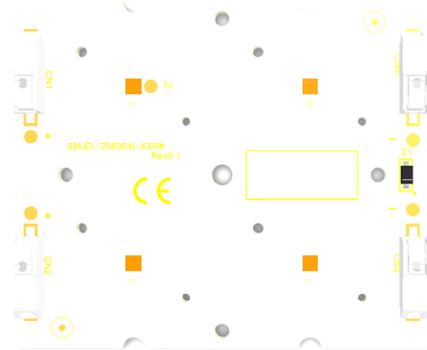


DC Module

SMJD-1208004L-XXN1



Product Brief

Description

- Wicop DC module has good optical properties. It is widely used in all kinds of outdoor lighting
- DC modules incorporate a wide angle optic that is designed to minimize the number of LEDs required for large area lighting.
- Modular design can effectively reduce the cost of lamp and improve the production efficiency.
- This modules will also allow for a more slimmer and lighter design with weight reduction than general direct type modules.

Features and Benefits

- Long Life Time
- Simple BOM
- Lead Free Product
- RoHS Compliant
- High Efficacy

Key Applications

- Outdoor lighting
- Tunnel lighting
- Parking lighting
- Street lighting

Product Code Information

Table 1-1. Order Code

CCT	CRI	Flux		Dimension	Order Code
		Min.	Typ.		
4000	70	1220	1310	60*50*1.0	SMJD-1208004L-XXN1 00B31ESA7ALL
3000		1130	1210		SMJD-1208004L-XXN1 00B21GSA7ALL
2700		1090	1170		SMJD-1208004L-XXN1 00B17HSA7ALL

Table 1-2. Product Selection - Flux , $I_F=700\text{mA}$, $T_c = 85^\circ\text{C}$

Bin	Flux			Unit	Remark
	Min.	Typ.	Max.		
B31	1220	1310	-	Lm	E rank
B21	1130	1210	-	Lm	G rank
B17	1090	1170	-	Lm	H rank

Table 1-3. Product Selection - CCT

Bin	CCT	Unit
XSA	X=E,G,H	K

Table 1-4. Product Selection – CRI and V_F

Bin	CRI	V_F
7All	70	DC 10.5~12.5V
8All	80	

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Performance Characteristics

Table 2. Electro Optical Characteristics , $I_F=700\text{mA}$, $T_c = 85^\circ\text{C}$ ⁽¹⁾

Parameter	Symbol	Value			Unit	Mark
		Min.	Typ.	Max.		
Luminous Flux	Φ_V ^[2]	1220	1310	-	lm	E rank
		1130	1210	-		G rank
		1090	1170	-		H rank
Correlated Color Temperature ^[3]	CCT	3700	4000	4200	K	E rank
		2900	3000	3200		G rank
		2600	2700	2900		H rank
CRI	Ra ^[4]	70	-	-	-	
		80	-	-		
Binning	SDCM	-	-	6		steps
Input Voltage ^[5]	V_{in}	10.5	11.5	12.5	V_{DC}	V
Power Consumption	P		8	12	W	$I_F=700\text{mA}$
Efficacy	LPW	-	164	-	Lm/W	E rank
		-	151	-	Lm/W	G rank
		-	146	-	Lm/W	H rank

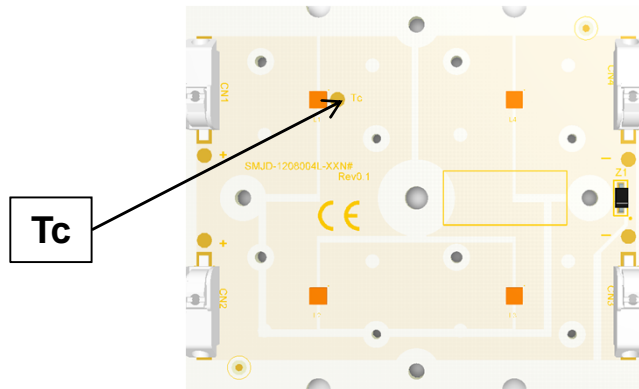
Notes :

- (1) The above data were tested at $T_c = 85^\circ\text{C}$.
- (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) 70 is only indicated to color rendering index 70, and 80 is only indicated to color rendering index 80
- (5) 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 Ratings

Table 3. Absolute Maximum Ratings, $I_F=700\text{mA}$, $T_c = 85^\circ\text{C}$ ⁽¹⁾

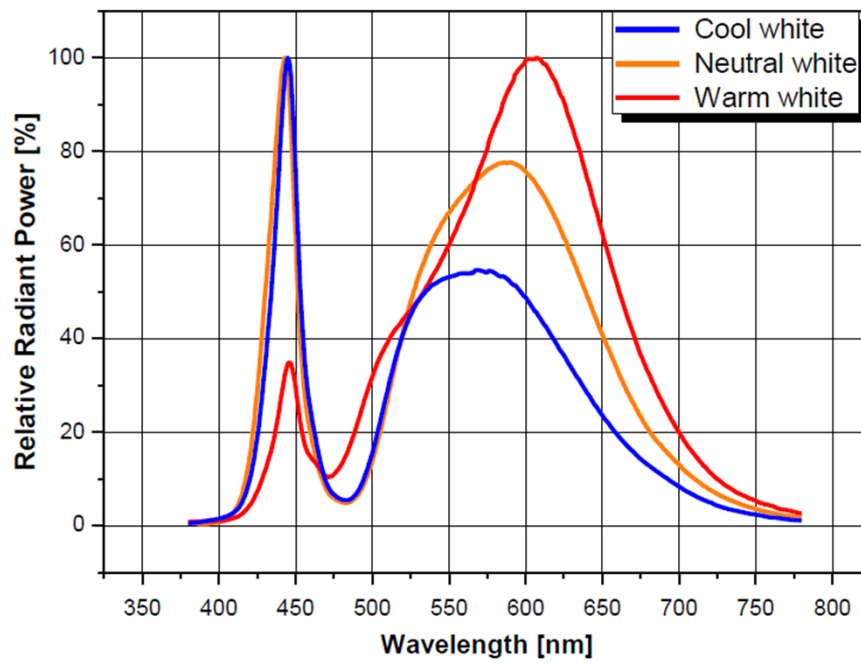
Parameter	Symbol	Unit	Value	Remark
Power Consumption	P	W	12	$P_{type}=8\text{ W}$
Driving Current ⁽²⁾	I_F	mA	1000	$I_{F_typ} = 700\text{mA}$
Operating Temperature ⁽³⁾	T_C	$^\circ\text{C}$	- 40 ~ 85	Reference point
Storage Temperature	T_{stg}	$^\circ\text{C}$	- 40 ~ 125	With no power
ESD Sensitivity	-	KV	± 15	IEC Air
			± 8	HBM

ILLUSTRATION 1: How to predict LED temperature ⁽⁴⁾

Recommended T_c testing point
Notes :

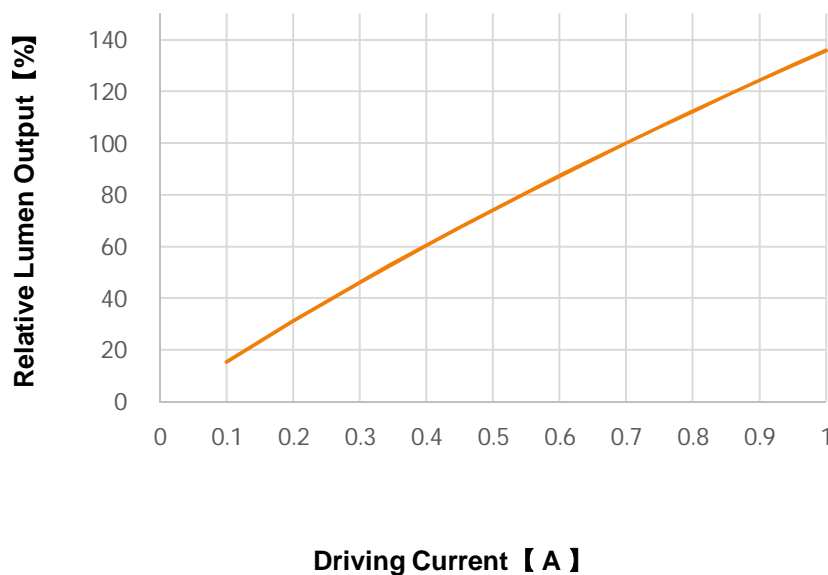
- (1) All guarantee are based on the Absolute Maximum Ratings listed.
- (2) Please use a Constant Current Source (CCS) to drive the module, the typical V_F of module is 11.5 VDC and V_{F_MAX} is 12.5 VDC, respectively.
- (3) Operating temperature was tested at the assigned T_c point on the PCB.
- (4) To ensure the module works properly, DO NOT let the T_c upper than 85°C ;

Relative Spectral Distribution

Relative Spectral Distribution vs. Wavelength Characteristic

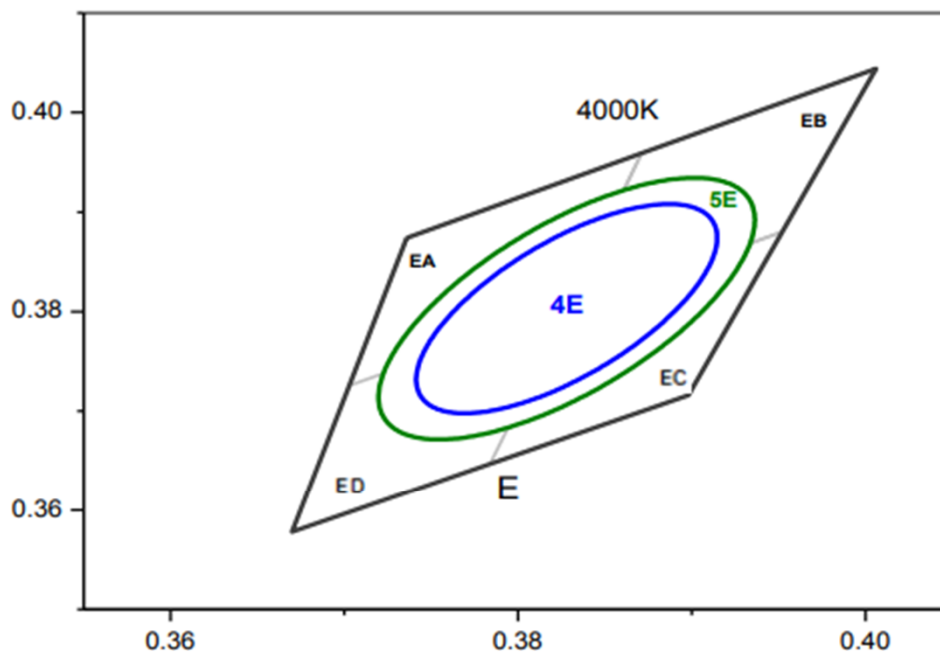


Driving Current VS Relative Lumen Output; obtained at $T_C = 25^\circ\text{C}$



Color Bin Structure

CIE Chromaticity Diagram (Natural white), $I_F=700\text{mA}$, $T_c = 85^\circ\text{C}$



4000K 4Step

4E

Center point	0.3818 : 0.3797
Major Axis a	0.0125
Minor Axis b	0.0053
Ellipse Rotation Angle	53

4000K 5Step

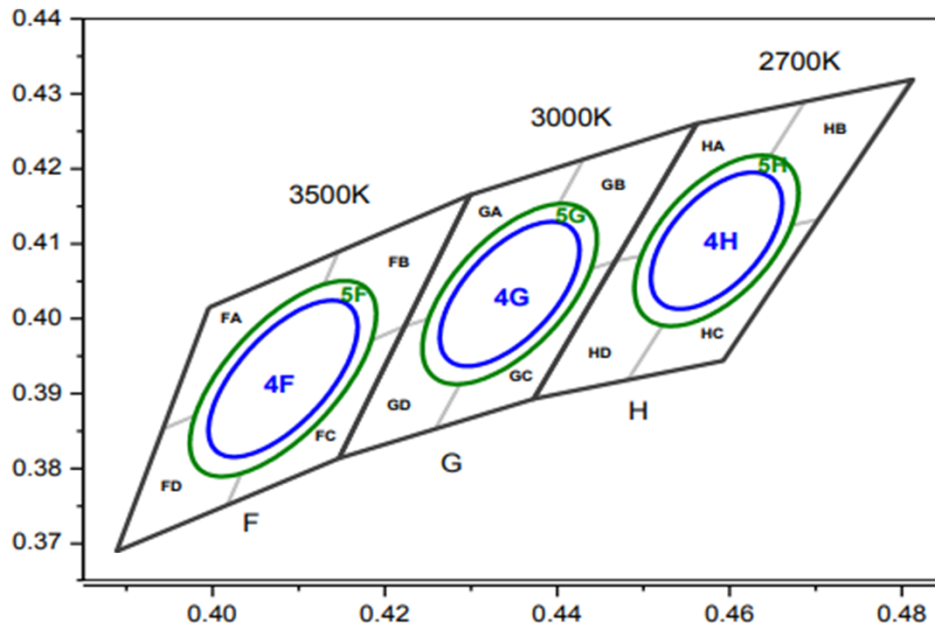
5E

Center point	0.3818 : 0.3797
Major Axis a	0.0157
Minor Axis b	0.0067
Ellipse Rotation Angle	53

EA		EB		EC		ED	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3736	0.3874	0.3871	0.3959	0.3828	0.3803	0.3703	0.3726
0.3703	0.3726	0.3828	0.3803	0.3784	0.3647	0.367	0.3578
0.3828	0.3803	0.3952	0.388	0.3898	0.3716	0.3784	0.3647
0.3871	0.3959	0.4006	0.4044	0.3952	0.388	0.3828	0.3803

Color Bin Structure

CIE Chromaticity Diagram (Natural white), $I_F=700\text{mA}$, $T_c = 85^\circ\text{C}$

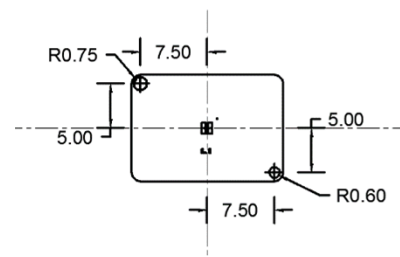
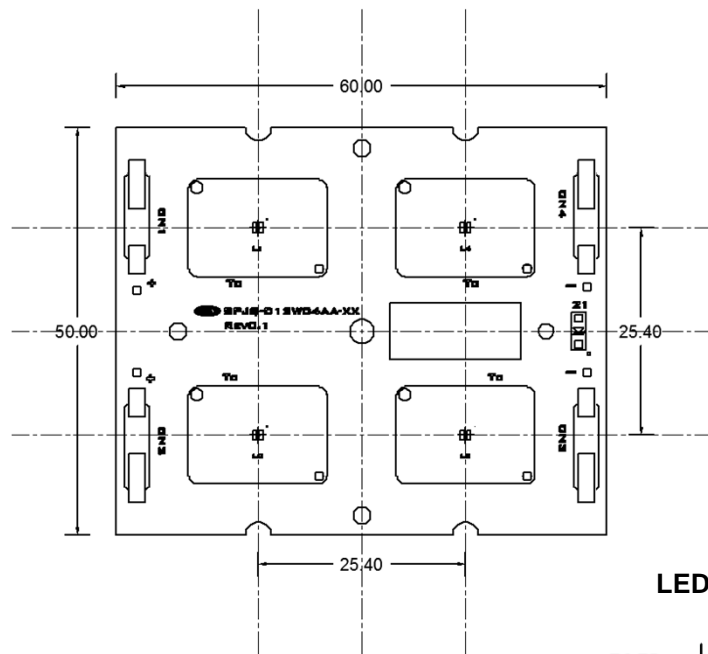
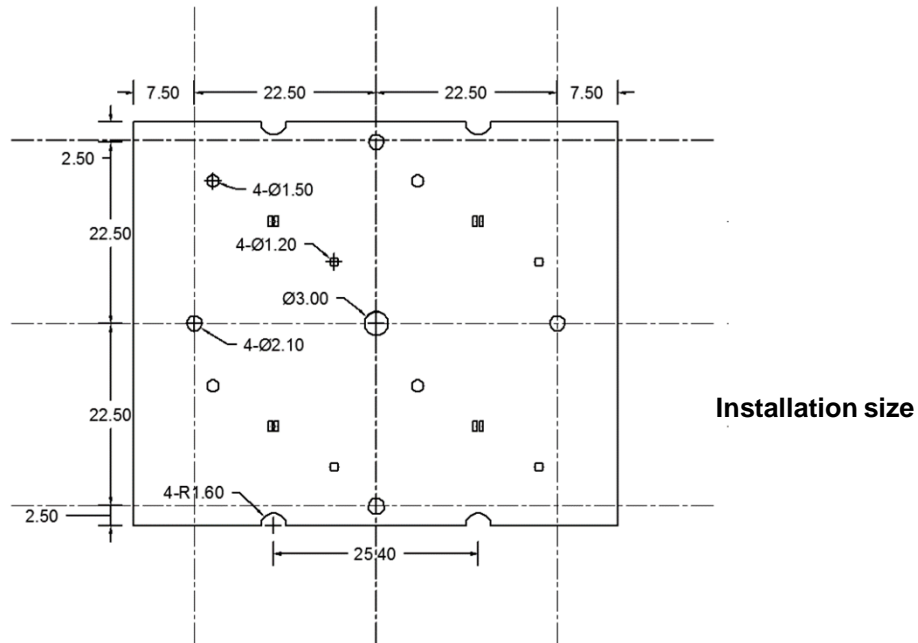


3500K 4Step		3000K 4Step		2700K 4Step	
4F		4G		4H	
Center point	0.4073 : 0.3917	Center point	0.4338 : 0.4030	Center point	0.4578 : 0.4101
Major Axis a	0.0124	Major Axis a	0.0113	Major Axis a	0.0105
Minor Axis b	0.0055	Minor Axis b	0.0055	Minor Axis b	0.0055
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53	Ellipse Rotation Angle	54

3500K 5Step		3000K 5Step		2700K 5Step	
5F		5G		5H	
Center point	0.4073 : 0.3917	Center point	0.4338 : 0.4030	Center point	0.4578 : 0.4101
Major Axis a	0.0155	Major Axis a	0.0142	Major Axis a	0.0132
Minor Axis b	0.0068	Minor Axis b	0.0068	Minor Axis b	0.0068
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53	Ellipse Rotation Angle	54

FA		FB		FC		FD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3996	0.4015	0.4146	0.4089	0.4082	0.392	0.3943	0.3853
0.3943	0.3853	0.4082	0.392	0.4017	0.3751	0.3889	0.369
0.4082	0.392	0.4223	0.399	0.4147	0.3814	0.4017	0.3751
0.4146	0.4089	0.4299	0.4165	0.4223	0.399	0.4082	0.392
GA		GB		GC		GD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4299	0.4165	0.443	0.4212	0.4345	0.4033	0.4223	0.399
0.4223	0.399	0.4345	0.4033	0.4259	0.3853	0.4147	0.3814
0.4345	0.4033	0.4468	0.4077	0.4373	0.3893	0.4259	0.3853
0.443	0.4212	0.4562	0.426	0.4468	0.4077	0.4345	0.4033
HA		HB		HC		HD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4562	0.426	0.4687	0.4289	0.4585	0.4104	0.4468	0.4077
0.4468	0.4077	0.4585	0.4104	0.4483	0.3919	0.4373	0.3893
0.4585	0.4104	0.4703	0.4132	0.4593	0.3944	0.4483	0.3919
0.4687	0.4289	0.481	0.4319	0.4703	0.4132	0.4585	0.4104

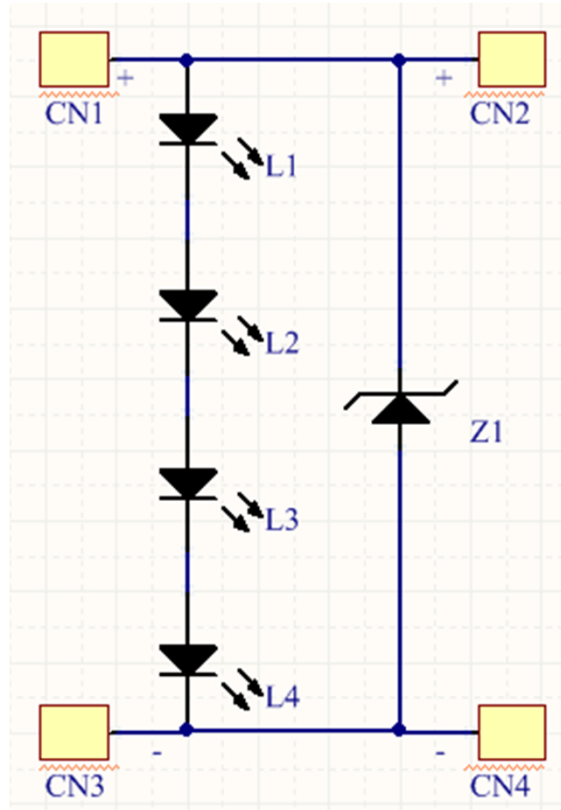
Mechanical Dimensions



Notes :

- (1) All dimensions are in millimeters.
- (2) Scale : none
- (3) Undefined tolerance is $\pm 0.5\text{mm}$

Circuit Drawing



Product Nomenclature

Product Name Rule:

S M J D - 12 08 004 L - XX N 1
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①: SMJD – Seoul Outdoor Module

② ~ ⑧: Refer to below table

Voltage				Power				LED Qty.				LED Type		Customer (Free)		Dimming		Etc. (Free)	
②				③				④				⑤		⑥		⑦		⑧	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	0	0	0	0	0	0	0	L	Y22	XX	Reference	N	Normal	#	1:CR170
1	10V	1	1V	1	10W	1	1W	1	100EA	1	10EA	1	1EA			D	Dimming		A:CR180
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														
...														
Z	350V			Z	350W														

Comments Rule:

(00 WW 70)
A B C

Lens Type		CCT		CRI	
A		B		C	
00		WN		70	
00	No lens	W0	6500K	70	CRI70
			5700K	80	CRI80
			5000K	90	CRI90
		WN	4500K		
			4000K		
		WW	3500K		
			3000K		
			2700K		

Product Nomenclature

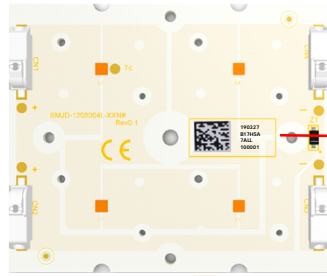
Characteristics Rule:

00 B17 HSA 7 All
A B C D E

Lens type		Flux bin		CCT bin		CRI bin		VF bin	
A		B		C		D		E	
00		B17		HSA		7		All	
00	No lens	B17	1170 lm	CSA	5000K 6-step	7	CRI70	All	G or F
		B31	1310 lm	ESA	4000K 6-step	8	CRI80		
		B21	1210 lm	GSA	3000K 6-step	9	CRI90		
				HSA	2700K 6-step				

Marking Information

Marking Point



QR Code Information



190327
B17HSA
7ALL
100001

- ①
- ②
- ③
- ④

QR Code Information								
Items	Factory	SAP Code	SMT Date	MP information	Line No.	Lot No.	Product	Note
Digits	1 Digit	7 Digit	6 Digit	10 Digit	1 Digit	1 Digit	5 Digit	In Total 31 Digits
Information	*	*****	YYMMDD D	B17 HSA7ALL	1~9, A~Z	1~9, A~Z	00001	

Notes:


- QR coded information shall include the fields described in the table above.
- 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.
- 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.
- QR Code Example: XXXXXXXX180827D30E038ALL1100001

Plain Code Information

No.	Item	Information		Digits	Remark1
①	Date	YYMMDD		6Digit	SMT date
②	Flux	B17		3Digit	B17=1170lm
	CCT	XSA	6- step	3Digit	X=C,E,F,G ,H
③	CRI	7		1Dight	CRI=70
	V _F	ALL		3Digit	G or F
④	Lot No.	1		1 Digit	0~9,A~Z
	Sequence No.	00001		5 Digit	00001 ~ 99999


Symbol	Im	Symbol	Im	Symbol	Im	Symbol	Im
D30	3300	O50	14500	R50	17500	U50	20500
M20	12200	P50	15500	S50	18500	V20	21200
N00	13000	Q50	16500	T50	19500	W00	22000

Label Information

Model No.	SMJD-1208004L-XXN1⁽¹⁾ II III
Rank	B17HSA7AII⁽²⁾ II III
Type	Customization
Quantity	XXX II III
Lot No.	YYMDDXXXXX- XXXXXXXX II III
	SEOUL SEMICONDUCTOR CO.,LTD.

Notes

- (1) Please refer to page 11
- (2) Please refer to page 12
- (3) It is attached to the top left corner of the carton box.
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 Code

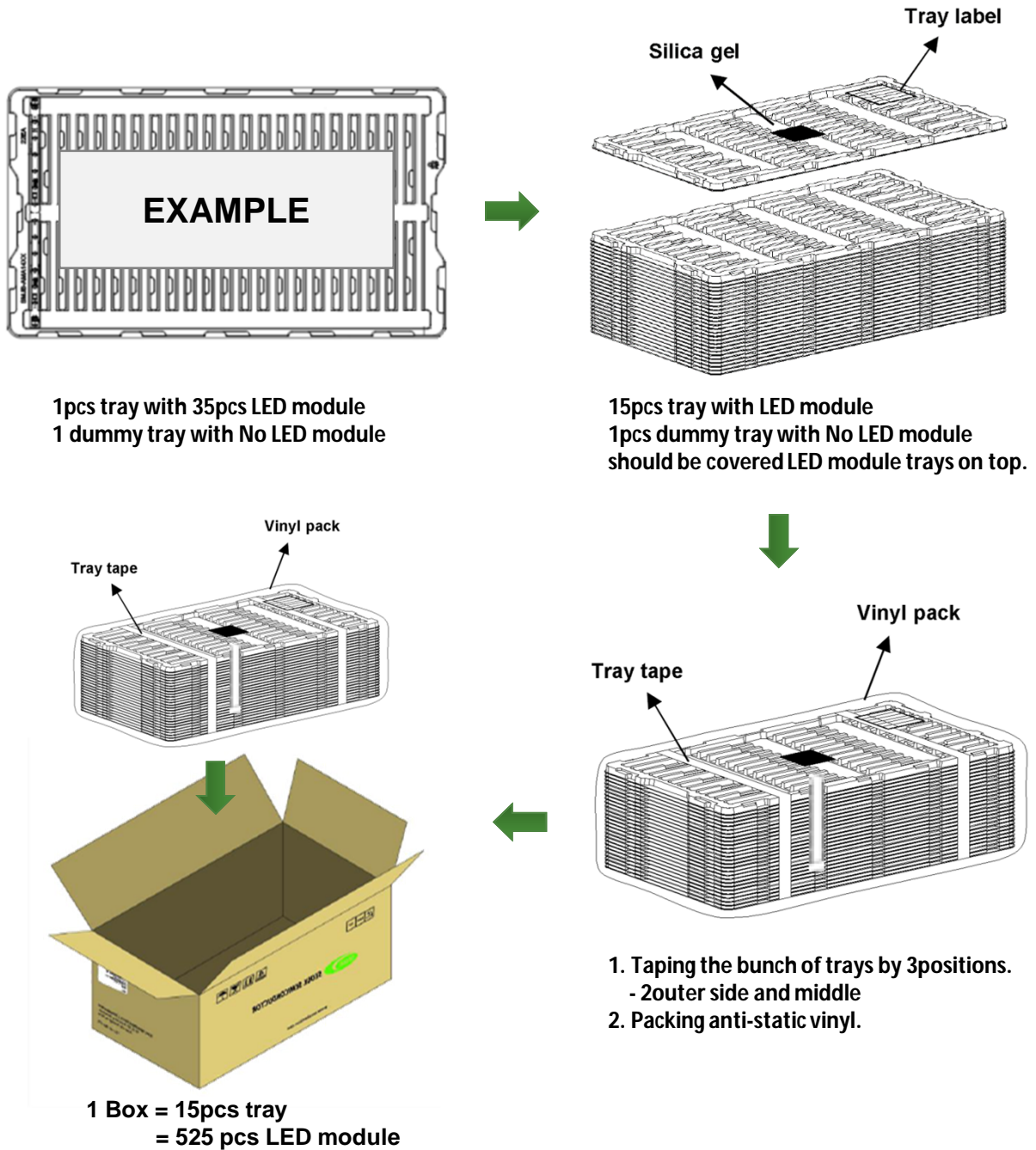
<p>TOTAL Quantity</p> <p> </p> <p>XX</p>
 SEOUL SEMICONDUCTOR CO.,LTD.

Notes

- (1) It is attached to the bottom right corner of the carton box.

Packaging Specification

Tray			Box		
Size (mm)	Module Quantity (EA)	Material	Size (mm)	Tray Quantity (EA)	Module Quantity (EA)
480 X 380 X 16	35	Anti-static PET	590 X 460 X 165	15	525



Precaution for Use

- (1) Check the appearance of module before wiring/ assembly, DO NOT use the LED cracked or PCB damaged module.
- (2) The module was designed to be driven with DC source, recognize the polarities of the module was necessity.
- (3) It was not SELV module, DO NOT connect the LED directly to main power during wiring.
- (4) DO NOT let the LED packages contacted with any hard matters.
- (5) There was no current regulator built in module, unevenly load between different parallel modules may occur due to the modules V_F variance .
- (6) Please do not use together with the materials containing Sulfur.
- (7) Please do not make any modification on module.

Precaution for Use

(8) LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).

Below is a list of suggestions that Seoul Semiconductor purposes to minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is defined as the release of static electricity when two objects 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 the emission surface of the LED package (shadowing can be noticed around the bond pads while viewing through a microscope).
- Anomalies noticed in the encapsulation and phosphor around the bond wires.
- This damage usually appears due to the thermal stress produced during the 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 module.
- 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 packages.
- (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.

Company Information

Published by

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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.

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.



Revision History

Revision	Date	Page	Remarks
R0.1	2019-07-08	All	Data sheet for SMJD-1208004IL-XXN1