

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} [μ 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 ($\tau < 10\ \mu\text{s}$)	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)	$\lambda_{S\ max}$	920	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 850 ... 1100	nm
Radiant sensitive area	(typ)	A	0.11	mm ²
Dimensions of chip area	(typ)	L x W	(typ) 0.55 x 0.55	mm x mm
Half angle	(typ)	φ	± 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}	≥ 0.4	μA
Dark current ($V_{CE} = 20\text{ V}$, $E = 0$)	(typ (max))	I_{CE0}	1 (≤ 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	μs
Collector-emitter saturation voltage (Threefold saturated)	(typ (max))	V_{CEsat}	140 (≤ 400)	mV

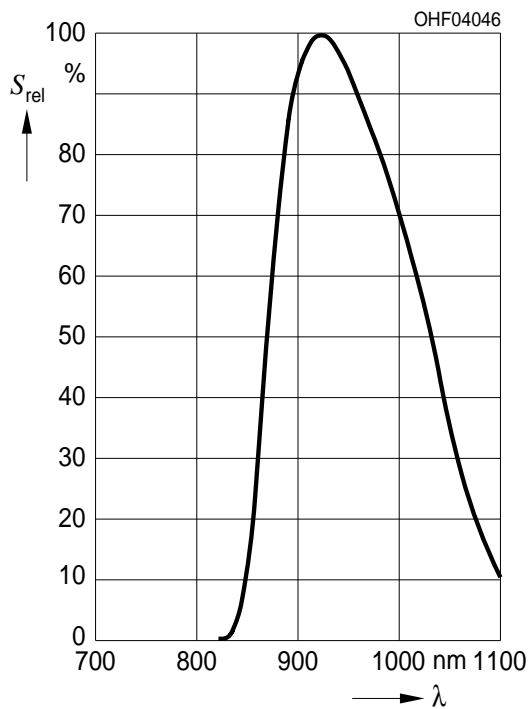
Grouping ($T_A = 25\text{ °C}$, $\lambda = 950\text{ nm}$)

Group	Min Photocurrent	Max Photocurrent
	$E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, min}$ [μA]	$E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, max}$ [μA]
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.

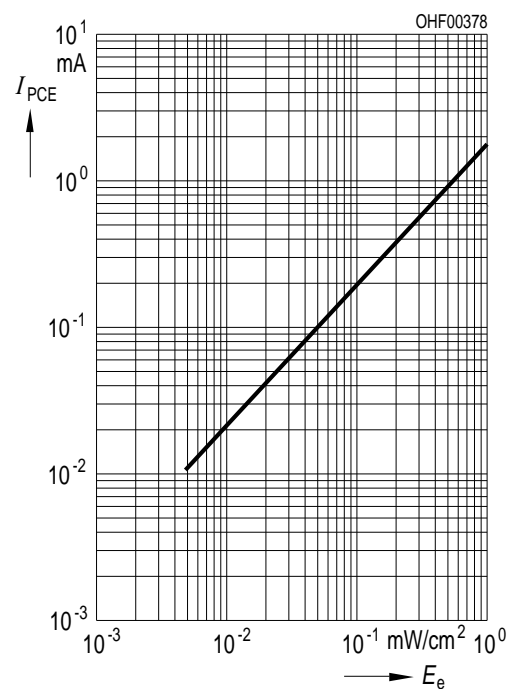
Relative Spectral Sensitivity ^{1) page 8}

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



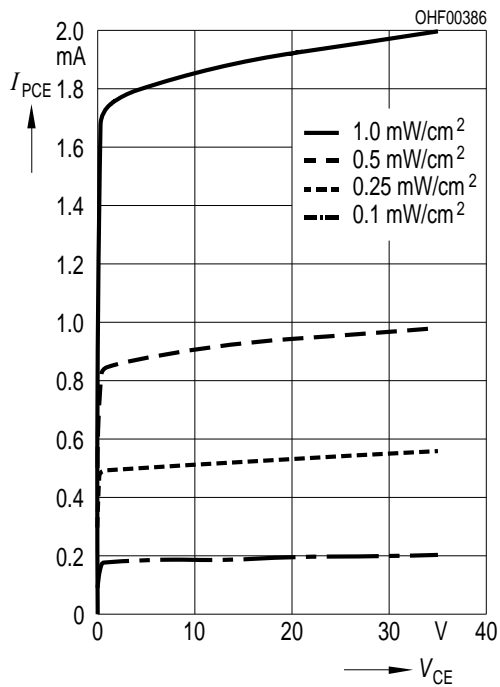
Photocurrent ^{1) page 8}

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



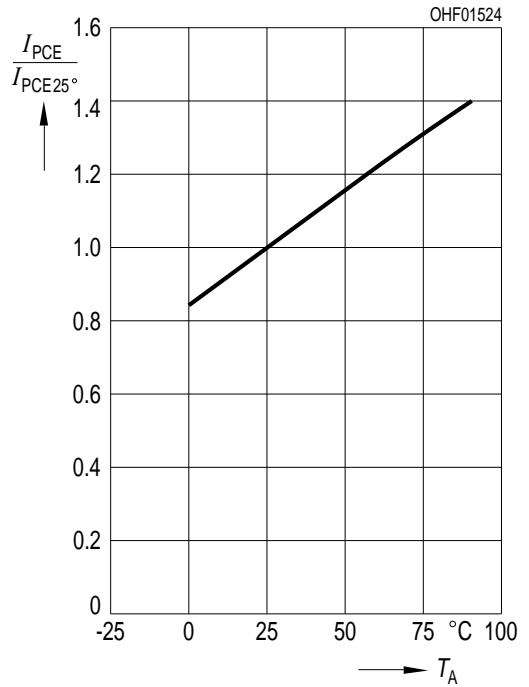
Photocurrent ^{1) page 8}

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



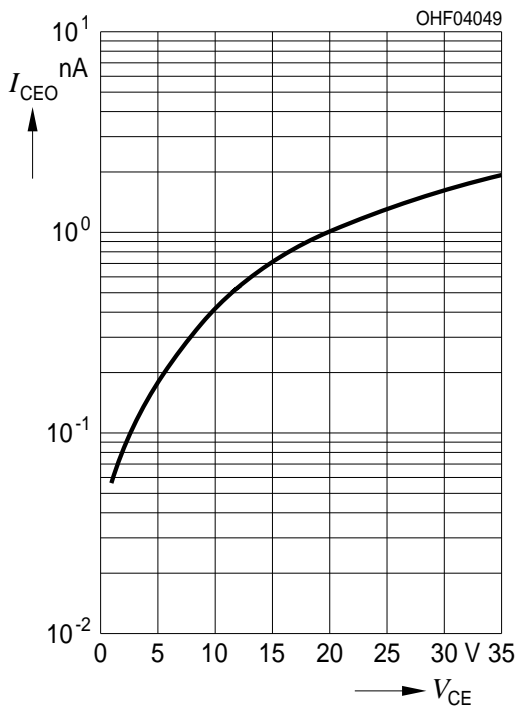
Photocurrent ^{1) page 8}

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



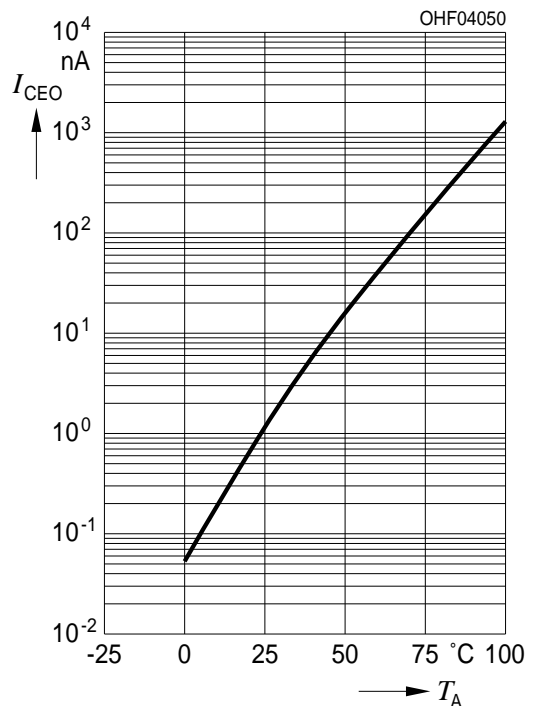
Dark Current ^{1) page 8}

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



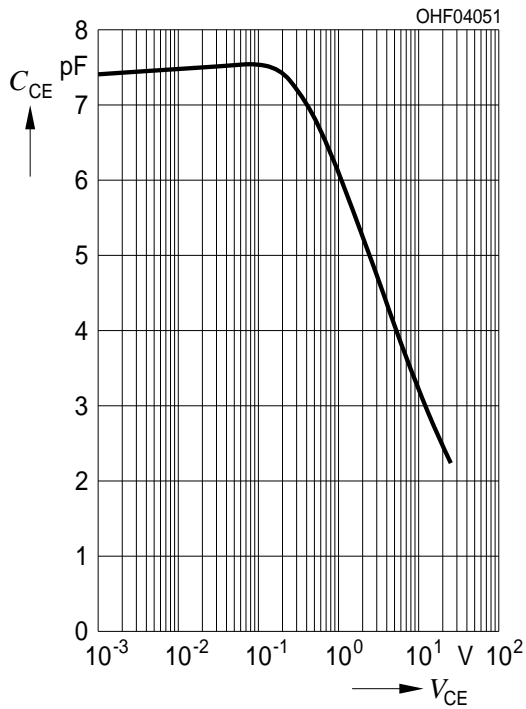
Dark Current ^{1) page 8}

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



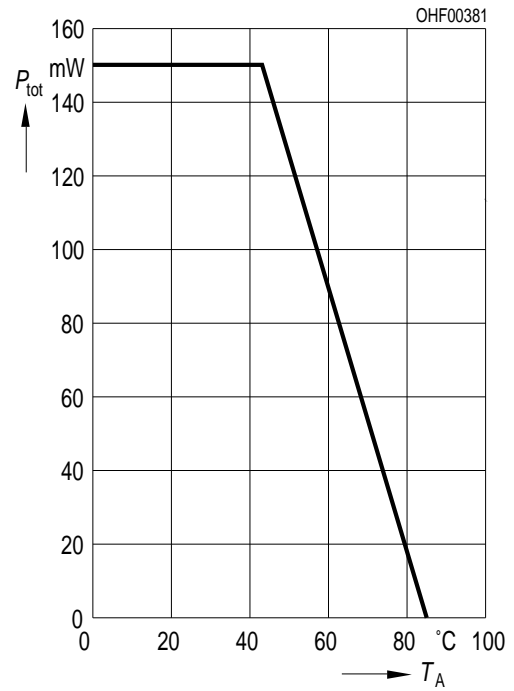
Collector-Emitter Capacitance ^{1) page 8}

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

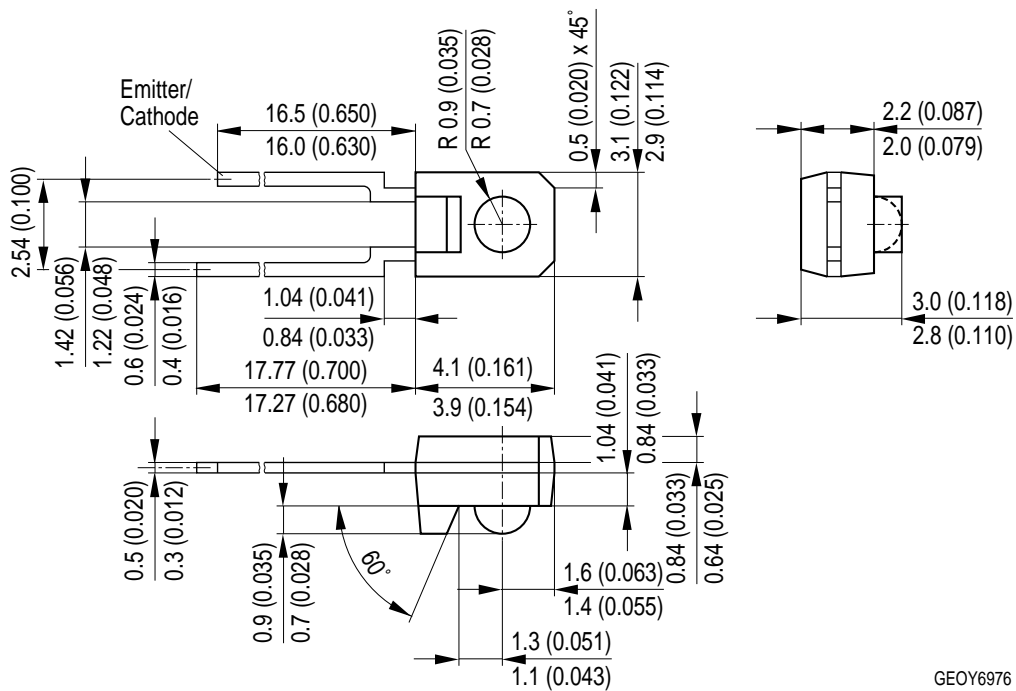


Power Consumption

$P_{tot} = f(T_A)$



Package Outline

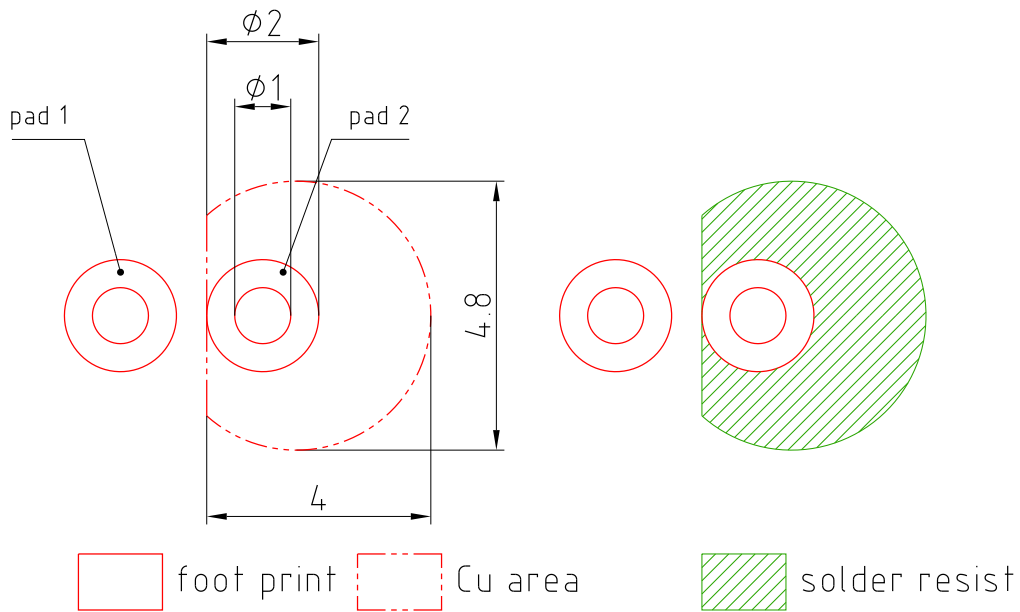


Dimensions in mm (inch).

Package

Miniature Sidelooker, Epoxy

Recommended Solder Pad



E062.3010.188-01

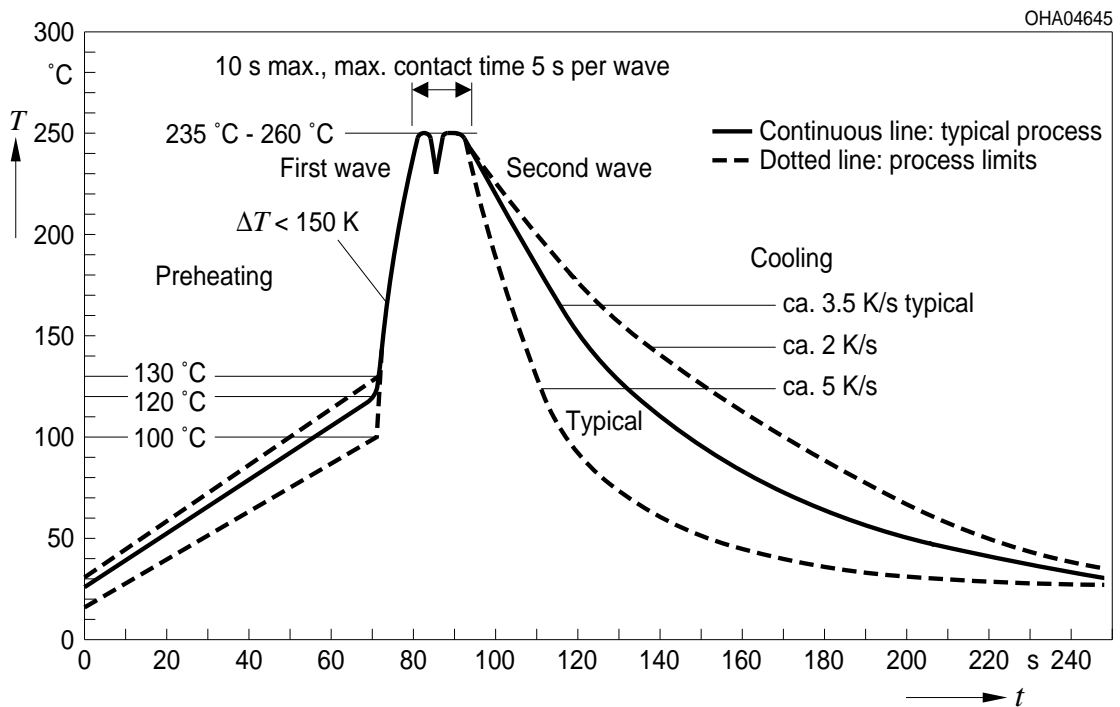
Dimensions in mm.

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!

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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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