

# TOCON\_GaP4

GaP detector with integrated amplifier

## GENERAL FEATURES



### Properties of the TOCON\_GaP4

- GaP detector for irradiation measurement in TO5 housing with diffusor
- 0...5 V voltage output
- peak wavelength at 445 nm
- max. radiation (saturation limit) at peak is 9  $\mu\text{W}/\text{cm}^2$ ,  
minimum radiation (resolution limit) is 0.9  $\text{nW}/\text{cm}^2$
- Applications: measurement of very low UV...VIS (560nm) irradiation, occupational safety

### What is a TOCON?

A TOCON is a UV photodetector with integrated amplifier converting UV radiation into a 0...5 V 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. Modern electronic components and a hermetically sealed metal housing with UV glass window eliminate noise caused by parasitic paths inside the package and EMI. A TOCON is a perfect solution for each industrial UV sensing application starting from flame or fire 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 measurement 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.

## NOMENCLATURE

TOCON_	ABC, A, B, C, E, blue or GaP	1 ... 10
	<b>Spectral response</b>	<b>Irradiance limits (<math>V_{\text{supply}}=5\text{V}, \lambda = \lambda_{\text{max}}</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 $\text{pW}/\text{cm}^2$ ... 1.8 $\text{nW}/\text{cm}^2$
	<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 = blue light</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 = UV + VIS</b> $\lambda_{\text{max}} = 445 \text{ nm}$ $\lambda_{\text{S10\%}} = 240 \text{ nm} \dots 560 \text{ nm}$	<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 ISO 17166	<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> = UVI 0 ... 30

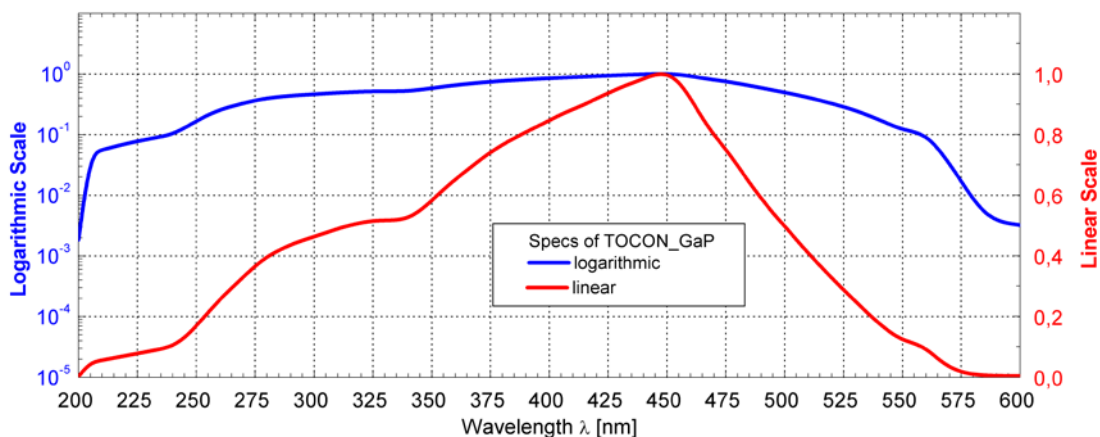
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▶ SPECIFICATIONS

Parameter	Symbol	Value	Unit
<b>Spectral Characteristics</b>			
Typical Responsivity at Peak Wavelength	$S_{max}$	560	mV/μW/cm <sup>2</sup>
Wavelength of max. Spectral Responsivity	$\lambda_{max}$	445	nm
Responsivity Range ( $S=0.1*S_{max}$ )	–	240 ... 560	nm
<b>General Characteristics (T=25°C, V<sub>supply</sub>=+5 V)</b>			
Supply Voltage range	$V_{Supply}$	2.5 ... 5	V
Saturation Voltage	$V_{Sat}$	$V_{Supply} - 5\%$	V
Typical dark output voltage at 10 MOhm load	$V_{Offset}$	700	μV
Temperature Coefficient at Peak	$T_c$	< -0.5	%/K
Typical Current Consumption	I	35	μA
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	$t_{rise}$	0.066	s
<i>(SHORTER RISE TIME AND BANDWIDTH ON REQUEST)</i>			
<b>Maximum Ratings</b>			
Operating Temperature	$T_{opt}$	-25 ... +85	°C
Storage Temperature	$T_{stor}$	-40 ... +100	°C
Maximum soldering temperature (for 3 seconds)	$T_{sold}$	300	°C

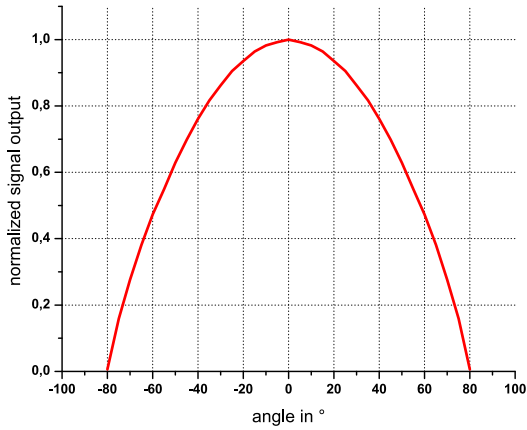
▶ NORMALIZED SPECTRAL RESPONSIVITY



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▶ **FIELD OF VIEW**

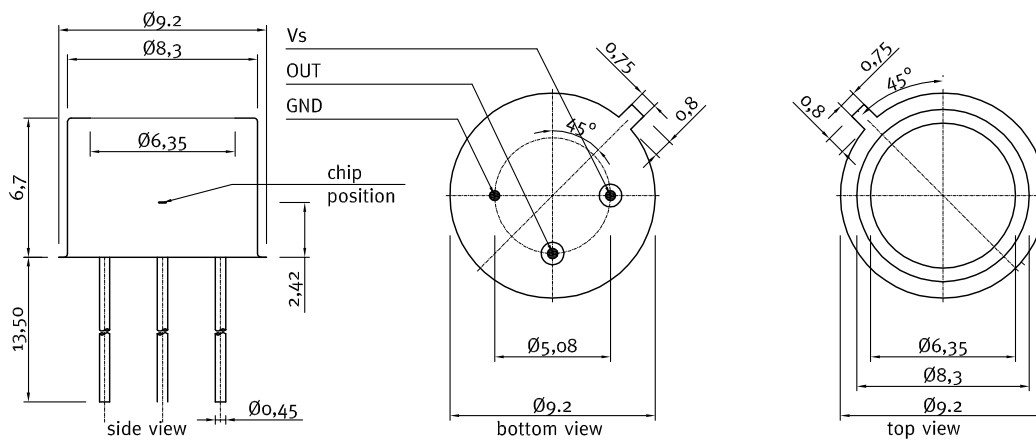


**Measurement Setup:**

- 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  $V_{\text{supply}} = 2.5 \dots 5 V_{\text{DC}}$  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