SFH 309

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) 380 ... 1150 nm
- High photosensitivity
- High linearity
- Available in groups

Ordering Information

Type	Photocurrent V_{CE} = 5 V; λ = 950 nm; E_e = 0.5 mW/cm² I_{PCE}	Ordering Code
SFH 309	400 ... 5000 µA	Q62702P0859
SFH 309-4	1000 ... 2000 µA	Q62702P0998
SFH 309-5	1600 ... 3200 µA	Q62702P0999
SFH 309-3/4	630 ... 2000 µA	Q62702P3592
SFH 309-4/5	1000 ... 3200 µA	Q62702P3593
SFH 309-5/6	1600 ... 5000 µA	Q62702P3594

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

Maximum Ratings

T_A = 25 °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.	15 mA
Collector surge current τ ≤ 10 µs	I_{CS}	max.	75 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 °C

Parameter	Symbol		Values
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	860 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	380 ... 1150 nm
Chip dimensions	L x W	typ.	0.45 x 0.45 mm x mm
Radiant sensitive area Ø = 220 µm	A	typ.	0.038 mm²
Distance chip front to case surface	H	max. min.	2.8 2.4
Half angle	φ	typ.	12 °
Photocurrent V_{CE} = 5 V; Std. Light A; E_v = 1000 lx	I_{PCE}	typ.	4500 µA
Dark current V_{CE} = 20 V; E = 0	I_{CE0}	typ. max.	1 nA 50 nA
Rise time I_C = 1 mA; V_{CC} = 5 V; R_L = 1 kΩ	t_r	typ.	7 µs
Fall time I_C = 1 mA; V_{CC} = 5 V; R_L = 1 kΩ	t_f	typ.	7 µs
Collector-emitter saturation voltage [1)] $I_C = I_{PCE,min}$ X 0.3; E_e = 0.5 mW/cm²	V_{CEsat}	typ.	200 mV
Capacitance V_{CE} = 0 V; f = 1 MHz; E = 0	C_{CE}	typ.	5 pF
Thermal resistance junction ambient real	R_{thJA}	max.	450 K / W

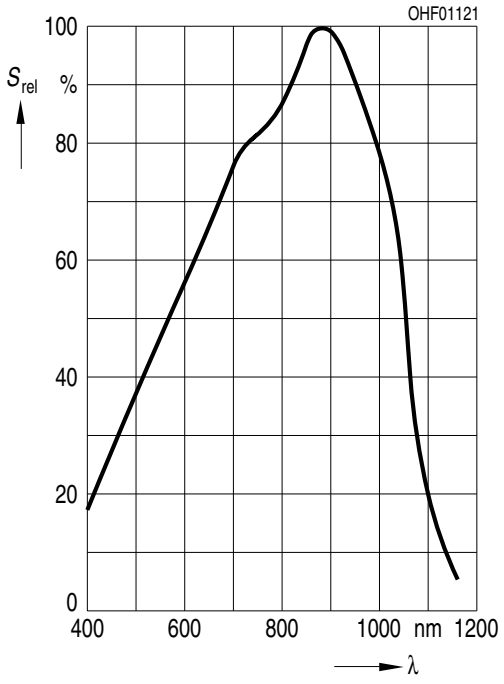
Grouping

T_A = 25 °C

Group	Photocurrent V_{CE} = 5 V; λ = 950 nm; E_e = 0.5 mW/cm² min. I_{PCE}	Photocurrent V_{CE} = 5 V; λ = 950 nm; E_e = 0.5 mW/cm² max. I_{PCE}
2	400 µA	800 µA
3	630 µA	1250 µA
4	1000 µA	2000 µA
5	1600 µA	3200 µA
6	2500 µA	5000 µA

Relative Spectral Sensitivity [2), 3)]

S_{rel} = f (λ)



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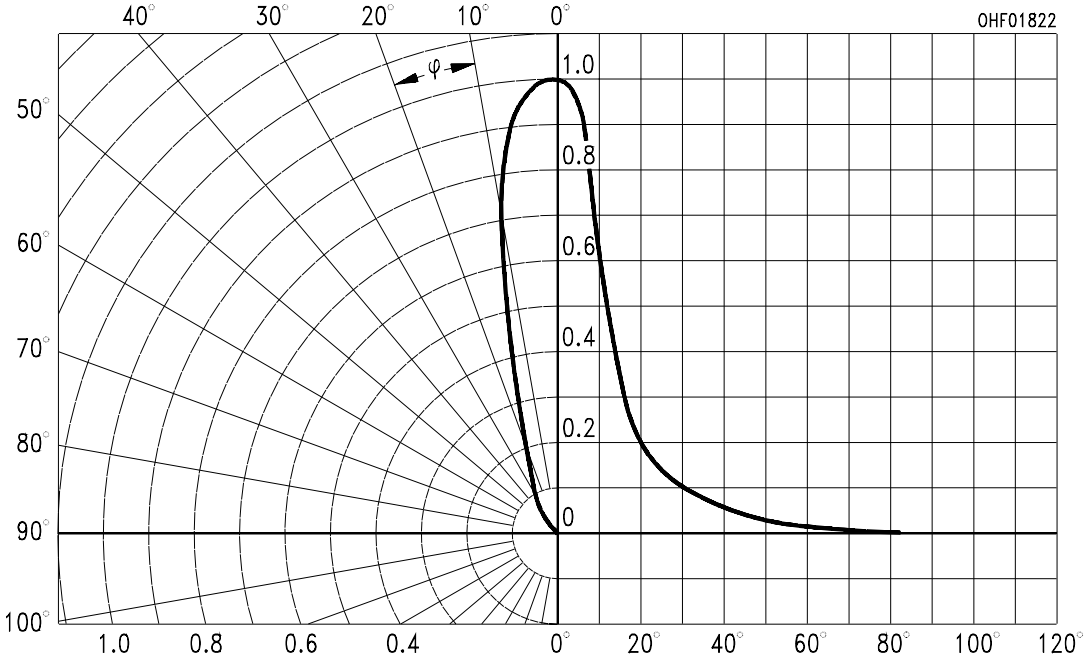
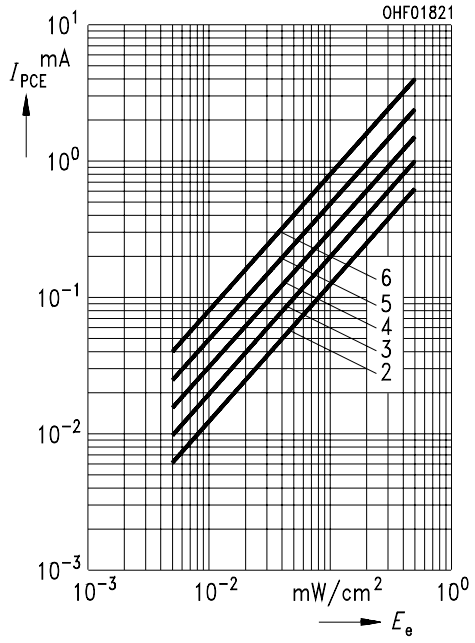
Directional Characteristics [2), 3)]

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



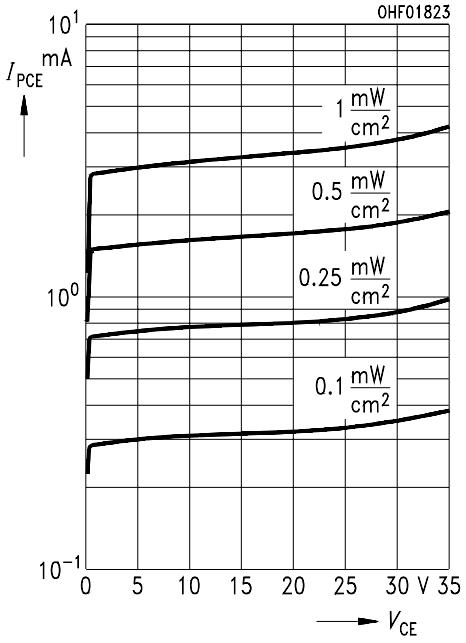
Photocurrent [2), 3)]

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



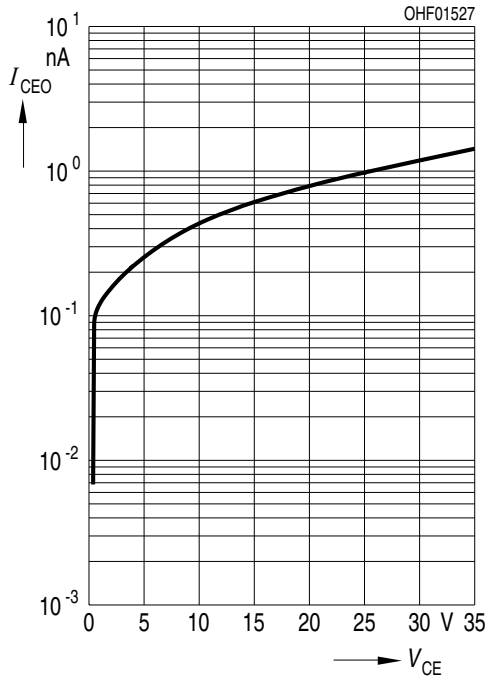
Photocurrent [2), 3)]

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



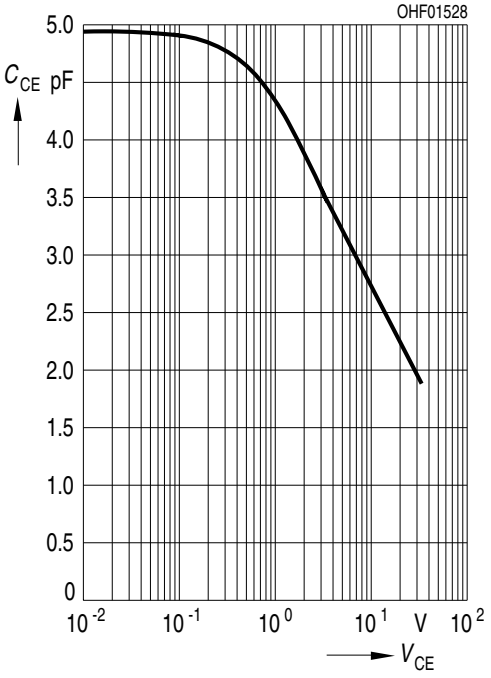
Dark Current [2), 3)]

$I_{CE0} = f(V_{CE})$; E = 0 ;



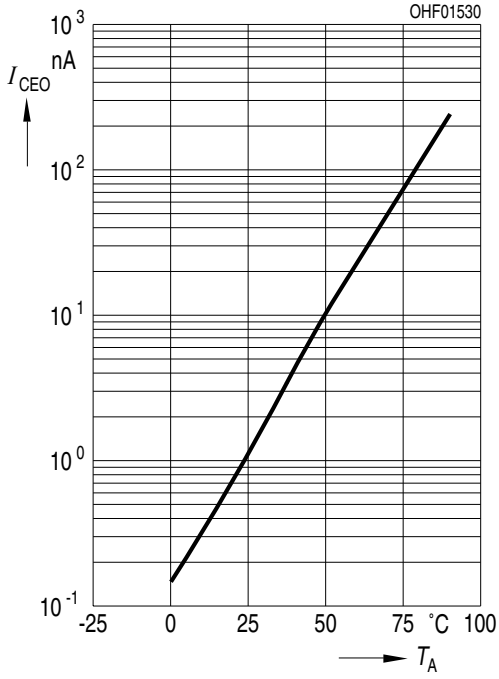
Collector-Emitter Capacitance [2), 3)]

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



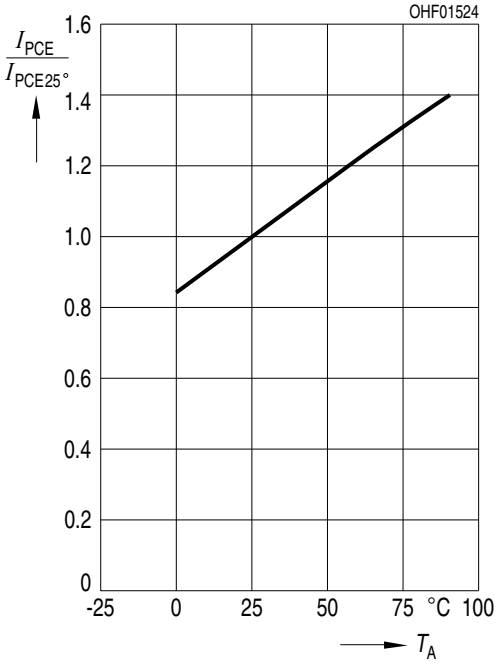
Dark Current [2)]

$I_{CE0} = f(T_A)$; V_{CE} = 20 V; E = 0



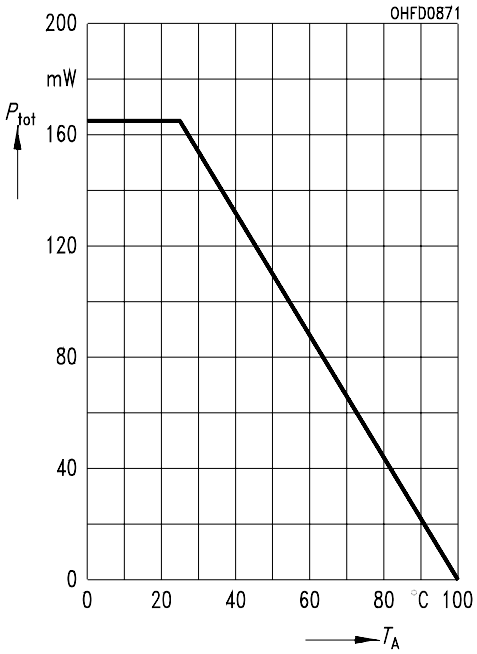
Photocurrent [2)]

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

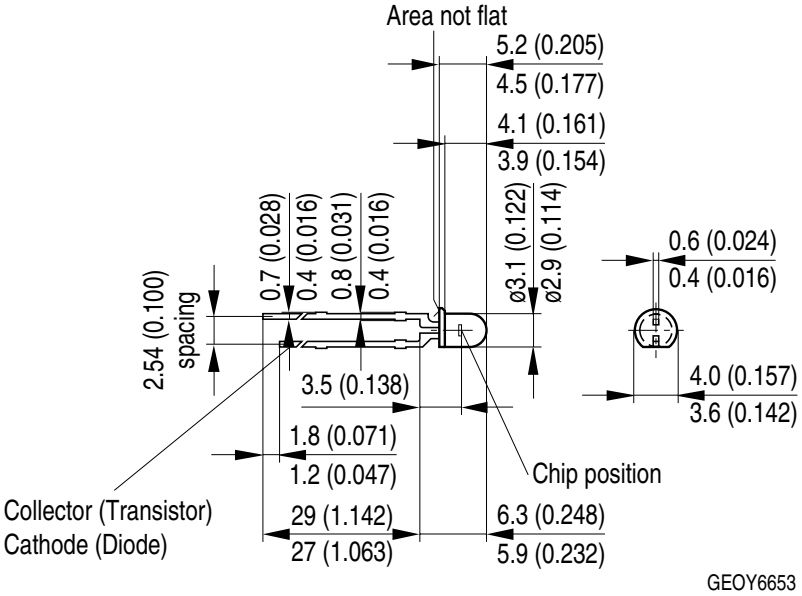


Power Consumption

$P_{tot} = f(T_A)$



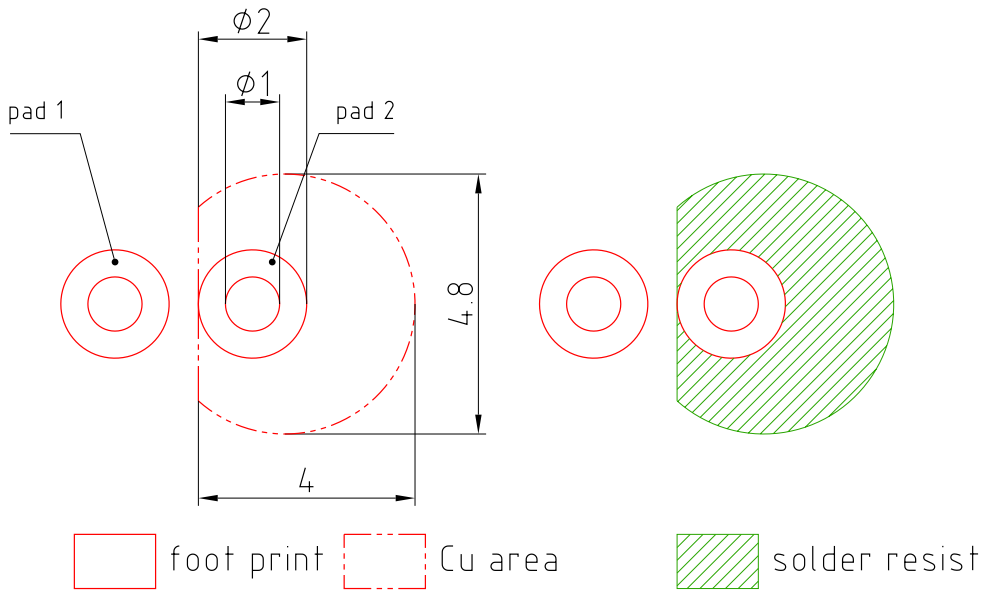
Dimensional Drawing [4)]



Approximate Weight: 178.0 mg

Package marking: Collector

Recommended Solder Pad [4)]



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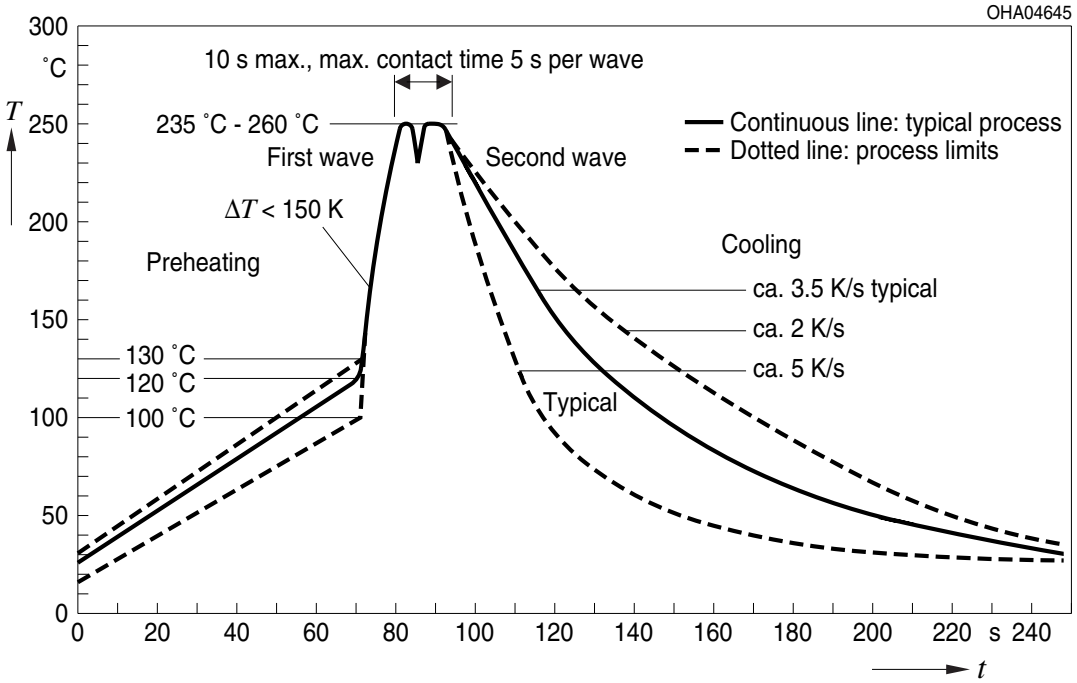
Pad 1: emitter

TTW Soldering

IEC-61760-1 TTW



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!
The information describes the type of component and shall not be considered as assured characteristics.
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For information on the types in question please contact our Sales Organization.
If printed or downloaded, please find the latest version in the OSRAM OS Webside.

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°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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EU RoHS and China RoHS compliant product

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按照中国的相关法规和标准，不含有毒有害物质或元素。