

Reference Module - HE Series

The HE Series utilizes Seoul's flagship high efficacy 5630 LEDs to deliver efficacies up to 202 Lm/W at typical driving currents. This solution features uniformity of light and color and enables easy installation with a Zhaga compatible mounting pattern.

Applications:



Features:

- High efficacy, long life
- Industry standard mechanical attributes
- Optimized for industry standard power supplies
- 3 SDCM
- ROHS Compliant
- Both 560mm and 1120mm lengths available

Key Applications:

- Troffer Retrofit
- High Bay
- LED Panel
- Channel

Product Selection: SMJD-3606036B-XXN1 $I_F = 195\text{mA}$, $T_C = 25^\circ\text{C}$

CCT	CRI	Flux		Dimension	Order Code
		Min.	Typ.		
3000	80	1190	1280	560*20	SMJD-3606036B-XXN100B28G038All
3500					SMJD-3606036B-XXN100B28F038All
4000		1240	1330		SMJD-3606036B-XXN100B33E038All
5000					SMJD-3606036B-XXN100B33C038All

Product Selection: SMJD-3611060B-XXN1 $I_F = 325\text{mA}$, $T_C = 25^\circ\text{C}$

CCT	CRI	Flux		Dimension	Order Code
		Min.	Typ.		
3000	80	1980	2130	560*20	SMJD-3611060B-XXN100C13G038All
3500					SMJD-3611060B-XXN100C13F038All
4000		2060	2210		SMJD-3611060B-XXN100C21E038All
5000					SMJD-3611060B-XXN100C21C038All

Product Selection: SMJD-3622120B-XXN1 $I_F = 650\text{mA}$, $T_C = 25^\circ\text{C}$

CCT	CRI	Flux		Dimension	Order Code
		Min.	Typ.		
3000	80	3960	4260	1120*20	SMJD-3622120B-XXN100E26G038All
3500					SMJD-3622120B-XXN100E26F038All
4000		4110	4420		SMJD-3622120B-XXN100E42E038All
5000					SMJD-3622120B-XXN100E42C038All

Electro Optical Characteristics: SMJD-3606036B-XXN1 $I_F = 195\text{mA}$, $T_C = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	$\Phi_V^{[2]}$	1190	1280	-	lm	F,G
		1240	1330	-		C,E
Correlated Color Temperature ^[3]	CCT	4745	5028	5311	K	C
		3710	3985	4260		E
		3200	3500	3700		F
		2870	3045	3220		G
CRI	Ra	80	-	-	-	-
Input Voltage	V_F	32.4	33.6	34.8	V_{DC}	@195mA
Power Consumption	P	6.3	6.6	6.8	W	
Efficiency	LPW	-	195	-	lm/W	F,G
		-	202	-		C,E

Electro Optical Characteristics: SMJD-3611060B-XXN1 $I_F = 325\text{mA}$, $T_C = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	$\Phi_V^{[2]}$	1980	2130	-	lm	F,G
		2060	2210	-		C,E
Correlated Color Temperature ^[3]	CCT	4745	5028	5311	K	C
		3710	3985	4260		E
		3200	3500	3700		F
		2870	3045	3220		G
CRI	Ra	80	-	-	-	-
Input Voltage	V_F	32.4	33.6	34.8	V_{DC}	@325mA
Power Consumption	P	10.5	10.9	11.3	W	
Efficiency	LPW	-	195	-	lm/W	F,G
		-	202	-		C,E

Notes:

- 1 Above data tested with constant typical current at $T_C = 25^\circ\text{C}$.
- 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.

Electro Optical Characteristics: SMJD-3622120B-XXN1 $I_F = 650\text{mA}$, $T_C = 25^\circ\text{C}$

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	$\Phi_V^{[2]}$	3960	4260	-	lm	F,G
		4160	4420	-		C,E
Correlated Color Temperature ^[3]	CCT	4745	5028	5311	K	C
		3710	3985	4260		E
		3200	3500	3700		F
		2870	3045	3220		G
CRI	Ra	80	-	-	-	-
Input Voltage	V_F	32.4	33.6	34.8	V_{DC}	@650mA
Power Consumption	P	21.1	21.8	22.6	W	
Efficiency	LPW	-	195	-	lm/W	F,G
		-	202	-		C,E

Absolute Maximum Operating Specification: $T_C = 25^\circ\text{C}$

Model	Parameter	Symbol	Unit	Value	Remark
SMJD-3606036B-XXN1	Power Consumption	P	W	14.5	
	Forward Voltage	V_F	V	37.1	
	Driving Current ⁽²⁾	I_F	mA	390	
SMJD-3611060B-XXN1	Power Consumption	P	W	24.1	
	Forward Voltage	V_F	V	37.1	
	Driving Current ⁽²⁾	I_F	mA	650	
SMJD-3622120B-XXN1	Power Consumption	P	W	48.2	
	Forward Voltage	V_F	V	37.1	
	Driving Current ⁽²⁾	I_F	mA	1300	
All	Operating Temperature ⁽³⁾	T_C	$^\circ\text{C}$	- 40 ~ 85	Reference point
	Storage Temperature	T_{stg}	$^\circ\text{C}$	- 40 ~ 100	With no power
	Thermal resistance (T_C to base)	$R_{th(T_C\text{-base})}$	$^\circ\text{C/W}$	0.3	
	ESD Sensitivity	-	KV	±8	IEC Air
				±4	HBM

Notes:

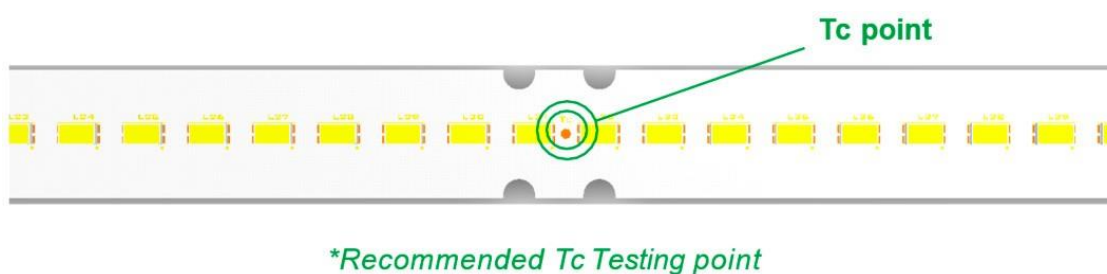
- 1 Above data tested with constant typical current at $T_C = 25^\circ\text{C}$.
- 2 Φ_V is the total luminous flux output measured with an integrated sphere.
- 3 Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
- 4 To use the module properly, recommend to drive the module by a Constant Current Source (CCS). But the Maximum output voltage of the CCS should be limited by referring this sheet.

Notes:

*Colors fully compliant with the CIE requested color temperatures on the following table:

Correlated Color Temperature	Nominal CCT	CCT (K)
C	5000 K	5028 ± 283
E	4000 K	3985 ± 275
F	3500 K	3465 ± 245
G	3000 K	3045 ± 175

Illustration: How to predict components temperature

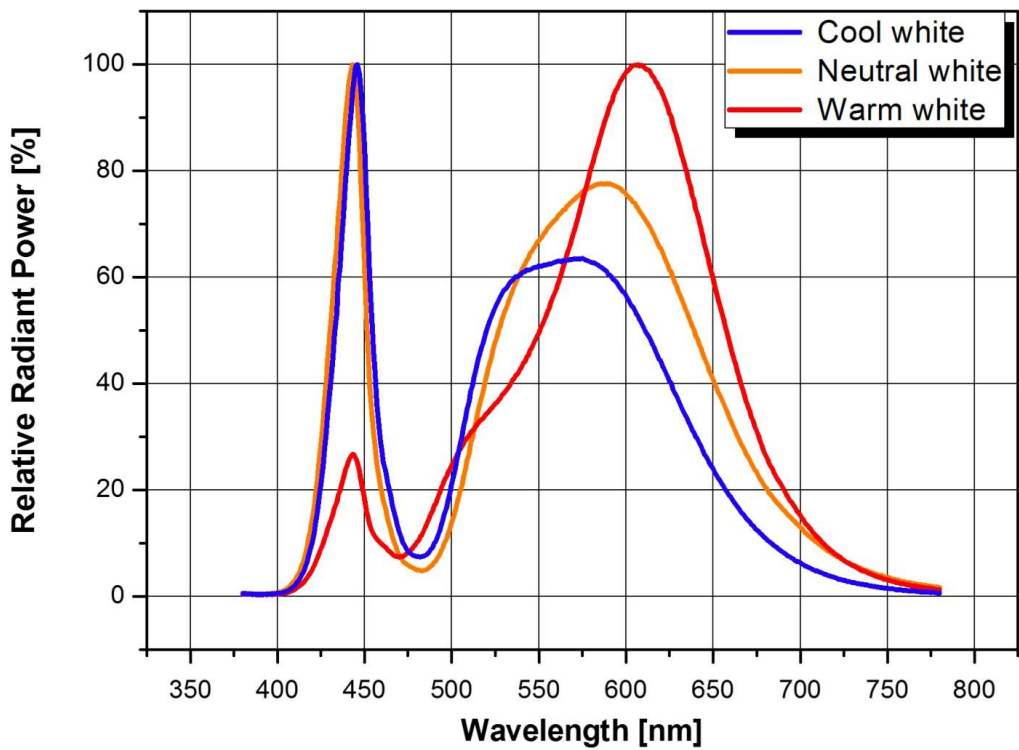


Notes:

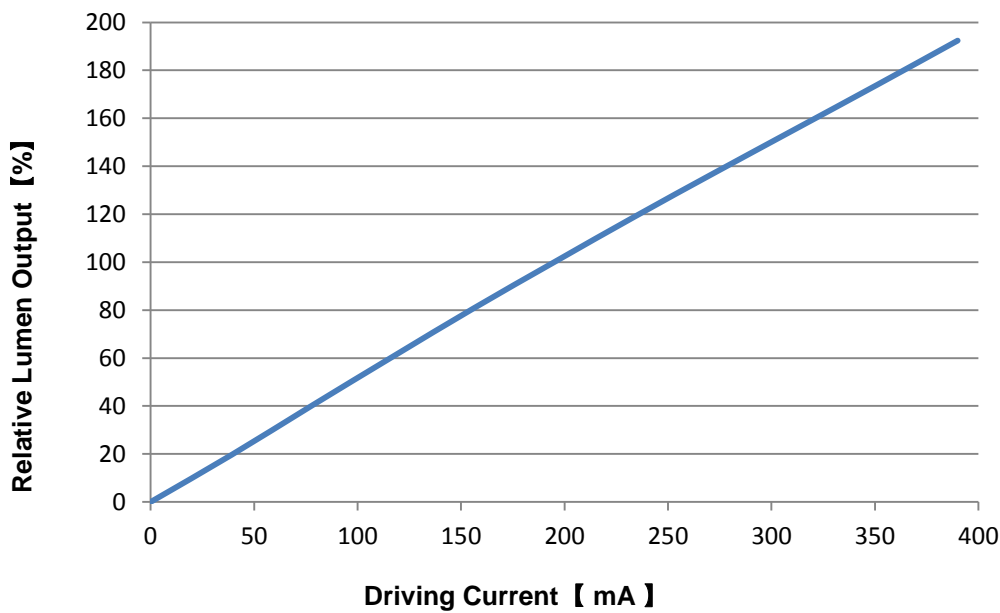
- 1 The modules must be operated within the operating conditions stated in the Absolute Maximum Operating Specifications.
- 2 Please use a Constant Current Source (CCS) to drive the module, the typical V_F of module is 33.6 VDC and V_{F_MAX} is 34.8 VDC, respectively.
- 3 Operating temperature was tested at the assigned T_c point on the PCB.
- 4 To ensure the module works properly, T_c should refer to "Absolute Maximum Operating Specification".

Relative Spectral Distribution

- Relative Spectral Distribution vs. Wavelength

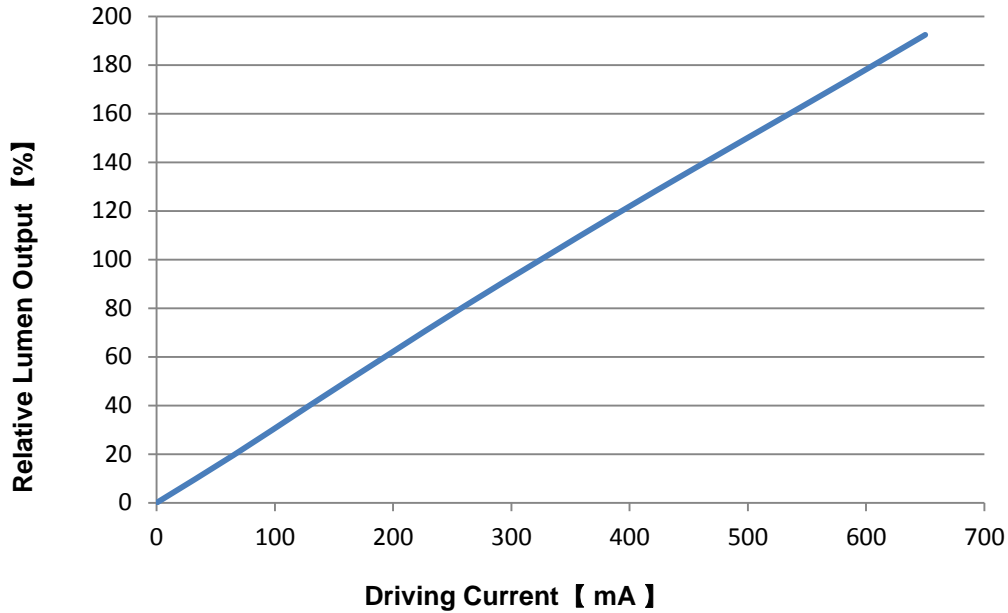


Scale ratio curve for related lumen output VS driving current, $T_c=25^{\circ}\text{C}$
SMJD-3606036B-XXN1



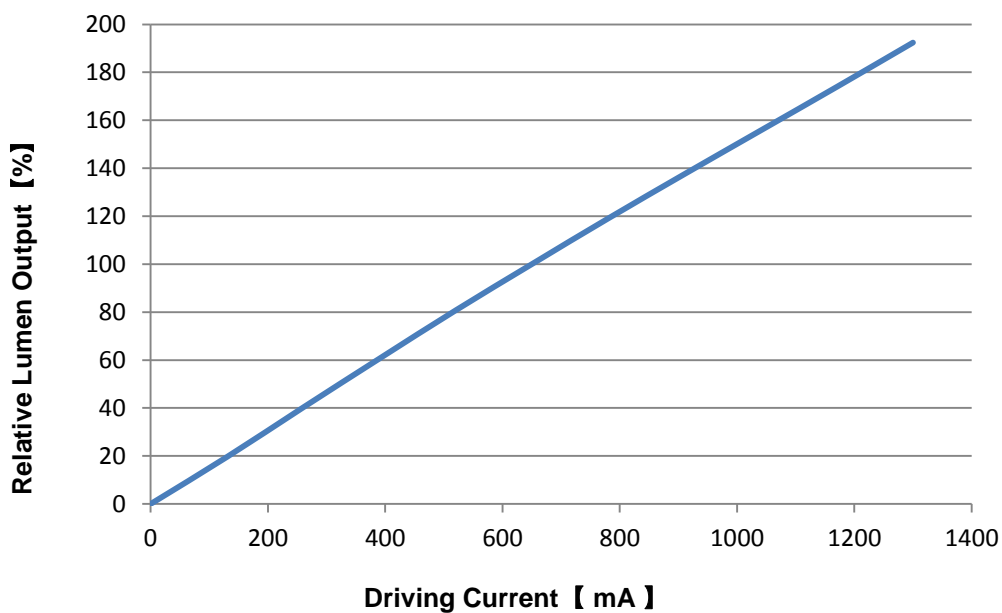
- Scale ratio curve for related lumen output VS driving current, $T_C=25^{\circ}\text{C}$

SMJD-3611060B-XXN1



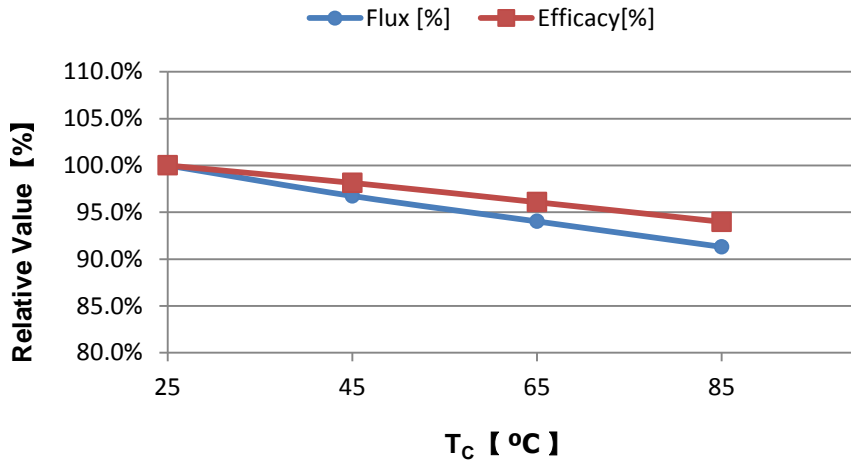
- Scale ratio curve for related lumen output VS driving current, $T_C=25^{\circ}\text{C}$

SMJD-3622120B-XXN1



Flux and Efficacy Versus Temperature at T_C (at I_F nominal)

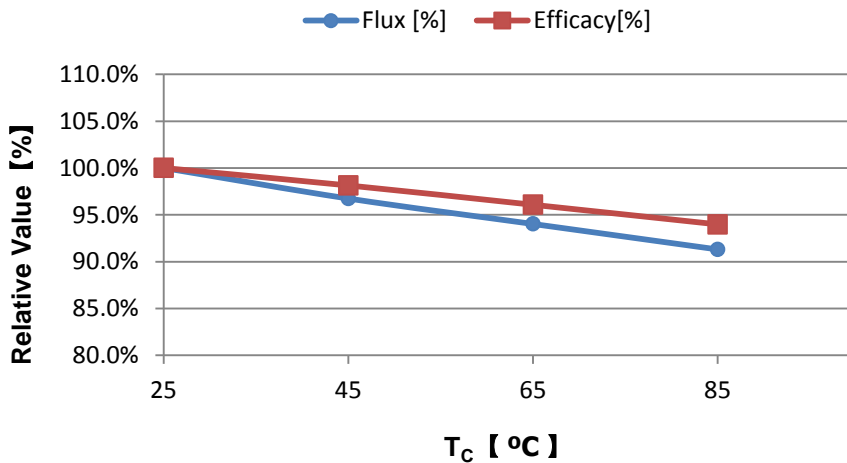
SMJD-3606036B-XXN1, $I_F = 195\text{mA}$



TC [°C]	Flux[%]	Efficacy[%]
25	100	100
45	96.74	98.14
65	94.02	96.07
85	91.30	93.98

Flux and Efficacy Versus Temperature at T_C (at I_F nominal)

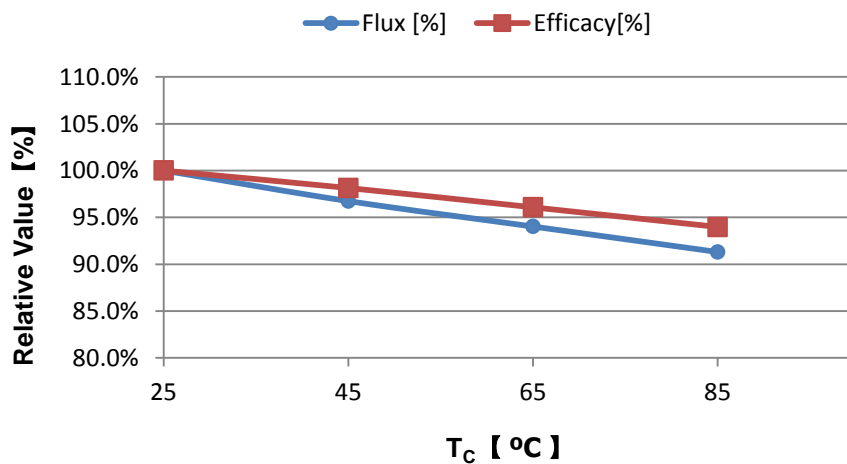
SMJD-3611060B-XXN1, $I_F = 325\text{mA}$



TC [°C]	Flux[%]	Efficacy[%]
25	100	100
45	96.74	98.14
65	94.02	96.07
85	91.30	93.98

Flux and Efficacy Versus Temperature at T_C (at I_F nominal)

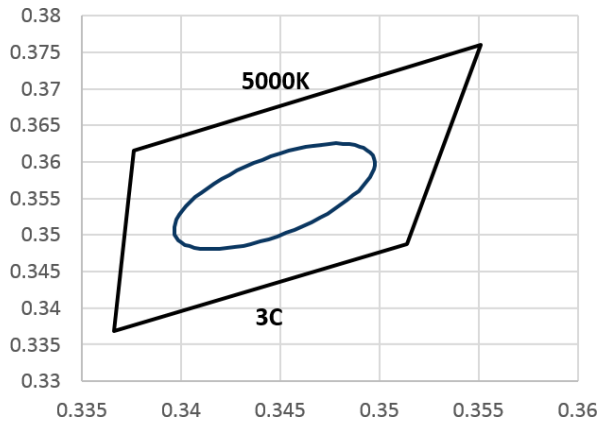
SMJD-3622120B-XXN1, $I_F = 650\text{mA}$



TC [°C]	Flux[%]	Efficacy[%]
25	100	100
45	96.74	98.14
65	94.02	96.07
85	91.30	93.98

Color Bin Structure

CIE Chromaticity Diagram (Cool white), $T_c=25^\circ\text{C}$

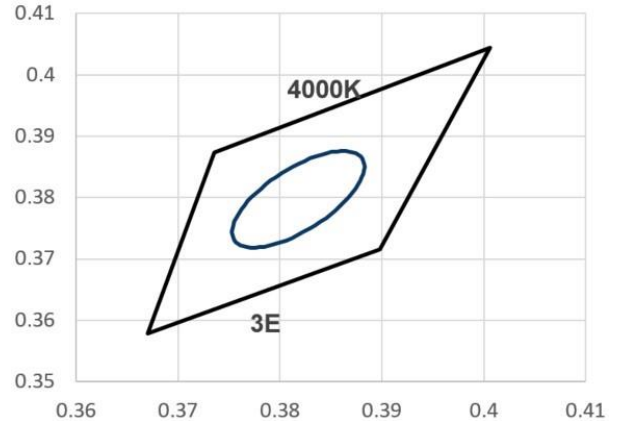


5000K 3 Step Ellipse

3C				
x	y	a	b	theta

0.3447	0.3553	0.0081	0.0035	60
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CIE Chromaticity Diagram (Nature white), $T_c=25^\circ\text{C}$

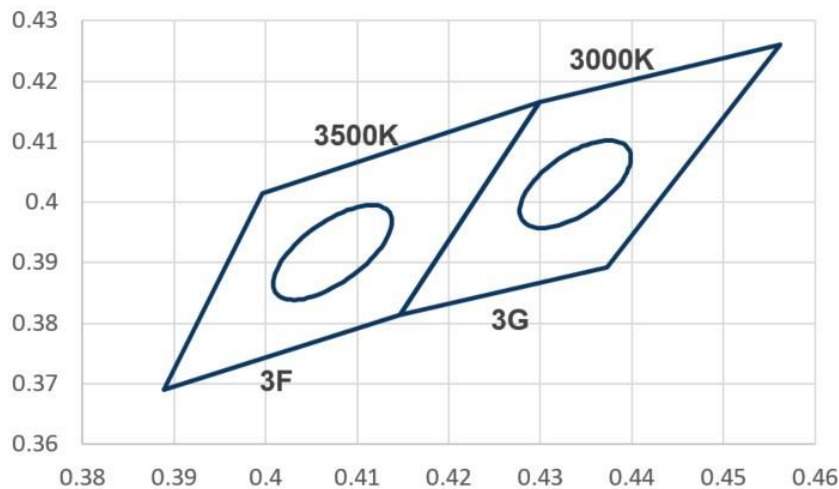


4000K 3 Step Ellipse

3E				
x	y	a	b	theta

0.3818	0.3797	0.0094	0.004	53
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CIE Chromaticity Diagram (Warm white), $T_c=25^\circ\text{C}$



3500K 3 Step Ellipse

3F				
x	y	a	b	theta

0.4073	0.3917	0.0093	0.0041	53
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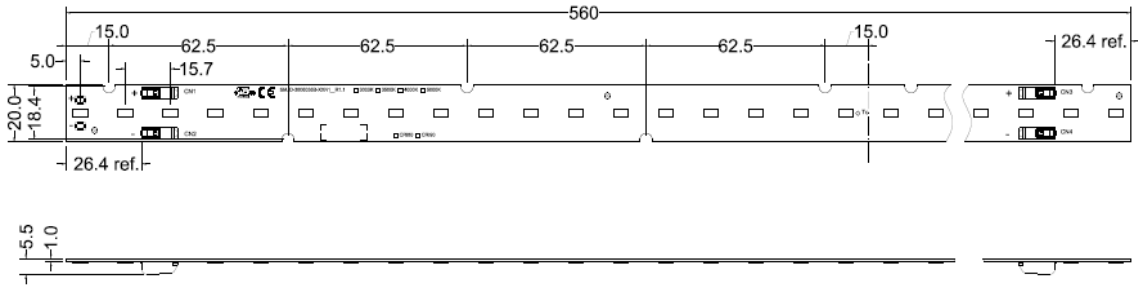
3000K 3 Step Ellipse

3G				
x	y	a	b	theta

0.4338	0.4030	0.0085	0.0041	53
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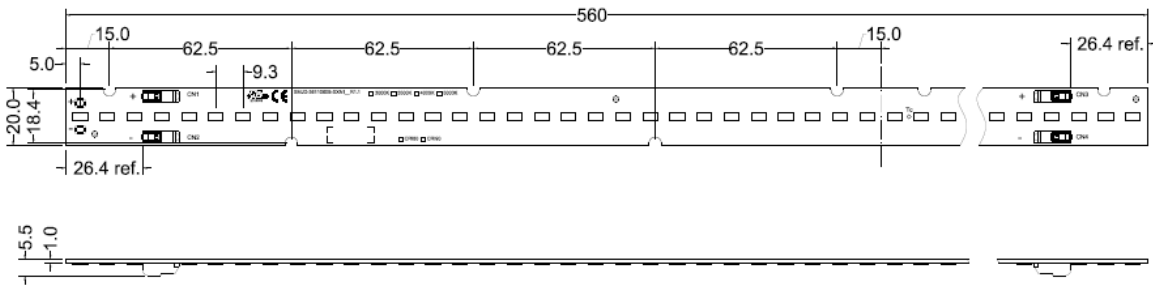
Mechanical Dimensions

SMJD-3606036B-XXN1



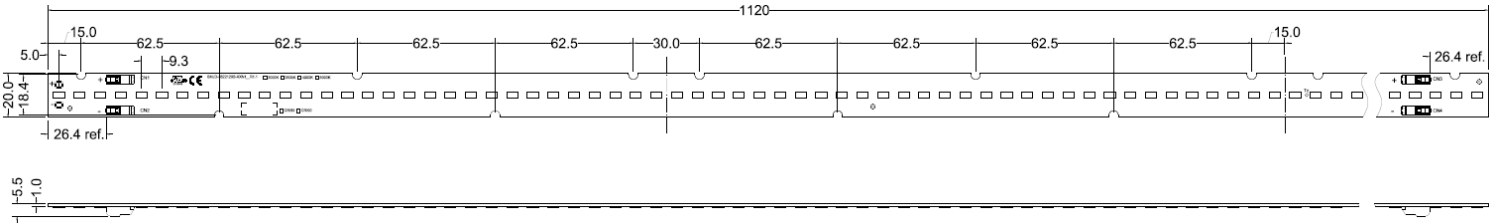
Dimension	Specification	Tolerance	Unit
Module Length	560	±0.5	mm
Module Width	20	±0.3	
Module Height	5.5	±0.3	
PCB Thickness	1.0	±0.1	

SMJD-3611060B-XXN1



Dimension	Specification	Tolerance	Unit
Module Length	560	±0.5	mm
Module Width	20	±0.3	
Module Height	5.5	±0.3	
PCB Thickness	1.0	±0.1	

SMJD-3622120B-XXN1



Dimension	Specification	Tolerance	Unit
Module Length	1120	±0.6	mm
Module Width	20	±0.3	
Module Height	5.5	±0.3	
PCB Thickness	1.0	±0.1	

Product Nomenclature:

*Please refer to the following chart

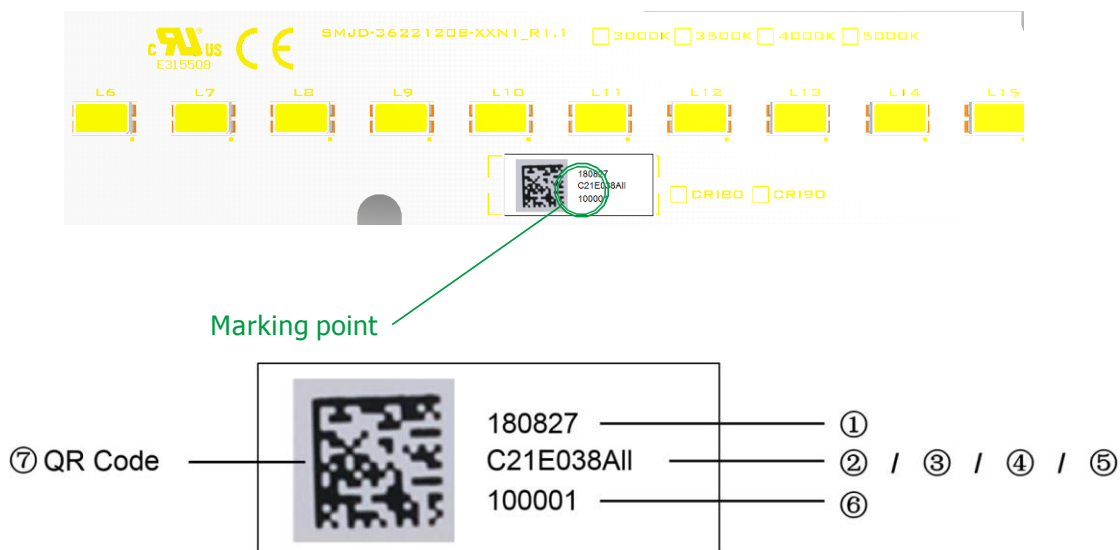
S M J D - 36 11 060 B - XX N 1										
Seoul DC Module										
Voltage		Power		LED Qty			Type	Custom	Dimming	Etc
3	6	1	1	0	6	0	B	XX	N	1
0 0V	0 0V	0 0W	0 0W	0 0ea	0 0ea	0 0ea	B 5630D	XX ref	N Norm	1 vers
1 10V	1 1V	1 10W	1 1W	1 100ea	1 10ea	1 1ea			D Dim	
2 20V	2 2V	2 20W	2 2W	2 200ea	2 20ea	2 2ea			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

00 C21 E03 8 ALL				
Lens Type	Flux Bin	CCT Bin	CRI Bin	VF Bin
00	C21	E03	8	ALL
00 No Lens	C21 2210 lm	G03 3000k - 3 step	8 CRI 80	All 32.4 ~ 34.8V _{DC}
		F03 3500k - 3 step		
		E03 4000k - 3 step		
		C03 5000k - 3 step		

Marking Information



No.	Item	Information	Digits	Remark
①	Date	YYMMDD	6 Digit	SMT date
②	Flux ⁽¹⁾	C21	3 Digit	C21=2210lm
③	CCT	X03 3-step Mixing	3 Digit	X=C,E,F,G
④	CRI	8	1 Digit	CRI=80
⑤	V _F	All	3 Digit	
⑥	Lot No.	1	1 Digit	0~9,A~Z
	Sequence No.	00001	5 Digit	00001 ~ 99999
⑦	QR Code	QR Code	-	Please refer to below table


Note:

*Flux Bin - please refer to following chart for definitions:

Flux Bin Definitions

Symbol	lm	Symbol	lm	Symbol	lm	Symbol	lm
A50	500	D50	3500	G50	6500	J50	9500
B50	1500	E50	4500	H50	7500	K20	10200
C50	2500	F50	5500	I50	8500	L00	11000

Module QR Code Information


<div>  QR Code Information </div>								
Items	Factory	SAP Code	SMT Date	MP information	Line No.	Lot No.	Product	Note
Digits	1 Digit	7 Digits	6 Digits	10 Digits	1 Digit	1 Digit	5 Digits	In Total 31 Digits
Information	*	*****	YYMMDD	C21E03 8ALL	1~9, A~Z	1~9, A~Z	00001	

Notes:

- 1 QR coded information shall include the fields described in the table above.
- 2 Minimum size of QR code shall be 4.5 mm x 4.5 mm and a minimum QR 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 QR code in minimum size of 6 mm by 6 mm printed on a label.
- 4 The length of the QR code is 31 digits and includes all characters combined without spaces.



Example: *****180827 C21E038ALL11100001

Label Information

PO Number 	XXXXXX ⁽¹⁾
Supplier Part Number 	SMJD-3611060B-XXN100C21E038ALL ⁽²⁾
Bin Code 	C21E038ALL ⁽³⁾
Quantity 	XX
Country of Origin 	XX ⁽⁴⁾
Date Code 	YYYYWW ⁽⁵⁾
Lot Code 	YYMDDXXXXX- XXXXXXXX ⁽⁶⁾
	SEOUL SEMICONDUCTOR CO.,LTD.

Notes:

- [1] This is customer's PO Number
- [2] Please refer to SPEC page 10 (30 digit code)
- [3] Please refer to SPEC page 10
- [4] Country of Origin: 2 digit code . For example : Chinese Code: CN
- [5] Date Code : YYYYWW : 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.

TOTAL Quantity  XX
 SEOUL SEMICONDUCTOR CO.,LTD.

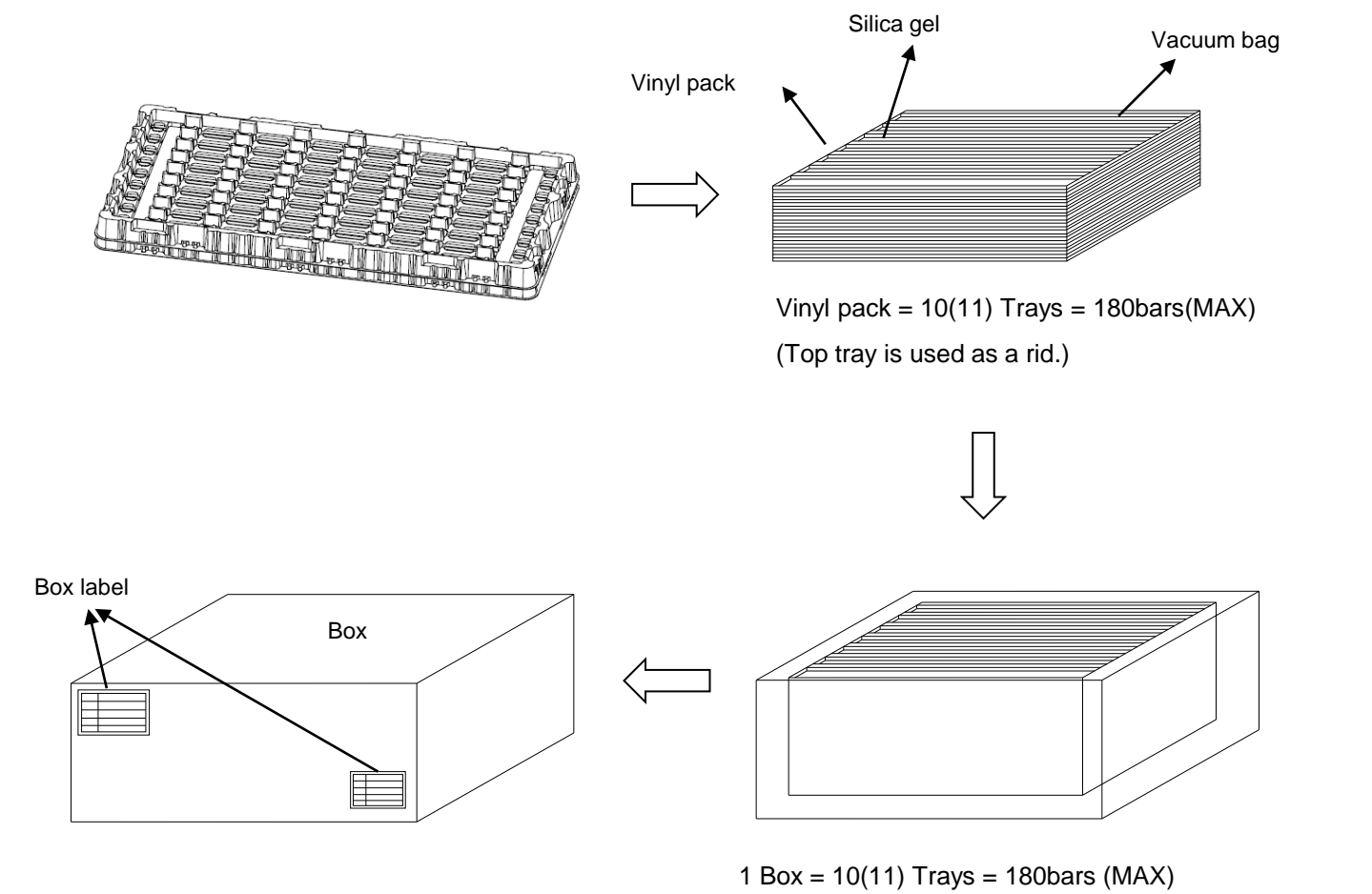
Notes:

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

Packaging Specification

**Packaging specification subject to change*

	Tray		Box		Pallet	
	Size (mm)	Q'ty per tray	Size (mm)	Q'ty per box	Size (mm)	Q'ty per pallet
SMJD-3606036B-XXN1	610 x 300 x 30	18	625*315*215	180	1000*1000	3600
SMJD-3611060B-XXN1						
SMJD-3622120B-XXN1	1230 x 285 x 30	16	1245*300*133	80	1300*1100	1920



Storage before use

1. 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) manufactures and packages a wide selection of light emitting diodes (LEDs) for the automotive, 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 its fully owned subsidiary, 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.

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