PRELIMINARY DATASHEET
Lighting Solutions

CurX™ UV-LED Module

UV LED for Printing and Curing

The CurX™ UV-LED module is well suited for a wide range of demanding printing and curing applications.

Excelitas Technologies' CurX™ UV-LED module is an LED-based, high-power UV light source for UV curing applications in the UVA wavelength range. The CurX UV-LED module is well suited for applications such as digital ink printing, screen printing, flexo printing, offset printing, and the curing of coatings, adhesives, glues, and varnishes.

The CurX UV-LED module is a linear, scalable, high-end UV LED curing "flood" module available in 365 nm, 385 nm, and 395 nm ranges of UV output. It incorporates LED technology from Nichia, and delivers higher irradiance than other products on the market, featuring an ultra-compact design for easy integration. The module also features a sophisticated water cooling system that provides a consistent operating temperature for maximum performance. It is comprised of a ceramic substrate with multiple UV LED dies, a driver, and controller for fast switching and easy dimming. The CurX UV-LED module is fully customizable to meet specific needs of customers and requires no mechanical switches.

A 20 mm x 60 mm emitting area provides the highest irradiance available and maximum performance for high speed curing. The CurX UV-LED module is environmentally friendly, mercury-free, with no ozone generation, and is RoHS compliant.

CurX™

Key Features

- Maximum Operating Stability for Increased Productivity
- Highest Irradiance Available (W/cm^2) for Increased Throughput
- Up to 18 W/cm^2 @ 385 nm
- Superior Reliability, Longer Life, Lower Operating Costs
- Compact Design for Easy Integration and Customization
- Based on Nichia LED Technology
- Environmentally Friendly and Energy Efficient

Applications

- Digital Ink Printing
- Screen Printing
- Flexo Printing
- Offset Printing
- Coating and Varnish Curing
- Adhesive Curing

EXCELITAS® TECHNOLOGIES

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Optical Performance

The CurX UV-LED module provides unparalleled high power irradiance with a high level of homogeneity for even curing. It was designed for long-term use and has excellent operational stability. Stable curing results mean less waste, less testing and adjustments, with better results. The internal controller intelligence provides a proportional power output for easy dimming and adjusting.

Table 1 – Optical Specification

Parameter	Symbol	Unit	Minimal	Typical	Maximal	Notes
Wavelength (peak)	λ	nm	380	385	390	1
Length of emitting area		mm	-	63.6	-	
Width of emitting area		mm	-	20	-	
Irradiance, peak	I_{avg}	W/cm²	-	16	-	1, 2, 3
Irradiance uniformity	-	%	-	-	±10	3, 4
Lifetime	L_{70}	hours	-	20,000	-	5

Notes:

1. Measured at 700 mA per LED (see electrical characteristics for total current) and water inlet at 20°C.
2. Measured at glass exit window of module.
3. Irradiance specifications apply to the defined target distance.
4. Relative to the measured average irradiance of that module in 15 mm distance.
5. Operation time for output degradation to 70% of initial average irradiance in 10 mm distance to the module.

Figure 1 - Relative irradiance as a function of the working distance to the exit window plane.

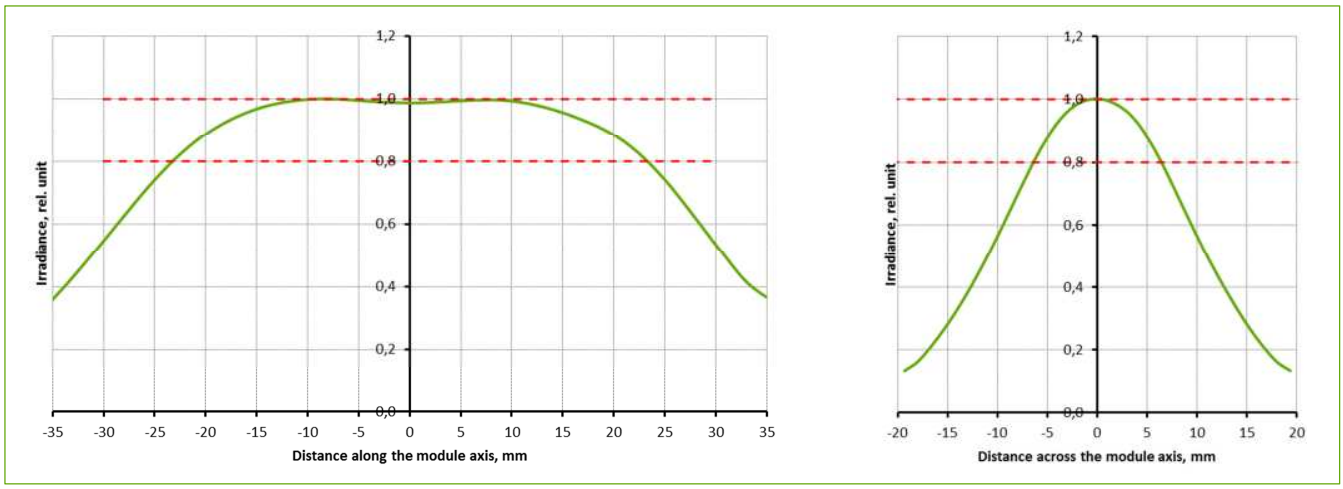

Figure 2 - Relative irradiance on the target area, working distance 15 mm (± 10% limits indicated by the red dotted line).

Note the irradiance drop at the edges shown in the left graph applies to one module situation. When multiple modules are assembled in longer curing lines, no significant irradiance drop occurs between the individual CurX modules as shown in Figure 3.

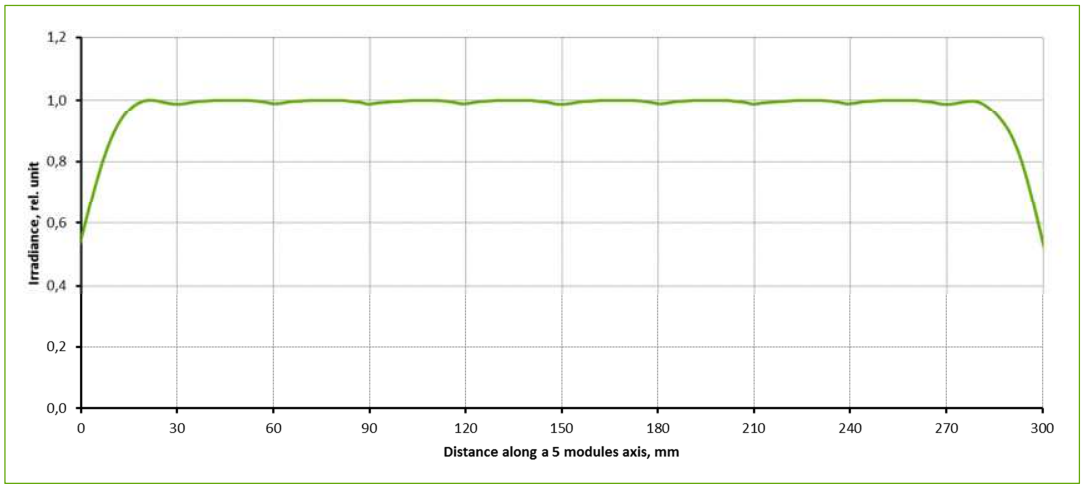

Figure 3 - Relative irradiation homogeneity in 15 mm distance for five CurX 60 mm modules in a row.

Electrical Specification

The CurX UV-LED module utilizes standard off-the-shelf power supply units (PSU). Please see the power and current requirements to achieve best performance.

Table 2 – PSU Requirements and Electrical Module Specification

Parameter	Symbol	Unit	Minimal	Typical	Maximal
Power supply for LED array, voltage	V_{LED}	V	-3%	48	+3%
Power supply for LED array, current	I_{LED}	A	-	11	12
Number of LED die per row				28	
Number of LED rows			-	6	-
Total power consumption	P_E	W	-	530	570
Diming range		%	10		100
Diming signal		V	0.5		10
Trigger signal		V	0 = OFF		12 = ON

The CurX UV-LED module can be electrically connected by a DSUB connector as shown in Table 3 below. See Table 4 for connector pin assignment and the corresponding signals.

Table 3 – DSUB Combi connector to be used with the CurX UV-LED module.

Manufacturer	Connector Type	Remarks
Connec	3007W2SXK99A10X, 3007W2SAM99A10X, …	Receptacle. Use appropriate with solder or crimp contacts. See “7w2” at http://www.conec.com/en/index.php?s=7w2
Phoenix Contact	1688230; 1655344	Receptacle. Use appropriate with solder or crimp contacts. See “DSUB-2P-5S” at http://www.phoenixcontact.com/online/portal/us/?q=DSUB-2P-5S&uri=pxc-search%3Awebsite&library=usen
TE Connectivity	215927-1	Receptacle. Use appropriate with solder or crimp contacts. See “7c2” at http://www.te.com/catalog/products/en?q=7c2

Table 4 – DSUB connector pin assignment.

Pin number	Signal	Description
A1	GND	Power Supply
A2	+48V	Power supply
1	On/Off	12V Pull-up. Apply 0V (or short circuit) to signal ground (Pin 5) to switch the module off. Apply 12V (or leave open) to switch the module on.
2	TSENSE	
3	ERROR	
4	DIM	0.5 - 10V for 10 … 100% of the output radiation
5	SGND	Signal ground

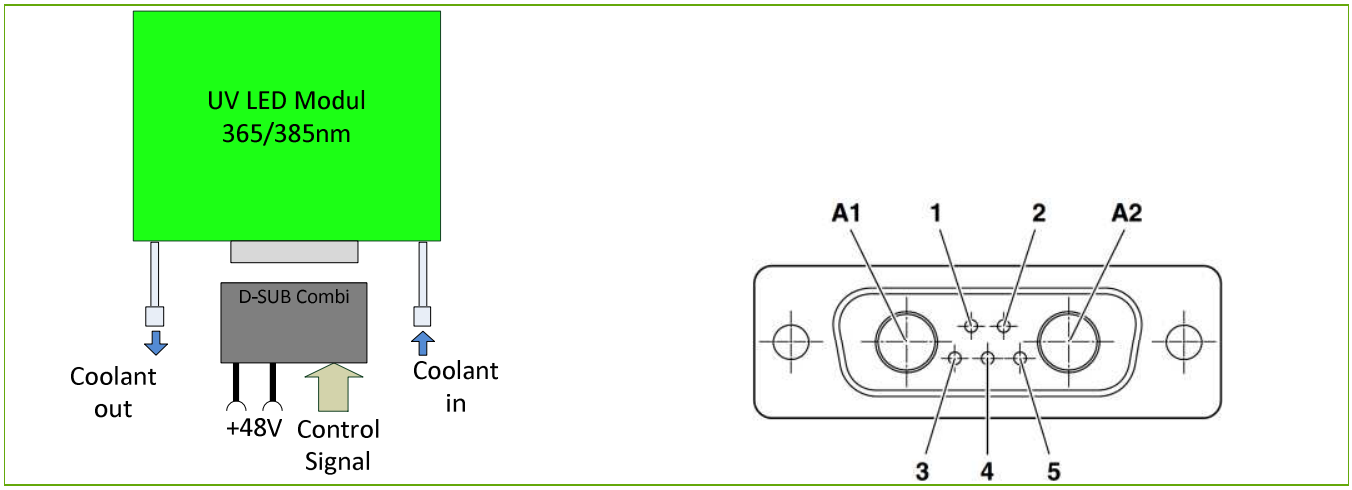

Figure 4 - CurX UV-LED module connector scheme (left) and electrical DSUB connector (right).

Cooling System

The CurX UV-LED module features a sophisticated water cooling system that provides a consistent operating temperature for maximum performance. The internal cooling block of the CurX UV-LED module that directly cools the high density LED packaged ceramic substrate uses a highly sophisticated water channel distribution system to provide proper and homogeneous cooling. As a result, the irradiance remains stable during long term operation. By operating the module at the conditions shown in Table 5, the junction temperature of the LED dies will remain below 70°C, resulting in a long product life. The cooling block is composed of brass for best corrosion stability.

The water system also cools the power electronics of the integrated driver, so no additional fans are needed.

Caution: To avoid condensation of water on the electronics, the coolant temperature should not be lower than 18°C. Do not use components or tubing containing zinc, zinc alloys or galvanization, as zinc dissolves in glycol-based cooling liquids.

Table 5 – Cooling specification

Parameter	Symbol	Unit	Minimal	Typical	Maximal
Coolant flow	-	l/min	3	4	-
Maximum pressure	-	bar	-	-	5
Pressure drop over module		bar		0.5	
Coolant temperature		°C	18	20	25

Use G1/8 thread water fittings for connecting the CurX UV-LED module. The hose nozzle is for flexible tubing with 10mm internal diameter. Excelitas advises closed circuit water cooling with an inhibitor such as Antifrogen–N.

The CurX UV-LED module water connectors are nozzles of a 2-way, fast locking coupler system of either a socket type (left pictures in Figure 5) or a nozzle type (right pictures Figure 5, as used in the module). Both types have self-locking valves that open as soon as they are coupled together to provide coupling without the loss of water, even under pressure.

When assembling the water connection make sure not to bend or pinch the tubes to ensure proper water flow.

Figure 5 – Self-locking, 2-way water coupling system, as used with CurX

Mechanical Specification

The mechanical specifications shown in this section apply to a 60 mm standard module including housing. When assembled to curing lines, housing parts including connections and protection window will change according to the specifications of the final system.

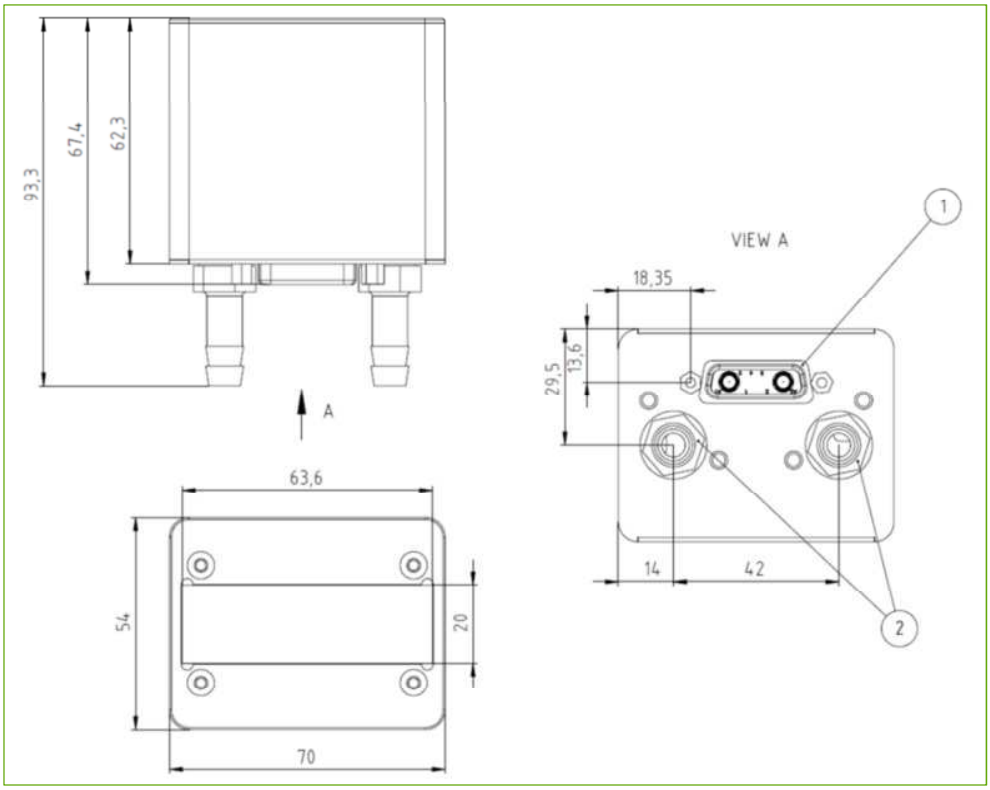

Figure 6 – Dimensions in mm of a single 60 mm module. ① Electrical connector ② Water connectors

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Notes

Safety guideline for human eyes and body

The CurX UV-LED module produces very strong UV light in the UVA range. Please use appropriate eye and body protection when handling this product.

RoHS Compliance

The CurX UV-LED module has been designed and built to be fully compliant with the European Union Directive 2002/95EEC – Restriction of the use of certain Hazardous Substances in Electrical and Electronic equipment (RoHS).

Ordering information

Part Number: CURXW01-0060-385-140-0000

Order Number: E002544

Limited warranty for 12 months from date of purchase.

U.S. and International patents pending.

Product improvements may result in specification or feature changes without notice.

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About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection, and other high-performance technology needs of OEM customers. From medical lighting to analytical instrumentation, clinical diagnostics, industrial, safety and security, and aerospace and defense applications, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has approximately 5,000 employees in North America, Europe and Asia, serving customers across the world.

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CurX-Rev.1.3-2014.01