

# Mini-Silicon NPN Phototransistor

## Version 1.3

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### SFH 305



#### Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** Miniature Array, Epoxy
- **Special:** High linearity
- Available in groups

#### Applications

- Miniature 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 305	250 ... 1250	Q62702P0836
SFH 305-2/3	250 ... 800	Q62702P3589

*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 ... 80	°C
Collector-emitter voltage	$V_{CE}$	32	V
Collector current	$I_C$	50	mA
Collector surge current ( $\tau < 10\text{ }\mu\text{s}$ )	$I_{CS}$	200	mA
Emitter-collector voltage	$V_{EC}$	7	V
Total Power dissipation	$P_{tot}$	70	mW
Thermal resistance	$R_{thJA}$	950	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) 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)	$\varphi$	$\pm 16$	°
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)	$t_r, t_f$	6	$\mu\text{s}$

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

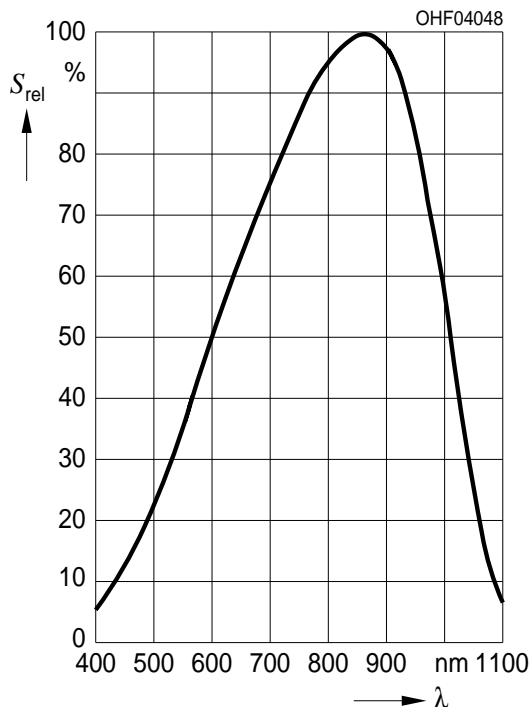
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min}\text{ }[\mu\text{A}]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max}\text{ }[\mu\text{A}]$	Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE}\text{ }[\mu\text{A}]$	Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f\text{ }[\mu\text{s}]$
SFH 305-2	250	500	1200	5.5
SFH 305-3	400	800	1900	6
SFH 305-4	630	1250	3000	8

Group	Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3, E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat}\text{ }[\text{mV}]$
SFH 305-2	150
SFH 305-3	150
SFH 305-4	150

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

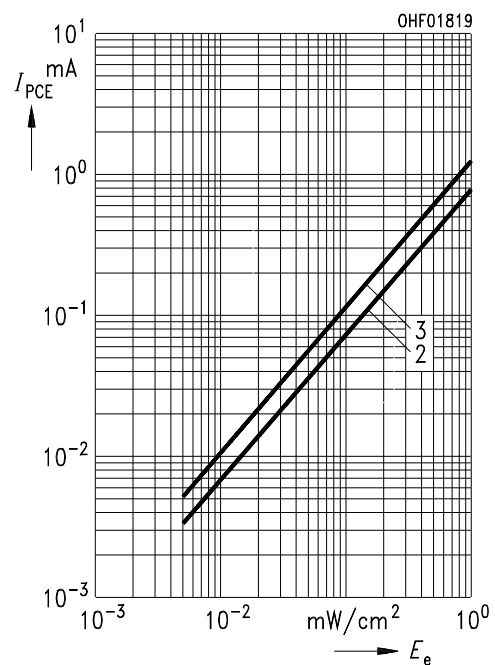
### Relative Spectral Sensitivity <sup>1) page 9</sup>

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



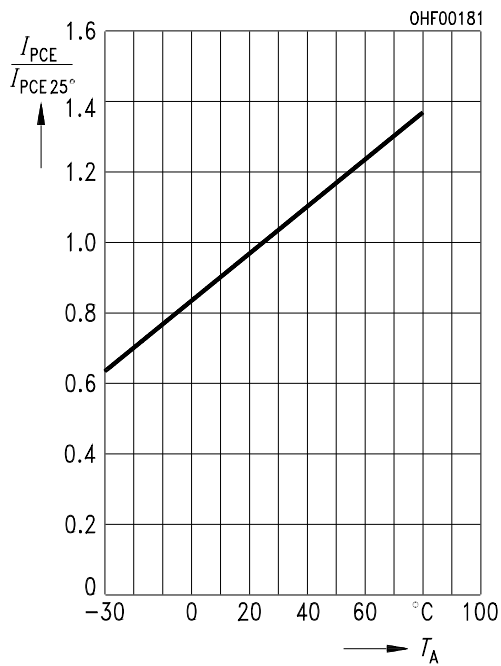
### Photocurrent <sup>1) page 9</sup>

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



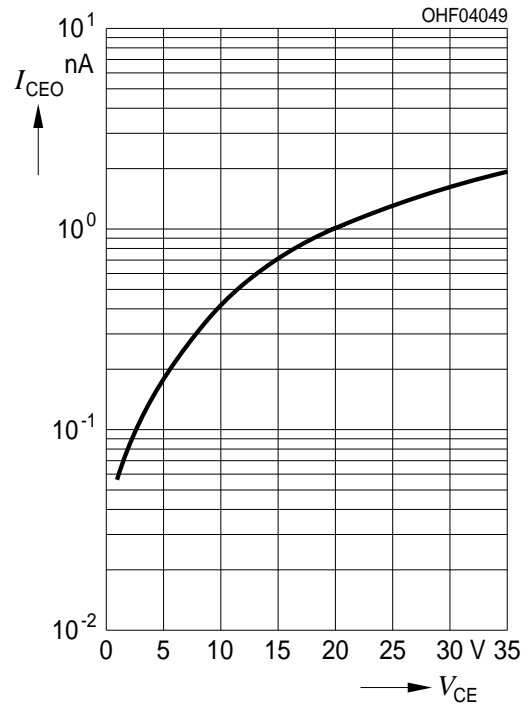
**Photocurrent** <sup>1) page 9</sup>

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



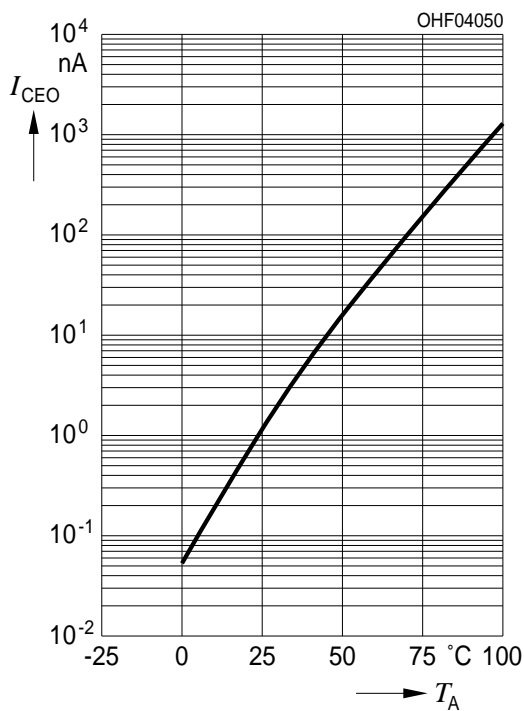
**Dark Current** <sup>1) page 9</sup>

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



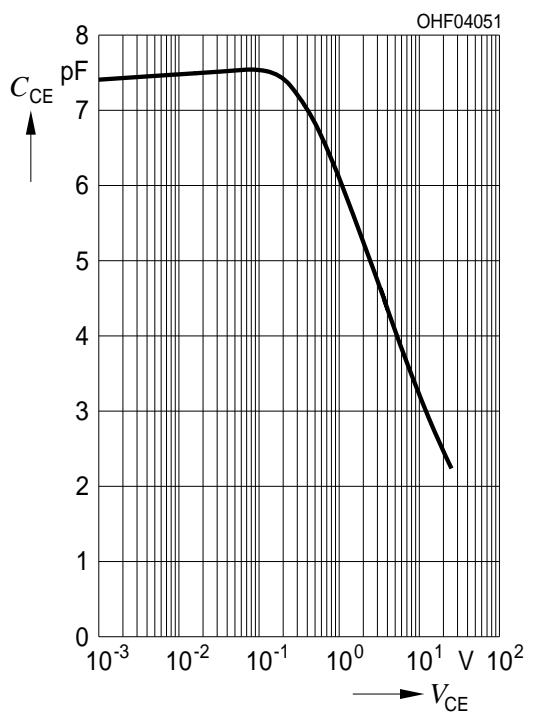
**Dark Current** <sup>1) page 9</sup>

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



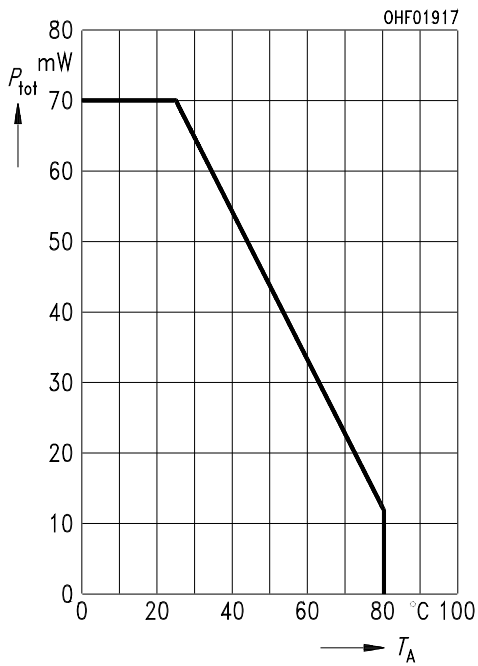
**Collector-Emitter Capacitance** <sup>1) page 9</sup>

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



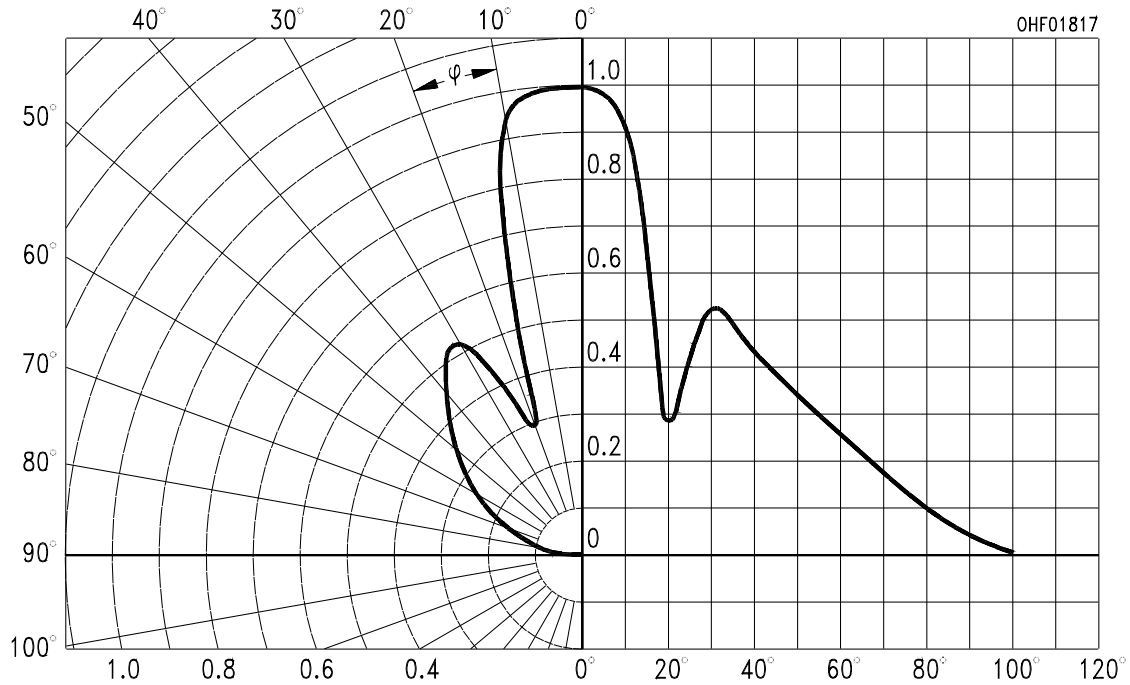
**Power Consumption**

$P_{tot} = f(T_A)$

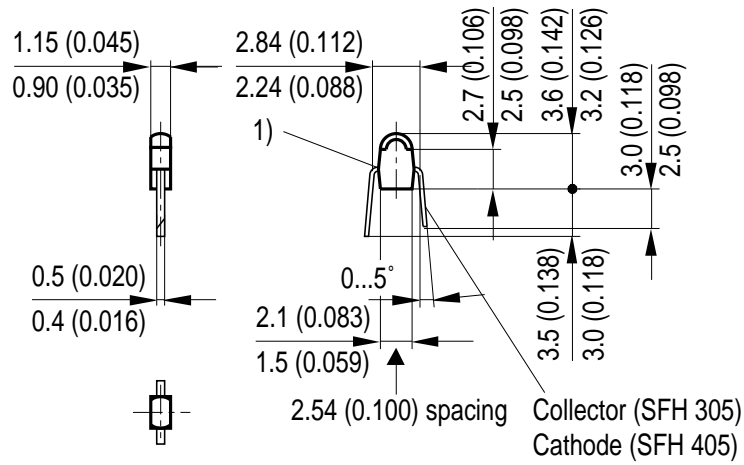


**Directional Characteristics** <sup>1) page 9</sup>

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



Package Outline



1) Detaching area for tools,  
flash not true to size.

GEOY6137

*Dimensions in mm (inch).*

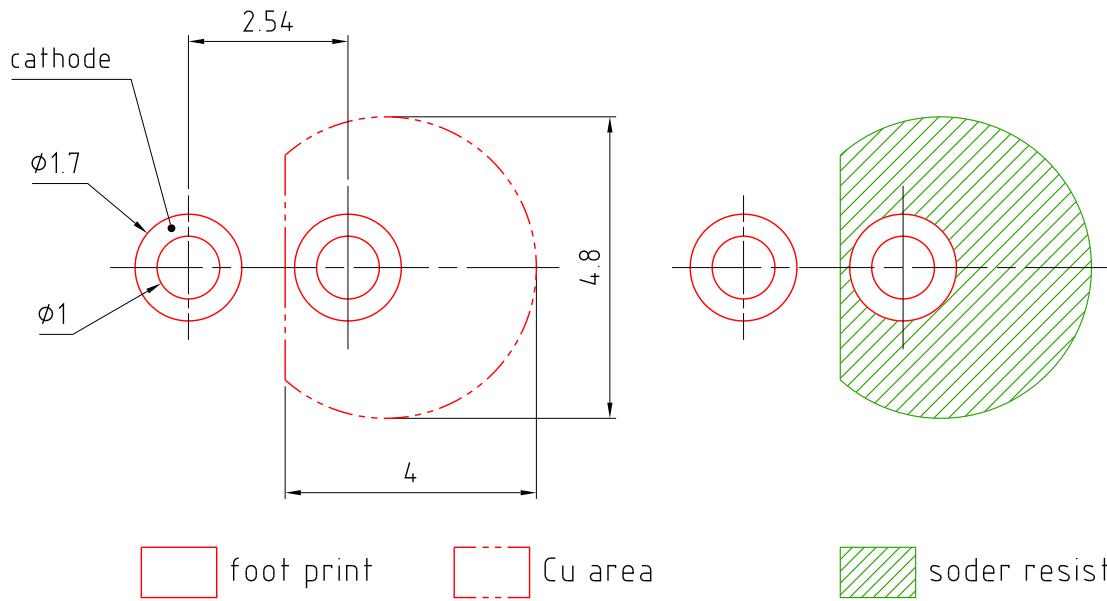
**Package**

Miniature Array, Epoxy

**Approximate Weight:**

10.0 mg

**Recommended Solder Pad**

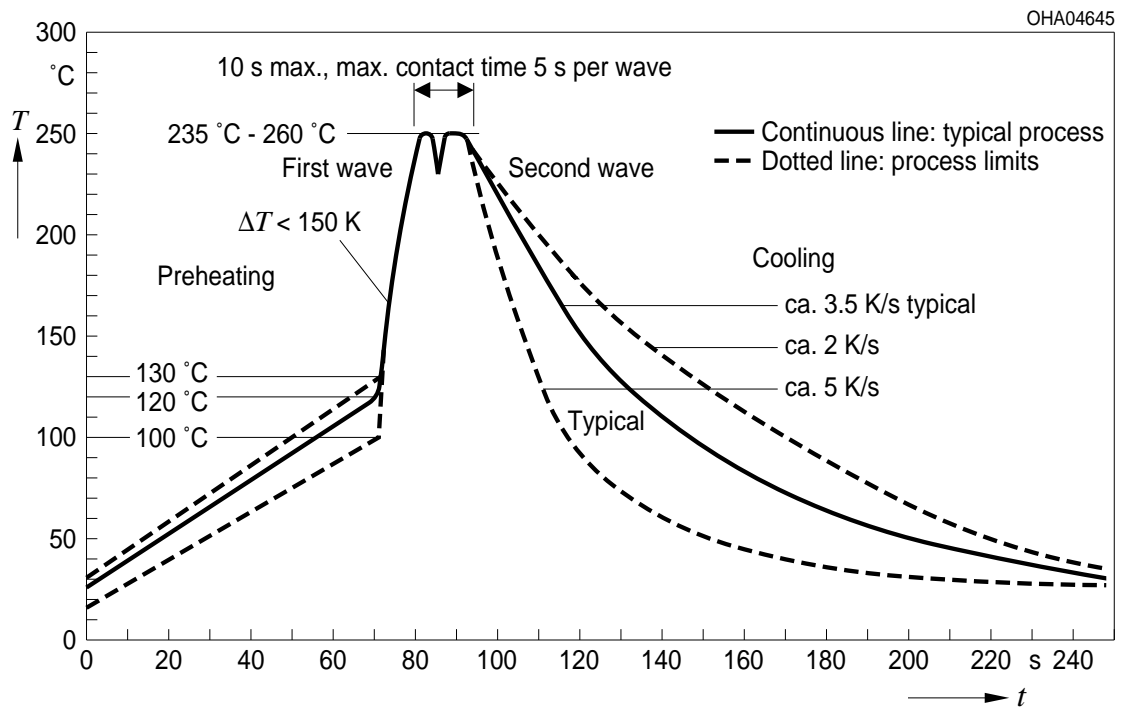


E062.3010.189-01

Dimensions in mm.

**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**

- <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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