DC Module

SMJD-2410040G-XXN1

RoHS CE LM-80

Product Brief

Description

- Multiple CCT is optional
- Modular design concept, easily expend to multitude application
- Poke-in connector in built

Features and Benefits

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

Key Applications

- Linear lighting
- Decorative lighting
- Troffer

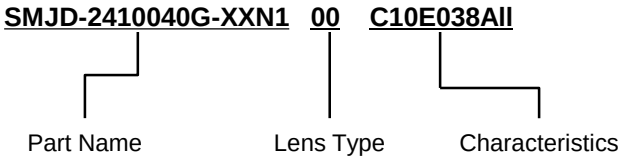
Product Code Information

Table 1. Order Code

CCT	CRI	Lens type	Order Code
6500	80	-	SMJD-2410040G-XXN100B93A038All
5700	80	-	SMJD-2410040G-XXN100B93B038All
5000	80	-	SMJD-2410040G-XXN100C04C038All
4000	80	-	SMJD-2410040G-XXN100C10E038All
3500	80	-	SMJD-2410040G-XXN100B93F038All
3000	80	-	SMJD-2410040G-XXN100B93G038All
2700	80	-	SMJD-2410040G-XXN100B84H038All

Notes:

(1) Order code include 18D(Part Name) + 2D(lens Type) + 10D(Characteristics)



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Performance Characteristics

Table2. Electro Optical Characteristics, I_F = 475mA, T_p=45℃,

Parameter	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Luminous Flux	Φ_V [2]	1950	2100	-	Lm	E rank
		1950	2040	-		C rank
		1820	1930			A,B,F,G rank
		1760	1840	-		H rank
Luminous Efficiency	LPW		203		Lm/W	E rank
			200			C rank
			189			A,B,F,G rank
			180			H rank
Correlated Color Temperature [3]	CCT	6000	6500	7000	K	A rank
		5300	5700	6000		B rank
		4700	5000	5300		C rank
		3700	4000	4200		E rank
		3200	3500	3700		F rank
		2900	3000	3200		G rank
		2600	2700	2900		H rank
CRI	Ra	80	-	-	-	
R9	$_{R9}$	0	-	-	-	
Color Consistency		-	-	3	SDCM	
Input Voltage	V_{in}	20	21.5	23	Vdc	
Forward Current	I_F		475		mA	
Power Consumption	P	9	10.2	11	W	
Viewing Angle	$2\Theta_{1/2}$		120		deg.	

Notes :

(1) The above data were tested at T_p=45ºC.

(2) Φ_V is the total luminous flux output measured with an integrated sphere, the tolerance is 7% .

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

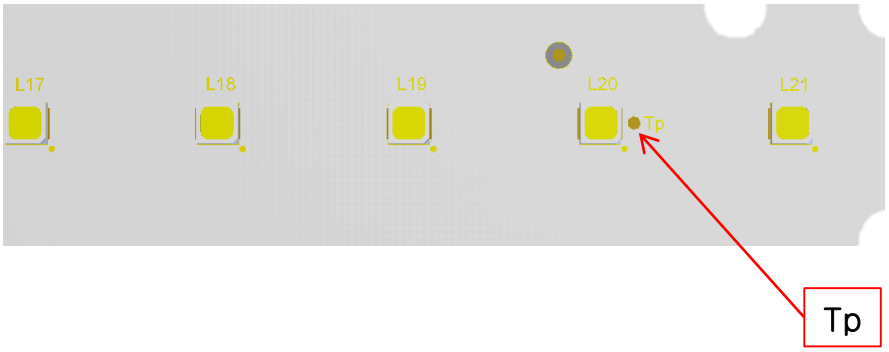
(4) To use the module properly, recommend to drive the module by a Constant Current Source (CCS). But the Maximum output voltage of the CCS should be limited by referring this datasheet.

Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings, T_p= 45ºC (1)

Parameter	Symbol	Unit	Value	Remark
Power Consumption	P	W	15	$P_{\_Typ.}$= 10.2W
Driving Current(2)	I_F	mA	700	$I_{F\_Typ.}$ = 475mA
Operating Temperature(3)	T_p	ºC	- 40 ~ 90	Reference point
Storage Temperature	T_{stg}	ºC	- 40 ~ 100	With no power
ESD Sensitivity	-	KV	±4	HBM

ILLUSTRATION 1: How to predict components temperature (4)



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 around 21.5VDC and V_{F_MAX} is around 23VDC, respectively.

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

(4) To ensure the module works properly, DO NOT let the Tp upper than 90 ºC;

Relative Spectral Distribution

Fig 1. Relative Spectral Distribution vs. Wavelength Characteristic

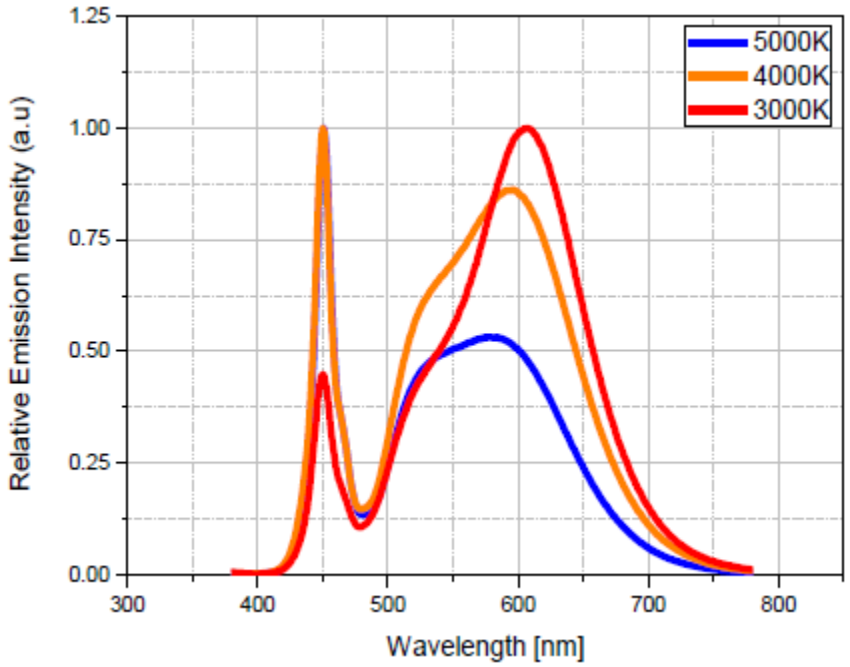
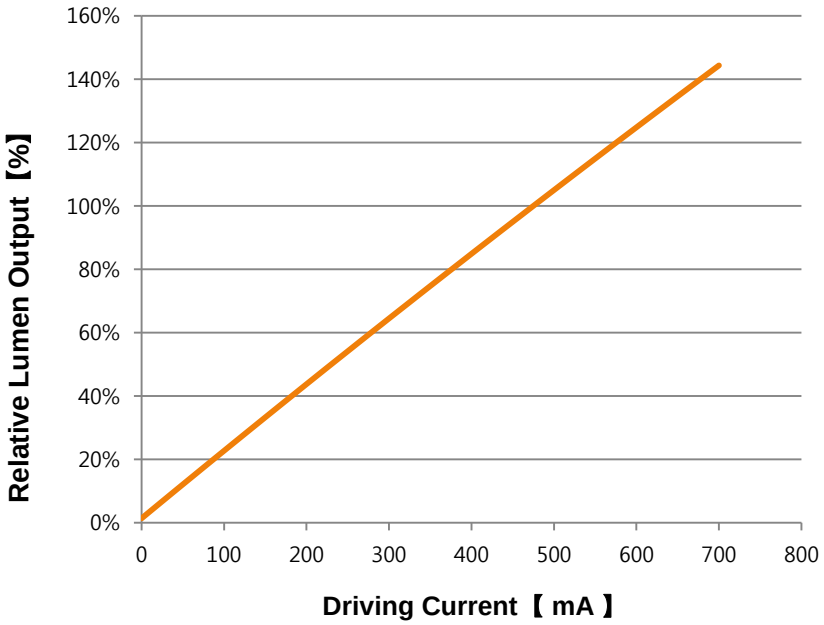
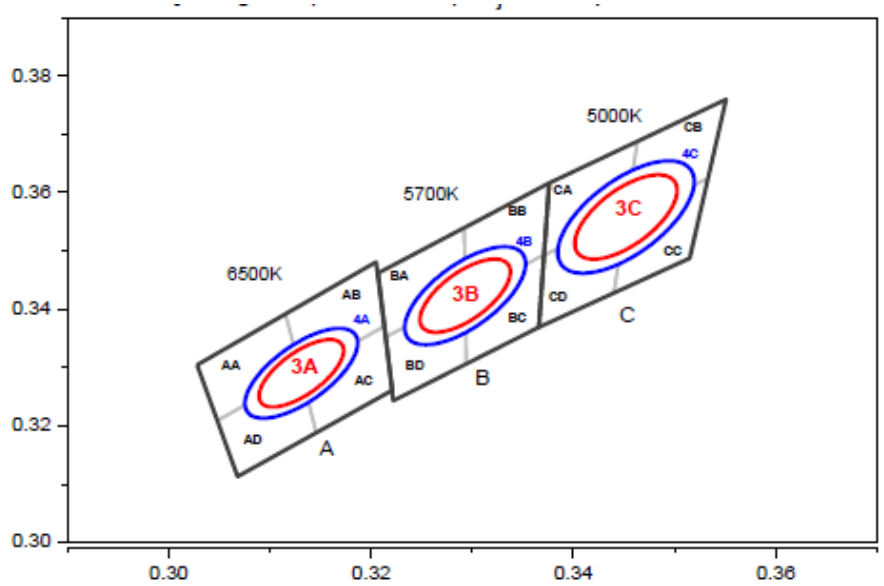


Fig 2. Forward Current vs. Relative Luminous Flux, T_p=45℃



Color Bin Structure

Fig 3. CIE Chromaticity Diagram



6500K 3Step

3A	
Center point	0.3123 : 0.3282
Major Axis a	0.0066
Minor Axis b	0.0027
Ellipse Rotation Angle	58

5700K 3Step

3B	
Center point	0.3287 : 0.3417
Major Axis a	0.0071
Minor Axis b	0.0030
Ellipse Rotation Angle	59

5000K 3Step

3C	
Center point	0.3447 : 0.3553
Major Axis a	0.0081
Minor Axis b	0.0035
Ellipse Rotation Angle	60

6500K 4Step

4A	
Center point	0.3123 : 0.3282
Major Axis a	0.0088
Minor Axis b	0.0036
Ellipse Rotation Angle	58

5700K 4Step

4B	
Center point	0.3287 : 0.3417
Major Axis a	0.0095
Minor Axis b	0.0040
Ellipse Rotation Angle	59

5000K 4Step

4C	
Center point	0.3447 : 0.3553
Major Axis a	0.0108
Minor Axis b	0.0047
Ellipse Rotation Angle	60

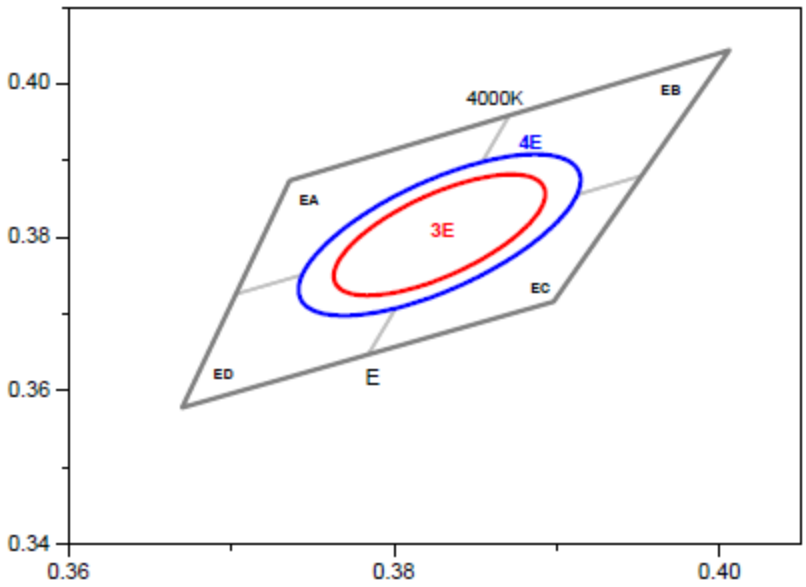
AA		AB		AC		AD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3028	0.3304	0.3115	0.3393	0.3131	0.329	0.3048	0.3209
0.3048	0.3209	0.3131	0.329	0.3146	0.3187	0.3068	0.3113
0.3131	0.329	0.3213	0.3371	0.3221	0.3261	0.3146	0.3187
0.3115	0.3393	0.3205	0.3481	0.3213	0.3371	0.3131	0.329

BA		BB		BC		BD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3207	0.3462	0.3292	0.3539	0.3293	0.3423	0.3215	0.3353
0.3215	0.3353	0.3293	0.3423	0.3294	0.3306	0.3222	0.3243
0.3293	0.3423	0.3371	0.3493	0.3366	0.3369	0.3294	0.3306
0.3292	0.3539	0.3376	0.3616	0.3371	0.3493	0.3293	0.3423

CA		CB		CC		CD	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3376	0.3616	0.3463	0.3687	0.3452	0.3558	0.3371	0.3493
0.3371	0.3493	0.3452	0.3558	0.344	0.3428	0.3366	0.3369
0.3452	0.3558	0.3533	0.3624	0.3514	0.3487	0.344	0.3428
0.3463	0.3687	0.3551	0.376	0.3533	0.3624	0.3452	0.3558

Color Bin Structure

Fig 4. CIE Chromaticity Diagram



4000K 3Step

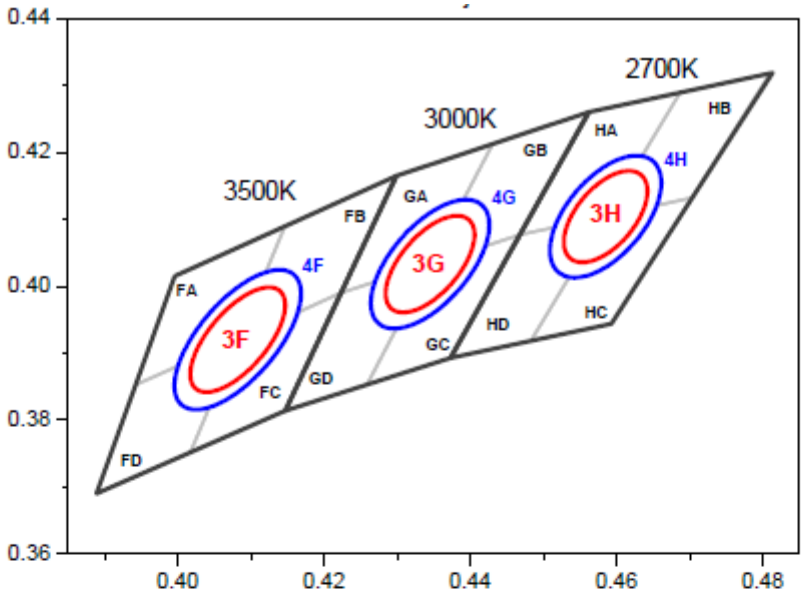
3E	
Center point	0.3818 : 0.3797
Major Axis a	0.0094
Minor Axis b	0.0040
Ellipse Rotation Angle	53

4000K 4Step

4E	
Center point	0.3818 : 0.3797
Major Axis a	0.0125
Minor Axis b	0.0053
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



3500K 3Step	
3 Step	
Center point	0.4073 : 0.3917
Major Axis a	0.0093
Minor Axis b	0.0041
Ellipse Rotation Angle	53

3000K 3Step	
3 Step	
Center point	0.4338 : 0.4030
Major Axis a	0.0085
Minor Axis b	0.0041
Ellipse Rotation Angle	53

2700K 3Step	
3 Step	
Center point	0.4578 : 0.4101
Major Axis a	0.0079
Minor Axis b	0.0041
Ellipse Rotation Angle	54

3500K 4Step	
4 Step	
Center point	0.4073 : 0.3917
Major Axis a	0.0124
Minor Axis b	0.0055
Ellipse Rotation Angle	53

3000K 4Step	
4 Step	
Center point	0.4338 : 0.4030
Major Axis a	0.0113
Minor Axis b	0.0055
Ellipse Rotation Angle	53

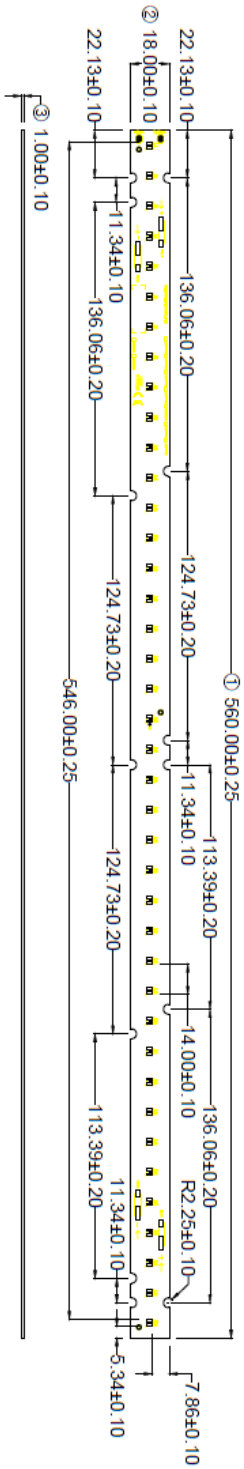
2700K 4Step	
4 Step	
Center point	0.4578 : 0.4101
Major Axis a	0.0105
Minor Axis b	0.0055
Ellipse Rotation Angle	54

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

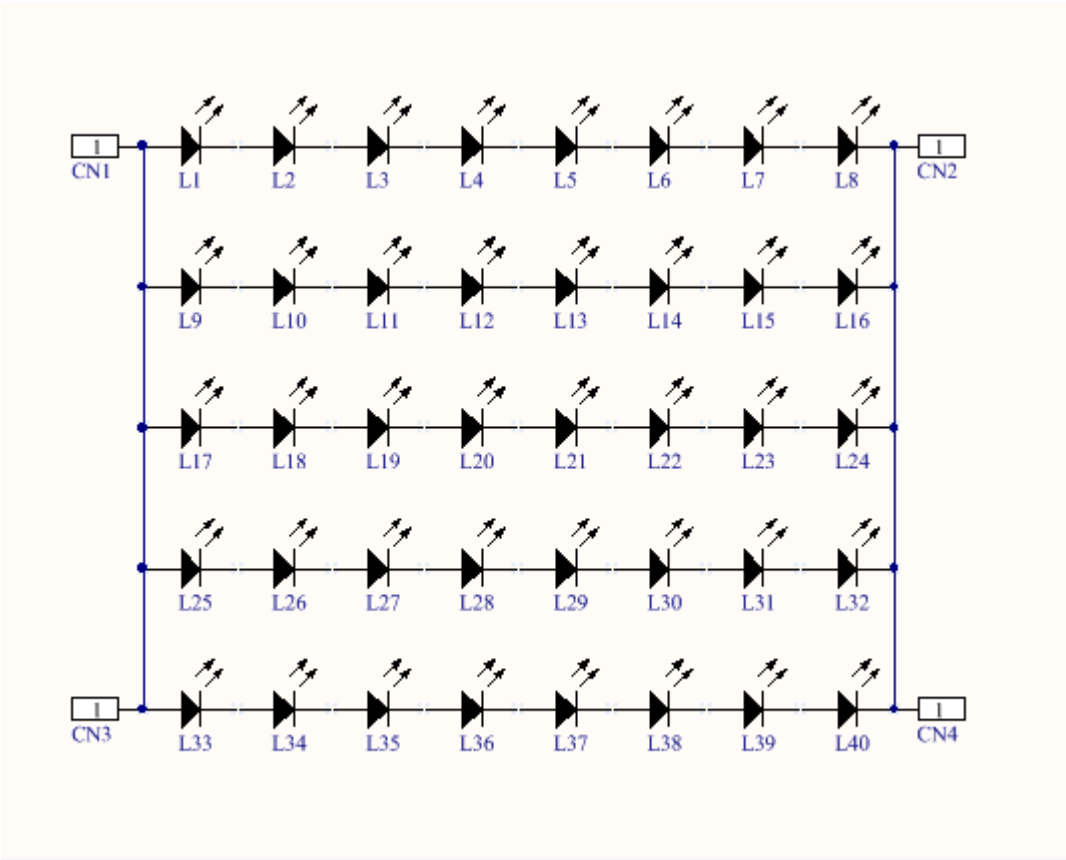
Mechanical Dimensions



Notes :

1. All dimensions are in millimeters.

Circuit Drawing



Product Nomenclature

Product Name Rule:

S M J D - 24 10 040 G - XX N 1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①: SMJD – Seoul DC 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	
2		4		1		0		0		4		0		G		XX		N		1	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	G	3030	XX	Reference	N	normal	1	Version
1	10V	1	1V	1	10W	1	1W	1	100 EA	1	10EA	1	1EA					D	Dimming		
2	20V	2	2V	2	20W	2	2W	2	200 EA	2	20EA	2	2EA					E	etc		
3	30V	3	3V	3	30W	3	3W	3	300 EA	3	30EA	3	3EA								
… …		… …		… …		… …		… …		… …		… …									
9	90V	9	9V	9	90W	9	9W	9	900 EA	9	90EA	9	9EA								
A	100 V			A	100 W			A	1000 EA												
B	110 V			B	110 W																
… …				… …																	
Z	350 V			Z	350 W																

Comments Rule:

(00 WN 80)

A B C

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

Product Nomenclature

Characteristics Rule:

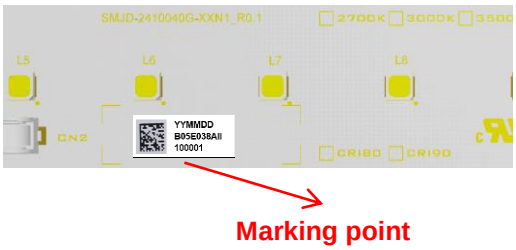
00 C10 E03 8 All

A B C D E

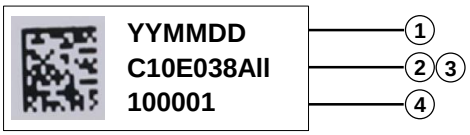
Lens type		Flux bin		CCT bin		CRI bin		VF bin	
A		B		C		D		E	
00		C10		E03		8		All	
00	No lens	C10	2100 lm	A03	6500K 3-step	8	CRI80	All	DC 21~23V
		C04	2040 lm	B03	5700K 3-step				
		B93	1930 lm	C03	5000K 3-step				
		B84	1840 lm	E03	4000K 3-step				
				F03	3500K 3-step				
				G03	3000K 3-step				
				H03	2700K 3-step				

Marking Information

Fig 7. Marking Point



QR Code Information



	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	*	*******	YYMMD D	C10E03 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: XXXXXXXX191112B65E038ALL1100001*

Plain Code Information

No.	Item	Information		Digits	Remark1
①	Date	YYMMDD		6Digit	SMT date
②	Flux(1)	C10		3Digit	C10=2100lm
	CCT	X03	3- step	3Digit	X=A,B,C,E,F,G ,H
③	CRI	8		1Dight	CRI=80
	V_F	All		3Digit	Y0 or Y1
④	Lot No.	1		1 Digit	0~9,A~Z
	Sequence No.	00001		5 Digit	00001 ~ 99999

Symbol	lm	Symbol	lm	Symbol	lm	Symbol	lm
B65	1650	O50	14500	R50	17500	U50	20500
M20	12200	P50	15500	S50	18500	V20	21200
N00	13000	Q50	16500	T50	19500	W00	22000

Label Information

PO Number	**XXXXXX**
Supplier Part Number	**SMJD-2410040G-XXN100C10E038ALL(1)**
Bin Code	**C10E038ALL (2)**
Quantity	**XX**
Country of Origin	**XX (3)**
Date Code	**YYYYWW (4)**
Lot Code	**YYMDDXXXXX- XXXXXXX (5)**
SEOUL	**Kwangmyung Semiconductor (TianJin) Co Ltd**

Notes

(1) Please refer to SPEC page 12-13 (30 digit code)
(2) Please refer to SPEC page 13
(3) Country of Origin: 2 digit code . For example : Chinese Code: CN
(4) Date Code : YYYYWW : Packing Date: Year + Week
(5) 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
(6) It is attached to the top left corner of the box.

TOTAL Quantity

XXX

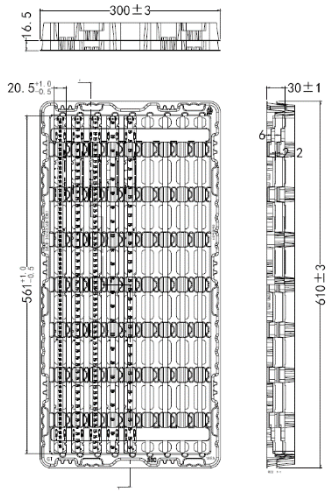
SEOUL **Kwangmyung Semiconductor (TianJin) Co Ltd**

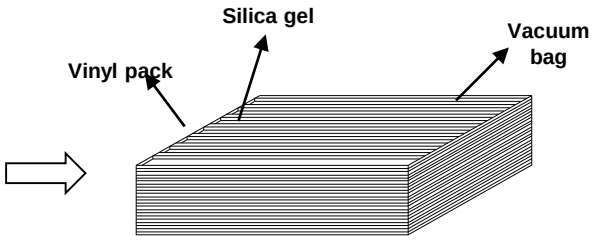
Notes

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

Packaging Specification

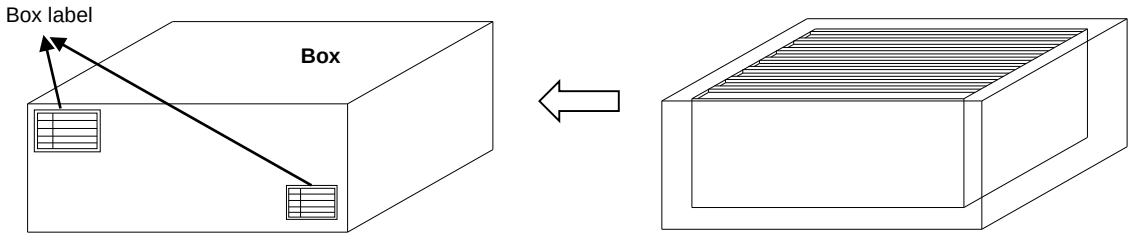
Model	Tray		Box		Pallet	
	Size (mm)	Q'ty per tray (ea)	Size (mm)	Q'ty per box (ea)	Saze (mm)	Q'ty per pallet(ea)
SMJD-2410040G-XXN1	610 x 300 x 30	18	625 x 325 x 220	180	1100x1100x150	4320





Vinyl pack = 10(11) Trays = 180bars(MAX)

(Top tray is used as a rid.)



1 Box = 10(11) Trays = 180bars (MAX)

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 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 the 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 product. The product should also not be placed in high temperatures, high humidity or direct sunlight since the device is sensitive to these conditions.

(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.

Guidelines for properly working with Module

(1) Discharge the lighting system a minimum of 2-3 times prior to working with the module.
(2) Use only properly rated test equipment and tools for the rated voltage and current of the product being tested.
(3) It is strongly suggested to wear rubber insulated gloves and rubber bottom shoes.
(4) Do not wear any conductive items (such as jewelry) which could accidentally contact electric circuits.
(5) Perform several tests with power off and the lighting system unplugged.
(6) Faults, lightning, or switching transients can cause voltage surges in excess of the normal ratings.
(7) Internal component failure can cause excessive voltages.
(8) Stored or residual electricity in long wire could be hazardous.
(9) Make sure proper discharge prior to starting work.

Company Information

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Seoul Semiconductor (SeoulSemicon.com) manufacturers 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 it's 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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Revision History

Revision	Date	Page	Remarks
Rev0.1	2020-05-20	All	Preliminary data sheet for SMJD-2410040G-XXN1
Rev0.2	2020-06-17	10,16	Update mechanical drawing and packing
Rev0.3	2020-07-08	All	Update Tp temperature
Rev0.4	2020-08-12	4,5,15	Add R9 requirement and update Tp temperature and label
Rev0.5	2020-08-14	All	Delete D rank information