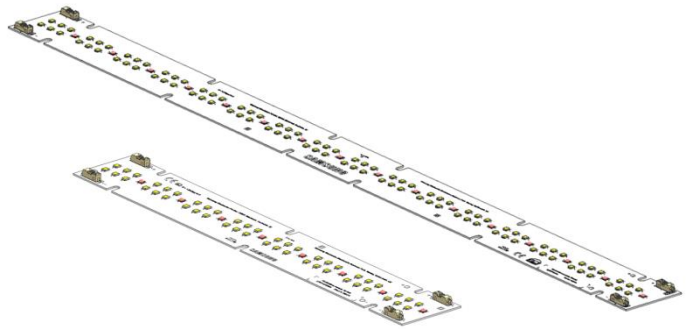


LED Module

Horticulture L2 Module



Features & Benefits

- Qualified spectrum based on growth experimentation
- Excellent PPF/PPE delivering $>141 \text{ umol/s}$, $>2.7 \text{ umol/J}$ by adopting optimized PKG solution designed by Samsung
- Conformal coating to cover LED dies
- Two length variation, 1ft / 2ft

Applications

- Horticulture lighting : vertical farm, indoor farm
- Supplementary lighting: greenhouse



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1. Product Code Information

Item	Product Code
1ft	SL-B8R5C9H1AWW
2ft	SL-B8R5C9H2AWW

2. Characteristics ($I_F = 1,200\text{mA}$, $t_p = 25^\circ\text{C}$)

a) Basic Information

Item	Unit	Rating	Remark
Rated Lifetime	Hour	>50,000	L70B50 @ $t_p < 65^\circ\text{C}, I_F = 1,200\text{mA}$
Ingress Protection (IP)	-	no rating	
Ambient / Operating Temperature (t_a)	$^\circ\text{C}$	-20 ~ +50	
Storage Temperature	$^\circ\text{C}$	-30 ~ +80	
Working voltage for insulation	V	59	SELV

Notes

- ※ I_F : Forward current or Operating current
- ※ t_p : temperature at which performance is specified measured at "Tc point".
- ※ t_a : ambient temperature

b) Electro-Optical Characteristics

	Item	Unit	Rating			Remark
			min	typ	max	
1ft	Luminous Flux	lm	3,600	4,110	4,400	I _F = 1,200 mA t _p = 25 °C
	Luminous Efficacy	lm/W	139	159	171	
	Operating Voltage	V	19.5	21.5	23.5	
	Power Consumption	W	23.4	25.8	28.2	
	PPF	umol/s		70.92		
	PPE	umol/J		2.74		
2ft	Luminous Flux	lm	7,100	8,220	8,800	
	Luminous Efficacy	lm/W	137	159	170	
	Operating Voltage	V	38.5	43.1	45.5	
	Power Consumption	W	46.2	51.7	54.6	
	PPF	umol/s		141.8		
	PPE	umol/J		2.74		
	Operating Current	mA	-	1,200	1,600	

Notes

- ※ Operating current tolerance may be ±5%.
- ※ tp: temperature at which performance is specified measured at "Tc point".
- ※ Samsung maintains a measurement tolerance of Luminous flux ±7% , Ra ±3.0 , Voltage ±5%.

c) Color Correlated Temperature

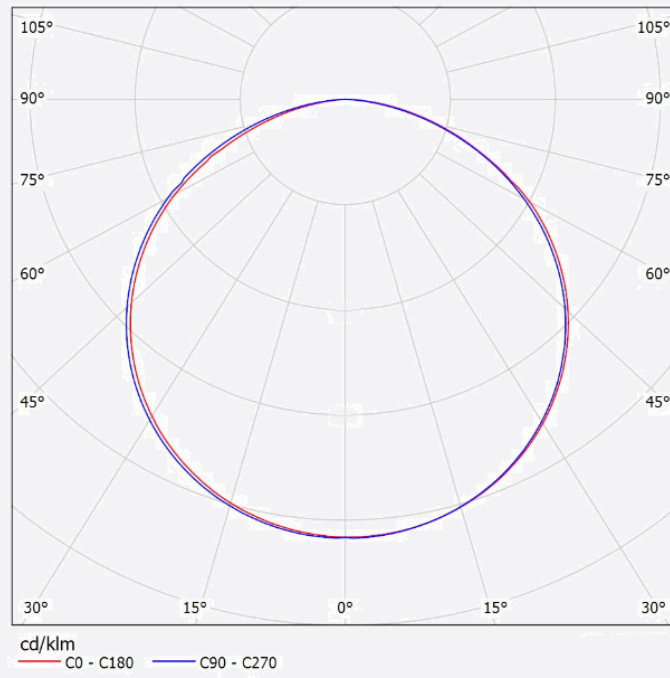
Model	Item	Unit	Color Correlated Temperature			Remark
			min	typ	max	
Horticulture L2	1ft	K	4,990	5,390	5,820	I _F = 1,200 mA t _p = 25 °C
	2ft		4,990	5,390	5,820	

Notes

- ※ Samsung maintains a measurement tolerance of CCT ± 5%

d) Light Distribution

Item	Unit	Nominal	Tolerance	Remark
Beam Angle (FWHM)	°(degree)	118	± 5	



e) Temperature Characteristics

Item	Unit	Nominal* (t_p)	Life** (t_L)	Max*** (t_c)
Temperature Case (Tc)	°C	25	65	95

Notes:

- * Temperature used to specify performance of the module (t_p).
- ** Rated maximum performance temperature at which lifetime is specified in L70B50 (t_L).
- *** Rated maximum temperature, highest permissible temperature to avoid safety risk (t_c).

All temperatures are measured at the designated "Tc point" as indicated on the module.

Please use heat-sink(or heat dissipation solution) with proper thermal capacity(operating wattage).

f) Thermal Measurement

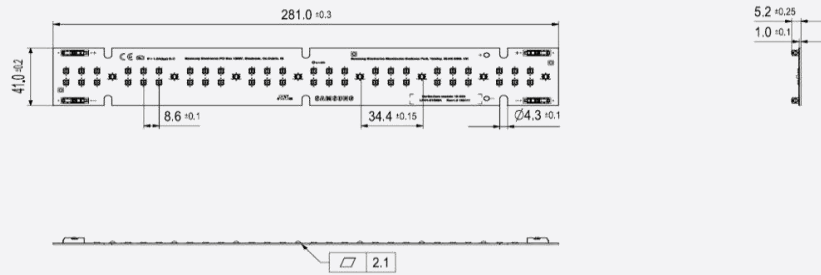
Performance temperatures are measured on "Tc point" as indicated on the module.



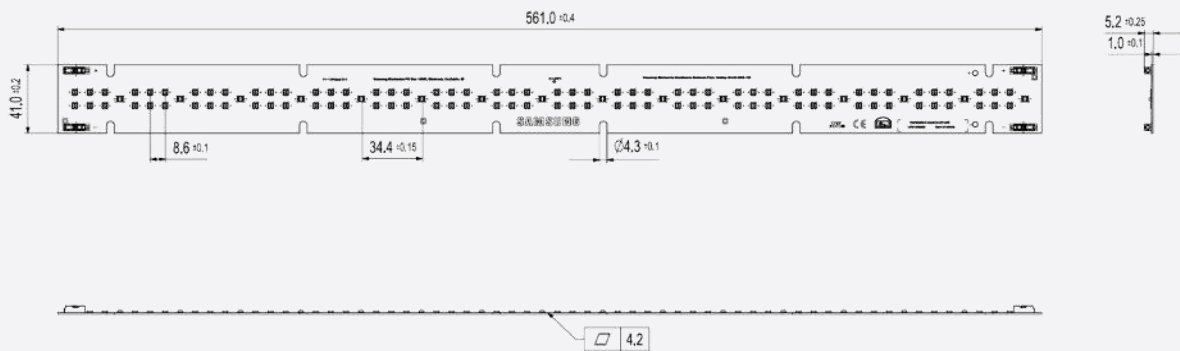
3. Appearance and Structure

a) Appearance and Dimension

- 1ft



- 2ft




Item	Unit	Unit	Dimension	Tolerance
Module Length	1ft	mm	281.0	± 0.3
	2ft		561.0	± 0.4
Module Width	1ft	mm	41.0	± 0.2
	2ft		41.0	
Module Height	All	mm	5.2	± 0.25
Screw Hole	All	mm	4.3	± 0.1
PCB Thickness	1ft	mm	1.0	± 0.1
	2ft		1.0	
Module Weight	1ft	g	33.3	± 1.67
	2ft		66.6	± 3.33

b) Structure

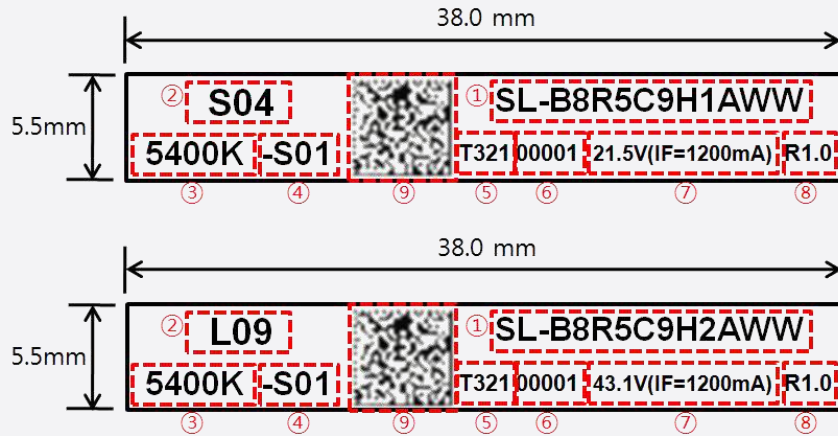
Item	Specification
LED	LM301H, LH351H
PCB	MPCB, White PSR, Cu 1oz Single layer
CONNECTOR	1pin Re-workable poke-in connector type
Conformal Coating	Solventless, transparent conformal coating

4. Certification and Declaration

Item	Compliant to	Remark
Test & Certification	UL / cUL	E344519
	CE	IEC / EN 62031, IEC / EN 62471
	Eye Protection(Photo-biological Safety)	Risk group 1
	Type Classification	Built-in module 
Declaration	RoHS	Hazardous Substance & Material
	REACH	Hazardous Substance & Material

5. Label Structure

a) Module Label



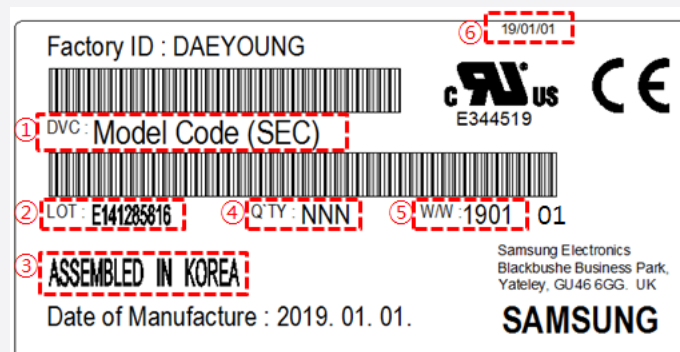
Number	Item	Remark
①	Model code	Refer to page 3
②	Product name	-
③	Color temperature	Typ.5400K
④	LED maker & Bin rank	-S (Samsung) 00~ZZ
⑤	SMT date	T321 (2019-March-21th)
⑥	Serial No.	00001~99999; Setting "00001" every working day
⑦	Voltage (IF).	-
⑧	Product Revision	-
⑨	2D Matrix	Horticulture 1ft S04 : SL-B8R5C9H1AWW T3211000015400K-S01 Horticulture 2ft L09 : SL-B8R5C9H2AWW T3211000015400K-S01

b) Tray & MBB bag Label



Number	Item	Remark
①	Model Code	Refer to page 3
②	LOT ID	
③	Quantity	Refer to page 9
④	Date of production	
⑤	Date of Issue	
⑥	Place of origin	

c) Box Label



Number	Item	Remark
①	Model Code	Refer to page 3
②	LOT ID	
③	Place of origin	
④	Quantity	Refer to page 9
⑤	Describe production week	
⑥	Date of Issue	

6. Packing Structure

a) Quantity

Product	Packing	Quantity (ea)	Weight (kg)	Remark
1ft	Tray	32	8.9	Weight (includes Modules, Trays and a Box)
	Outer Box	160		
	Pallet	3,840	-	
2ft	Tray	30	12.3	Weight (includes Modules, Trays and a Box)
	Outer Box	120		
	Pallet	1,920	-	

7. Precautions in Handling & Use

- 1) This LED Module should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use. When using other solvents it should be confirmed beforehand whether the solvents may react with the Module material. The banned Freon solvents should not be used. Do not clean using ultrasonic cleaner.
- 2) The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LED Modules. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices. Damaged LEDs may show some unusual characteristics such as increase in leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- 3) VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those chemicals and they may lead a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires (fixtures). In order to prevent these problems, we recommend users to know the physical properties of the materials used in luminaires, and they must be selected carefully.
- 4) Risk of sulfurization (or tarnishing)
The LED uses a silver-plated lead frame and its surface color may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of lead frame may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of lead frame, the LED Modules should not be used and stored together with oxidizing substances made of materials such as rubber, plain paper, lead solder cream, etc.
- 5) The resin area is very sensitive, please do not handle, press, touch or rub it.
- 6) Do not drop the Module or give shocks.
- 7) Do not store the Module in a dusty place or humid location.
- 8) Do not disassemble the Module.
- 9) Do not directly look into the lighted LED with naked eyes for a long period of time.
- 10) Please consider the creepage and clearance distance at the end product.
- 11) Please use this product within 5 months, which is kept in its original packaging unopened when stocked

Legal and additional information.

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[Appendix]

1. Applicable Wire Information

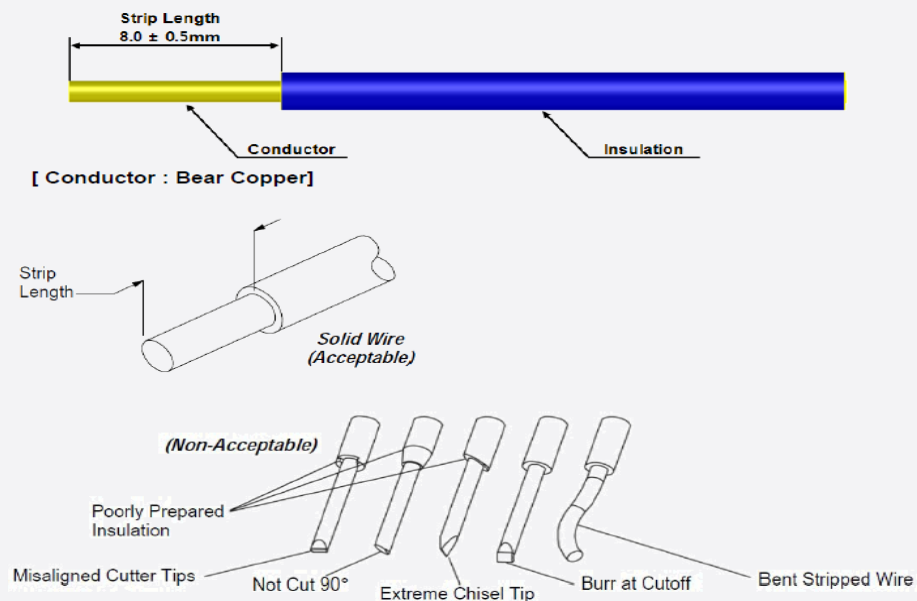
a) Applicable wire

Wire Range AWG No.	Number of Conductors/ Diameter of a conductors (No./mm)	Insulation Diameter (mm)	Conductor Type
24	1 / 0.51 (0.2mm ²)	1.35	Solid
22	1 / 0.64 (0.3mm ²)	1.48	
20	1 / 0.81 (0.5mm ²)	1.65	
18	1 / 1.02 (0.8mm ²)	1.86	
22	17 / 0.76 (Reference) After soldering : Φ 0.9mm Max	1.60	Strand
20	21 / 0.95 (Reference) After soldering : Φ 1.1mm Max	1.78	
18	23 / 1.1 (Reference) After soldering : Φ 1.25mm Max	2.10	

Notes

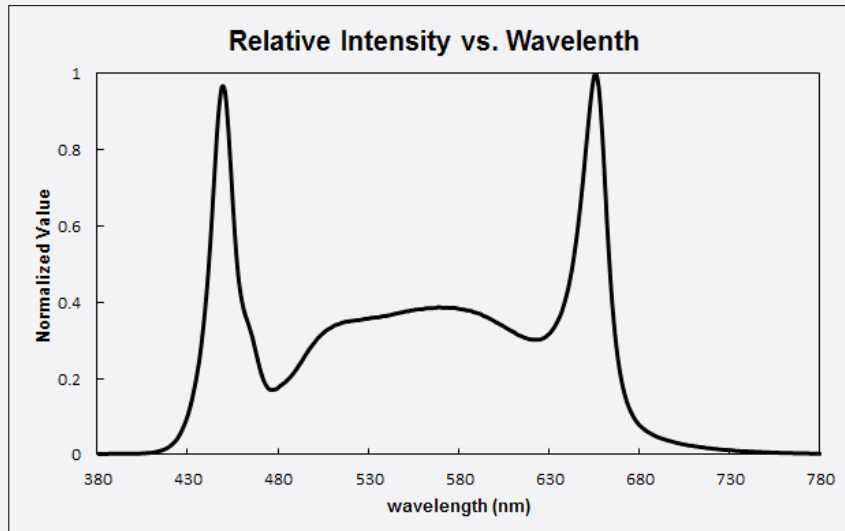
- ※ Outside insulation diameter Φ 2.1mm Max
- ※ Regarding strand conductor wire, strictly recommend that Pre bond wire type which is dipping into soldering after twisting

b) Wire Strip length



[Appendix]

2. Spectrum Distribution ($I_F = 1,200\text{mA}$, $t_p = 25^\circ\text{C}$)



Notes

- ※ Spectrum distribution is normalized based on actual measurement as a representative and products could have a difference with above.

[Appendix]

3. Connection

Product	Max parallel	Max series	Remark
1ft	2 bar	8 bar	Operating current / module = 1.2A
2ft	2 bar	4 bar	

4. Conformal coating



Notes

- ※ Conformal coating process is applied around LED lead frames and appearance could look different with above picture