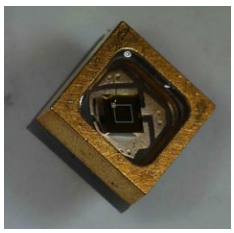
SG01L–SMD

Broadband SiC based SMD UV photodiode A = 1,00 mm²

GENERAL FEATURES



Properties of the SG01L-SMD UV photodiode

- Broadband UVA+UVB+UVC, PTB reported high chip stability
- Active Area A = 1,00 mm²
- 3535 SMD ceramic housing with mineral window glass material
- 10µW/cm² peak radiation results a current of approx. 13 nA

About the material Silicon Carbide (SiC)

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. The SiC detectors can be permanently operated at up to 170°C (338°F). The temperature coefficient of signal (responsivity) is also low, < 0,1%/K. Because of the low noise (dark current in the fA range), very low UV radiation intensities can be measured reliably. Please note that this device needs an appropriate amplifier (see typical circuit on page 3).

SMD packaging vs. TO packaging

The packaging and hermetically sealing of photodiode chips into metal TO housing components with a melted glass window is a more than 50 years old well matured and extremely reliable process. A TO packaged sglux SiC UV photodiode is usually the most reliable and durable component of a product - even if irradiated with very high UV radiation or if operated at high temperature level.

However, recent progress in developing long time stable UV LEDs, also in the UVC region, allow to replace UV low pressure tubes by these LED which leads to a considerable possible reduction of the product's dimensions. The miniaturisation of products such as UV transmission measuring modules or point-of-use LED UVC disinfection modules allow our customers to go into new fields of application. Sometimes our TO packaged UV photodiodes are regarded as too voluminous.

For those applications our SiC SMD photodiode series is designed. The housing is made of a ceramic body with an a mineral window glass trying to make these SMD photodiodes as reliable as possible. However, TO type photodiodes remain to be the best choice in terms of durability, reliability and price.

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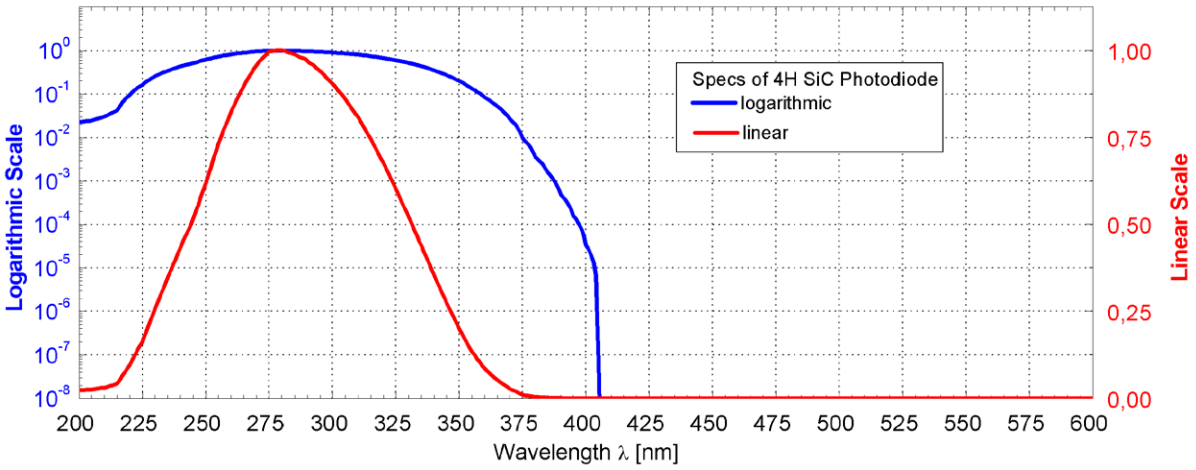
SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Typical Responsivity at Peak Wavelength	S_{max}	0,130	AW^{-1}
Wavelength of max. Spectral Responsivity	λ_{max}	280	nm
Responsivity Range (S=0,1*S_{max})	–	221 ... 358	nm
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	$> 10^{10}$	–
General Characteristics (T=25°C)			
Active Area	A	1,00	mm^2
Dark Current (1V reverse bias)	I_d	3,3	fA
Capacitance	C	250	pF
Short Circuit (1µW/cm² at peak)	I_o	1,3	nA
Temperature Coefficient	T_c	< 0,1	%/K
Maximum Ratings			
Operating Temperature	T_{opt}	-55 ... 170	°C
Storage Temperature	T_{stor}	-55 ... 170	°C
Soldering Temperature (3s)	T_{sold}	260	°C
Reverse Voltage	V_{Rmax}	20	V

NORMALIZED SPECTRAL RESPONSIVITY



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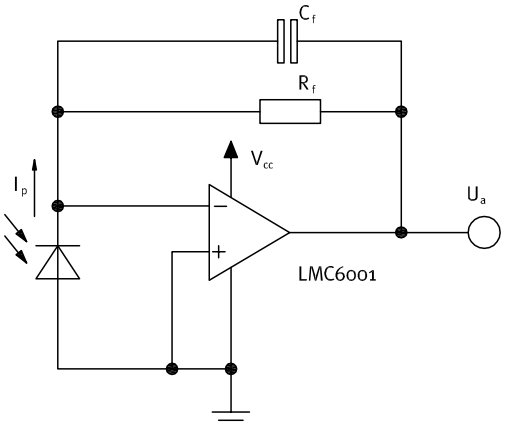
TYPICAL CIRCUIT



Calculations and Limits:

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

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

R_f = 10kΩ ... ~ 10GΩ, $C_f \geq 3pF$
Recommendation: $R_f \times C_f \geq 10^{-3}s$
$I_{p,max} = U_{a,max} \div R_f$

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

Example:
I_p = 20nA, R_f =100MΩ, C_f =100 pF
$U_a = 20 \times 10^{-9}A \times 100 \times 10^{6}\Omega = 2V$

DRAWINGS