

VUU24V007LN270C-11

11" Linear UVC MODULE, 24V CONSTANT VOLTAGE INPUT

- Deep ultraviolet light, suitable for surface sterilization and purification.
- High UV radiation power density, high irradiance
- 270nm UVC +395nm UVA combined, visible to human eyes when UV radiates
- Low-profile design, suitable for limited space mounting
- Compatible with LEDiL VIOLET 12x1 UVC lens
- For use in UL Class 2 lighting systems
- Meets UL8750 recognized
- RoHS compliant

General Specifications

Input Voltage	24VDC $\pm$ 5%	
Input Current	0.27A	
Input Power	6.5W	
Peak Wavelength	UVC Chip: 270-280nm	UVA Chip: 395-405nm
Radiation Power @ 24V Input	UVC Chip: 60mW	UVA Chip: 130mW
Irradiance @ 24V Input, 5" distance	UVC Chip: 114 μ W/cm ²	UVA Chip: 108 μ W/cm ²
Irradiance @ 24V Input, 8" distance	UVC Chip: 50 μ W/cm ²	UVA Chip: 51 μ W/cm ²
Irradiance @ 24V Input, 5" distance, with 30° lens	UVC Chip: 278 μ W/cm ²	UVA Chip: 180 μ W/cm ²
Irradiance @ 24V Input, 8" distance, with 30° lens	UVC Chip: 166 μ W/cm ²	UVA Chip: 110 μ W/cm ²
Beam Angle	130°(Without lens); 14°, 30°, 60° (With lens options);	
Storage Temperature Range	-40°C to 100°C / -40°F to 212°F	
Operating Temperature Range (ta)	-20°C to 40°C / -4°F to 104°F	
Maximum Case Temperature (Tc)	Tc max 50°C	
Estimated Radiation Maintenance	L50 = 16,000 hrs	
Overall Size	11.06" L x 0.756" W x 0.268" H (281mm x 19.2mm x 6.8mm)	
PCB Material / Thermal Conductivity	MCPCB (Aluminum Clad)/ 1.5W / mK	
Extruded Material / Finish	Aluminum/surface treatment with Anodic Oxidation	
LED Quantity	12pcs.	
Module Weight	27g / 0.06lb	
PCB Part Number	PTL050C01M1	
Maximum Screw Installation Torque	25 inch - ounces	
Connector Type	WAGO #2060-452 / 998-404 (2 pin connector)	
Packaging: Master Carton	40pcs.	
Thermal Feedback	Not Available	
Safety/Compliance	cURus (File # E351548)	
	Suitable for UL Class 2 Lighting Systems	
	RoHS Compliant	
	Dry and Damp Location	
Warranty	3 years @ Max. Tc from the date of manufacture	

VUU24V007LN270C-11

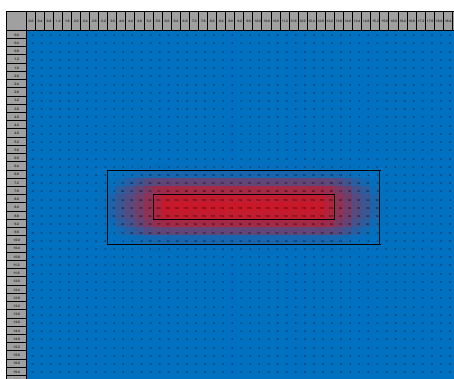
Electrical and Optical Specifications

Module Part Number	Number of LED	Input Voltage	Nom. Current	Nom. Rated Power	UVC Chip Radiation	UVA Chip Radiation
VUU24V007LN270C-11 (No lens)	12	24.0 VDC	0.27 A	6.5 W	60 mW	130 mW
VUU24V007LN270C-11 (with lens)	12	24.0 VDC	0.27 A	6.5 W	42 mW	91 mW

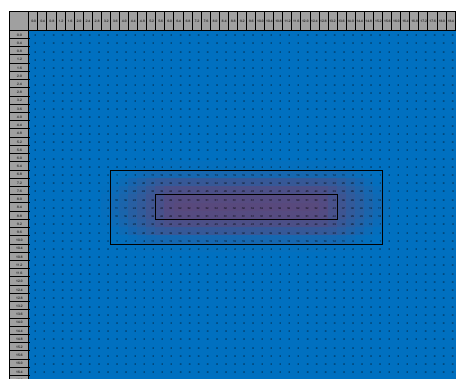
VUU24V007LN270C-11 without lens

Distance	Irradiance ($\mu\text{W}/\text{cm}^2$)
1" (25.4mm)	1849
2" (50.8mm)	561
3" (76.2mm)	278
4" (101.6mm)	166
5" (127.0mm)	114
6" (152.4mm)	82
7" (177.8mm)	64
8" (203.2mm)	50
9" (228.6mm)	41
10" (254.0mm)	34

Simulation $114\mu\text{W}/\text{cm}^2$ @ 5" distance



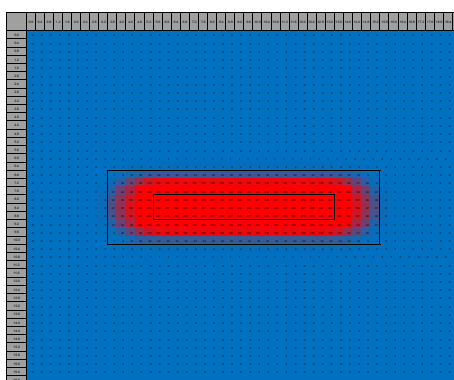
Simulation $50\mu\text{W}/\text{cm}^2$ @ 8" distance



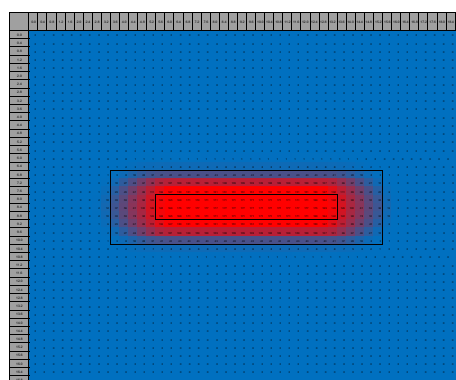
VUU24V007LN270C-11 with 30° lens

Distance	Irradiance ($\mu\text{W}/\text{cm}^2$)
1" (25.4mm)	4508
2" (50.8mm)	1372
3" (76.2mm)	677
4" (101.6mm)	408
5" (127.0mm)	278
6" (152.4mm)	203
7" (177.8mm)	182
8" (203.2mm)	166
9" (228.6mm)	137
10" (254.0mm)	111

Simulation $278\mu\text{W}/\text{cm}^2$ @ 5" distance



Simulation $166\mu\text{W}/\text{cm}^2$ @ 8" distance



NOTES:

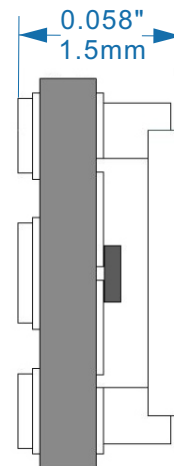
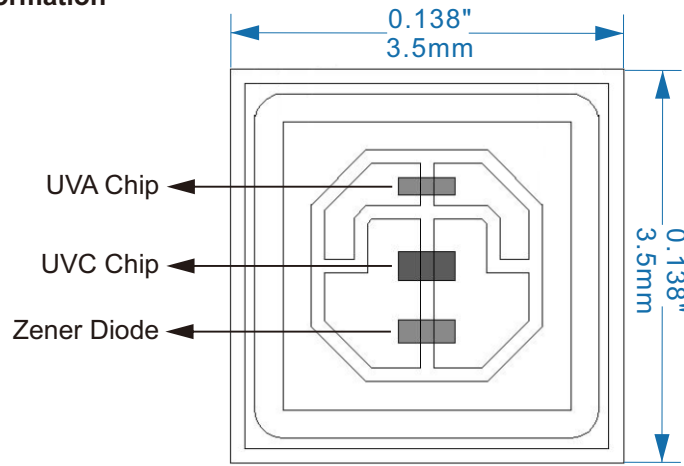
- 1) Performance based on $T_c \text{ mod} = 25^\circ\text{C}$. See thermal de-rating chart for higher temperature operation.
- 2) Per the design, UVA and UVC chips will radiates simultaneously, 395nm UVA is visible to human eye as UV indication. Proper protection is still needed from UV hazard.
- 2) The LED DC Module can be configure with different LED chip quantities, series and parallel design configurations to meet a specific design requirement.
- 3) Specifications are subject to change without notice.

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c **UL** US

RoHS
COMPLIANT

LED Information

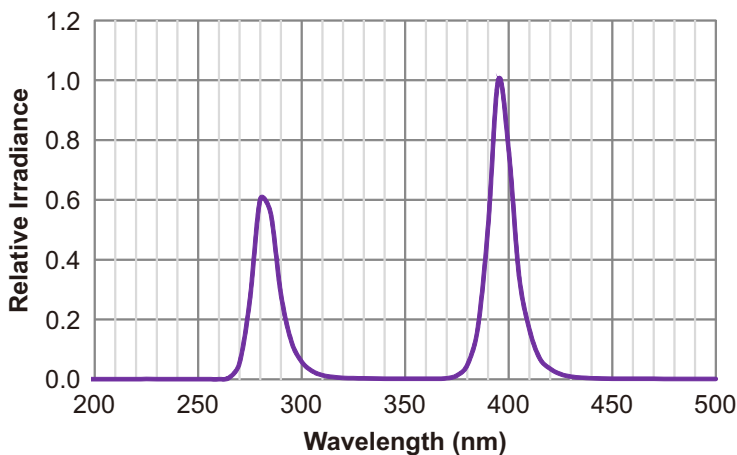


3535 UVA+UVC LED

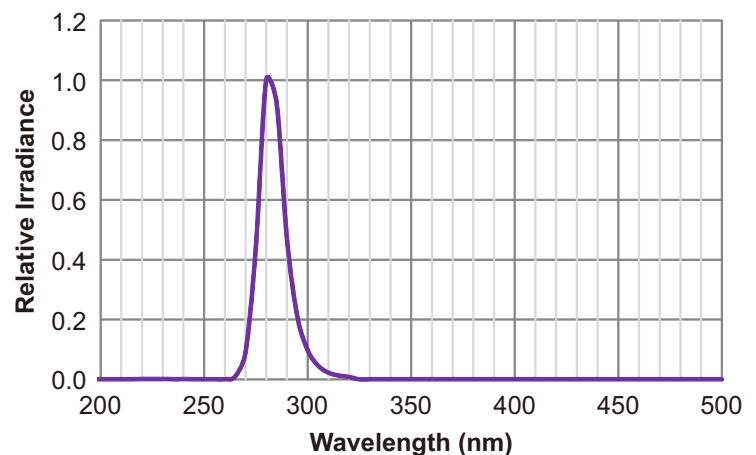
Substrate material: Al_2O_3 Ceramic

Housing material: Al_2O_3 Ceramic

UVA + UVC



UVC Only



CAUTION

UV emitted from this product. Eye or Skin irritation may result from exposure. Use appropriate shielding.

- UV LEDs emit high intensity UV light.
- Do not look directly into the UV light during operation.
- Wear protective clothing and eyewear to avoid exposure to UV light.
- Attach caution labels to your products which contain UV LEDs.
- Keep out of reach of children.

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Disinfection Time Estimation

UV-C dosage, also called exposure dosage, is a way to measure how much total UV-C energy has radiated a particular surface. Dosage is determined not only by the strength of the UV-C that falls on a surface, but also how long that surface is exposed.

$$\text{Exposure Dosage (mJ/cm}^2\text{)} = \text{UV Irradiance (mW/cm}^2\text{)} \times \text{Time (seconds)}$$

The reduction of micro-organisms is classified using a logarithmic scale. A single log reduction is a 90% reduction of organisms. A two log reduction is a 99% reduction of organisms, followed by a three log reduction (99.9%), etc.

Bacteria	UV dosage in mJ/cm ² 99.9% (3 log reduction)	Disinfection Time VUU24V007LN270C-11 (No lens) @ 5"		Disinfection Time VUU24V007LN270C-11 (30° lens) @ 5"	
Bacillus anthracis	13.6	119 s	2.0 mins	49 s	0.8 mins
B. Megatherium sp. (vegetative)	3.9	34 s	0.6 mins	14 s	0.2 mins
B. Megatherium sp. (spores)	8.2	72 s	1.2 mins	29 s	0.5 mins
B. paratyphosus	9.6	84 s	1.4 mins	35 s	0.6 mins
B. subtilis (vegetative)	17.4	153 s	2.5 mins	63 s	1.0 mins
B. subtilis (spores)	61	535 s	8.9 mins	219 s	3.7 mins
Clostridium tetani	22	193 s	3.2 mins	79 s	1.3 mins
Corynebacterium diptheriae	10.1	89 s	1.5 mins	36 s	0.6 mins
Eberthella typhosa	6.4	56 s	0.9 mins	23 s	0.4 mins
Escherichia coli	9	79 s	1.3 mins	32 s	0.5 mins
Leptospira interrogans	9.5	83 s	1.4 mins	34 s	0.6 mins
Micrococcus candidus	18.2	159 s	2.7 mins	65 s	1.1 mins
Micrococcus sphaeroides	30	263 s	4.4 mins	108 s	1.8 mins
Mycobacterium tuberculosis	18.6	163 s	2.7 mins	67 s	1.1 mins
Neisseria catarrhalis	13.2	116 s	1.9 mins	47 s	0.8 mins
Phytomonas tumefaciens	13.2	116 s	1.9 mins	47 s	0.8 mins
Proteus vulgaris	9	79 s	1.3 mins	32 s	0.5 mins
Pseudomonas aeruginosa	16.5	145 s	2.4 mins	59 s	1.0 mins
Pseudomonas fluorescens	10.5	92 s	1.5 mins	38 s	0.6 mins
Salmonella enteritidis	12	105 s	1.8 mins	43 s	0.7 mins
Salmonella paratyphi	9.6	84 s	1.4 mins	35 s	0.6 mins
Salmonella typhimurium	24	211 s	3.5 mins	86 s	1.4 mins
Salmonella typhosa (Typhoid)	6.5	57 s	0.9 mins	23 s	0.4 mins
Sarcina lutea	59.1	518 s	8.6 mins	213 s	3.5 mins
Serratia marcescens	7.3	64 s	1.1 mins	26 s	0.4 mins
Shigella dysenteriae (Dysentery)	6.6	58 s	1.0 mins	24 s	0.4 mins
Shigella paradysenteriae	5.0	44 s	0.7 mins	18 s	0.3 mins
Spirillum rubrum	13.2	116 s	1.9 mins	47 s	0.8 mins
Staphylococcus albus	5.5	48 s	0.8 mins	20 s	0.3 mins
Staphylococcus aureus	7.8	68 s	1.1 mins	28 s	0.5 mins
Streptococcus hemolyticus	6.5	57 s	0.9 mins	23 s	0.4 mins
Streptococcus lactis	18.5	162 s	2.7 mins	66 s	1.1 mins
Streptococcus viridans	6	53 s	0.9 mins	22 s	0.4 mins
Viruses	UV dosage in mJ/cm ² 99.9% (3 log reduction)	Disinfection Time VUU24V007LN270C-11 (No lens) @ 5"		Disinfection Time VUU24V007LN270C-11 (30° lens) @ 5"	
Bacteriophage - E. Coli	7.8	68 s	1.1 mins	28 s	0.5 mins
Infectious Hepatitis	17.4	153 s	2.5 mins	63 s	1.0 mins
Influenza	10.2	89 s	1.5 mins	37 s	0.6 mins
Poliovirus - Poliomyelitis	9.5	83 s	1.4 mins	34 s	0.6 mins
Rotavirus	140	1228 s	20.5 mins	504 s	8.4 mins
Tobacco mosaic	440	3860 s	64.3 mins	1583 s	26.4 mins
2019-nCoV	22	193 s	3.2 mins	79 s	1.3 mins
Molds	UV dosage in mJ/cm ² 99.9% (3 log reduction)	Disinfection Time VUU24V007LN270C-11 (No lens) @ 5"		Disinfection Time VUU24V007LN270C-11 (30° lens) @ 5"	
Aspergillus flavus	180	1579 s	26.3 mins	647 s	10.8 mins
Aspergillus glaucus	132	1158 s	19.3 mins	475 s	7.9 mins
Aspergillus niger	396	3474 s	57.9 mins	1424 s	23.7 mins
Mucor racemosus A	51	447 s	7.5 mins	183 s	3.1 mins
Mucor racemosus B	51	447 s	7.5 mins	183 s	3.1 mins
Oospora lactis	15	132 s	2.2 mins	54 s	0.9 mins
Penicillium expansum	39	342 s	5.7 mins	140 s	2.3 mins
Penicillium roqueforti	39	342 s	5.7 mins	140 s	2.3 mins
Penicillium digitatum	132	1158 s	19.3 mins	475 s	7.9 mins
Rhizopus nigricans	333	2921 s	48.7 mins	1198 s	20.0 mins
Yeasts	UV dosage in mJ/cm ² 99.9% (3 log reduction)	Disinfection Time VUU24V007LN270C-11 (No lens) @ 5"		Disinfection Time VUU24V007LN270C-11 (30° lens) @ 5"	
Baker's yeast	11.7	103 s	1.7 mins	42 s	0.7 mins
Brewers yeast	9.9	87 s	1.4 mins	36 s	0.6 mins
Common yeast cake	18	158 s	2.6 mins	65 s	1.1 mins
Saccharomyces cerevisiae	18	158 s	2.6 mins	65 s	1.1 mins
Saccharomyces ellipsoideus	18	158 s	2.6 mins	65 s	1.1 mins
Saccharomyces spores	24	211 s	3.5 mins	86 s	1.4 mins

NOTES:

- 1) Above 3 log reduction UV dosage is based on article on below website, different researches may vary on the dosage needed.
<https://www.clordsys.com/pdfs/misc/UV%20Data%20Sheet.pdf>
- 2) The dosage stated in the table refers to 254nm mercury lamp, the dosage using this 275nm UVC LED may vary. Spectrum effect difference is not taking into account.
- 3) The UV irradiance will vary based on distance, radiation angle and working temperature, above disinfection time is for reference only.

VUU24V007LN270C-11

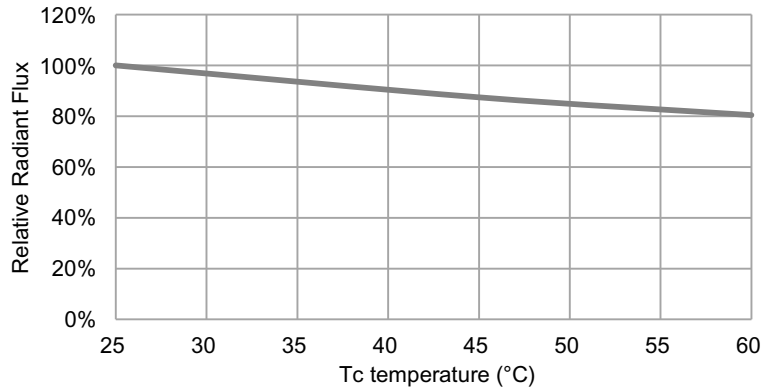
Thermal Specifications

Linear UVC DC Module

Storage Temperature Range	-40 to 100°C / -40 to 212°F
Operating Ambient Temperature Range (ta)	-20 to 40°C / -4 to 104°F
Maximum Case Temperature (Tc)	50°C / 122°F



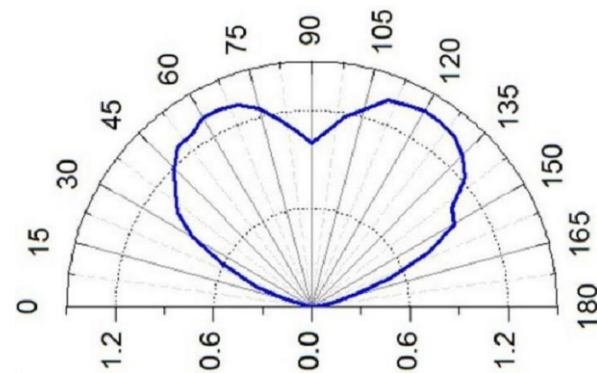
Thermal De-Rating



Certification Chart

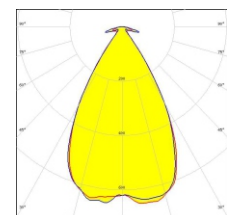
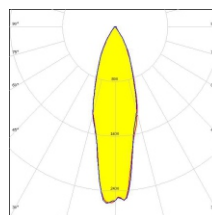
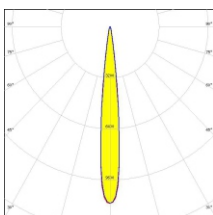
Model	VUU24V007LN270C-11
Classification	
	YES
	YES
	N/A
Energy Efficiency Label (EEL-Label)	N/A
Suitable for UL Class 2 Lighting System	YES

Radiation Pattern



Compatible Lens

- Compatible with LEDiL IP67 295 x 42 mm lens. Additional evaluation should be taken for lead wire exit on heatsink. For more information, please visit LEDiL's website; http://lediloptics.cn/news_all/violet-silicone-optic-for-uv-c-applications/
- 14° FN17810_VIOLET-12X1-RS
- 30° FN17294_VIOLET-12X1-S
- 60° FN17818_VIOLET-12X1-W

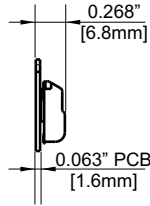


Reference Radiation shape with LEDiL lens

VUU24V007LN270C-11

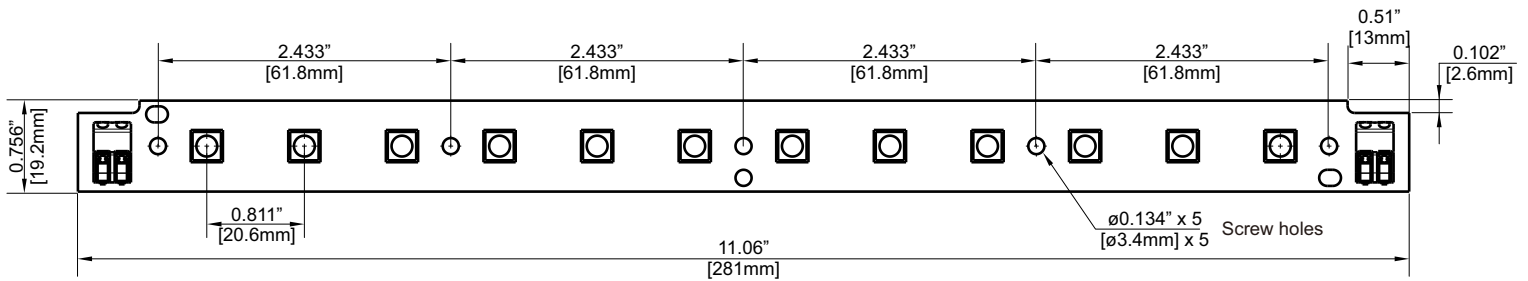
Mechanical Drawings

11"
[281mm]

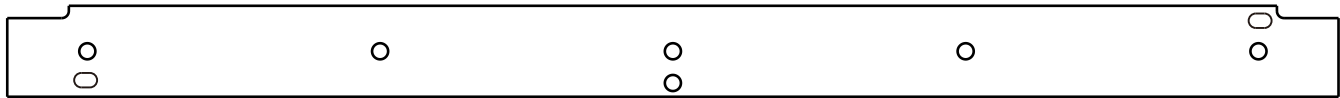


SIDE VIEW

Overall Dimensions	
Length	11.06" [281mm]
Width	0.756" [19.2mm]
Height	0.268" [6.8mm]

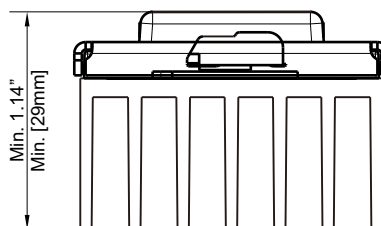
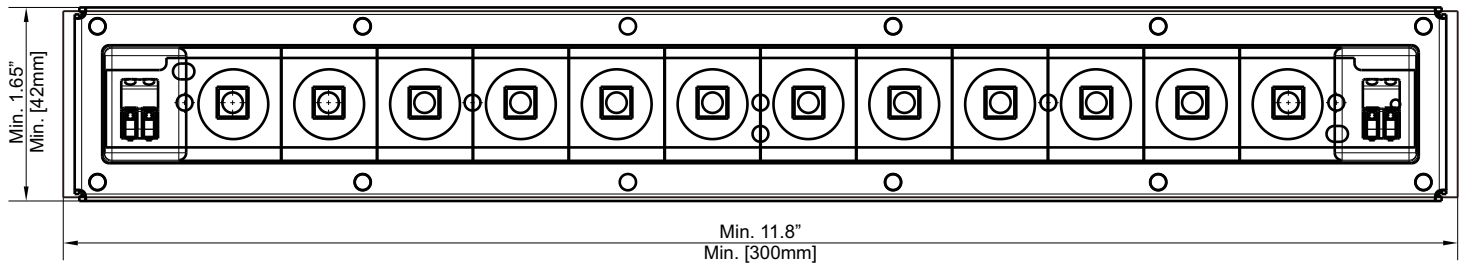


TOP VIEW



BOTTOM VIEW

Dimensions with recommended lens and heatsink



Recommended Heatsink Size:
11.8" L x 1.65" W x 0.79" H
(300mm L x 42mm L x 20mm H)
Lens or heatsink are not included.

VUU24V007LN270C-11

Guidelines

Termination Notes

- Connector Type: WAGO #2060-452 / 998-404 (2 pin push wire connector)
 - AWG: 24...18 solid wire
 - Strip length: 7...9mm / 0.28...0.35in
 - Connector Max amp. rating: 9 Amps.



For more detail information, please visit Wago's website: <http://www.wago.com/infomaterial/pdf/51300133.pdf>

Fastening Notes

- If fastening by screw hole a recommended screw size: 6-20 x 5/8" flat head drilling screws. Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation.
- If fastening using double-sided tape, start with clean, oil-free and dust-free surface. Peel backing and place LED module on mounting surface. Firmly press down on the module to ensure good adherence. Follow the double-side tape manufacturer's installation instructions.
- BJB P2F (Push-to-Fix) fixing elements for PCBs can be used to fasten LED modules to mounting surface. Reference BJB's website for ordering information and specific model to use: <http://www.bjb.com/index.php?pid=376706&lid=10>.

Environmental Rating / Conformal Coating

- The UV Modules have been evaluated for use in dry or damp locations only. If used in wet locations, acceptability and the need for additional evaluation shall be determined in the end product.
- Fulham's UV modules are available with conformal coating; made to order with MOQ and lead time will apply. The conformal coating is a silicone based material which is double sprayed on the module only (LEDs and PCB). Conformal coating is recommended for the following applications: near ocean where salt is present, constant moisture, refrigeration, continuously high humidity, or outdoor applications. An IP rating of IP64 or IP65 is achieved when the conformal coating is used, but other factors should be considered. Fulham still recommends the luminaire also meet an IP64/65 rating.

Electrostatic Sensitive Product (ESD)

- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

Thermal Management

- Proper thermal management should be employed to ensure life and reliability of product. Max Tc of module should not be exceeded.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

Polarity Notes

- DC Modules are polarity sensitive.
- Ensure that "positive" from LED Driver is connected to "positive" of LED modules and that "negative" from LED Driver is connected to "negative" of LED modules.
- Polarities of modules are marked with "+" for positive and "-" for negative.

VUU24V007LN270C-11

C **UL** US

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Part Number Matrix

V U U 24V 007 LN 270C - 11

Product Line	Type	Control Type	Input Voltage	Max. Power	Design	Peak Wavelength	Length
V = Vizion	U = UV (UL Class 2)	U = None	24V = 24VDC	007 = 7W	LN = Linear	270 = 270nm UVC	11 = 11 inch

① Standard Product offering (All other options are made to order with MOQ and lead time)

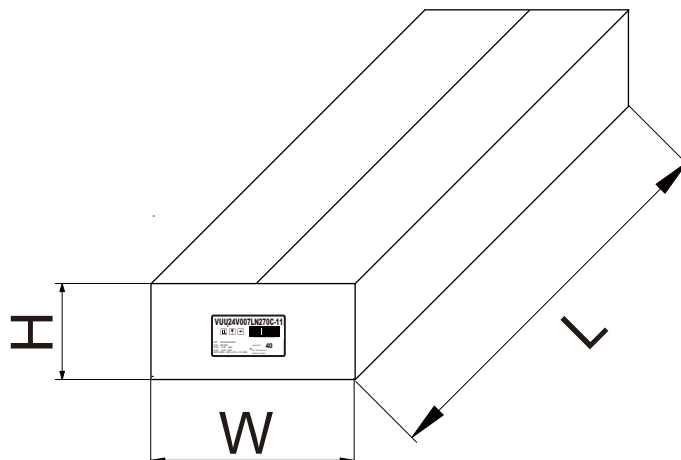
Product Image: Linear UV Module



TOP VIEW

Packaging

Master Carton



OUTER DIMENSION		
L	W	H
12.20"(310mm)	10.63"(270mm)	4.33"(110mm)
Net Weight	Gross Weight	QUANTITY
2.4 lbs. (1.09kg)	3.51 lbs. (1.60kg)	40pc.