

Silicon NPN Phototransistor

Version 1.3

SFH 310



Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** 3mm Radial (T 1), Epoxy
- **Special:** high photosensitivity

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Ordering Information

Type:	Photocurrent I_{PCE} [μA] $\lambda = 950 \text{ nm}$, $E_e = 0.5 \text{ mW/cm}^2$, $V_{CE} = 5 \text{ V}$	Ordering Code
SFH 310	630 ... 3200	Q62702P0874
SFH 310-2/3	630 ... 2000	Q62702P3595

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 ... 100	°C
Collector-emitter voltage	V_{CE}	35	V
Collector current	I_C	50	mA
Collector surge current	I_{CS}	100	mA
Total Power dissipation	P_{tot}	165	mW
Thermal resistance	R_{thJA}	450	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)	$\lambda_{S\max}$	880	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) 0.5 x 0.5	mm x mm
Half angle	(typ)	φ	± 25	°
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

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

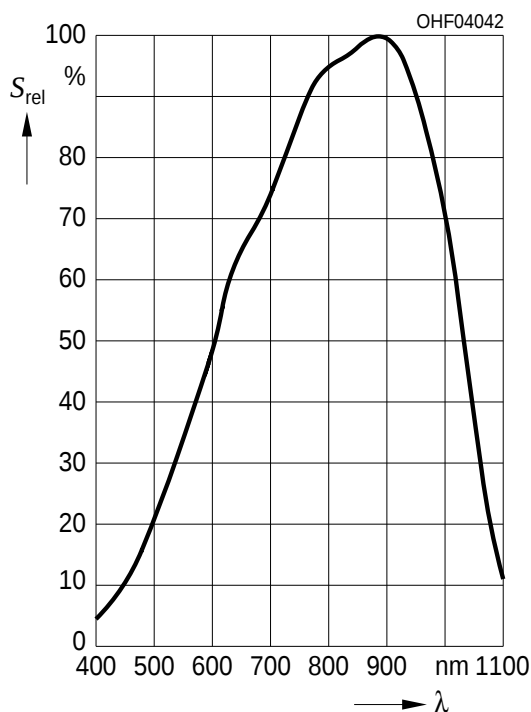
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, \min} [\mu\text{A}]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, \max} [\mu\text{A}]$	Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE} [\mu\text{A}]$	Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f [\mu\text{s}]$
-2	630	1250	3000	5
-3	1000	2000	4800	8
-4	1600	3200	7700	12

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

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

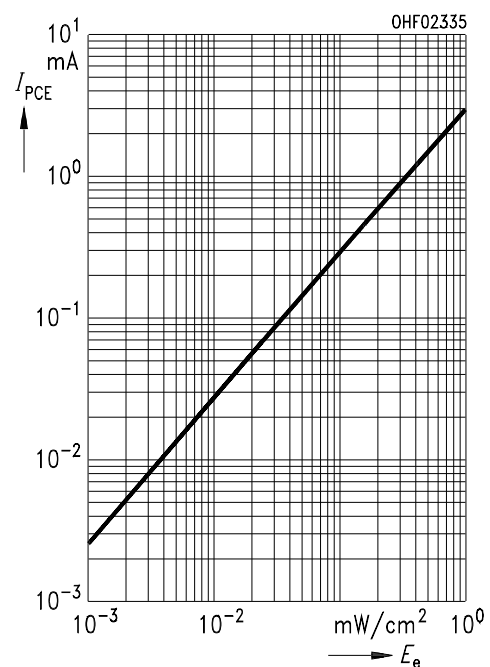
Relative Spectral Sensitivity ^{1) page 9}

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



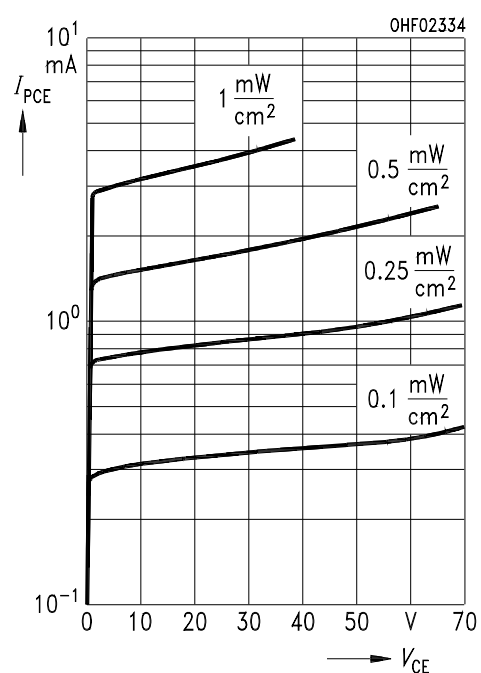
Photocurrent ^{1) page 9}

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

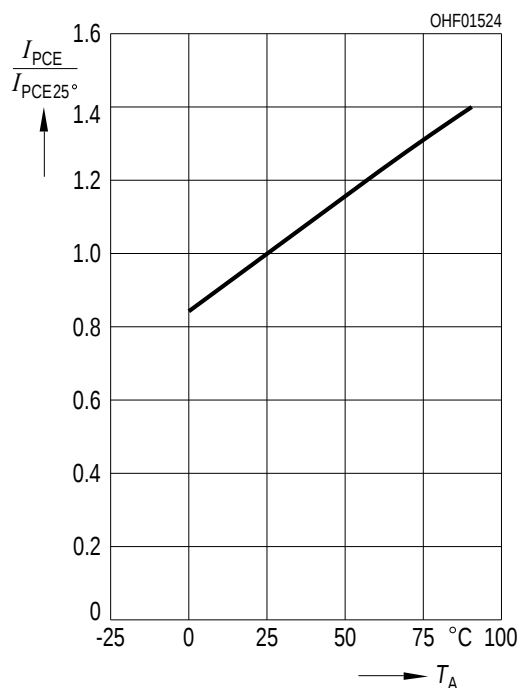


Photocurrent ^{1) page 9}

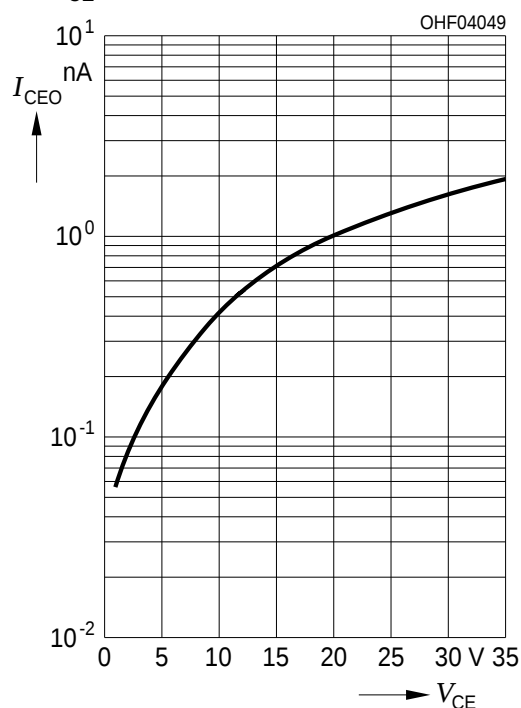
$$I_{PCE} = f(V_{CE}), E_e = \text{Parameter}$$

**Photocurrent** ^{1) page 9}

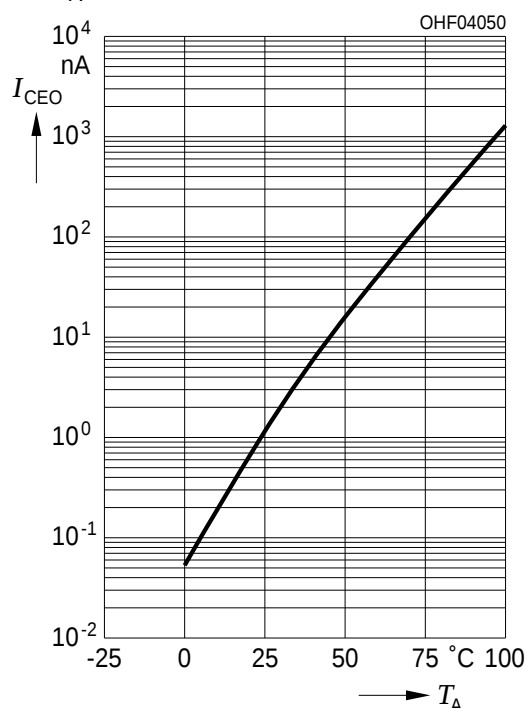
$$I_{PCE} / I_{PCE}(25^\circ\text{C}) = f(T_A), V_{CE} = 5 \text{ V}$$

**Dark Current** ^{1) page 9}

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

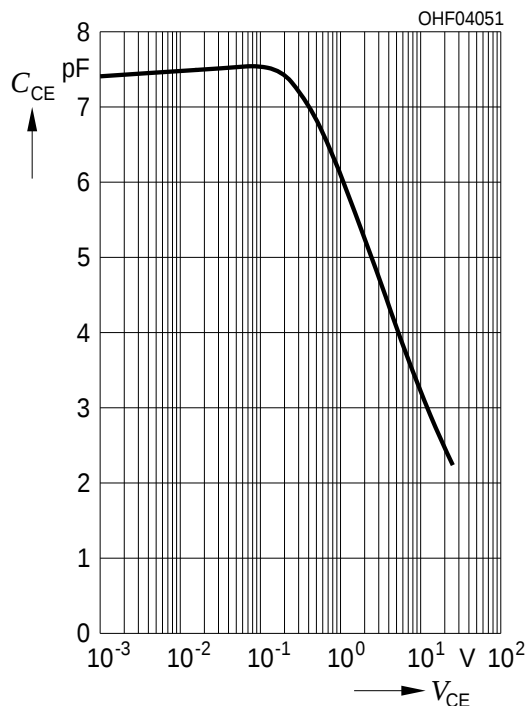
**Dark Current** ^{1) page 9}

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

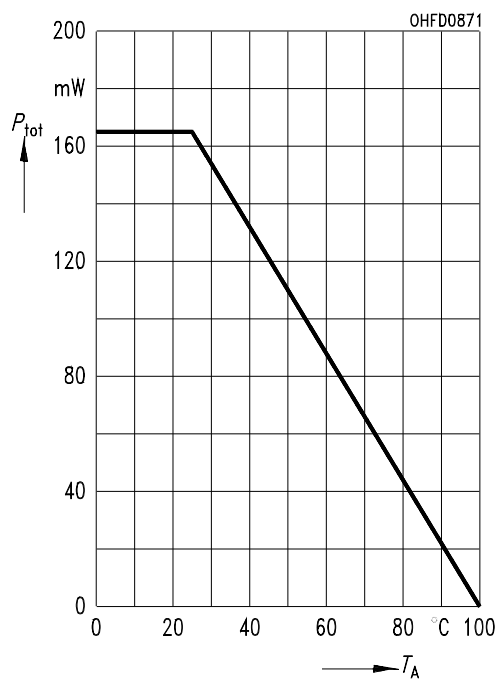


Collector-Emitter Capacitance ^{1) page 9}

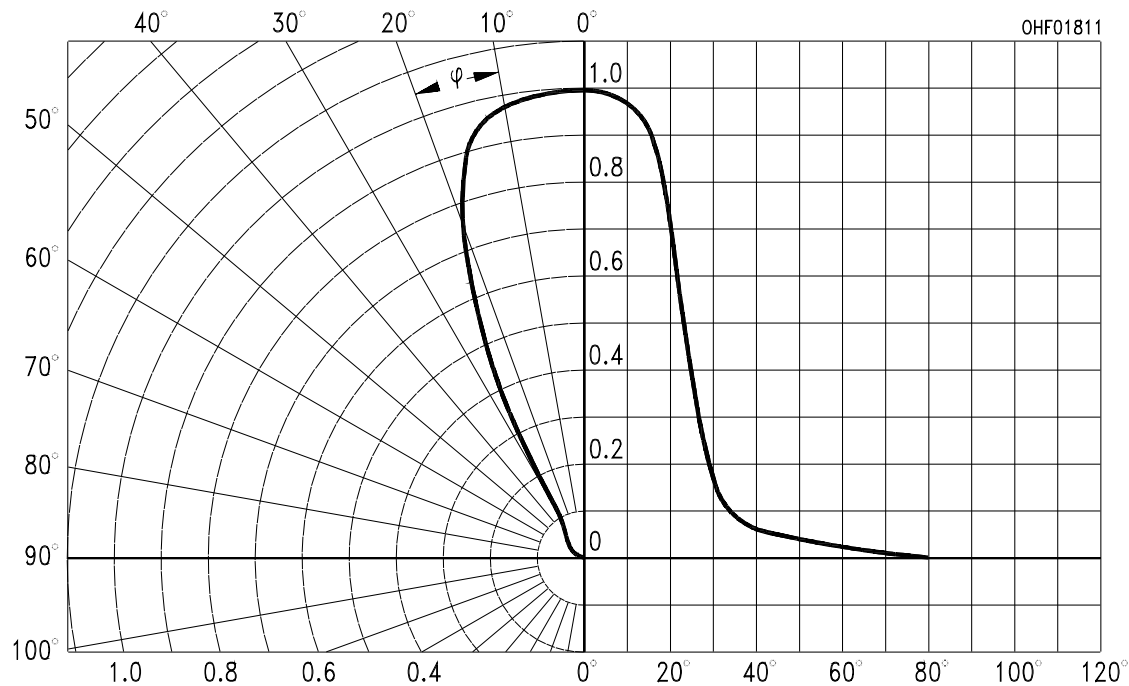
$$C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$$

**Power Consumption**

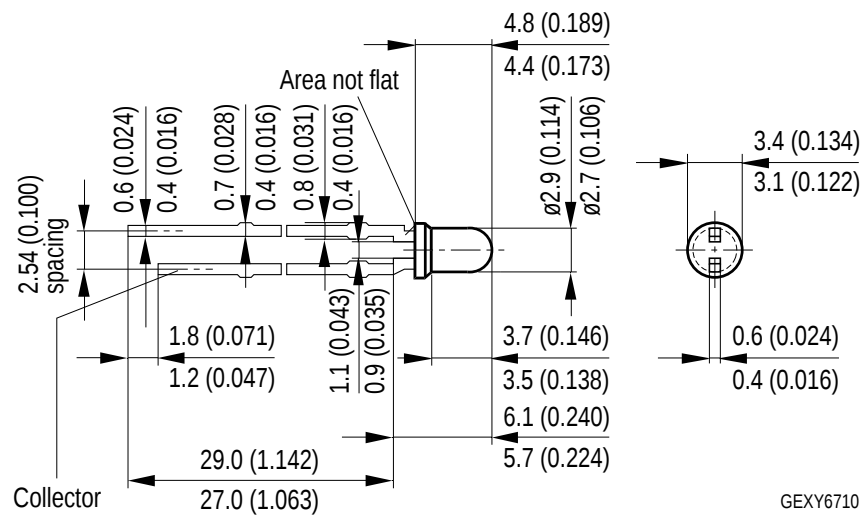
$$P_{tot} = f(T_A)$$

**Directional Characteristics** ^{1) page 9}

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



Package Outline



Dimensions in mm (inch).

Package

3mm Radial (T 1), Epoxy

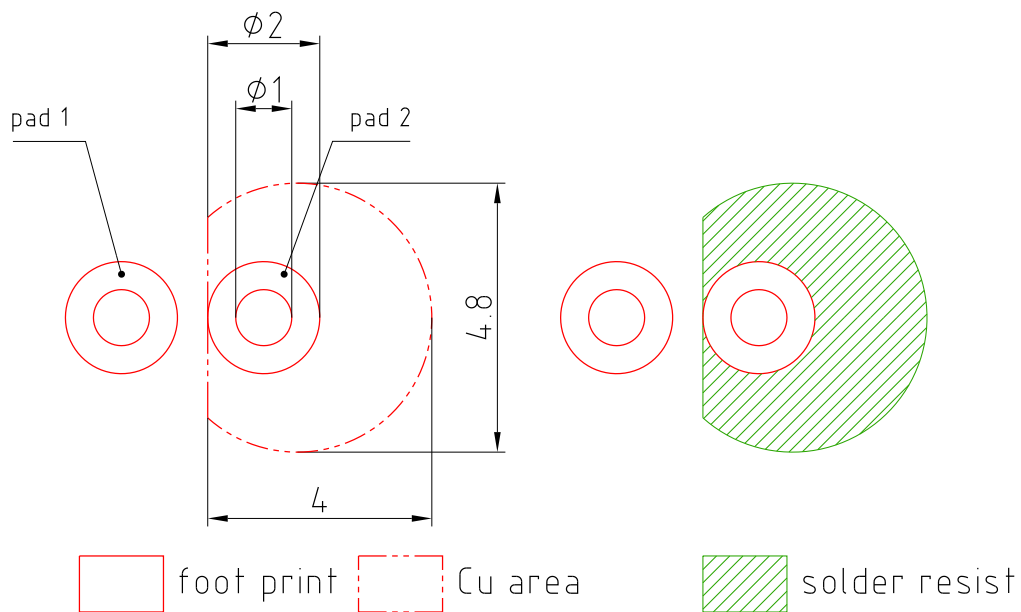
Approximate Weight:

0.2 g

Note

Packing information is available on the internet (online product catalog).

Recommended Solder Pad



E062.3010.188-01

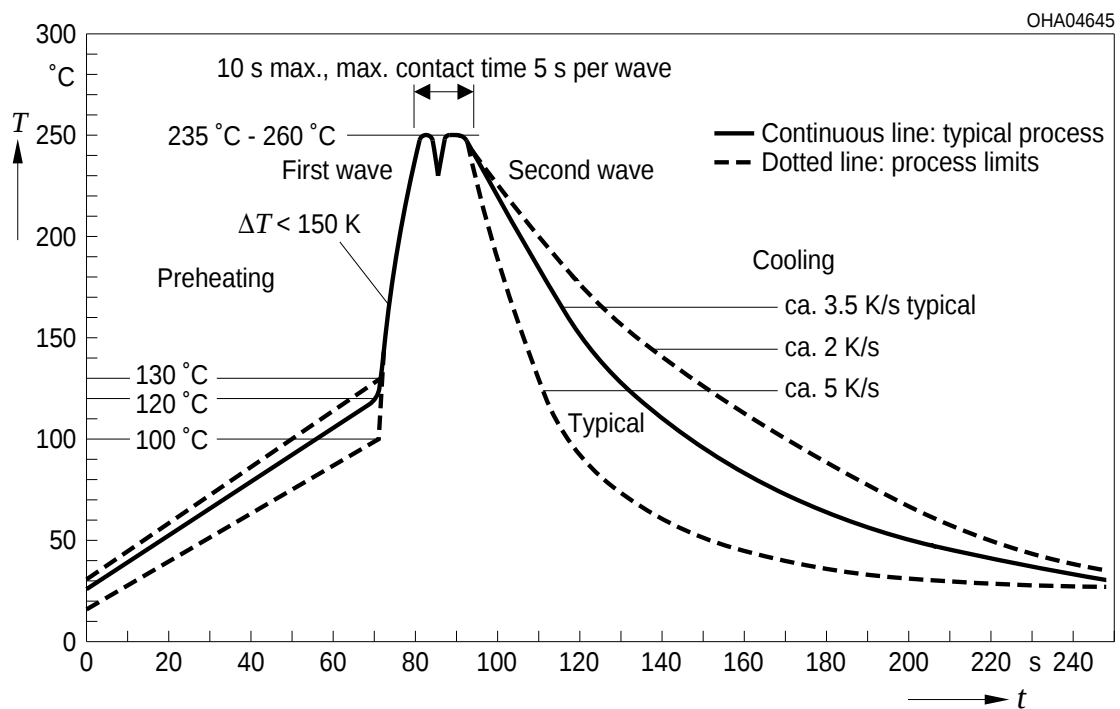
Dimensions in mm.

Note:

pad 1: emitter

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

- 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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