55  | mm x<br>mm      |
| Half angle  | (typ)       | $\varphi$          | $\pm 8$               | °               |
| Photocurrent of collector-base photodiode<br>( $\lambda = 950\text{ nm}$ , $E_e = 0.5\text{ mW/cm}^2$ , $V_{CB} = 5\text{ V}$ ) | (typ)       | $I_{PCB}$          | 5.5                   | $\mu\text{A}$   |
| Photocurrent of collector-base photodiode<br>( $E_V = 1000\text{ lx}$ , Std. Light A, $V_{CB} = 5\text{ V}$ )                   | (typ)       | $I_{PCB}$          | 17                    | $\mu\text{A}$   |
| Capacitance<br>( $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )   | (typ)       | $C_{CE}$           | 7.5                   | pF              |
| Capacitance<br>( $V_{CB} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )   | (typ)       | $C_{CB}$           | 14                    | pF              |
| Capacitance<br>( $V_{EB} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )   | (typ)       | $C_{EB}$           | 19                    | pF              |
| Dark current<br>( $V_{CE} = 20\text{ V}$ , $E = 0$ )  | (typ (max)) | $I_{CE0}$          | 1 ( $\leq 50$ )       | nA              |

Grouping ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

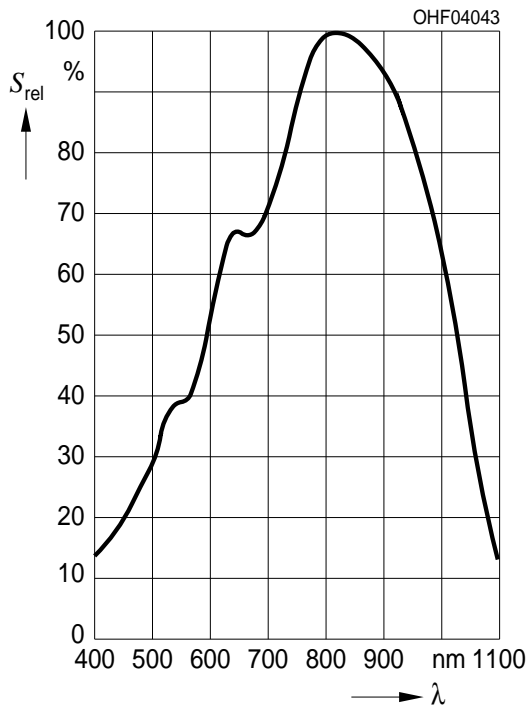
| Group    | Min Photocurrent<br>$E_e = 0.5\text{ mW/cm}^2$ ,<br>$V_{CE} = 5\text{ V}$<br>$I_{PCE, min}\text{ }[\mu\text{A}]$ | Max Photocurrent<br>$E_e = 0.5\text{ mW/cm}^2$ ,<br>$V_{CE} = 5\text{ V}$<br>$I_{PCE, max}\text{ }[\mu\text{A}]$ | Typ Photocurrent<br>$E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$<br>$I_{PCE}\text{ }[\mu\text{A}]$ | Rise and fall time<br>$I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$<br>$t_r, t_f\text{ }[\mu\text{s}]$ |
|----------|--|--|--|---|
| BPY 62-2 | 500  | 1000   | 2400   | 5   |
| BPY 62-3 | 800  | 1600   | 3800   | 7   |
| BPY 62-4 | 1250   | 2500   | 5800   | 9   |
| BPY 62-5 | 2000   |  | 9600   | 12  |

| Group    | Collector-emitter saturation voltage<br>$I_C = I_{PCEmin} \times 0.3$ ,<br>$E_e = 0.5\text{ mW/cm}^2$<br>$V_{CEsat}\text{ }[\text{mV}]$ | Current gain<br>$E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}$<br>$I_{PCE} / I_{PCB}$ |
|----------|---|--|
| BPY 62-2 | 150   | 140  |
| BPY 62-3 | 150   | 220  |
| BPY 62-4 | 160   | 340  |
| BPY 62-5 | 180   | 550  |

Note.:  $I_{PCEmin}$  is the min. photocurrent of the specified group.

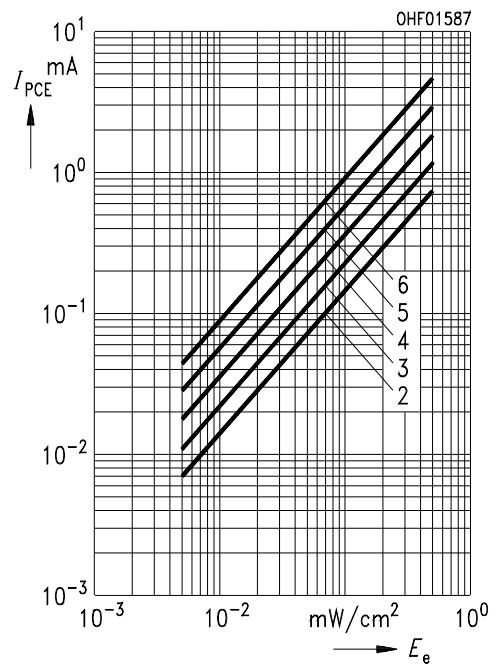
**Relative Spectral Sensitivity** <sup>1) page 9</sup>

$S_{rel} = f(\lambda)$



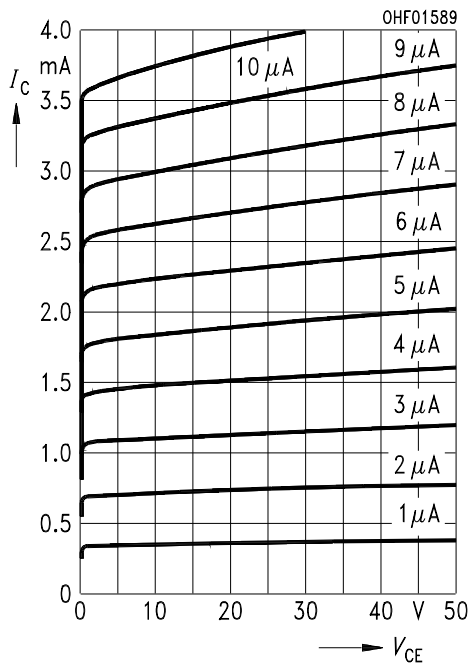
**Photocurrent** <sup>1) page 9</sup>

$I_{PCE} = f(E_e), V_{CE} = 5 V$



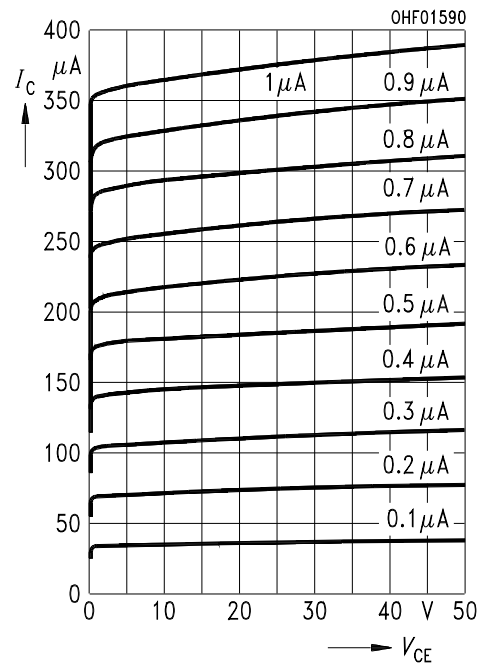
**Collector Current** <sup>1) page 9</sup>

$I_C = f(V_{CE}), I_B = \text{Parameter}$



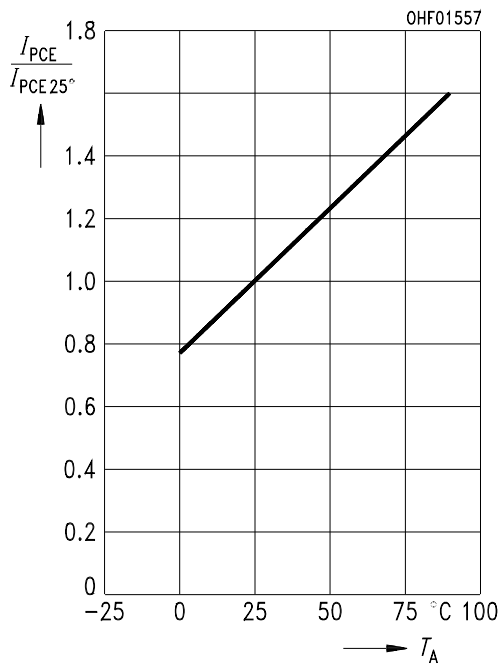
**Collector Current** <sup>1) page 9</sup>

$I_C = f(V_{CE}), I_B = \text{Parameter}$



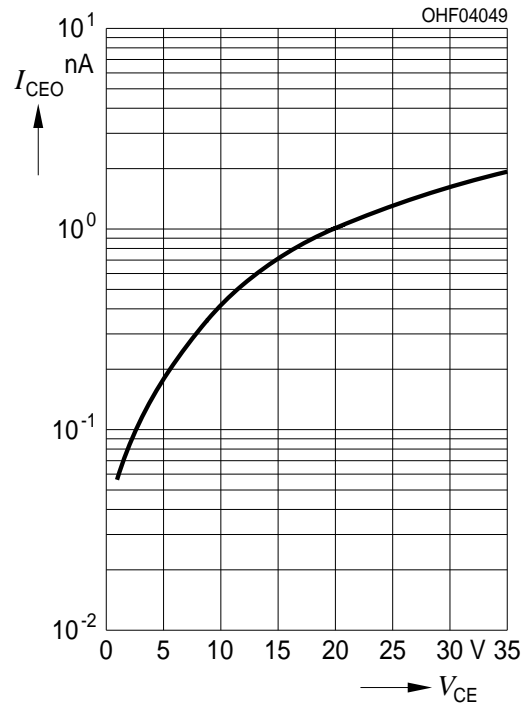
**Photocurrent** <sup>1) page 9</sup>

$I_{PCE} / I_{PCE}(25^\circ\text{C}) = f(T_A), V_{CE} = 5 \text{ V}$



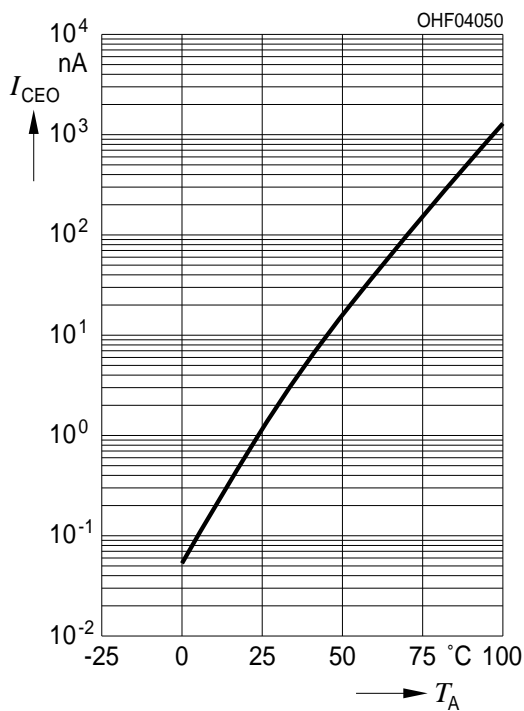
**Dark Current** <sup>1) page 9</sup>

$I_{CEO} = f(V_{CE}), E = 0$



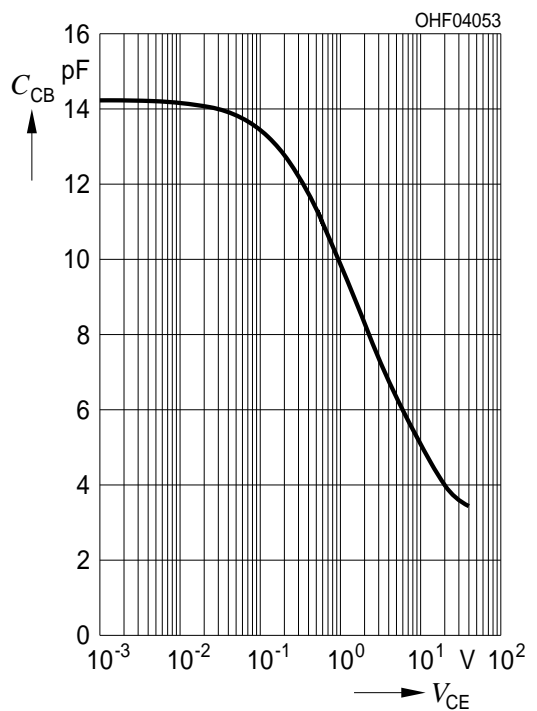
**Dark Current** <sup>1) page 9</sup>

$I_{CEO} = f(T_A), E = 0$



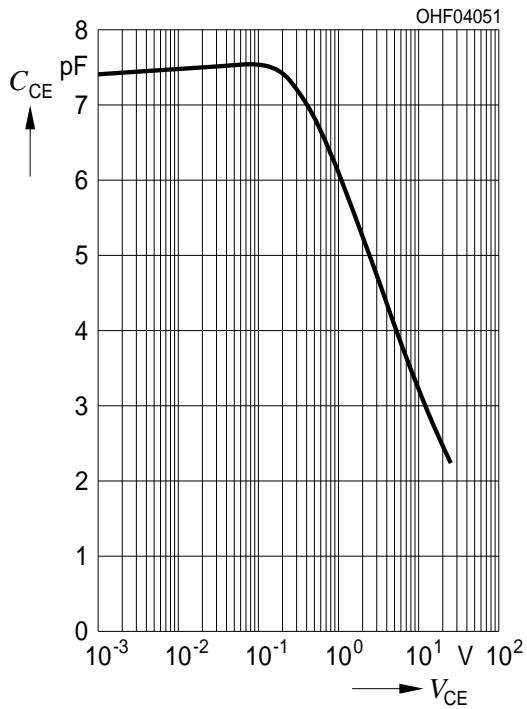
**Collector-Base Capacitance** <sup>1) page 9</sup>

$C_{CB} = f(V_{CB}), f = 1 \text{ MHz}, E = 0$



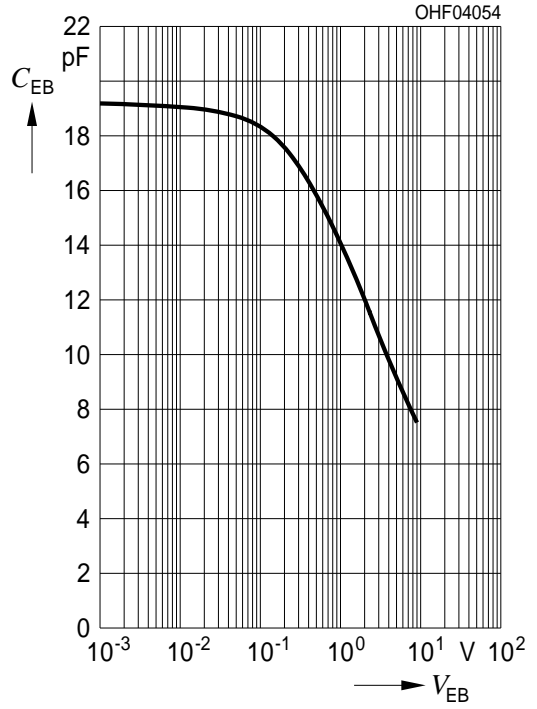
**Collector-Emitter Capacitance** <sup>1) page 9</sup>

$C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$



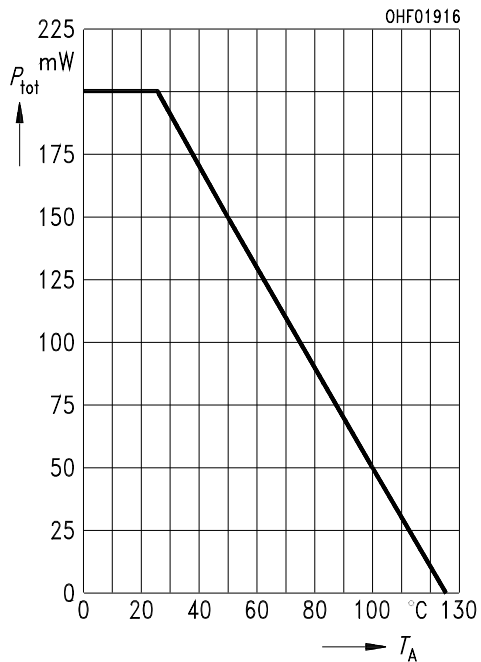
**Emitter-Base Capacitance** <sup>1) page 9</sup>

$C_{EB} = f(V_{EB}), f = 1 \text{ MHz}, E = 0$



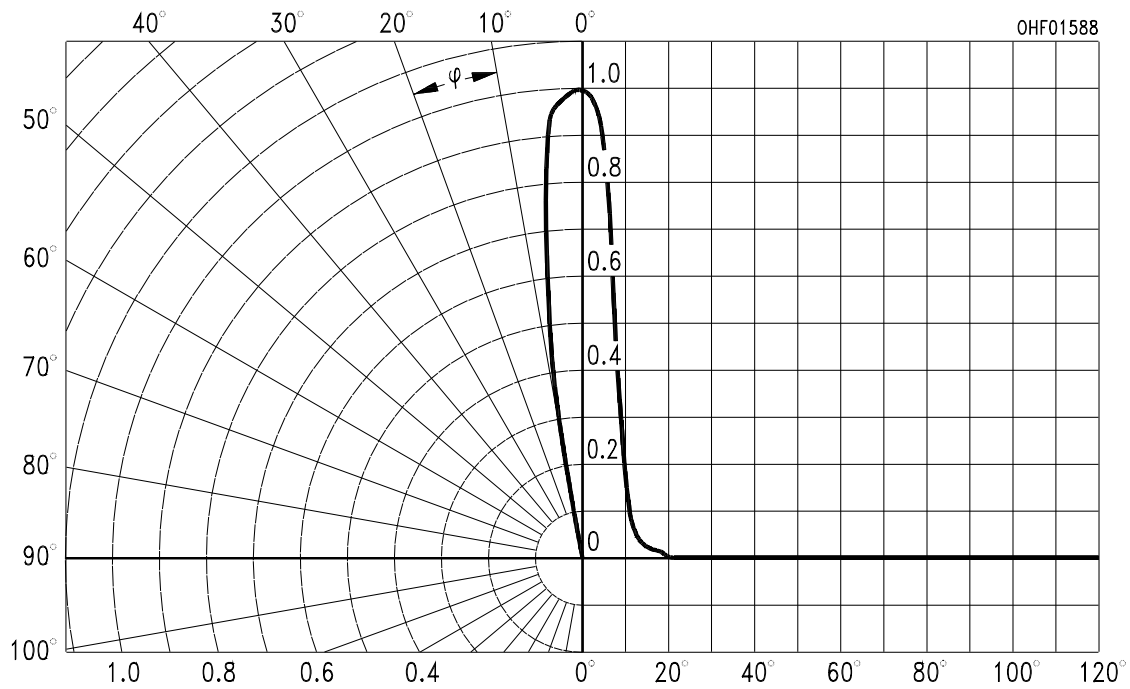
**Power Consumption**

$P_{tot} = f(T_A)$

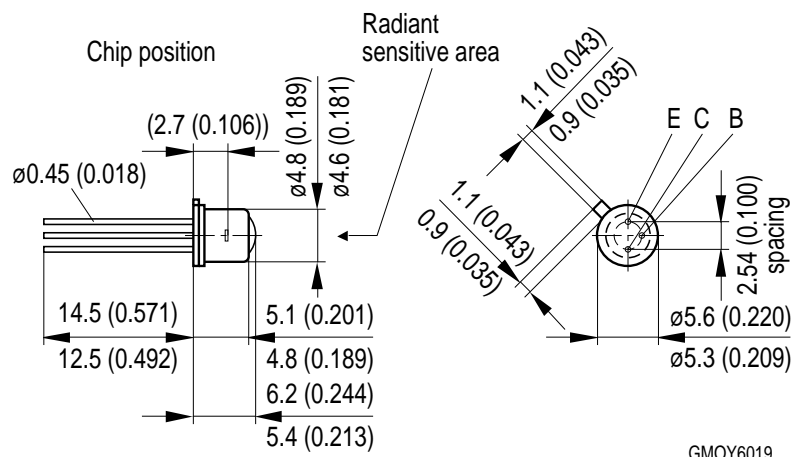


**Directional Characteristics** <sup>1) page 9</sup>

$S_{rel} = f(\phi)$



**Package Outline**



*Dimensions in mm (inch).*

**Package**

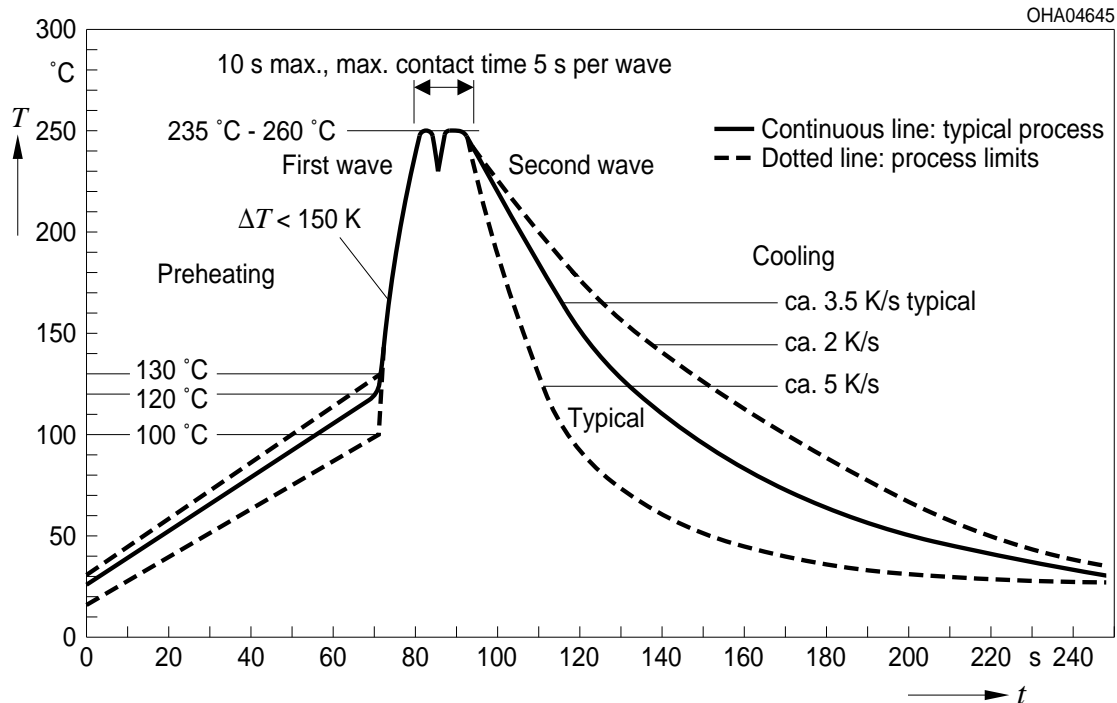
Metal Can (TO-18), hermetically sealed

**Approximate Weight:**

0.3 g

**TTW Soldering**

IEC-61760-1 TTW

**Disclaimer**

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

**Attention please!**

The information describes the type of component and shall not be considered as assured characteristics.

Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact our Sales Organization.

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\*\*) Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered.

**Glossary**

- <sup>1)</sup> **Typical Values:** Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

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