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# Silicon NPN Phototransistor with Daylight - Cutoff Filter

## Version 1.5

### SFH 3100 F



#### Features:

- **Spectral range of sensitivity:** (typ) 850 ... 1100 nm
- **Package:** Miniature Sidelooker, Epoxy
- **Special:** Narrow half angle
- Small outline dimensions
- Same package as IRED SFH 4141
- High coupling factor in light barriers with SFH 4141
- Easy identification of SFH 3100 F (black package) and SFH 4141 (clear package)

#### Applications

- Detector in photointerrupters
- Data transmission
- Position sensing
- Barcode reader
- For control and drive circuits
- Coin counters

#### 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 3100 F	> 400	Q62702P5073
SFH 3100 F-2/3/4	630 ... 3200	Q62702P5475

*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 ... 85	°C
Collector-emitter voltage	$V_{CE}$	35	V
Collector current	$I_C$	50	mA
Collector surge current ( $\tau < 10\text{ }\mu\text{s}$ )	$I_{CS}$	100	mA
Emitter-collector voltage	$V_{EC}$	7	V
Total Power dissipation	$P_{tot}$	150	mW
Thermal resistance junction - ambient	$R_{thJA}$	280	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)	$\lambda_{S\text{ max}}$	920	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 850 ... 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)	$\varphi$	$\pm 14$	°
Capacitance ( $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ)	$C_{CE}$	7.5	pF
Capacitance ( $V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ)	$C_{CE}$	4	pF
Photocurrent ( $\lambda = 950\text{ nm}$ , $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ )		$I_{PCE}$	$\geq 0.4$	$\mu\text{A}$
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)	$t_r, t_f$	7, 9	$\mu\text{s}$
Collector-emitter saturation voltage (Threefold saturated)	(typ (max))	$V_{CEsat}$	140 ( $\leq 400$ )	mV

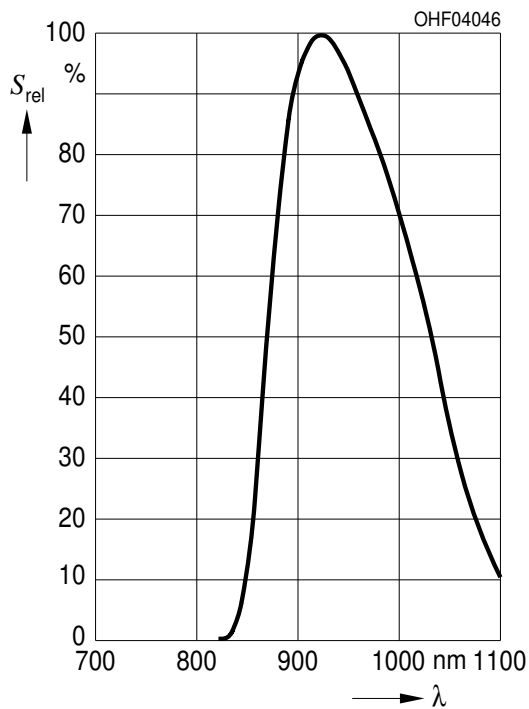
Grouping ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

Group	Min Photocurrent	Max Photocurrent
	$E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min}$ [ $\mu\text{A}$ ]	$E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max}$ [ $\mu\text{A}$ ]
SFH 3100 F - 1	400	800
SFH 3100 F - 2	630	1250
SFH 3100 F - 3	1000	2000
SFH 3100 F - 4	1600	3200
SFH 3100 F - 5	2500	5000

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

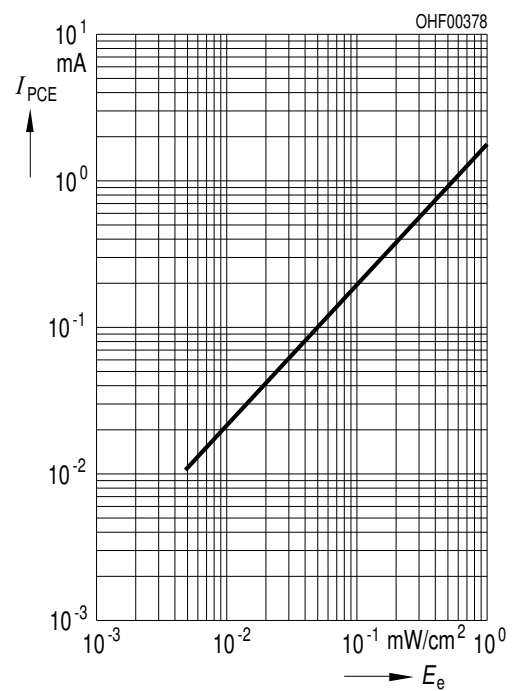
### Relative Spectral Sensitivity <sup>1) page 8</sup>

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



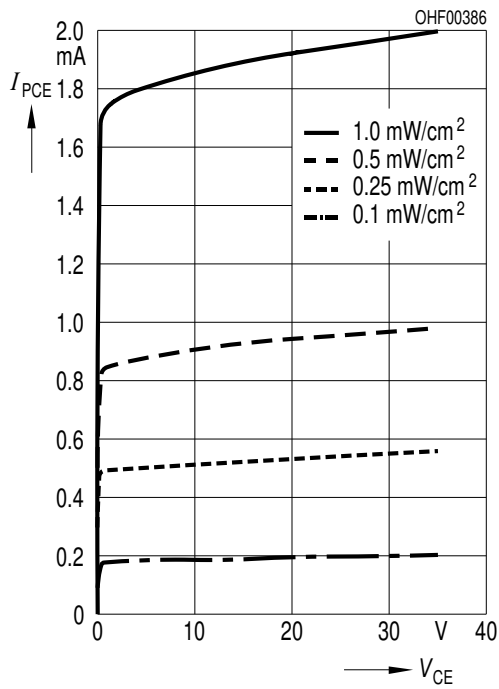
### Photocurrent <sup>1) page 8</sup>

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



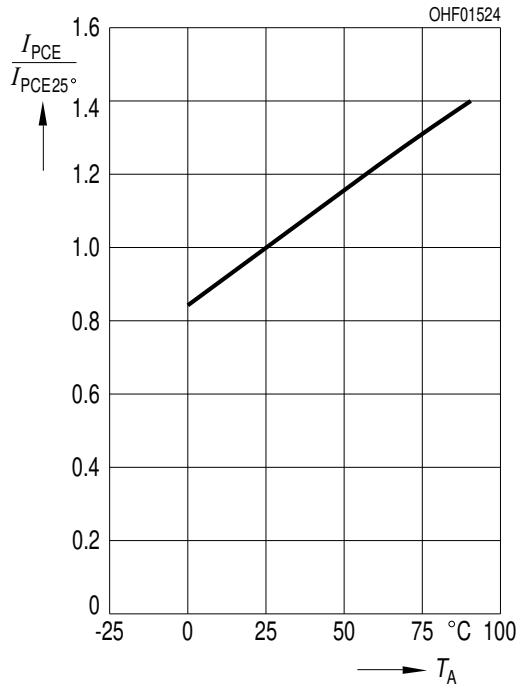
**Photocurrent** <sup>1) page 8</sup>

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



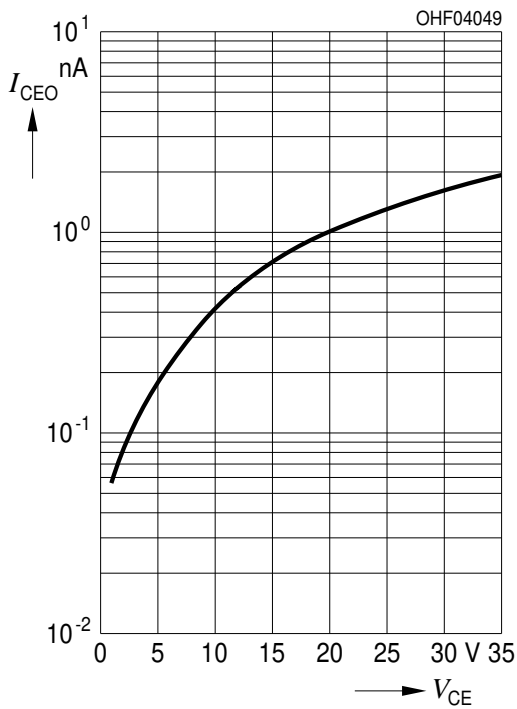
**Photocurrent** <sup>1) page 8</sup>

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



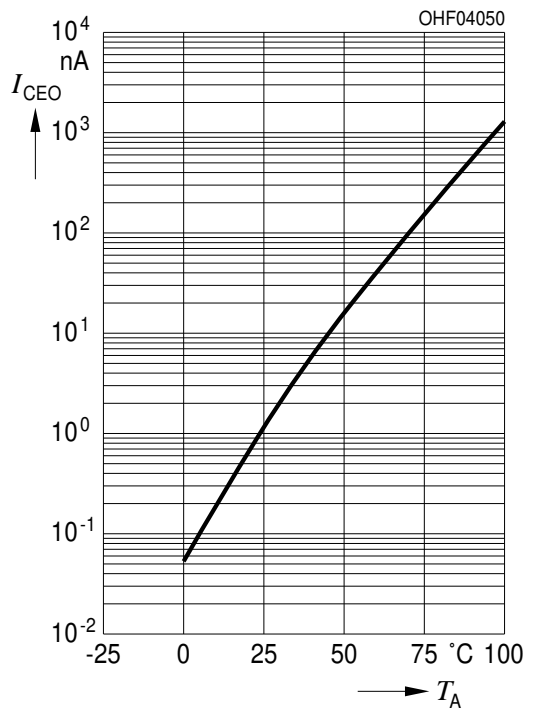
**Dark Current** <sup>1) page 8</sup>

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



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

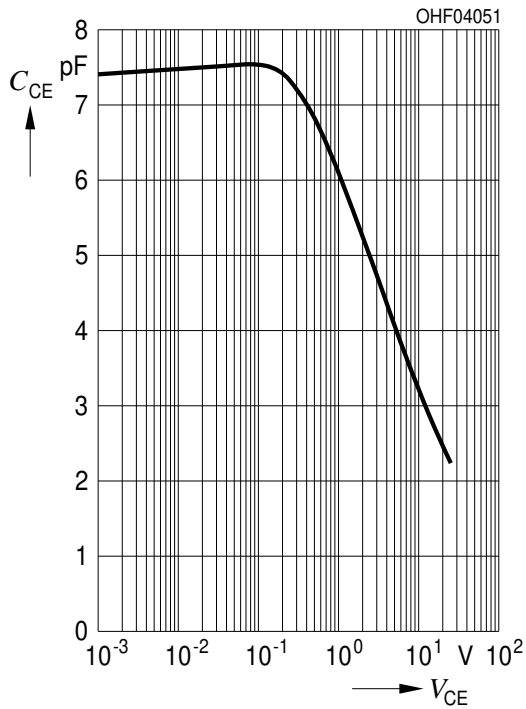
$I_{CEO} = f(T_A), E = 0$





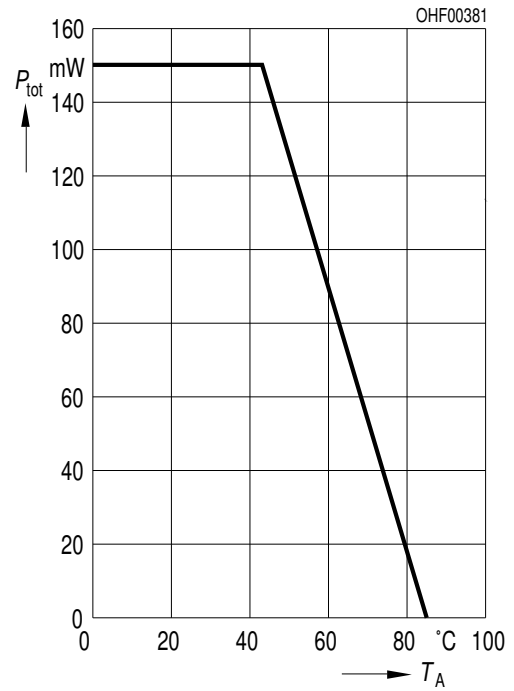
**Collector-Emitter Capacitance** <sup>1) page 8</sup>

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

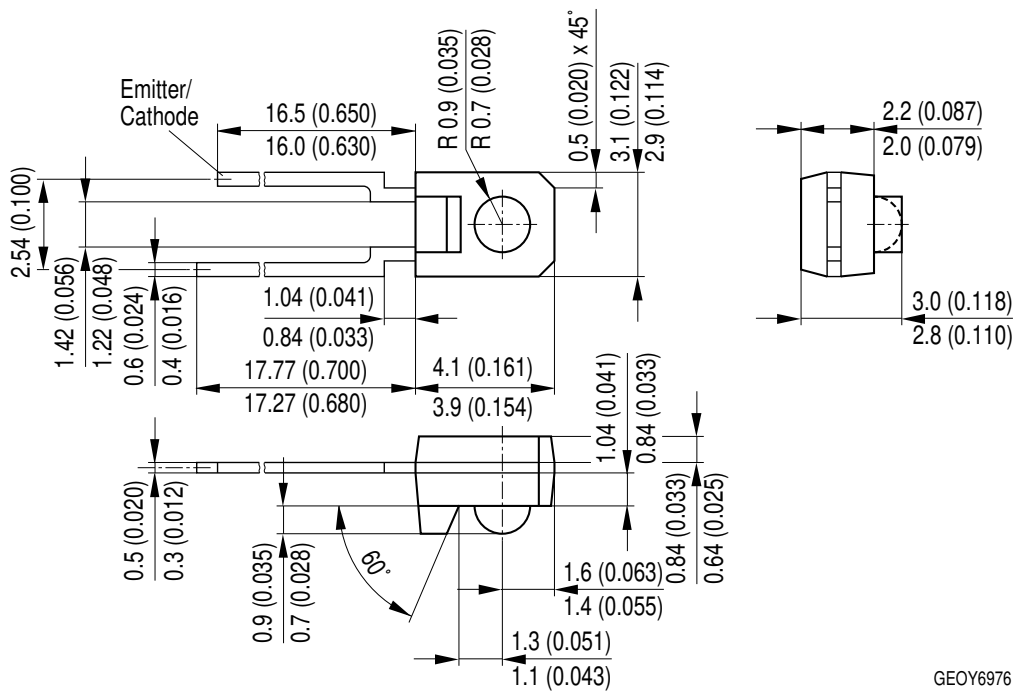


**Power Consumption**

$P_{tot} = f(T_A)$



**Package Outline**



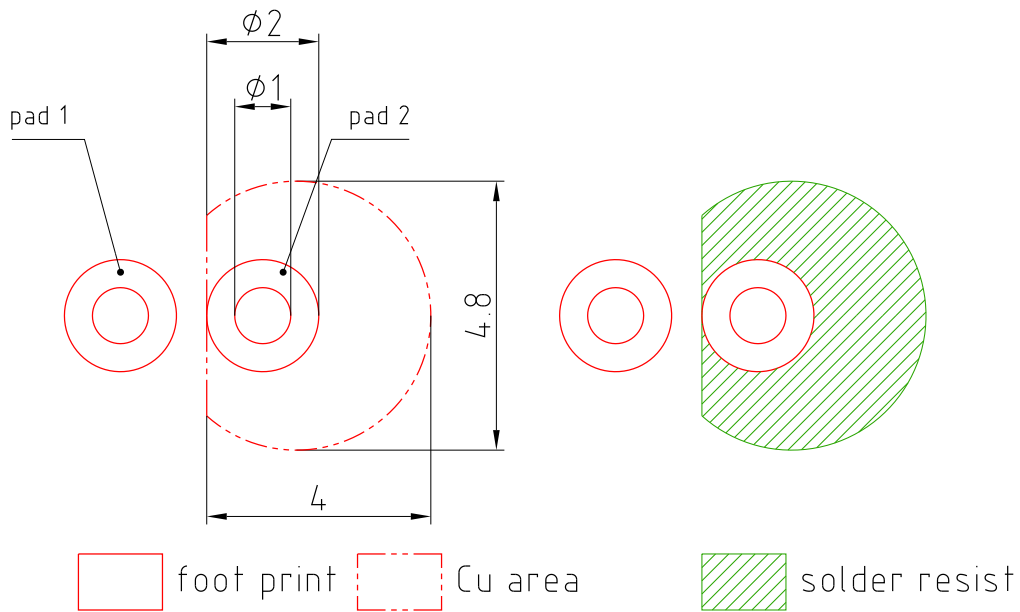
GEOY6976

*Dimensions in mm (inch).*

**Package**

Miniature Sidelooker, Epoxy

**Recommended Solder Pad**



E062.3010.188-01

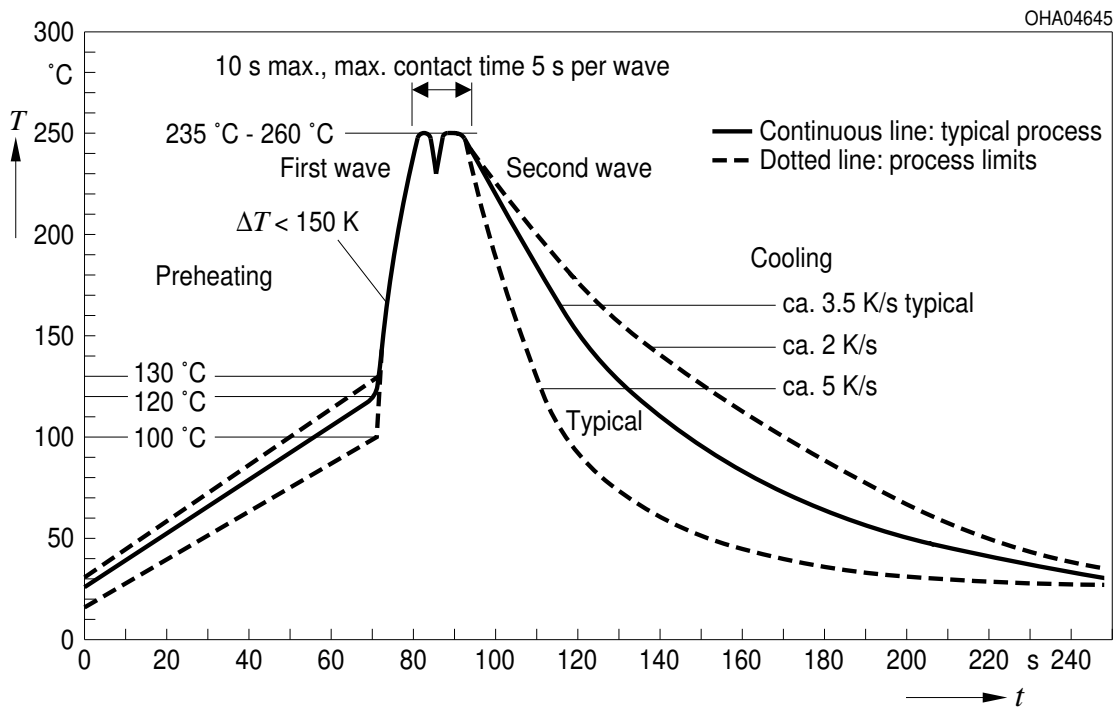
Dimensions in mm.

**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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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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\*) 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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