

# Silicon NPN Phototransistor

## Version 1.3

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### SFH 313 FA



#### Features:

- **Spectral range of sensitivity:** (typ) 740 ... 1080 nm
- **Package:** 5mm Radial (T 1 3/4), Epoxy
- **Special:** 5 mm plastic package
- High photosensitivity
- Especially suitable for applications from 740 nm to 1080 nm

#### 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 313 FA	$\geq 2500$	Q62702P1674
SFH 313 FA-2/3	4000 ... 12500	Q62702P3597
SFH 313 FA-3/4	$\geq 6300$	Q62702P5196

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

Parameter		Symbol	Values	Unit
Wavelength of max. sensitivity	(typ)	$\lambda_{S\ max}$	870	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 740 ... 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)	$\varphi$	± 10	°
Capacitance ( $V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ)	$C_{CE}$	10	pF
Dark current ( $V_{CE} = 20\text{ V}$ , $E = 0$ )	(typ (max))	$I_{CE0}$	3 ( $\leq 200$ )	nA

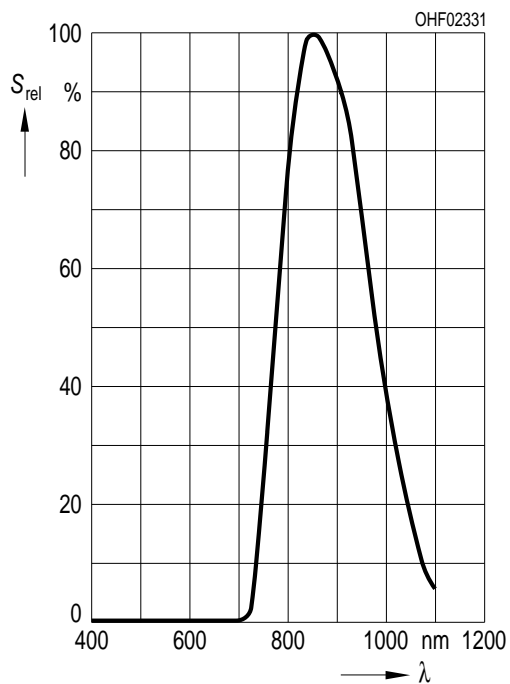
Grouping ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min} [\mu\text{A}]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max} [\mu\text{A}]$	Rise and fall time $I_C = 1\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 1\text{ k}\Omega$ $t_r, t_f [\mu\text{s}]$	Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3$ , $E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat} [\text{mV}]$
-1	2500	5000	8	150
-2	4000	8000	10	150
-3	6300	12500	12	150
-4	10000		14	150

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

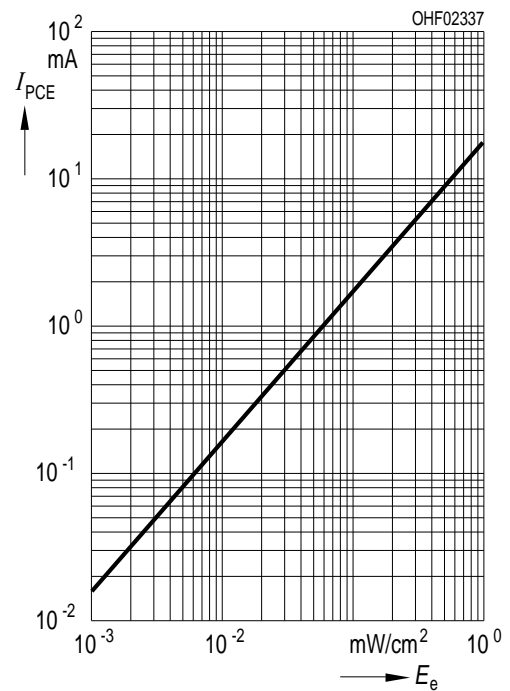
### Relative Spectral Sensitivity <sup>1) page 9</sup>

SFH 313 FA  $S_{rel} = f(\lambda)$



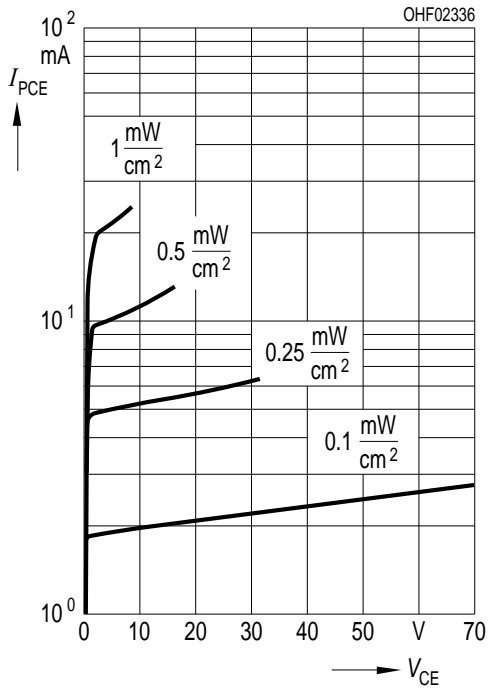
### Photocurrent <sup>1) page 9</sup>

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



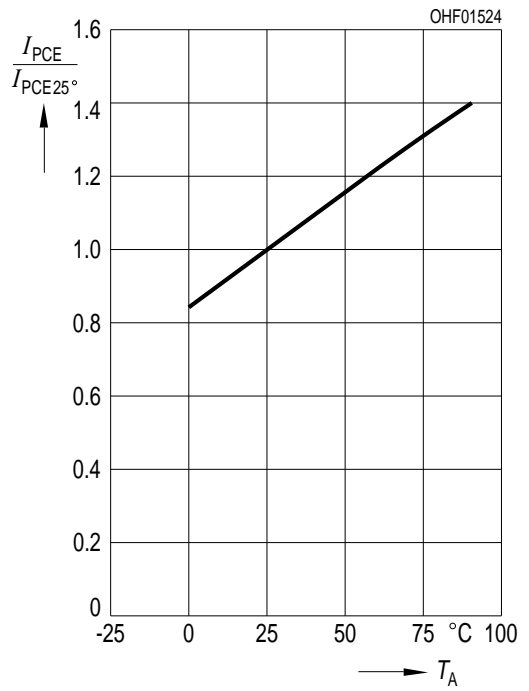
**Photocurrent** <sup>1) page 9</sup>

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



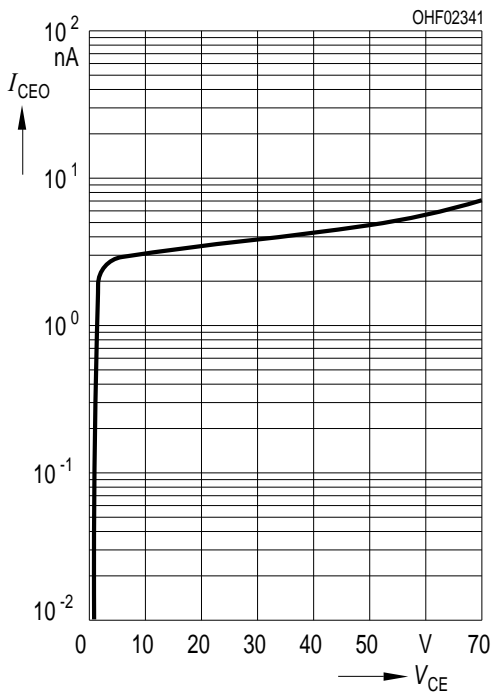
**Photocurrent** <sup>1) page 9</sup>

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



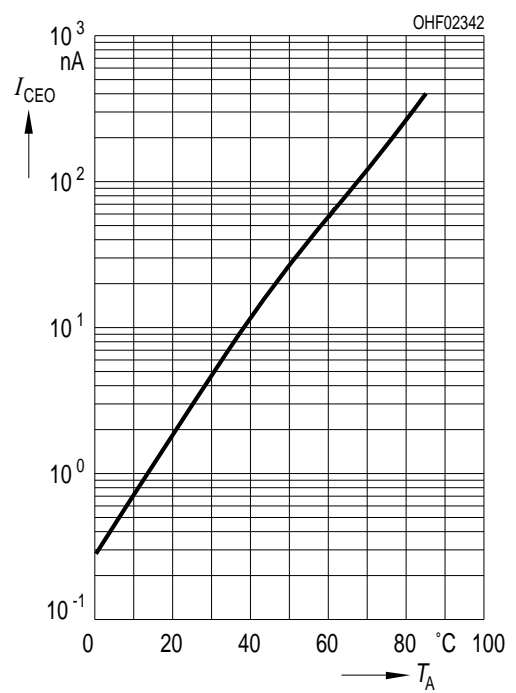
**Dark Current** <sup>1) page 9</sup>

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



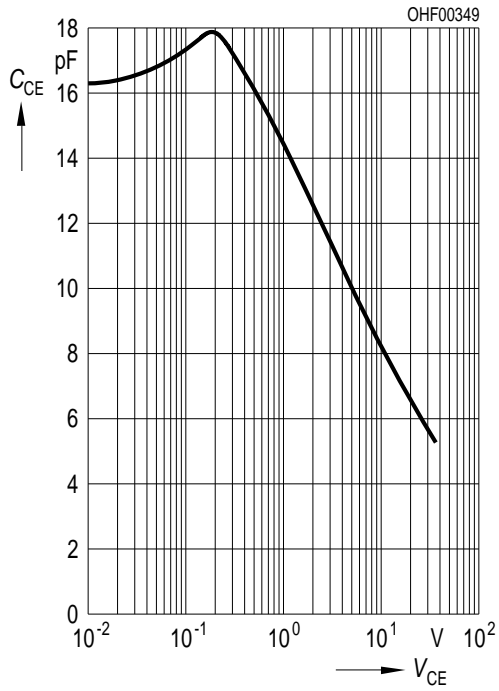
**Dark Current** <sup>1) page 9</sup>

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



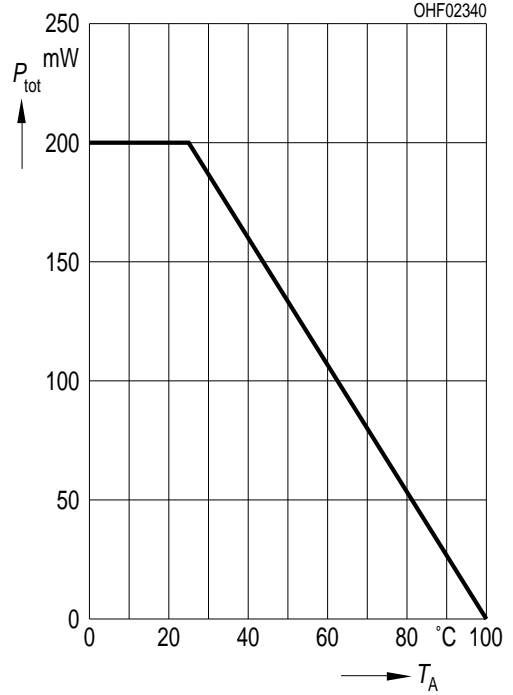
**Collector-Emitter Capacitance** <sup>1) page 9</sup>

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



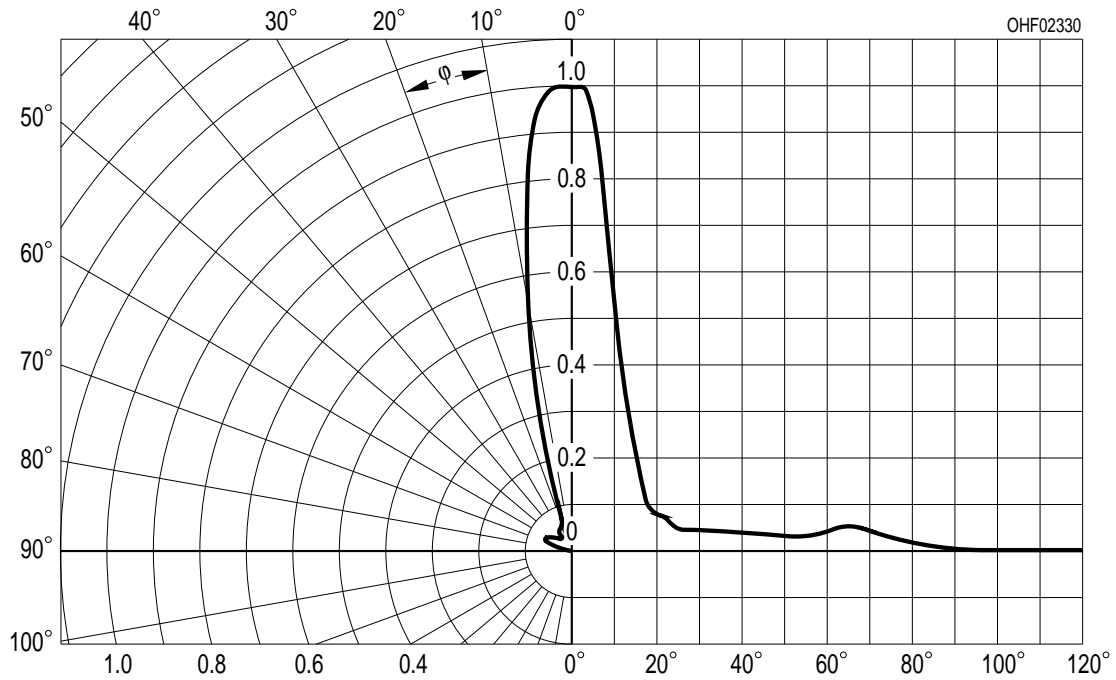
**Power Consumption**

$P_{tot} = f(T_A)$

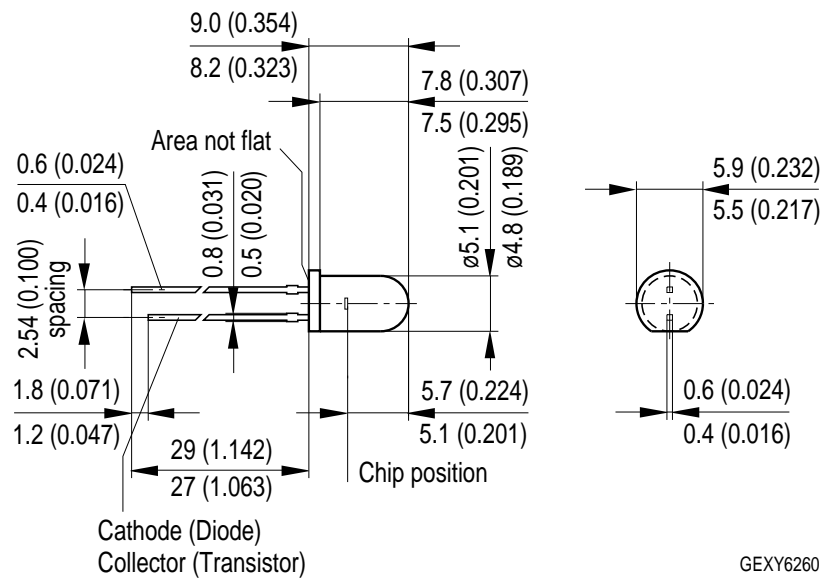


**Directional Characteristics** <sup>1) page 9</sup>

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



## Package Outline



*Dimensions in mm (inch).*

**Package**

5mm Radial (T 1  $\frac{3}{4}$ ), Epoxy

**Approximate Weight:**

0.4 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.

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

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By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

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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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