

# TOCON\_Si7

v-lambda weighted Si based VIS photodetector with integrated amplifier  
for lux measurement



## Properties of the TOCON\_Si7

- v-lambda weighted Si based VIS photodetector in TO5 housing with diffuser
- 0 ... 5 V voltage output
- peak wavelength at 560 nm
- max. illuminance at peak is 80 klux,  
minimum illuminance (resolution limit) is 80 lux
- Applications: daylight illuminance measurement

## What is a TOCON?

A TOCON is a photodetector with integrated amplifier converting visible light into a voltage. 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. Modern electronic components and a hermetically sealed metal housing with glass window eliminate noise caused by parasitic paths inside the package and EMI. A TOCON is a perfect solution for each ambient light sensing application starting from stray light detection at mlx level up to sun light measurements at Mlux level. This ten orders of magnitude measurement range is covered by ten different TOCONs that differ by their sensitivity.

## NOMENCLATURE

TOCON_	ABC, A, B, C, blue, GaP or Si	1 ... 10
	<b>Spectral response</b>	<b>Irradiance limits (<math>V_{supply}=5V</math>, <math>\lambda = \lambda_{max}</math>)</b>
	<b>ABC = broadband</b> $\lambda_{max} = 290 \text{ nm}$ $\lambda_{S10\%} = 227 \text{ nm} \dots 360 \text{ nm}$	<b>1</b> = 1.8 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 $\mu$ W/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 $\mu$ W/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 $\mu$ W/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>Si = VIS</b> $\lambda_{max} = 560 \text{ nm}$ $\lambda_{S10\%} = 390 \text{ nm} \dots 800 \text{ nm}$	<b>7</b> = 1.8 $\mu$ W/cm <sup>2</sup> ... 18 mW/cm <sup>2</sup>
	<b>E = UV-Index</b> spectral response according to ISO 17166	<b>8</b> = 18 $\mu$ W/cm <sup>2</sup> ... 180 mW/cm <sup>2</sup>
		<b>9</b> = 180 $\mu$ W/cm <sup>2</sup> ... 1.8 W/cm <sup>2</sup>
		<b>10</b> = 80 mlx ... 80 Mlux
		<b>2</b> = up to UVI 30

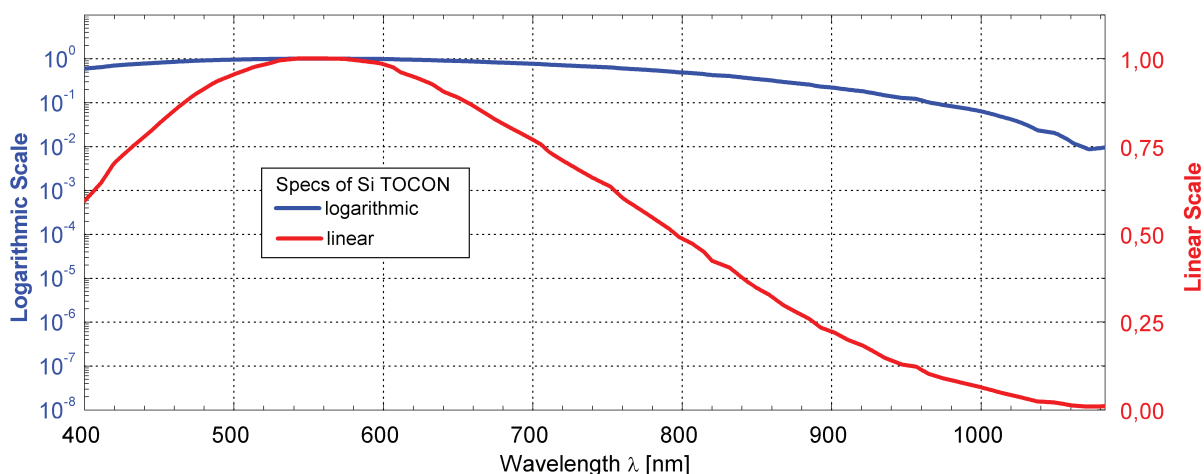
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## SPECIFICATIONS

Parameter	Symbol	Value	Unit
<b>Spectral Characteristics</b>			
Typical Responsivity at Peak Wavelength	$S_{\max}$	62	mV/klux
Wavelength of max. Spectral Responsivity	$\lambda_{\max}$	560	nm
Responsivity Range ( $S=0.1 \cdot S_{\max}$ )	—	390 ... 800	
<b>General Characteristics (<math>T=25^{\circ}\text{C}</math>, <math>V_{\text{supply}}=+5\text{ V}</math>)</b>			
Supply Voltage range	$V_S$	2.5 ... 5	V
Saturation Voltage	$V_{\text{Sat}}$	$V_S - 5\%$	V
Typical dark output voltage at 10 MOhm load	$V_{\text{Offset}}$	700	$\mu\text{V}$
Temperature Coefficient at Peak	$T_c$	$< +0,16$	%/K
Typical Current Consumption	$I$	150	$\mu\text{A}$
Bandwidth (-3 dB)	$B$	15	Hz
Risetime (10-90%)	$t_{\text{rise}}$	0.073	s
<b>Maximum Ratings</b>			
Operating Temperature	$T_{\text{opt}}$	$-25 \dots +85$	$^{\circ}\text{C}$
Storage Temperature	$T_{\text{stor}}$	$-40 \dots +100$	$^{\circ}\text{C}$
Maximum soldering temperature (for 3 seconds)	$T_{\text{sold}}$	300	$^{\circ}\text{C}$

## NORMALIZED SPECTRAL RESPONSIVITY

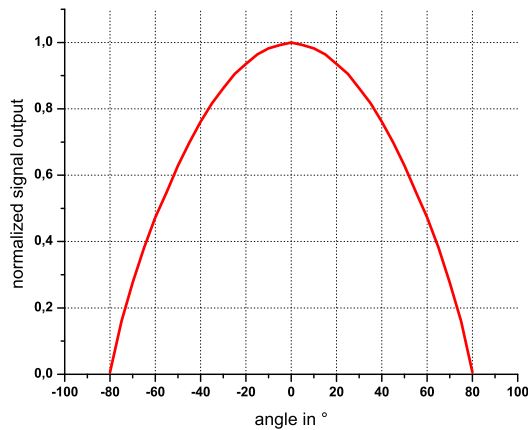


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## FIELD OF VIEW

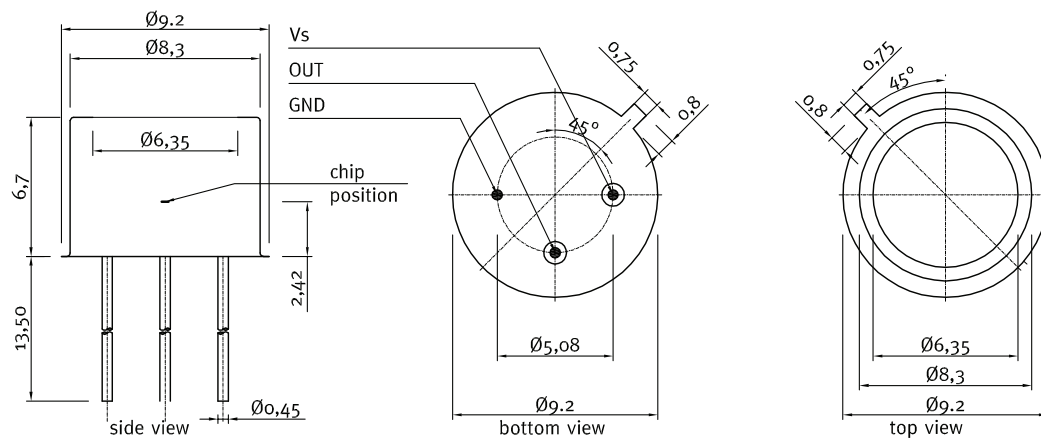


### Measurement Setup:

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
- 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