

Ultraviolet (UVB) TOCON Datasheets



- **UV photodiode with integrated preamplifier**
- **SiC based UV sensors with 0 to 5 V voltage output**
- **measures intensities from 1.8pW/cm² up to 18W/cm²**



 **Boston**Electronics

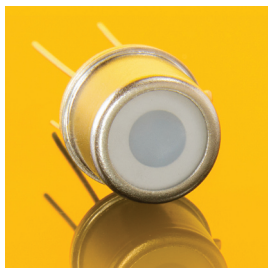
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TOCON_B4

UVB+UVC SiC based UV photodetector with integrated amplifier



GENERAL FEATURES



Properties of the TOCON_B4

- UVB+UVC SiC based UV photodetector in TO5 housing with diffusor
- spectral response compliant to CIE087
- 0...5 V voltage output
- peak wavelength at 280 nm
- max. radiation (saturation limit) at peak is 7,5 $\mu\text{W}/\text{cm}^2$
- Applications: UVB 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_{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 pW/cm^2 level up to UV curing lamp control at W/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
	Spectral response	Irradiance limits ($V_{\text{supply}}=5\text{V}$, $\lambda = \lambda_{\text{peak}}$)
	ABC = broadband $\lambda_{\text{max}} = 290 \text{ nm}$ $\lambda_{\text{S10\%}} = 227 \text{ nm} \dots 360 \text{ nm}$	1 = 1,8 pW/cm^2 ... 18 nW/cm^2
	A = UVA $\lambda_{\text{max}} = 331 \text{ nm}$ $\lambda_{\text{S10\%}} = 309 \text{ nm} \dots 367 \text{ nm}$	2 = 18 pW/cm^2 ... 180 nW/cm^2
	B = UVB $\lambda_{\text{max}} = 280 \text{ nm}$ $\lambda_{\text{S10\%}} = 243 \text{ nm} \dots 303 \text{ nm}$	3 = 180 pW/cm^2 ... 1,8 $\mu\text{W}/\text{cm}^2$
	C = UVC $\lambda_{\text{max}} = 275 \text{ nm}$ $\lambda_{\text{S10\%}} = 225 \text{ nm} \dots 287 \text{ nm}$	4 = 1,8 nW/cm^2 ... 18 $\mu\text{W}/\text{cm}^2$
	Blue $\lambda_{\text{max}} = 445 \text{ nm}$ $\lambda_{\text{S10\%}} = 390 \text{ nm} \dots 515 \text{ nm}$	5 = 18 nW/cm^2 ... 180 $\mu\text{W}/\text{cm}^2$
	Gap $\lambda_{\text{max}} = 445 \text{ nm}$ $\lambda_{\text{S10\%}} = 190 \text{ nm} \dots 570 \text{ nm}$	6 = 180 nW/cm^2 ... 1,8 mW/cm^2
	E = UV-Index spectral response according to CIE087	7 = 1,8 $\mu\text{W}/\text{cm}^2$... 18 mW/cm^2
		8 = 18 $\mu\text{W}/\text{cm}^2$... 180 mW/cm^2
		9 = 180 $\mu\text{W}/\text{cm}^2$... 1,8 W/cm^2
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		2 = 0 UVI ... 30 UVI

TOCON_B4

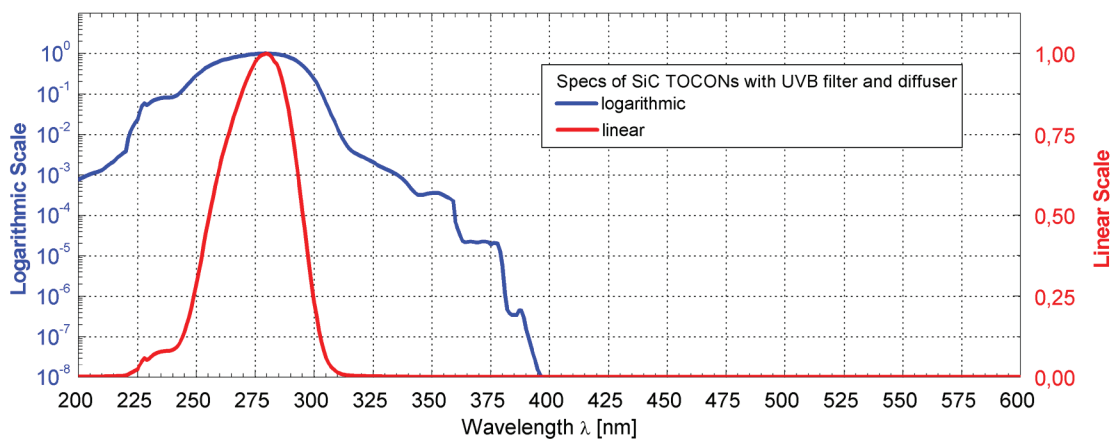
UVB+UVC SiC based UV photodetector with integrated amplifier



SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Typical Responsivity at Peak Wavelength	S_{max}	670	mV/ μ W/cm ²
Wavelength of max. Spectral Responsivity	λ_{max}	280	nm
Responsivity Range ($S=0,1*S_{max}$)	–	243 ... 303	nm
Visible Blindness ($S_{max}/S_{>405nm}$)	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	μ V
Temperature Coefficient at Peak	T _c	< -0,3	%/K
Current Consumption	I	150	μ A
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

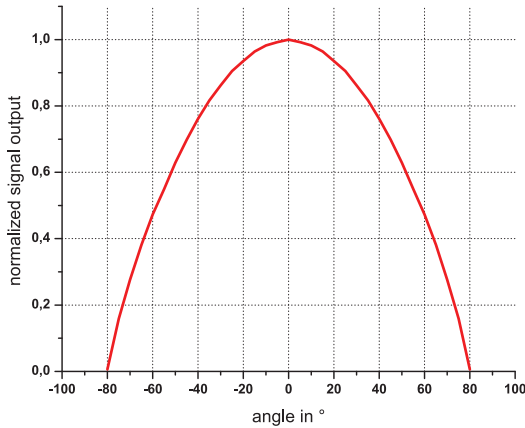


TOCON_B4

UVB+UVC SiC based UV photodetector with integrated amplifier



FIELD OF VIEW

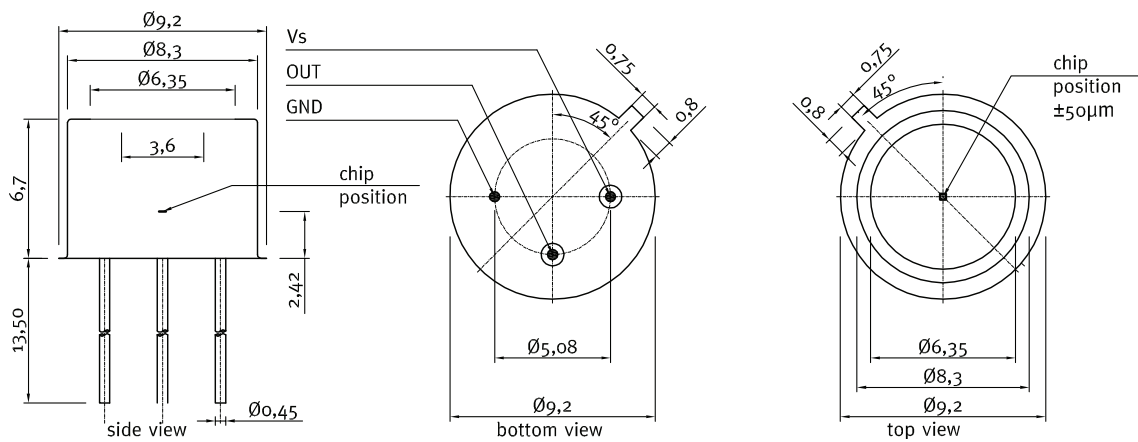


Measurement Setup:

- 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_B4

UVB+UVC SiC based UV 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.

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

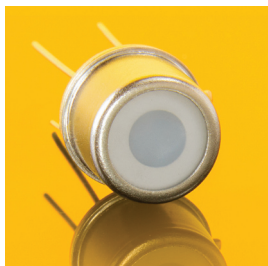
- Optional feature for all TOCON detectors without concentrator lens
- G1/4" thread, 10 bar water pressure proof
- Customized housings available
- Easy to mount and to connect
- Integrated sensor connector (Binder 5-Pin plug)
- Cable available

TOCON_B5

UVB+UVC SiC based UV photodetector with integrated amplifier



GENERAL FEATURES



Properties of the TOCON_B5

- UVB+UVC SiC based UV photodetector in TO5 housing with diffusor
- spectral response compliant to CIE087
- 0...5 V voltage output
- peak wavelength at 280 nm
- max. radiation (saturation limit) at peak is 75 $\mu\text{W}/\text{cm}^2$
- Applications: UVB 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_{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 pW/cm^2 level up to UV curing lamp control at W/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

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NOMENCLATURE

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

TOCON_B5

UVB+UVC SiC based UV photodetector with integrated amplifier



SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Typical Responsivity at Peak Wavelength	S_{max}	67	mV/ μ W/cm ²
Wavelength of max. Spectral Responsivity	λ_{max}	280	nm
Responsivity Range ($S=0,1*S_{max}$)	–	243 ... 303	nm
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	$> 10^{10}$	–

General Characteristics (T=25°C, V_{supply} =+5 V)

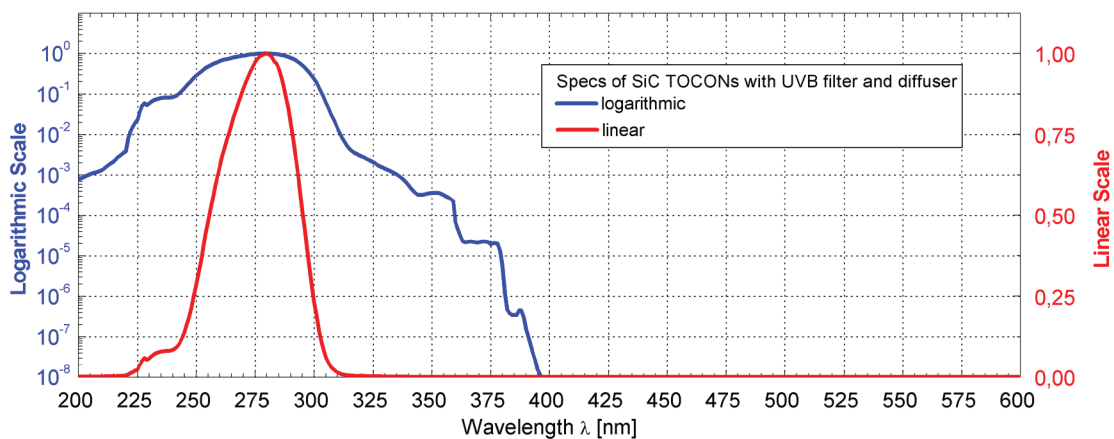
Supply Voltage	V_{Supply}	2,5 ... 5	V
Saturation Voltage	V_{Sat}	$V_{Supply} - 5\%$	V
Dark Offset Voltage	V_{Offset}	50	μ V
Temperature Coefficient at Peak	T_c	$< -0,3$	%/K
Current Consumption	I	150	μ A
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	t_{rise}	0,075	s

(other risetimes on request)

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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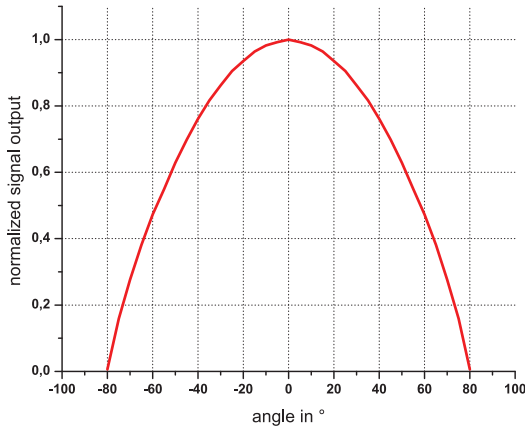
Rev. 3.1 Due to our strive for continuous improvement, specifications are subject to change within our PCN policy according to JESD46C.

TOCON_B5

UVB+UVC SiC based UV photodetector with integrated amplifier



FIELD OF VIEW

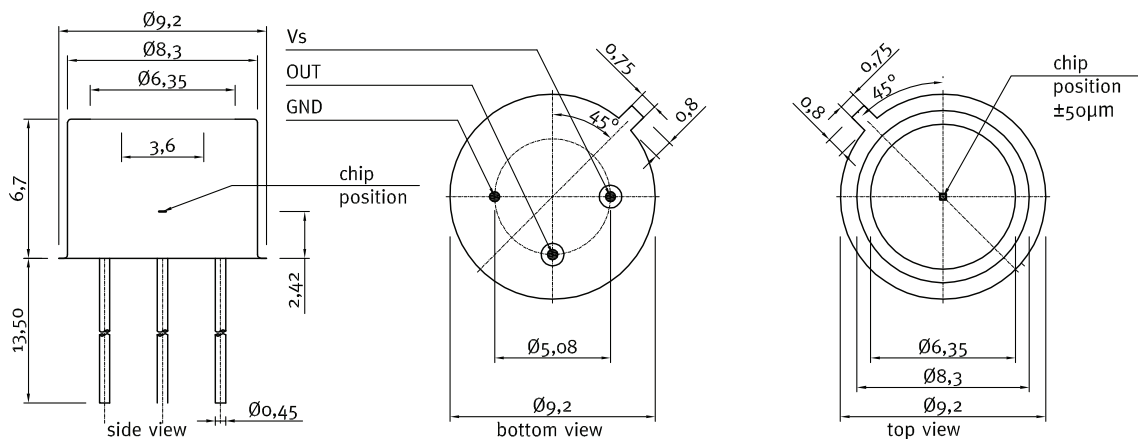


Measurement Setup:

- 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_B5

UVB+UVC SiC based UV photodetector with integrated amplifier

APPLICATION NOTE FOR TOCONs

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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

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- UV probes in small plastic housings with a TOCON inside
- Customized housings available
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Water pressure proof TOCON housing

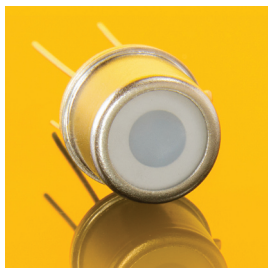
- Optional feature for all TOCON detectors without concentrator lens
- G1/4" thread, 10 bar water pressure proof
- Customized housings available
- Easy to mount and to connect
- Integrated sensor connector (Binder 5-Pin plug)
- Cable available

TOCON_B6

UVB+UVC SiC based UV photodetector with integrated amplifier



GENERAL FEATURES



Properties of the TOCON_B6

- UVB+UVC SiC based UV photodetector in TO5 housing with diffusor
- 0 ... 5 V voltage output
- peak wavelength at 280 nm
- max. radiation (saturation limit) at peak is 0,75 mW/cm²
- Applications: UVB 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_{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 pW/cm² level up to UV curing lamp control at W/cm² 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

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NOMENCLATURE

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

TOCON_B6

UVB+UVC SiC based UV photodetector with integrated amplifier



SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Typical Responsivity at Peak Wavelength	S_{max}	6,7	mV/ μ W/cm ²
Wavelength of max. Spectral Responsivity	λ_{max}	280	nm
Responsivity Range ($S=0,1*S_{max}$)	–	243 ... 303	nm
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	$> 10^{10}$	–

General Characteristics (T=25°C, V_{supply}=+5 V)

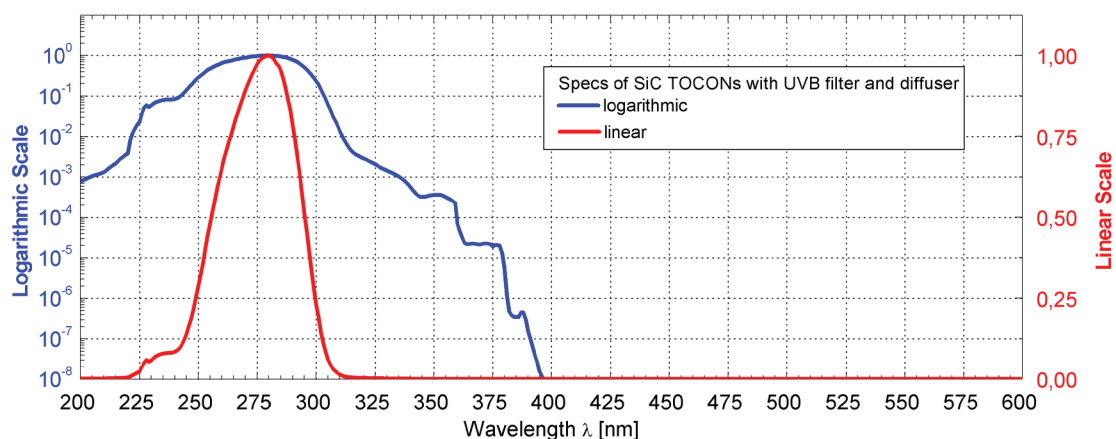
Supply Voltage	V _{Supply}	2,5 ... 5	V
Saturation Voltage	V _{Sat}	V _{Supply} - 5%	V
Dark Offset Voltage	V _{Offset}	50	μ V
Temperature Coefficient at Peak	T _c	< -0,3	%/K
Current Consumption	I	150	μ A
Bandwidth (-3 dB)	B	15	Hz
Risetime (10-90%)	t _{rise}	0,062	s

(other risetimes on request)

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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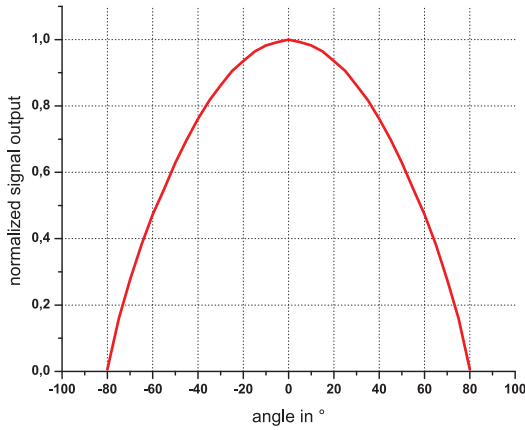
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UVB+UVC SiC based UV photodetector with integrated amplifier



FIELD OF VIEW

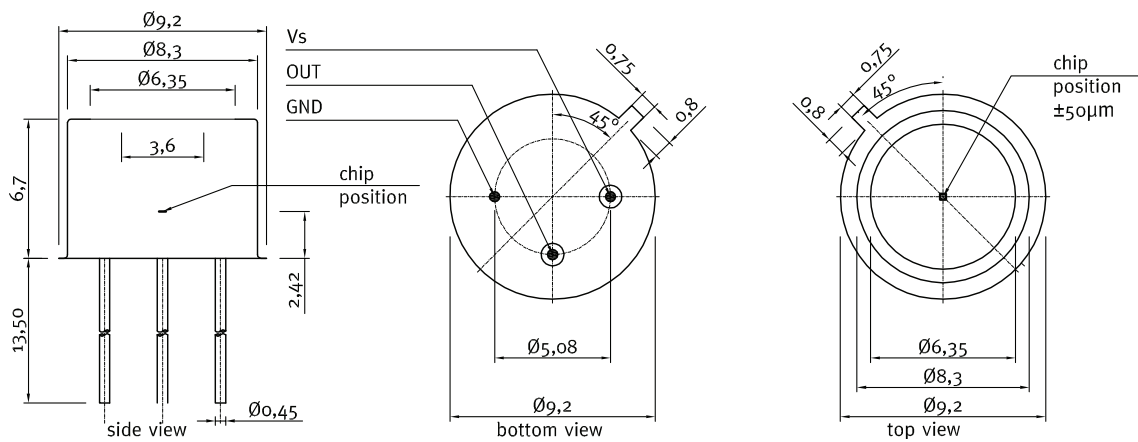


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DRAWING



TOCON_B6

UVB+UVC SiC based UV photodetector with integrated amplifier



▶ APPLICATION NOTE FOR TOCONs

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- 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