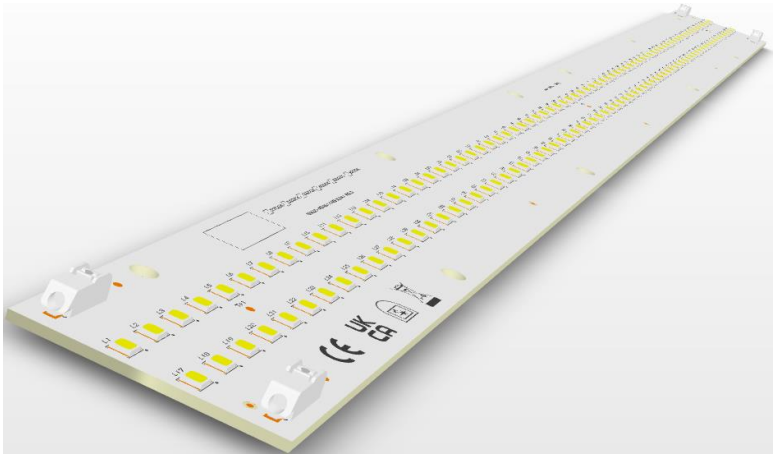
SEOUL SEMICONDUCTOR

SunLike Linear Reference Module



Product Overview:

- Zhaga standard mounting pattern
- Uniformity of light and color.
- Best in class efficacy at typical driving currents

Lighting Applications:





Features:

- High Color Quality with CRI Min.95.
- Industry standard mechanical attributes
- Optimized to function with industry standard power supplies
- 3 SDCM
- ROHS compliant

Applications:

- Residential
- Commercial
- Linear highbay

Product Selection - SMJD-4846144G-XXN1 I_F = 900mA, Ta= 25ºC

CCT	CRI	Flux		Length	Order Code
	Min	Min	Typ.		
2700	95	3800	4000	560*39.8	SMJD-4846144G-XXN100D80H039All
3000	95	3800	4000	560*39.8	SMJD-4846144G-XXN100D80G039All
3500	95	3800	4000	560*39.8	SMJD-4846144G-XXN100D80F039All
4000	95	4200	4400	560*39.8	SMJD-4846144G-XXN100E20E039All
5000	95	4200	4400	560*39.8	SMJD-4846144G-XXN100E20C039All
6500	95	4200	4400	560*39.8	SMJD-4846144G-XXN100E20A039All

Maximum Operating Specification: Ta = 25ºC

Model	Parameter	Symbol	Unit	Value	Remark
SMJD-4846144G-XXN1	Power Consumption	P	W	70	
	Driving Current	I_F	mA	1350	
SMJD-4846144G-XXN1	Operating Temperature(3)	T_C	ºC	- 40 ~ 98	Reference point
SMJD-4846144G-XXN1	Storage Temperature	Tc_{tg}	ºC	- 40 ~ 98	With no power
SMJD-4846144G-XXN1	Thermal resistance (T_C to base)	$R_{th(Tc\text{-}base)}$	ºC/W	0.3	
SMJD-4846144G-XXN1	ESD Sensitivity	-	KV	±8	IEC Air
				±4	HBM

Electro Optical Characteristics , SMJD-4846144G-XXN1 I_F = 900mA T_a= 25ºC[1]

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	Φ_V [2]	3800	4000	-	lm	H,G,F
		4200	4400	-		E,C,A
Correlated Color Temperature [3]	CCT	6000	6500	7000	K	A
		4700	5000	5300		C
		3700	4000	4200		E
		3200	3500	3700		F
		2900	3000	3200		G
		2600	2700	2900		H
CRI	Ra	95	97	-	-	-
Input Voltage	V_F	48	52	56	V_{DC}	@900mA
Power Consumption	P	42	46	50	W	
Efficiency	LPW	-	90	-	Lm/W	H,G,F
		-	95	-		E,C,A

Notes:

1 *Above data tested with constant typical current at T_a= 25ºC.*

2 *Φ_V is the total luminous flux output measured with an integrated sphere.*

3 *Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.*

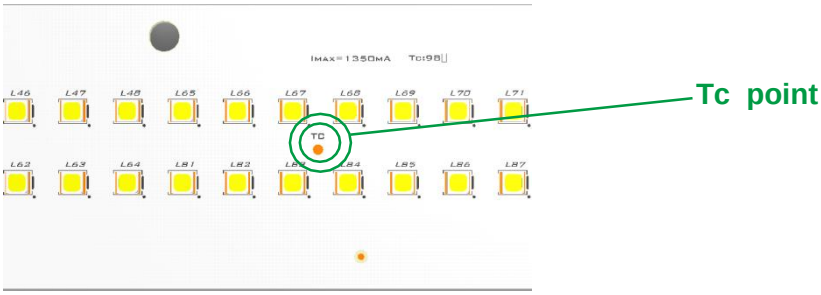
4 *To use the module properly, recommend to drive the module by a Constant Current Source (CCS). But the Maximum output voltage of the CCS should be limited by referring this sheet.*

Notes:

**CCT range and tolerance of 3-step MacAdam flexible LED modules.*

CCT "Colour"	Center point(x,y)	Typ. CCT (K)	3-step MacAdam CCT range
F6500	x=0.3123, y=0.3282	6500	6530 ± 510
F5000	x=0.3447, y=0.3553	5000	5028 ± 283
F4000	x=0.3818, y=0.3797	4000	3985 ± 275
F3500	x=0.4073, y=0.3917	3500	3465 ± 245
F3000	x=0.4338, y=0.4030	3000	3045 ± 175
F2700	x=0.4578, y=0.4101	2700	2725 ± 145

ILLUSTRATION 1: How to predict components temperature [4]



**Recommended Tc Testing point*

Notes :

(1) All guarantee are based on the Absolute Maximum Ratings listed.

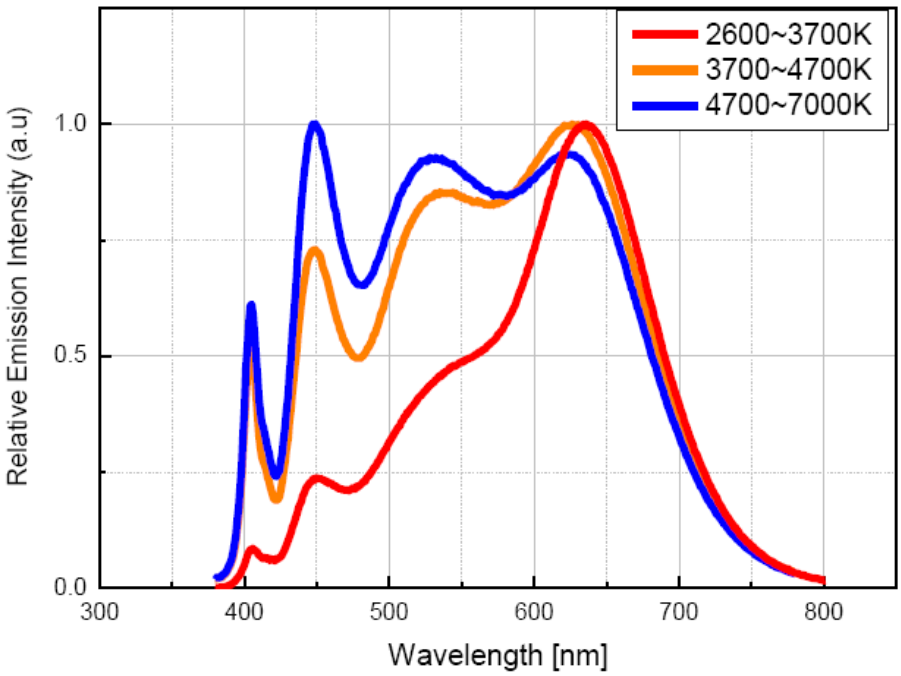
(2) Please use a Constant Current Source (CCS) to drive the module, the typical V_F of module is 52 VDC and V_{F_MAX} is 56 VDC, respectively.

(3) Operating temperature was tested at the assigned Tc point on the PCB.

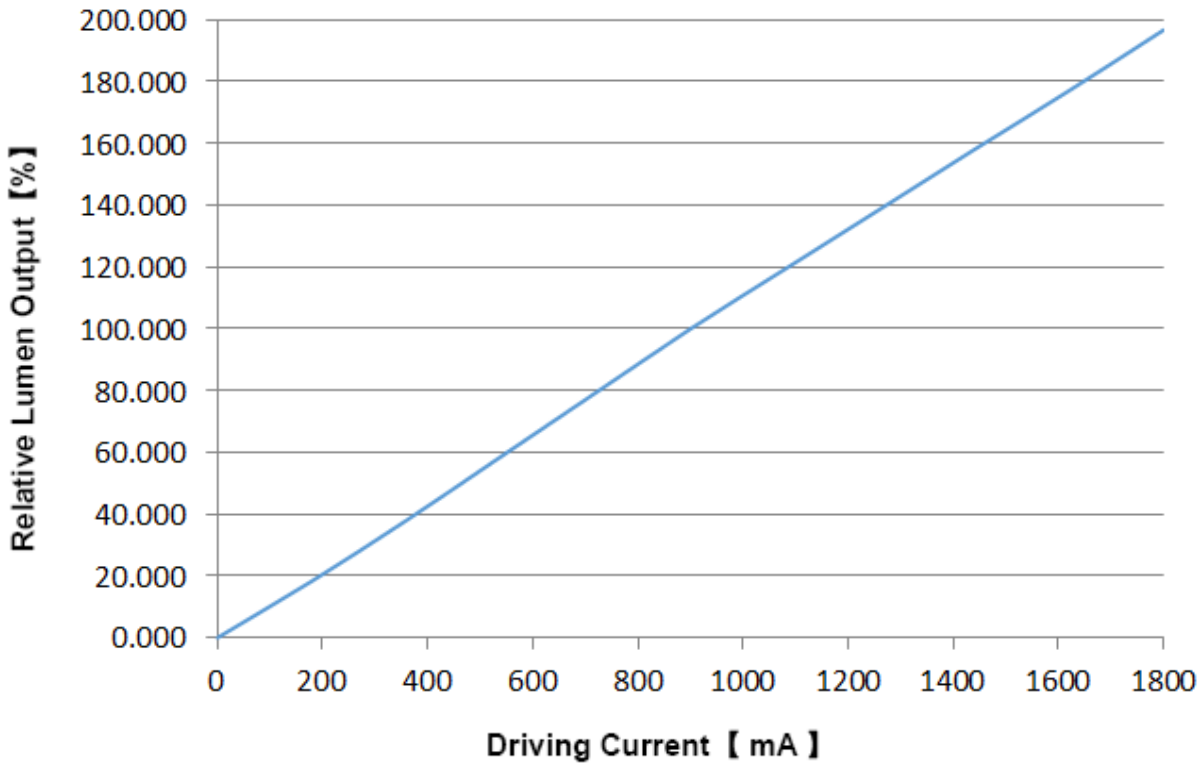
(4) To ensure the module works properly, Tc should be kept below 98 ºC;

Relative Spectral Distribution

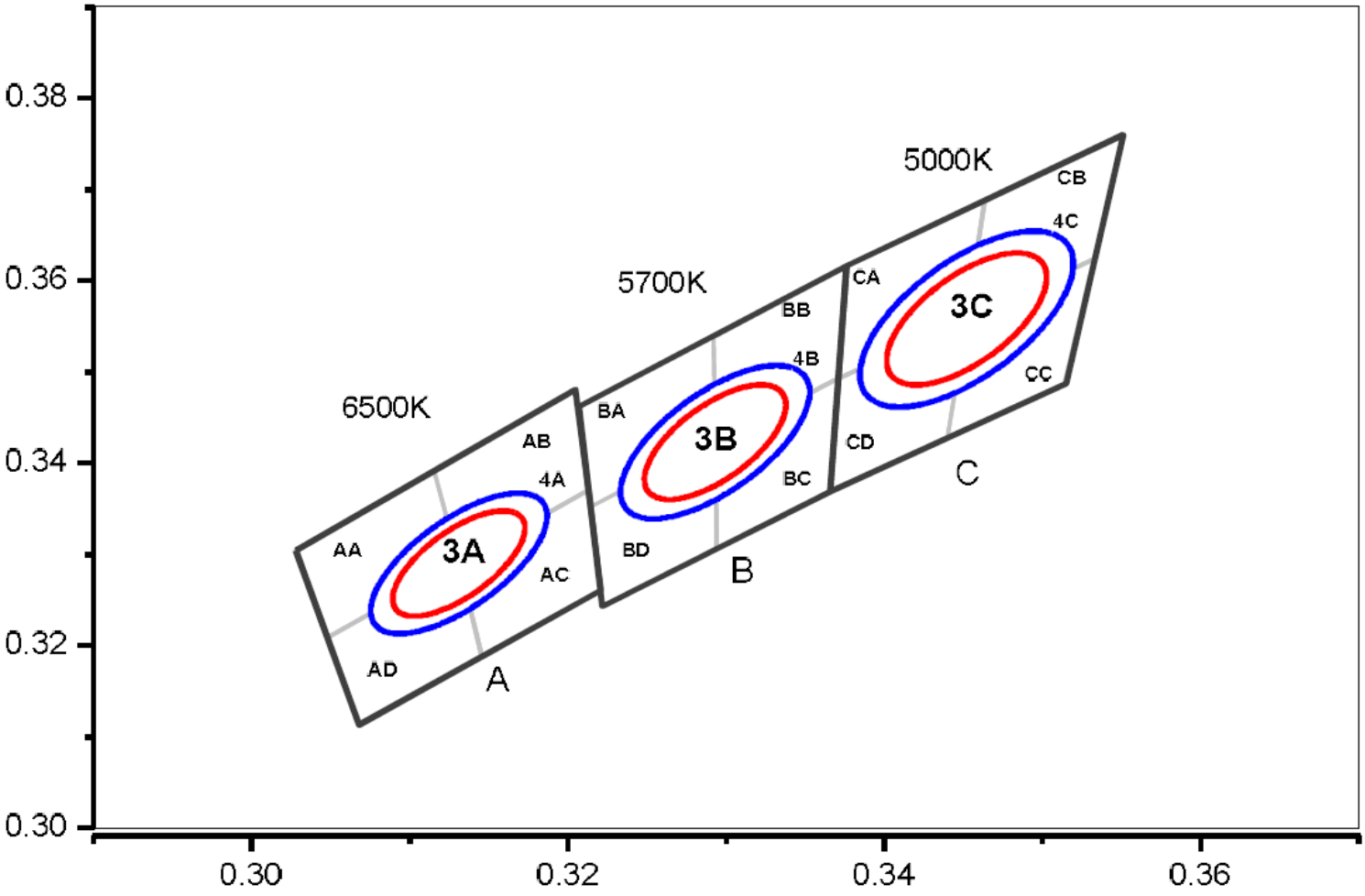
- **Relative Spectral Distribution vs. Wavelength**



- **Scale ratio curve for related lumen output VS driving current, T_a=25℃**

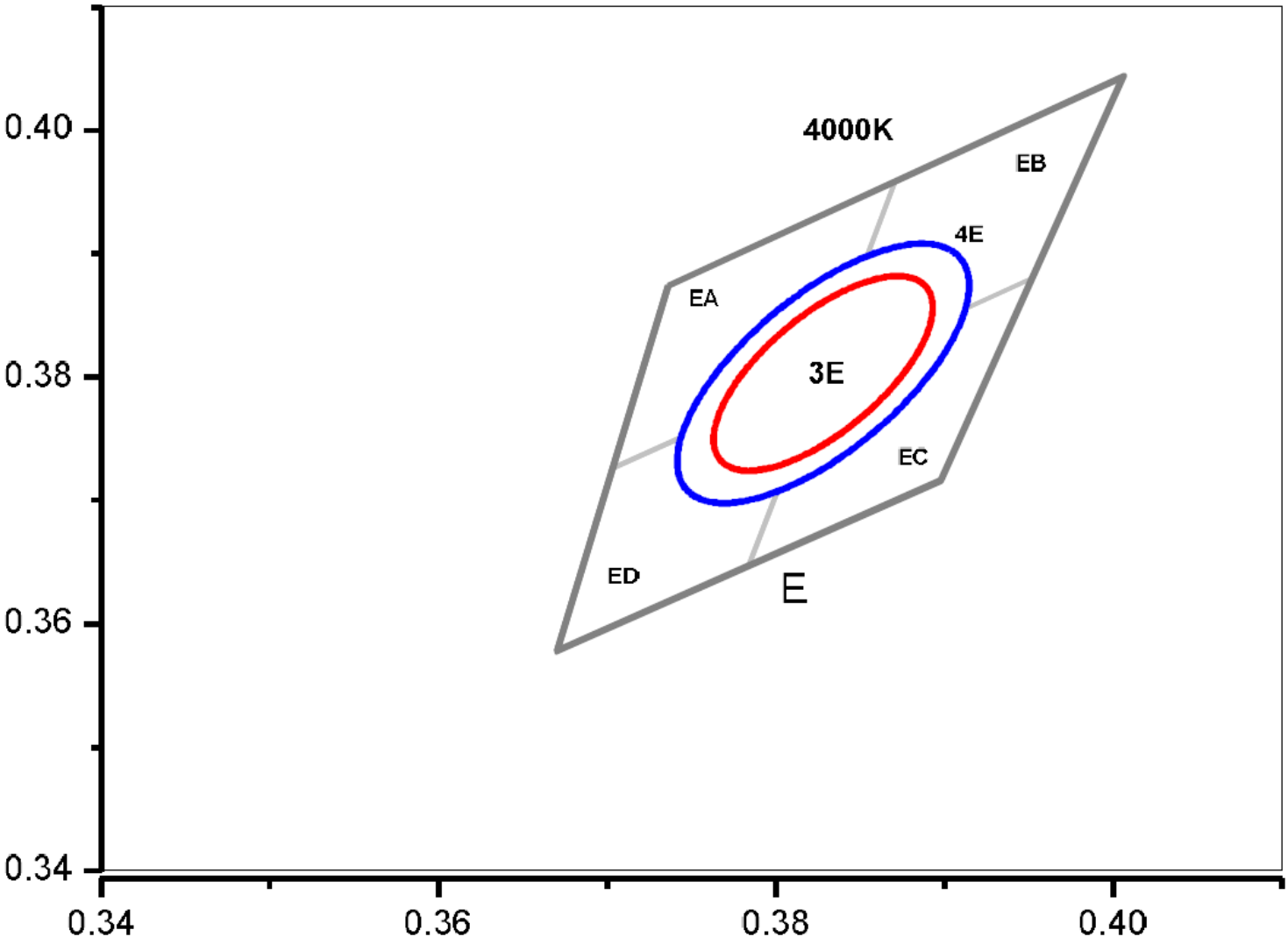


- **CIE Chromaticity Diagram (Cool white), T_a=25℃**



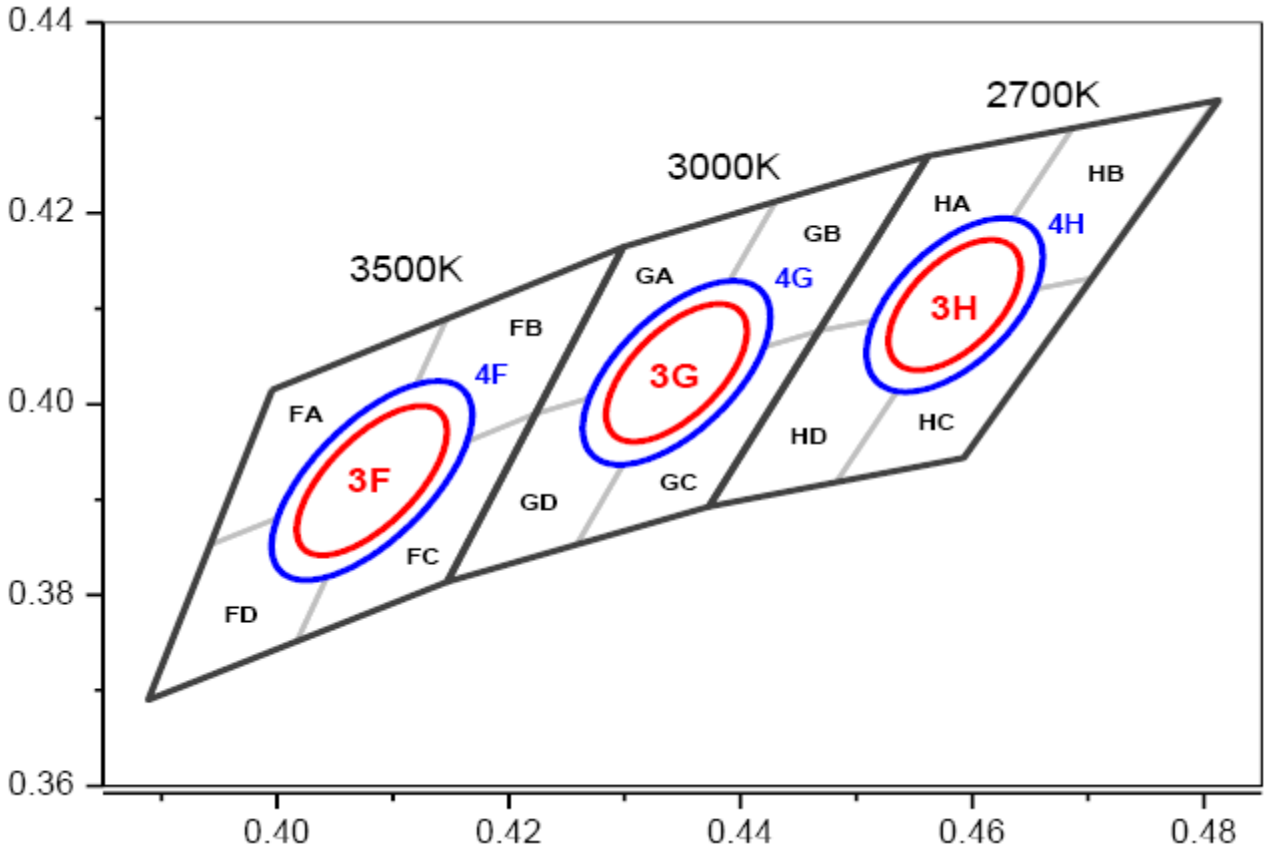
6500K 3 Step Ellipse					5700K 3 Step Ellipse					5000K 3 Step Ellipse				
3A					3B					3C				
x	y	a	b	theta	x	y	a	b	theta	x	y	a	b	theta
0.3123	0.3282	0.0066	0.0027	58	0.3287	0.3417	0.0071	0.0030	59	0.3447	0.3553	0.0081	0.0035	60

- **CIE Chromaticity Diagram (Cool white), T_a=25℃**



4000K 3 Step Ellipse				
3E				
x	y	a	b	theta
0.3818	0.3797	0.0094	0.004	53

- **CIE Chromaticity Diagram (Cool white), T_a=25℃**

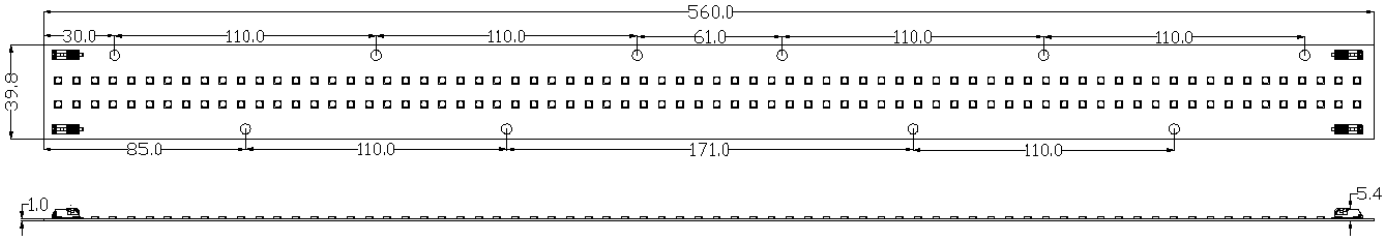


3500K 3 Step Ellipse					3000K 3 Step Ellipse					2700K 3 Step Ellipse				
3F					3G					3H				
x	y	a	b	theta	x	y	a	b	theta	x	y	a	b	theta
0.4073	0.3917	0.0093	0.0041	53	0.4338	0.4030	0.0085	0.0041	53	0.4578	0.4101	0.0079	0.0041	54

Mechanical Dimensions

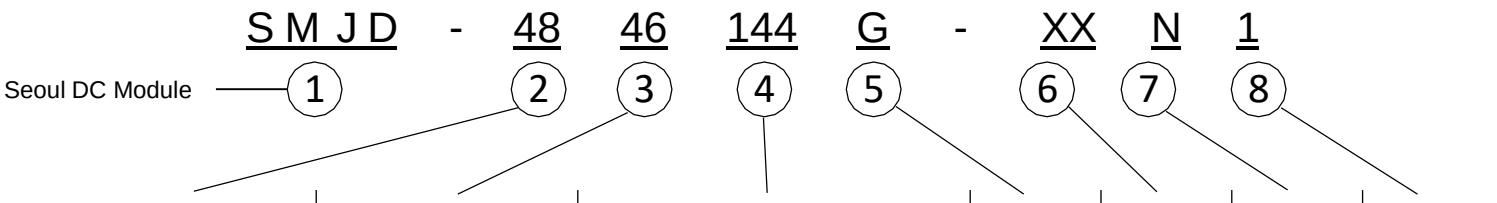
- **SMJD-4846144G-XXN1**

Dimension	Specification	Tolerance	Unit
Module Length	560	±0.5	mm
Module Width	39.8	±0.3	mm
Module Height	5.4	±0.3	mm
PCB Thickness	1.0	±0.1	mm
Module weight	TBD	±10	g



Product Nomenclature:

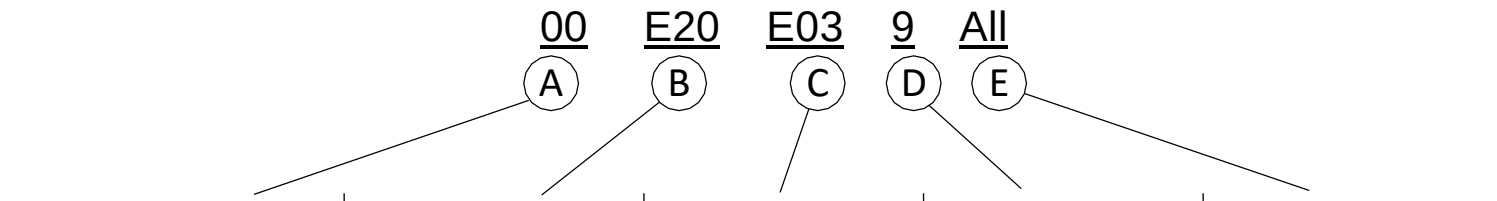
**Please refer to the following chart*



Voltage		Power		LED Qty			Type	Custom	Dimming	Etc
4	8	4	6	1	4	4	G	XX	N	1
0 *0V*	**0** *0V*	**0** *0W*	**0** *0W*	**0** *0ea*	**0** *0ea*	**0** *0ea*	**C** *3030*	**XX** *ref*	**N** *Norm*	**1** *vers*
1 *10V*	**1** *1V*	**1** *10W*	**1** *1W*	**1** *100ea*	**1** *10ea*	**1** *1ea*			**D** *Dim*	
2 *20V*	**2** *2V*	**2** *20W*	**2** *2W*	**2** *200ea*	**2** *20ea*	**2** *2ea*			**E** *etc*	
3 *30V*	**3** *3V*	**3** *30W*	**3** *3W*	**3** *300ea*	**3** *30ea*	**3** *3ea*				
-	-	-	-	-	-	-				
9 *90V*	**9** *9V*	**9** *90W*	**9** *9W*	**9** *900ea*	**9** *90ea*	**9** *9ea*				
A *100V*		**A** *100W*		**A** *1000ea*						
B *110V*		**B** *110W*		**B** *1100ea*						
-		-		-						
Z *350V*		**Z** *350W*		**Z** *3500ea*						

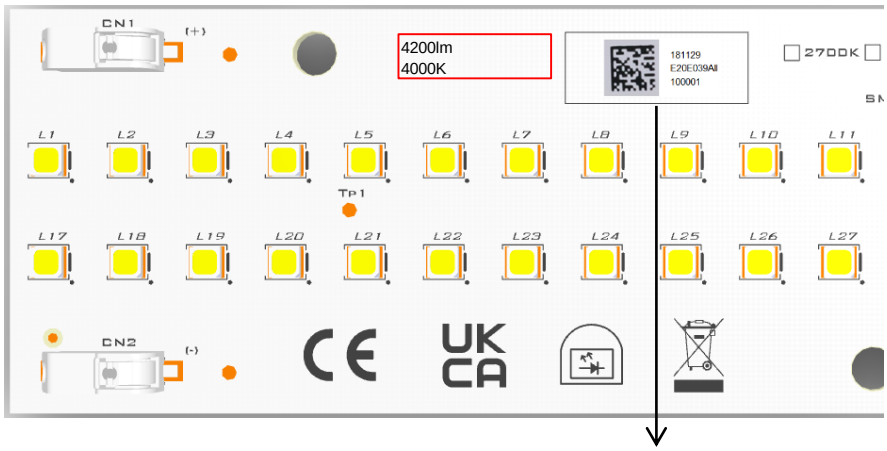
Product Nomenclature: Binning

**Please refer to the following chart*

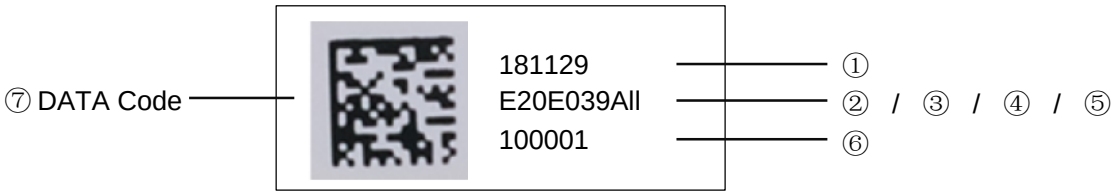


Lens Type	Flux Bin	CCT Bin	CRI Bin	VF Bin
00	**D30**	E03	8	All
00 *No Lens*	**D80** *3800lm*	**H03** *2700k – 3step*	**9** *CRI Min95*	**All** 48~56V_{DC}
	D80 *3800lm*	**G03** *3000k – 3step*		
	D80 3800*lm*	**F03** *3500k – 3 step*		
	E20 4200lm	**E03** *4000k – 3 step*		
	E20 4200lm	**C03** *5000k – 3 step*		
	E20 4200lm	**A03** *6500k – 3 step*		

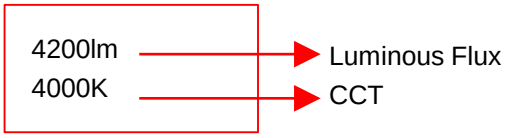
Marking Information



- **Marking Information**



No.	Item	Information	DigiTc	Remark
①	Date	YYMMDD	6Digit	SMT date
②	Flux(1)	E20	3Digit	E20=4200lm(1)
③	CCT	X03 3-step Mixing	3Digit	X=A,C,E,F,G,H
④	CRI	9	1Dight	CRI Min95
⑤	V_F	All	3Digit	
⑥	Lot No.	1	1 Digit	0~9,A~Z
	Sequence No.	00001	5 Digit	00001 ~ 99999
⑦	DATA Code	DATA Code	-	Please refer bellow table



Example:
3800lm 2700K or 3800lm 3000K or 3800lm 3500K or 4200lm 4000K or 4200lm 5000K or 4200lm 6500K

Note:
(1) Flux bin please refer to the bellow binning definitions

Symbol	lm	Symbol	lm	Symbol	lm	Symbol	lm
A20	200	D20	3200	G20	6200	J20	9200
B20	1200	E20	4200	H20	7200	K20	10200
C20	2200	F20	5200	I20	8200	L20	11200

Module DATA Code Information



DATA Code Information

Items	Factory	SAP Code	SMT Date	Characteristics	Line No.	Lot No.	Serial number	Note
Digits	1 Digit	7 Digits	6 Digits	10 Digits	1 Digit	1 Digit	5 Digits	In Total 31 Digits
Information	1~9	*******	YYMMDD	E20E039All	1~9, A~Z	1~9, A~Z	00001	

Notes:

1 *DATA coded information shall include the fields described in the table above.*

2 *Minimum size of DATA code shall be 4.5 mm x 4.5 mm and a minimum DATA code grade of 'C'.*
**'A' grading is preferred.*

3 *If the component is small to have a full label, it is acceptable to have only the DATA code in minimum size of 6 mm by 6 mm printed on a label.*

4 *Each character is separated by ","*
Example: SMJD-4846144G-XXN1, XXXXXXX, 181129, 00E20E039All, 1, 1, 1, 00001

Label Information

(K)PO Number	**XXXXXX** (1)
(1P)Supplier P/N	**SMJD-4846144G-XXN100E20E039ALL** (2)
(33P)Bin Code	**E20E039All** (3)
(Q)Quantity	**XXX**
(4L)Country of Origin	**XX** (4)
(10D)Date Code	**YYWW** (5)
(1T)Lot Code	**YYMDDXXXXX- XXXXXXX** (6)
SEOUL	**SEOUL SEMICONDUCTOR CO.,LTD.**

Notes:

(1) This is customer's PO Number (6 digit code)
(2) Product Name Rule (18 digit code) + Characteristics Rule (12 digit code)
(3) Characteristics Rule (10 digit code)
(4) Country of Origin: 2 digit code (KR : Korea, CN : China, VN : Vietnam)
(5) Date Code : YYWW : Packing Date: Year + Week
(6) Lot Code :
  Initial of manufacture is refer to the 2D code rule.
  YYMDD : Packing Date (Oct. : A, Nov. : B, Dec. : C)
  X : Initial of Manufacturer
  XXXX : Sealing Pack No.
  XXXXXXX : SSC SAP Code
(7) It is attached to the top left corner of the box.
(8) Font: Arial, Size : 12
(9) Barcode Type : Code128, Size : 26

TOTAL Quantity

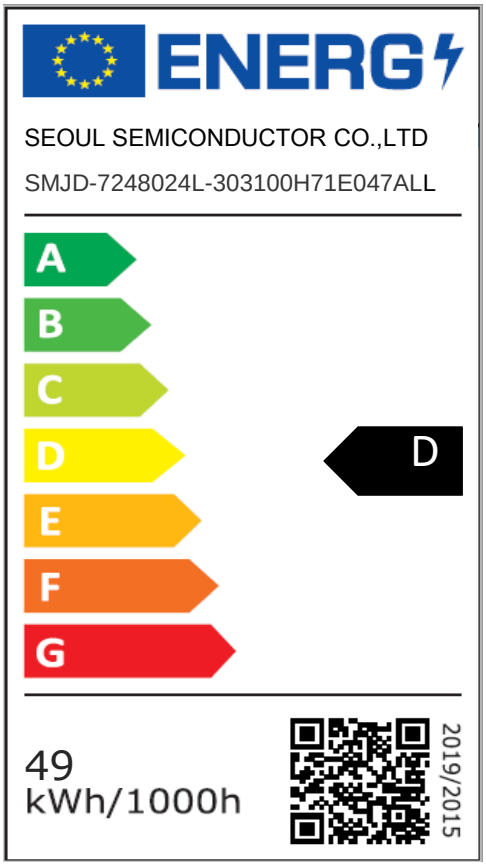
XXX

SEOUL **SEOUL SEMICONDUCTOR CO.,LTD.**

Notes:

[1] Attached to the bottom right corner of the carton box.

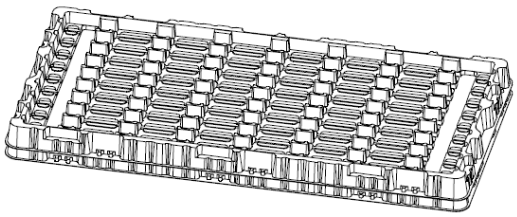
Label Information

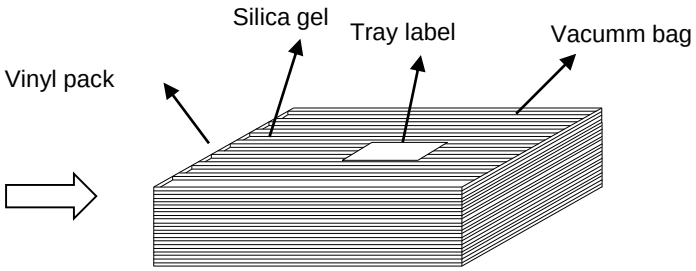


Notes

(1) You can download the label from EPREL system
(2) The label size should be 72mm*36mm
(3) The background of the label shall be 100% white.
(4) The typefaces shall be Verdana and Calibri.
(5) Colours shall be CMYK – cyan, magenta, yellow and black,
following this example: 0-70-100-0: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black.
(6) It is attached to the top right corner of the box.

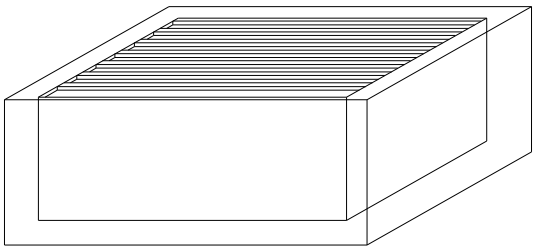
Packaging Specification

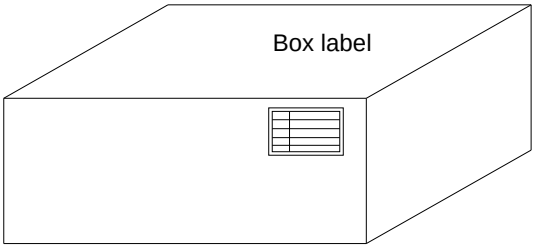




Vinyl pack = 10(11) Trays = 100 bars (MAX)

(Top tray is used as a rid.)





1 Box = 10(11) Trays = 100bars (MAX)

Model	Tray		Box		Pallet	
	Size(mm)	Q'TY per Tray	Size(mm)	Q'TY per Box	Size(mm)	Q'TY per Pallet
SMJD-4846144G-XXN1	610 x 300 x 30	10	625*315*215	100	1000*1000	1800

Precaution for Use

1. Check the appearance of engine before wiring/ assembly, DO NOT use the lens cracked or wire damaged engine.
2. The engine was designed to be driven with DC source, recognize the polarities of the engine was necessity.
3. It was not SELV engine, DO NOT connect the LED driver to main power during wiring.
4. DO NOT prolong the cable too much for long term using
5. No current regulator built in engine, unevenly load between different parallel engines may occur due to the engines VF variance.
6. DO NOT detach the lens at any application.
7. DO NOT let the lens face to touch rough stuff, and DO NOT touch lens with sharp matters
8. Please do not use together with the materials containing Sulfur.
9. Please do not make any modification on module.
10. LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).
    The following contains suggestions that Seoul Semiconductor purposes to minimize these effects

A. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two object come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LEDs may cause the product to demonstrate unusual characteristics such as:

- *Increase in reverse leakage current lowered turn-on voltage*
- *Abnormal emissions from the LED at low current*

The following recommendations are suggested to help minimize the potential for an ESD event: One or more recommended work area suggestions:

- *Ionizing fan setup*
- *ESD table/shelf mat made of conductive materials*
- *ESD safe storage containers*

One or more personnel suggestion options:

- *Antistatic wrist-strap*
- *Antistatic material shoes*
- *Antistatic clothes*

Environmental controls:

- *Humidity control (ESD gets worse in a dry environment)*

B. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. The effects from an EOS event can be noticed through product performance like:

•Changes to the performance of the LED package (If the damage is around the bond pad area and since the package is completely encapsulated the package may turn on but flicker show severe performance degradation.)

•Changes to the light output of the luminaire from component failure

•Components on the board not operating at determined drive power

- *Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures*

It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred.

- *Damaged may be noticed to the bond wires (appearing similar to a blown fuse).*
- *Damage to the bond pads located on emission surface of the LED package (shadowing can be noticed around the bond pads viewing through microscope).*
  - *Anomalies noticed in encapsulation & phosphor around bond wires. This damage usually appears due to thermal stress produced during EOS event.*

C. To help minimize the damage from an EOS event Seoul Semiconductor recommends utilizing

- Qualified LED driver with no big over shoot out put • Isolated driver that to prevent harmful peaks passed to engine. • A current limiting device

Storage before use

1. DO NOT impact or place pressure on this product because even a small amount of pressure can damage the lens cover.
2. When storing devices for a long period of time before usage, please following these guidelines.
   - *The devices should be stored in the anti-static bag that it was shipped in from Seoul-Semiconductor with opening*
   - *If the anti-static bag has been opened, re-seal preventing air and moisture from being present in the bag.*

SEOUL SEMICONDUCTOR

Company Information

Seoul Semiconductor (SeoulSemicon.com) manufacturers and packages a wide selection of light emitting diodes (LEDs) for the automotice, general illumination/ lighting, appliance, signage and back lighting markets. The company is the world's fifth largest LED supplier, holding more than 10,000 patents globally, while offering a wide range of LED technology and production capacity in areas such as "nPola", deep UV LEDs, "Acrich", the world's first commercially produced AC LED, and "Acrich MJT - Multi-Junction Technology", a proprietary family of high-voltage LEDs. The company's broad product portfolio includes a wide array of package and device choices such as Acrich, high-brightness LEDs, mid-power LEDs, side-view LEDs, through-hole type LED lamps, custom displays, and sensors. The company is vertically integrated from epitaxial growth and chip manufacture in it's fully owned subsidary, Seoul Viosys, through packaged LEDs and LED modules in three Seoul Semiconductor manufacturing facilities. Seoul Viosys also manufactures a wide range of unique deep-UV wavelength devices.

Legal Disclaimer

Information in this document is provided in connection with Seoul Semiconductor products. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Seoul Semiconductor hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party. The appearance and specifications of the product can be changed to improve the quality and/or performance without notice.