OSRAM SFH 221

Datasheet

Not for new design

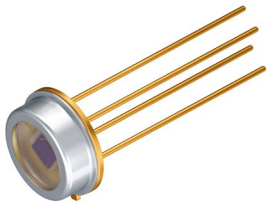
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OSRAM

Metal Can® TO39

SFH 221

Silicon Dual Photodiode



Applications

- Factory Automation

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

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Ordering Information

Type	Photocurrent [1)] 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.

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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

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Characteristics

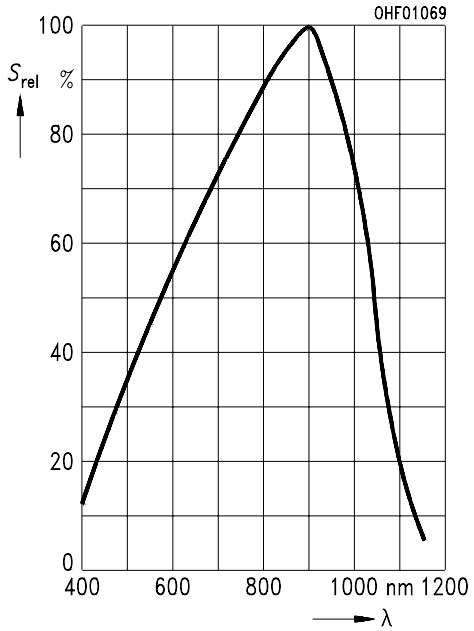
T_A = 25 °C

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
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_R = 0 V	V_O	min. typ.	280 mV 330 mV
Short-circuit current E_v = 1000 lx; Std. Light A; V_R = 0 V	I_{SC}	typ.	24 µA
Rise time V_R = 5 V; R_L = 1 kΩ; λ = 850 nm	t_r	typ.	0.5 µs
Fall time V_R = 5 V; R_L = 1 kΩ; λ = 850 nm	t_f	typ.	0.5 µs
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

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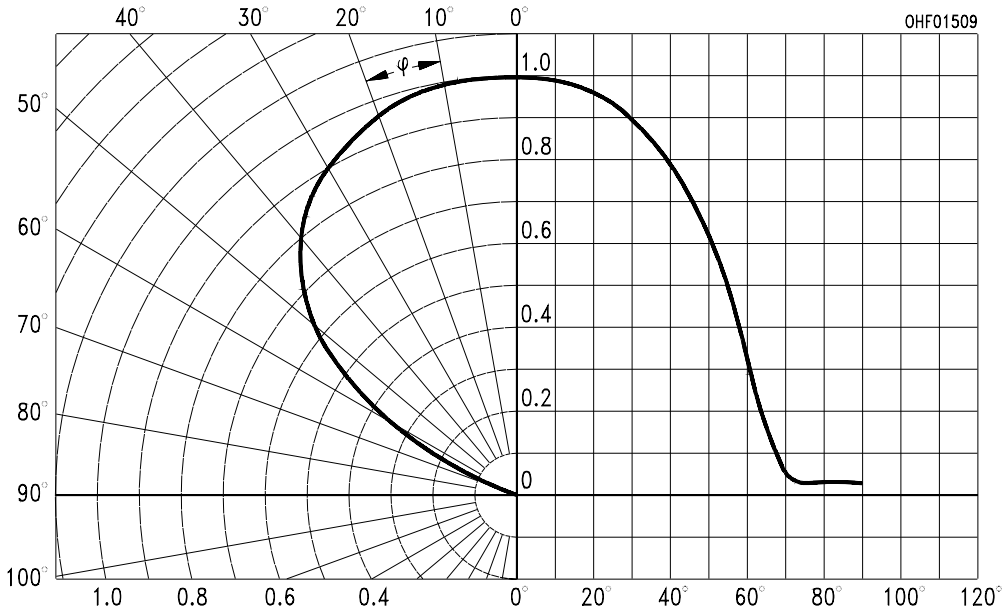
Relative Spectral Sensitivity [2], [3]

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



Directional Characteristics [2], [3]

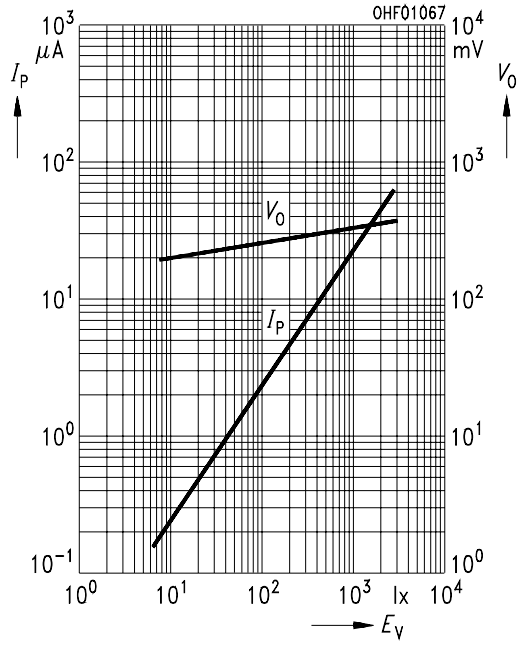
$S_{rel} = f(\varphi)$



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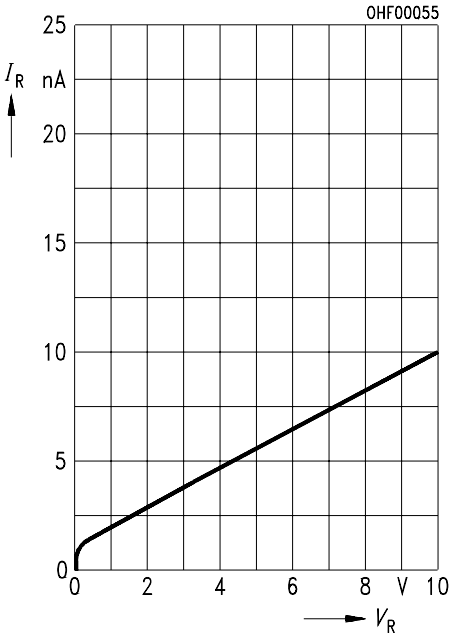
Photocurrent/Open-Circuit Voltage [2], [3]

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



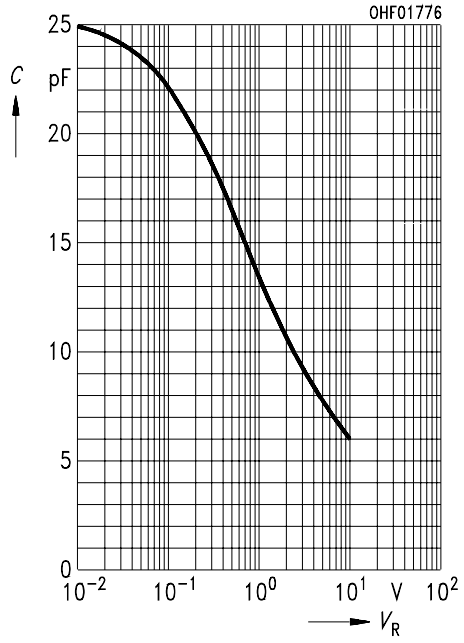
Dark Current [2], [3]

I_R = f (V_R); E = 0



Capacitance [2], [3]

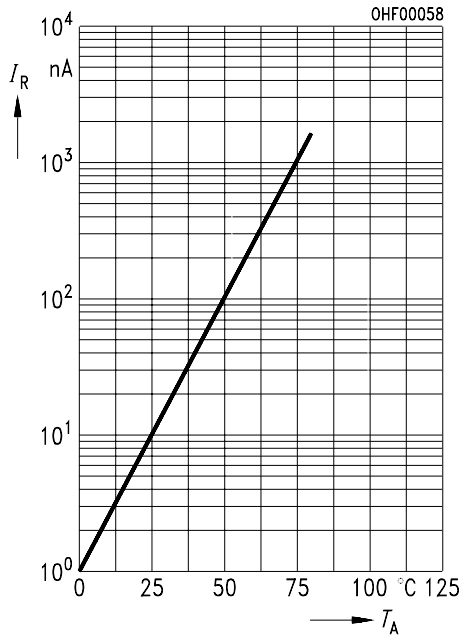
C = f (V_R); f = 1MHz; E = 0; T_A = 25°C



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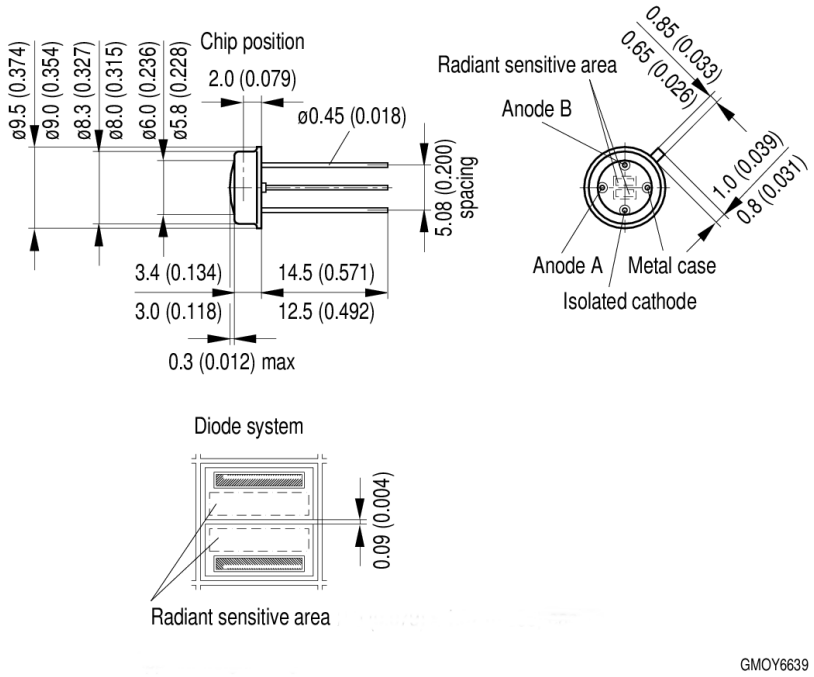
Dark Current [2)]

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



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Dimensional Drawing [4)]



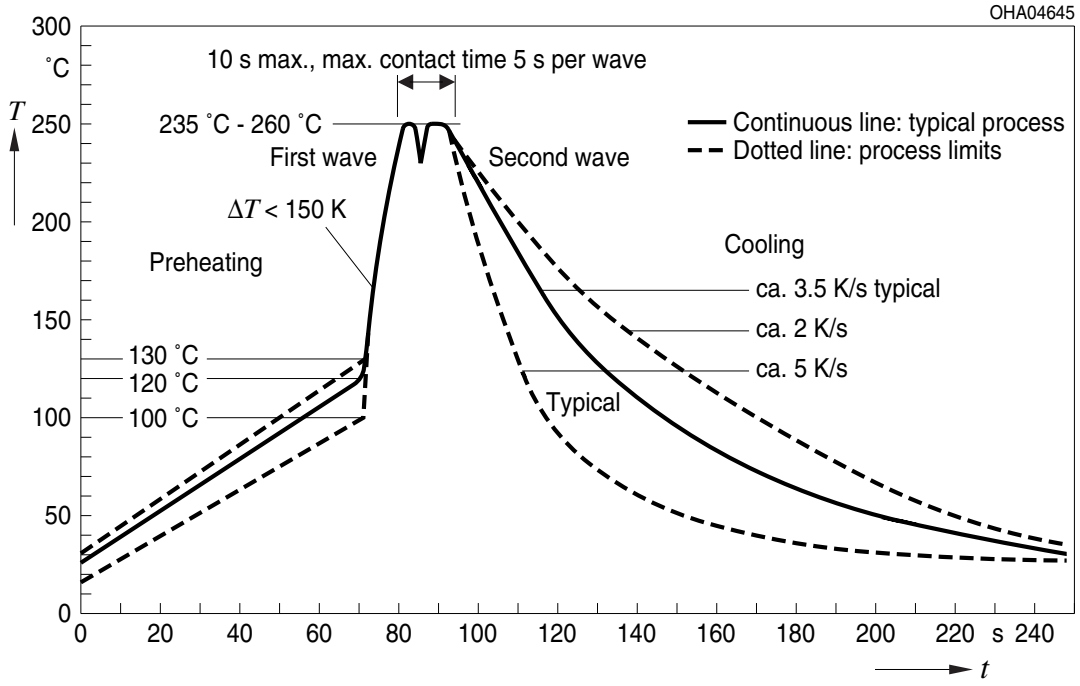
Further Information:

Approximate Weight: 780.0 mg

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TTW Soldering

IEC-61760-1 TTW



Notes

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 information please visit www.osram-os.com/appnotes

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Disclaimer

Attention please!

The information describes the type of component and shall not be considered as assured characteristics.
Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.
For information on the types in question please contact our Sales Organization.
If printed or downloaded, please find the latest version on our website.

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.

Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

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Glossary

1) **Photocurrent:** The photocurrent values are measured (by irradiating the devices with a homogenous light source and applying a voltage to the device) with a tolerance of ±11 %.

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) **Testing temperature:** TA = 25°C (unless otherwise specified)

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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Revision History

Version	Date	Change
1.5	2018-11-30	Characteristics
1.6	2022-07-21	Applications New Layout Not for new design

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