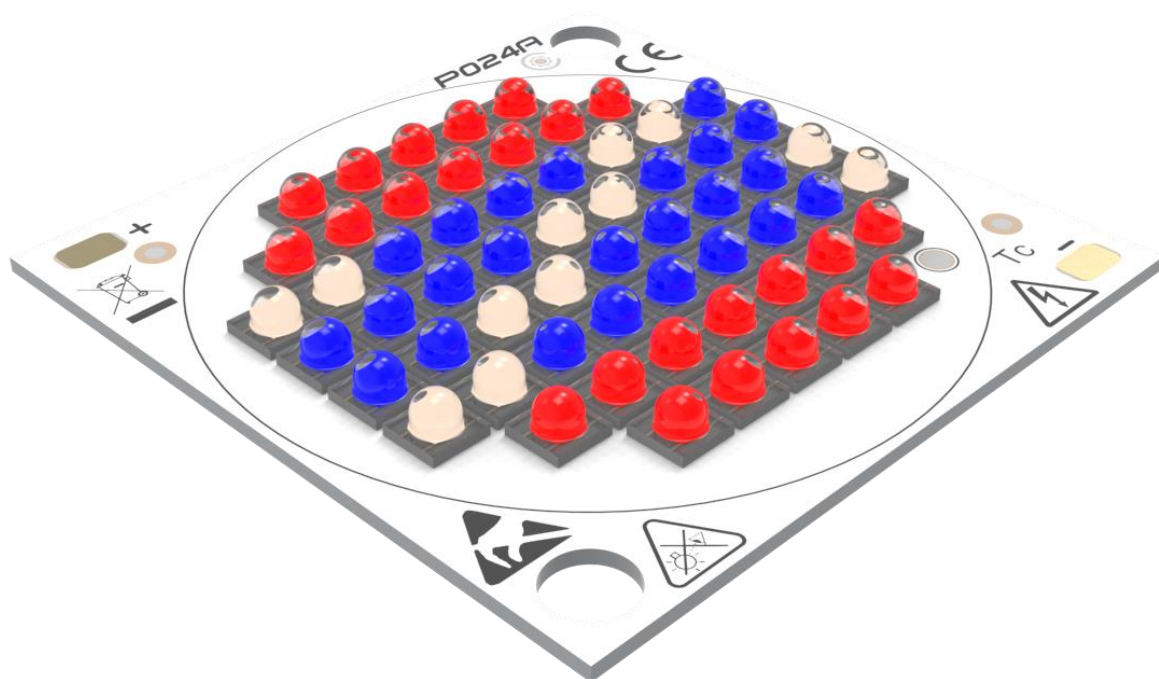


# CEZOS

***GrowEmity LOB 38x38 - P024***



The GrowEmity LED light source allows to accelerate plant growth and increase harvest. It is even possible to regulate plant growth and blooming time. Unlike an artificial light sources, LED light sources have specially matched spectrum for specific plants. Additionally, LEDs generate more light and less heat than sodium lamp, allow for lighting from side of plants. LED light sources are used in artificial plantation without daylight.

**Possibility to choose up to four colors from the following (one set of 2 or a multiple LEDs, total 18 LEDs).**

Colour	$\lambda$ [nm] / CCT [K]	Input Current [mA]	Forward Voltage [V]	Power [W]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]
RED	625	350	4,2	1,5	165	3,76	2,56
		500	4,4	2,2	233	5,32	2,41
		700	4,7	3,3	322	7,36	2,25
		800	4,8	3,8	364	8,31	2,17
		1000	5,0	5,0	447	10,20	2,02
HYPER RED	657	350	4,3	1,5	850	4,61	3,06
		500	4,5	2,3	1199	6,50	2,89
		700	4,8	3,4	1624	8,81	2,62
		800	5,0	4,0	1853	10,05	2,53
		1000	5,1	5,1	2231	12,10	2,35
FAR RED	727	350	4,3	1,5	850	4,61	3,06
		500	3,9	2,0	747	0,45	0,23
		700	4,1	2,9	1012	0,61	0,21
		800	4,2	3,4	1155	0,70	0,21
		1000	4,4	4,4	1391	0,84	0,19
DEEP BLUE	455	350	5,7	2,0	1270	4,70	2,36
		500	5,8	2,9	1765	6,53	2,25
		700	5,9	4,2	2184	8,08	1,94
		800	6,0	4,8	2413	8,93	1,87
		1000	6,1	6,1	3048	11,28	1,84
BLUE	470	350	5,7	2,0	56	3,24	1,62
		500	5,9	2,9	74	4,28	1,46
		700	6,1	4,3	96	5,54	1,30
		800	6,1	4,9	105	6,09	1,25
		1000	6,3	6,3	124	7,20	1,14
TRUE GREEN	528	350	6,7	2,3	242	2,24	0,95
		500	6,9	3,4	315	2,92	0,85
		700	7,1	5,0	402	3,72	0,75
		800	7,1	5,7	440	4,07	0,72
		1000	7,4	7,4	516	4,78	0,65
AMBER	617	350	4,2	1,5	178	3,94	2,68
		500	4,4	2,2	251	5,54	2,51
		700	4,7	3,3	342	7,56	2,31
		800	4,8	3,8	385	8,49	2,22
		1000	5,1	5,1	469	10,36	2,05
YELLOW	590	350	4,4	1,5	164	1,74	1,13
		500	4,6	2,3	224	2,38	1,03
		700	4,9	3,4	287	3,04	0,89
		800	4,9	3,9	307	3,26	0,83
		1000	5,2	5,2	349	3,70	0,71
WHITE	5000	350	5,5	1,9	296	3,92	2,04
		500	5,7	2,9	405	5,24	1,84
		700	5,9	4,1	532	6,80	1,65
		800	6,0	4,8	586	7,48	1,57
		1000	6,6	6,6	679	8,67	1,35

Radiant Power for Hyper Red, Far Red, Deep Blue. Luminous flux for rest of colour.

CCT only for White colour

### CALCULATED PARAMETERS AT $T_J = 25^{\circ}\text{C}$

Name	GrowEmity LOB 38x38 RBW – P026
Size	38x38 mm
Power Supply Type	Constant Current (CC)
Number Of Channels	1
Power Supply Current	Max. 1000 mA
Red LED – 12 pcs	OSRAM - GH CSSPM1.24
Deep Blue LED – 4 pcs	OSRAM - GD CSSPM1.14
White LED – 2 pcs	OSRAM - GW CSHPM1.PM
Ambient Temperature	0 - 40°C
Material Type / Thickness	MCPCB / 0,8 mm

### GROWEMITY LOB 38X38 RBW - P024

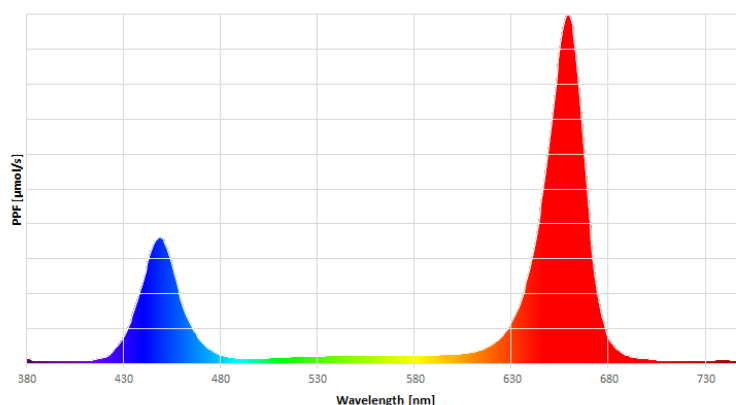
	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38X38 RBW - P024	700	76,5	53,6	RED	657	10200	55,32	3,06	135,24	2,53	Q0-038038-RBW-C2000-P024
				DEEP BLUE	455	15240	56,40	2,36			
				WHITE	5000	1775	23,52	2,04			
	1050	78,9	78,9	RED	657	14382	78,00	2,89	187,84	2,38	Q0-038038-RBW-C2000-P024
				DEEP BLUE	455	21184	78,40	2,25			
				WHITE	5000	2431	31,44	1,84			
	1400	82,1	115,0	RED	657	19482	105,66	2,62	243,47	2,12	Q0-038038-RBW-C2000-P024
				DEEP BLUE	455	26213	97,01	1,94			
				WHITE	5000	3195	40,80	1,65			
	1600	83,5	133,6	RED	657	22236	120,60	2,53	272,64	2,04	Q0-038038-RBW-C2000-P024
				DEEP BLUE	455	28956	107,16	1,87			
				WHITE	5000	3514	44,88	1,57			

Parameters were calculated for temperatures  $T_J = 25^{\circ}\text{C}$

Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.

Values of these parameters were calculated for default bin and with tolerances of 15%.

Different type of plants have different requirements for the best growth, so to maximized effect, GrowEmity light sources have many sets of LEDs configuration. Most commands LED types are: red, far red, hyper red, blue, deep blue and white with different colour temperature. Some examples are below.

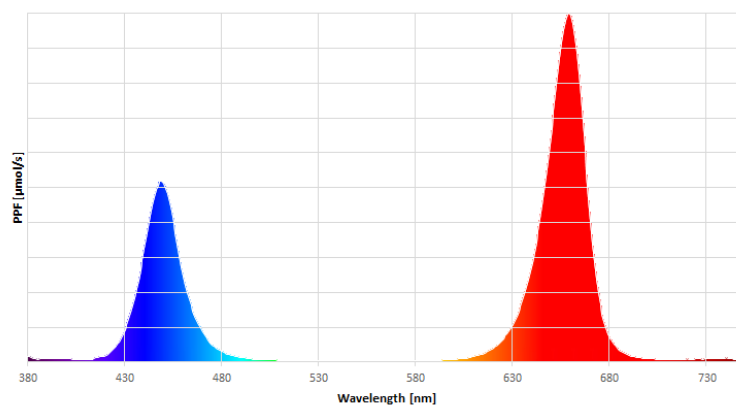
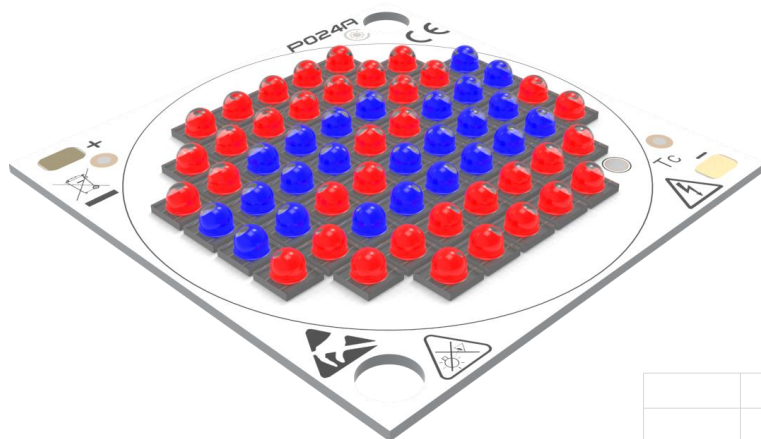


### GROWEMITY LOB 38x38 RRB - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm]	Radiant Power [mW]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38x38 RRB - P024	700	72,9	51,0	RED	657	15300	82,98	3,06	139,38	2,73	Q0-038038-RRB-C2000-P024
				DEEP BLUE	455	15240	56,40	2,36			
	1050	75,3	75,3	RED	657	21573	117,00	2,89	195,40	2,59	Q0-038038-RRB-C2000-P024
				DEEP BLUE	455	21184	78,40	2,25			
	1400	78,8	110,4	RED	657	29223	158,49	2,62	255,50	2,31	Q0-038038-RRB-C2000-P024
				DEEP BLUE	455	26213	97,01	1,94			
	1600	80,5	128,8	RED	657	33354	180,90	2,53	288,06	2,24	Q0-038038-RRB-C2000-P024
				DEEP BLUE	455	28956	107,16	1,87			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Values of these parameters were calculated for default bin and with tolerances of 15%.



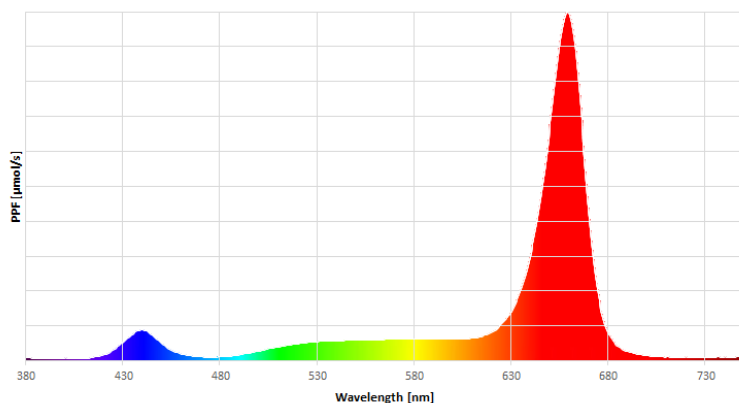
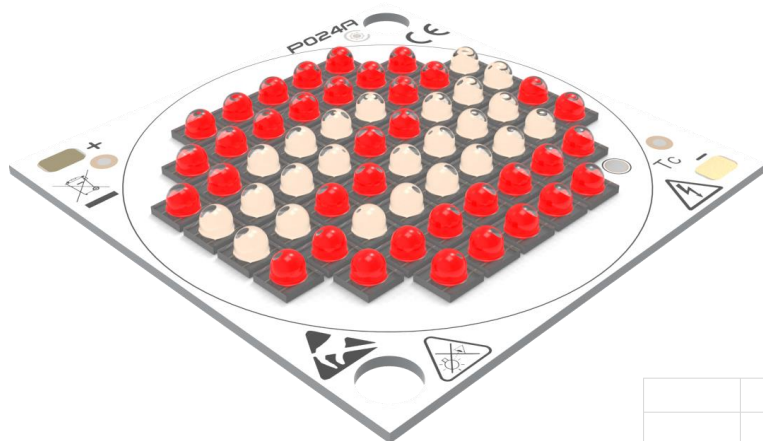
### GROWEMITY LOB 38x38 RRW - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38x38 RRW - P024	700	71,7	50,2	RED	657	15300	82,98	3,06	130,02	2,59	Q0-038038-RRW-C2000-P024
				WHITE	5000	3550	47,04	2,04			
	1050	74,7	74,7	RED	657	21573	117,00	2,89	179,88	2,41	Q0-038038-RRW-C2000-P024
				WHITE	5000	4863	62,88	1,84			
	1400	78,6	110,0	RED	657	29223	158,49	2,62	240,09	2,18	Q0-038038-RRW-C2000-P024
				WHITE	5000	6389	81,60	1,65			
	1600	80,4	128,6	RED	657	33354	180,90	2,53	270,66	2,10	Q0-038038-RRW-C2000-P024
				WHITE	5000	7028	89,76	1,57			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.

Values of these parameters were calculated for default bin and with tolerances of 15%.

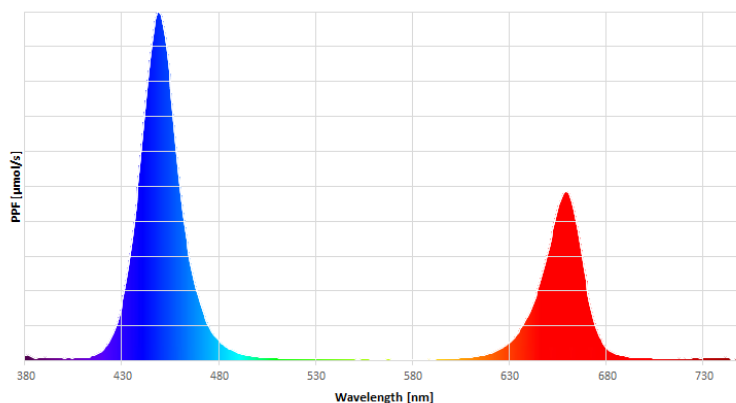
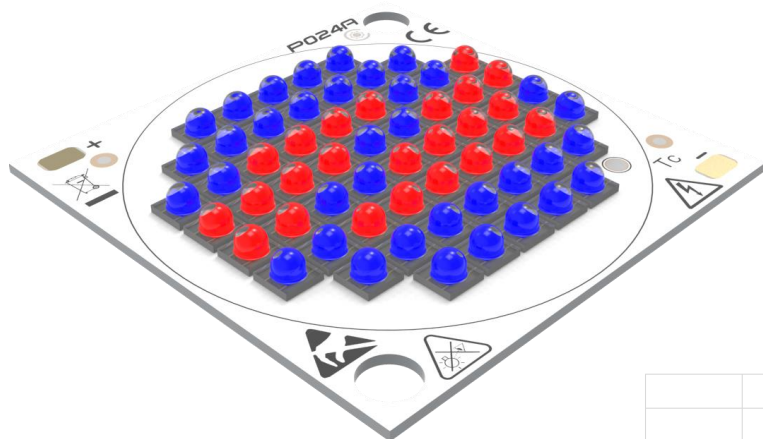


### GROWEMITY LOB 38X38 RBB - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm]	Radiant Power [mW]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38X38 RBB - P024	700	77,1	54,0	RED	657	10200	55,32	3,06	139,92	2,59	Q0-038038-RBB-C2000-P024
				DEEP BLUE	455	22860	84,60	2,36			
	1050	79,2	79,2	RED	657	14382	78,00	2,89	195,60	2,47	Q0-038038-RBB-C2000-P024
				DEEP BLUE	455	31775	117,59	2,25			
	1400	82,3	115,2	RED	657	19482	105,66	2,62	251,17	2,18	Q0-038038-RBB-C2000-P024
				DEEP BLUE	455	39319	145,51	1,94			
	1600	83,6	133,7	RED	657	22236	120,60	2,53	281,34	2,10	Q0-038038-RBB-C2000-P024
				DEEP BLUE	455	43434	160,74	1,87			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Values of these parameters were calculated for default bin and with tolerances of 15%.



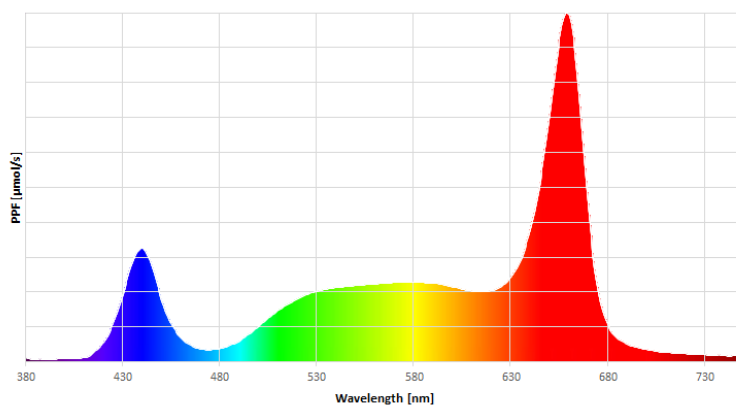
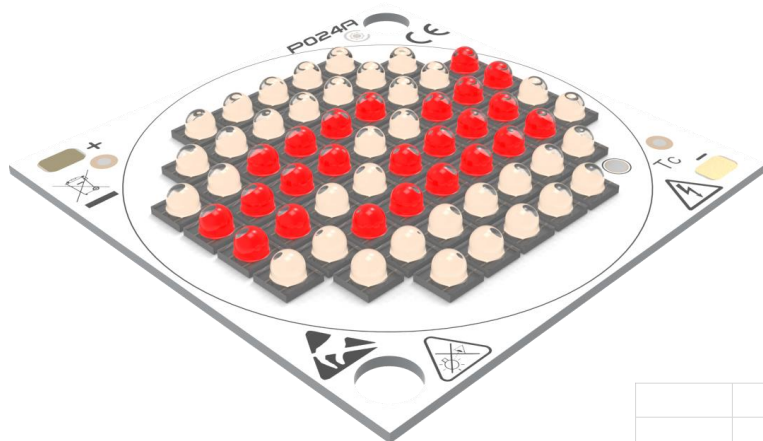
## GROWEMITY LOB 38x38 RWW - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38x38 RWW - P024	700	75,3	52,7	RED	657	10200	55,32	3,06	125,88	2,39	Q0-038038-RWW-C2000-P024
				WHITE	5000	5324	70,56	2,04			
	1050	78,3	78,3	RED	657	14382	78,00	2,89	172,32	2,20	Q0-038038-RWW-C2000-P024
				WHITE	5000	7294	94,32	1,84			
	1400	81,9	114,7	RED	657	19482	105,66	2,62	228,06	1,99	Q0-038038-RWW-C2000-P024
				WHITE	5000	9584	122,40	1,65			
	1600	83,4	133,4	RED	657	22236	120,60	2,53	255,24	1,91	Q0-038038-RWW-C2000-P024
				WHITE	5000	10542	134,64	1,57			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.

Values of these parameters were calculated for default bin and with tolerances of 15%.



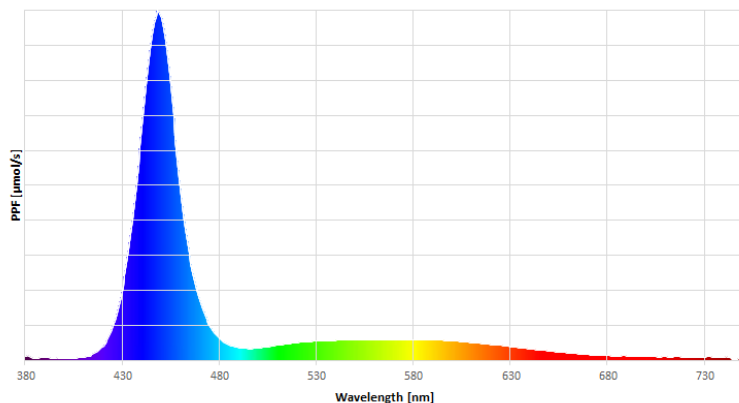
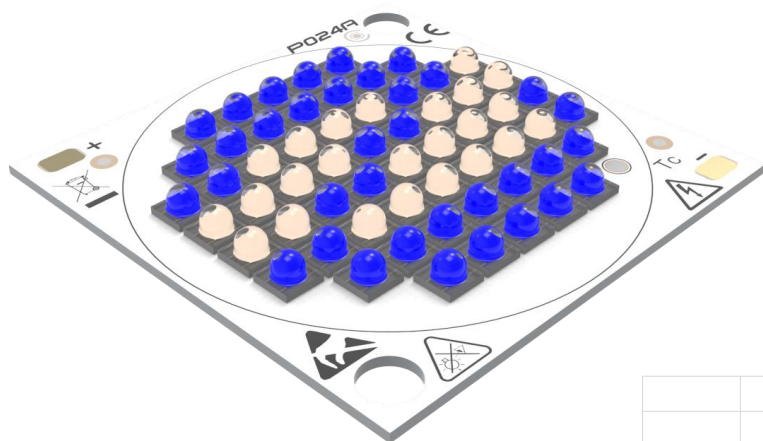
### GROWEMITY LOB 38X38 BBW - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38X38 BBW - P024	700	84,3	59,0	DEEP BLUE	455	22860	84,60	2,36	131,64	2,23	QO-038038-BBW-C2000-P024
				WHITE	5000	3550	47,04	2,04			
	1050	86,4	86,4	DEEP BLUE	455	31775	117,59	2,25	180,47	2,09	QO-038038-BBW-C2000-P024
				WHITE	5000	4863	62,88	1,84			
	1400	88,9	124,4	DEEP BLUE	455	39319	145,51	1,94	227,11	1,83	QO-038038-BBW-C2000-P024
				WHITE	5000	6389	81,60	1,65			
	1600	89,6	143,3	DEEP BLUE	455	43434	160,74	1,87	250,50	1,75	QO-038038-BBW-C2000-P024
				WHITE	5000	7028	89,76	1,57			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.

Values of these parameters were calculated for default bin and with tolerances of 15%.





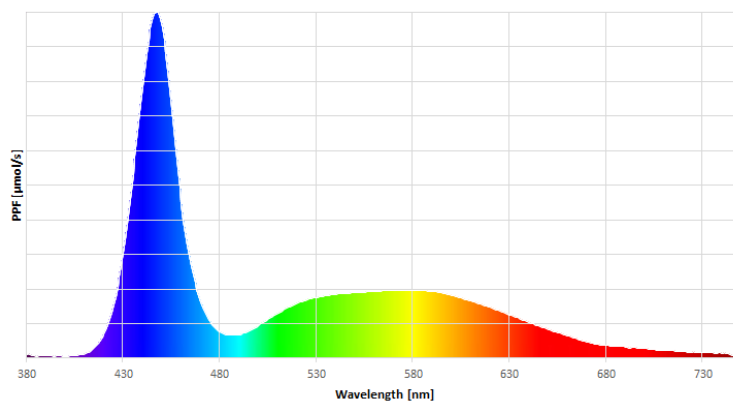
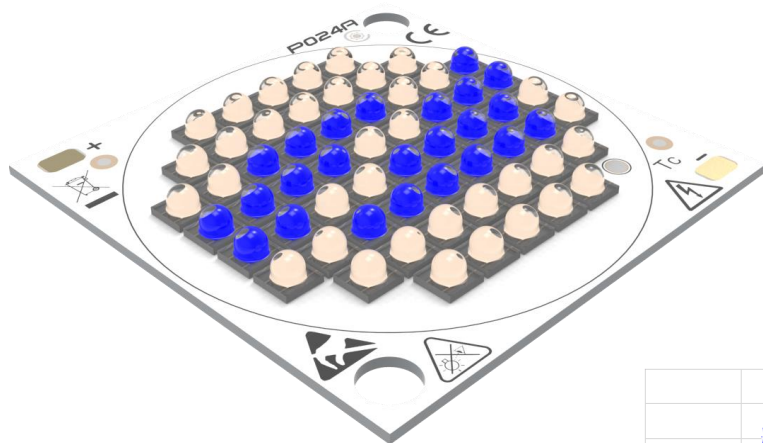
### GROWEMITY LOB 38X38 BWW - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm] / CCT [K]	Radiant Power [mW] / Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Total PPF [ $\mu\text{mol/s}$ ]	Total PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38X38 BWW - P024	700	83,7	58,6	DEEP BLUE	455	15240	56,40	2,36	126,96	2,17	Q0-038038-BWW-C2000-P024
				WHITE	5000	5324	70,56	2,04			
	1050	86,1	86,1	DEEP BLUE	455	21184	78,40	2,25	172,72	2,01	Q0-038038-BWW-C2000-P024
				WHITE	5000	7294	94,32	1,84			
	1400	88,7	124,2	DEEP BLUE	455	26213	97,01	1,94	219,41	1,77	Q0-038038-BWW-C2000-P024
				WHITE	5000	9584	122,40	1,65			
	1600	89,5	143,2	DEEP BLUE	455	28956	107,16	1,87	241,80	1,69	Q0-038038-BWW-C2000-P024
				WHITE	5000	10542	134,64	1,57			

Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

Radiant power and wavelength for color LEDs; Luminous flux and color temperature for white LEDs.

Values of these parameters were calculated for default bin and with tolerances of 15%.

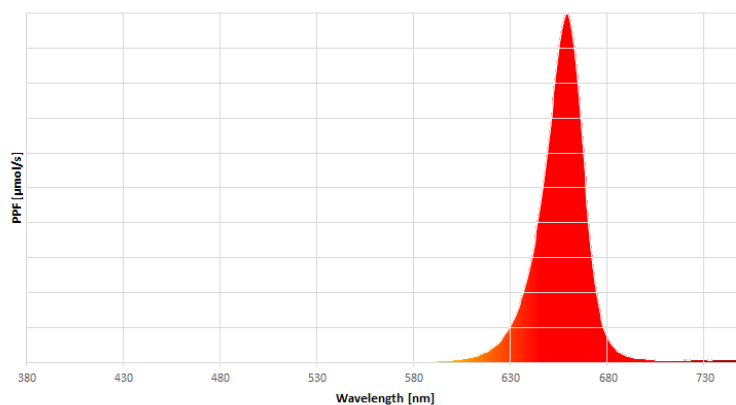
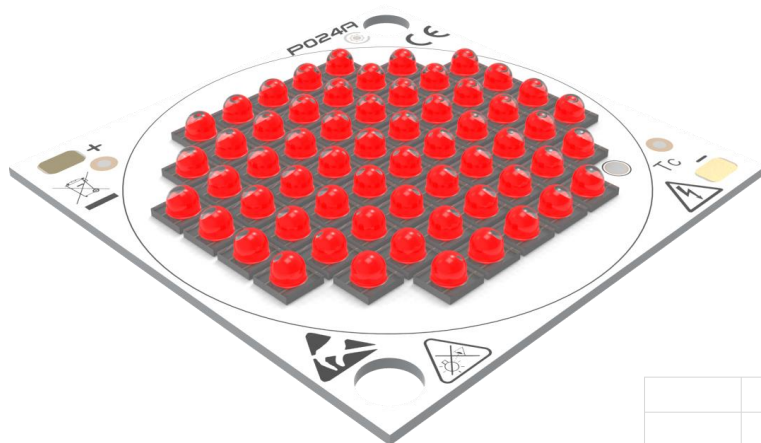


### GROWEMITY LOB 38x38 RRR - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm]	Radiant Power [mW]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38x38 RRR - P024	700	64,5	45,2	RED	657	25500	138,30	3,06	Q0-038038-RRR-C2000-P024
	1050	67,5	67,5	RED	657	35955	195,00	2,89	Q0-038038-RRR-C2000-P024
	1400	72,0	100,8	RED	657	48705	264,15	2,62	Q0-038038-RRR-C2000-P024
	1600	74,4	119,0	RED	657	55590	301,49	2,53	Q0-038038-RRR-C2000-P024

Parameters were calculated for temperatures  $T_j = 25^\circ\text{C}$

Values of these parameters were calculated for default bin and with tolerances of 15%.

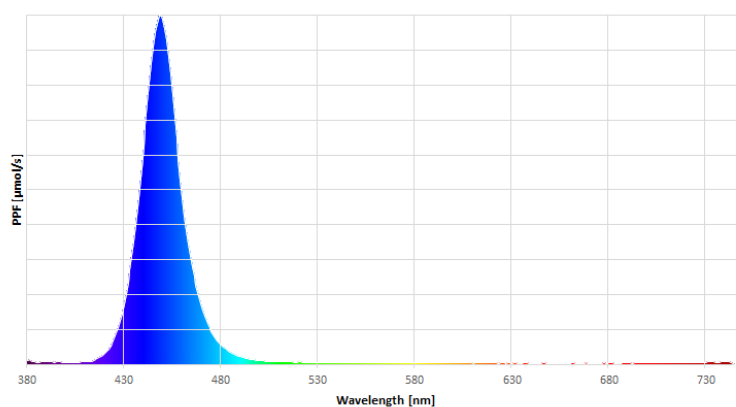
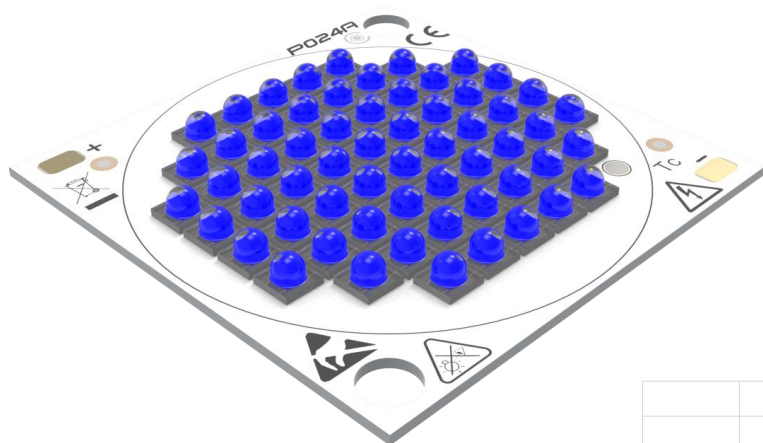


## GROWEMITY LOB 38x38 BBB - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	$\lambda$ [nm]	Radiant Power [mW]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38x38 BBB - P024	700	85,5	59,9	DEEP BLUE	455	38100	141,00	2,36	Q0-038038-BBB-C2000-P024
	1050	87,0	87,0	DEEP BLUE	455	52959	195,99	2,25	Q0-038038-BBB-C2000-P024
	1400	89,1	124,7	DEEP BLUE	455	65532	242,52	1,94	Q0-038038-BBB-C2000-P024
	1600	89,7	143,5	DEEP BLUE	455	72390	267,90	1,87	Q0-038038-BBB-C2000-P024

Parameters were calculated for temperatures  $T_j = 25^\circ\text{C}$

Values of these parameters were calculated for default bin and with tolerances of 15%.

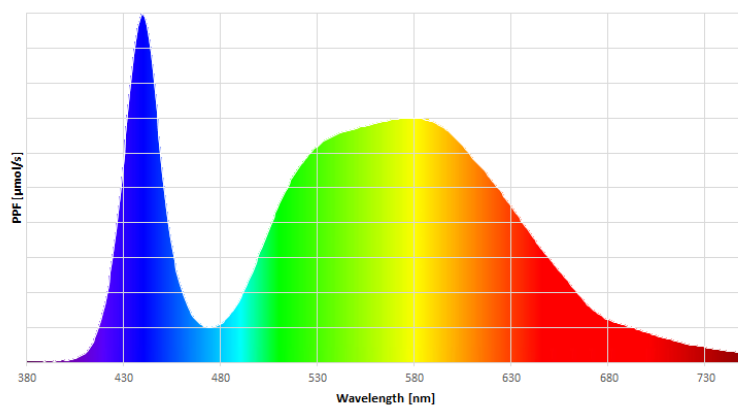
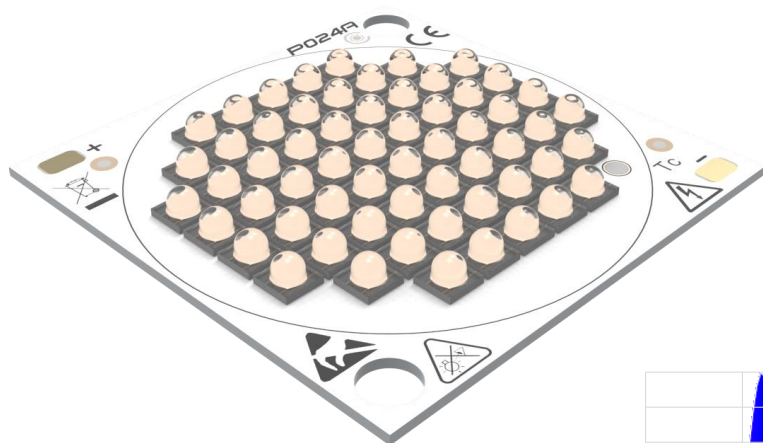


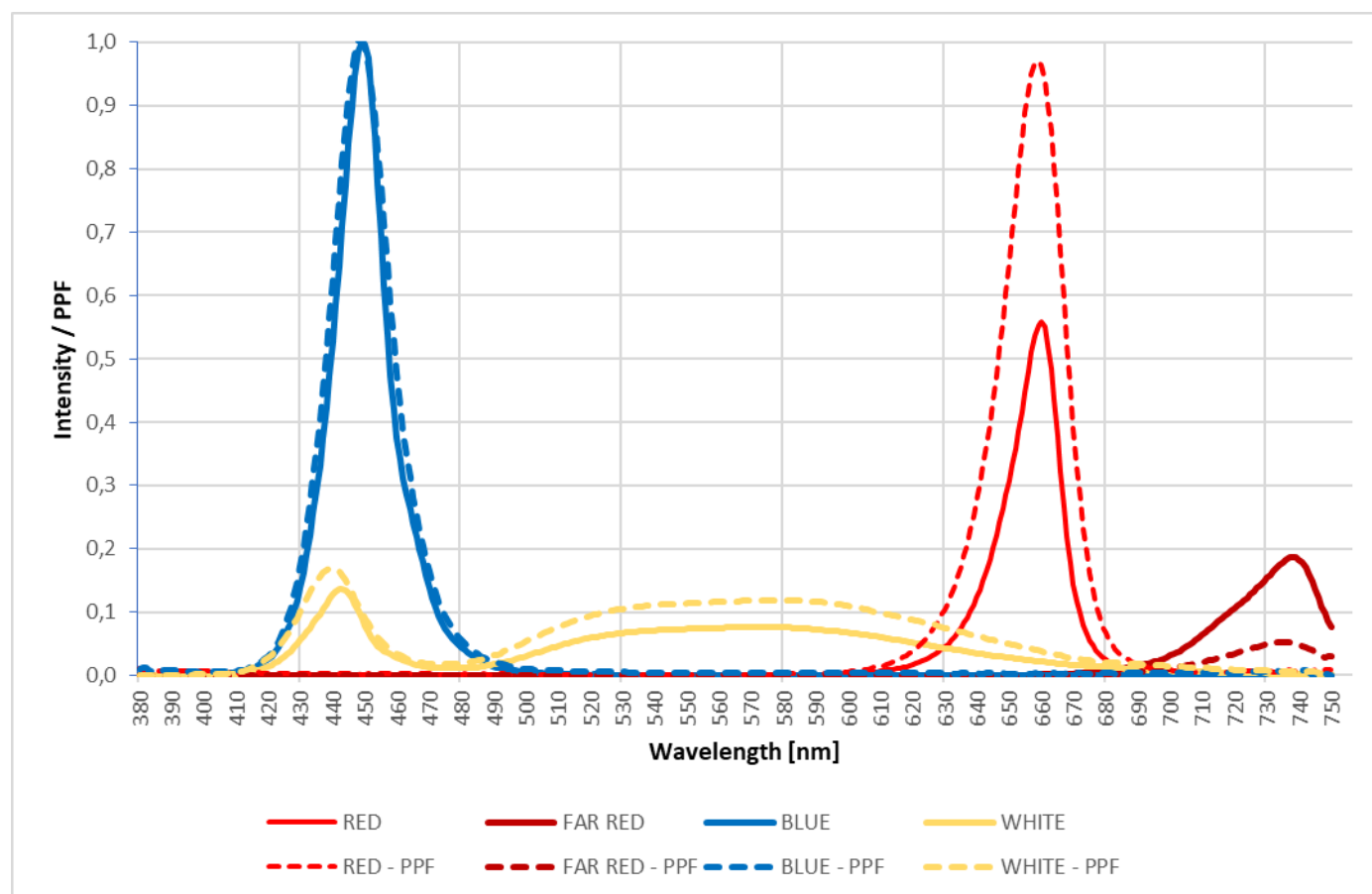
### GROWEMITY LOB 38X38 MONO - P024

	Input Current [mA]	Forward Voltage [V]	Power [W]	Colour	CCT [K]	Luminous Flux [lm]	PPF [ $\mu\text{mol/s}$ ]	PPF/W [ $\mu\text{mol/J}$ ]	Article Number
GrowEmity LOB 38X38 MONO - P024	700	82,5	57,8	WHITE	5000	8874	117,60	2,04	Q0-038038-MONO-C2000-P024
	1050	85,5	85,5	WHITE	5000	12157	157,20	1,84	Q0-038038-MONO-C2000-P024
	1400	88,5	123,9	WHITE	5000	15973	204,00	1,65	Q0-038038-MONO-C2000-P024
	1600	89,4	143,0	WHITE	5000	17571	224,40	1,57	Q0-038038-MONO-C2000-P024

Parameters were calculated for temperatures  $T_j = 25^\circ\text{C}$

Values of these parameters were calculated for default bin and with tolerances of 15%.



**SPECTRUM OF LEDs**

Spectrum graph of the red, far red, blue and white LEDs at 350 mA current. Spectrum can be changed by choosing LEDs and power output.

## **COOLING**

GrowEmity light source isn't self-cooling and additional heat-sink is required. The lifetime of the light source depends on the operating temperature and used LEDs. The temperature should be measured in the middle of the board. The temperature can be measured with thermocouple or simple temperature probe. Lifetime of LEDs decreases with the rise of temperature and luminous intensity in higher temperatures may be lower than nominal. Construction of the lamp or any place of installation should ensure correct heat dissipation from LED light sources. Overheat can damage or destroy some elements or entire LED light source. Never use overheated light source again as it may be damaged and can cause losses or even fire. We are not responsible for any loss, or damage resulting from overheating! Guarantee become void in such cases.

## **SAFETY**

LED light source can change light intensity, but even dimmed LEDs generate high-intensity light. Looking into LEDs beam is unhealthy and may cause irreversible injury to eye's retina. Never look into the beam without protection glasses with an appropriate filter. Additionally, they may change LEDs light intensity almost immediately. If people are photosensitive, LEDs light may be a trigger to epileptic seizures and alter the perception, especially when light change very fast.

LED light source can work on high power supply current, so never touch components and wires of LED light source when power supply is on.

## **PROTECTION MEASURES AGAINST DAMAGE**

LED light sources are delicate, even small mechanical stress may damage them. Such stresses should be avoided. If it is impossible, it should be kept to the minimum. Mechanical stresses such as pressure, bending, breaking, drilling, etc. may cause irreversible damage. Damaged LED light source aren't suitable for use.

Electrostatic Discharge (ESD) is a serious threat to electronics devices. The human body can accumulate very high electrostatic charge which can decrease the lifetime of electronics significantly and in worst cases may destroy electronic components. To avoid damages use of electrostatic protection is required. It is needed to follow ESD precautions during manipulation of these devices. Do not touch electronic components directly to avoid damages. Observe the official regulations for electrical devices (like DIN, VDE, EN). It is necessary to isolate components like controllers, LED light sources, power supply, wires etc. from any metal parts which can conduct electrostatic charges or cause a short circuit. LED light source aren't equipped with short circuit protection. During a short circuit, very high current is flowing from a power supply and can destroy it, causing risk of fire. Electronics must not be modified. Any modification causes loss of guarantee. The electric wiring/connection must comply with all current and valid national requirements, be constructed by a certified electrical tradesman, and comply with all the requirements set forth in this manual. We are not responsible for any loss, or damage resulting from electrostatic voltage discharge and a short circuit caused by inappropriate handling or wrong construction of the lamp! Guarantee become void in such cases.

Additionally LED light source can be damaged by some chemical substances. Depends on elements the damage may be different. It is important not to use chemical substances like acids, organic acids, sulphur, alkalis, organic solvents, mineral oils, vegetable oils and synthetic oils, etc. We are not responsible for any loss, or damage resulting from improper use of LED light source! Guarantee become void in such cases.

Do not operate LED light source when they aren't working properly. If LED light source are working incorrectly, turn off a power supply. Damaged LED light source may cause electric shock or short circuit.

## **CONTACT**

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Subject to errors and technical changes.