

Mini-Silicon NPN Phototransistor

Version 1.3

SFH 305



Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** Miniature Array, Epoxy
- **Special:** High linearity
- Available in groups

Applications

- Miniature photointerrupters
- Industrial electronics
- For control and drive circuits

Ordering Information

| Type: | Photocurrent I_{PCE} [μ A] $\lambda = 950$ nm, $E_e = 0.5$ mW/cm ² , $V_{CE} = 5$ V | Ordering Code |
|-------------|--|---------------|
| SFH 305 | 250 ... 1250 | Q62702P0836 |
| SFH 305-2/3 | 250 ... 800 | Q62702P3589 |

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 ... 80 | °C |
| Collector-emitter voltage | V_{CE} | 32 | V |
| Collector current | I_C | 50 | mA |
| Collector surge current ($\tau < 10\ \mu\text{s}$) | I_{CS} | 200 | mA |
| Emitter-collector voltage | V_{EC} | 7 | V |
| Total Power dissipation | P_{tot} | 70 | mW |
| Thermal resistance | R_{thJA} | 950 | K / W |
| ESD withstand voltage (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) | $\lambda_{S\ max}$ | 850 | nm |
| Spectral range of sensitivity | (typ) | $\lambda_{10\%}$ | (typ) 450 ... 1100 | nm |
| Radiant sensitive area | (typ) | A | 0.11 | mm ² |
| Dimensions of chip area | (typ) | L x W | (typ) 0.55 x 0.55 | mm x mm |
| Half angle | (typ) | φ | ± 16 | ° |
| Capacitance ($V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$) | (typ) | C_{CE} | 7.5 | pF |
| Dark current ($V_{CE} = 20\text{ V}$, $E = 0$) | (typ (max)) | I_{CE0} | 1 (≤ 50) | nA |
| Rise and fall time ($I_C = 1\text{ mA}$, $V_{CC} = 5\text{ V}$, $R_L = 1\text{ k}\Omega$) | (typ) | t_r, t_f | 6 | μs |

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

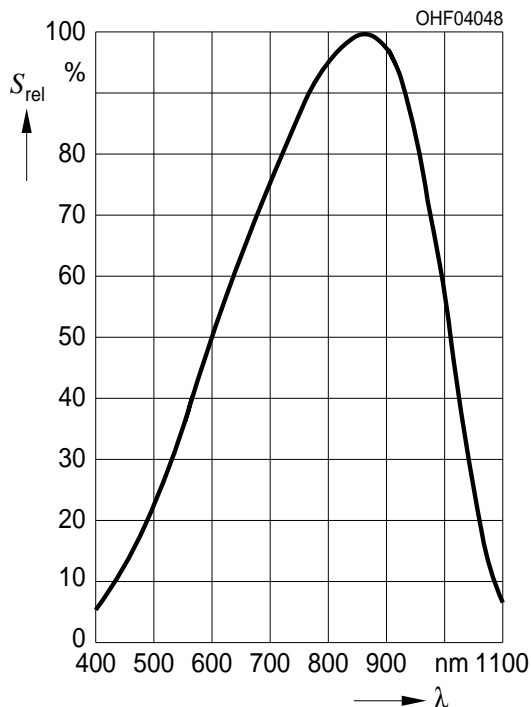
| Group | Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, min}\text{ }[\mu\text{A}]$ | Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, max}\text{ }[\mu\text{A}]$ | Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE}\text{ }[\mu\text{A}]$ | Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f\text{ }[\mu\text{s}]$ |
|-----------|--|--|--|---|
| SFH 305-2 | 250 | 500 | 1200 | 5.5 |
| SFH 305-3 | 400 | 800 | 1900 | 6 |
| SFH 305-4 | 630 | 1250 | 3000 | 8 |

| Group | Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3, E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat}\text{ }[\text{mV}]$ |
|-----------|---|
| SFH 305-2 | 150 |
| SFH 305-3 | 150 |
| SFH 305-4 | 150 |

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

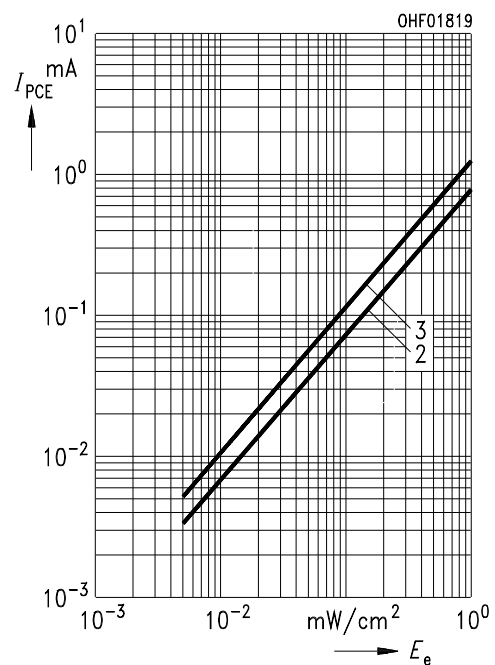
Relative Spectral Sensitivity ^{1) page 9}

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



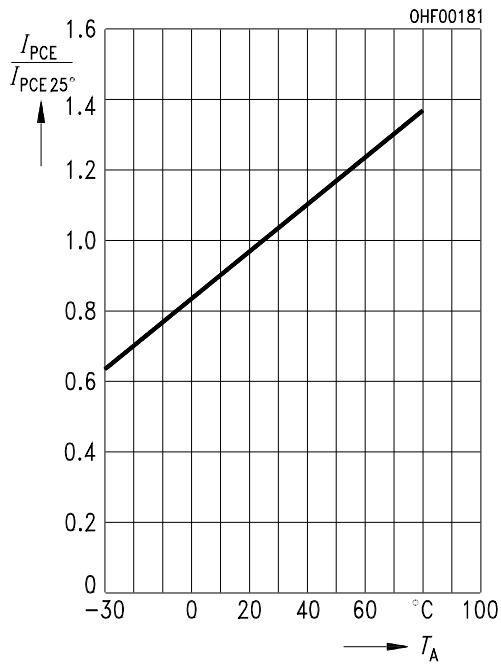
Photocurrent ^{1) page 9}

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



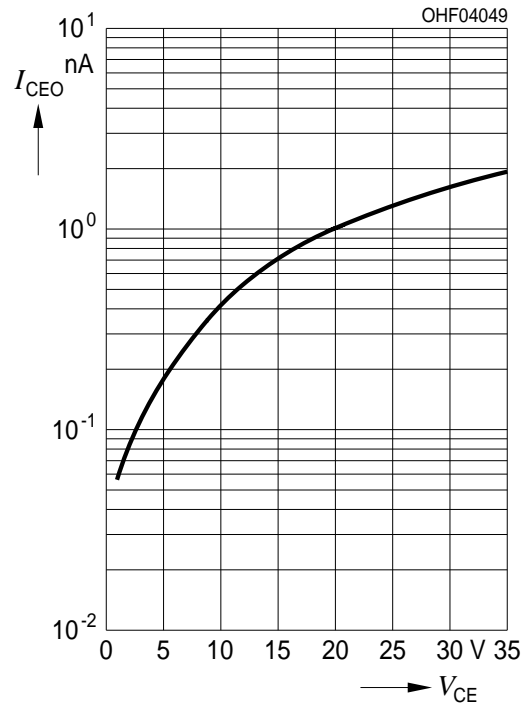
Photocurrent ^{1) page 9}

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



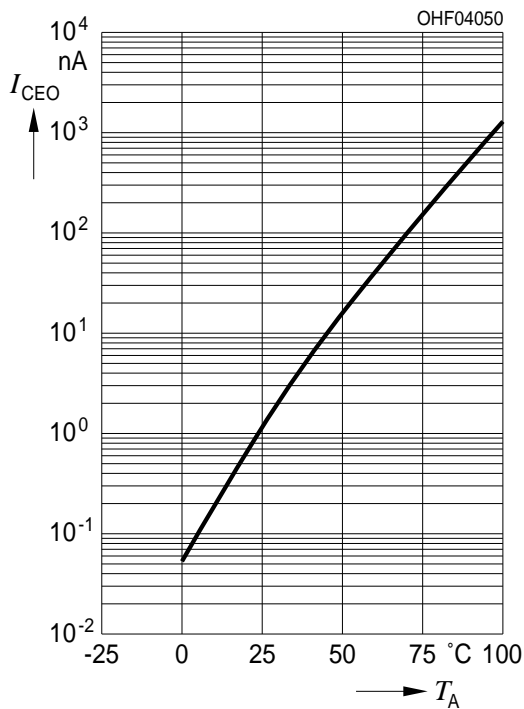
Dark Current ^{1) page 9}

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



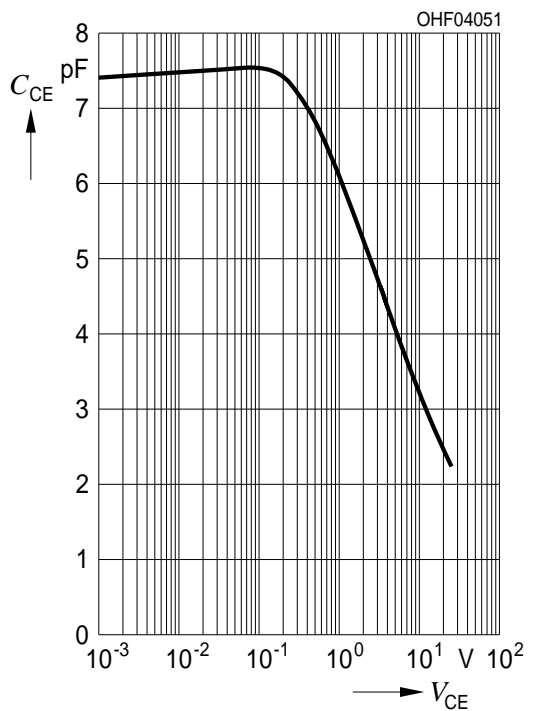
Dark Current ^{1) page 9}

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



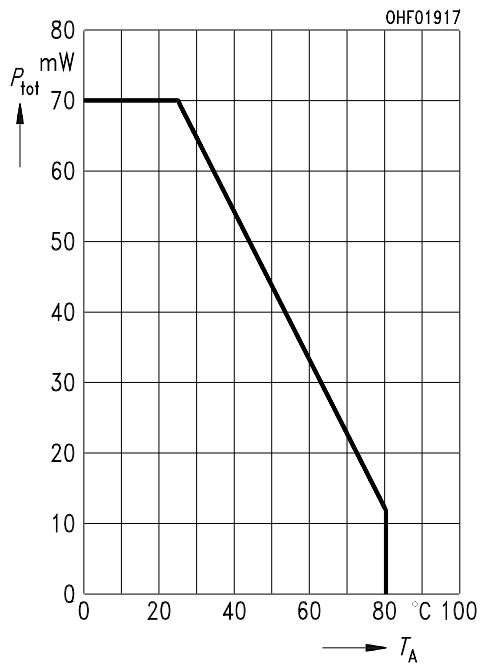
Collector-Emitter Capacitance ^{1) page 9}

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



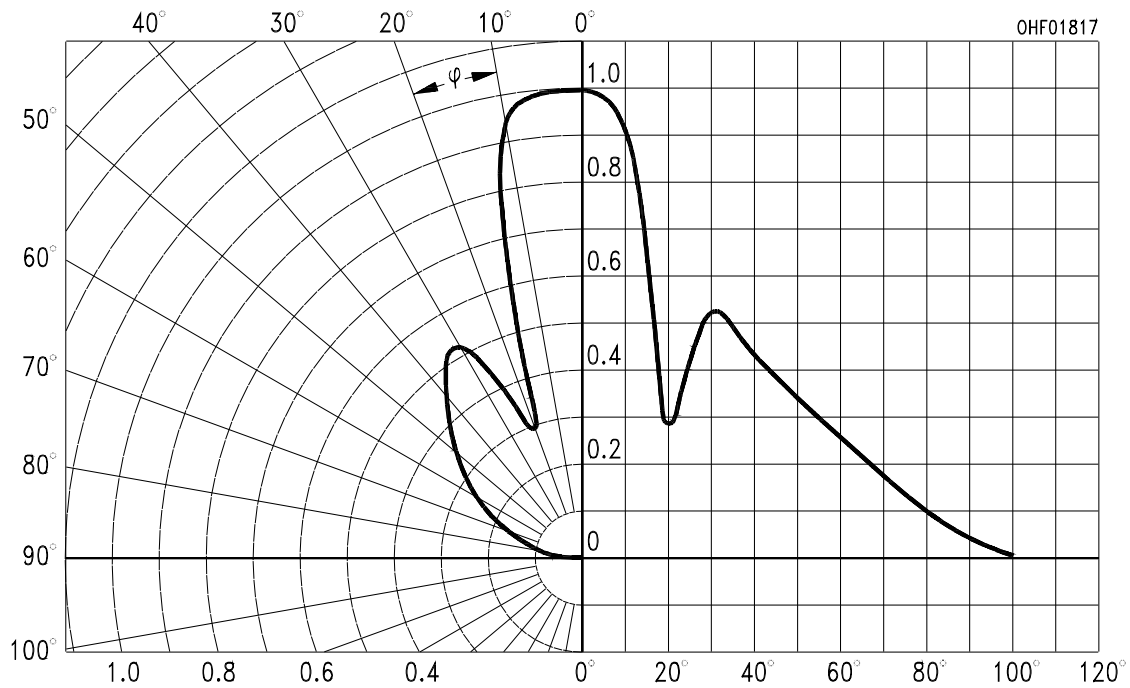
Power Consumption

$P_{\text{tot}} = f(T_A)$

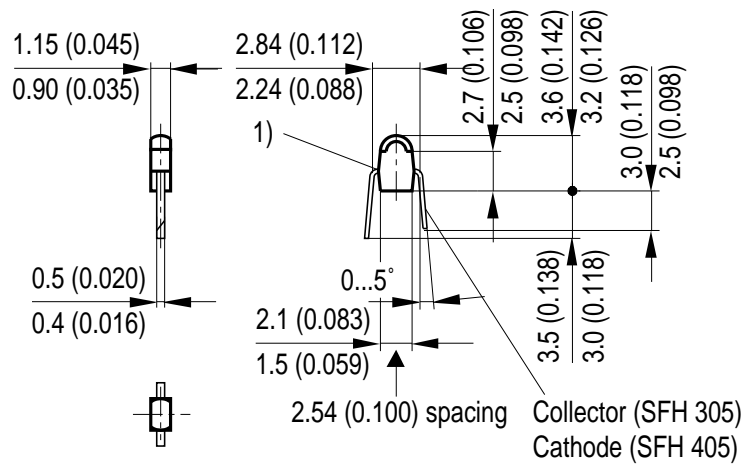


Directional Characteristics ^{1) page 9}

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



Package Outline



GEOY6137

Dimensions in mm (inch).

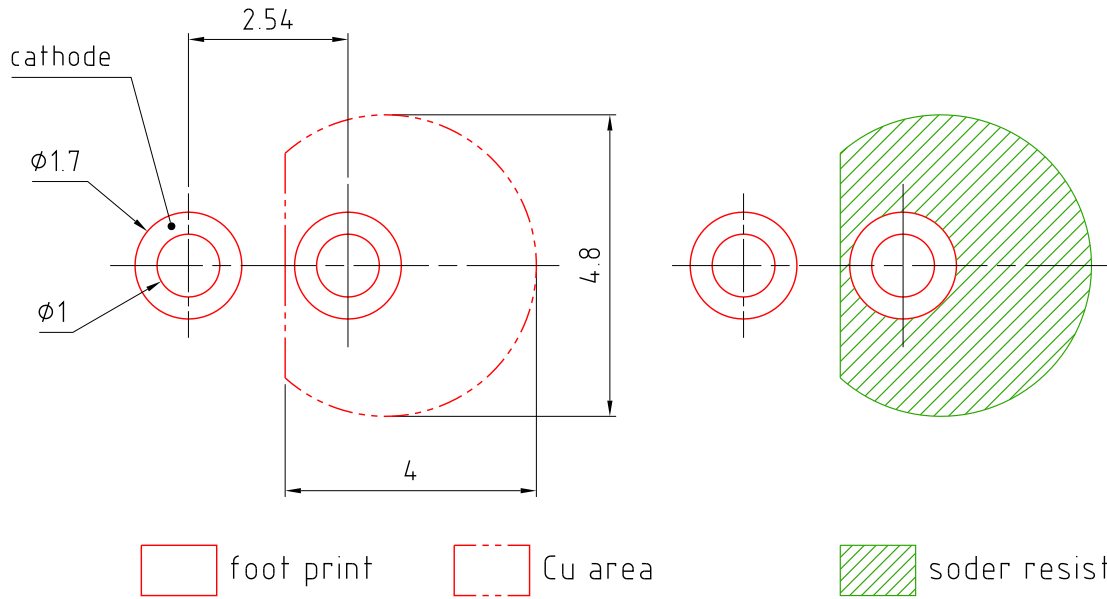
Package

Miniature Array, Epoxy

Approximate Weight:

10.0 mg

Recommended Solder Pad

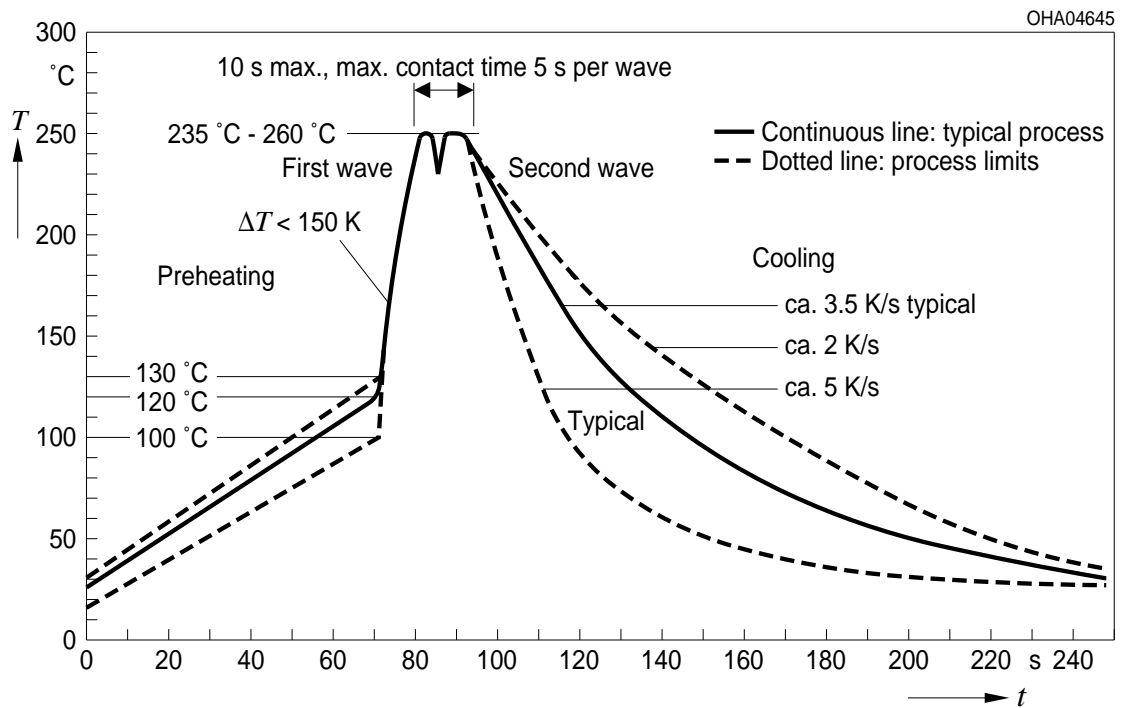


E062.3010.189-01

Dimensions in mm.

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.

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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

- ¹⁾ **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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