

# TOCON\_ABC5

Broadband SiC based UV photodetector with integrated amplifier



## GENERAL FEATURES



### Properties of the TOCON\_ABC5

- Broadband SiC based UV photodetector in TO5 housing with diffusor
- 0 ... 5 V voltage output
- peak wavelength at 290 nm
- max. radiation (saturation limit) at peak is 180  $\mu\text{W}/\text{cm}^2$ ,  
minimum radiation (resolution limit) is 18  $\text{nW}/\text{cm}^2$
- Applications: UV irradiation measurement

### What is a TOCON?

A TOCON is a 5 Volt powered UV photodetector with integrated amplifier converting UV radiation into a 0 ... 5V voltage output. The  $V_{\text{out}}$  pin of the TOCON can be directly connected to a controller, a voltmeter or any other data analyzing device with voltage input. Highly modern electronic components and a hermetically sealed metal housing with UV glass window eliminates noise caused by parasitic resistance paths inside the package or EMI. A TOCON is a perfect solution for each industrial UV sensing application starting from flame detection at  $\text{pW}/\text{cm}^2$  level up to UV curing lamp control at  $\text{W}/\text{cm}^2$  level. This thirteen orders of magnitude range is covered by ten different TOCONs that differ by their sensitivity. The TOCONs are produced as UV broadband sensors or with filters for selective measurement.

### Silicon Carbide (SiC) detector chip inside

Sophisticated electronics make a TOCON a reliable component in harsh environments as well as for extremely low or extremely high UV radiation. But what makes the TOCON a quasi eternally living sensor is the sglux in-house produced SiC detector chip featured by a PTB-reported extreme radiation hardness.

## NOMENCLATURE

TOCON_	ABC, A, B, C, blue or GaP	1 ... 10
	<b>Spectral response</b>	<b>Irradiance limits (<math>V_{\text{supply}}=5\text{V}</math>, <math>\lambda = \lambda_{\text{peak}}</math>)</b>
	<b>ABC = broadband</b> $\lambda_{\text{max}} = 290 \text{ nm}$ $\lambda_{\text{S10\%}} = 227 \text{ nm} \dots 360 \text{ nm}$	<b>1</b> = 1,8 $\text{pW}/\text{cm}^2$ ... 18 $\text{nW}/\text{cm}^2$
	<b>A = UVA</b> $\lambda_{\text{max}} = 331 \text{ nm}$ $\lambda_{\text{S10\%}} = 309 \text{ nm} \dots 367 \text{ nm}$	<b>2</b> = 18 $\text{pW}/\text{cm}^2$ ... 180 $\text{nW}/\text{cm}^2$
	<b>B = UVB</b> $\lambda_{\text{max}} = 280 \text{ nm}$ $\lambda_{\text{S10\%}} = 243 \text{ nm} \dots 303 \text{ nm}$	<b>3</b> = 180 $\text{pW}/\text{cm}^2$ ... 1,8 $\mu\text{W}/\text{cm}^2$
	<b>C = UVC</b> $\lambda_{\text{max}} = 275 \text{ nm}$ $\lambda_{\text{S10\%}} = 225 \text{ nm} \dots 287 \text{ nm}$	<b>4</b> = 1,8 $\text{nW}/\text{cm}^2$ ... 18 $\mu\text{W}/\text{cm}^2$
	<b>Blue</b> $\lambda_{\text{max}} = 445 \text{ nm}$ $\lambda_{\text{S10\%}} = 390 \text{ nm} \dots 515 \text{ nm}$	<b>5</b> = 18 $\text{nW}/\text{cm}^2$ ... 180 $\mu\text{W}/\text{cm}^2$
	<b>Gap</b> $\lambda_{\text{max}} = 445 \text{ nm}$ $\lambda_{\text{S10\%}} = 190 \text{ nm} \dots 570 \text{ nm}$	<b>6</b> = 180 $\text{nW}/\text{cm}^2$ ... 1,8 $\text{mW}/\text{cm}^2$
	<b>E = UV-Index</b> spectral response according to CIE087	<b>7</b> = 1,8 $\mu\text{W}/\text{cm}^2$ ... 18 $\text{mW}/\text{cm}^2$
		<b>8</b> = 18 $\mu\text{W}/\text{cm}^2$ ... 180 $\text{mW}/\text{cm}^2$
		<b>9</b> = 180 $\mu\text{W}/\text{cm}^2$ ... 1,8 $\text{W}/\text{cm}^2$
		<b>10</b> = 1,8 $\text{mW}/\text{cm}^2$ ... 18 $\text{W}/\text{cm}^2$
		<b>2</b> = 0 UVI ... 30 UVI

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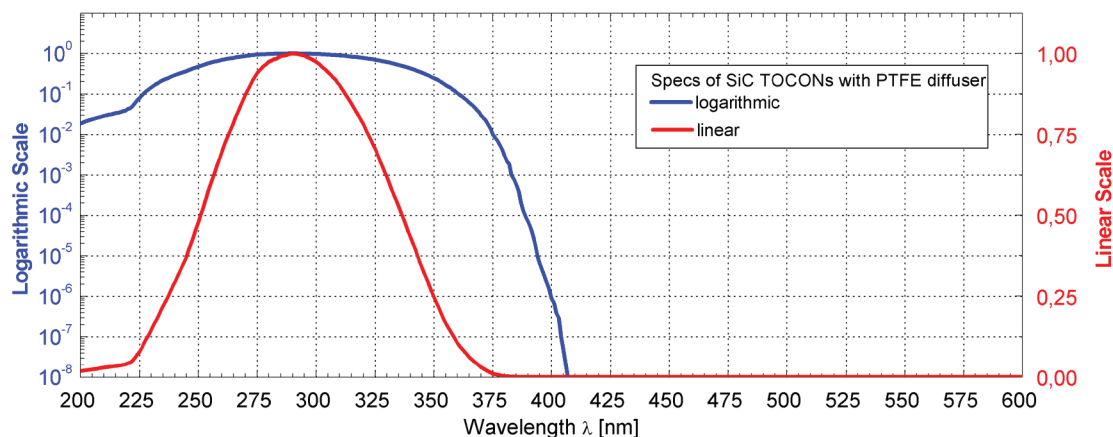
Broadband SiC based UV photodetector with integrated amplifier



## SPECIFICATIONS

Parameter	Symbol	Value	Unit
<b>Spectral Characteristics</b>			
Typical Responsivity at Peak Wavelength	$S_{max}$	28	mV/ $\mu$ W/cm <sup>2</sup>
Wavelength of max. Spectral Responsivity	$\lambda_{max}$	290	nm
Responsivity Range ( $S=0,1*S_{max}$ )	–	227 ... 360	nm
Visible Blindness ( $S_{max}/S_{>405nm}$ )	VB	$> 10^{10}$	–
<b>General Characteristics (T=25°C, V<sub>supply</sub> =+5 V)</b>			
Supply Voltage	V <sub>Supply</sub>	2,5 ... 5	V
Saturation Voltage	V <sub>Sat</sub>	V <sub>Supply</sub> - 5%	V
Dark Offset Voltage	V <sub>Offset</sub>	50	$\mu$ V
Temperature Coefficient at Peak	T <sub>c</sub>	< -0,3	%/K
Current Consumption	I	150	$\mu$ A
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	t <sub>rise</sub>	0,066	s
<i>(other risetimes on request)</i>			
<b>Maximum Ratings</b>			
Operating Temperature	T <sub>opt</sub>	-25 ... +85	°C
Storage Temperature	T <sub>stor</sub>	-40 ... +100	°C
Soldering Temperature (3s)	T <sub>sold</sub>	300	°C

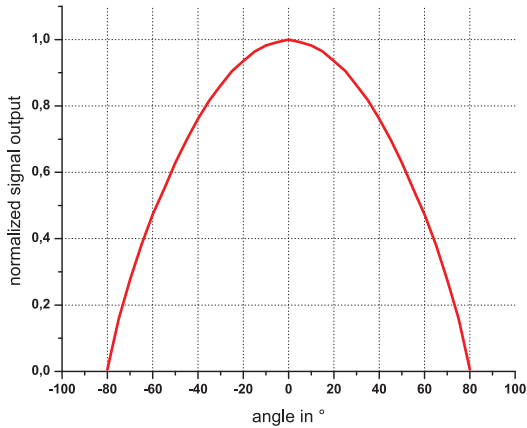
## NORMALIZED SPECTRAL RESPONSIVITY



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## FIELD OF VIEW

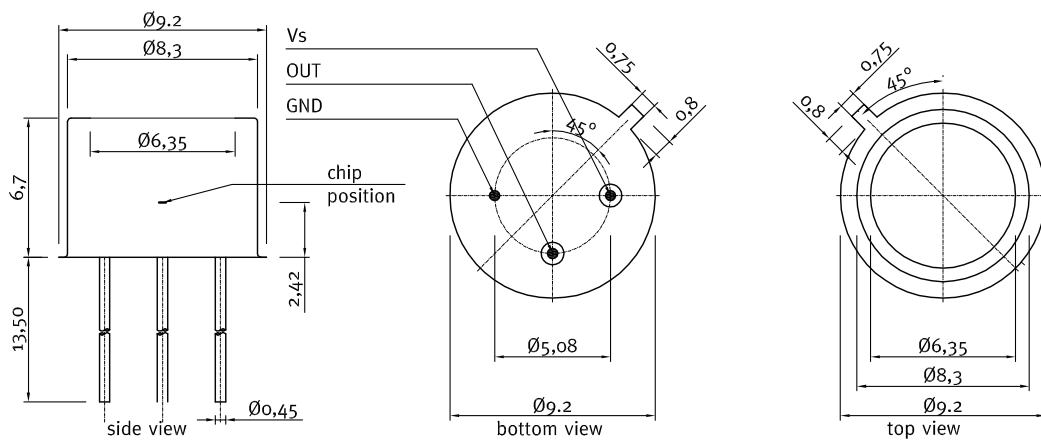


### Measurement Setup:

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 detector window

## DRAWING



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## ▶ APPLICATION NOTE FOR TOCONs

The TOCONs need a supply voltage of  $V_{\text{supply}} = 2,5 \dots 5V_{\text{DC}}$  and can be directly connected to a controller or voltmeter. Please note that the theoretic maximum signal output is always a little less (approx. 5%) than the supply voltage. To learn more about perfect use of the TOCONs please refer to the TOCON FAQ list published at [www.sglux.com](http://www.sglux.com).

**CAUTION!** Wrong wiring leads to destruction of the device.

For easy setup of the device please ask for a TOCON starter kit.



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

- Optional feature for all TOCON detectors
- Robust stainless steel M12x1 thread body, length 32 mm
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and to connect



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

- Optional feature for all TOCON detectors without concentrator lens
- Teflon (PTFE) M12x1 thread body, length 31 mm
- Wide field of view, dirt-repellant, water proof at wet side (IP 68)
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and connect, cleanable

*The PTFE housing reduces the signal output by approx. 95%. Please consider this while selecting the TOCON's sensitivity range.*



### Plastic probes

- Optional feature for all TOCON detectors
- UV probes in small plastic housings with a TOCON inside
- Customized housings available
- Easy to mount and to connect
- Integrated sensor connector (Binder 4-Pin plug)
- Cable available



### Water pressure proof TOCON housing

- Optional feature for all TOCON detectors without concentrator lens
- G1/4" thread, 10 bar water pressure proof
- Customized housings available
- Easy to mount and to connect
- Integrated sensor connector (Binder 5-Pin plug)
- Cable available