UV-Index Measurement

- **Photodiodes for measurement of the UV Index, various optics and detector chip areas**
- **UV sensors (TOCONs) with 0 to 5 V voltage output for measurement of the UV Index, various optics**
- **UV sensor probes for measurement of the UV Index, cosine field of view**
- **UV index reference radiometers**

sglux
The UV Experts

BostonElectronics

91 Boylston Street, Brookline, MA 02445
tel: (617)566-3821 fax: (617)731-0935
www.boselec.com boselec@boselec.com

UV-Index Measurements

Catalog

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PHOTODIODES AND SENSORS (MEASUREMENT MEAN ERROR < 1.3%)

SiC UV photodiodes

UV-Index photodiodes, different active chip areas and housings, with erythema filter

SiC TOCONs

UV-Index hybrid sensor in a TO5 housing with 0 - 5 V signal output, with erythema filter

TOCON_UVI

UV-Index hybrid sensor (TOCON) in PTFE housing (with G1/4" thread), EMC safe, with erythema filter

UV-Surface_UVI

top looking surface-mount UV sensor probe with cosine FOV, EMC safe, with erythema filter

UV-Cosine_UVI

waterproof UV-Index sensor probe with cosine FOV, EMC safe, for outdoor use, with erythema filter

UV-INDEX DISPLAYS AND NETWORK COMPUTERS

UV-Index reference radiometer

Reference radiometer for UV-Index measurements, incl. calibrated (PTB traceable) UVI sensor probe

Safester UVI

Smartphone (Android) based UV-Index radiometer with graphic display and calibrated UVI sensor probe

stand-alone UV Index Transmitter

Solar powered UVI transmitter measures per ISO 17166 and sends data via cellular network

SG01L–E5

high precision SiC based UV-Index photodiode without cosine correction

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GENERAL FEATURES

Properties of the SG01L–E5 UV photodiode

- ISO 17166 compliant UV-Index photodiode, uncertainty less than 5%
- Active Area A = 1.0 mm² , PTB reported high chip stability
- TO5 hermetically sealed metal housing, 1 isolated pin and 1 case pin
- 1 UVI (2.5 µW/cm²) = 2.5 nA. This item needs an appropriate amplifier.
- This item needs an appropriate cosine correction to meet the Iso 17166 requirements. Alternatively our product SG01L-E5D (including a diffusor) can be applied.

About the material Silicon Carbide (SiC)

SiC provides the unique property of extreme radiation hardness, near-perfect visible blindness, low dark current, high speed and low noise. These features make SiC the best available material for visible blind semiconductor UV detectors. The SiC detectors can be permanently operated at up to 170°C (338°F). The temperature coefficient of signal (responsivity) is also low, < 0.1%/K. Because of the low noise (dark current in the fA range), very low UV radiation intensities can be measured reliably.

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 response). 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

SG01

S, M, D, L, XL	–	**nothing, A, B, C or E**	**18, 18ISO90, 18S, 5, 5ISO90**	**nothing, Lens, MEGA, GIGA**

Chip area	Spectral response	Housing	Special
S 0.06 mm²	**nothing = broadband** λ_{max} = 280 nm $\lambda_{S10\%}$ = 221 nm ... 358 nm	**18** 2-pin TO18 housing, h = 5.2 mm, 1 pin isolated, 1 pin grounded	**Lens** with concentrating lens, TO5 only
M 0.20 mm²	**A = UVA** λ_{max} = 331 nm $\lambda_{S10\%}$ = 309 nm ... 367 nm	**18ISO90** 3-pin TO18 housing, h = 5.2 mm, 2 pins isolated, 1 pin grounded	
D 0.50 mm²	**B = UVB** λ_{max} = 280 nm $\lambda_{S10\%}$ = 231 nm ... 309 nm	**18S** 2-pin TO18 housing, h = 3.7 mm, 1 pin isolated, 1 pin grounded	**MEGA** with attenuator up to 0.5 W/cm²
L 1.00 mm²	**C = UVC** λ_{max} = 275 nm $\lambda_{S10\%}$ = 225 nm ... 287 nm	**5** 2-pin TO5 housing, h = 4.3 mm for broadband; h = 6.7 mm for filtered UVA, UVB, UVC, UVI	
XL 7.60 mm²	**E = UV-Index** spectral response according to ISO17166	**5ISO90** 3-pin TO5 housing, h = 4.2 mm, 2 pins isolated, 1 pin grounded	**GIGA** with attenuator up to 7 W/cm²

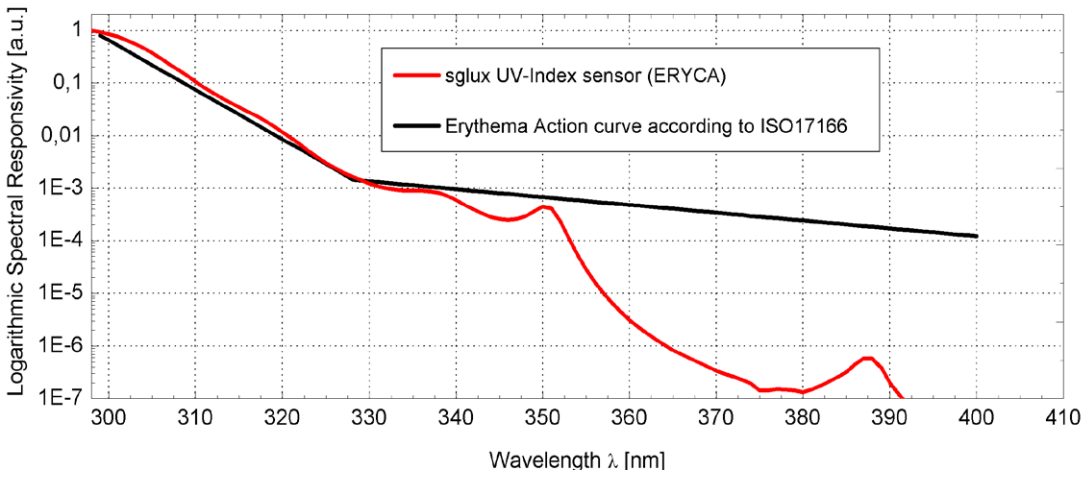
SG01L–E5

high precision SiC based UV-Index photodiode without cosine correction

SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Approx. Responsivity *(UNIT IS NOT CALIBRATED)*	S_{max}	0.10	AW^{-1}
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	$> 10^{10}$	–
General Characteristics (T=25°C)			
Active Area	A	1.0	mm^2
Dark Current (1V reverse bias)	I_d	3.3	fA
Capacitance	C	250	pF
Short Circuit (1 UVI)	I_o	2.5	nA
Temperature Coefficient	T_c	< 0.1	%/K
Maximum Ratings			
Operating Temperature	T_{opt}	–55 ... +170	°C
Storage Temperature	T_{stor}	–55 ... +170	°C
Soldering Temperature (3s)	T_{sold}	260	°C
Reverse Voltage	V_{Rmax}	20	V

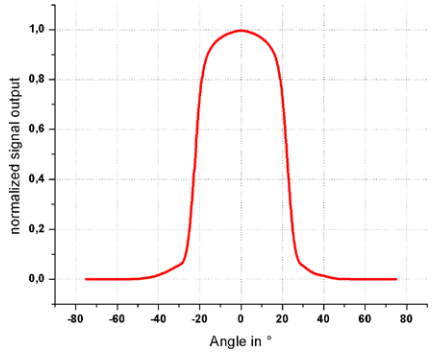
NORMALIZED SPECTRAL RESPONSIVITY & ERYTHEMA ACTION CURVE



SG01L–E5

high precision SiC based UV-Index photodiode without cosine correction

FIELD OF VIEW

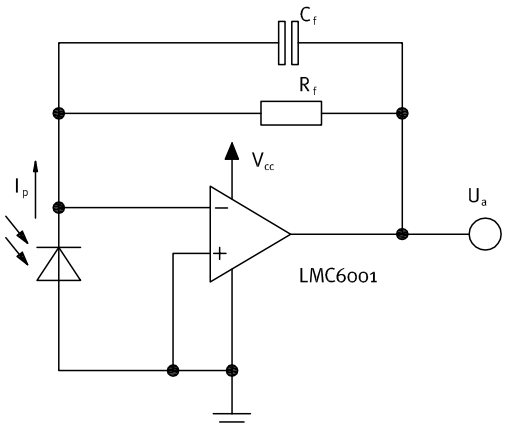


Measurement Setup

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 photodiode window

TYPICAL CIRCUIT



Calculations and Limits:

$U_a = I_p \times R_f = 0 \ldots \sim V_{cc}$

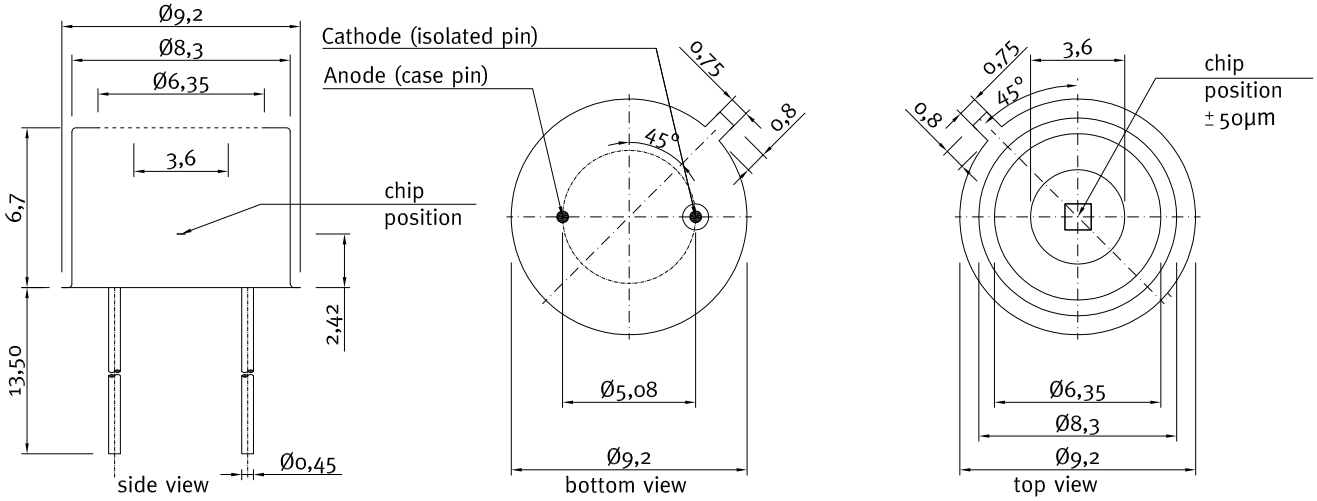
$U_{a,max}$ depends on load and amplifier type

R_f = 10kΩ ... ~ 10GΩ, $C_f \geq 3pF$
Recommendation: $R_f \times C_f \geq 10^{-3}s$
$I_{p,max} = U_{a,max} \div R_f$

Bandwidth = DC ... $\frac{1}{2\pi \times R_f \times C_f}$

Example:
I_p = 20nA, R_f =100MΩ, C_f =100 pF
$U_a = 20 \times 10^{-9}A \times 100 \times 10^{6}\Omega = 2V$

DRAWINGS



SG01L–E5

high precision SiC based UV-Index photodiode without cosine correction

APPLICATION NOTE FOR PHOTODIODES

For correct reading of the photodiode the current (and NOT the voltage) must be analyzed. This requires a short circuiting of the photodiode. Usual approaches are using a **Picoamperemeter** or a **transimpedance amplifier** circuit as shown on page 3.

UPGRADE TO A TOCON OR A PROBE FOR UV INDEX MEASUREMENTS

TOCONs = UV sensors with integrated amplifier

- SiC based UV hybrid detector with amplifier (0–5V output),
- No additional amplifier needed, direct connection to controller, voltmeter, etc.
- With erythema filter, measures intensities up to 30 UVI

TOCON_UVI = miniature sensor probe

- UV-Index hybrid sensor (TOCON) in a PTFE housing (with G1/4" thread)
- EMC safe, with erythema filter
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and connect

UV-Cosine_UVI sensor probe (ERYCA)

- Special water proof and dirt-repellent housing for outdoor measurements
- Housing made of PTFE with cosine FOV, with erythema filter
- Different electronic outputs configurable (voltage, current, USB, CAN)
- Good EMC safety

CALIBRATION SERVICE

Before using this photodiode a calibration is needed. Our ISO9001:2015 - certified calibration laboratory offers a PTB traceable calibration of the photodiode. Our calibration laboratory is traceable to PTB (The National Metrology Institute of Germany) and works according to guideline DAkkS-DKD-MB-3 and CIE 220:2016.

SG01L–E5D

high precision SiC based UV-Index photodiode with cosine correction

sglux The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the SG01L–E5D UV photodiode

- ISO 17166 compliant UV-Index photodiode, uncertainty less than 5%
- Active Area A = 1.0 mm² , PTB reported high chip stability
- TO5 hermetically sealed metal housing, 1 isolated pin and 1 case pin
- 1 UVI (2.5 µW/cm²) = 2 nA. This item needs an appropriate amplifier.

About the material Silicon Carbide (SiC)

SiC provides the unique property of extreme radiation hardness, near-perfect visible blindness, low dark current, high speed and low noise. These features make SiC the best available material for visible blind semiconductor UV detectors. The SiC detectors can be permanently operated at up to 170°C (338°F). The temperature coefficient of signal (responsivity) is also low, < 0.1%/K. Because of the low noise (dark current in the fA range), very low UV radiation intensities can be measured reliably. Please note that this device needs an appropriate amplifier (see typical circuit on page 3).

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 response). 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

SG01

S, M, D, L, XL	–	**nothing, A, B, C or E**	**18, 18ISO90, 18S, 5, 5ISO90**	**nothing, Lens, MEGA, GIGA**
Chip area		**Spectral response**	**Housing**	**Special**
S 0.06 mm²		**nothing = broadband** λ_{max} = 280 nm $\lambda_{S10\%}$ = 221 nm ... 358 nm	**18** 2-pin TO18 housing, h = 5.2 mm, 1 pin isolated, 1 pin grounded	**Lens** with concentrating lens, TO5 only
M 0.20 mm²		**A = UVA** λ_{max} = 331 nm $\lambda_{S10\%}$ = 309 nm ... 367 nm	**18ISO90** 3-pin TO18 housing, h = 5.2 mm, 2 pins isolated, 1 pin grounded	
D 0.50 mm²		**B = UVB** λ_{max} = 280 nm $\lambda_{S10\%}$ = 231 nm ... 309 nm	**18S** 2-pin TO18 housing, h = 3.7 mm, 1 pin isolated, 1 pin grounded	**MEGA** with attenuator up to 0.5 W/cm²
L 1.00 mm²		**C = UVC** λ_{max} = 275 nm $\lambda_{S10\%}$ = 225 nm ... 287 nm	**5** 2-pin TO5 housing, h = 4.3 mm for broadband; h = 6.7 mm for filtered UVA, UVB, UVC, UVI	**GIGA** with attenuator up to 7 W/cm²
XL 7.60 mm²		**E = UV-Index** spectral response according to ISO17166	**5ISO90** 3-pin TO5 housing, h = 4.2 mm, 2 pins isolated, 1 pin grounded	

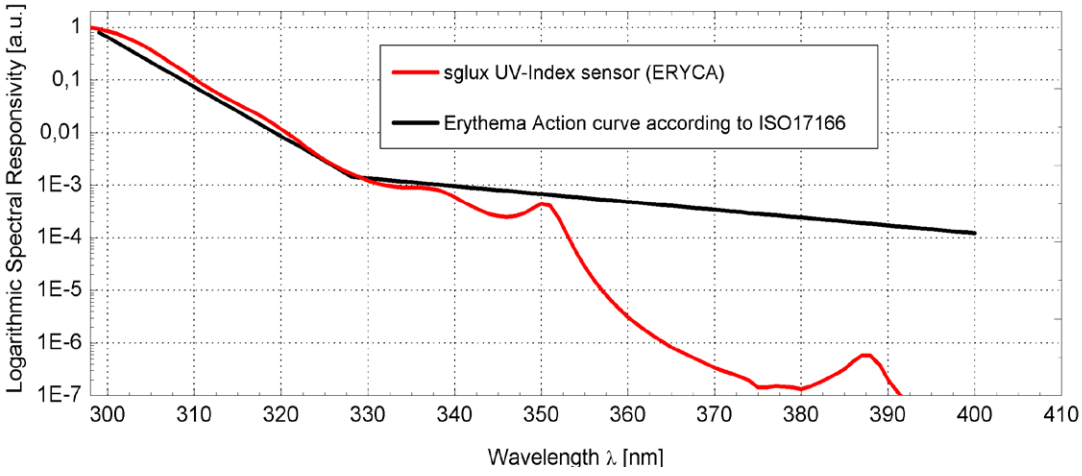
SG01L–E5D

high precision SiC based UV-Index photodiode with cosine correction

SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Approx. Responsivity *(UNIT IS NOT CALIBRATED)*	S_{max}	0.08	AW^{-1}
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	$> 10^{10}$	–
General Characteristics (T=25°C)			
Active Area	A	1.0	mm^2
Dark Current (1V reverse bias)	I_d	3.3	fA
Capacitance	C	250	pF
Short Circuit (1 UVI)	I_o	2	nA
Temperature Coefficient	T_c	< 0.1	%/K
Maximum Ratings			
Operating Temperature	T_{opt}	–55 ... +170	°C
Storage Temperature	T_{stor}	–55 ... +170	°C
Soldering Temperature (3s)	T_{sold}	260	°C
Reverse Voltage	V_{Rmax}	20	V

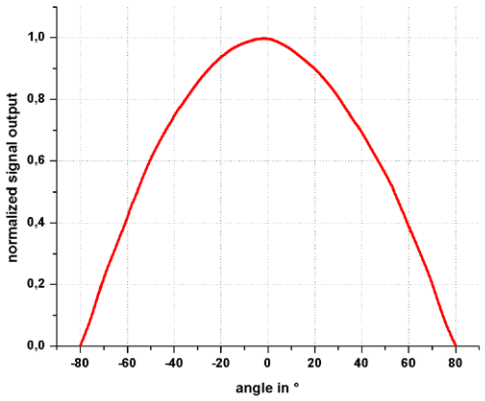
NORMALIZED SPECTRAL RESPONSIVITY & ERYTHEMA ACTION CURVE



SG01L–E5D

high precision SiC based UV-Index photodiode with cosine correction

FIELD OF VIEW

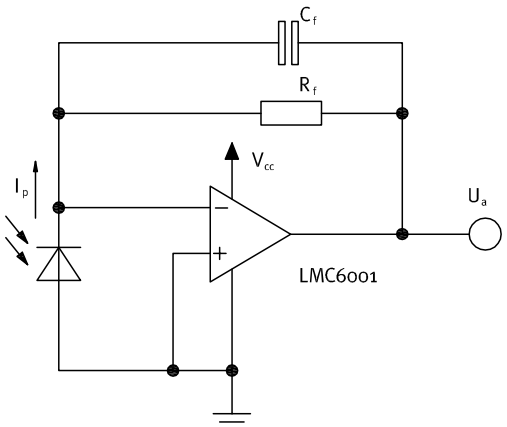


Measurement Setup

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 photodiode window

TYPICAL CIRCUIT



Calculations and Limits:

$U_a = I_p \times R_f = 0 \ldots \sim V_{cc}$

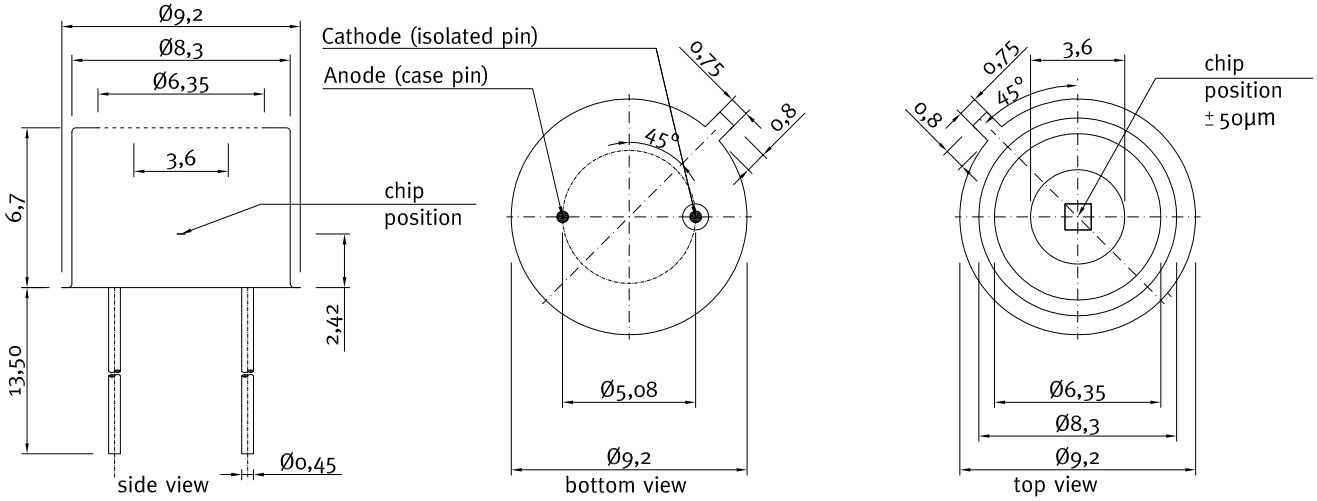
$U_{a,max}$ depends on load and amplifier type

R_f = 10kΩ ... ~ 10GΩ, $C_f \geq 3pF$
Recommendation: $R_f \times C_f \geq 10^{-3}s$
$I_{p,max} = U_{a,max} \div R_f$

Bandwidth = DC ... $\frac{1}{2\pi \times R_f \times C_f}$

Example:
I_p = 20nA, R_f =100MΩ, C_f =100 pF
$U_a = 20 \times 10^{-9}A \times 100 \times 10^{6}\Omega = 2V$

DRAWINGS



SG01L–E5D

high precision SiC based UV-Index photodiode with cosine correction

APPLICATION NOTE FOR PHOTODIODES

For correct reading of the photodiode the current (and NOT the voltage) must be analyzed. This requires a short circuiting of the photodiode. Usual approaches are using a **Picoamperemeter** or a **transimpedance amplifier** circuit as shown on page 3.

UPGRADE TO A TOCON OR A PROBE FOR UV INDEX MEASUREMENTS

TOCONs = UV sensors with integrated amplifier

- SiC based UV hybrid detector with amplifier (0–5V output),
- No additional amplifier needed, direct connection to controller, voltmeter, etc.
- With erythema filter, measures intensities up to 30 UVI

TOCON_UVI = miniature sensor probe

- UV-Index hybrid sensor (TOCON) in a PTFE housing (with G1/4” thread)
- EMC safe, with erythema filter
- Integrated sensor connector (Binder 4-Pin plug) with 2m connector cable
- Easy to mount and connect

UV-Cosine_UVI sensor probe (ERYCA)

- Special water proof and dirt-repellent housing for outdoor measurements
- Housing made of PTFE with cosine FOV, with erythema filter
- Different electronic outputs configurable (voltage, current, USB, CAN)
- Good EMC safety

CALIBRATION SERVICE

Before using this photodiode a calibration is needed. Our ISO9001:2015 - certified calibration laboratory offers a PTB traceable calibration of the photodiode. Our calibration laboratory is traceable to PTB (The National Metrology Institute of Germany) and works according to guideline DAkkS-DKD-MB-3 and CIE 220:2016.

TOCON_E2

SiC based UV-Index photodetector with integrated amplifier

sglux The UV Experts

Boston Electronics

GENERAL FEATURES

Properties of the TOCON_E2

- SiC based UV-Index photodetector in TO5 housing with diffusor
- spectral response compliant to 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 less than 5 %

What is a TOCON?

A TOCON is a 5 Volt powered UV photodetector with integrated amplifier converting UV radiation into a 0 ... 5 V 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 λ_{max} = 290 nm $\lambda_{S10\%}$ = 227 nm ... 360 nm	**1** = .,8 pW/cm² ... 18 nW/cm²
	A = UVA λ_{max} = 331 nm $\lambda_{S10\%}$ = 309 nm ... 367 nm	**2** = 18 pW/cm² ... 180 nW/cm²
	B = UVB λ_{max} = 280 nm $\lambda_{S10\%}$ = 243 nm ... 303 nm	**3** = 180 pW/cm² ... 1.8 µW/cm²
	C = UVC λ_{max} = 275 nm $\lambda_{S10\%}$ = 225 nm ... 287 nm	**4** = 1.8 nW/cm² ... 18 µW/cm²
	Blue = blue light λ_{max} = 445 nm $\lambda_{S10\%}$ = 390 nm ... 515 nm	**5** = 18 nW/cm² ... 180 µW/cm²
	GaP = UV + VIS λ_{max} = 445 nm $\lambda_{S10\%}$ = 190 nm ... 570 nm	**6** = 180 nW/cm² ... 1.8 mW/cm²
		7 = 1.8 µW/cm² ... 18 mW/cm²
		8 = 18 µW/cm² ... 180 mW/cm²
		9 = 180 µW/cm² ... 1.8 W/cm²
		10 = 1.8 mW/cm² ... 18 W/cm²
	E = UV-Index spectral response according to ISO 17166	**2** = measurement range UVI up to 30

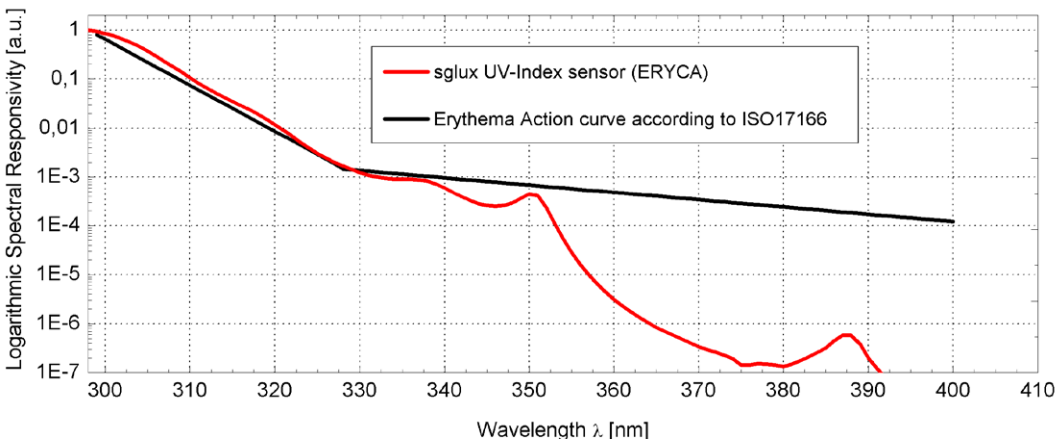
TOCON_E2

SiC based UV-Index photodetector with integrated amplifier

SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Approx. Sensitivity *(UNIT IS NOT CALIBRATED)*	S_{max}	170	mV/UVI
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	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
(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

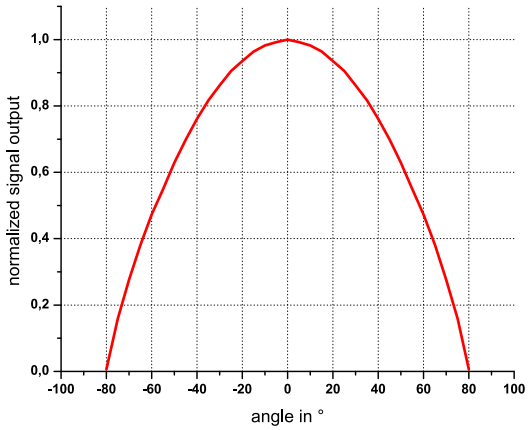
NORMALIZED SPECTRAL RESPONSIVITY



TOCON_E2

SiC based UV-Index photodetector with integrated amplifier

FIELD OF VIEW

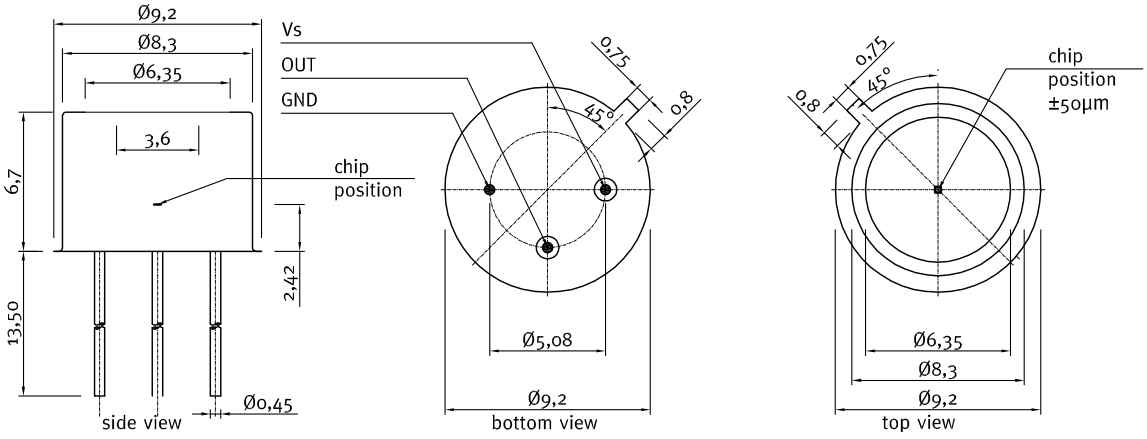


Measurement Setup:

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



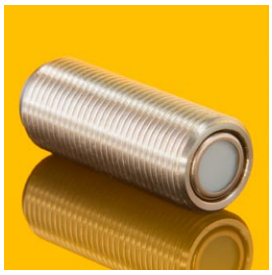
TOCON_E2

SiC based UV-Index photodetector with integrated amplifier

APPLICATION NOTE FOR TOCONs

The TOCONs need a supply voltage of V_{supply} = 2.5 ... 5 V_{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 2 m 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 2 m 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_UVI

UV-Index sensor with G1/4“ Thread and Plug Connector

GENERAL FEATURES

Properties of the TOCON_UVI

This UV sensor is designed for very high accuracy UV-Index measurements. The measurement uncertainty of this sensor is 5% only. The spectral response curve and the field of view (cosine type) are in near perfect accordance with the requirements defined in the ISO 17166 standard. The sensor contains integrated electronics and is shielded against electromagnetic interference. The sensor housing is made of Teflon (PTFE), water pressure proof up to 10 bar and configured with a G1/4” thread. The supply voltage is 7 to 24 V (low power option 2.5 to 5 V available on request) and the signal output is 0 to 5 V. This sensor is delivered with integrated sensor connector (Binder 5-Pin plug) and 2 m cable. The UV sensor is available with a PTB traceable calibration.

The PTFE housing reduces the signal output by 90 - 99 %.

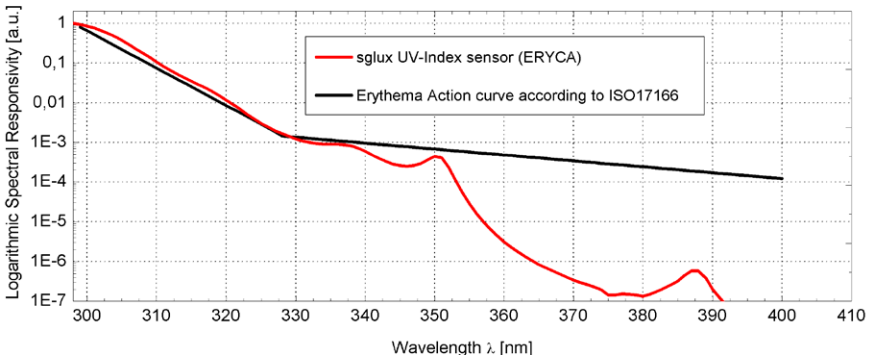
SPECIFICATIONS

Parameter	Symbol	Value	Unit
Spectral Characteristics			
Approx. Sensitivity *(UNIT IS NOT CALIBRATED)*	S_{max}	170	mV/UVI
Visible Blindness ($S_{max}/S_{>405nm}$)	VB	> 10^{10}	–
General Characteristics (T=25°C, V_{supply}=+7 V)			
Supply Voltage	V_{Supply}	7 to 24	V
Max. Output Voltage (non depending on V_{supply})	V_{Out}	4.75	V
Temperature Coefficient at Peak for SiC	T_c	-0.3	%/K
Current Consumption	I	150	µA
Maximum Ratings			
Operating Temperature	T_{opt}	–25 to +85	°C
Storage Temperature	T_{stor}	–40 to +100	°C

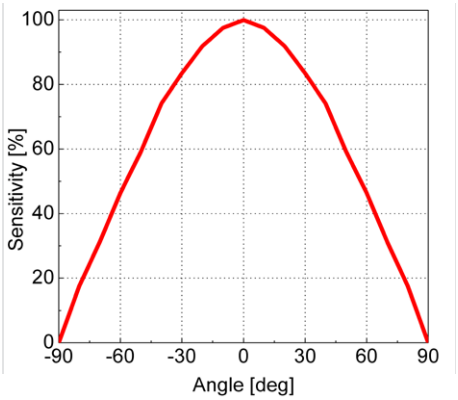
TOCON_UVI

UV-Index sensor with G1/4“ Thread and Plug Connector

NORMALIZED SPECTRAL RESPONSIVITY



FIELD OF VIEW

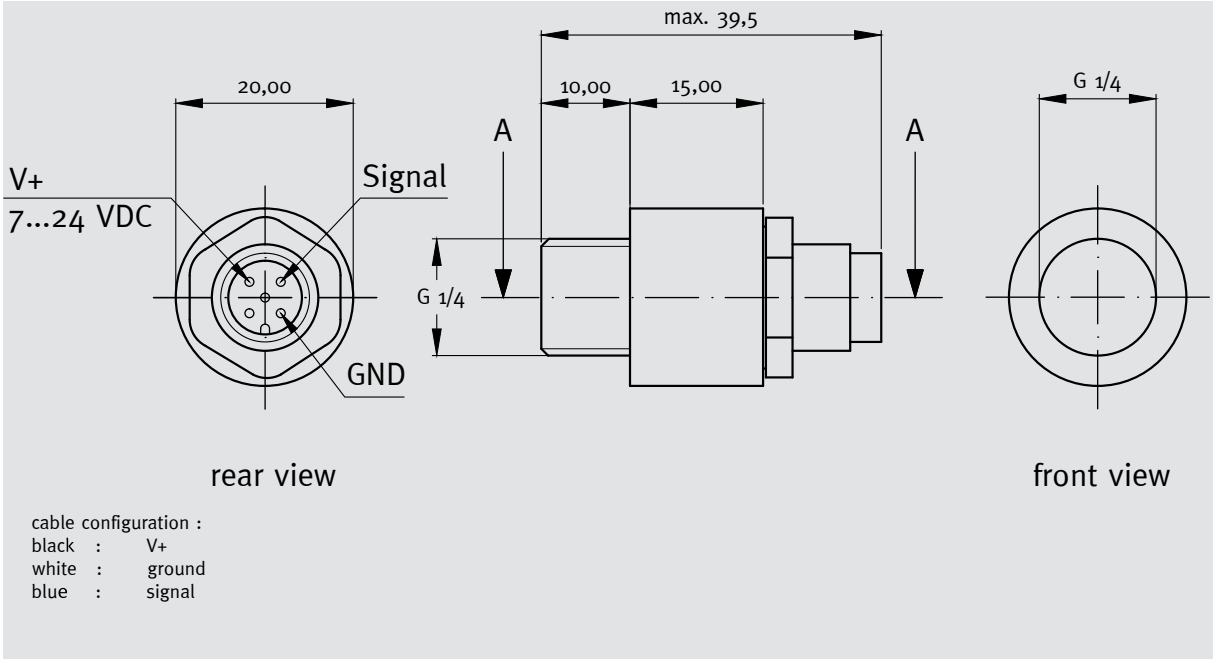


Measurement Setup:

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



cable configuration :
black : V+
white : ground
blue : signal

UV Sensor "UV-Surface_UVI"

Top looking surface-mount UV sensor for UV-Index measurements

GENERAL FEATURES

Properties of this sensor

This UV sensor is designed for very high accuracy UV-Index measurements. The measurement uncertainty of this sensor is 5% only. The spectral response curve and the field of view (cosine type) are in near perfect accordance with the requirements defined in the ISO 17166 standard. The sensor contains integrated electronics and is shielded against electromagnetic interference. The sensor can be configured as a voltage of 0 to 5 V, a current of 4 to 20 mA, CAN bus interface or USB. The UV sensor is available with a PTB traceable calibration.

Page 3 of this datasheet allows to enter the signal output requirements of the needed sensor. After selection you may forward this document to factory or agent, or alternatively use the sensor probe online configurator at www.sglux.com. Please contact us for assistance.

SPECIFICATIONS

Fixed Specifications **Parameter**	**Value**
Dimensions	please refer to drawing on page 2
Weight	56 g
Spectral Sensitivity	UV-Index (erythema curve) according to ISO 17166, measurement uncertainty 5 %
Temperature Coefficient (30 to 65°C)	0.05 to 0.075%/K
Operating Temperature	-20 to +80°C
Storage Temperature	-40 to +80°C
IP Protection Class	< 80%, non condensing

Configurable Specifications **Parameter**	**Value** (page 3 shows more detailed information)
Signal Output	0 to 5 V or 4 to 20 mA or CAN bus signal (125kbit/s) or USB
Current Consumption	for 0 to 5 V = < 30 mA / for 4 to 20 mA = signal out / digital = < 17 mA
Connections	cable = 2 m cable with tinned leads on free end CAN = 2 m cable with 8 pin male connector (to converter or else) USB = with 1.5 m cable with USB-A plug
Measuring Range	up to UVI 30

UV Sensor "UV-Surface_UVI"

Top looking surface-mount UV sensor for UV-Index measurements

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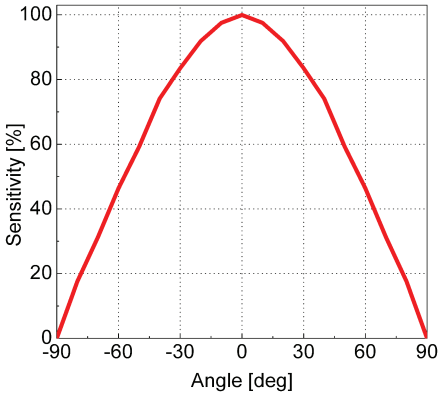
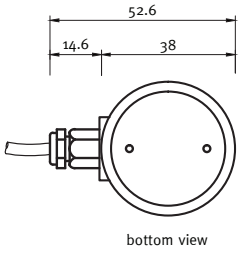
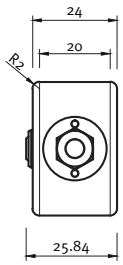
FIELD OF VIEW

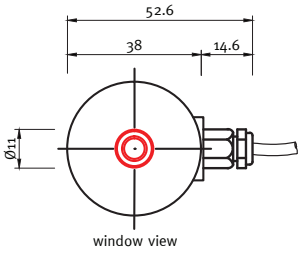


DRAWING

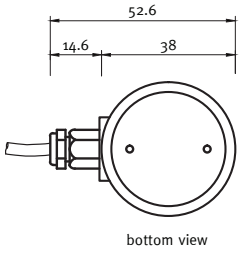
ANALOG CABLE

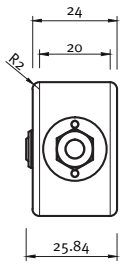


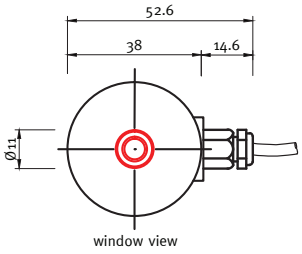


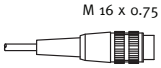


DIGITAL









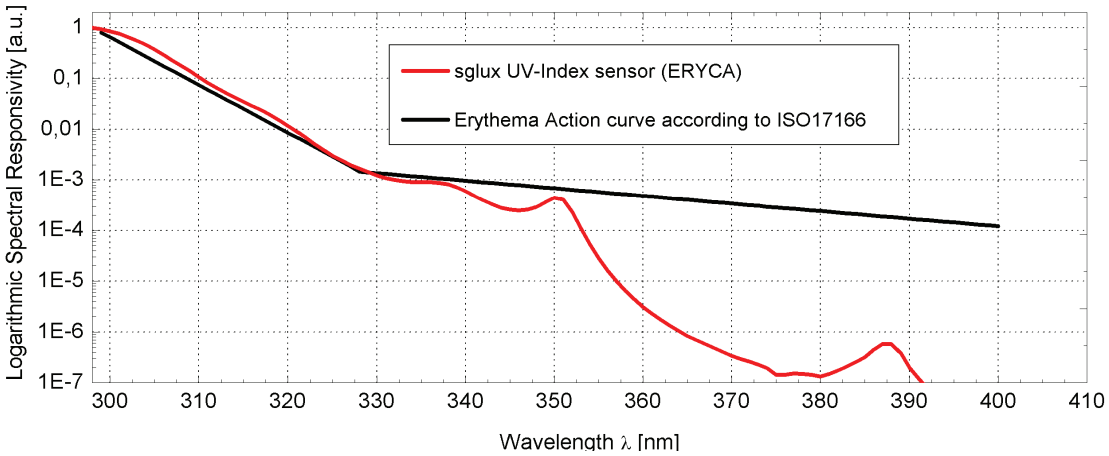
KFV 80 plug

pin layout

UV Sensor "UV-Surface_UVI"

Requirements questionaire sheet

STEP 1 ⇢ Normalized Spectral Responsivity



STEP 2 ⇢ Signal Output Type Selection

Please tick your selection. The pin configuration is shown in drawings on page 2.

Output Type	Description	Connection = "cable"
☐ 0 to 5 V	0 to 5 V voltage output proportional to radiation input. Supply voltage is 7 to 24VDC, current consumption is < 30 mA.	☐ V_- = brown, V_+ = white, V_{out} = green, shield = black
☐ 4 to 20 mA	4 to 20 mA current loop for PLC controllers. The current is proportional to the radiation, supply voltage is 24VDC.	☐ V_- = brown, V_+ = white, shield = black
☐ CAN bus signal	VSCP protocol according to the following specifications: http://download.sglux.de/probes-digital/digiprobe-can/	Pins 1 & 7 = CAN low Pins 3 & 8 = CAN high Pins 2 & 4 & 5 = GND
☐ USB	The signal is transmitted via standard USB-A plug to a computer. Software and 1.5 m cable are included. Other cable lengths on request. Programming guide available: http://download.sglux.de/probes-digital/digiprobe-usb/digiprobe_USB_Programming_Guide.pdf	

UV Sensor "UV-Cosine_UVI"

Waterproof cosine corrected UV sensor for UV-Index measurements

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GENERAL FEATURES

Properties of this sensor

This UV sensor is designed for very high accuracy UV-Index measurements. The measurement uncertainty of this sensor is 5% only. The spectral response curve and the field of view (cosine type) are in near perfect accordance with the requirements defined in the ISO 17166 standard. The housing is made of PTFE. It is waterproof and stain repellent with a male threaded body (M20x1.5). The sensor contains integrated electronics and is shielded against electromagnetic interference. The sensor can be configured as a voltage of 0 to 5 V, a current of 4 to 20 mA, CAN bus interface or USB. The UV sensor is available with a PTB traceable calibration.

Page 3 of this datasheet allows to enter the signal output requirements of the needed sensor. After selection you may forward this document to factory or agent, or alternatively use the sensor probe online configurator at www.sglux.com. Please contact us for assistance.

SPECIFICATIONS

Fixed Specifications **Parameter**	**Value**
Dimensions	please refer to drawing on page 2
Weight	27 g
Spectral Sensitivity	UV-Index (erythema curve) according to ISO 17166, measurement uncertainty 5 %
Temperature Coefficient (30 to 65°C)	0.05 to 0.075%/K
Operating Temperature	-25 to +80°C
Storage Temperature	-40 to +80°C
IP Protection Class	IP68 at window side, IP65 at plug side, on request IP68 for submerge applications

Configurable Specifications **Parameter**	**Value** (page 3 shows more detailed information)
Signal Output	0 to 5 V or 4 to 20 mA or CAN bus signal (125kbit/s) or USB
Current Consumption	for 0 to 5 V = < 30 mA / for 4 to 20 mA = signal out / digital = < 17 mA
Connections	cable = 2 m cable with tinned leads on free end plug = 5 pin male connector with 2 m cable with tinned leads on free end CAN = 2 m cable with 8 pin male connector (to converter or else) USB = with 1.5 m cable with USB-A plug Other cable lenghts on request.
Measuring Range	up to UVI 30

UV Sensor "UV-Cosine_UVI"

Waterproof cosine corrected UV sensor for UV-Index measurements

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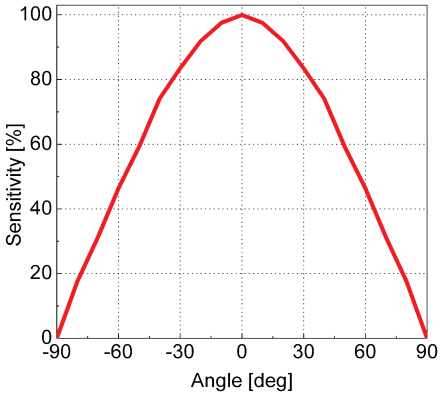
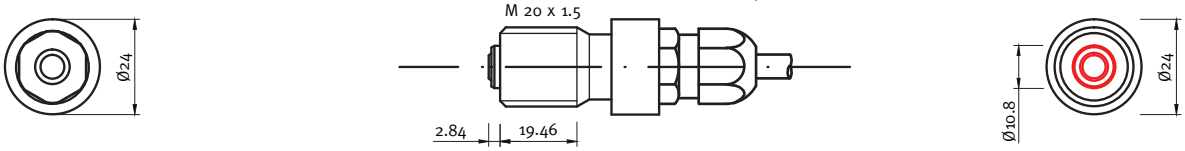
FIELD OF VIEW

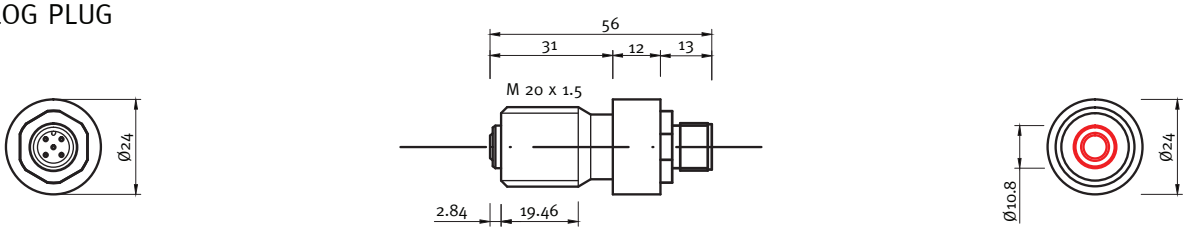


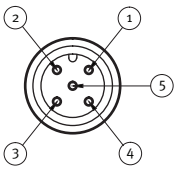
DRAWING

ANALOG CABLE

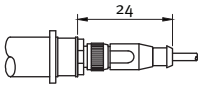


ANALOG PLUG



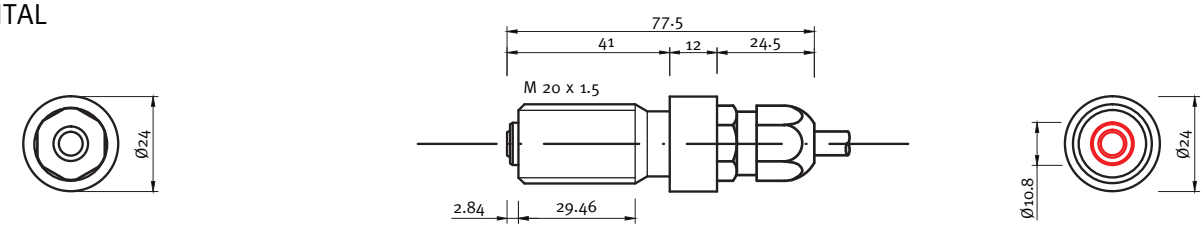


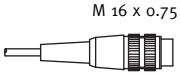
connector view
5 pin M 12 x 1
RSFM5



plug connection
5 pin M 12 x 1
e.g. Lumberg PRSFM 5

DIGITAL





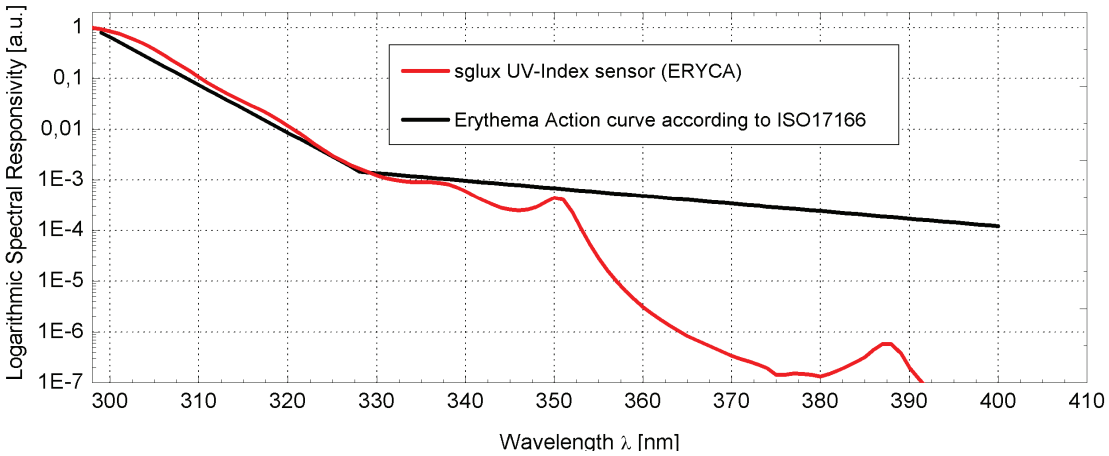
KFV 80 plug

pin layout

UV Sensor "UV-Cosine_UVI"

Requirements questionaire sheet

STEP 1 ⇢ Normalized Spectral Responsivity



STEP 2 ⇢ Signal Output Type Selection

Please tick your selection. The pin configuration is shown in drawings on page 2.

Output Type	Description	Connection = "cable"	Connection = "male plug"
☐ 0 to 5 V	0 to 5 V voltage output proportional to radiation input. Supply voltage is 7 to 24VDC, current consumption is < 30 mA.	☐ V_- = brown, V_+ = white, V_{out} = green, shield = black	☐ V_- = 1, V_+ = 4, V_{out} = 3
☐ 4 to 20 mA	4 to 20 mA current loop for PLC controllers. The current is proportional to the radiation, supply voltage is 24VDC.	☐ V_- = brown, V_+ = white, shield = black	☐ V_- = 1, V_+ = 4
☐ CAN bus signal	VSCP protocol according to the following specifications: http://download.sglux.de/probes-digital/digiprobe-can/	Pins 1 & 7 = CAN low Pins 3 & 8 = CAN high Pins 2 & 4 & 5 = GND	
☐ USB	The signal is transmitted via standard USB-A plug to a computer. Software and 1.5 m cable are included. Other cable lengths on request. Programming guide available: http://download.sglux.de/probes-digital/digiprobe-usb/digiprobe_USB_Programming_Guide.pdf		

STAND-ALONE UV INDEX TRANSMITTER

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- measurement and calculation of the UV Index
- data transmission via cellular radio to a server using the MQTT protocol
- solar powered with integrated battery
- various approaches to display the UV Index measured by the unit

PRODUCT DESCRIPTION

The sglux solar cell powered stand-alone UV Index transmitter measures the UV Index according to the standard ISO17166:2019 and the WHO requirements. The UV Index quantifies the risk of sunburn at a given solar UV exposure spectrum. The unit transmits the current UV Index via cellular radio using the MQTT protocol to a server where the obtained values are stored. By default this server is hosted by sglux. Alternatively the user's server can be used. The unit does not require any wiring to the building where it is placed. It can also be used where lightning protection requirements exclude wires on the roof of a building. The unit bases on the UV sensor "sglux ERYCA" that is featured by a spectral responsivity very close to the erythema action curve (picture 1). Set-up and use of the UV Index transmitter does not require specific metrological or computer knowledge.

SPECIFICATIONS

sensor	SiC based UVI sensor "sglux ERYCA" with interference filter according to ISO17166 and WHO requirements, spectral responsivity close to the erythema action curve as defined by ISO17166, cosine field of view
measurement uncertainty	+-10%
measurement range	0.00 ..... 1.00 W/m² biological effective UV irradiance, equals to UVI 0 ... 40
calibration	versus the sun, PTB traceable
resolution	2 mW/m², equals to UVI 0.08
temperature range	-30°C ... 70°C
power supply	10 W solar cell with battery reserve, 7 days operation time under cloudy conditions
transmitted values	biological effective UV irradiance in W/m², battery voltage, charging current, battery status, internal temperature. Additional optional values (e.g. external temperature, humidity) can be measured and transmitted.
wireless connection	via cellular radio. A SIM card with a suitable data plan is required.
weight	3.4 kg
dimensions	see drawing

STAND-ALONE UV INDEX TRANSMITTER

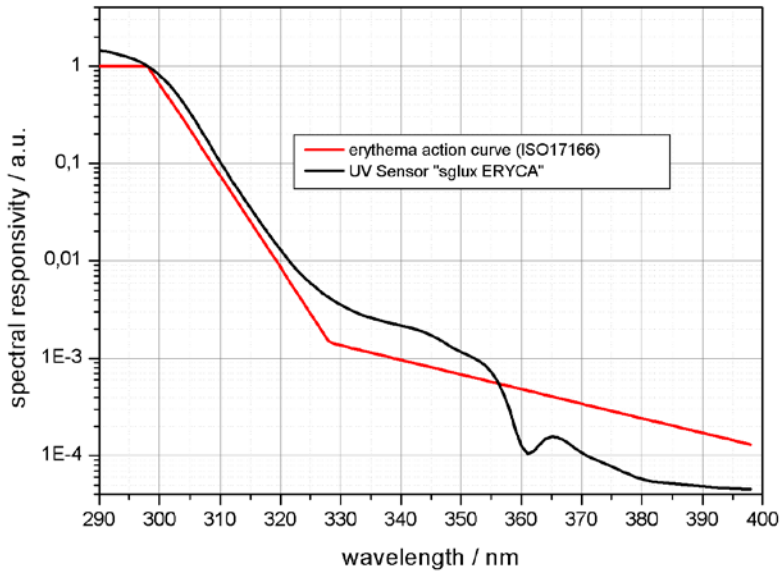

figure 1 spectral responsivity of the sglux ERYCA sensor compared with the erythema action curve according to ISO17166:2019

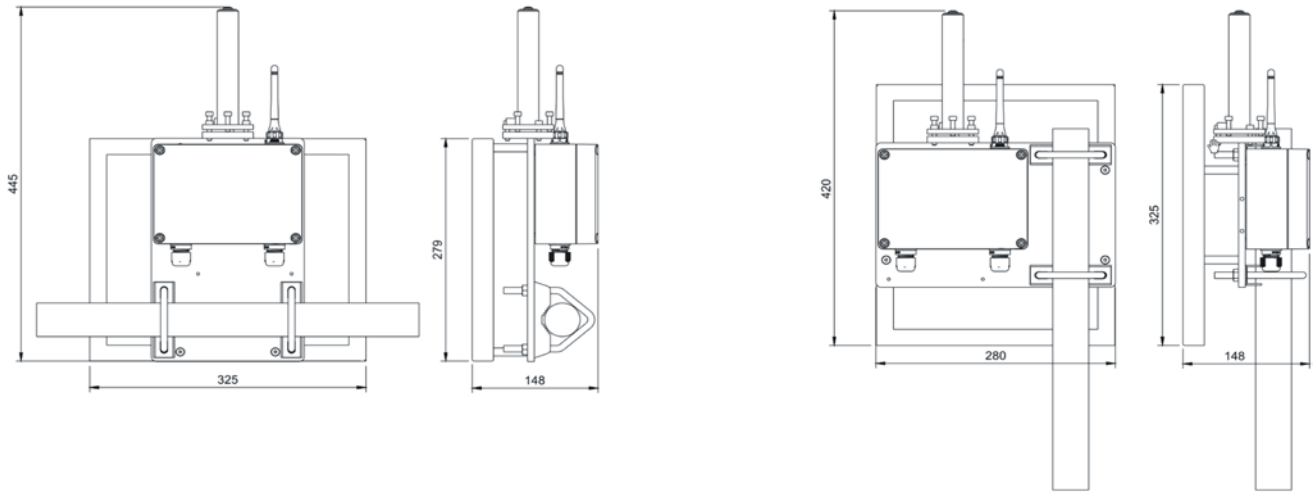

figure 2 dimensions, the drawing on left shows the horizontal (railing) mounting version and the drawing on right shows the vertical (mast) mounting version (as shown in the photo on page 1)

STAND-ALONE UV INDEX TRANSMITTER

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CUSTOMIZED APPROACHES FOR DISPLAYING OF THE RECORDED UV INDEX

There are many possible reasons to operate a UV Index measuring unit. As various are the approaches to display the obtained UV Index values. A scientific approach is to get the values from the server and to analyze and apply or publish them according to some specific research interest or according to a public authority requirement. This approach requires good meteorological and database administration skill. We supply free of charge a plug & play solution for unskilled persons. We offer a web based desktop display as shown on figure 3. It shows the current and the previous day's UV Index. The text shown on figure 3 can be deleted or modified according to the customer's requirements.

Other possible display approaches (not yet implemented) could include a smartphone optimized web site or a smartphone app. Also possible is a display optimized to a wall mounted monitor. If used in construction areas, public pools etc. a mechanical display using a clock hand pointer can be a display solution. sglux is happy to produce such special software and hardware for customized application.

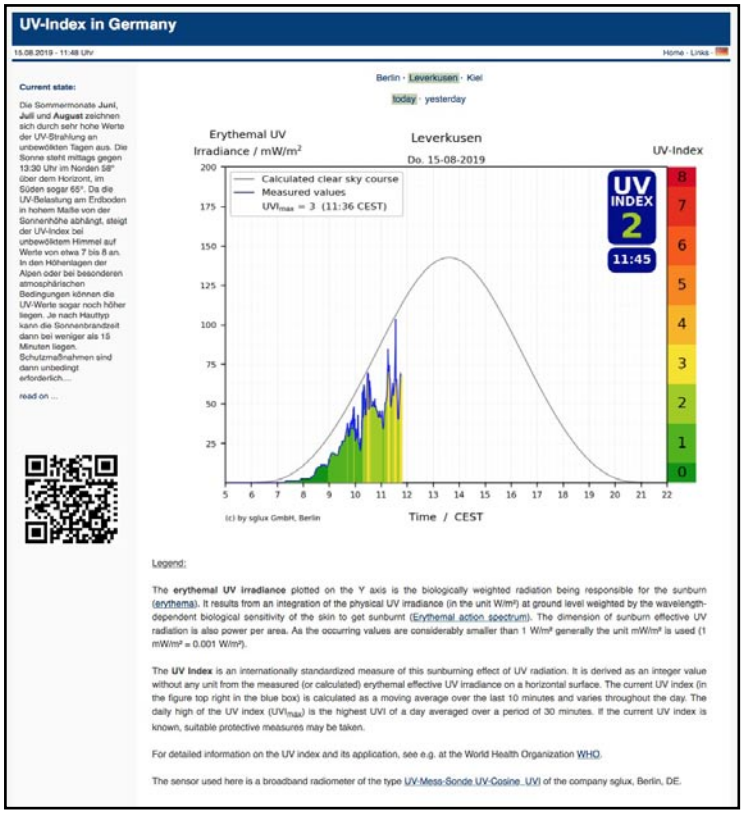

figure 3 example of the web based desktop diplay, colors and UV Index calculation according to the WHO requirements