

# SG01S-C18-LED

UVC photodiode for 275nm UVC LED measurement,  $A = 0.06 \text{ mm}^2$

## GENERAL FEATURES

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### Properties of the SG01S-C18-LED UV photodiode

- UVC-only sensitivity, compliant with DVGW W294 and DIN 19294. for 275nm UVC LED measurement
- SiC chip with PTB reported high chip stability
- Active Area  $A = 0.06 \text{ mm}^2$
- TO18 hermetically sealed metal housing, 1 isolated pin and 1 case pin
- $10 \text{ mW/cm}^2$  peak radiation results a current of approx.  $960 \text{ nA}$

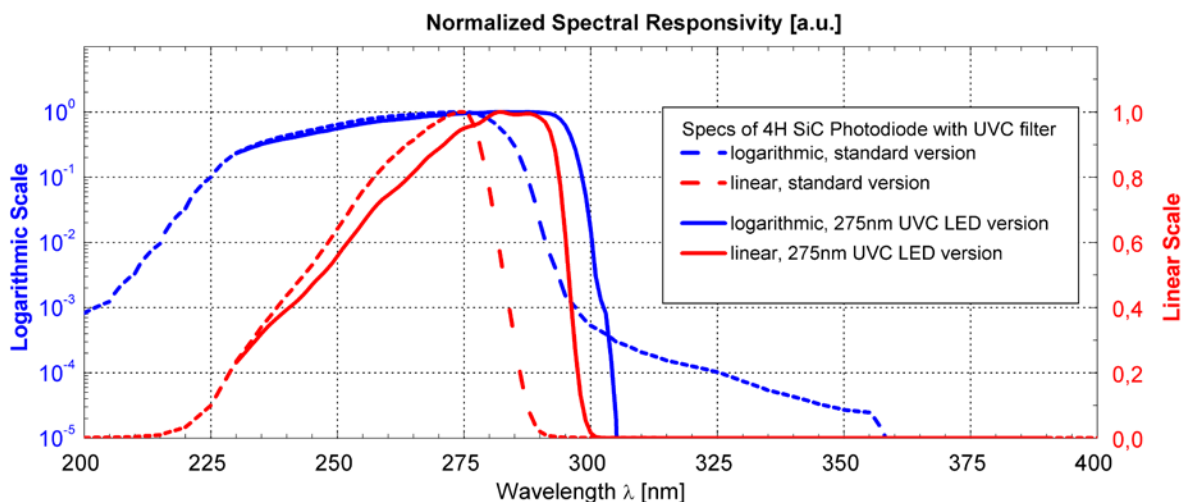
### About the sglux SiC UV photodiodes

SiC provides the unique property of extreme radiation hardness, near-perfect visible blindness, low dark current, high speed and low noise. These features make SiC the best available material for visible blind semiconductor UV detectors. By standard our SiC detectors can be permanently operated at up to  $170^\circ\text{C}$ . A  $350^\circ\text{C}$  version is available. The temperature coefficient is also low,  $< 0.1\%/K$ . Because of the low noise (dark current in the fA range), very low UV irradiance can be measured reliably. Please note that this device needs an appropriate signal transducer transducer (see typical circuit on page 3).

### Differences between the SG01S-C18 photodiode and the SG01S-C18-LED photodiode

The sglux photodiode SG01S-C18 is produced since almost 20 years. It is the best choice for ÖNORM M5873 and DIN 19294 standard compliant detection of UVC low pressure tubes and UV medium pressure lamps. As depicted below (dot lines) the cut off wavelength is around 280nm. However, this kind of spectral responsivity causes problems while measuring UVC LEDs with a peak wavelength of 275nm because this peak is quite close to the cut off wavelength of 280nm. In case of a peak shifting of the LED towards 280nm, caused by increasing LED chip temperature, the readings of the SG01S-C18 photodiode may strongly decrease. This may result a wrong information about the LED's germicidal UVC irradiance.

As depicted below (solid lines) the SG01S-C18-LED photodiode has a cut off wavelength around 295nm. Accordingly, a peak wavelength shift towards 280nm will not cause a photodiode reading decrease.



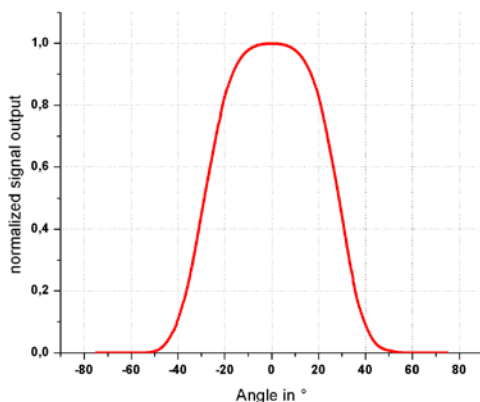
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## SPECIFICATIONS

Parameter	Symbol	Value	Unit
<b>Spectral Characteristics</b>			
Typical Responsivity at Peak Wavelength	$S_{\max}$	0.160	AW <sup>-1</sup>
Wavelength of max. Spectral Responsivity	$\lambda_{\max}$	285	nm
Responsivity Range ( $S=0.1 \cdot S_{\max}$ )	–	225 ... 298	nm
Visible Blindness ( $S_{\max}/S_{>405\text{nm}}$ )	VB	$> 10^{10}$	–
<b>General Characteristics (T=25°C)</b>			
Active Area	A	0.06	mm <sup>2</sup>
Dark Current (1V reverse bias)	$I_d$	0.2	fA
Capacitance	C	15	pF
Short Circuit (10 mW/cm <sup>2</sup> at peak)	$I_o$	960	nA
Temperature Coefficient	$T_c$	$< 0.1$	%/K
<b>Maximum Ratings</b>			
Operating Temperature	$T_{\text{opt}}$	-55 ... +170	°C
Storage Temperature	$T_{\text{stor}}$	-55 ... +170	°C
Soldering Temperature (3s)	$T_{\text{sold}}$	260	°C
Reverse Voltage	$V_{R\max}$	20	V

## FIELD OF VIEW



### Measurement Setup:

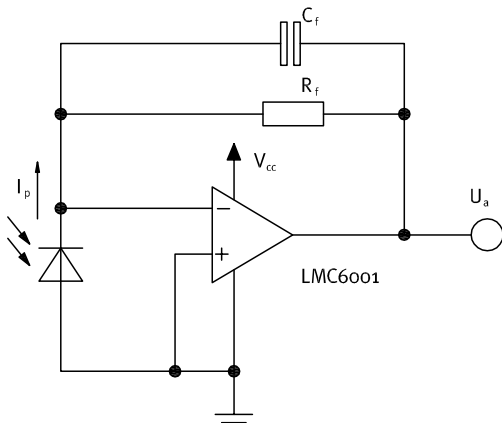
lamp aperture diameter: 10 mm  
distance lamp aperture to second aperture: 17 mm  
second aperture diameter: 10 mm  
distance second aperture to detector: 93 mm

pivot level = top surface of the photodiode window

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## TYPICAL CIRCUIT



Calculations and Limits:

$$U_a = I_p \times R_f = 0 \dots \sim V_{cc}$$

$U_{a,max}$  depends on load and amplifier type

$$R_f = 10k\Omega \dots \sim 10G\Omega, C_f \geq 3pF$$

Recommendation:  $R_f \times C_f \geq 10^{-3}s$

$$I_{p,max} = U_{a,max} \div R_f$$

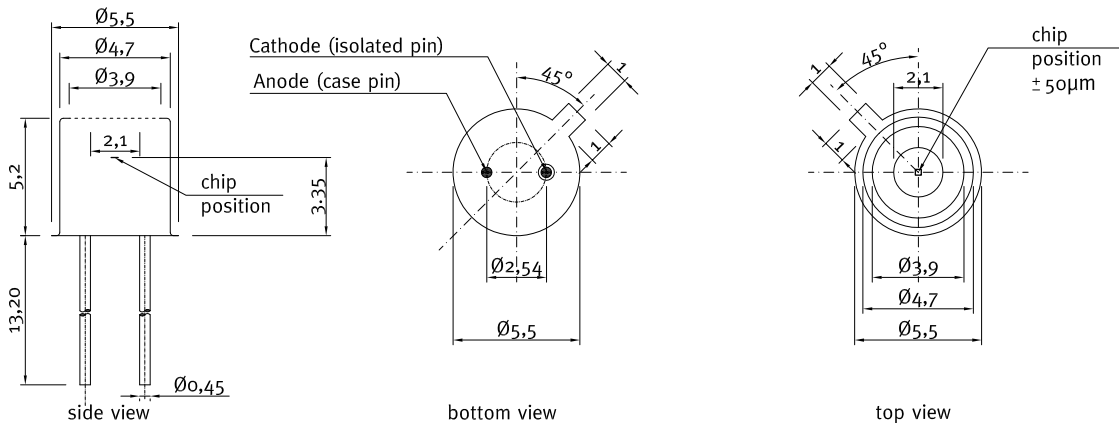
$$\text{Bandwidth} = DC \dots \frac{1}{2\pi \times R_f \times C_f}$$

Example:

$$I_p = 20nA, R_f = 100M\Omega, C_f = 100pF$$

$$U_a = 20 \times 10^{-9}A \times 100 \times 10^6\Omega = 2V$$

## DRAWINGS



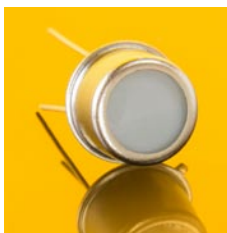
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## APPLICATION NOTE FOR PHOTODIODES

For correct reading of the photodiode the current (and NOT the voltage) must be analyzed. This requires a short circuiting of the photodiode. Usual approaches are using a **Picoamperemeter** or a **transimpedance signal transducer** circuit as shown on page 3.

## UPGRADE TO A TOCON OR A PROBE



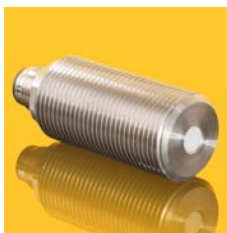
### TOCONs = UV sensors with integrated signal transducer

- SiC based UV hybrid detector with signal transducer (0–5V output), no additional amplifier needed, direct connection to controller, voltmeter, etc.
- Measures irradiance from  $1.8 \text{ pW/cm}^2$  up to  $18 \text{ W/cm}^2$
- UV broadband, UVA, UVB, UVC or Erythema measurements



### Miniature housing with M12x1 thread for the TOCON series

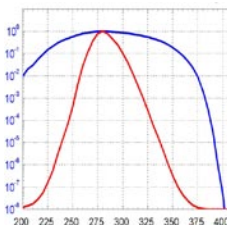
- Optional feature for all TOCON detectors
- Robust stainless steel M12x1 thread body, supply voltage 7...24 V
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and connect, increased EMC safety



### UV probes

- Different housings e.g. with cosine response or water pressure proof
- Different electronic outputs configurable (voltage, current loop, USB, Modbus, CAN)
- Good EMC safety for industrial applications

## CALIBRATION SERVICE



- PTB traceable calibrations and measurements:
- Calibration of sensors for irradiance measurements
- Calibration of UV sensors on discrete wavelengths
- Determination of a specific spectral sensor responsivity