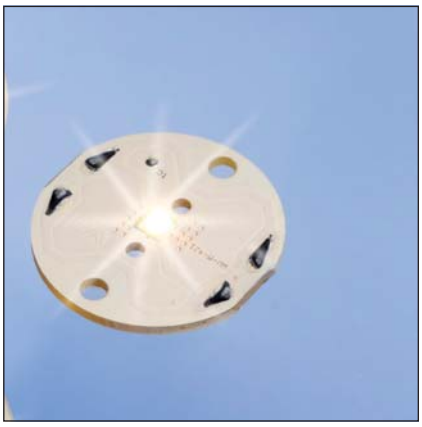
A New Lighting Experience



- **long service lifetime due to optimal thermal management**
- **very high lumen output**
- **highly efficient (up to 132 lm/W)**
- **available in different CCTs**
- **attachment for lenses with different radiation angles**
- **resistant against shock and vibrations**

PowerEmitter XP

WU-M-421

Typical Applications

- Integration in luminaires
- Architectural illumination
- Marking of paths, stairs, etc.
- Furniture lighting
- Light advertising
- Entertainment, shop design

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PowerEmitter XP

Technical Notes

- PCB diameter: 30 mm
- FR4-PCB with thermal vias for optimum thermal management
- ESD protection class 2

Electrical Characteristics

at ambient temperature t_a = 25 °C

Type	Ref. No.	350 mA				500 mA				700 mA				1050 mA			
		Voltage DC (V)		Power W		Voltage DC (V)		Power W		Voltage DC (V)		Power W		Voltage DC (V)		Power W	
WU-M-421-		typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.	typ.	max.
XPC-CW/NW/WW	**All types**	3.40	3.90	1.19	1.37	3.50	4.00	1.75	2.00	not allowed		not allowed		not allowed		not allowed	
XPE-CW/NW/WW	**All types**	3.20	3.90	1.12	1.37	3.30	4.00	1.65	2.00	3.40	4.10	2.38	2.87	not allowed		not allowed	
XPG-CW/NW/WW	**All types**	3.00	3.75	1.05	1.31	3.10	3.85	1.55	1.93	3.20	3.95	2.24	2.77	3.30	4.05	3.47	4.25

Use of external LED constant current driver with max. 500 mA (XP-C) or 700 mA (XP-E) or 1050 mA (XP-G) required.

Maximum Ratings

Exceeding the maximum ratings can lead to reduction of lifetime or destruction of the module.

Type	Operation current	Operation temperature range at t_c-point		Storage temperature range		Reverse voltage
	mA	°C min.	°C max.	°C min.	°C max.	V
All types	350	–20	+85	–20	+85	5
All types	500	–20	+75	–20	+85	5
XP-E, XP-G types	700	–20	+70	–20	+85	5
XP-G types	1050	–20	+60	–20	+85	5

Optical Characteristics

at junction temperature t_j = 25 °C

Type	Ref. No.	Colour	Correlated colour temperature (K)	Luminous flux (lm) at								Radiation angle (°)
				350 mA		500 mA		700 mA		1050 mA		
				min.	typ.	min.	typ.	min.	typ.	min.	typ.	
PowerEmitter XP-C												
WU-M-421-XPC-CW	**546673**	White	5650...6950	100.0	114.0	130.0	148.2	not allowed		not allowed		110
WU-M-421-XPC-NW	**546671**	Neutral white	3700...4260	73.9	87.4	96.1	113.6	not allowed		not allowed		110
WU-M-421-XPC-WW	**546676**	Warm white	2870...3200	67.2	80.6	87.4	104.8	not allowed		not allowed		110
PowerEmitter XP-E												
WU-M-421-XPE-CW	**546680**	White	5650...6950	107.0	122.0	139.1	158.6	181.9	207.4	not allowed		115
WU-M-421-XPE-NW	**546685**	Neutral white	3700...4260	93.9	107.0	122.1	139.1	159.6	181.9	not allowed		115
WU-M-421-XPE-WW	**546684**	Warm white	2870...3200	80.6	93.9	104.8	122.1	137.0	159.6	not allowed		115
PowerEmitter XP-G												
WU-M-421-XPG-CW	**546686**	White	5300...7050	122.0	139.0	170.8	194.6	219.6	250.2	305.0	347.5	125
WU-M-421-XPG-NW	**546687**	Neutral white	3700...4260	107.0	122.0	149.8	170.8	192.6	219.6	267.5	267.5	125
WU-M-421-XPG-WW	**546688**	Warm white	2870...3200	100.0	114.0	140.0	159.6	180.0	205.2	250.0	250.0	125

* On account of the complex manufacturing process of the modules the above values only represent statistical variables.
The values do not necessarily correspond exactly to the actual parameters of every single product which can vary from the typical specification.

** The reference numbers represent a single brightness group. In order to ensure availability please contact your sales prior to order.

Minimum order quantity: 144 pcs. | lower quantity on request, when available from stock
Packing unit: 24 pcs.

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PowerEmitter XP

Operating Life

50,000 hrs. (lumen maintenance at 70 %)

Modul	I_F 350 mA	I_F 500 mA	I_F 700 mA	I_F 1050 mA
XP-C	t_c 65 °C	t_c 55 °C	not allowed	not allowed
XP-E	t_c 75 °C	t_c 65 °C	t_c 55 °C	not allowed
XP-G	t_c 80 °C	t_c 70 °C	t_c 60 °C	t_c 50 °C

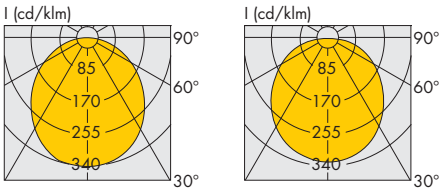
These values do not refer to the colour temperature.

Thermal Characteristics

Type	Thermal resistance, p-n junction to t_c point (K/W)	Thermal resistance, p-n-junction to bottom of PCB (K/W)
all types	24	25

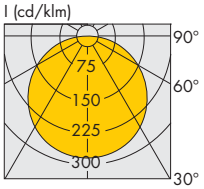
VS recommends an additional cooling element for improved thermal management.

Light Distribution Curve



XP-C

XP-E

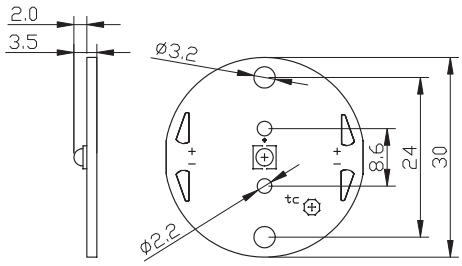


XP-G

Attachment optics with various radiation characteristics are available at VS Optoelectronic. Please find further information at www.vs-optoelectronic.com.

Mechanical Dimensions

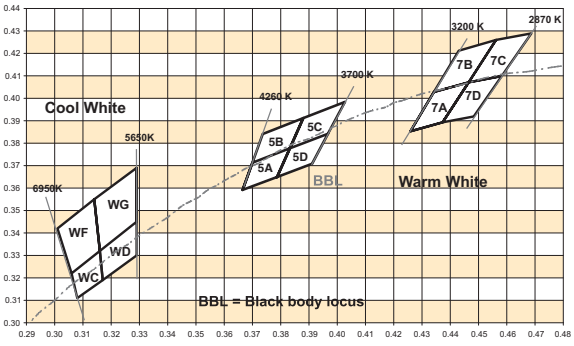
Preassembled lead connection on request.



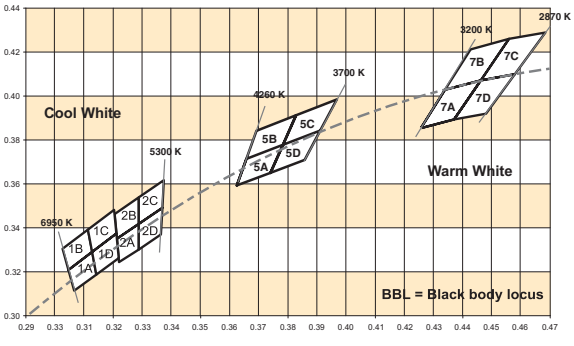
Bins

The standard shipping format regarding the reference numbers on page 2 includes all chromaticity coordinate groups.
The concrete delivered group is marked on each product. Reduction of orderable groups is possible only project-based.

XP-C / XP-E



XP-G



The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.
Please find further detailed information at www.vs-optoelectronic.com.

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PowerEmitter XP

Assembly and Safety Information

Installation must be carried out under observation of the relevant regulations and standards. The LED modules are designed for operation within a casing or luminaire. Installation must be carried out in a voltage-free state (i.e. disconnection from the mains). The following advice must be observed; non-observance can result in the destruction of the LED assembly modules, fire and/or other hazards.

- ESD (electrostatic discharge) protection measures must be observed when handling and installing the LED modules. See VS's application notes on ESD protection.
- LED assembly modules must not be subjected to any undue mechanical stress, e. g.:
  – do not treat as bulk cargo
  – avoid shear and compressive forces during handling and installation
  – do not damage circuit paths
- LED assembly modules are designed for attachment using a thermally conductive adhesive, an adhesive foil (Ref. No. 529157) or M3 screws. Please observe the manufacturer's technical data provided at www.3M.com/converter. Products equipped with adhesive transfer tape must only be applied to dry and clean surfaces that are free from grease, oil, silicone or other soiling. It is therefore recommended to clean the substrate with isopropyl alcohol (IPA).
  Please ensure a full-surface bond over the entire contact area when sticking the module to the substrate.
  The following substances are regarded as critical for creating an adhesive bond:
  – Polyefins (polyethylene, polypropylene)
  – Rubber
  – Powder-coated materials
  – Silicone rubber
  – Teflon

  Owing to the varying application options and different types of surface as well as ambient conditions, VS accepts no liability for the quality of the adhesive bond achieved when mounting these products. Prior to sticking a VS product, care must be taken to check whether the material in question is actually suitable for the intended purpose under consideration of all possible application-relevant influences. Supplementary holders must be used if necessary. If opting for screw attachment, plastic screws or suitably insulated, non-loosening metal screws must be used.
- Safe operation only possible by the use of external constant current sources (Imax. see table "Electrical Characteristics").
- Power supply units must be used for operation, in which the following protective measures are ensured:
  – Short-circuit protection
  – Overload protection
  – Overheating protection
  – SELV equiv. (Safety Extra Low Voltage)
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- For optimal load of used constant current driver the modules can only be connected in series. The quantity of LED modules is limited by the sum of forward voltage and the capacity of used constant current driver. Safety regulations acc. to EN 60598 has to be observed if the sum of forward voltage exceed the permitted touchable value.
- A parallel connection of the modules is not allowed.

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Assembly and Safety Information

- Due to the manufacturing process, the PCBs of the LED assembly modules can have sharp edges and corners. Care must therefore be taken during handling and installation to avoid injury.
- To ensure problem-free operation, the specified maximum temperature at the t_C point (see "Operating Life") must be observed (measured in accordance with EN 60598-1). To satisfy this point, it may be necessary to put measures in place to ensure any heat is dissipated from the PCB to the environment.
- In the event of outdoor applications or applications in damp locations, care must be taken to protect LED assembly modules against humidity, splashes and jets of water. Any corrosion damage resulting from humidity or contact with condensation will not be recognised as a defect or manufacturing fault. LED assembly modules are not specially protected against foreign bodies or dust. Depending on the type of application, further protection must be ensured to prevent dust and foreign bodies from entering.
- Tests have shown the following chemicals to be harmful to LEDs used on the modules.
  It is recommended not to use these chemicals anywhere in an LED system.
  The fumes from even small amounts of these chemicals may damage the LEDs.
  - Chemicals that might outgas aromatic hydrocarbons (e.g., toluene, benzene, xylene)
  - Methyl acetate or ethyl acetate (i.e., nail polish remover)
  - Cyanoacrylates (i.e., "Superglue")
  - Glycol ethers (including Radio Shack®, Precision Electronics Cleaner – dipropylene glycol monomethyl ether)
  - Formaldehyde or butadiene (includingAshland PLIOBOND® adhesive)
  - Dymax 984-LVUF conformal coating
  - Loctite Sumo glue
  - Gorilla glue
  - Clorox bleach
  - Clorox Clean-Up cleaner spray
  - Loctite 384 adhesive
  - Loctite 7387 activator
  - Loctite 242 threadlocker

  Detailed information of handling of Cree LEDs can be found on www.cree.com.
- The photobiological safety of the LED modules must be classified into risk groups in accordance with EN 62471: 2008.
  - general lighting
    exempt group:
    WU-M-421
  - other applications
    risk group 2:
    WU-M-421

  Use of standard VS optics does not affect the need to classify LED modules into the above mentioned risk groups.

Applied Standards

EN 62031
LED modules for general lighting – Safety specifications

EN 62471
Photobiological safety of lamps and lamp systems

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