BPW 21

TO39 Ambient Light Sensor

Silicon Photodiode for the Visible Spectral Range

Applications

- Electronic Equipment
- Industrial Automation (Machine controls, Light barriers, Vision controls)
- Measurement Levelling

Features:

- Package: hermetically sealed
- Especially suitable for applications from 350 nm to 820 nm
- Adapted to human eye sensitivity (V_λ)
- Package similar to TO-5

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
BPW 21	≥ 5.50 µA	10 µA	Q62702P0885

OSRAM
Opto Semiconductors

Maximum Ratings

T_A = 25 °C

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 80 °C
Storage temperature	T_{stg}	min. max.	-40 °C 80 °C
Reverse voltage	V_R	max.	10 V
Total power dissipation	P_{tot}	max.	250 mW

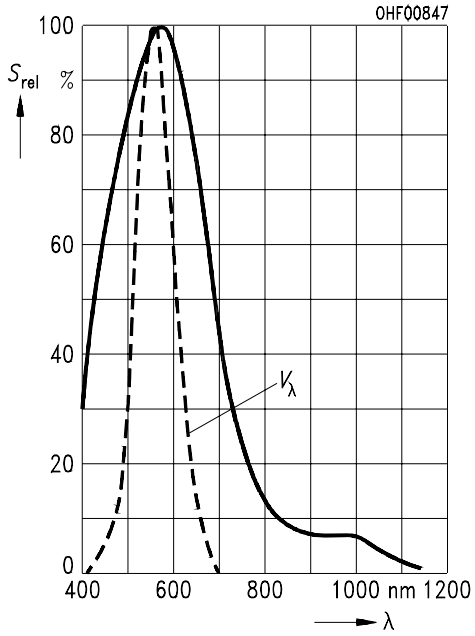
Characteristics

T_A = 25 °C

Parameter	Symbol		Values
Spectral sensitivity V_R = 5 V; Std. Light A; T=2856 K	S	min. typ.	5.5 nA/lx 10 nA/lx
Wavelength of max sensitivity	$\lambda_{S\ max}$	typ.	550 nm
Spectral range of sensitivity	$\lambda_{10\%}$	typ.	350 ... 820 nm
Radiant sensitive area	A	typ.	7.45 mm²
Dimensions of active chip area	L x W	typ.	2.73 x 2.73 mm x mm
Half angle	φ	typ.	55 °
Dark current V_R = 5 V	I_R	typ. max.	2 nA 30 nA
Dark current V_R = 10 mV	I_R	typ. max.	8 pA 200 pA
Spectral sensitivity of the chip λ = 550 nm	S_λ	typ.	0.34 A / W
Quantum yield of the chip λ = 550 nm	η	typ.	0.77 Electrons / Photon
Open-circuit voltage E_v = 1000 lx; Std. Light A	V_O	min. typ.	320 mV 400 mV
Short-circuit current E_v = 1000 lx; Std. Light A	I_{SC}	typ.	10 µA
Rise time V_R = 5 V; R_L = 1 kΩ; λ = 550 nm	t_r	typ.	1.5 µs
Fall time V_R = 5 V; R_L = 1 kΩ; λ = 550 nm	t_f	typ.	1.5 µs
Forward voltage I_F = 100 mA; E = 0	V_F	typ.	1.2 V
Capacitance V_R = 0 V; f = 1 MHz; E = 0	C_0	typ.	580 pF
Temperature coefficient of voltage	TC_V	typ.	-2.6 mV / K
Temperature coefficient of short-circuit current λ = 550 nm	TC_I	typ.	-0.05 % / K
Noise equivalent power V_R = 5 V; λ = 550 nm	NEP	typ.	0.074 pW / $Hz^{1/2}$
Detection limit V_R = 5 V; λ = 550 nm	D*	typ.	3.7e12 cm x $Hz^{1/2}$ / W

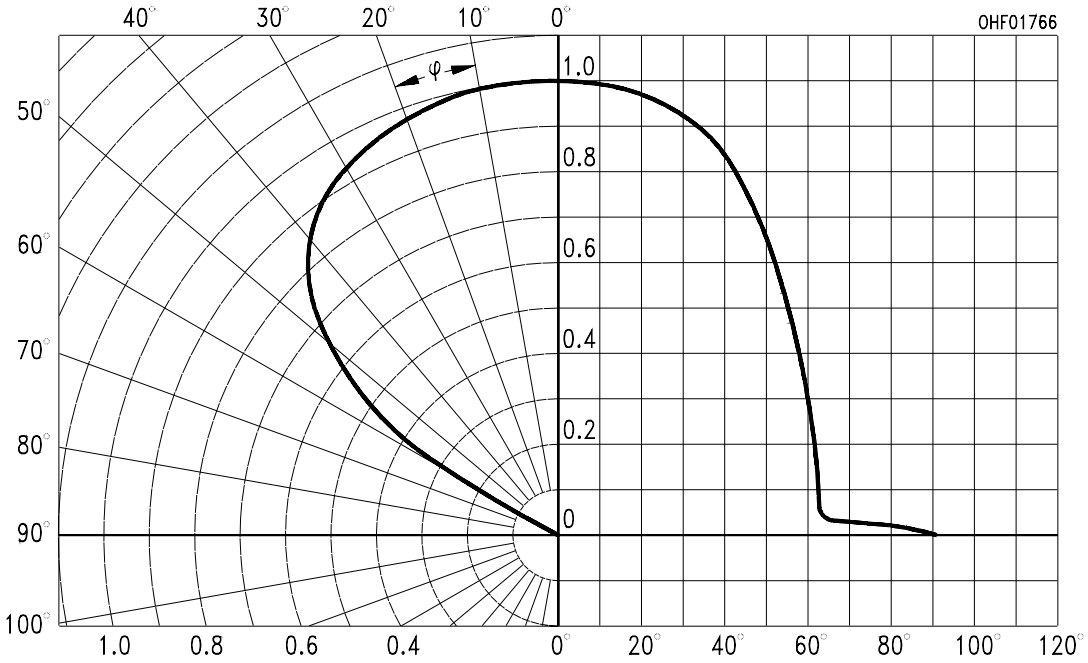
Relative Spectral Sensitivity [1), 2)]

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



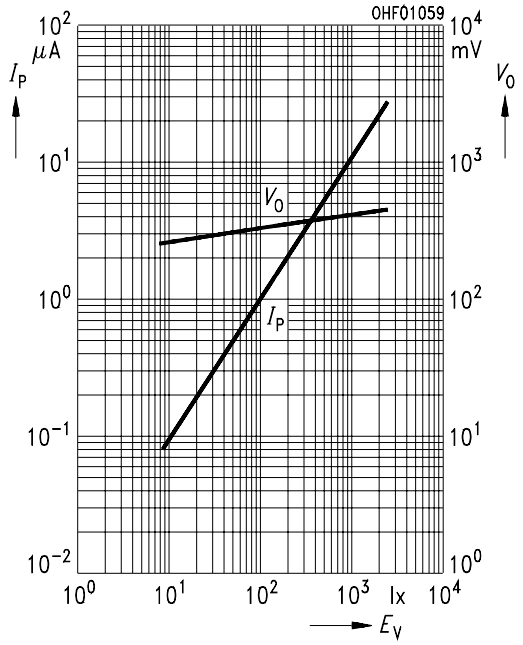
Directional Characteristics [1), 2)]

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



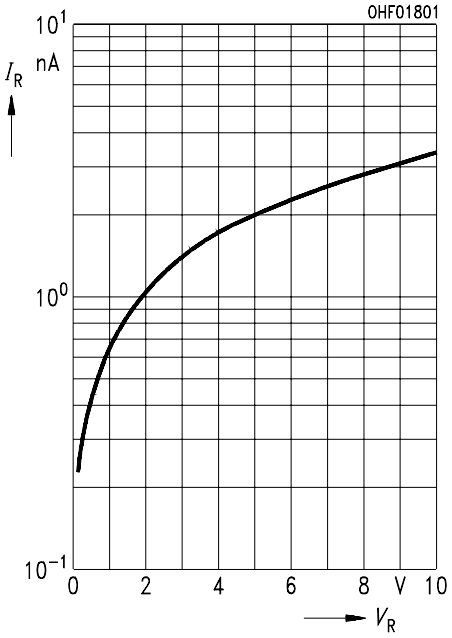
Photocurrent/Open-Circuit Voltage [1), 2)]

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



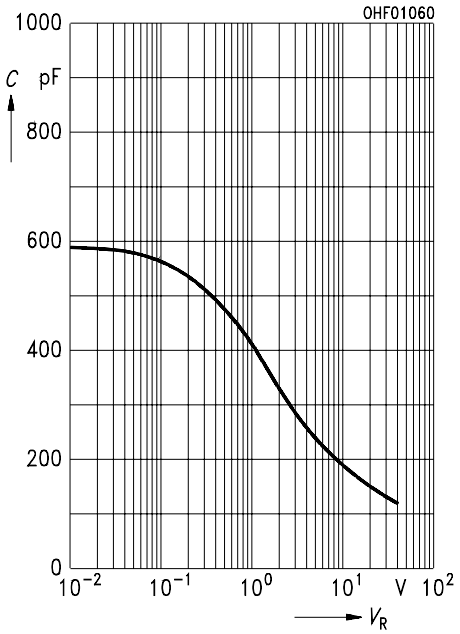
Dark Current [1), 2)]

I_R = f (V_R) ; E = 0



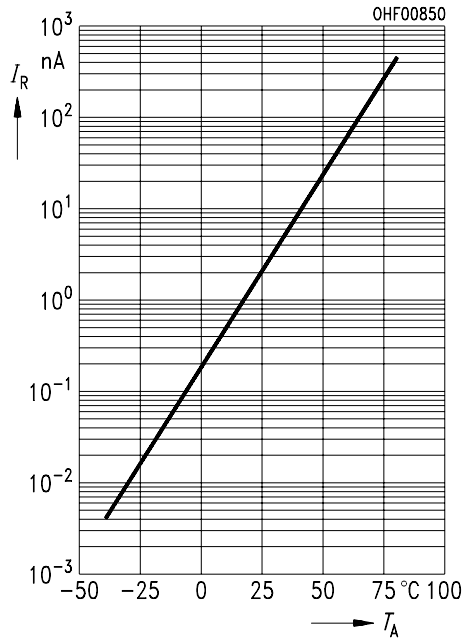
Capacitance [1), 2)]

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



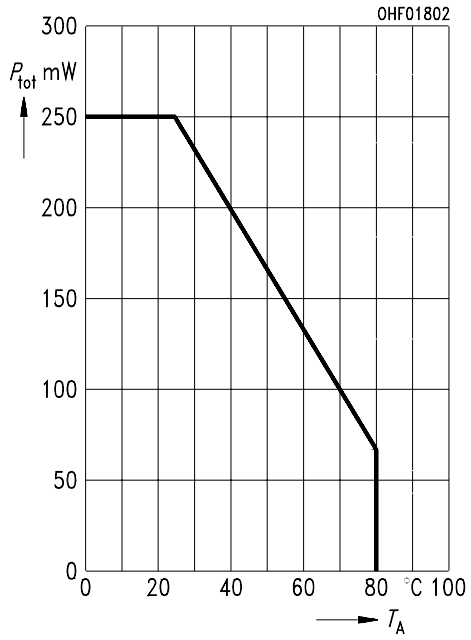
Dark Current [2)]

$I_R = f(T_A)$; E = 0; V_R = 5 V

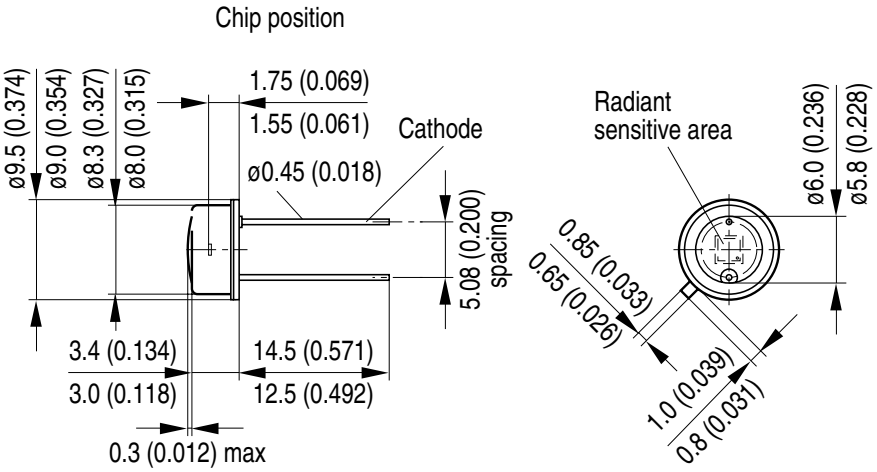


Power Consumption

$P_{tot} = f(T_A)$;



Dimensional Drawing [3)]

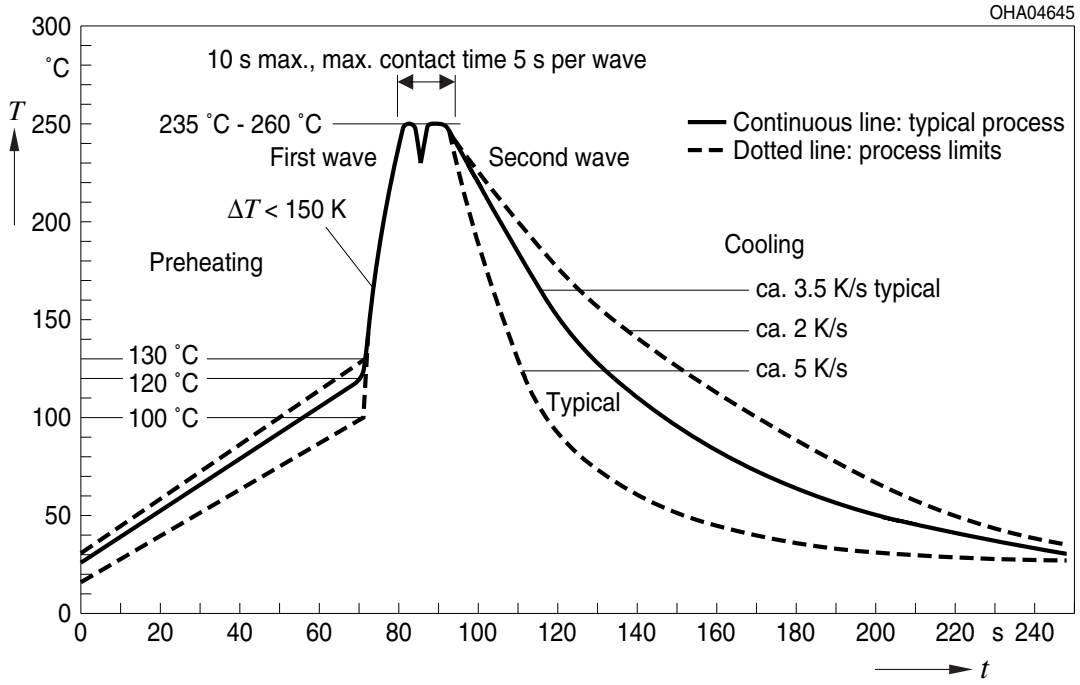


Approximate Weight: 855.0 mg

Package marking: Cathode

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.

Subcomponents of this LED 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 LED exposure to aggressive substances during storage, production, and use. LEDs 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.

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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 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) **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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