

# Silicon NPN Phototransistor

## Version 1.3

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### SFH 314



#### Features:

- **Spectral range of sensitivity:** (typ) 460 ... 1080 nm
- **Package:** 5mm Radial (T 1 3/4), Epoxy
- **Special:** High linearity

#### Applications

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

#### 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 314	$\geq 630$	Q62702P1668
SFH 314-2/3	1000 ... 3200	Q62702P3600

*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	$V_{CE}$	70	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)	$\lambda_{S\ max}$	850	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 460 ... 1080	nm
Radiant sensitive area	(typ)	A	0.55	mm <sup>2</sup>
Dimensions of chip area	(typ)	L x W	(typ) 1 x 1	mm x mm
Half angle	(typ)	$\varphi$	$\pm 40$	°
Capacitance ( $V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ)	$C_{CE}$	10	pF
Dark current ( $V_{CE} = 10\text{ V}$ , $E = 0$ )	(typ (max))	$I_{CE0}$	3 ( $\leq 200$ )	nA
Rise and fall time ( $I_C = 1\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 1\text{ k}\Omega$ )	(typ)	$t_r, t_f$	11	$\mu\text{s}$

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

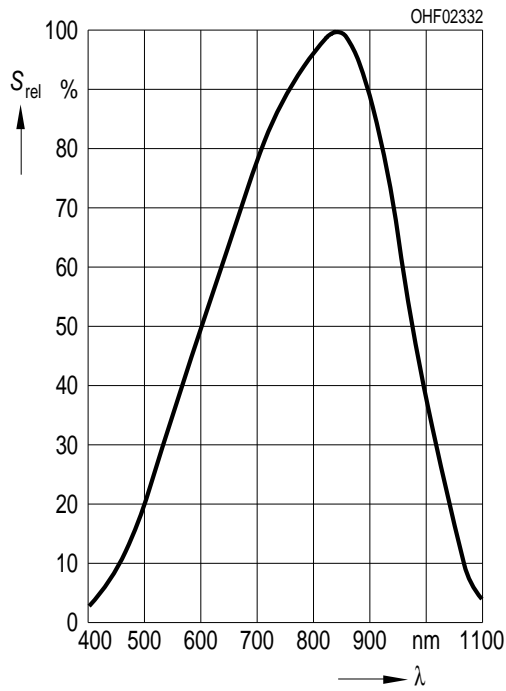
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min}\text{ }[\mu\text{A}]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max}\text{ }[\mu\text{A}]$	Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE}\text{ }[\mu\text{A}]$	Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f\text{ }[\mu\text{s}]$
-1	630	1250	3400	8
-2	1000	2000	5400	10
-3	1600	3200	8600	12
-4	2500		13500	14

Group	Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3, E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat}\text{ }[\text{mV}]$
-1	150
-2	150
-3	150
-4	150

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

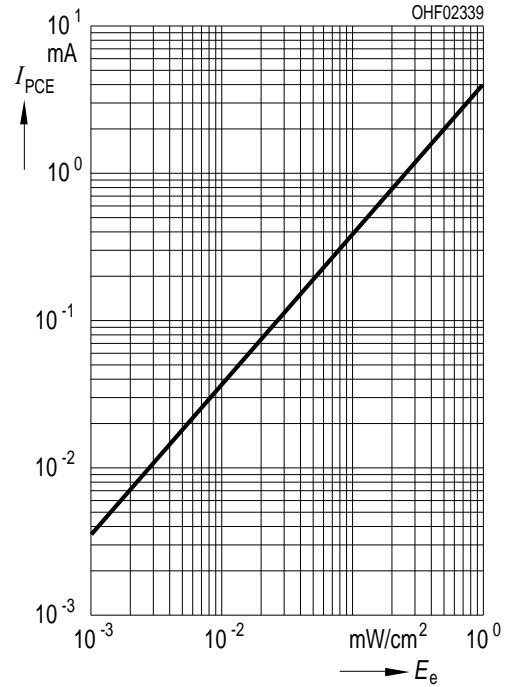
**Relative Spectral Sensitivity** <sup>1) page 9</sup>

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



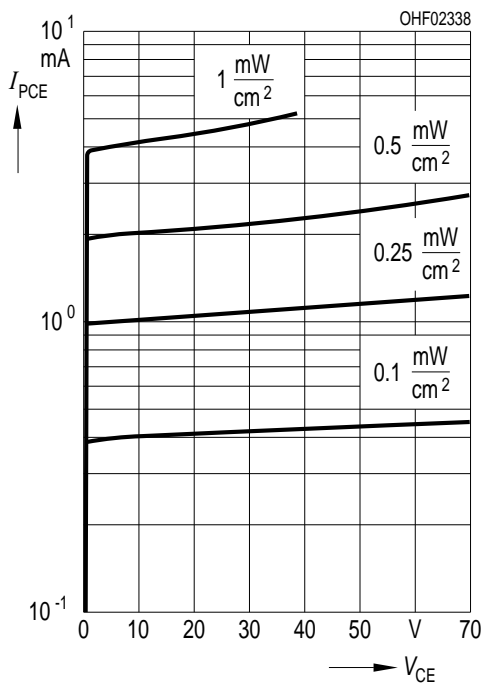
**Photocurrent** <sup>1) page 9</sup>

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



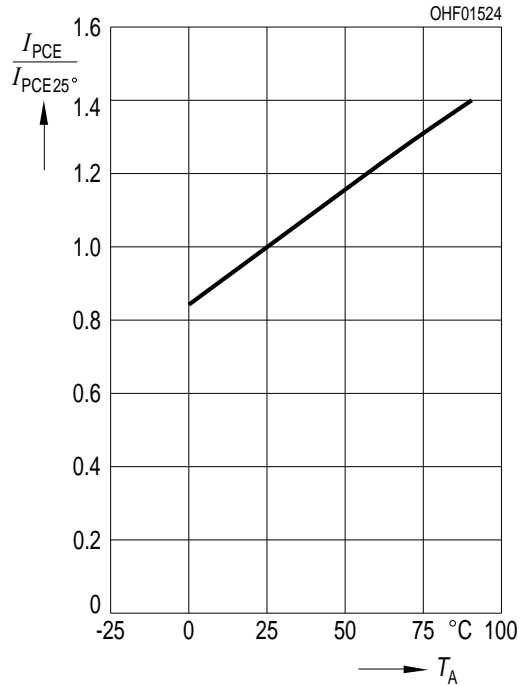
**Photocurrent** <sup>1) page 9</sup>

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



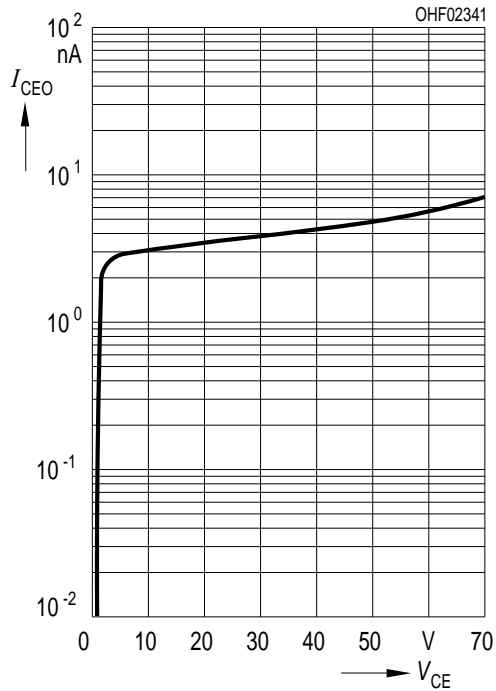
**Photocurrent** <sup>1) page 9</sup>

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



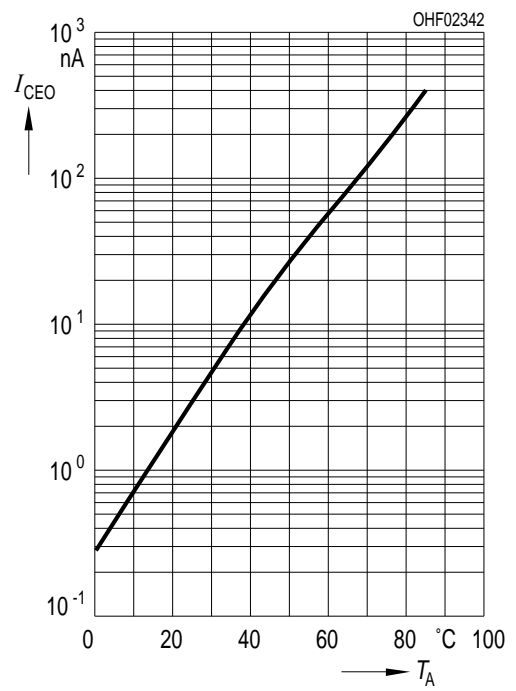
**Dark Current** <sup>1) page 9</sup>

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



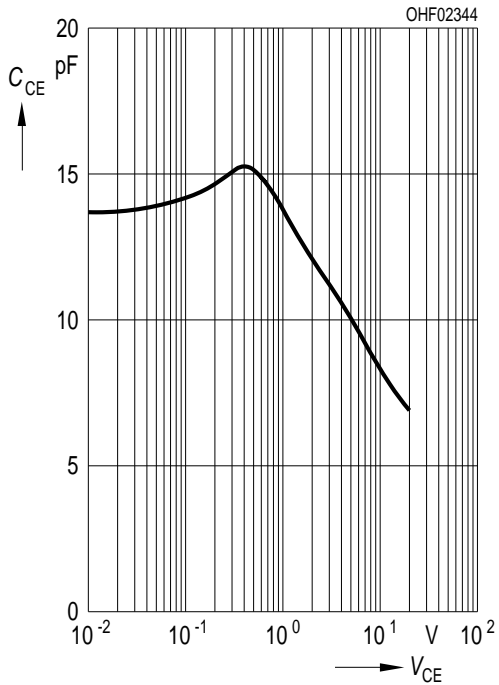
**Dark Current** <sup>1) page 9</sup>

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



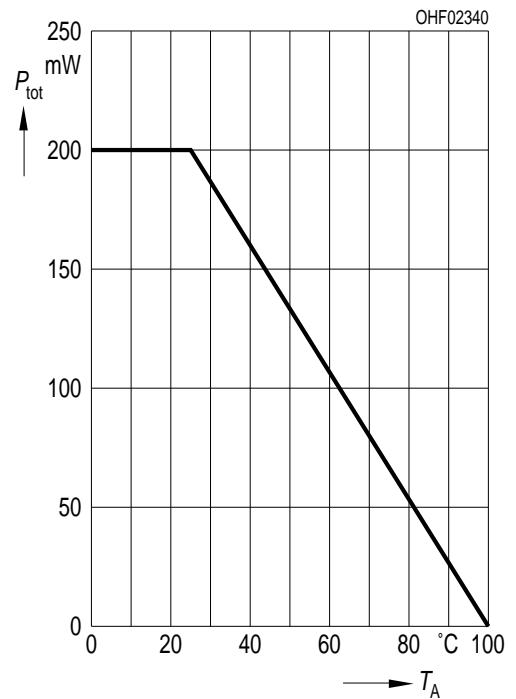
**Collector-Emitter Capacitance** <sup>1) page 9</sup>

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



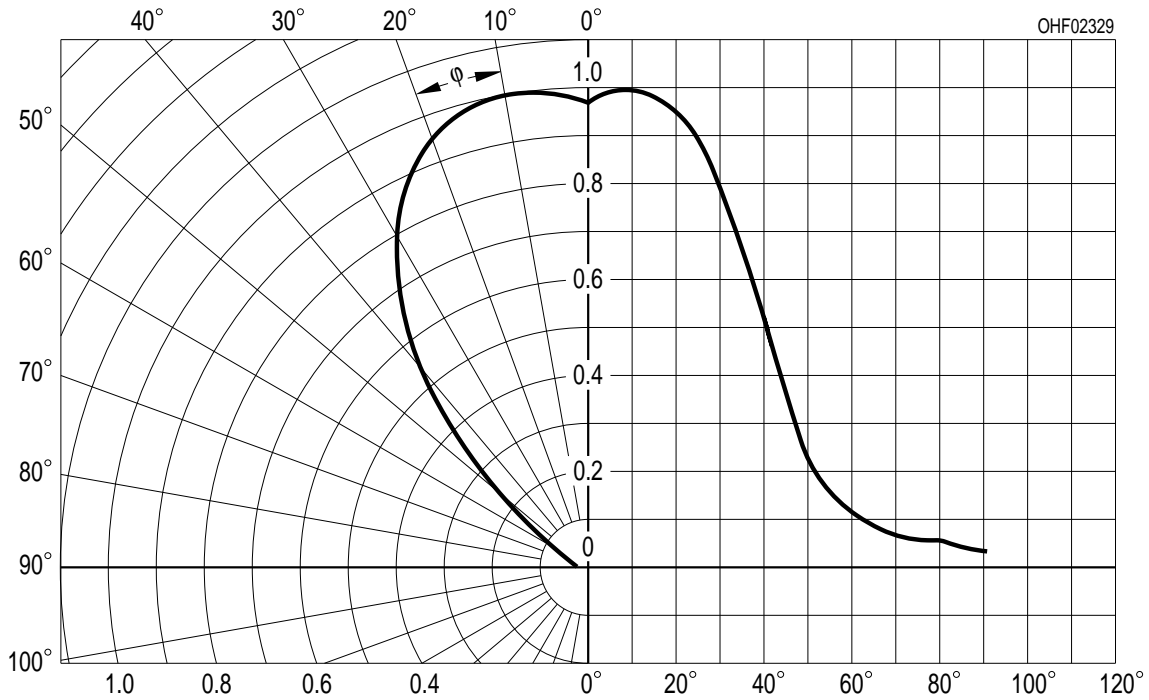
**Power Consumption**

$P_{tot} = f(T_A)$

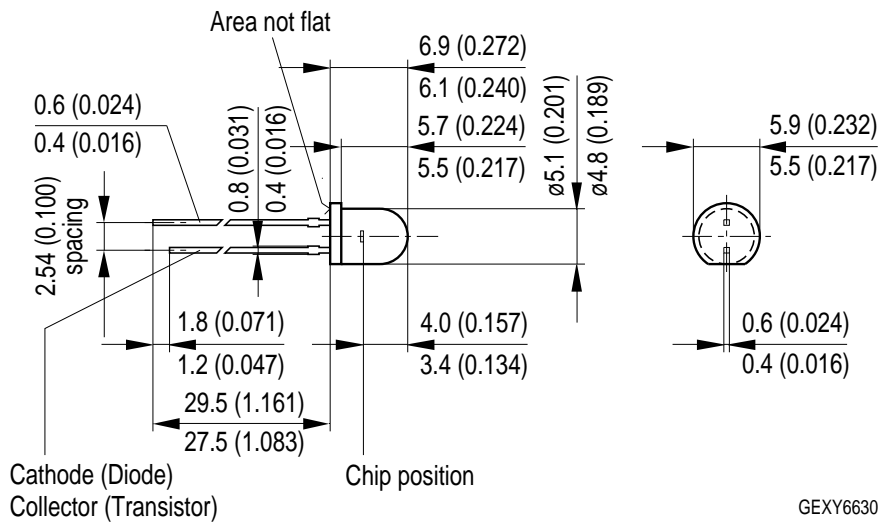


**Directional Characteristics** <sup>1) page 9</sup>

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



**Package Outline**



*Dimensions in mm (inch).*

**Package**

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

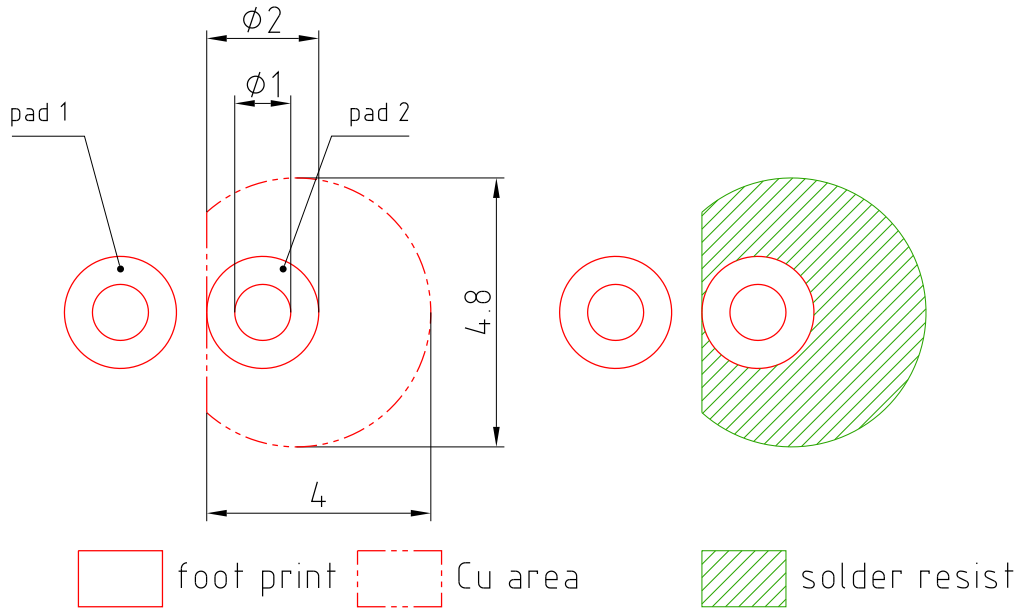
**Approximate Weight:**

0.3 g

**Note**

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

**Recommended Solder Pad**



E062.3010.188-01

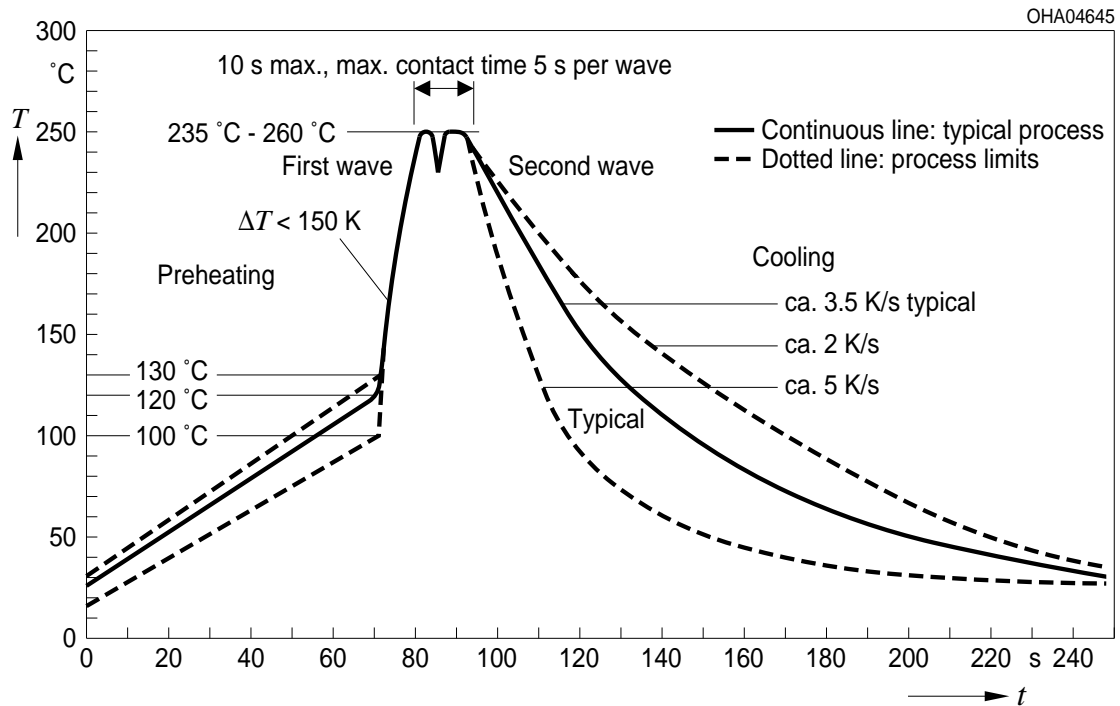
Dimensions in mm.

**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.

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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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