

UV LED Product Catalog

2024

All UV LED, Heat Sinks, Drivers
and Plug-and Play Application
Sets are available for easy
online purchase at the Boston
Electronics webstore:

shop.boselec.com



 **Boston**Electronics

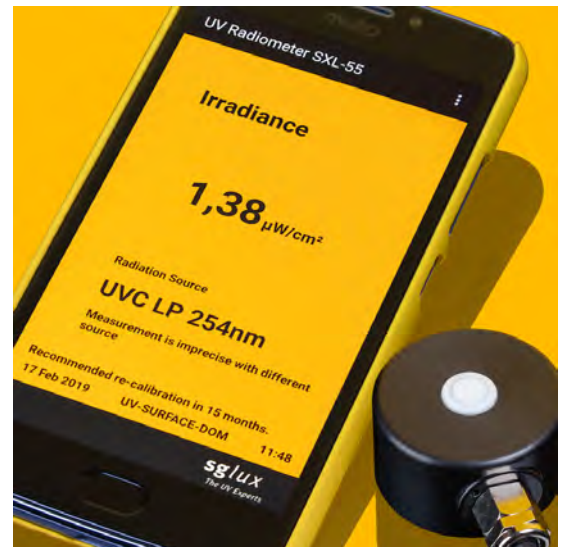
violumas
High Power UV LED Solutions



SiC UV Detectors and Sensors

High reliability, high dose

- Deep UV to visible
- Discrete photodiodes
- Amplified sensors (TOCONs)
- Compact TO packages
- Hardened probes
- Robust SiC detectors
- UV radiometers - lab and portable Android
- Certified calibration laboratory
- **sglux**



We provide powerful,
reliable, and affordable
UV LED technology to
people, emphasizing
health and non-toxic
solutions for the future.

About Violumas

Violumas is dedicated to producing the world's most powerful ultraviolet LEDs. Originating from Flip Chip Opto, our patented chip technology allows us to engage in unparalleled applications of ultraviolet technology with brighter, more powerful, and safer solutions. As a company that carries the whole spectrum of UV products from bare die to modules in the UVA to UVC range (405 nm to 265 nm), Violumas aims to be the world-leading supplier of high performance ultraviolet LEDs and solutions.

Capabilities

Violumas is a one-stop-shop UV solutions provider with a full UV LED product line and capabilities in MCPCB production, optical design, thermal management, LED packaging, custom modules, and fixture design. With roots in thermal management, our vast range of expertise has allowed us to develop our patented 3-PAD chip technology as well as numerous consequent application patents, giving us the capability to produce the world's most powerful UV LED lights with the lowest thermal resistance. As a global company with offices in the U.S., Canada, Taiwan, and China, we are ISO 9000 certified with resources for global impact.

Products

- Bare Die



- MCPCBs



- SMD Packages



- Cooling Solutions



- COB Modules



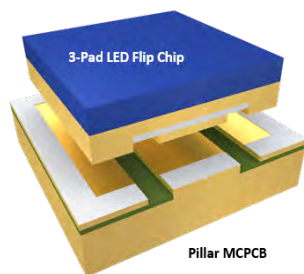
- Custom Modules



Introducing the 3-PAD Flip Chip

Experience the 3-PAD difference. Highest reliability and optical output, driven at maximum currents.

All of Violumas UV LEDs are packaged with our core chip technologies, the patented 3-PAD LED Flip Chip and Pillar MCPCB. When combined, these technologies coordinate to optimize heat dissipation through a unique thermal structure. The 3-PAD innovation minimizes thermal resistance between the chip and the board, thus increasing optical output and LED lifetime.



Patented 3-PAD technology maximizes UV output per dollar value through exceptional thermal management.



More UV output with higher driving currents:

While typical operating currents are set at 350mA, 3-PAD LEDs can be driven up to 1000mA per chip for up to 50% more output with no signs of thermal decay.



Longer lifetime and reliable performance:

With extreme thermal dissipation as low as 0.2°C/W, our LEDs have lower junction temperatures and have industry-leading lifetimes up to 5,000 hours in the UVC range.

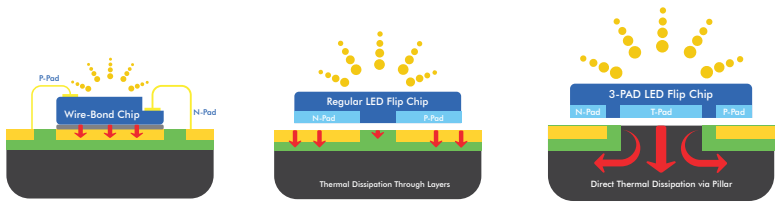


Minimized cooling with maximum heat dissipation:

Violumas LEDs are more efficient and generate less heat, reducing thermal budgets and increasing design flexibility. With less heat, 3-PAD LEDs are ideal for high power UV applications.

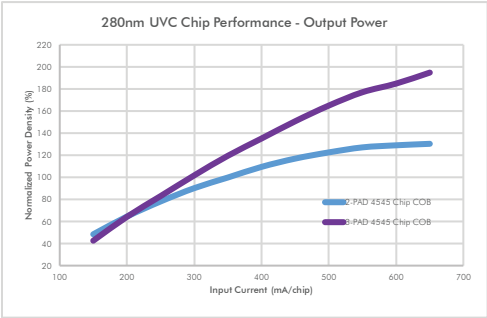
2-PAD vs. 3-PAD

While conventional LEDs must diffuse thermal energy through an insulation layer that has poor thermal conductivity, our 3-PAD UV LEDs enable direct dissipation from the Flip Chip to the metal core through the MCPCB pillar structure.

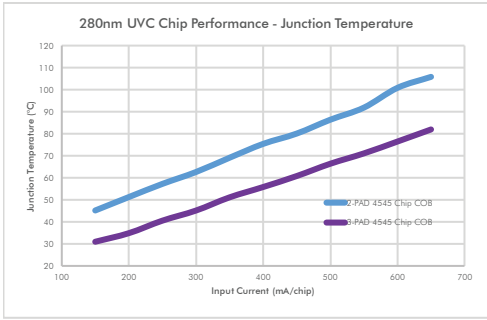


Violumas' groundbreaking technologies have the potential to transform the performance of the UV LED industry as thermal issues remain a persistent obstacle to achieving high optical power, particularly in the deep UV range, where up to 98% of energy can be dissipated as heat rather than optical radiation. Violumas is able to offer the most powerful UVC LED solutions on the market today with our expertise in thermal management and packaging solutions.

Achieve 50% more UV output than conventional LEDs driving at 600mA.



Every 20°C drop in junction temperature means your LED will last four times longer.



SMD Package Lineup

Violumas specializes in standard SMDs (surface mount device) packaged with optics to allow for maximum UV output. We offer mid and high power SMDs suitable for every application from curing to disinfection with flexible integration.

VS5252 Series Mid Power SMD

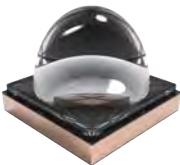
- Single Chip Package
- Dimensions: 5.2x5.2mm
- Thermal Resistance: 0.9°C/W



Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
VS5252C45L6-405	405	700	1285	3.7	60°
VS5252C45L6-395	395	700	1280	3.7	60°
VS5252C45L6-385	385	700	1300	3.9	60°
VS5252C45L6-375	375	700	930	3.9	60°
VS5252C45L6-365	365	700	775	4.1	60°
VS5252C48L3-310-V1	310	700	115	6.0	30°
VS5252C48L3-275	275	700	87	6.6	30°
VS5252C48L3-265	265	700	82	6.4	30°

VS7272 Series High Power SMD

- Four Chip Package
- Dimensions: 7.2x7.2mm
- Thermal Resistance: 0.32°C/W



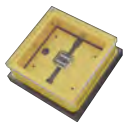
Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
VS7272C45L9-405	405	1400	4900	7.4	90°
VS7272C45L9-395	395	1400	4700	7.5	90°
VS7272C45L9-385	385	1400	4650	7.6	90°
VS7272C45L9-375	375	1400	3300	7.8	90°
VS7272C45L9-365	365	1400	2850	8.2	90°
VS7272C48L6-310-V1	310	1400	400	12.0	60°
VS7272C48L6-275	275	1400	338	13.2	60°
VS7272C48L6-265	265	1400	320	12.8	60°

SMD Package Lineup (Cont.)

Violumas is now offering low power SMDs suitable for UVC applications which may require denser LED configurations and lower power consumptions. Standard package size of 3.5x3.5mm allows for easy retrofitting of SMD packages.

WS3535 Series Low Power SMD

- Single Chip Package
- Dimensions: 3.5x3.5mm
- Thermal Resistance: 9-16°C/W



Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
WS3535C20LF-310	310	100	8	5.5	130°
WS3535C20LF-275	275	100	6	6.3	130°
WS3535C20LF-265	265	100	5	5.8	130°
WS3535C30LF-310	310	150	13	5.5	130°
WS3535C30LF-275	275	150	10	6.3	130°
WS3535C30LF-265	265	150	10	6.1	130°
WS3535C48LF-310	310	350	37	5.7	130°
WS3535C48LF-275	275	350	31	5.8	130°
WS3535C48LF-265	265	350	33	5.9	130°

New Products - 325 and 340 nm

Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
WS5252C40L3-340-V1	340	350	160	4.5	30°
WC1X1C40L3-340-V1	340	350	160	4.5	30°
WS5252C40L3-325	325	350	55	5.3	30°
WC1X1C40L3-325	325	350	55	5.3	30°
WC2X2C40L6-325	325	350	200	19.0	60°
WC2X2C40L9-340-V1	340	350	640	18.0	90°

- All standard products (SMDs and COBs) are offered in wavelengths 405nm to 265nm with options of 30°, 60°, 90°, 120°, or flat lens.
- Standard heat sinks, power supplies, and starboard PCBs are available for testing purposes for each SMD and COB product.

COB Module Lineup

With chips bonded directly on MCPCBs, COB (chip on board) solutions are ready for plug and play use (solder-free) with no need for PCB mounting. Ideal for prototyping purposes, our standard COBs are fitted with connectors and TVS for maximum ease in testing.

VC1X1 Series Mid Power COB

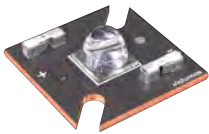
- Single Chip Module
- Dimensions: 15x15mm
- Thermal Resistance: 0.9°C/W



Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
VC1X1C45L6-405	405	700	1285	3.7	60°
VC1X1C45L6-395	395	700	1280	3.7	60°
VC1X1C45L6-385	385	700	1300	3.9	60°
VC1X1C45L6-375	375	700	930	3.9	60°
VC1X1C45L6-365	365	700	775	4.1	60°
VC1X1C48L3-310-V1	310	700	115	6.0	30°
VC1X1C48L3-275	275	700	87	6.6	30°
VC1X1C48L3-265	265	700	82	6.4	30°

VC2X2 Series High Power COB

- Four Chip Module
- Dimensions: 20x20mm
- Thermal Resistance: 0.2-0.3°C/W



Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (mW)	Forward Voltage (V)	Viewing Angle (degree)
VC2X2C45L9-405	405	1400	4900	7.4	90°
VC2X2C45L9-395	395	1400	4700	7.5	90°
VC2X2C45L9-385	385	1400	4650	7.6	90°
VC2X2C45L9-375	375	1400	3300	7.8	90°
VC2X2C45L9-365	365	1400	2850	8.2	90°
VC2X2C48L6-310-V1	310	1400	400	12.0	60°
VC2X2C48L6-275	275	1400	338	13.2	60°
VC2X2C48L6-265	265	1400	320	12.8	60°

New Products - 3x3 and 4x4 UVC LED Arrays

COB Module Lineup (Cont.)

VC12X1 Series Light Bar COB

- Twelve Chip Module
- Dimensions: 304x20mm
- Thermal Resistance: 0.075°C/W



Part Number	Wavelength (nm)	Forward Current (mA)	Optical Output (W)	Forward Voltage (V)	Viewing Angle (degree)
VC12X1C45L6-405	405	700	12	43.5	60°
VC12X1C45L6-395	395	700	13	43.5	60°
VC12X1C45L6-385	385	700	12	43.5	60°
VC12X1C45L6-375	375	700	9	43.5	60°
VC12X1C45L6-365	365	700	6	46.8	60°
VC12X1C48L6-310	310	1400	1.35	35.4	60°
VC12X1C48L6-275	275	1400	1	37.8	60°
VC12X1C48L6-265	265	1400	0.8	38.4	60°

Custom COB Modules

Custom COB solutions give you more power in an optimized design. Chips are bonded directly on an MCPCB in close configurations for increased efficiency and target illumination. With our optical simulation and design services, COBs can be customized to your system with minimized material costs.

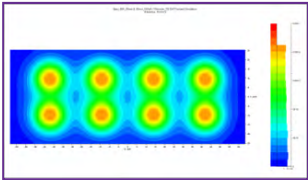
FEATURES

- Customized array for target application
- Multi-wavelength capability
- Lens options for various viewing angles
- Connectors for wiring
- TVS for ESD protection



SERVICES

- Optical Simulation
- Optical Design
- Circuit Design
- Thermal Simulation
- Thermal Design



UV LED Application Set

Plug-and-Play:

- COB UV LED
- Heatsink Kit
- Driver Kit

Violumas COB LED



Violumas Heatsink Kit



Heatsink (x1), Mounting Screws (x2), Thermal Pad (x2)

Violumas Driver Kit with LED Wire & Connector - 110V or 220V



Negative/Black Wire (x1), Positive/Red Wire (x1), 2-Terminal Connectors (x2)

Photos are provided for reference only and may not be accurate of the exact items received.

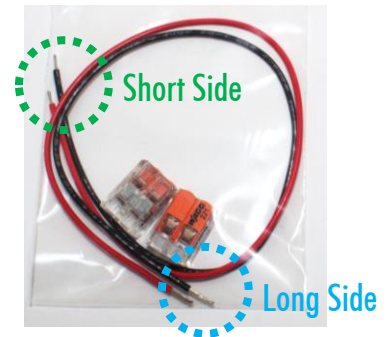
UV LED Application Set

Step 1: Mounting the COB LED onto the Heatsink

- If there is a protective film on the backside of the LED, please remove the film. Inspect the contact surfaces and ensure the contact surfaces of the LED backside and the heatsink are smooth. If surfaces are not smooth, high resolution sandpaper polish is recommended. Gently clean the surfaces with alcohol.
- Place the thermal pad on the coupling area where the LED is to be mounted onto the heatsink.
- Tighten down the LED onto the heatsink surface via provided screws. Do not over torque the screws.

Violumas LED Wire & Connector Kit:

- Each wire is pre-stripped for plug-and-play connections.
- One end of each wire is stripped approximately 5mm (**short side**). The short side should be inserted into the COB LED.
- One end of each wire is stripped approximately 10mm (**long side**). The long side should be coupled with the driver kit wires.



Step 2: Connecting Wires to the COB LED

- Insert the short side of the "-" wire into the "-" COB connector.
- Insert the short side of the "+" wire into the "+" COB connector.
- Please insert the wire end fully into the appropriate COB connector (positive to positive, negative to negative). The connection should be tight even with a weak pull on the ends of the wires. Soldering is not required.

Step 3: Connecting Wires to the Driver Kit

- Couple the long side of the "-" wire to the "-" wire of the driver kit using the provided connector.
- Couple the long side of the "+" wire to the "+" wire of the driver kit using the provided connector.
- For coupling wires with the provided connector, please insert the wire end fully into an unoccupied terminal and snap the connector shut. The connection should be tight even with a weak pull on the 2 ends of the wires. Please ensure positive and negative wires are connected appropriately (positive to positive, negative to negative).

Notes for Operation

- Please ensure the driver kit is off before making any wire connections.
- Please connect the driver kit to a separate power strip (not provided) with an ON/OFF switch. Please utilize the power strip switch to turn the driver kit on and off. Directly plugging the driver kit into a wall outlet is not recommended.
- If the driver kit includes a dimmer dial, please ensure the dimmer dial is set to the lowest position before turning the power on.

UV LED Application Set

Disclaimer

Violumas is not responsible for any damages that may result from inaccurate use of the recommended products. Violumas does not make any claims regarding warranty or guarantee of these products. It is recommended that each customer consults the Violumas engineering team before engaging Violumas products in extreme applications where the failure of the LED and damage to human health may be possible. Each user assumes full responsibility for determining the suitability of the use of Violumas products in various applications. Operating Violumas LEDs incorrectly or with an unsuitable driver may result in immediate failure and Violumas will not be responsible for replacement.

Precautions

Handling & Usage Precautions

- Exhibit extreme care when handling LEDs. Do not touch the LED with bare hands as doing so may contaminate and affect the optical characteristics of the LED. When using tweezers, do not apply excessive force, especially to the glass lens. Do not drop the LED as doing so may cause product damage.
- Ensure that electrostatic discharge specifications are followed. Static electricity and surge voltages may cause product damage. Proper electrostatic discharge protection equipment, working machinery, and protected mounting equipment are recommended.
- Do not expose the LEDs to volatile organic compounds as well as hazardous, acidic, and corrosive substances during storage and operation to avoid product damage.
- Do not apply excess mechanical force and vibration while handling the product.
- Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Ensure that the PCB is suitable for the product and be wary of LED placement and possible PCB warpage.
- To avoid fault issues, do not couple any electrical wires to the metal substrate of the MCPCB or COB. If any electrical wires from the power source have contact with the MCPCB's metal base under power ON conditions, permanent damage may occur due to inner arcing within the 3-PAD LED structure.

Storage Precautions

- Perform soldering as soon as the moisture-proof packaging is opened.
- After the storage duration has exceeded the recommended time, products may need to be baked before soldering.
- Store all products in a controlled environment under 30° C free of dust. Do not expose the product to sudden changes in temperature, high humidity levels, and condensation.
- Please consult the Violumas engineering team for further information on storage precautions.

Eye Safety Precautions

- Avoid exposure to UV light during LED operation. Do not look directly into the UV light during LED operation. Do not look directly into the UV light during optical measurements even through optical instruments. Protect the body, skin, and eyes with UV protective equipment.
- Attach warning labels on all products and systems that use UV LEDs.

Cleaning Precautions

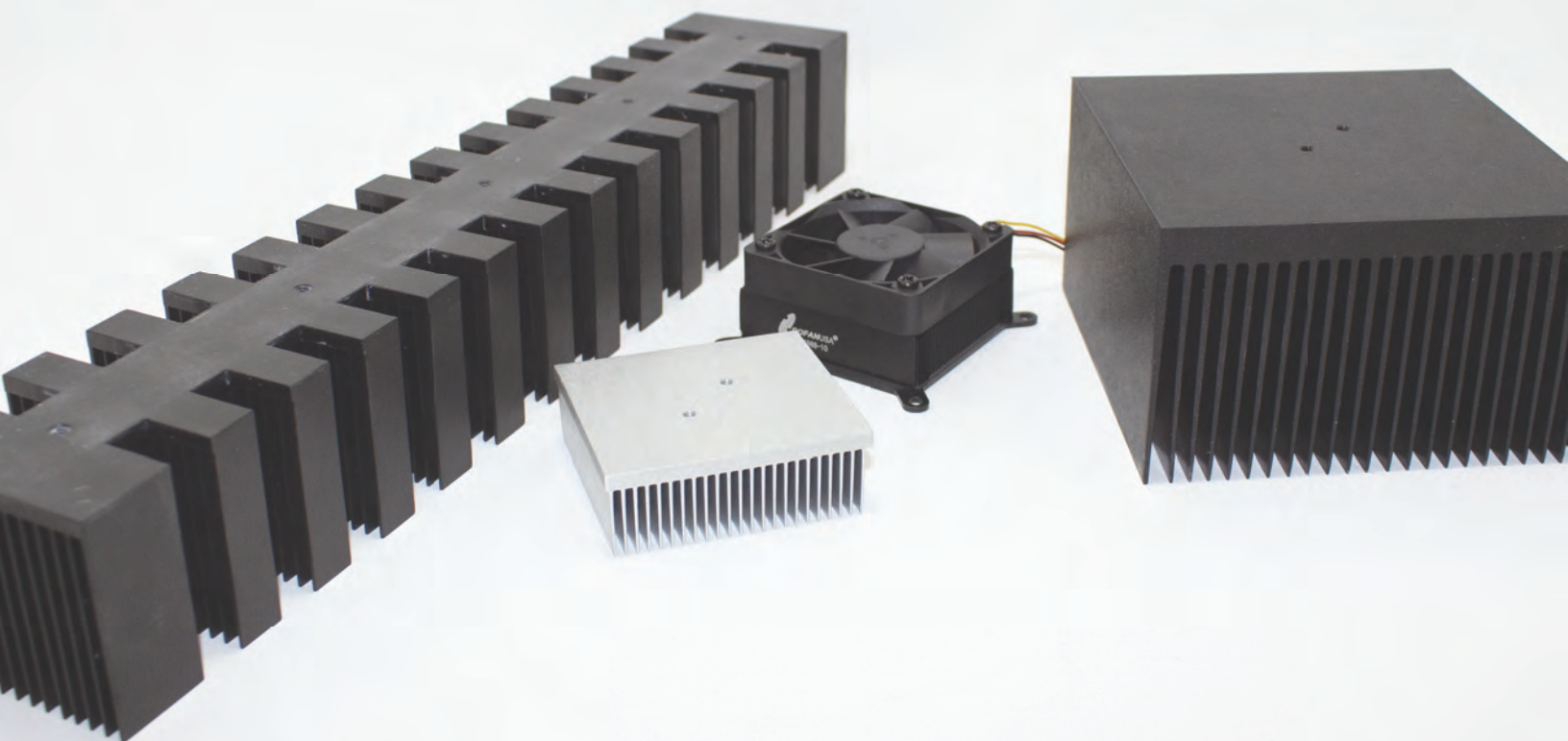
- Do not use brushes or organic solvents for cleaning the LEDs.
- Perform electrical and optical measurements before and after cleaning to ensure optimal performance.

Static Electricity Precautions

- Ensure that equipment and machinery are properly grounded.
- Anti-electrostatic attire (wristbands, gloves, footwear, etc.) is recommended.
- Damage inspection is recommended while performing characteristics inspection of LEDs.

UV Application Sets

Set Part Number	UV LED	Heat Sink	Driver Kit	Price Set	LED	Heat Sink	Driver
265 nm LED							
SET-265-MED-110V	VC1X1C48L3-265	30.1.006770	PS-700A6W-ND-110V	93.28	43.53	11.90	37.85
SET-265-MED-220V	VC1X1C48L3-265	30.1.006770	PS-700A6W-ND-220V	98.69	43.53	11.90	43.26
SET-265-HI-110V	VC2X2C48L6-265	30.1.006846	PS-1400A25W-ND-110V	239.74	153.21	32.45	54.08
SET-265-HI-220V	VC2X2C48L6-265	30.1.006846	PS-1400A20W-ND-220V	245.14	153.21	32.45	59.48
275 nm LED							
SET-275-MED-110V	VC1X1C48L3-275	30.1.006770	PS-700A6W-ND-110V	93.28	43.53	11.90	37.85
SET-275-MED-220V	VC1X1C48L3-275	30.1.006770	PS-700A6W-ND-220V	98.69	43.53	11.90	43.26
SET-275-HI-110V	VC2X2C48L6-275	30.1.006846	PS-1400A25W-ND-110V	239.74	153.21	32.45	54.08
SET-275-HI-220V	VC2X2C48L6-275	30.1.006846	PS-1400A20W-ND-220V	245.14	153.21	32.45	59.48
295 nm LED							
SET-295-MED-110V	VC1X1C48L3-295	30.1.006770	PS-700A6W-ND-110V	93.28	43.53	11.90	37.85
SET-295-MED-220V	VC1X1C48L3-295	30.1.006770	PS-700A6W-ND-220V	98.69	43.53	11.90	43.26
SET-295-HI-110V	VC2X2C48L6-295	30.1.006846	PS-1400A20W-ND-110V	239.74	153.21	32.45	54.08
SET-295-HI-220V	VC2X2C48L6-295	30.1.006846	PS-1400A20W-ND-220V	245.14	153.21	32.45	59.48
310 nm LED							
SET-310-MED-110V	VC1X1C48L3-310-V1	30.1.006770	PS-700A6W-ND-110V	93.28	43.53	11.90	37.85
SET-310-MED-220V	VC1X1C48L3-310-V1	30.1.006770	PS-700A6W-ND-220V	98.69	43.53	11.90	43.26
SET-310-HI-110V	VC2X2C48L6-310-V1	30.1.006846	PS-1400A25W-ND-110V	239.74	153.21	32.45	54.08
SET-310-HI-220V	VC2X2C48L6-310-V1	30.1.006846	PS-1400A20W-ND-220V	245.14	153.21	32.45	59.48
325 nm LED							
SET-325-MED-110V	WC1X1C40L3-325	30.1.006770	PS-350A3W-ND-110V	97.63	47.88	11.90	37.85
SET-325-MED-220V	WC1X1C40L3-325	30.1.006770	PS-350A3W-ND-220V	103.04	47.88	11.90	43.26
SET-325-HI-110V	WC2X2C40L3-325	30.1.006846	ask	ask	168.50	32.45	ask
SET-325-HI-220V	WC2X2C40L3-325	30.1.006846	ask	ask	168.50	32.45	ask
340 nm LED							
SET-325-MED-110V	WC1X1C40L3-340-V1	30.1.006770	PS-350A3W-ND-110V	101.98	52.23	11.90	37.85
SET-340-MED-220V	WC1X1C40L3-340-V1	30.1.006770	PS-350A3W-ND-220V	107.39	52.23	11.90	43.26
SET-340-HI-110V	WC2X2C40L9-340-V1	30.1.006846	ask	ask	183.81	32.45	ask
SET-340-HI-220V	WC2X2C40L9-340-V1	30.1.006846	ask	ask	183.81	32.45	ask
365 nm LED							
SET-365-MED-110V	VC1X1C45L6-365	30.1.006770	PS-700A3W-ND-110V	57.63	7.88	11.90	37.85
SET-365-MED-220V	VC1X1C45L6-365	30.1.006770	PS-700A3W-ND-220V	63.04	7.88	11.90	43.26
SET-365-HI-110V	VC2X2C45L9-365	30.1.006846	PS-1400A16W-ND-110V	98.03	22.32	32.45	43.26
SET-365-HI-220V	VC2X2C45L9-365	30.1.006846	PS-1400A16W-ND-220V	103.44	22.32	32.45	48.67
375 nm LED							
SET-375-MED-110V	VC1X1C45L6-375	30.1.006770	PS-700A3W-ND-110V	57.63	7.88	11.90	37.85
SET-375-MED-220V	VC1X1C45L6-375	30.1.006770	PS-700A3W-ND-220V	63.04	7.88	11.90	43.26
SET-375-HI-110V	VC2X2C45L9-375	30.1.006846	PS-1400A16W-ND-110V	98.03	22.32	32.45	43.26
SET-375-HI-220V	VC2X2C45L9-375	30.1.006846	PS-1400A16W-ND-220V	103.44	22.32	32.45	48.67
385 nm LED							
SET-385-MED-110V	VC1X1C45L6-385	30.1.006770	PS-700A3W-ND-110V	57.63	7.88	11.90	37.85
SET-385-MED-220V	VC1X1C45L6-385	30.1.006770	PS-700A3W-ND-220V	63.04	7.88	11.90	43.26
SET-385-HI-110V	VC2X2C45L9-385	30.1.006846	PS-1400A16W-ND-110V	98.03	22.32	32.45	43.26
SET-385-HI-220V	VC2X2C45L9-385	30.1.006846	PS-1400A16W-ND-220V	103.44	22.32	32.45	48.67
395 nm LED							
SET-395-MED-110V	VC1X1C45L6-395	30.1.006770	PS-700A3W-ND-110V	57.63	7.88	11.90	37.85
SET-395-MED-220V	VC1X1C45L6-395	30.1.006770	PS-700A3W-ND-220V	63.04	7.88	11.90	43.26
SET-395-HI-110V	VC2X2C45L9-395	30.1.006846	PS-1400A16W-ND-220V	98.03	22.32	32.45	43.26
SET-395-HI-220V	VC2X2C45L9-395	30.1.006846	PS-1400A16W-ND-110V	103.44	22.32	32.45	48.67
405 nm LED							
SET-405-MED-110V	VC1X1C45L6-405	30.1.006770	PS-700A3W-ND-110V	57.63	7.88	11.90	37.85
SET-405-MED-220V	VC1X1C45L6-405	30.1.006770	PS-700A3W-ND-220V	63.04	7.88	11.90	43.26
SET-405-HI-110V	VC2X2C45L9-405	30.1.006846	PS-1400A16W-ND-110V	98.03	22.32	32.45	43.26
SET-405-HI-220V	VC2X2C45L9-405	30.1.006846	PS-1400A16W-ND-220V	103.44	22.32	32.45	48.67
3 x 3 and 4x4 LED Arrays				ask			



Product Catalog

Thermal Product Catalog

This catalog includes standard heatsink products for testing purposes which are suitable for each of the standard UV LED product lines, as well as information on thermal services for custom cooling solutions.

Thermal Product Catalog

Standard Heatsink Products

Violumas standard heatsink products are not optimized for unique systems and are primarily meant to be utilized for testing purposes.

- Each product has been tested under the condition of $T_a=25^{\circ}\text{C}$ and maintains the junction temperature of the LED below 75°C .
- Each standard heatsink is provided with mounting screws for the associated COB product.
- Thermal pads can be provided as suitable TIM (thermal interface material). For higher power COB products, samples of thermal grease may be available upon request.
- For instructions on properly mounting the LED on a heatsink, please refer to the Application Note: Mounting LEDs on Heatsinks.

Precaution: Please do not operate Violumas LEDs without a proper cooling solution. Operating the LED without a heatsink may result in immediate failure and Violumas will not be responsible for replacement.

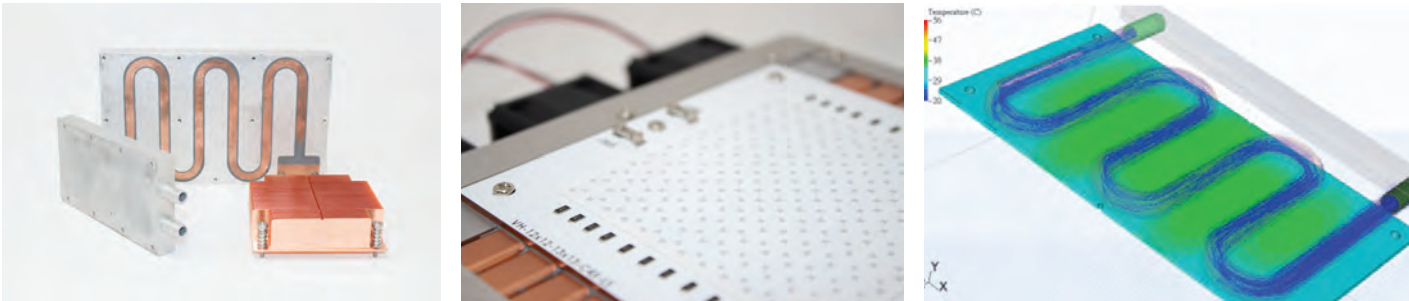
Heatsink Part Number	Description	Catalog Page No.
30.1.006770	Heatsink for VC1X1 COB Series	2
30.1.006846	Heatsink for VC2X2 COB Series	3
30.4988.10	Heatsink with Fan for VC4X2 or VC2X2 COB Series	4
30.3.006733	Heatsink for VC12X1 COB Series	5

Thermal Services: Simulation & Design

For the integration of LEDs or LED arrays into specified systems, many off-the-shelf heatsink solutions may not suffice as proper cooling solutions. Designing a proper cooling solution may take the following parameters into consideration:

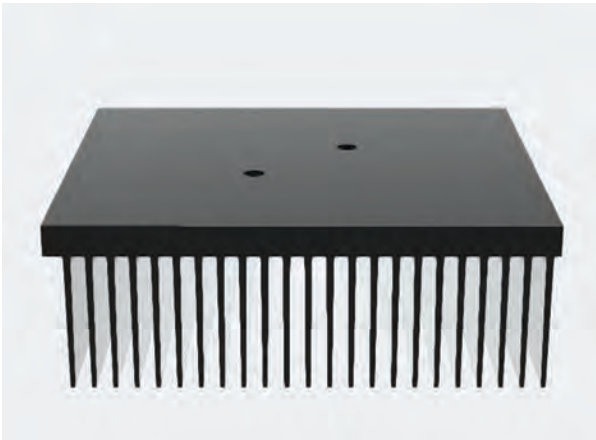
- Lifetime requirements of the system
- Mechanical requirements of the system
- Thermal budget

Violumas offers thermal modeling and design services to provide customized passive, active, and liquid cooling solutions to optimize reliability while keeping your specific system requirements in mind.

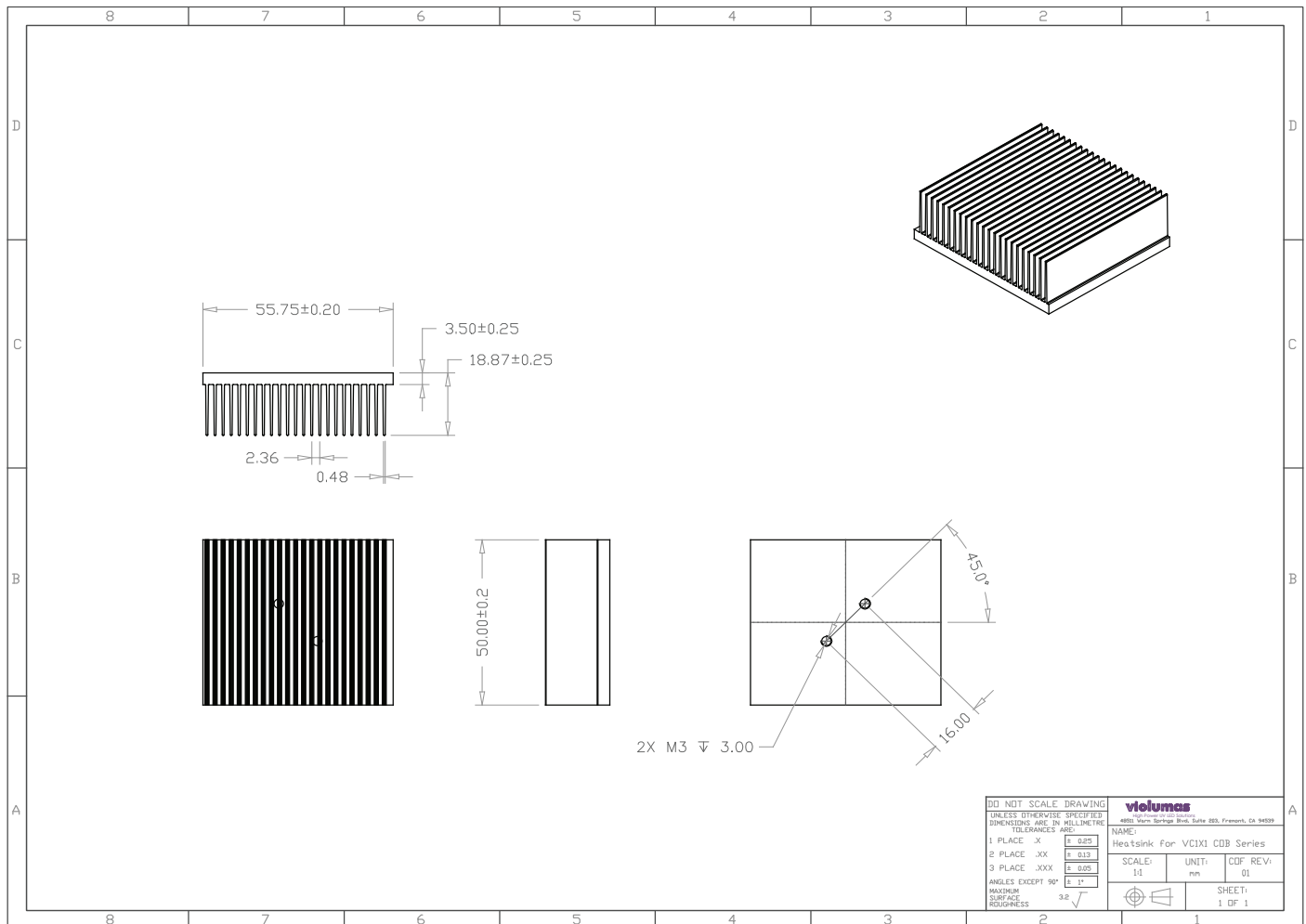


Contact the Violumas team to learn more about thermal services.

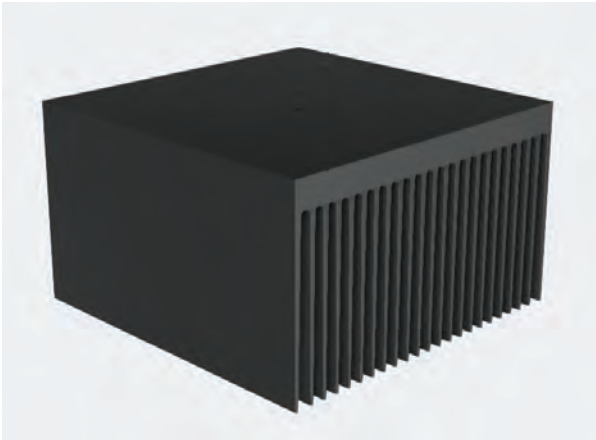
30.1.006770 (Heatsink for VC1X1 COB Series)



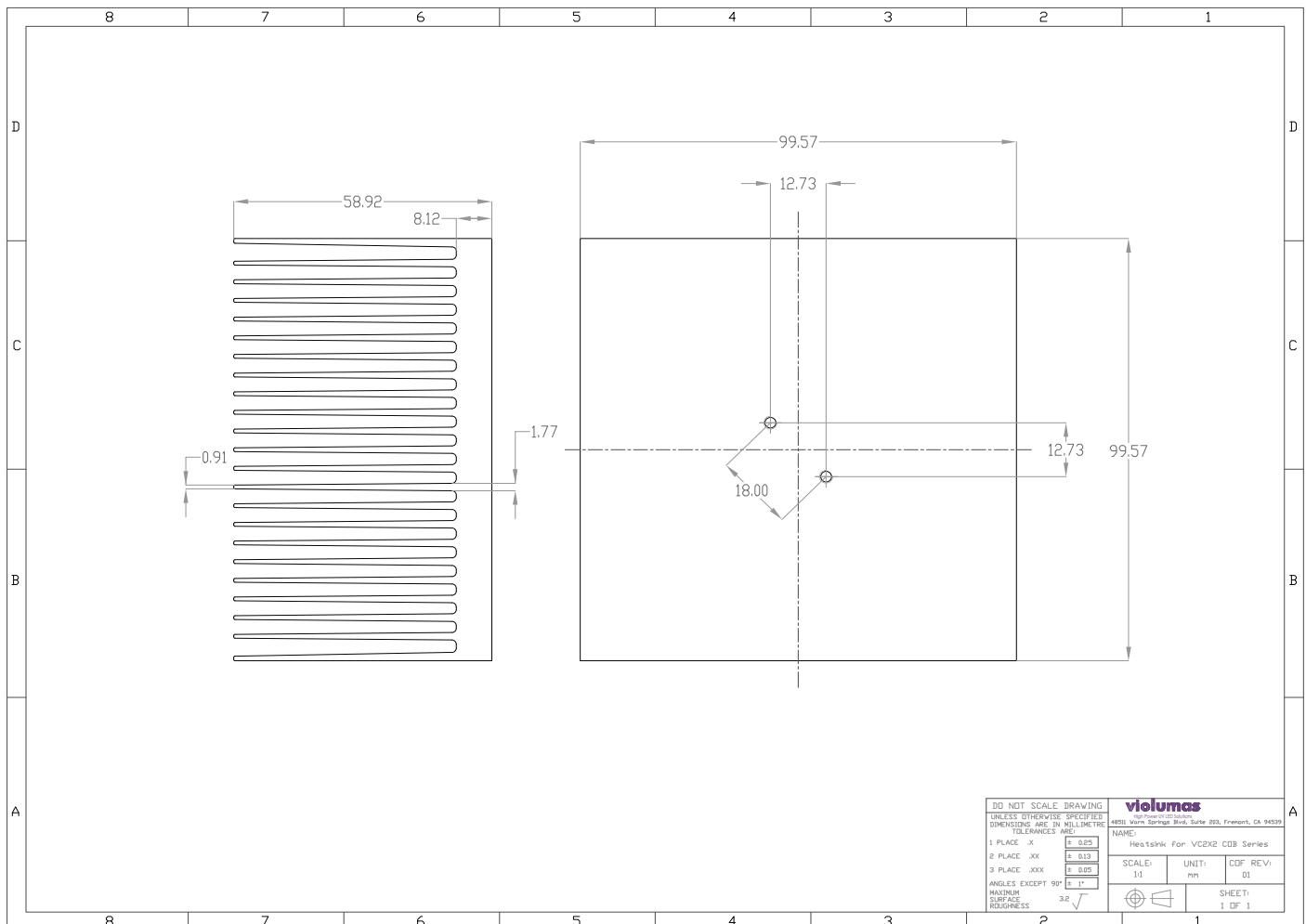
- **Suitable LED Models:** VC1X1 COB Series (pre-drilled mounting holes)
- **Thermal Capacity:** 6 W
- **Dimensions:** 50 x 55.75 x 18.87 mm
- **Weight:** 57 g
- **Material:** Aluminum
- **Product Includes:** Heatsink (1), M3 Screws (2)
- **Available Upon Request:** Thermal Pad



30.1.006846 (Heatsink for VC2X2 COB Series)



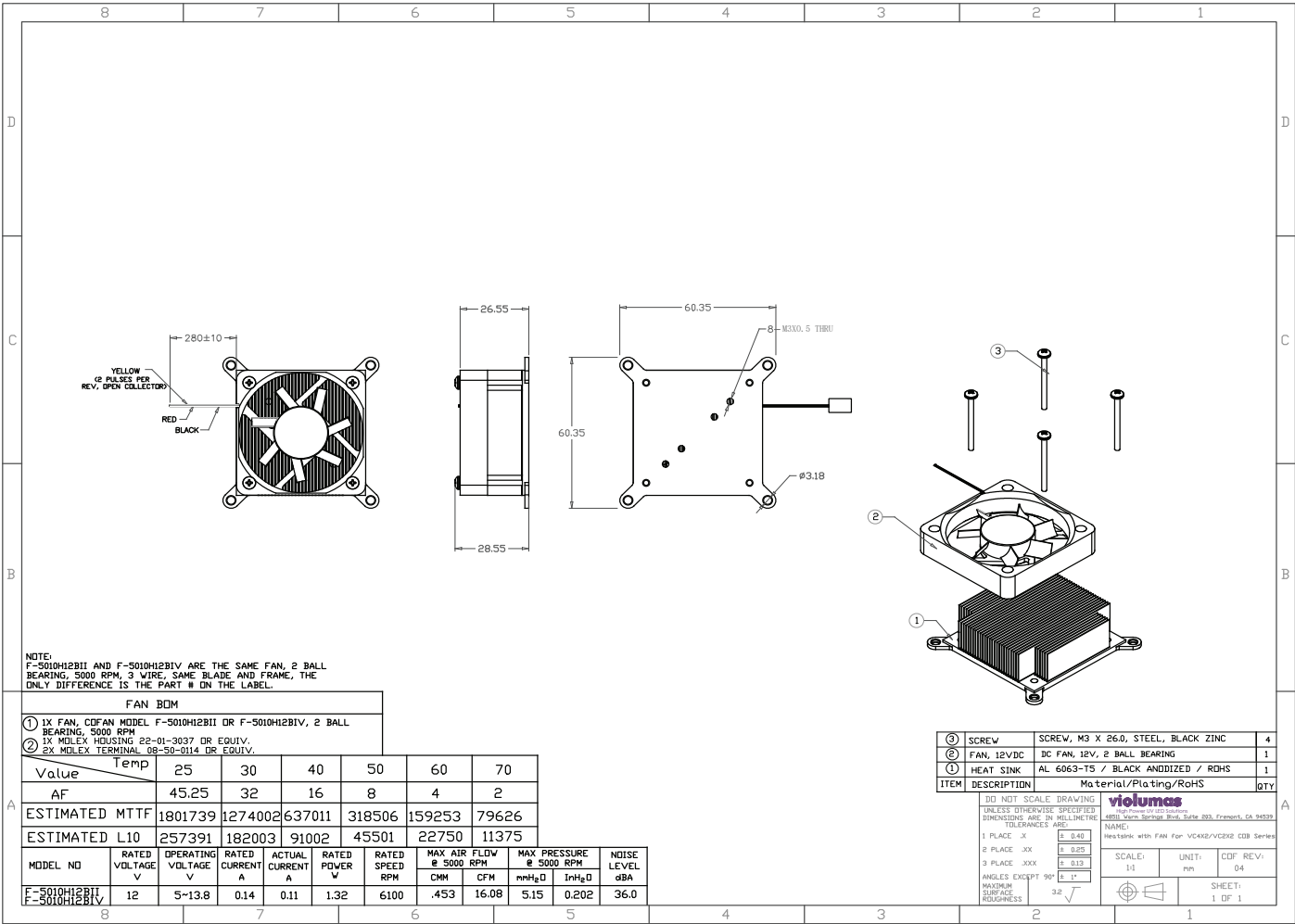
- **Suitable LED Models:** VC2X2 COB Series (pre-drilled mounting holes)
- **Thermal Capacity:** 20 W
- **Dimensions:** 99.57 x 99.57 x 58.92 mm
- **Weight:** 644 g
- **Material:** Aluminum (Black Anodized)
- **Product Includes:** Heatsink (1), M3 Screws (2)
- **Available Upon Request:** Thermal Pad



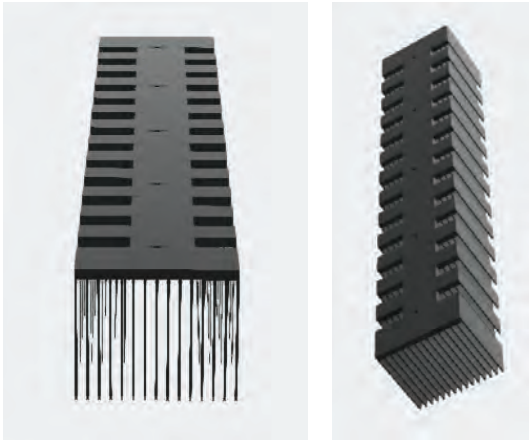
30.4988.10 (Heatsink with Fan for VC4X2 or VC2X2 COB Series)



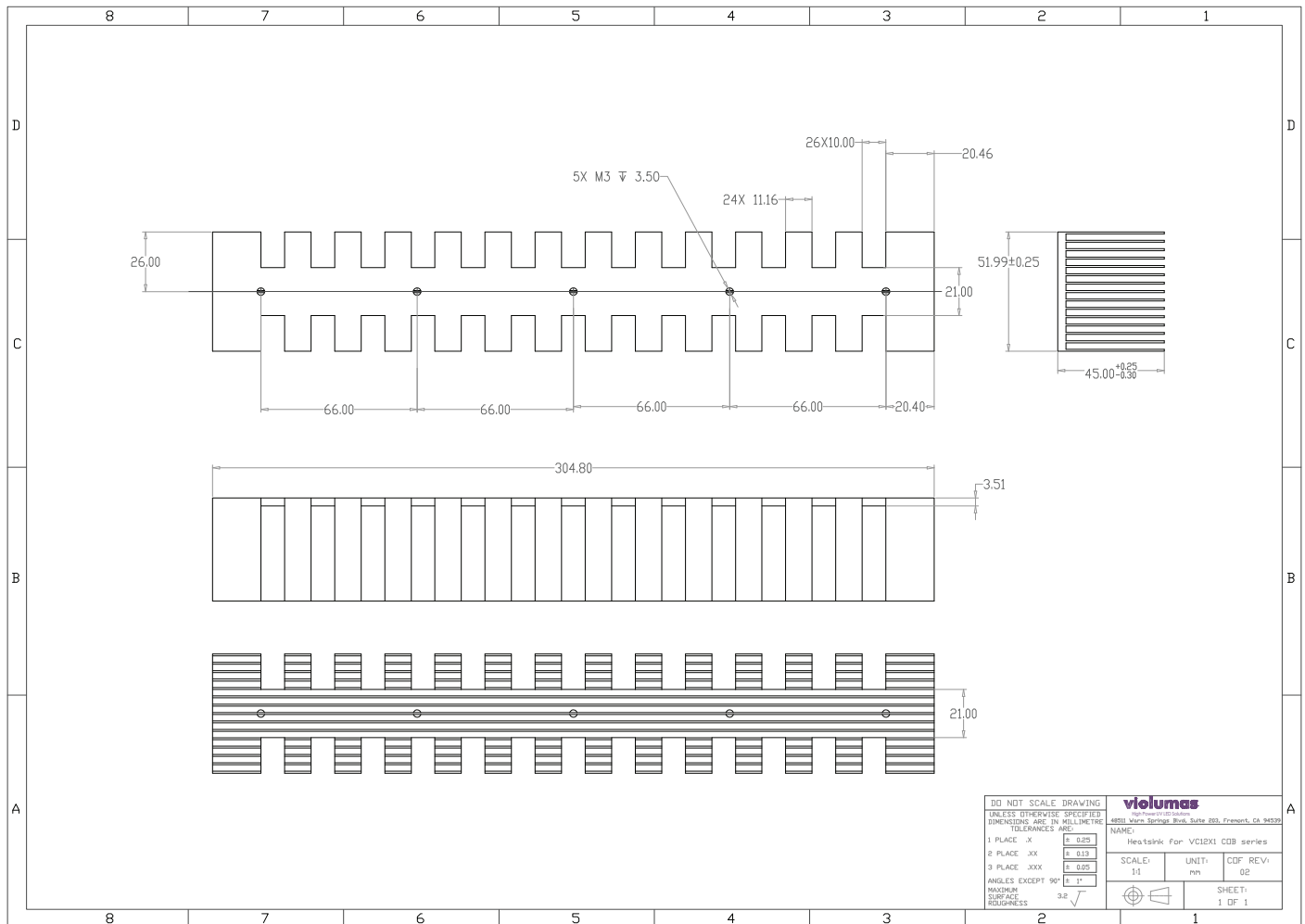
- Suitable LED Models: VC4X2 or VC2X2 COB Series (pre-drilled mounting holes)
- Thermal Capacity: 50 W
- Dimensions: 60.35 x 60.35 x 26.5 mm
- Weight: 64 g
- Material: Aluminum (Black Anodized)
- Product Includes: Heatsink with Fan (1), M3 Screws (2)
- Available Upon Request: Thermal Pad, Fan Power Supply



30.3.006733 (Heatsink for VC12X1 COB Series)



- **Suitable LED Models:** VC12X1 COB Series (pre-drilled mounting holes)
- **Thermal Capacity:** 60 W
- **Dimensions:** 304.8 x 52 x 45 mm
- **Weight:** 385 g
- **Material:** Aluminum (Black Anodized)
- **Product Includes:** Heatsink (1), M3 Screws (2)





Application Note

Mounting LEDs on Heatsinks

This application note will provide guidance on the selection of appropriate cooling solutions and the recommended method of mounting an LED on a heatsink.

Mounting LEDs on Heatsinks

Overview

LEDs are subject to heat generation and may suffer from early failure and thermal damage if operated without an appropriate thermal management solution. A suitable cooling solution (usually in the form of a heatsink, fanned heatsink, or cold plate) must be utilized to ensure the junction temperature of an LED is maintained within an acceptable range. Operating LEDs at high junction temperatures can reduce the performance and reliability of the device and the system. This guideline is provided as a resource for the selection of appropriate cooling solutions and the proper method of mounting an LED onto a heatsink.

Disclaimer: Please do not operate Violumas LEDs without a proper cooling solution. Operating the LED without a heatsink may result in immediate failure and Violumas will not be responsible for replacement. Violumas cannot be held responsible for any damages caused by following these guidelines as this document provides generic guidelines for heatsink mounting and does not intend to replace standard engineering practices.

Part 1: Selection of Cooling Solutions

A proper cooling solution must be selected by carefully considering the overall wattage, thermal density, and size of the LED or LED array. The LED datasheet should be referred to for information regarding the thermal resistance of the LED and absolute maximum ratings for junction temperature. The absolute maximum ratings for junction temperature should never be exceeded, and keeping the LED junction temperature as low as possible will result in increased reliability and performance.

Violumas provides heatsink products for testing purposes which are suitable for each of the standard LED product lines. For the integration of LEDs and LED arrays into specified systems and enclosures, Violumas provides thermal modeling and design services in order to maintain proper junction temperatures within a specific system.

Applicable Violumas Products

- 30.1.006770 (Heatsink for VC1X1 COB Series)
- 30.1.006846 (Heatsink for VC2X2 COB Series)
- 30.4988.10 (Heatsink with Fan for VC4X2 or VC2X2 COB Series)
- 30.3.006733 (Heatsink for VC12X1 COB Series)

Please refer to the Violumas Thermal Products Catalog for more information regarding heatsinks and thermal services.

Part 2: Assembly with Thermal Pads

For testing purposes, Violumas provides thermal kits for its standard product lines VC1X1 COB Series and VC2X2 COB Series. The thermal kit includes: heatsink (1), thermal pad (1), and screws (2) which are suitable for the specified LED product. The following instructions can be utilized for assembly of LEDs to heatsinks with appropriate thermal pad material.

Necessary Materials

- Violumas LED (COB or SMD mounted on PCB)
- Heatsink with Mounting Screws
- Thermal Pad
- Isopropyl Alcohol

Step by Step Guidelines

1) Inspect the contact surfaces.

- If there is a protective film on the backside of the LED, please remove the film.
- Before assembly, ensure the contact surface of the LED backside and heatsink are smooth.
- If surfaces are not smooth, high resolution sandpaper polish is recommended.
- Gently clean the surfaces with alcohol.

2) Apply thermal pad as TIM (thermal interface material).

- Place the thermal pad on the coupling area where the LED is to be mounted onto the heatsink.

3) Tighten down the LED onto the heatsink surface via screws.

- M3 or M4 screws are provided to ensure the mechanical pressure is evenly applied.
- Do not overtorque the screws.

Part 3: Assembly with Thermal Grease

While thermal pads can be easier to install, for high power LED products, such as larger LED arrays with electrical wattages surpassing 10 W, Violumas recommends the use of thermal grease or paste as an enhanced thermal conduction material.

Necessary Materials

- Violumas LED (COB or SMD mounted on PCB)
- Heatsink with Mounting Screws
- Thermal Grease*
- Putty Knife
- Isopropyl Alcohol

*There are many thermal grease product options available. The use of a ceramic-based thermal grease is recommended (as opposed to metal-based thermal grease) due to the lower electrical conductivity. Violumas recommends a minimum thermal conductivity value of 2W/mK. Please contact the Violumas team for specific recommendations on appropriate thermal grease materials.

Step by Step Guidelines

1) Inspect the contact surfaces.

- If there is a protective film on the backside of the LED, please remove the film.
- Before assembly, ensure the contact surface of the LED backside and heatsink are smooth.
- If surfaces are not smooth, high resolution sandpaper polish is recommended.
- Gently clean the surfaces with alcohol.

2) Apply thermal grease as TIM (thermal interface material).

- Apply thermal grease on the backside of the LED and the coupling area on the heatsink.
- Use a putty knife to ensure the thermal grease is as thin and evenly spread as possible.

3) Tighten down the LED onto the heatsink surface via screws.

- M3 or M4 screws are provided to ensure the mechanical pressure is evenly applied.
- While tightening the screws, avoid uneven tilting and air bubbles/gaps between the LED and heatsink. Do not overtorque the screws.
- Proper precautions must be taken to ensure proper contact by tightening the screws when the LED is powered on.



 **Boston**Electronics

Product Catalog

Driver Product Catalog

This catalog includes information on plug-and-play driver kits which are suitable for each of the standard UV LED product lines from Violumas.

October 27, 2023

Driver Product Catalog

Standard Driver Products

Violumas driver kits use standardized, commercially available, constant current LED drivers which are assembled for plug-and-play use and recommended for testing UV LEDs in the Violumas product line.

- Violumas drivers are assembled with a power cord and plug and are suitable for either 120VAC or 220VAC operation.
- Assembly includes a 120VAC power cord and NEMA 1-15P plug OR 220VAC power cord and NEMA 6-15P plug.
- All driver products include a wire connection kit with 2-conductor connectors (x2) and pre-stripped wires (x2). See page 5 for a guideline on operating standard driver products with Violumas UV LEDs.
- Dimmable driver products include a dimmer dial (for adjusting driving current) and a digital panel meter (displaying current, voltage, and wattage levels).



Driver Part Number	Description	Corresponding LED	Page No.
PS-350A3W-ND	Non-Dimming; 120VAC	WS3535C48LF-310/275/265 WC1X1C40L3-340/325	2
PS-350A3W-ND-220V	Non-Dimming; 220VAC		
PS-700A6W-ND	Non-Dimming; 120VAC	VC1X1C48L3-310/295/275/265	2
PS-700A6W-ND-220V	Non-Dimming; 220VAC		
PS-700A3W-ND	Non-Dimming; 120VAC	VC1X1C45L6-405/395/385/375/365	2
PS-700A3W-ND-220V	Non-Dimming; 220VAC		
PS-1400A20W-ND	Non-Dimming; 120VAC	VC2X2C48L6-310/295/275/265	3
PS-1400A20W-ND-220V	Non-Dimming; 220VAC		
PS-1400A20W-D	Dimming; 120VAC		
PS-1400A20W-D-220V	Dimming; 220VAC		
PS-1400A16W-ND	Non-Dimming; 120VAC	VC2X2C45L9-405/395/385/375/365	3
PS-1400A16W-ND-220V	Non-Dimming; 220VAC		
PS-1400A16W-D	Dimming; 120VAC		
PS-1400A16W-ND-220V	Dimming; 220VAC		
PS-1400A60W-ND	Non-Dimming; 120VAC	VC12X1C48L6-310/295/275/265	4
PS-1400A60W-ND-220V	Non-Dimming; 220VAC		
PS-1400A60W-D	Dimming; 120VAC		
PS-1400A60W-D-220V	Dimming; 220VAC		
PS-700A30W-ND	Non-Dimming; 120VAC	VC12X1C45L6-405/395/385/375/365	4
PS-700A30W-ND-220V	Non-Dimming; 220VAC		
PS-700A30W-D	Dimming; 120VAC		
PS-700A30W-D-220V	Dimming; 220VAC		

Violumas offers additional driver products which are suitable for powering multi-LED configurations or arrays. Contact the Violumas team to learn more about additional driver products. To learn more about the proper driver selection of LED drivers, please refer to the Application Note: [LED Driver Selection Guideline](#).

PS-350A3W Driver Products



- **Available Drivers:**
 - » PS-350A3W-ND
 - » PS-350A3W-ND-220V
- **Corresponding LEDs:**
 - » WS3535C48LF-310/275/265
 - » WC1X1C40L3-340/325

Driver Part Number	PS-350A3W-ND	PS-350A3W-ND-220V
Manuf. Model Number	Recom RACD03-350	Recom RACD03-350
Output Current	350mA	350mA
Output Voltage	3.0V ~ 12.0V	3.0V ~ 12.0V
Rated Power	3.0W ~ 4.2W	3.0W ~ 4.2W
Input Voltage	90VAC ~ 264VAC	90VAC ~ 264VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug

PS-700A6W Driver Products



- **Available Drivers:**
 - » PS-700A6W-ND
 - » PS-700A6W-ND-220V
- **Corresponding LEDs:**
 - » VC1X1C48L3-310/295/275/265

Driver Part Number	PS-700A6W-ND	PS-700A6W-ND-220V
Manuf. Model Number	Recom RACD06-700	Recom RACD06-700
Output Current	700mA	700mA
Output Voltage	3.0V ~ 8.4V	3.0V ~ 8.4V
Rated Power	6.0W ~ 7.2W	6.0W ~ 7.2W
Input Voltage	90VAC ~ 264VAC	90VAC ~ 264VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug

PS-700A3W Driver Products



- **Available Drivers:**
 - » PS-700A3W-ND
 - » PS-700A3W-ND-220V
- **Corresponding LEDs:**
 - » VC1X1C45L6-405/395/385/375/365

Driver Part Number	PS-700A3W-ND	PS-700A3W-ND-220V
Manuf. Model Number	Recom RACD03-700	Recom RACD03-700
Output Current	700mA	700mA
Output Voltage	3.0V ~ 4.5V	3.0V ~ 4.5V
Rated Power	3.0W ~ 3.1W	3.0W ~ 3.1W
Input Voltage	90VAC ~ 264VAC	90VAC ~ 264VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug

PS-1400A20W Driver Products



- **Available Drivers:**
 - » PS-1400A20W-ND
 - » PS-1400A20W-ND-220V
 - » PS-1400A20W-D (Dimming)
 - » PS-1400A20W-D-220V (Dimming)
- **Corresponding LEDs:**
 - » VC2X2C48L6-310/295/275/265

Driver Part Number	PS-1400A20W-ND	PS-1400A20W-ND-220V	PS-1400A20W-D	PS-1400A20W-D-220V
Manuf. Model Number	ERP ESS020W-1400-14	ERP ESS020W-1400-14	ERP ESS020W-1400-14	ERP ESS020W-1400-14
Output Current	1400mA	1400mA	1400mA	1400mA
Output Voltage	8.0V ~ 14.0V	8.0V ~ 14.0V	8.0V ~ 14.0V	8.0V ~ 14.0V
Rated Power	19.6W	19.6W	19.6W	19.6W
Input Voltage	120VAC ~ 277VAC	120VAC ~ 277VAC	120VAC ~ 277VAC	120VAC ~ 277VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug	120VAC power cord, NEMA 1-15P plug, dimmer dial, and digital panel meter	220VAC power cord, NEMA 6-15P plug, dimmer dial, and digital panel meter

PS-1400A16W Driver Products



- **Available Drivers:**
 - » PS-1400A16W-ND
 - » PS-1400A16W-ND-220V
 - » PS-1400A16W-D (Dimming)
 - » PS-1400A16W-D-220V (Dimming)
- **Corresponding LEDs:**
 - » VC2X2C45L9-405/395/385/375/365

Driver Part Number	PS-1400A16W-ND	PS-1400A16W-ND-220V	PS-1400A16W-D	PS-1400A16W-D-220V
Manuf. Model Number	MW PCD-16-1400A	MW PCD-16-1400B	MW LPF-25D-12	MW LPF-25D-12
Output Current	1400mA	1400mA	2100mA	2100mA
Output Voltage	8.0V ~ 12.0V	8.0V ~ 12.0V	6.6V ~ 12.0V	6.6V ~ 12.0V
Rated Power	16.8W	16.8W	25.2W	25.2W
Input Voltage	90VAC ~ 135VAC	180VAC ~ 295VAC	90VAC ~ 305VAC	90VAC ~ 305VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug	120VAC power cord, NEMA 1-15P plug, dimmer dial, and digital panel meter	220VAC power cord, NEMA 6-15P plug, dimmer dial, and digital panel meter

PS-1400A60W Driver Products



- **Available Drivers:**
 - » PS-1400A60W-ND
 - » PS-1400A60W-ND-220V
 - » PS-1400A60W-D (Dimming)
 - » PS-1400A60W-D-220V (Dimming)
- **Corresponding LEDs:**
 - » VC12X1C48L6-310/295/275/265

Driver Part Number	PS-1400A60W-ND	PS-1400A60W-ND-220V	PS-1400A60W-D	PS-1400A60W-D-220V
Manuf. Model Number	MW LPC-60-1400	MW LPC-60-1400	MW LPF-60D-42	MW LPF-60D-42
Output Current	1400mA	1400mA	1430mA	1430mA
Output Voltage	9.0V ~ 42.0V	9.0V ~ 42.0V	25.2V ~ 42.0V	25.2V ~ 42.0V
Rated Power	58.8W	58.8W	60.06W	60.06W
Input Voltage	90VAC ~ 264VAC	90VAC ~ 264VAC	90VAC ~ 305VAC	90VAC ~ 305VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug	120VAC power cord, NEMA 1-15P plug, dimmer dial, and digital panel meter	220VAC power cord, NEMA 6-15P plug, dimmer dial, and digital panel meter

PS-700A30W Driver Products



- **Available Drivers:**
 - » PS-700A30W-ND
 - » PS-700A30W-ND-220V
 - » PS-700A30W-D (Dimming)
 - » PS-700A30W-D-220V (Dimming)
- **Corresponding LEDs:**
 - » VC12X1C45L6-405/395/385/375/365

Driver Part Number	PS-700A30W-ND	PS-700A30W-ND-220V	PS-700A30W-D	PS-700A30W-D-220V
Manuf. Model Number	MW APC-35-700	MW APC-35-700	MW LPF-40D-54	MW LPF-40D-54
Output Current	700mA	700mA	760mA	760mA
Output Voltage	15.0V ~ 50.0V	15.0V ~ 50.0V	32.4V ~ 54.0V	32.4V ~ 54.0V
Rated Power	35W	35W	41.04W	41.04W
Input Voltage	90VAC ~ 264VAC	90VAC ~ 264VAC	90VAC ~ 305VAC	90VAC ~ 305VAC
Assembly Includes	120VAC power cord and NEMA 1-15P plug	220VAC power cord and NEMA 6-15P plug	120VAC power cord, NEMA 1-15P plug, dimmer dial, and digital panel meter	220VAC power cord, NEMA 6-15P plug, dimmer dial, and digital panel meter

Operation of Driver Kits with Violumas UV LEDs

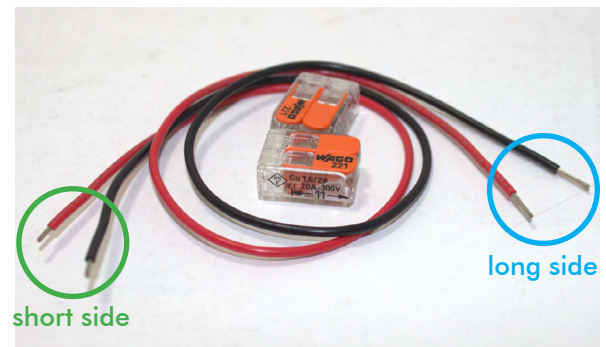
Notes for Operation

- Ensure you are utilizing the correct driver kit for the corresponding LED.
- Ensure that the LED is mounted onto a proper cooling solution (heatsink) before turning the LED on.
- When plugging in the driver kit, the use of a power strip with an on/off switch is recommended.
- If operating outside of North America, the use of a universal plug adapter is recommended.
- If operating a dimmable driver kit (with a dimmer dial), ensure the dimmer dial is set to the lowest setting before plugging in the driver kit. After turning the driver on, increase the driving current gradually to the target value (do not exceed the recommended current on the LED datasheet).

Wire Connection Kit (Included in Driver Kit)

The wire connection kit includes 2-conductor connectors (x2) and positive and negative wires (x2).

- Each wire is pre-stripped for plug-and-play connections and has a length of approximately 300 mm.
- One end of each wire is stripped approximately 5 mm (**short side**). The short side should be inserted into the connector of the COB LED (or soldered onto the electrodes of the SMD LED's PCB).
- One end of each wire is stripped approximately 10 mm (**long side**). The long side should be coupled with the driver wires using the included 2-conductor connectors.



Connecting Wires to the COB LED

- Insert the short side of the negative/black wire into the negative COB connector.
- Insert the short side of the positive/red wire into the positive COB connector.
- For connecting the wires to the COB LED, insert the wire end fully into the appropriate COB connector (positive to positive, negative to negative). The connection should be tight even with a weak pull on the end of the wire. Direct insertion of the wire is recommended (soldering is not required).

Connecting Wires to the Driver

- Couple the long side of the negative/black wire to the negative/black wire of the driver using the provided 2-conductor connector.
- Couple the long side of the positive/red wire to the positive/red wire of the driver using the provided 2-conductor connector.
- For coupling wires with the provided connector, please insert the wire end fully into an unoccupied terminal and snap the connector shut. The connection should be tight even with a weak pull on the ends of the wires. Please ensure positive and negative wires are connected appropriately (positive to positive, negative to negative).

Disclaimer: Driver kits are intended for operating Violumas UV LED products. Violumas is not responsible for any damages that may result from inaccurate use of the recommended products. Violumas does not make any claims regarding warranty or guarantee of these products. It is recommended that each customer consults the Violumas engineering team before engaging Violumas products in extreme applications where the failure of the LED and damage to human health may be possible. Each user assumes full responsibility for determining the suitability of the use of Violumas products in various applications. Operating Violumas LEDs incorrectly or with an unsuitable driver may result in immediate failure and Violumas will not be responsible for replacement.

Violumas LED Driver Selection Guideline

About this Document

This technical note is intended to provide high-level, generic guidelines regarding the selection of LED drivers suitable for use with Violumas' LED products. Furthermore, applicable LED parameters, LED driver concepts, and safety regulations for the North American market are briefly explained.

Intended Audience

- Hardware designers, product developers and engineers using Violumas' LED products
- Violumas' technical Sales Engineers providing support to potential customers

Scope

While this technical note provides the basics for selecting a suitable power supply for use with Violumas' LED products, it is not meant to replace fundamental engineering knowledge and is rather intended to be used as a first guide for selection of a suitable power supply. The documentation is not geared towards providing detailed information on regulations and safety certifications for different countries and does not provide information on application-specific requirements. Please contact the Violumas team for resources on thermal management solutions.

Disclaimer

This resource is intended for product developers using Violumas' LED products. Product designers are solely responsible for (1) selecting the appropriate Violumas' products, (2) validating and testing the power supplies depending on the application, and (3) ensuring that the applicable standards and safety requirements are met. Violumas cannot be held responsible for any damages caused by following these guidelines since this document provides generic, high-level guidelines for driver selection (independent of the application).

1. Introduction

The power supply, also known as a driver, is one of the most important components of an LED system. LEDs are DC devices and so cannot be operated using AC wall-power. The LED power supply converts the AC wall-power to a DC signal and in most cases steps down the voltage/current to meet specific LED device and/system requirements.

The selection of an optimal power supply is vital to obtain the desired optical output, suitable lifetimes, and the desired reliability from the LEDs. Using the incorrect power supply can not only damage your LED product but can also be a source of dangerous hazards. Hence, the power supply should be chosen with utmost caution, keeping in mind the specific characteristics, which closely match the requirements of the application and the LEDs being used.

In this document, we provide a general guideline to select power supplies for Violumas' products. A standard PSU by Meanwell has been chosen as a reference to study the required parameters.

2. Before the selection process

In order to select a suitable driver(s) for your LEDs, you need to obtain the datasheet(s) of the LED product(s) of interest. In case of a custom product, please check-in with Violumas' technical support team to obtain this information.

2.1 Electro-optical parameters

- a) **Forward voltage:** This parameter is specified in the electro-optical characteristics of the LED product and is defined as the voltage required to turn on the LED. While the parameter may be represented as a single value and not a range, it is important to also know about the binning differences and the range of forward voltages available for a particular bin. In addition, the operating voltage may also vary slightly depending on the drive current. The forward voltage in the datasheet should match the output voltage required from the power supply.

Electro-Optical Characteristics at $T=25^{\circ}\text{C}$ and $I_F=350\text{mA}$					
Parameter	Symbol	Unit	Min	Typical	Max
Peak Wavelength	λ_p	nm	260	265	270
Forward Voltage	V_f	V	-	5.9	-
Radiant Flux	P_o	mW	20.1	22.0	23.4
Full Width of Half Magnitude	$\Delta\lambda$	nm	-	12.5	-
Radiant Angle	$2\Phi_{1/2}$	Degree	-	130	-
Thermal Resistance, Junction to Solder Joint	$R_{\theta(J-S)}$	$^{\circ}\text{C/W}$	-	9	-

Figure 1: Electro-optical characteristics of a Violumas LED

- b) **Driving current:** Optical output of an LED is directly proportional to the driving current chosen as shown in the Figure 2 below. This would be the minimum output current required from the power supply (in case of a single LED product) and would determine the intensity of the light. Hence, this may be varied on the basis of the application.

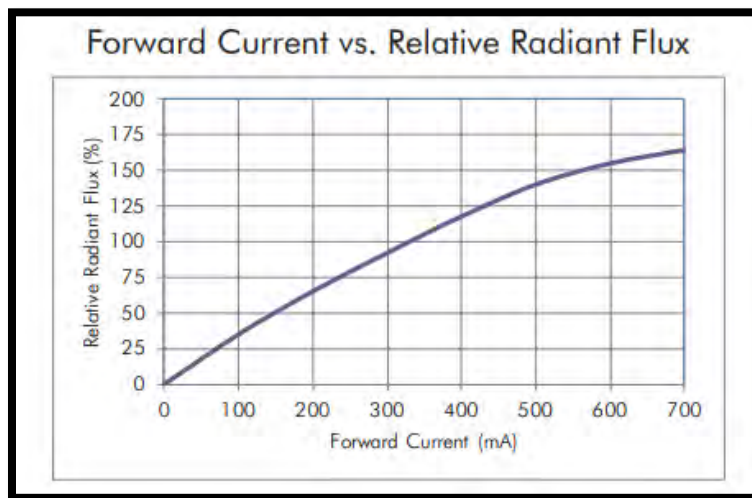


Figure 2: Relative radiant flux as a function of the driving current for a UV LED

- c) **LED arrays:** In many cases LEDs may be configured in series or parallel arrays to meet application requirements. Information on the series/ parallel combinations of LED products is important if a combination of products is required to be driven by the same PSU. Voltages are to be added in series and currents should be added when LEDs are connected in parallel. The total voltage and current requirements for a module need to be known to power up the module.

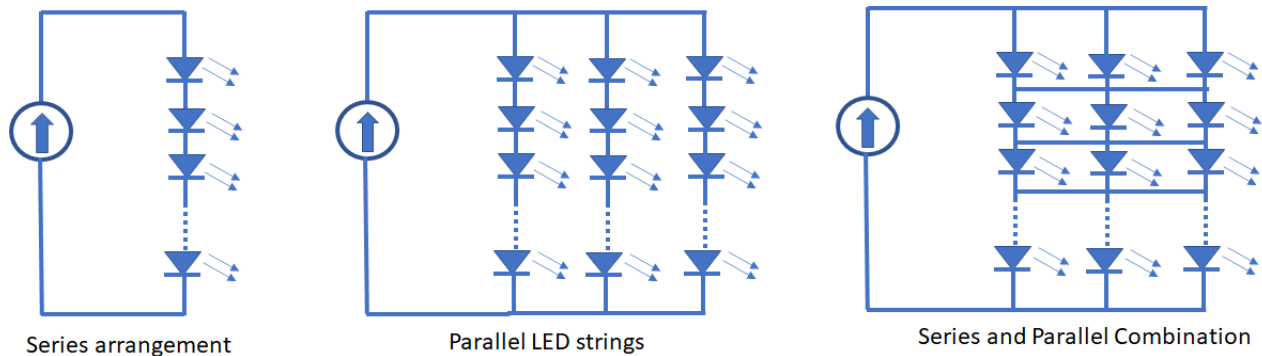


Figure 3: Different LED array formats define the voltage/current requirements

- d) **Power requirements:** Once the forward voltage and current are known, the output power requirements for the power-supply can be calculated.

2.2 Environmental/operational parameters

- **Wall voltage:** It is important to know the input AC Voltage value available to power-up the power supply. North American products are mostly designed for 120/240VAC but 277 VAC may also be used in some facilities.
- **Ambient temperature:** Depending on the application requirements, the ambient temperature needs to be determined. Outdoor products may have harsher ambient temperature requirements than products used indoors.
- **Water and dust ingress protection:** Many applications may require water-proofing and so the IP or the ingress protection requirements for the application need to be known.

3. Power Supply Selection procedure

3.1 A Constant-Voltage or a Constant Current driver

As the majority of our products are designed for specific illumination requirements, Violumas recommends the use of constant-current drivers with LED products. Constant current drivers support limited voltage ranges and proper driver selection should be ensured for a given COB. If a constant voltage driver is used instead and the current is not regulated, as the LED temperature increases when powered ON, the LED forward voltage would decrease accordingly. This would mean that the LED would draw more current, implying a further increase in temperature. This continual increase in the driving current would result in additional heat generation leading to a thermal runaway fault resulting in premature failures and lower lifetimes. Hence, the preferred method of driving Violumas' LEDs is by using a constant current LED driver. A constant current driver controls and maintains the set current without over driving the LEDs and preventing thermal runaway, even if there is a change in temperature.

3.2 Driver specifications

The driver specifications provided here assume that a constant-current driver is being used.

- 1. Input voltage and frequency range:** The AC input voltage range for the driver must comply with the AC wall-voltage of the facility. Voltage variations should also be taken into account. For example, a 90-305 VAC PSU would work both for 120 and 220 VAC grid systems. For European voltages, the requirement would be 230 VAC @ 50 Hz, which the power-supply (specifications in Figure 4) below would satisfy.

INPUT	VOLTAGE RANGE	90 ~ 305VAC 127 ~ 431VDC (Please refer to "STATIC CHARACTERISTIC" section)							
	FREQUENCY RANGE	47 ~ 63Hz							
	POWER FACTOR (Typ.)	PF ≥ 0.98/115VAC, PF ≥ 0.95/230VAC, PF ≥ 0.94/277VAC @ full load (Please refer to "POWER FACTOR (PF) CHARACTERISTIC" section)							
	TOTAL HARMONIC DISTORTION	THD < 20% (@ load ≥ 50% / 115VAC, 230VAC; @ load ≥ 75% / 277VAC) (Please refer to "TOTAL HARMONIC DISTORTION (THD)" section)							
	EFFICIENCY (Typ.) (230Vac)	91%	92.5%	93.5%	94%	94%	94.5%	95%	95%
	EFFICIENCY (Typ.) (277Vac)	91.5%	93%	94%	94.5%	94.5%	95%	95%	95%
	AC CURRENT (Typ.)	3.5A / 115VAC 1.65A / 230VAC 1.45A / 277VAC							
	INRUSH CURRENT(Typ.)	COLD START 70A (width=1010μs measured at 50% peak) at 230VAC; Per NEMA 410							
	MAX. No. of PSUs on 16A CIRCUIT BREAKER	1 unit (circuit breaker of type B) / 2 units (circuit breaker of type C) at 230VAC							
	LEAKAGE CURRENT	<0.75mA / 277VAC							

Figure 4: Input parameters from a [Meanwell power-supply](#)

It should also be noted that the PSU may be derated below certain input voltages as shown in the static characteristics below. This should be kept in mind if input AC voltage fluctuations are anticipated.

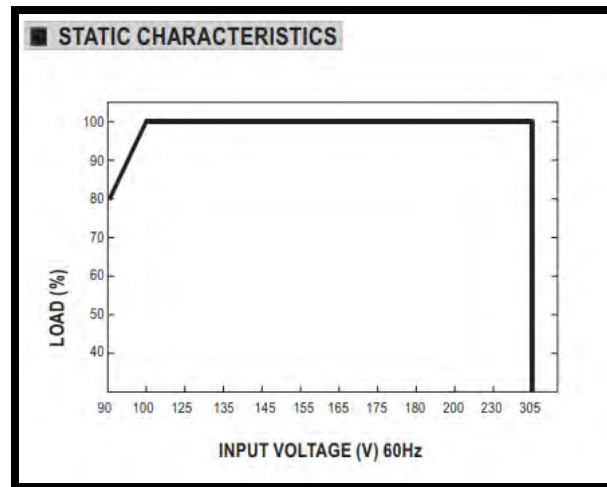


Figure 5: Load characteristics over the input voltage range from a [Meanwell power-supply](#)

- Output current range:** To select a constant current driver you will need to determine the proper driving current for your LED array and ensure the “Output Current” matches the driving current you require. Figure 6 below shows several models (of the Meanwell power supply referred to earlier) which have different voltage and current ranges.

MODEL	HLG-320H-12	HLG-320H-15	HLG-320H-20	HLG-320H-24	HLG-320H-30	HLG-320H-36	HLG-320H-42	HLG-320H-48	HLG-320H-54
DC VOLTAGE	12V	15V	20V	24V	30V	36V	42V	48V	54V
CONSTANT CURRENT REGION <small>Note.4</small>	6 ~ 12V	7.5 ~ 15V	10 ~ 20V	12 ~ 24V	15 ~ 30V	18 ~ 36V	21 ~ 42V	24 ~ 48V	27 ~ 54V
RATED CURRENT	22A	19A	15A	13.34A	10.7A	8.9A	7.65A	6.7A	5.95A
RATED POWER	264W	285W	300W	320.16W	321W	320.4W	321.3W	321.6W	321.3W
RIPPLE & NOISE (max.) <small>Note.2</small>	150mVp-p	150mVp-p	150mVp-p	150mVp-p	200mVp-p	250mVp-p	250mVp-p	250mVp-p	350mVp-p
OUTPUT	Adjustable for A/C-Type only (via built-in potentiometer)								
	VOLTAGE ADJ. RANGE	10.8 ~ 13.5V	13.5 ~ 17V	17 ~ 22V	21 ~ 26V	26 ~ 32V	32 ~ 39V	38 ~ 45V	43 ~ 52V
	Adjustable for A/AB/C-Type only (via built-in potentiometer)								
	CURRENT ADJ. RANGE	11 ~ 22A	9.5 ~ 19A	7.5 ~ 15A	6.67 ~ 13.34A	5.35 ~ 10.7A	4.45 ~ 8.9A	3.8 ~ 7.65A	3.35 ~ 6.7A
	VOLTAGE TOLERANCE <small>Note.3</small>	± 3.0%	± 2.0%	± 1.5%	± 1.0%	± 1.0%	± 1.0%	± 1.0%	± 1.0%
	LINE REGULATION	± 0.5%	± 0.5%	± 0.5%	± 0.5%	± 0.5%	± 0.5%	± 0.5%	± 0.5%
	LOAD REGULATION	± 2.0%	± 1.5%	± 1.0%	± 0.5%	± 0.5%	± 0.5%	± 0.5%	± 0.5%
	SETUP, RISE TIME <small>Note.6</small>	2500ms, 80ms/115VAC		500ms, 80ms/230VAC					

Figure 6: Output characteristics of a constant-current driver

3. **Output voltage range:** This range should cover the forward voltage of the LED or the LED array. The voltage supplied by the driver automatically adjusts to meet the require LED forward voltage. In some power supplies, the output voltage can be adjusted using a potentiometer option (voltage adjustable range) as shown in Figure 6 above.
4. **Output power:** The output power from the PSU should be equal to or greater than the LED power requirement. In many cases, a 20% additional margin is used to ensure the power supply lifetime and reliability.
5. **Other parameters**

- a) **Ingress protection:** Depending on the ambient environment where the power-supply needs to be used, an ingress protection (IP) rating may be required. The IP rating determines how resistant the PSU would be to dust and water. The table below shows how to determine the IP rating for an application. For example, a dust-tight supply protected against jets of water would be rated IP65. This rating should be checked when selecting the PSU.

SOLID OBJECT	MOISTURE
1 Protected against a solid object greater than 50mm such as a hand.	1 Protected against vertical falling drops of water. Limited ingress permitted.
2 Protected against a solid object greater than 12.5mm such as a finger.	2 Protected against vertical falling drops of water with enclosure tilted up to 15 degrees from the vertical. Limited ingress permitted.
3 Protected against a solid object greater than 2.5mm such as a screwdriver.	3 Protected against sprays of water up to 60 degrees from the vertical. Limited ingress permitted.
4 Protected against a solid object greater than 1mm such as a wire.	4 Protected against water splashes from all directions. Limited ingress permitted.
5 Dust protected. Limited ingress of dust permitted. Will not interfere with operation of the equipment.	5 Protected against jets of water. Limited ingress permitted.
6 Dust tight. No ingress of dust.	6 Protected against powerful jets of water. Limited ingress permitted.
	7 Watertight against the effects of immersion in water between 15cm and 1m for 30 minutes.
	8 Watertight against the effects of immersion in water under pressure for long periods.

IP65
Ingress protection

Figure 7: Ingress protection rating chart

- b) Ambient and case temperature:** It is important to note the temperature ratings if the PSU is going to be used in extreme temperature conditions as the load % as well as the driver lifetime can vary depending on temperature. For example, in Figure 8, the performance characteristics for a Meanwell driver vary depending on the input wall voltage. The lifetime drops to 50% of the value when case temperature is increased to 80 deg. C.

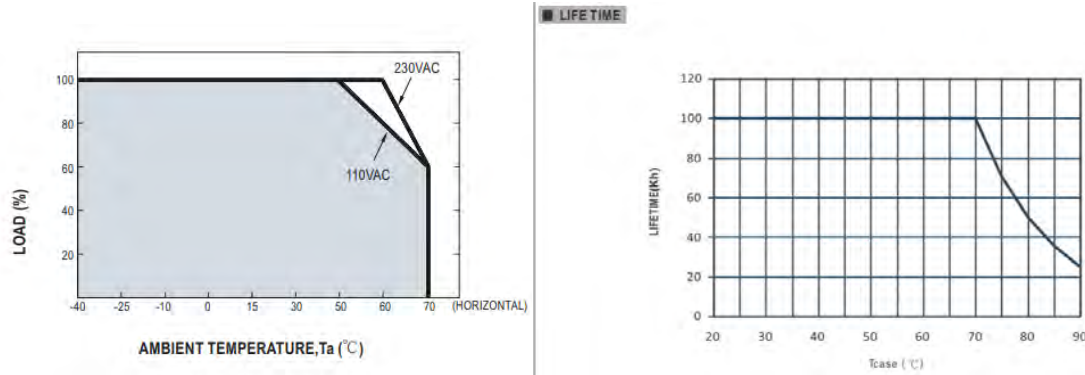


Figure 8: Performance and lifetime dependence of drivers at different temperatures.

- c) Certifications:** All LED drivers require basic agency safety certifications from UL and/or CSA, as well as FCC or equivalent EMI/RFI certification. In Japan, devices are required to meet PSE, and in Europe the certification requirement is TUV.

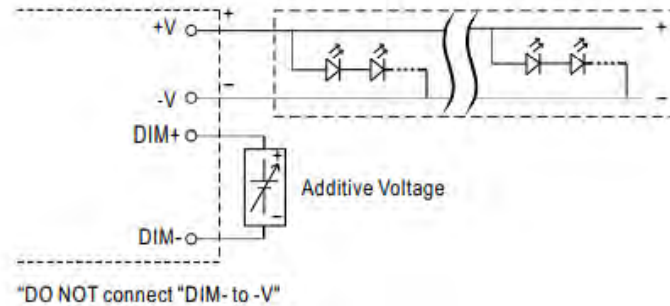
3.3 Dimming requirements

If the application requires intensity control, a power supply with a dimming control would be needed. Many PSU manufacturers such as Meanwell offer several options for dimming control as shown. Depending on the driver type (Type A, Type B or Type AB, various dimming options are available. Meanwell's Type A PSU provides an in-built potentiometer option for controlling current as well as the voltage (within the specified adjustable range).

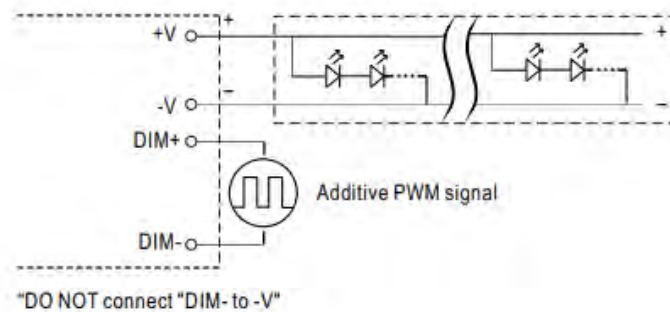
Type B PSU required external controlling devices to control the current. Three different ways are possible as shown in Figure 9.

Type AB provides both the in-built potentiometer as well as an external control option.

⦿ Applying additive 1 ~ 10VDC



⦿ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



⦿ Applying additive resistance:

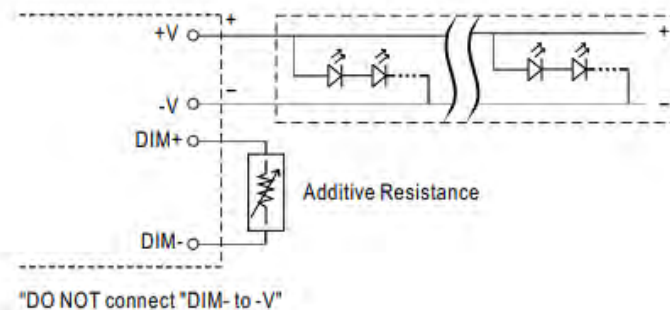


Figure 9: Different ways to dim a Type B Meanwell PSU

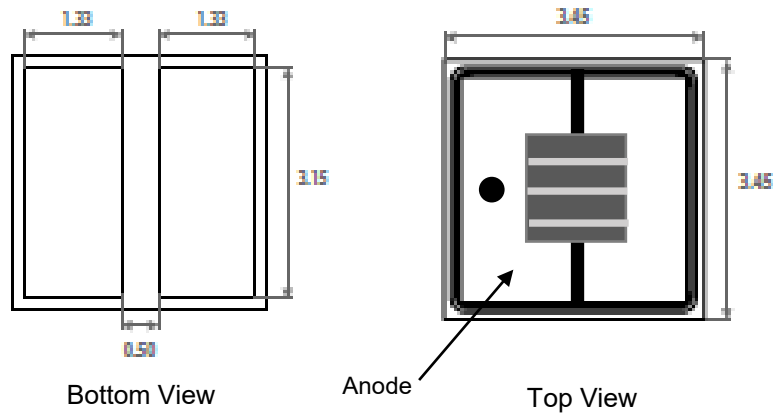
Please check with Violumas' technical support on what can be offered for dimming control for your application.

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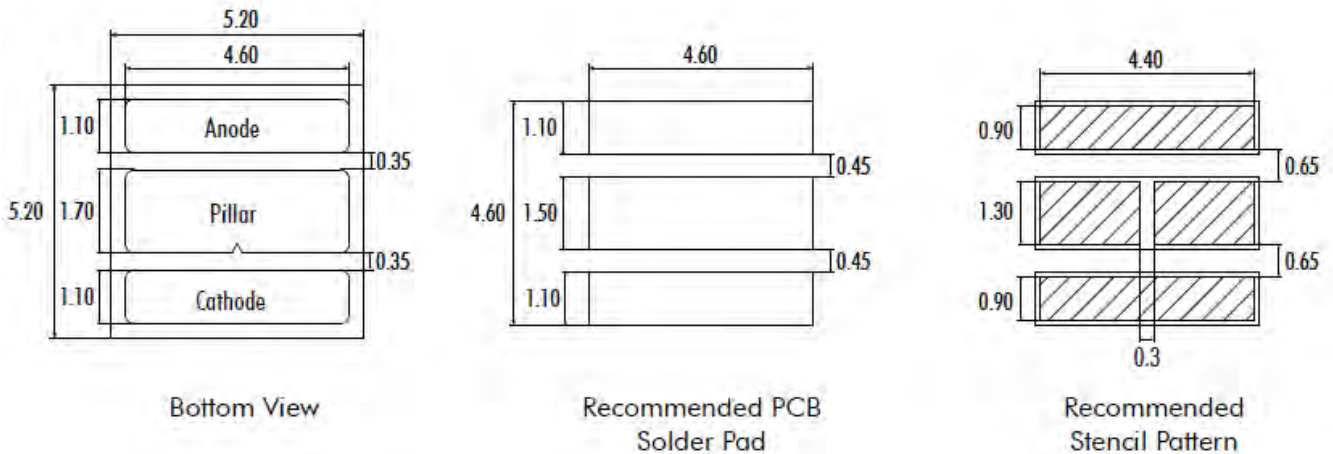
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UV LED Solder Pad Dimensions (mm)

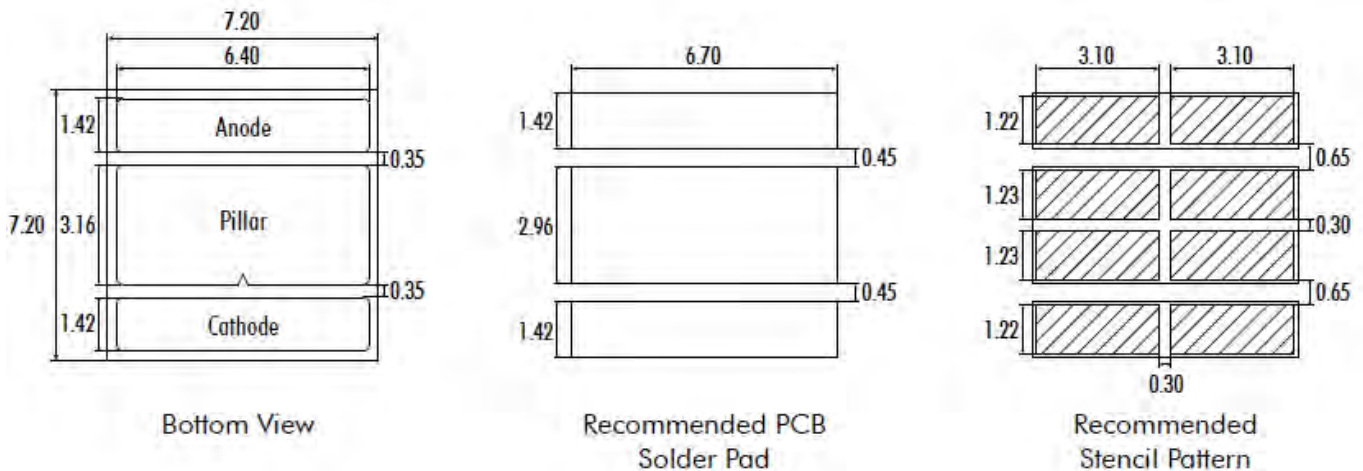
WS3535 series



VS5252 series



VS7272 series

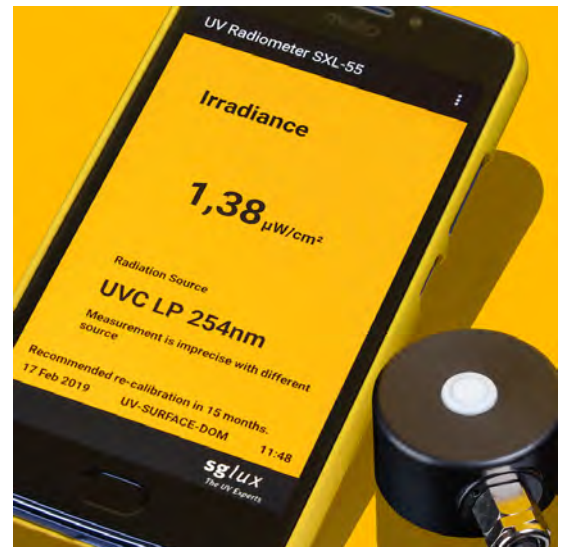




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