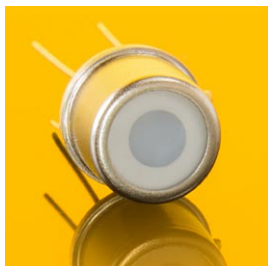


# TOCON\_E2

SiC based UV-Index photodetector with integrated amplifier

## GENERAL FEATURES



### Properties of the TOCON\_E2

- SiC based UV-Index photodetector in TO5 housing with diffusor
- spectral response compliant to CIE 1987 / ISO 17166
- 0...5 V voltage output
- 1 UVI results a voltage of approx. 170 mV
- Applications: UV-Index measurement with very small measurement uncertainty <5%

### 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  $V_{out}$  pin of the TOCON can be directly connected to a controller, a voltmeter or any other data analyzing device with voltage input.

### Information about the UV-Index (UVI)

The UV-Index is an international standard measurement of how strong the ultraviolet (UV) radiation from the sun is at a particular place on a particular day. It is a scale primarily used in daily forecasts aimed at the general public. The UV-Index is calculated by integrating the sun's UV spectrum multiplied with the Erythema action curve (see spectral responsivity). That integral is divided by 25 mW/m<sup>2</sup> to generate a convenient index value, which becomes essentially a scale of 0 to 10. The Erythema action curve is a wavelength resolved measure of the sunburn danger. It is maximised at 297 nm (UVB) and then strongly decreases towards UVA radiation.

Literature: A. F. McKinlay and B. L. Diffey, "A reference action spectrum for ultraviolet induced erythema in human skin" CIE Journal, 6-1, 17-22 (1987)

## NOMENCLATURE

TOCON_	ABC, A, B, C, blue or GaP	1 ... 10
	<b>Spectral response</b>	<b>Irradiance limits (<math>V_{supply}=5V, \lambda = \lambda_{peak}</math>)</b>
	<b>ABC = broadband</b> $\lambda_{max} = 290 \text{ nm}$ $\lambda_{S10\%} = 227 \text{ nm} \dots 360 \text{ nm}$	<b>1</b> = 0,8 pW/cm <sup>2</sup> ... 18 nW/cm <sup>2</sup>
	<b>A = UVA</b> $\lambda_{max} = 331 \text{ nm}$ $\lambda_{S10\%} = 309 \text{ nm} \dots 367 \text{ nm}$	<b>2</b> = 18 pW/cm <sup>2</sup> ... 180 nW/cm <sup>2</sup>
	<b>B = UVB</b> $\lambda_{max} = 280 \text{ nm}$ $\lambda_{S10\%} = 243 \text{ nm} \dots 303 \text{ nm}$	<b>3</b> = 180 pW/cm <sup>2</sup> ... 1.8 μW/cm <sup>2</sup>
	<b>C = UVC</b> $\lambda_{max} = 275 \text{ nm}$ $\lambda_{S10\%} = 225 \text{ nm} \dots 287 \text{ nm}$	<b>4</b> = 1.8 nW/cm <sup>2</sup> ... 18 μW/cm <sup>2</sup>
	<b>Blue = blue light</b> $\lambda_{max} = 445 \text{ nm}$ $\lambda_{S10\%} = 390 \text{ nm} \dots 515 \text{ nm}$	<b>5</b> = 18 nW/cm <sup>2</sup> ... 180 μW/cm <sup>2</sup>
	<b>GaP = UV + VIS</b> $\lambda_{max} = 445 \text{ nm}$ $\lambda_{S10\%} = 190 \text{ nm} \dots 570 \text{ nm}$	<b>6</b> = 180 nW/cm <sup>2</sup> ... 1.8 mW/cm <sup>2</sup>
	<b>E = UV-Index</b> spectral response according to CIE087	<b>7</b> = 1.8 μW/cm <sup>2</sup> ... 18 mW/cm <sup>2</sup>
		<b>8</b> = 18 μW/cm <sup>2</sup> ... 180 mW/cm <sup>2</sup>
		<b>9</b> = 180 μW/cm <sup>2</sup> ... 1.8 W/cm <sup>2</sup>
		<b>10</b> = 1.8 mW/cm <sup>2</sup> ... 18 W/cm <sup>2</sup>
		<b>2</b> = 0 UVI ... 30 UVI

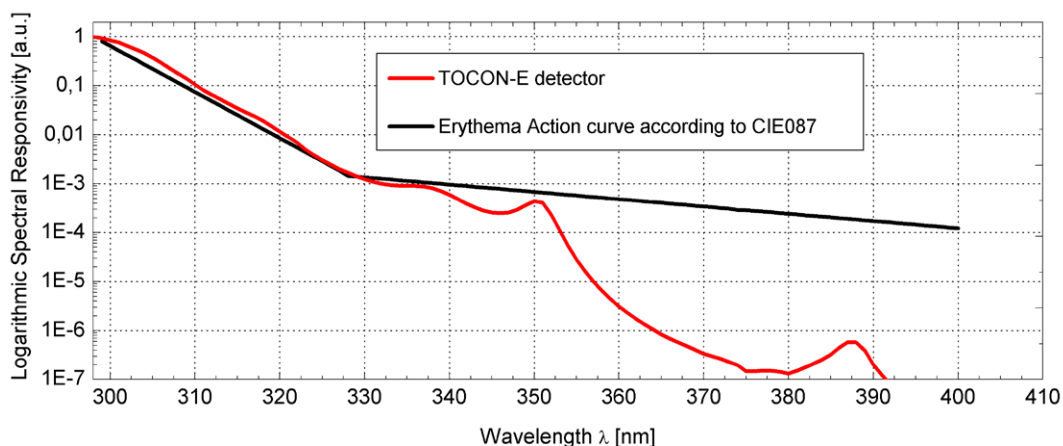
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## SPECIFICATIONS

Parameter	Symbol	Value	Unit
<b>Spectral Characteristics</b>			
Approx. Sensitivity ( <i>UNIT IS NOT CALIBRATED</i> )	$S_{max}$	170	mV/UVI
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	μV
Temperature Coefficient at Peak	T <sub>c</sub>	< -0.3	%/K
Current Consumption	I	150	μA
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	t <sub>rise</sub>	0.182	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

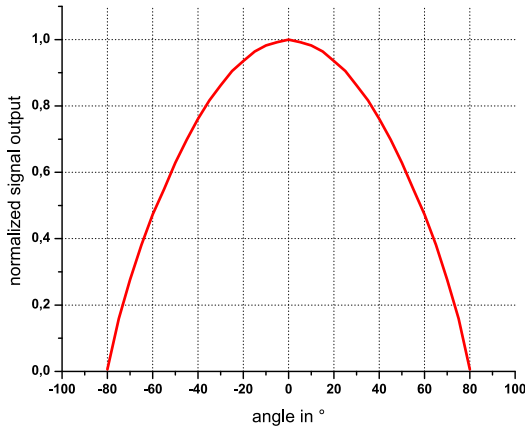
## NORMALIZED SPECTRAL RESPONSIVITY



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## FIELD OF VIEW

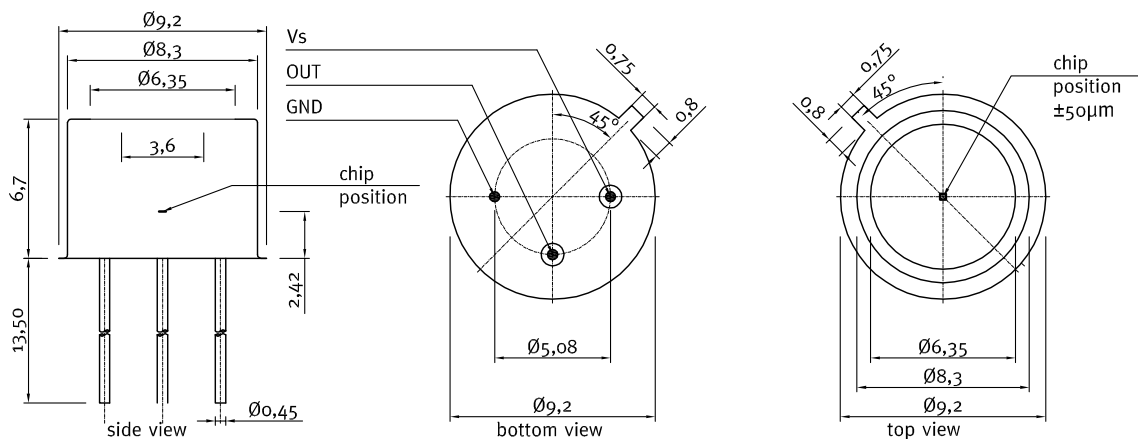


### Measurement Setup:

- 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



# TOCON\_E2

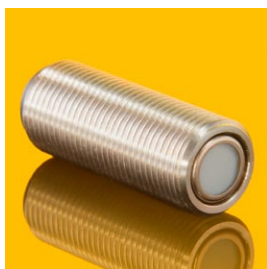
SiC based UV-Index photodetector with integrated amplifier

## 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

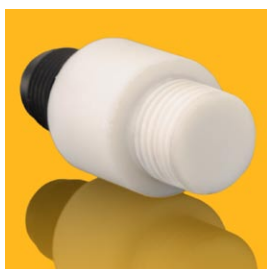
- Optional feature for all TOCON detectors without concentrator lens
- Teflon (PTFE) M12x1 thread body, length 31 mm
- Wide field of view, dirt-repellant, water proof at wet side (IP 68)
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and connect, cleanable

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