SFH 221

Metal Can® TO39

Silicon Dual Photodiode

Applications

- Electronic Equipment
- Industrial Automation (Machine Controls, Light Barriers, Vision Controls)
- Measurement Levelling

Features:

- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Especially suitable for applications from 400 nm to 1100 nm
- High photosensitivity
- Hermetically sealed metal package (similar to TO-5), suitable up to 125 °C
- Double diode with extremely high homogeneousness

Ordering Information

Type	Photocurrent E_v = 1000 lx; Std. Light A; V_R = 5 V I_P	Photocurrent typ. E_v = 1000 lx; Std. Light A; V_R = 5 V I_P	Ordering Code
SFH 221	≥ 15 µA	24 µA	Q62702P0270

For operating conditions of T_A > 85 °C please contact us.

Maximum Ratings

T_A = 25 °C

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 125 °C
Storage temperature	T_{stg}	min. max.	-40 °C 125 °C
Reverse voltage	V_R	max.	10 V
Insulation voltage vs. package	V_{IS}	max.	100 V
Total power dissipation	P_{tot}	max.	50 mW
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	max.	2 kV

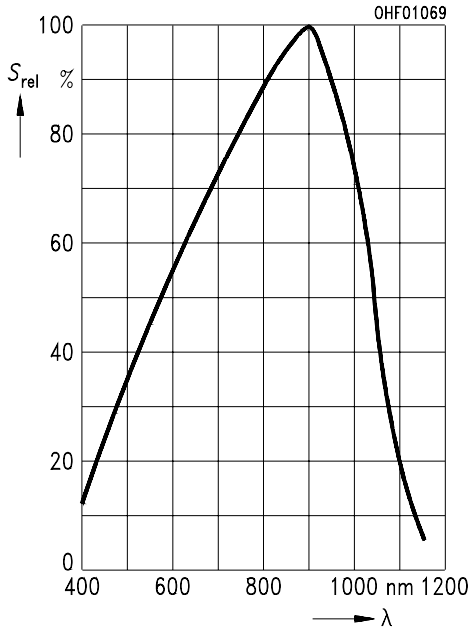
Characteristics

T_A = 25 °C

Parameter	Symbol		Values
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	900 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	400 ... 1100 nm
Radiant sensitive area	A	typ.	1.54 mm²
Dimensions of active chip area	L x W	typ.	0.7 x 2.2 mm x mm
Half angle	φ	typ.	55 °
Dark current V_R = 10 V	I_R	typ. max.	10 nA 100 nA
Insulation current V_{IS} = 100 V	I_{IS}	typ. max.	0.1 nA 1 nA
Spectral sensitivity of the chip λ = 850 nm	S_λ	typ.	0.55 A / W
Max. deviation from average for each single diode	ΔS	typ.	5 %
Quantum yield of the chip λ = 850 nm	η	typ.	0.80 Electrons / Photon
Open-circuit voltage E_v = 1000 lx; Std. Light A	V_O	min. typ.	280 mV 330 mV
Short-circuit current E_v = 1000 lx; Std. Light A	I_{SC}	typ.	24 µA
Rise time V_R = 5 V; R_L = 1 kΩ; λ = 850 nm	t_r	typ.	0.5 ns
Fall time V_R = 5 V; R_L = 1 kΩ; λ = 850 nm	t_f	typ.	0.5 ns
Forward voltage I_F = 40 mA; E = 0	V_F	typ.	1 V
Capacitance V_R = 0 V; f = 1 MHz; E = 0	C_0	typ.	25 pF
Temperature coefficient of voltage	TC_V	typ.	-2.6 mV / K
Temperature coefficient of short-circuit current Std. Light A	TC_I	typ.	0.18 % / K
Noise equivalent power V_R = 10 V; λ = 850 nm	NEP	typ.	0.103 pW / $Hz^{1/2}$
Detection limit V_R = 10 V; λ = 850 nm	D*	typ.	1.2e12 cm x $Hz^{1/2}$ / W

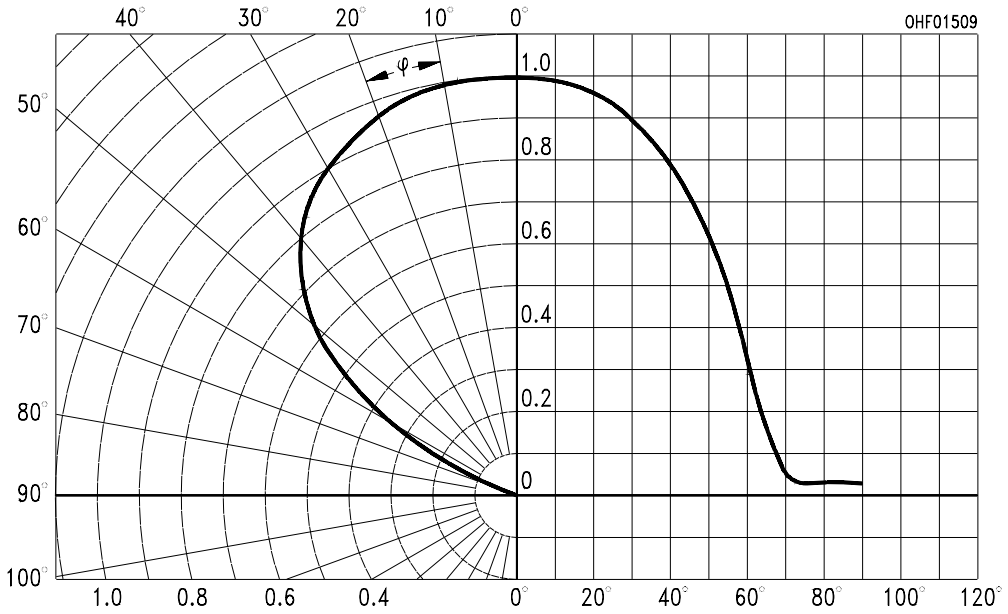
Relative Spectral Sensitivity [1), 2)]

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



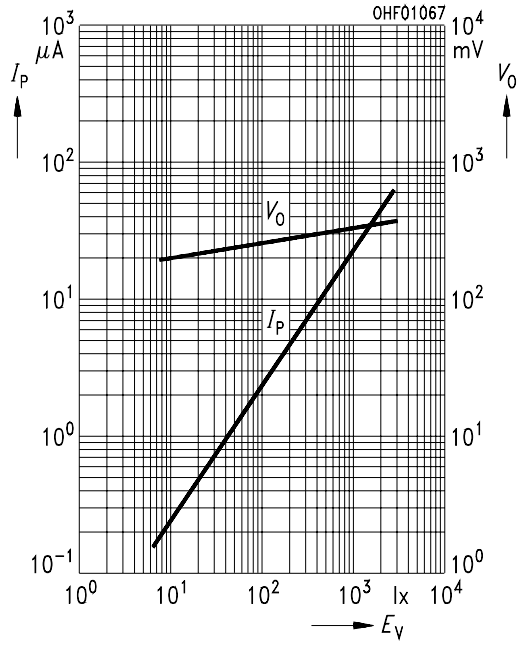
Directional Characteristics [1), 2)]

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



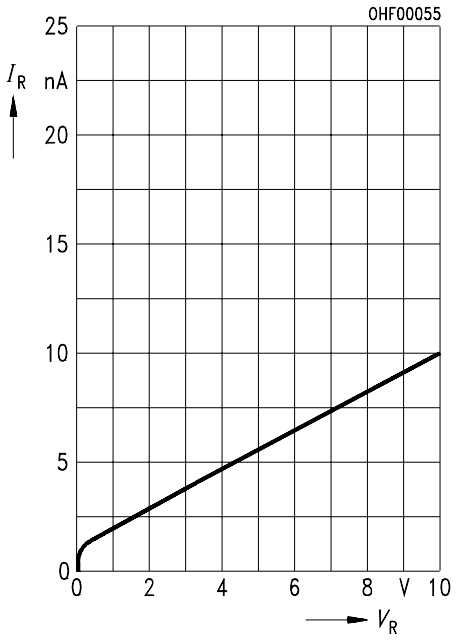
Photocurrent/Open-Circuit Voltage [1), 2)]

I_P (V_R = 5 V) / V_O = f (E_e)



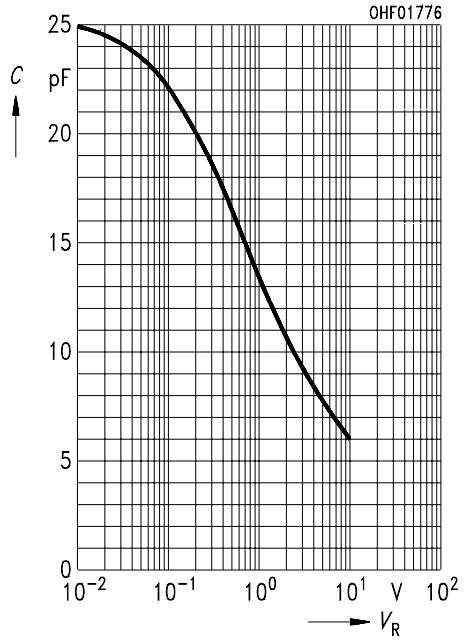
Dark Current [1), 2)]

I_R = f (V_R); E = 0



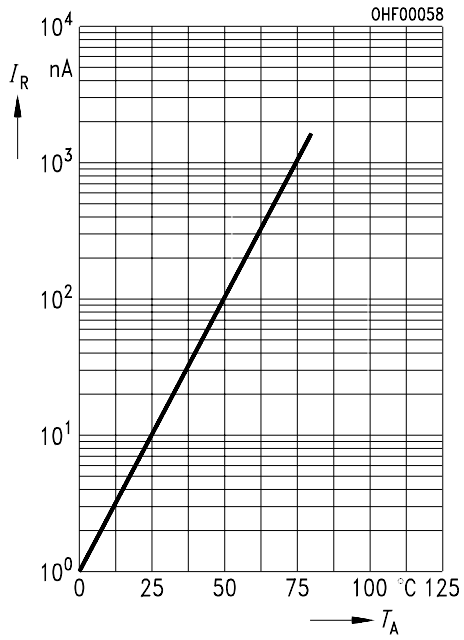
Capacitance [1), 2)]

C = f (V_R); f = 1 MHz; E = 0;



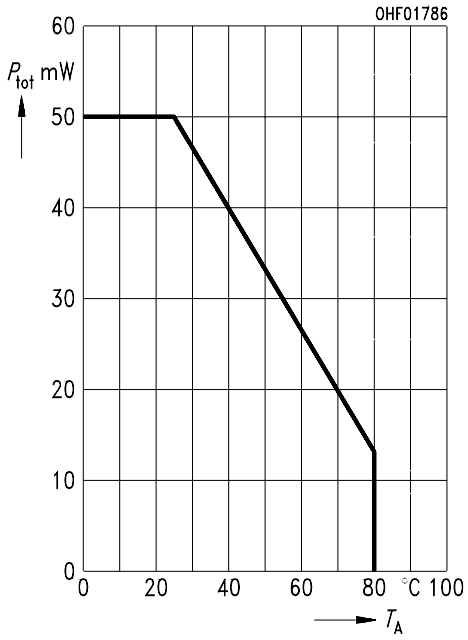
Dark Current [2)]

$I_R = f(T_A)$; E = 0; V_R = 10 V

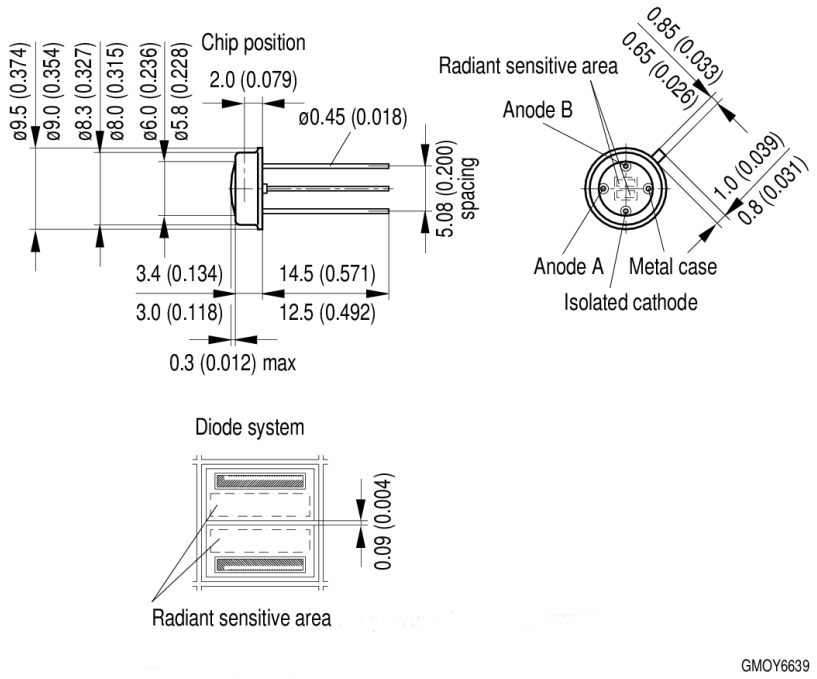


Power Consumption

$P_{tot} = f(T_A)$



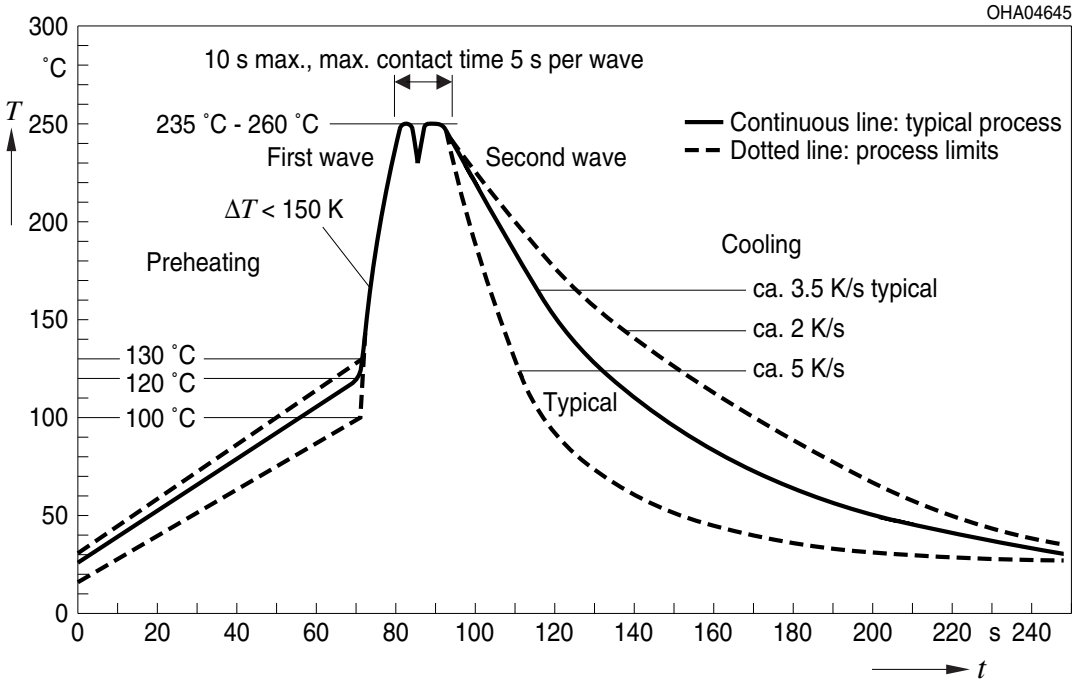
Dimensional Drawing [3)]



Approximate Weight: 780.0 mg

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 device 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.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

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

1) **Testing temperature**: T_A = 25°C

2) **Typical Values**: Due to the special conditions of the manufacturing processes of semiconductor devices, 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) **Tolerance of Measure**: Unless otherwise noted in drawing, tolerances are specified with ±0.1 and dimensions are specified in mm.

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Leibnizstraße 4, D-93055 Regensburg

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。