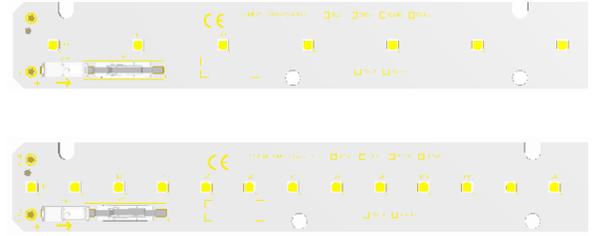


# Reference Module Preliminary

The Linear HE series utilizes Seoul's high performing and cost effective 3030 LEDs to deliver efficacies up to 203 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
- Optimized for the Book 7 of ZHAGA standard
- Flexible scalability with 280mm HE series
- 3 SDCM
- ROHS Compliant

## Key Applications:

- Troffer Retrofit
- High Bay
- LED Panel
- Channel

### Product Selection: SMJD-2206024G-XXNA<sub>F</sub> = 275mA, T<sub>c</sub> = 25°C

CCT	CRI	Flux		Dimension	Connector	Order Code
		Min.	Typ.			
3000	80	1040	1120	559.0 x 23.6	Normal Reverse	SMJD-2206024G-XXNA00B12G038AII SMJD-2206024G-XXNA01B12G038AII
4000		1160	1220		Normal Reverse	SMJD-2206024G-XXNA00B22E038AII SMJD-2206024G-XXNA01B22E038AII
5000		Normal Reverse	SMJD-2206024G-XXNA00B22C038AII SMJD-2206024G-XXNA01B22C038AII			

### Product Selection: SMJD-4412048G-XXNA<sub>F</sub> = 275mA, T<sub>c</sub> = 25°C

CCT	CRI	Flux		Dimension	Connector	Order Code
		Min.	Typ.			
3000	80	2080	2240	559.0 x 23.6	Normal Reverse	SMJD-4412048G-XXNA00C24G038AII SMJD-4412048G-XXNA01C24G038AII
4000		2320	2440		Normal Reverse	SMJD-4412048G-XXNA00C44E038AII SMJD-4412048G-XXNA01C44E038AII
5000		Normal Reverse	SMJD-4412048G-XXNA00C44C038AII SMJD-4412048G-XXNA01C44C038AII			

**Electro Optical Characteristics: SMJD-2206024G-XXNAI<sub>F</sub> = 275mA, T<sub>c</sub> = 25°C**

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	$\Phi_v$ [2]	1040	1120	-	lm	G
		1160	1220	-		C,E
Correlated Color Temperature [3]	CCT	4745	5028	5311	K	C
		3710	3985	4260		E
		2870	3045	3220		G
CRI	Ra	80	-	-	-	-
Input Voltage	VF	21.0	21.8	22.6	VDC	@275mA
Power Consumption	P	5.8	6.0	6.2	W	
Efficiency	LPW	-	183	-	Lm/W	G
		-	203	-		C,E

**Electro Optical Characteristics: SMJD-4412048G-XXNAI<sub>F</sub> = 275mA, T<sub>c</sub> = 25°C**

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	$\Phi_v$ [2]	2080	2240	-	lm	G
		2320	2440	-		C,E
Correlated Color Temperature [3]	CCT	4745	5028	5311	K	C
		3710	3985	4260		E
		2870	3045	3220		G
CRI	Ra	80	-	-	-	-
Input Voltage	VF	42.1	43.7	45.3	VDC	@275mA
Power Consumption	P	11.6	12.0	12.5	W	
Efficiency	LPW	-	183	-	Lm/W	G
		-	203	-		C,E

**Notes:**

- 1 Above data tested with constant typical current at T<sub>c</sub> = 25°C.
- 2  $\Phi_v$  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.

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

Model	Parameter	Symbol	Unit	Value	Remark
SMJD-2206024G-XXNA	Power Consumption	P	W	13.9	
	Forward Voltage	$V_F$	V	23.2	
	Driving Current <sup>(2)</sup>	$I_F$	mA	600	
SMJD-4412048G-XXNA	Power Consumption	P	W	27.8	
	Forward Voltage	$V_F$	V	46.4	
	Driving Current <sup>(2)</sup>	$I_F$	mA	600	
All	Operating Temperature <sup>(3)</sup>	$T_C$	$^\circ\text{C}$	- 40 ~ 85	Reference point
	Storage Temperature	$T_{stg}$	$^\circ\text{C}$	- 40 ~ 100	With no power
	ESD Sensitivity	-	KV	$\pm 8$	IEC Air
$\pm 4$				HBM	

**Notes:**

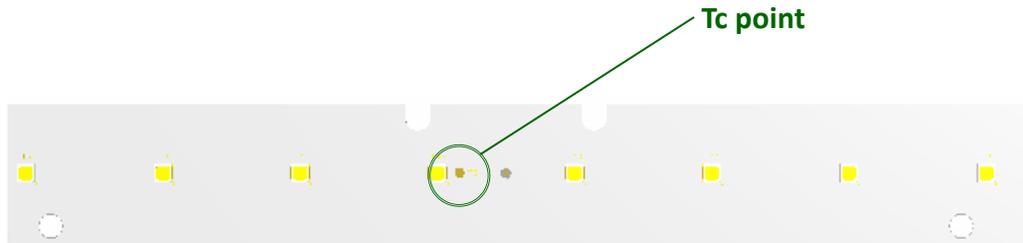
- Above data tested with constant typical current at  $T_c = 25^\circ\text{C}$ .
- $\Phi_v$  is the total luminous flux output measured with an integrated sphere.
- Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
- To use the module properly, recommend to drive the module 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
G	3000 K	3045 ± 175

**Illustration: How to predict components temperature**



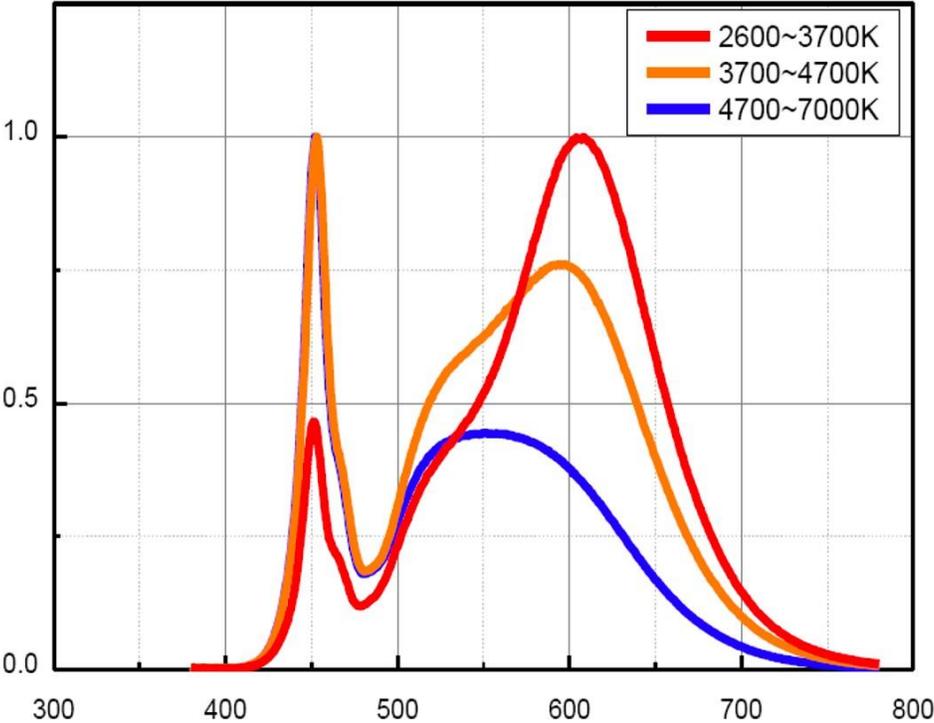
\* Recommended T<sub>c</sub> Testing point

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.
- 3 Operating temperature was tested at the assigned T<sub>c</sub> point on the PCB.
- 4 To ensure the module works properly, T<sub>c</sub> should refer to "Absolute Maximum Operating Specification".

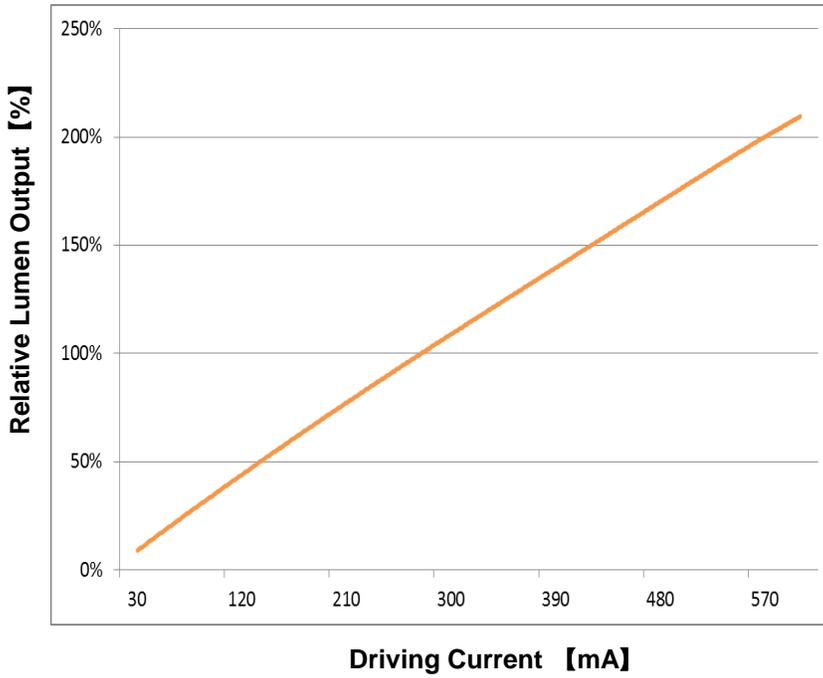
**Relative Spectral Distribution**

- Relative Spectral Distribution vs. Wavelength

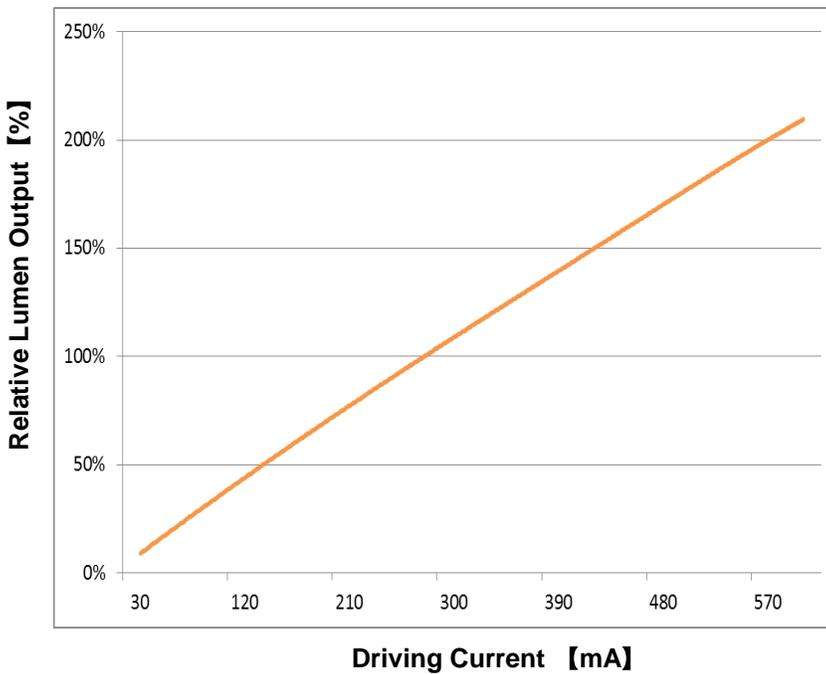


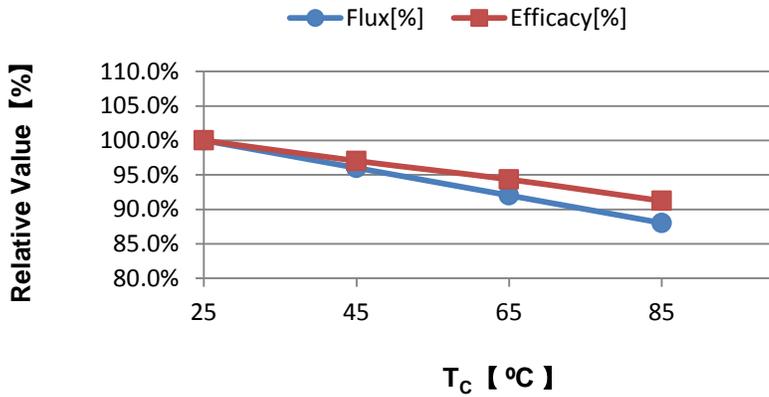
- Scale ratio curve for related lumen output VS driving current,  $T_c = 25\text{ }^\circ\text{C}$

**SMJD-2206024G-XXNA**

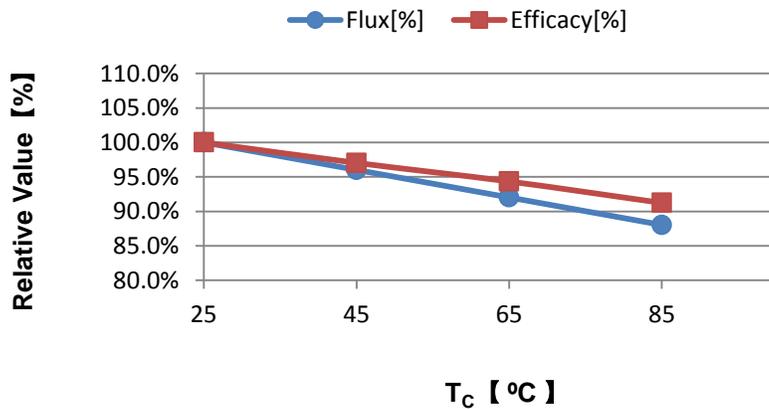


**SMJD-4412048G-XXNA**



**Flux and Efficacy Versus Temperature at  $T_C$ (at  $I_F$  nominal)**
**SMJD-2206024G-XXNA,  $I_F = 275\text{mA}$** 


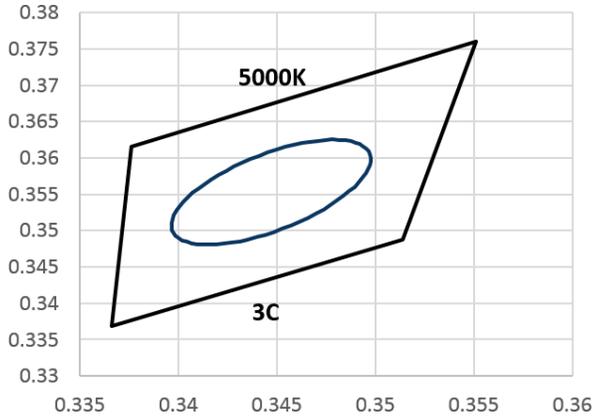
$T_C$ [°C]	Flux[%]	Efficacy[%]
25	100	100
45	96.0	97.0
65	92.0	94.3
85	88.0	91.2

**Flux and Efficacy Versus Temperature at  $T_C$ (at  $I_F$  nominal)**
**SMJD-4412048G-XXNA,  $I_F = 275\text{mA}$** 


$T_C$ [°C]	Flux[%]	Efficacy[%]
25	100	100
45	96.0	97.0
65	92.0	94.3
85	88.0	91.2

## Color Bin Structure

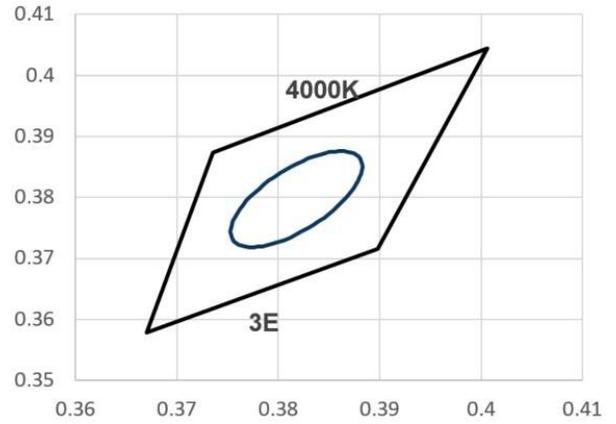
CIE Chromaticity Diagram (Cool white),  $T_c = 25\text{ }^\circ\text{C}$



5000K 3 Step Ellipse

3C				
x	y	a	b	theta
0.3447	0.3553	0.0081	0.0035	60

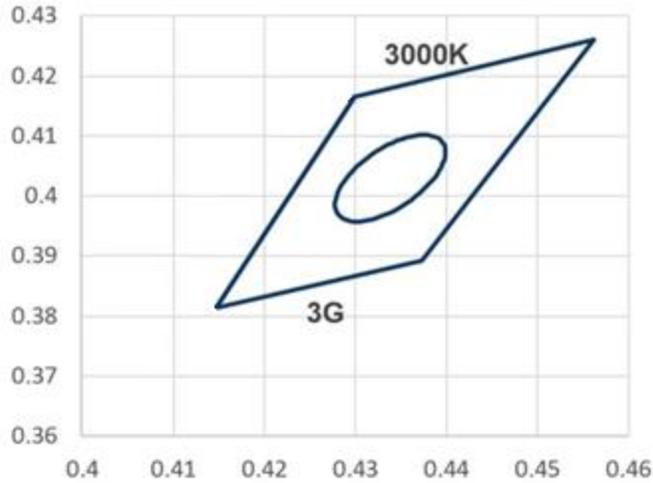
CIE Chromaticity Diagram (Nature white),  $T_c = 25\text{ }^\circ\text{C}$



4000K 3 Step Ellipse

3E				
x	y	a	b	theta
0.3818	0.3797	0.0094	0.004	53

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

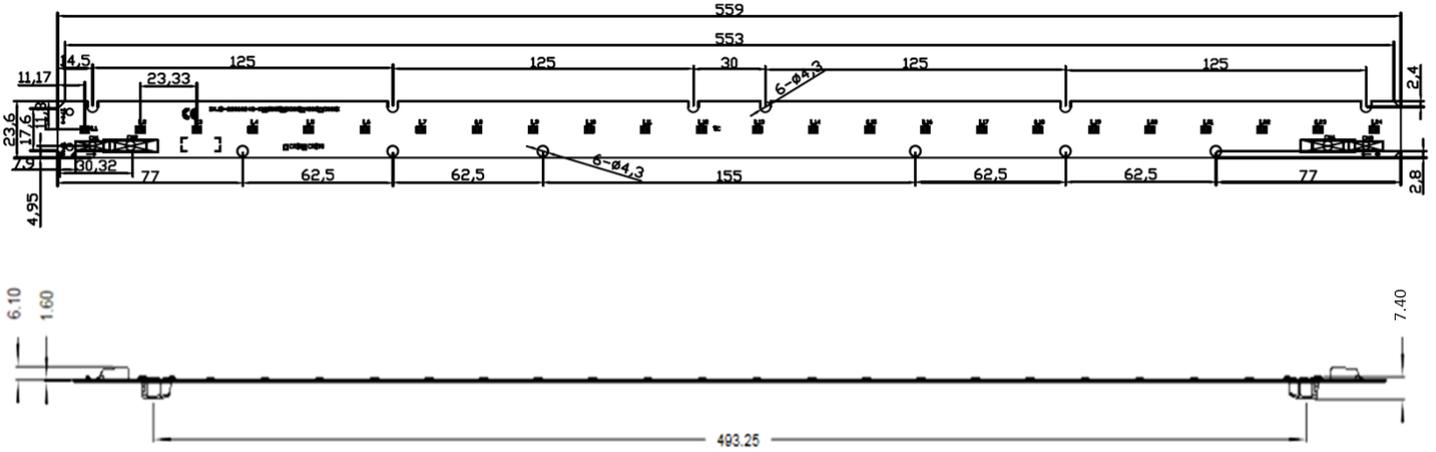


3000K 3 Step Ellipse

3G				
x	y	a	b	theta
0.4338	0.4030	0.0085	0.0041	53

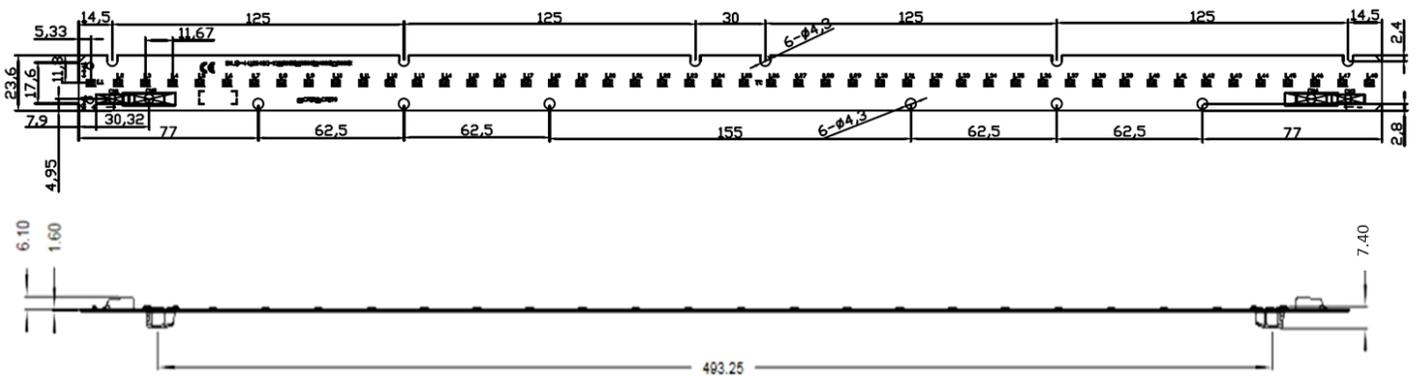
## Mechanical Dimensions

### SMJD-2206024G-XXNA



Dimension	Specification	Tolerance	Unit	
Module Length	559.0	±0.5	mm	
Module Width	23.6	±0.3		
Module Height	Normal	6.1		±0.3
	Reverse	7.4		±0.3
PCB Thickness	1.6	±0.1		

### SMJD-4412048G-XXNA



Dimension	Specification	Tolerance	Unit	
Module Length	559.0	±0.5	mm	
Module Width	23.6	±0.3		
Module Height	Normal	6.1		±0.3
	Reverse	7.4		±0.3
PCB Thickness	1.6	±0.1		

## Product Nomenclature:

\*Please refer to the following chart

**S M J D - 22 06 024 G - XX N A**  
 Seoul DC Module      (A) (B) (C) (D) (E) (F) (G)

Voltage		Power		LED Qty			Type	Custom	Dimming	Etc
2	2	0	6	0	2	4	G	XX	N	A
0 0V	0 0V	0 0W	0 0W	0 0ea	0 0ea	0 0ea	G 3030	XX ref	N Norm	A 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						

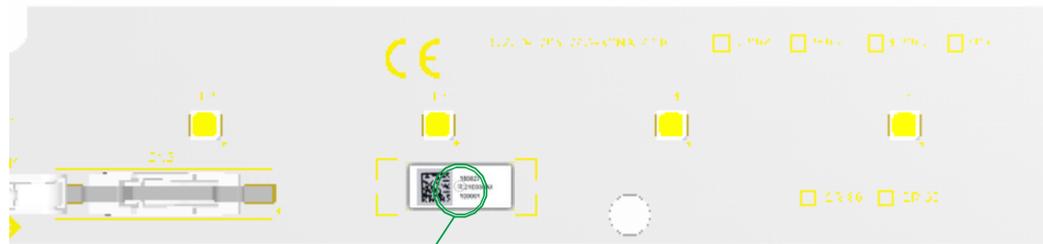
## Product Nomenclature: Binning

\*Please refer to the following chart

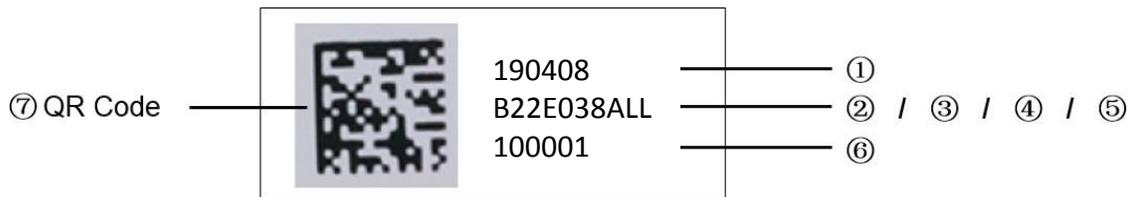
**00 B22 E03 8 ALL**  
 (A) (B) (C) (D) (E)

Connector Type	Flux Bin	CCT Bin	CRI Bin	VF Bin
00	B12	E03	8	ALL
00 Normal	B12 1120 lm	G03 3000k - 3 step	8 CRI 80	All 21.0 ~ 22.6V <sub>DC</sub>
01 Reverse	B22 1220 lm	E03 4000k - 3 step		42.1 ~ 45.3V <sub>DC</sub>
	C24 2240 lm	C03 5000k - 3 step		
	C44 2440 lm			

## Marking Information



Marking point



No.	Item	Information	Digits	Remark
①	Date	YYMMDD	6 Digit	SMT date
②	Flux <sup>(1)</sup>	B22	3 Digit	B22=1220lm
③	CCT	X03   3-step Mixing	3 Digit	X=C,E,G
④	CRI	8	1 Digit	CRI=80
⑤	V <sub>F</sub>	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

QR Code Information								
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	B22E03 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 QR Code Example: \*\*\*\*\*190408B12E038ALL11100001

## Label Information

PO Number 	XXXXXX <sup>(1)</sup> 
Supplier Part Number 	SMJD-2206024G-XXNA00B22E038ALL <sup>(2)</sup> 
Bin Code 	B22E038ALL <sup>(3)</sup> 
Quantity 	XX 
Country of Origin 	XX <sup>(4)</sup> 
Date Code 	YYYYWW <sup>(5)</sup> 
Lot Code 	YYMDDXXXX- XXXXXX <sup>(6)</sup> 
	SEOL 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.

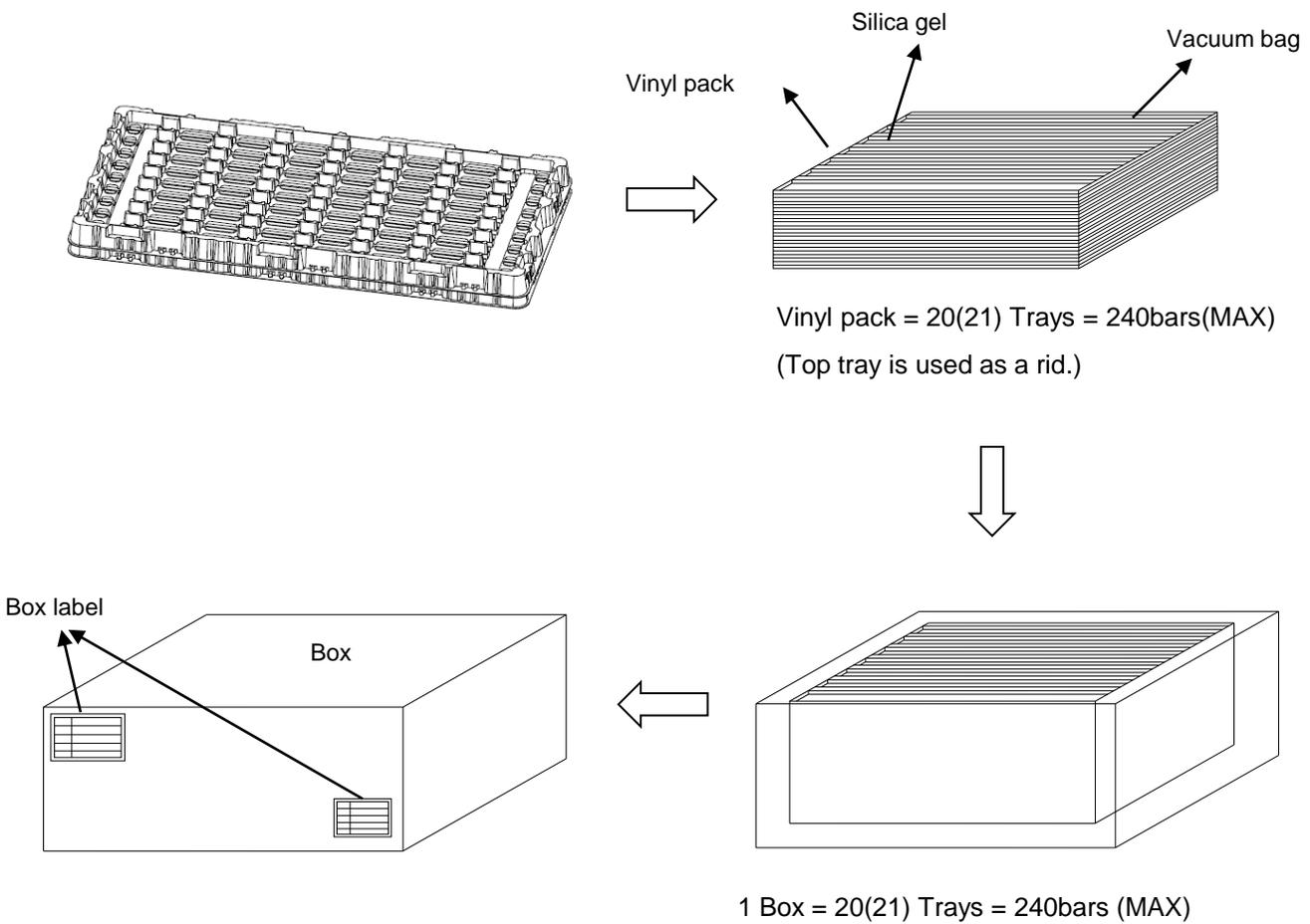
<p><b>TOTAL Quantity</b></p> <p>     </p> <p>XX</p>
<p> SEOL SEMICONDUCTOR CO.,LTD.</p>

**Notes:**

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

## Packaging Specification

Model	Tray		Box		Pallet	
	Size (mm)	Q'ty per tray (ea)	Size (mm)	Q'ty per box (ea)	Size (mm)	Q'ty per pallet(ea)
SMJD-2206024G-XXNA	630 x 430 x 16	12	645 x 445 x 208	240	1300 x 1130	5760
SMJD-4412048G-XXNA						





## 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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