

# Silicon NPN Phototransistor

## Version 1.3

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### SFH 300



#### Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** 5mm Radial (T 1 3/4), Epoxy
- **Special:** High linearity
- Available in groups

#### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits
- Computer-controlled flashes

#### Ordering Information

Type:	Photocurrent $I_{PCE}$ [ $\mu$ A] $\lambda = 950 \text{ nm}$ , $E_e = 0.5 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$	Ordering Code
SFH 300	$\geq 630$	Q62702P1189
SFH 300-3/4	$\geq 1000$	Q62702P3586

*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 ( $\tau < 10\ \mu\text{s}$ )	$I_{CS}$	100	mA
Emitter-collector voltage	$V_{EC}$	7	V
Total Power dissipation	$P_{tot}$	200	mW
Thermal resistance	$R_{thJA}$	375	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 <sup>2</sup>
Dimensions of chip area	(typ)	L x W	(typ) 0.55 x 0.55	mm x mm
Half angle	(typ)	$\varphi$	$\pm 25$	°
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 ( $\leq 50$ )	nA
Rise and fall time ( $I_C = 1\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 1\text{ k}\Omega$ )	(typ)	$t_r, t_f$	10	$\mu\text{s}$

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

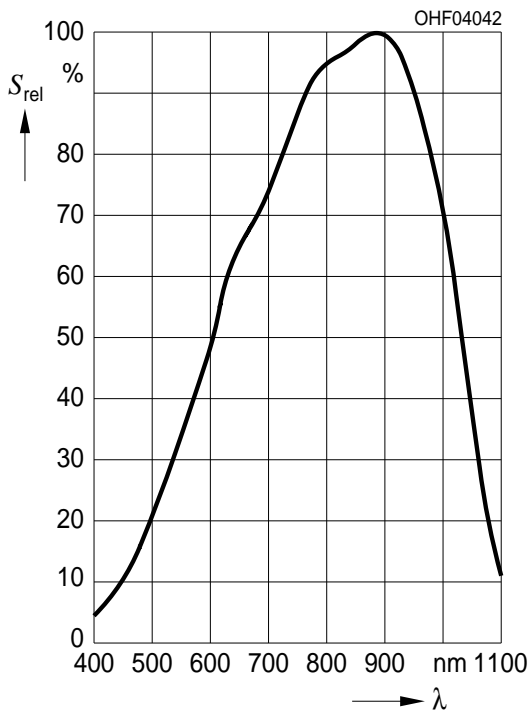
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min}\text{ }[\mu\text{A}]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max}\text{ }[\mu\text{A}]$	Typ Photocurrent SFH 300: $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE}\text{ }[\mu\text{A}]$	Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f\text{ }[\mu\text{s}]$
-2	630	1250	3000	7.5
-3	1000	2000	4800	10
-4	1600		7700	10

Group	Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3, E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat}\text{ }[\text{mV}]$
-2	130
-3	140
-4	150

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

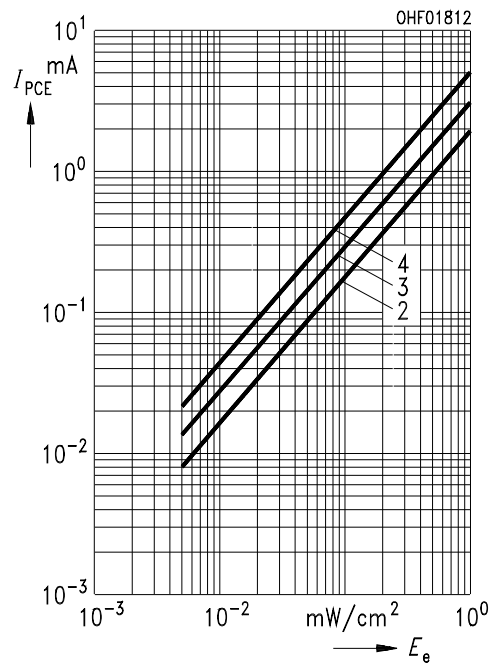
Relative Spectral Sensitivity <sup>1) page 8</sup>

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



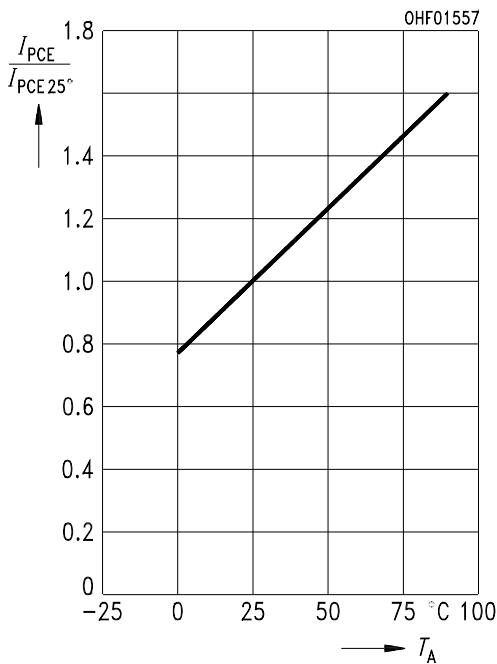
Photocurrent <sup>1) page 8</sup>

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



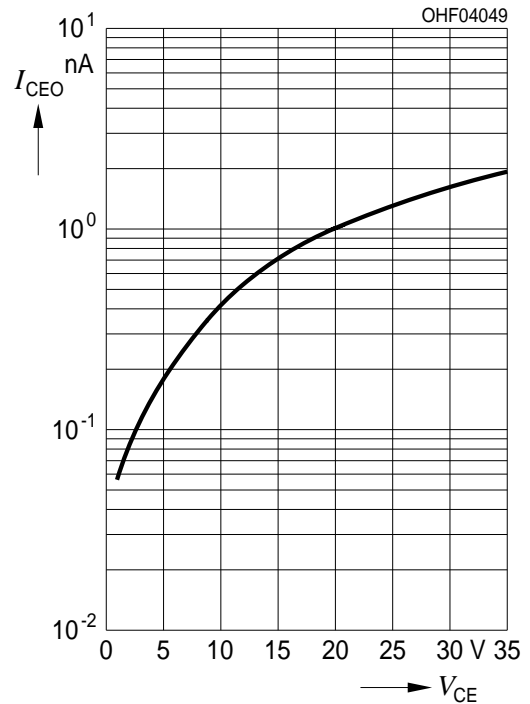
**Photocurrent** <sup>1) page 8</sup>

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



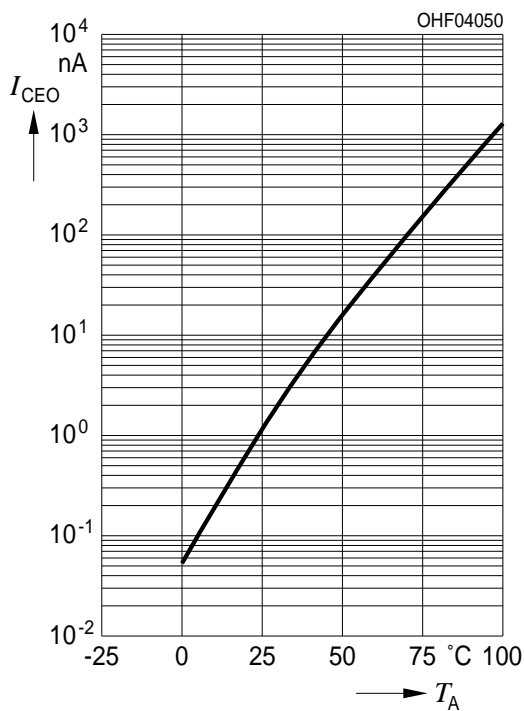
**Dark Current** <sup>1) page 8</sup>

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



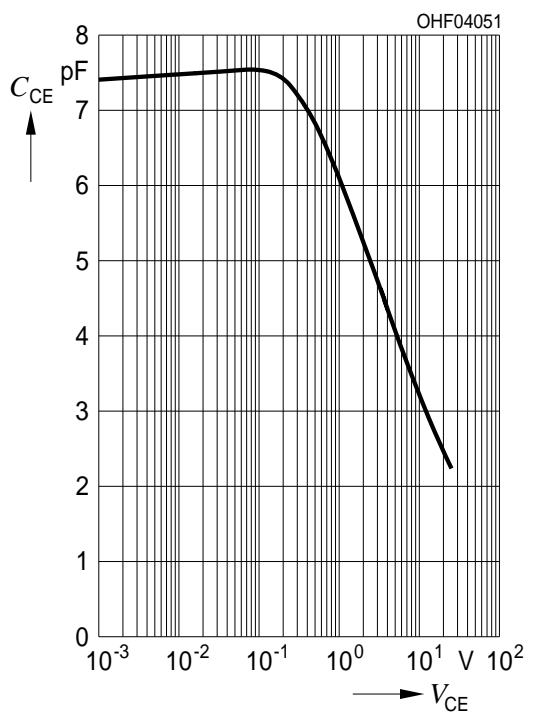
**Dark Current** <sup>1) page 8</sup>

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



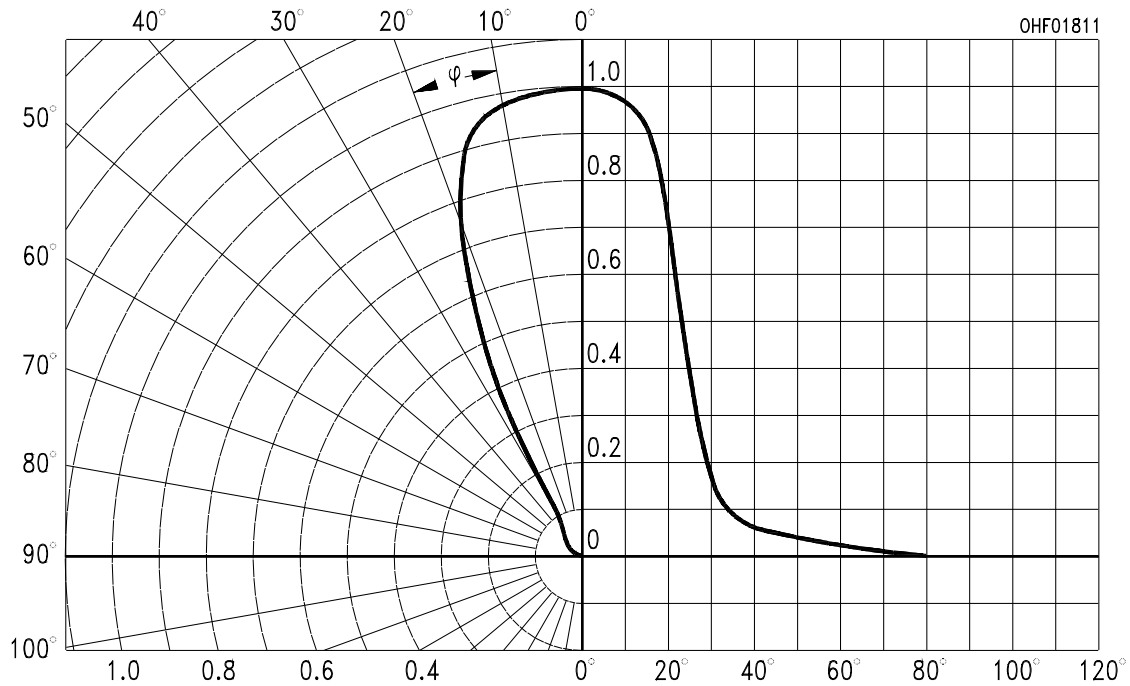
**Collector-Emitter Capacitance** <sup>1) page 8</sup>

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

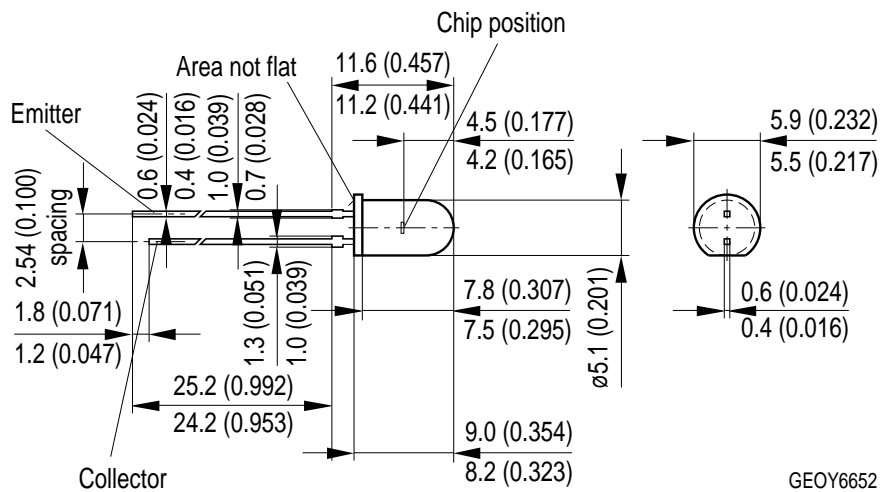


Directional Characteristics <sup>1) page 8</sup>

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



Package Outline



Dimensions in mm (inch).

Package

5mm Radial (T 1 3/4), Epoxy

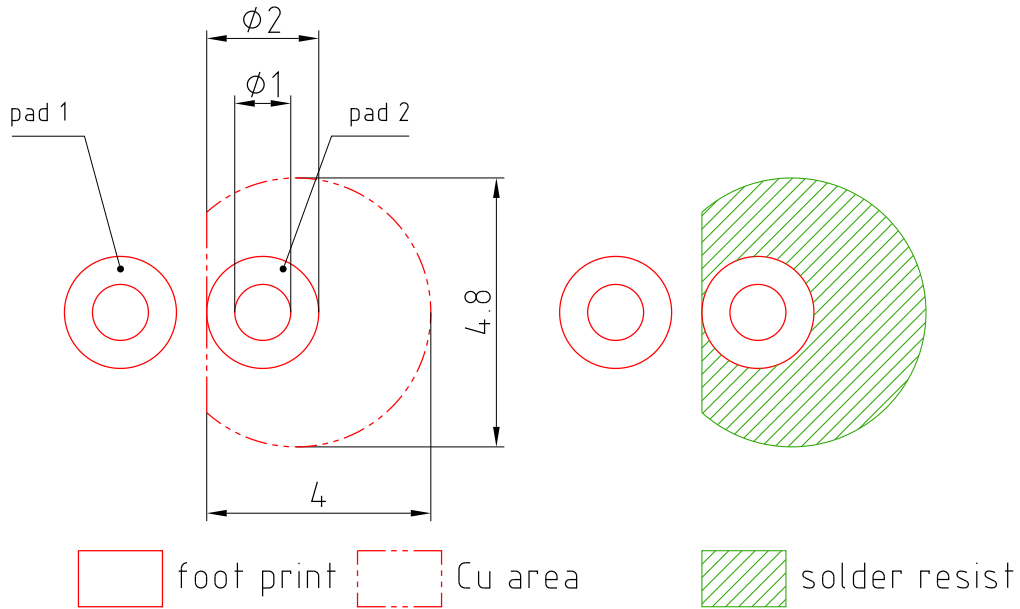
**Approximate Weight:**

0.3 g

**Note**

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

**Recommended Solder Pad**

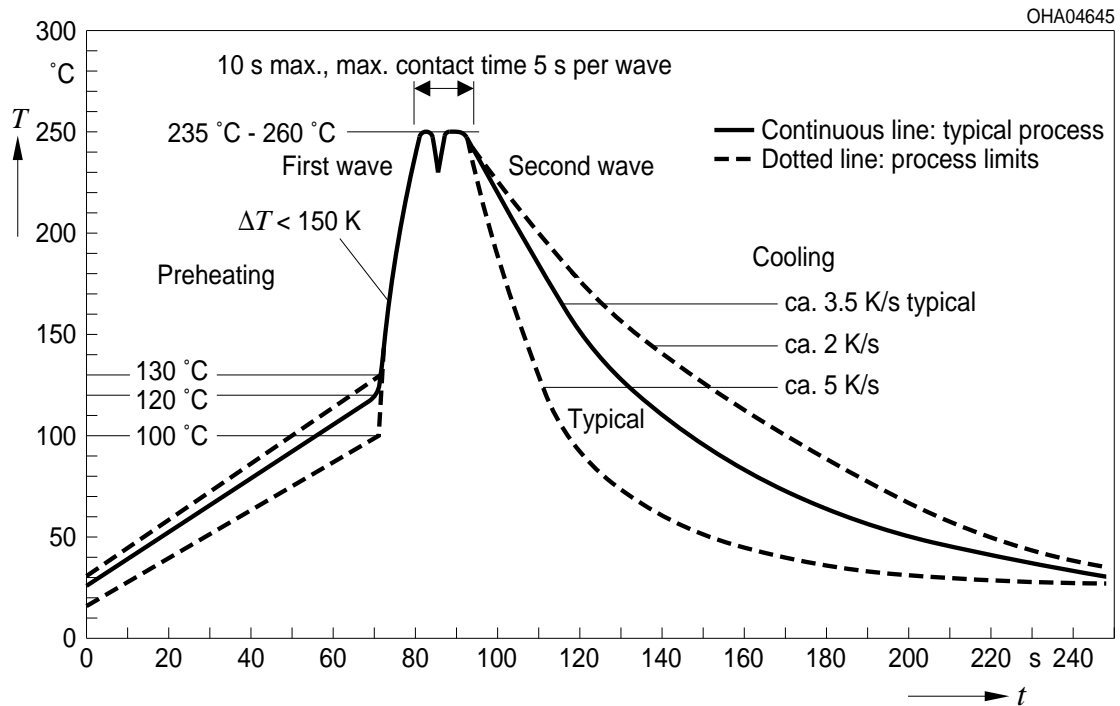


Dimensions in mm.

E062.3010.188-01

**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.

If printed or downloaded, please find the latest version in the Internet.

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\*) A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

\*\*) 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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