



DC Module

SMJD-4149104G-XXN1



Product Brief

Description

- Modular design concept, easily expand to multitude application
- Poke in connector in built
- Conformal coating around the pins of LED and connector

Features and Benefits

- High lumen density
- High efficiency
- RoHS compliance
- Comply with Zhaga Book 7

Key Applications

- Plant grow light

Table 1-1. Product Selection - PPF

Bin	PPF			Unit	Remark
	Min.	Typ.	Max.		
135	126	135	-	umol/s	

Table 1-2. Product Selection - CCT

Bin	CCT	Unit
XSA	5000K Cool White + Red 660nm	

Table 1-3. Product Selection – CRI and V_F

Bin	CRI	V _F	Unit
8ALL	80	40.6	VDC

Table 1- 4. Order Code

Nominal CCT (K)	CRI	Lens Type	Order Code
5000K Cool White + Red 660nm	80	-	SMJD-4149104G-XXN100135XSA8ALL



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Performance Characteristics

Table 2. Electro Optical Characteristics, $I_F=1200\text{mA}$, $T_c = 25^\circ\text{C}$ ⁽¹⁾

Parameter	Symbol	Value			Unit	Mark
		Min.	Typ.	Max.		
Photosynthetic Photon Flux	PPF	126	135		umol/S	
Photosynthetic Photon Efficiency	PPE	-	2.8	-	umol/J	
CRI	Ra	80	-	-	-	Reference
Input Voltage ^[4]	V_{in}	37.7	40.6	43.4	V_{DC}	V
Power Consumption	P	45.3	48.7	52.1	W	$I_F=1200\text{mA}$
Viewing Angle	$2\Theta_{1/2}$		120		deg.	

Notes :

- (1) The above data were tested 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.



Performance Characteristics

Table 2. Electro Optical Characteristics, $I_F=1200\text{mA}$, $T_c = 65^\circ\text{C}$ ⁽¹⁾

Parameter	Symbol	Value			Unit	Mark
		Min.	Typ.	Max.		
Photosynthetic Photon Flux	PPF	120	129		umol/S	
Photosynthetic Photon Efficiency	PPE	-	2.7	-	umol/J	
CRI	Ra	80	-	-	-	Reference
Input Voltage ^[4]	V_{in}	36.9	39.7	42.5	V_{DC}	V
Power Consumption	P	44.3	47.7	51.0	W	$I_F=1200\text{mA}$
Viewing Angle	$2\Theta_{1/2}$		120		deg.	

Notes :

- (1) The above data were tested at $T_c = 65^\circ\text{C}$.
- (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.

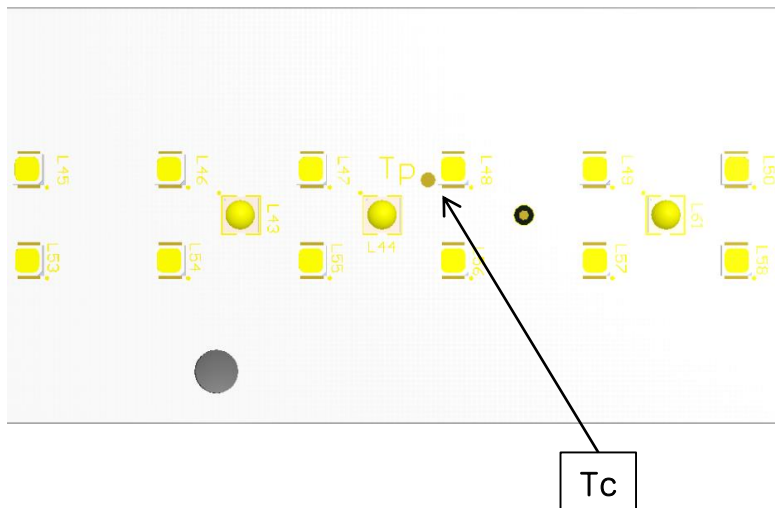


Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings, $I_F=1200\text{mA}$, $T_c = 25^\circ\text{C}$ ⁽¹⁾

Parameter	Symbol	Unit	Value	Remark
Power Consumption	P	W	63	$P_{\text{typ}} = 48.7\text{W}$
Driving Current ⁽²⁾	I_F	mA	1400	$I_{F_{\text{typ}}} = 1200\text{mA}$
Operating Temperature ⁽³⁾	$t_p(=t_c)$	$^\circ\text{C}$	- 40 ~ 95	Reference point
Storage Temperature	T_{stg}	$^\circ\text{C}$	- 40 ~ 105	With no power
ESD Sensitivity	-	KV	± 8	IEC Air
			± 4	HBM

ILLUSTRATION 1: How to predict components temperature ⁽⁴⁾



Recommended T_c testing point

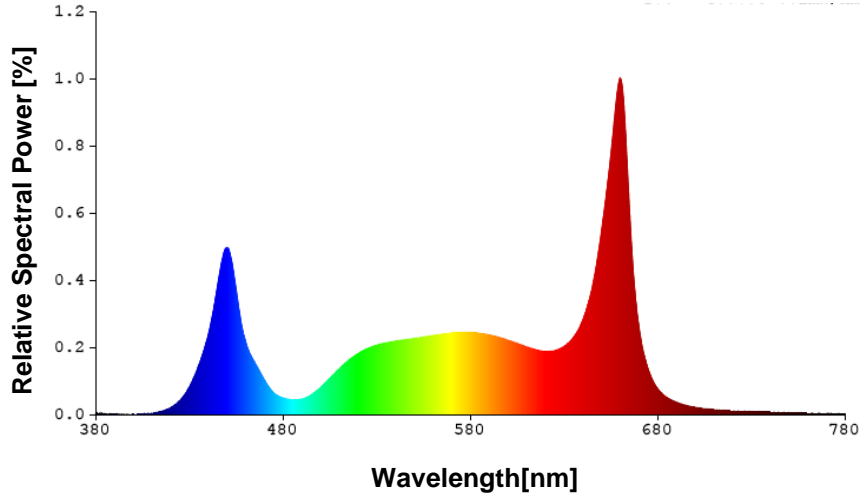
Notes :

- (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 around 40.6VDC and $V_{F_{\text{MAX}}}$ is around 43.4VDC, 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 95 $^\circ\text{C}$, note: $T_p=T_c$.



Relative Spectral Distribution

Relative Spectral Distribution vs. Wavelength Characteristic





Product Nomenclature

Product Name Rule:

S M J D - 41 49 104 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				
4		1		4		9		1		0		4		G	XX		N		1		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	G	3030C	XX	Reference	N	Normal	1	Version
1	10V	1	1V	1	10W	1	1W	1	100EA	1	10EA	1	1EA				D	Dimming			
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																

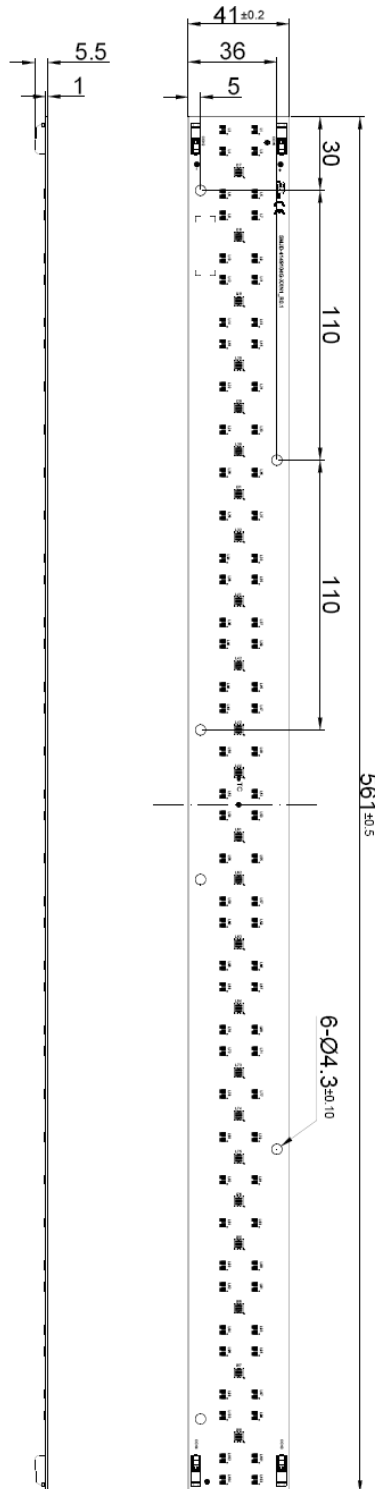
Product Name Rule: Binning

00 135 XSA 8 ALL
A B C D E

Lens type		PPF		CCT bin		CRI bin		VF bin	
A		B		C		D		E	
00		135		XSA		8		ALL	
00	No lens	135	135 umol/S	XSA	Reference	8	CRI80 Reference	ALL	3030C:Y0 or Y1 Z5C:C



Mechanical Dimensions

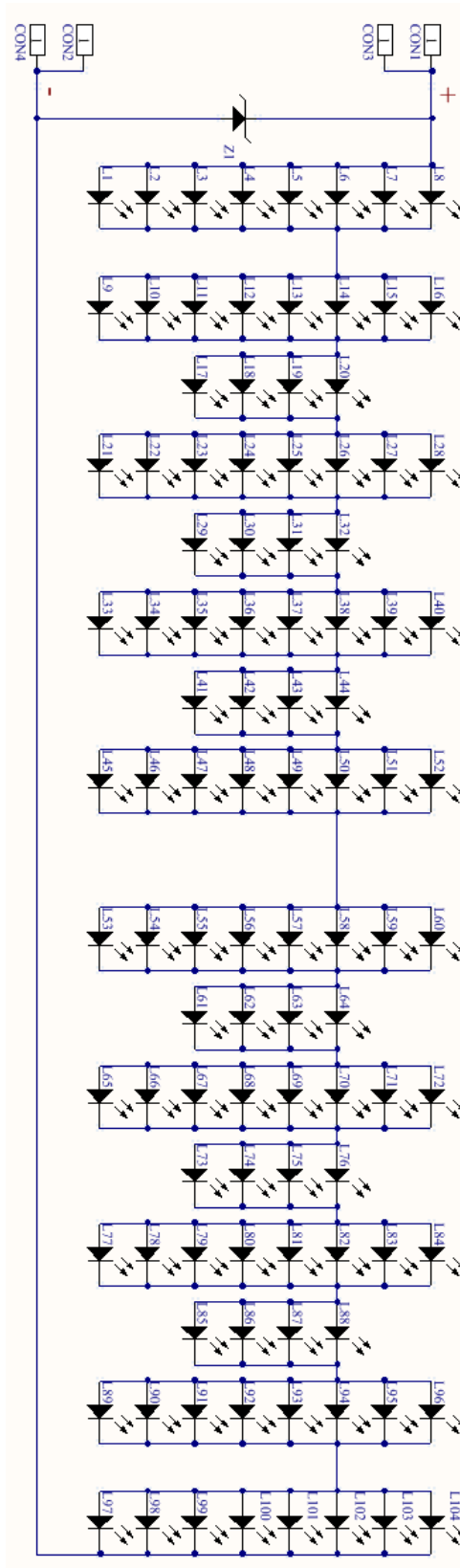


Notes :

(1) All dimensions are in millimeters.



Circuit Drawing





Part List

Table 4. Part List

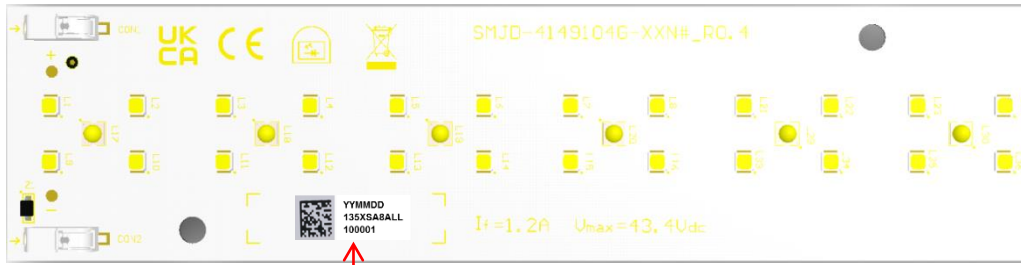
No	Part	Reference	Specification	Quantity
1	LED PKG 1	-	STW7C12C-E0	80
2	LED PKG 2	-	SZDR5A0C	24
3	PCB	-	Metal PCB 1layer / 1.0T / 1oz copper / OSP	1
4	Connector	CON1~CON4	WAGO2060-451/998-404	4
5	TVS	Z1	AMF60A	1

Notes :

(1) The above specification is subject to change without further notice for the improvement of products.



Marking Information



Marking point

Fig 1. Marking point



QR Code Information								
Items	Factory	SAP Code	SMT Date	Rank Information	Line No.	Lot No.	Product	Notes
Digits	1 Digit	7 Digit	6 Digit	10 Digit	1 Digit	1 Digit	5 Digit	In Total 31 Digits
Information	*	*****	YYMMDD	135XSA8ALL	1~9, A~Z	1~9, A~Z	00001	

Plain Code Information

No.	Item	Information	Digits	Remark
①	Date	YYMMDD	6Digit	SMT date
②	PPF ⁽¹⁾	135	3Digit	135=135umol/S
	CCT	XSA	3Digit	5000K Cool White + Red 660nm
③	CRI	8	1Digit	CRI=80 (Reference)
	V _F	ALL	3Digit	V _F : ALL
④	Lot No.	1	1 Digit	0~9,A~Z
	Sequence No.	00001	5 Digit	00001 ~ 99999


Notes :

(1) Module PPF code rule as below table

Symbol	umol/S	Symbol	umol/S	Symbol	umol/S	Symbol	umol/S
135	135	O50	14500	R50	17500	U50	20500
M20	12200	P50	15500	S50	18500	V20	21200
N00	13000	Q50	16500	T50	19500	W00	22000

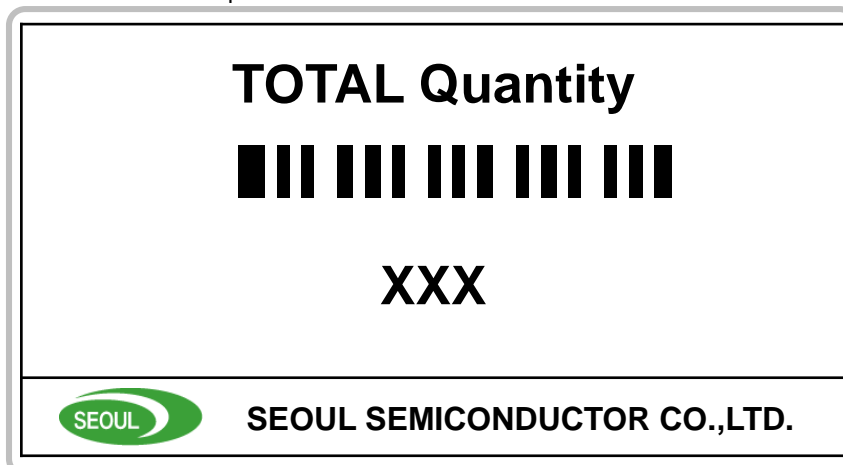


Label Information

PO Number 	XXXXXX (1)
Part Number 	SMJD-4149104G-XXN100135XSA8ALL (2)
Bin Code 	135XSA8ALL (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 1 (30 digit code)
(3) Please refer to SPEC page 7
(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.



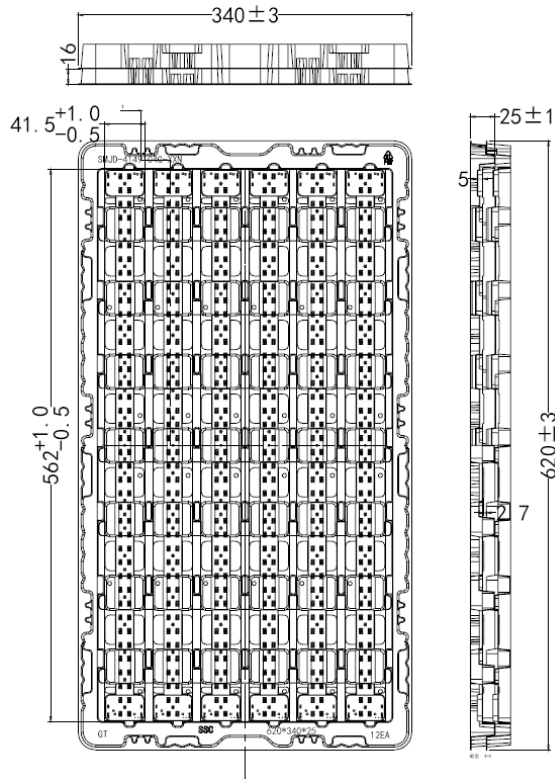
Notes

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



Packaging Specification

1. Tray information

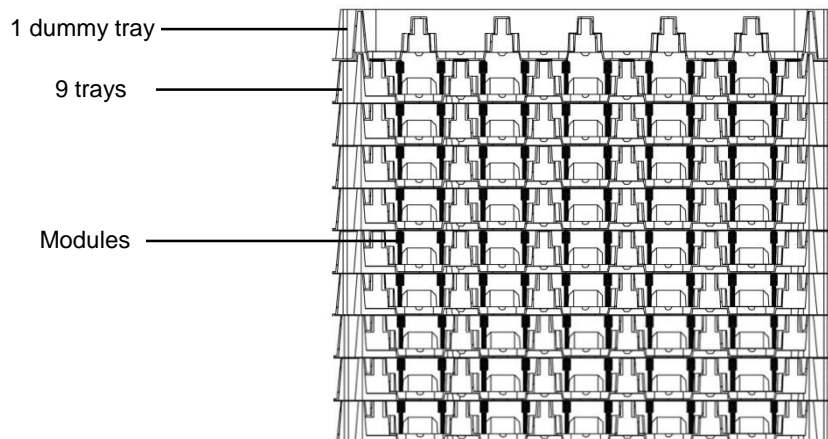


Notes

- (1) Quantity : 12 pcs/Tray
- (2) All dimensions are in millimeters (tolerance : ± 2)
- (3) Tray size: 620*340*25mm

2. Tray stack and taping

TBD



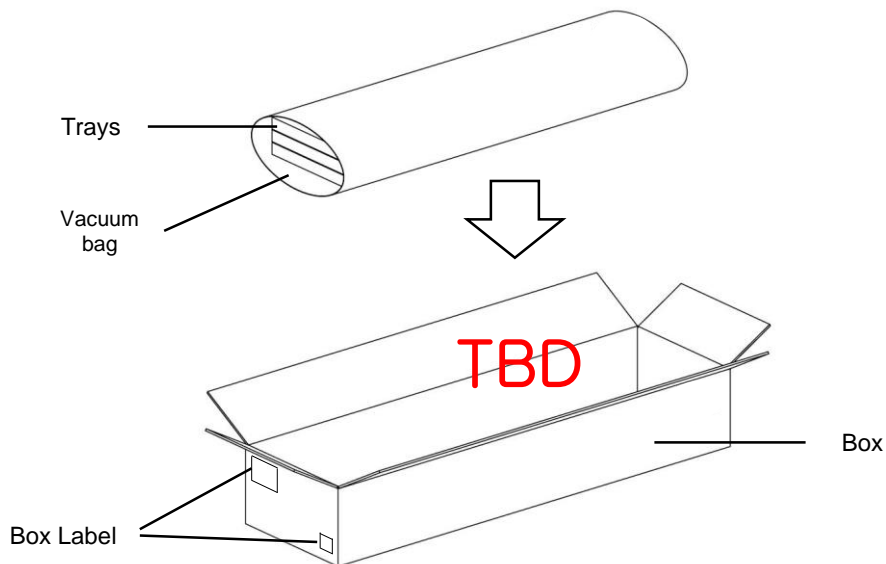
Notes

- (1) 9 trays and additional 1 dummy tray up of box



Packaging Specification

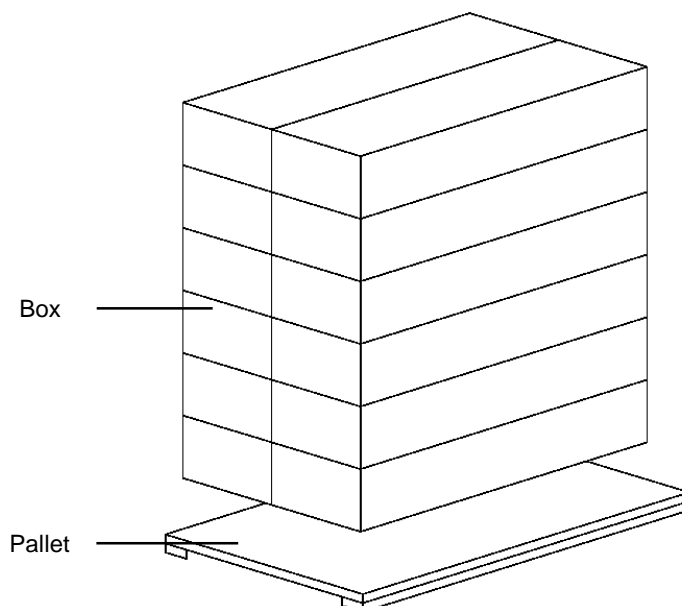
3. Box information & packing



Notes

- (1) Quantity: 9 Tray (90pcs Modules) / Box
- (2) Box size: 1250*455*130mm

4. Pallet information & packing



Notes

- (1) Quantity: 1 Pallet = 12 (2*6)Boxes = 108(9*12) Trays = 1080(10*108) Modules
- (2) Pallet size: 1300*1000 mm



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) DO NOT let the LED packages contacted with any hard matters.
- (4) There was no current regulator built in module, unevenly load between different parallel modules may occur due to the modules V_F variance .
- (5) Please do not use together with the materials containing Sulfur.
- (6) Please do not make any modification on module.



Precaution for Use

- (7) 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

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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.

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Revision History

Revision	Date	Page	Remarks
R0.1	2019-9-18	All	Preliminary data sheet for SMJD-4149104G-XXN1
R0.2	2019-11-13	All	Update Electro Optical Characteristics
R0.3	2019-11-26	All	Add Mechanical Dimensions
R0.4	2020-11-26	All	Add Electro Optical Characteristics at $T_c=65\text{ °C}$, update Relative Spectral Distribution and Circuit Drawing
R0.5	2021-06-17	All	Update the Absolute Maximum Ratings from 1600mA to 1400mA
R0.6	2021-07-15	All	Update the Silk of Gerber Files