

SFH 310

Radial T1

Silicon NPN Phototransistor



Applications

- Electronic Equipment
- Highbay Industrial
- Industrial Automation (Machine controls, Light barriers, Vision controls)
- White Goods

Features:

- Package: clear epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Spectral range of sensitivity: (typ) 450 ... 1100 nm
- High photosensitivity

Ordering Information

| Type | Photocurrent $V_{CE} = 5 \text{ V}; \lambda = 950 \text{ nm}; E_e = 0.5 \text{ mW/cm}^2$ I_{PCE} | Ordering Code |
|-------------|--|---------------|
| SFH 310 | 630 ... 3200 μA | Q62702P0874 |
| SFH 310-2/3 | 630 ... 2000 μA | Q62702P3595 |

Only one bin within one packing unit (variation less than 2:1)

Maximum Ratings

 $T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|--|-----------|--------------|------------------|
| Operating temperature | T_{op} | min. max. | -40 °C 100 °C |
| Storage temperature | T_{stg} | min. max. | -40 °C 100 °C |
| Collector-emitter voltage | V_{CE} | max. | 35 V |
| Collector current | I_C | max. | 50 mA |
| Collector surge current | I_{CS} | max. | 100 mA |
| Total power dissipation | P_{tot} | max. | 165 mW |
| ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2) | V_{ESD} | max. | 2 kV |

Characteristics

$T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|--|--------------------------|--------------|----------------------|
| Wavelength of max sensitivity | $\lambda_{S\text{ max}}$ | typ. | 880 nm |
| Spectral range of sensitivity | $\lambda_{10\%}$ | typ. | 450 ... 1100 nm |
| Chip dimensions | L x W | typ. | 0.5 x 0.5 mm x mm |
| Radiant sensitive area | A | typ. | 0.11 mm ² |
| Half angle | φ | typ. | 25 ° |
| Photocurrent $V_{CE} = 5\text{ V}$; Std. Light A; $E_e = 1000\text{ lx}$ | I_{PCE} | typ. | 4800 μA |
| Dark current $V_{CE} = 20\text{ V}$; $E = 0$ | I_{CE0} | typ. max. | 1 nA 50 nA |
| Rise time $I_C = 1\text{ mA}$; $V_{CC} = 5\text{ V}$; $R_L = 1\text{ k}\Omega$ | t_r | typ. | 8 μs |
| Fall time $I_C = 1\text{ mA}$; $V_{CC} = 5\text{ V}$; $R_L = 1\text{ k}\Omega$ | t_f | typ. | 8 μs |
| Collector-emitter saturation voltage ¹⁾ $I_C = I_{PCE,\text{min}} \times 0.3$; $E_e = 0.5\text{ mW/cm}^2$ | $V_{CE\text{sat}}$ | typ. | 150 mV |
| Capacitance $V_{CE} = 0\text{ V}$; $f = 1\text{ MHz}$; $E = 0$ | C_{CE} | typ. | 7.5 pF |
| Thermal resistance junction ambient real | R_{thJA} | max. | 450 K / W |

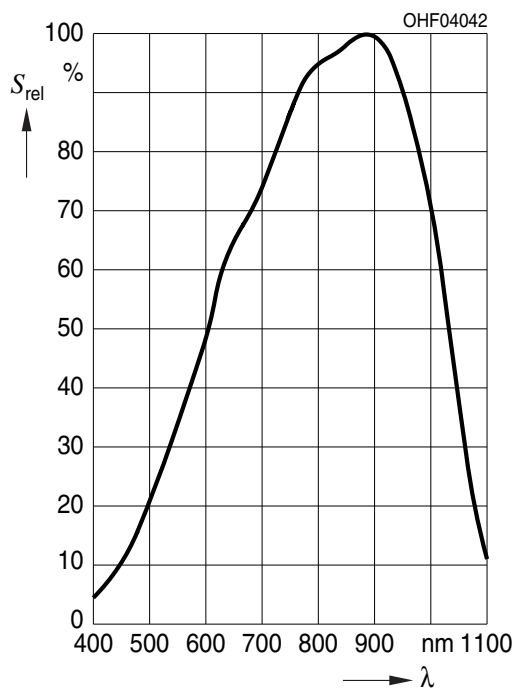
Grouping

$T_A = 25\text{ °C}$

| Group | Photocurrent $V_{CE} = 5\text{ V}$; $\lambda = 950\text{ nm}$; $E_e = 0.5\text{ mW/cm}^2$ min. I_{PCE} | Photocurrent $V_{CE} = 5\text{ V}$; $\lambda = 950\text{ nm}$; $E_e = 0.5\text{ mW/cm}^2$ max. I_{PCE} |
|-------|---|---|
| 2 | 630 μA | 1250 μA |
| 3 | 1000 μA | 2000 μA |
| 4 | 1600 μA | 3200 μA |

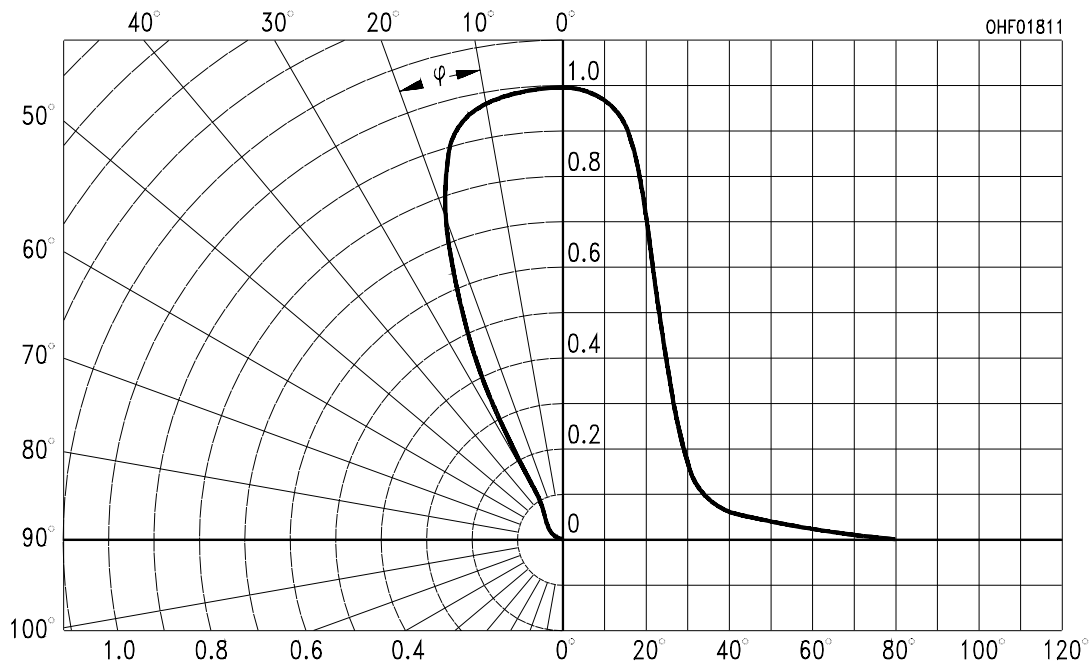
Relative Spectral Sensitivity ^{2), 3)}

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



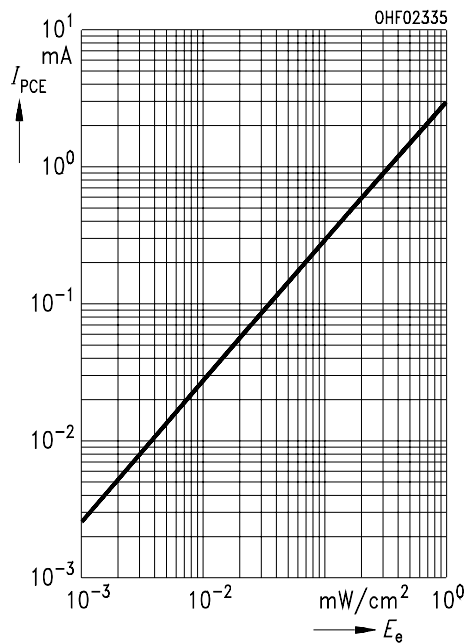
Directional Characteristics ^{2), 3)}

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



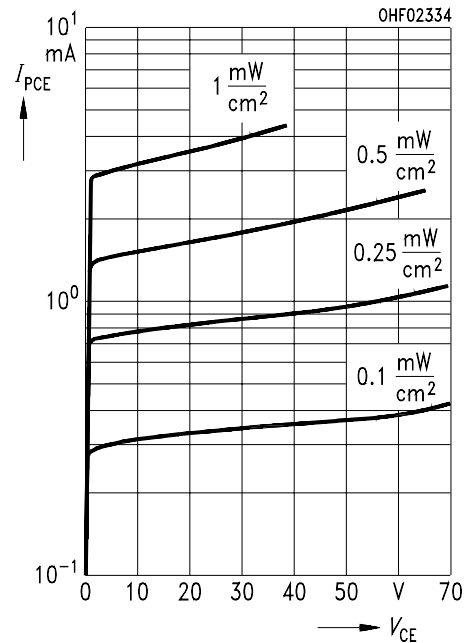
Photocurrent 2), 3)

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



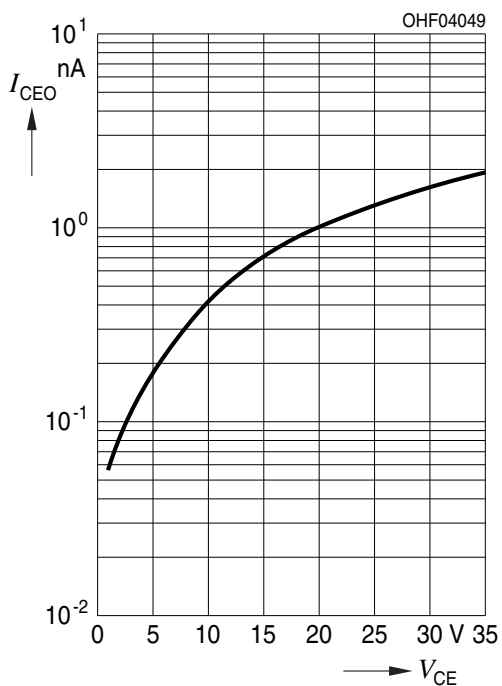
Photocurrent 2), 3)

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



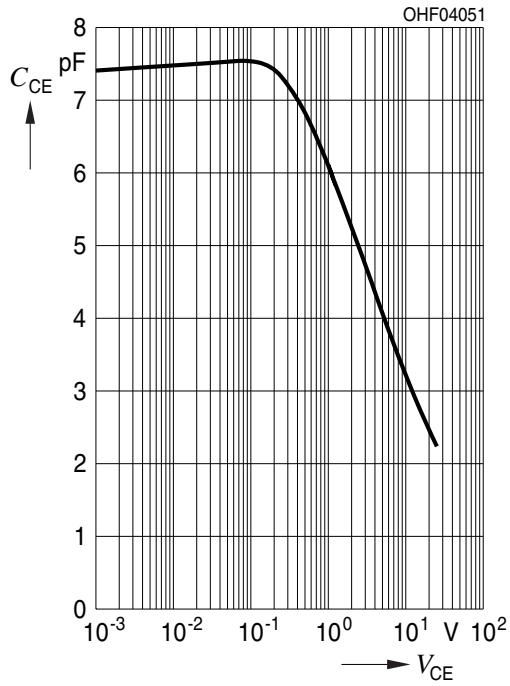
Dark Current 2), 3)

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



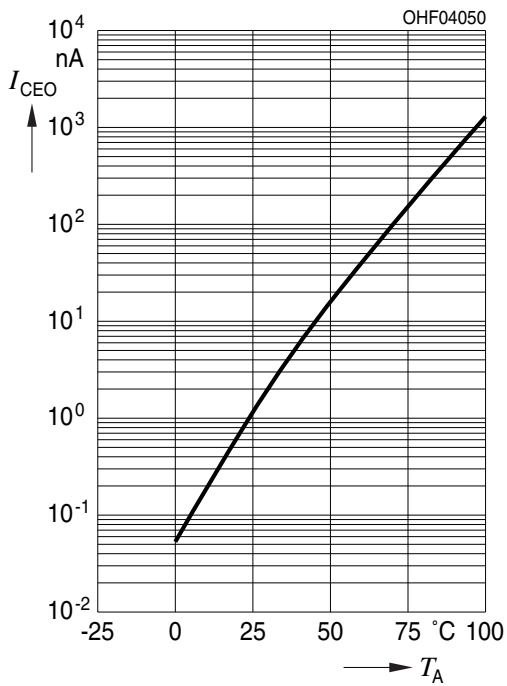
Collector-Emitter Capacitance ^{2), 3)}

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



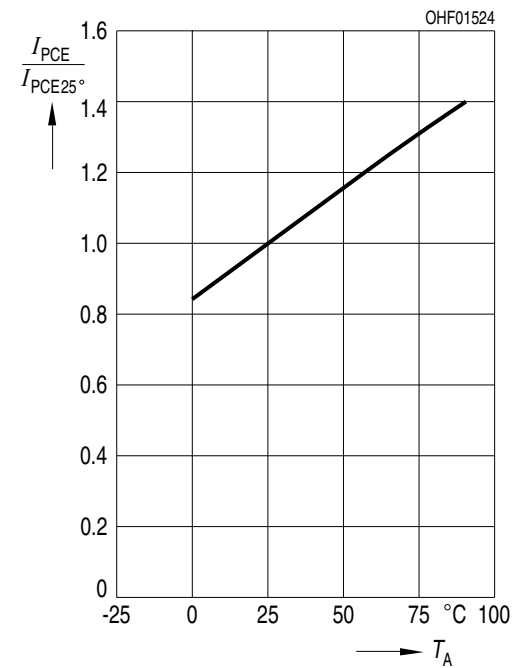
Dark Current ²⁾

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



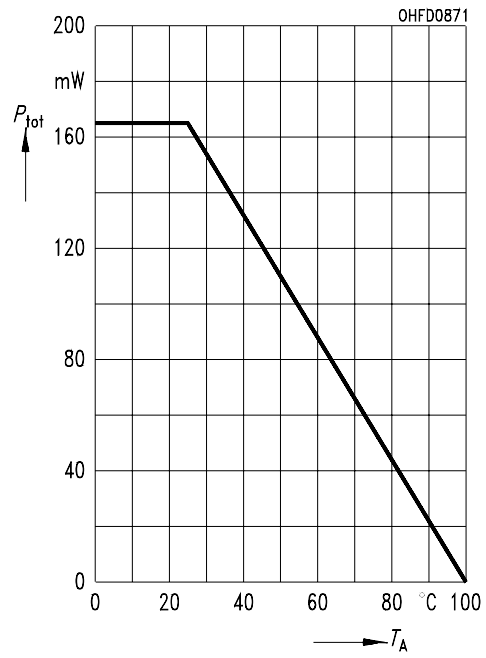
Photocurrent ²⁾

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

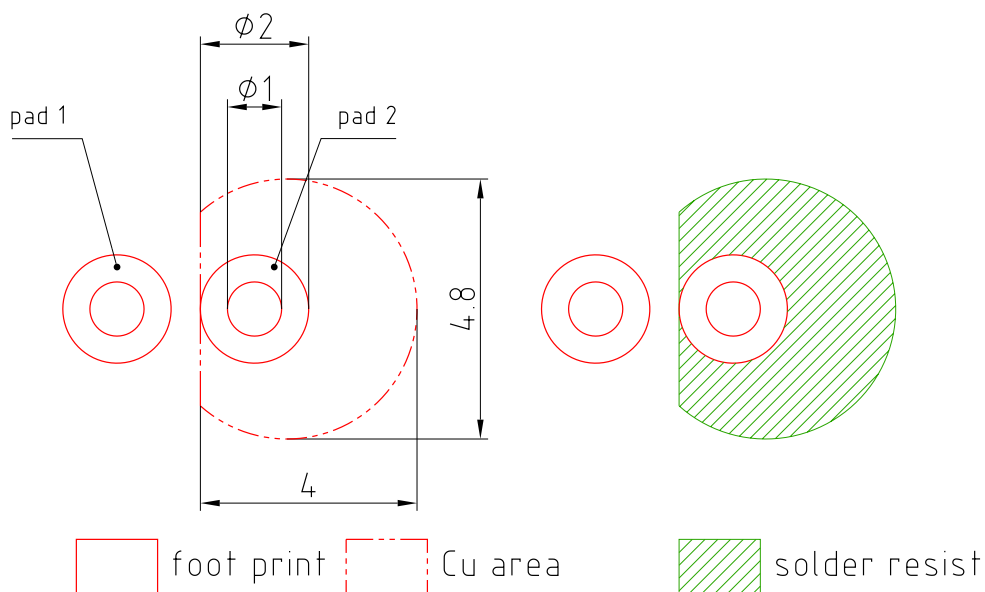


Power Consumption

$$P_{\text{tot}} = f(T_A)$$



Recommended Solder Pad ⁴⁾



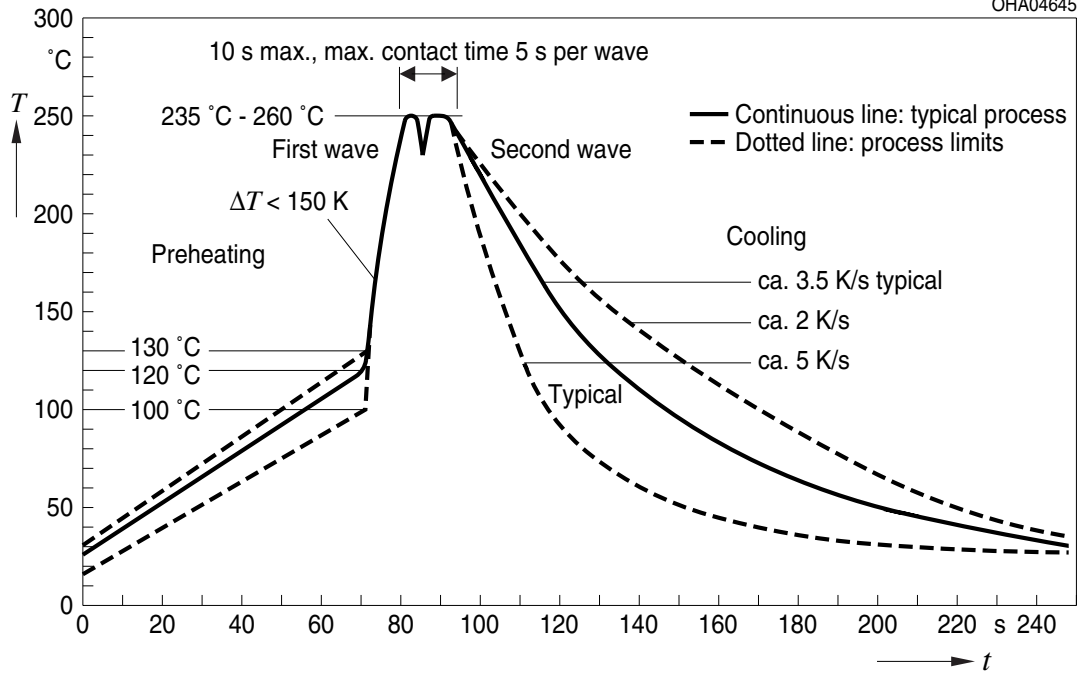
E062.3010.188-01

Pad 1: emitter

TTW Soldering

IEC-61760-1 TTW

OHA04645



Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the LED specified in this data sheet falls into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

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

For further application related informations please visit www.osram-os.com/appnotes

Disclaimer

Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

Attention please!

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Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office.

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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Glossary

- 1) **IPCEmin:** I_{PCEmin} is the min. photocurrent of the specified group.
- 2) **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.
- 3) **Testing temperature:** $T_A = 25^\circ\text{C}$
- 4) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.

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