

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 CIE087 / DIN5050
- 0 ... 5 V voltage output
- peak wavelength at 280 nm
- 1 UVI results a voltage of approx. 170 mV
- Applications: UV-Index measurement with very small error $< \pm 3\%$

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/m² 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
Spectral response		Irradiance limits ($V_{supply}=5V, \lambda = \lambda_{peak}$)
ABC = broadband $\lambda_{max} = 290 \text{ nm}$ $\lambda_{S10\%} = 227 \text{ nm} \dots 360 \text{ nm}$		1 = 0,8 pW/cm ² ... 18 nW/cm ²
A = UVA $\lambda_{max} = 331 \text{ nm}$ $\lambda_{S10\%} = 309 \text{ nm} \dots 367 \text{ nm}$		2 = 18 pW/cm ² ... 180 nW/cm ²
B = UVB $\lambda_{max} = 280 \text{ nm}$ $\lambda_{S10\%} = 243 \text{ nm} \dots 303 \text{ nm}$		3 = 180 pW/cm ² ... 1.8 μ W/cm ²
C = UVC $\lambda_{max} = 275 \text{ nm}$ $\lambda_{S10\%} = 225 \text{ nm} \dots 287 \text{ nm}$		4 = 1.8 nW/cm ² ... 18 μ W/cm ²
Blue $\lambda_{max} = 445 \text{ nm}$ $\lambda_{S10\%} = 390 \text{ nm} \dots 515 \text{ nm}$		5 = 18 nW/cm ² ... 180 μ W/cm ²
Gap $\lambda_{max} = 445 \text{ nm}$ $\lambda_{S10\%} = 190 \text{ nm} \dots 570 \text{ nm}$		6 = 180 nW/cm ² ... 1.8 mW/cm ²
E = UV-Index spectral response according to CIE087		7 = 1.8 μ W/cm ² ... 18 mW/cm ²
		8 = 18 μ W/cm ² ... 180 mW/cm ²
		9 = 180 μ W/cm ² ... 1.8 W/cm ²
		10 = 1.8 mW/cm ² ... 18 W/cm ²
		2 = 0 UVI ... 30 UVI

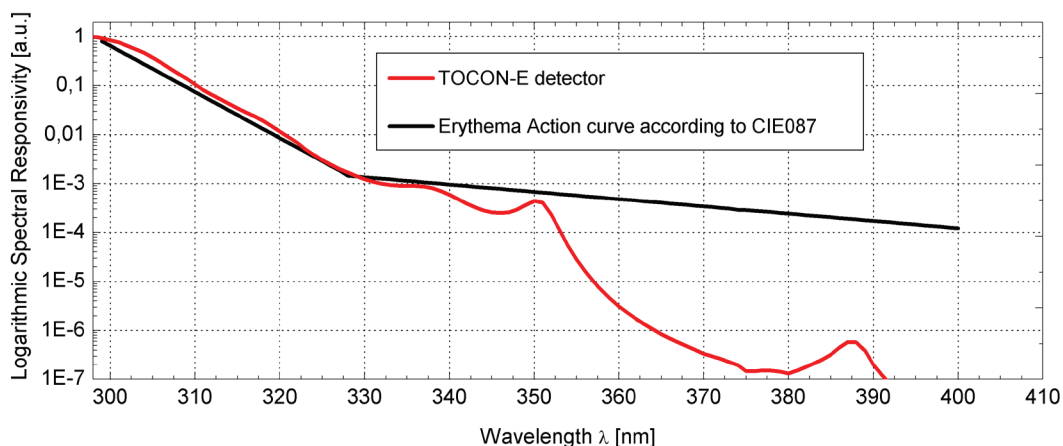
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SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Approx. Sensitivity (<i>unit is not calibrated</i>)	S_{\max}	170	mV/UVI
Visible Blindness ($S_{\max}/S_{>405\text{nm}}$)	VB	$> 10^{10}$	–
General Characteristics (T=25°C, V_{supply}=+5 V)			
Supply Voltage	V _{Supply}	2.5 ... 5	V
Saturation Voltage	V _{Sat}	V _{Supply} - 5%	V
Dark Offset Voltage	V _{Offset}	50	μV
Temperature Coefficient at Peak	T _c	< -0.3	%/K
Current Consumption	I	150	μA
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	t _{rise}	0.182	s
<i>(other risetimes on request)</i>			
Maximum Ratings			
Operating Temperature	T _{opt}	-25 ... +85	°C
Storage Temperature	T _{stor}	-40 ... +100	°C
Soldering Temperature (3s)	T _{sold}	300	°C

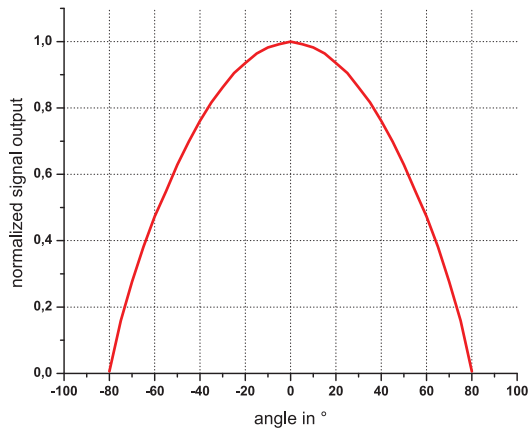
NORMALIZED SPECTRAL RESPONSIVITY



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FIELD OF VIEW

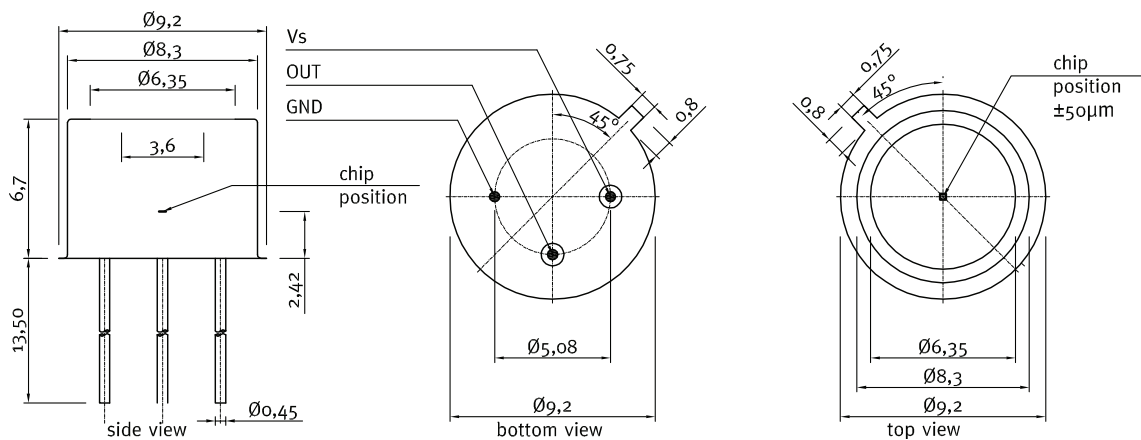


Measurement Setup:

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.

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