SEOUL SEMICONDUCTOR

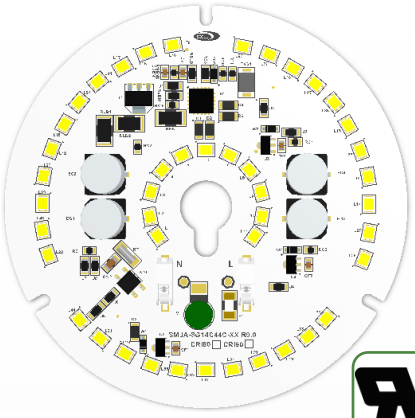
Product Data Sheet

SMJA-3C14C44C-XXXX - Acrich 14W

Integrated AC LED Solution

Acrich– 14W

SMJA-3G14C44C-XXXX



Product Brief

Description

- The Acrich series of products are designed to be driven directly off of AC line voltage, therefore they do not need the standard converter essential for conventional general lighting products.
- The converter or driver found in most general lighting products can limit the overall life of the product, but with the Acrich series of products the life of the product can more closely be estimated from the LED itself. This will also allow for a much smaller form factor from an overall fixture design allowing for higher creativity in the fixture.
- The modules have a high power factor which can contribute to a higher energy savings in the end application.

Features and Benefits

- Connects directly to AC line voltage
- High Power Factor
- Low THD
- Long Life Time
- Simple BOM
- Lead Free Product
- RoHS Compliant
- High Efficacy
- Flicker free
- TRIAC Dimmable

Key Applications

- Down light
- Flush mount lamp

Table 1. Product Selection

Part No.	Vin [Vac]	P [W]	CCT [K]		Flux [lm]			Vf	CRI	
			Bin	CCT	Bin	Min.	Typ.	Bin	Bin	Min.
SMJA-3G14C44C-XX01	230	14	H04	2700	B42	1280	1420	ALL	9	90
SMJA-3G14C44C-XX02					B65	1480	1650		8	80

Table of Contents

Performance Characteristics

Table 2. Electro Optical Characteristics, T_a [1] = 25ºC

Parameter	Symbol	Value			Unit	Mark
		Min.	Typ.	Max.		
Luminous Flux(@CRI90,230V)	Φ_V [2]	1280	1420	-	lm	B42
Luminous Flux(@CRI80,230V)		1480	1650	-		B65
Correlated Color Temperature [3]	CCT	2600	2700	2900	K	H
CRI	Ra	80	82	-	-	8
		90	92	-	-	9
Input Voltage [4]	V_{in}	-	230	-	Vac	3G
Power Consumption	P	13	14	15	W	-
Operating Frequency	F		50 / 60		Hz	-
Power Factor	PF		Over 0.97		-	-
Viewing Angle	$2\Theta_{1/2}$		120		deg.	-
Tolerance of Surge[5]	Vs	500	-	-	V	-
Transient Protection[6]	Vs	2500	-	-	V	-

Notes :

(1) Test voltage is 230Vac at T_a = 25ºC.

(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) Operating Voltage doesn't indicate the maximum voltage which customers use but means tolerable voltage according to each country's voltage variation rate. It is recommended that the solder pad temperature should be below 70℃.

(5) Surge withstand in accordance with IEC61000-4-5

(6) At 230Vac, seven strikes, 100kHz 2.5kV in accordance with ANSI/IEEE C62.41.2-2002 Category A operation

Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings, T_a = 25ºC

Parameter	Symbol	Unit	Value
Maximum Input Voltage[1)]	V_{in}	Vac	240Vac
Power Consumption	P	W	17
Operating Temperature[2)]	T_{opr}	ºC	- 20 ~ 45
Storage Temperature[3)]	T_{stg}	ºC	- 40 ~ 100
ESD Sensitivity	-	-	±4,000V HBM

Notes :

(1) Maximum Voltage doesn't indicate the operating voltage which customers use but means tolerable voltage according to each country's voltage variation rate.

(2) Ambient temperature with operation.

(3) Ambient temperature without operation.

Thermal Resistance

Part	Package Power Dissipation [W]	Maximum Junction Temperature [℃]	$R\theta_{j-s}$ [℃/W]
STW8A2SD	1.3	125	14.5
STW9A2SD-E1(H)	1.0	125	20

The Acrich LED has a thermal resistance of 6.0℃/W from junction of the LED to the

LED lead.

The maximum junction temperature of the WD LED package is 125℃, therefore the maximum lead temperature T_{s_max} is

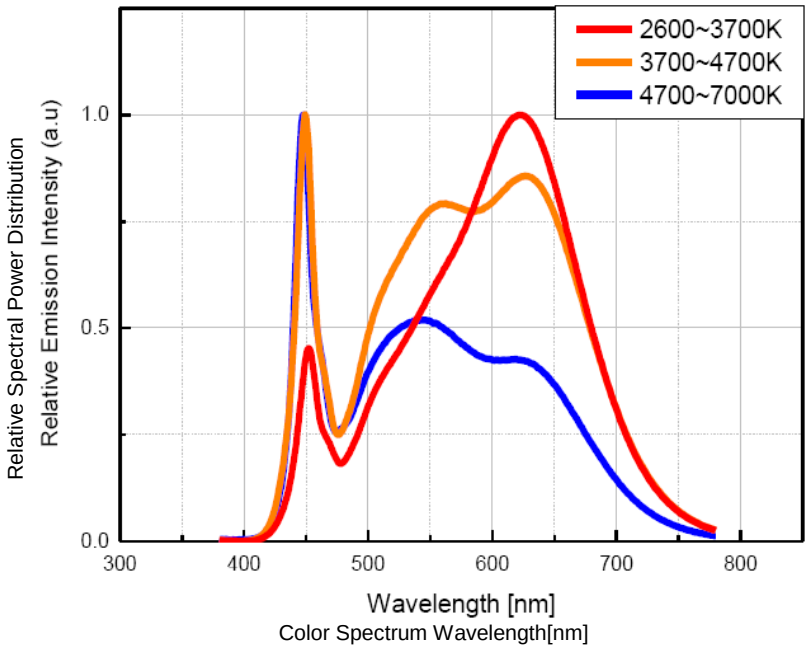
$T_{s\_max} = T_{j\_max} - (R\theta_{j-s} * P_d)$

$= 125℃ - (13℃/W * 1.0W) = 112℃$

Although this is the maximum lead temperature, it is recommended to keep the lead temperature under 70℃.

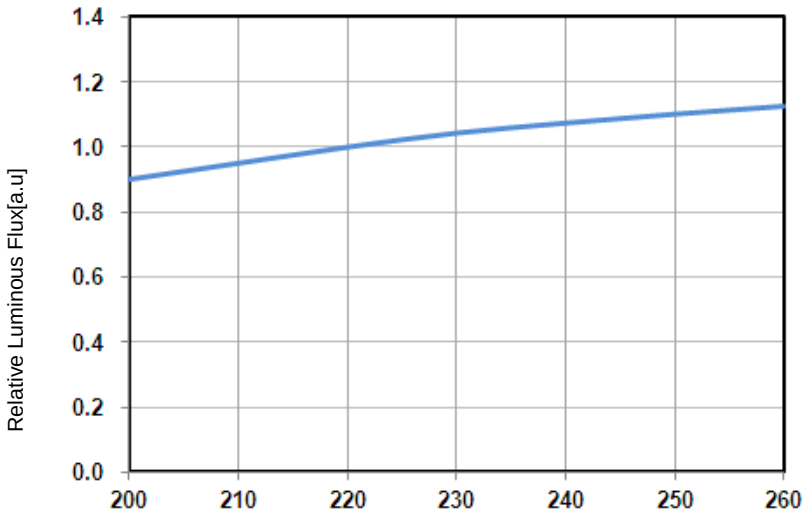
Relative Spectral Distribution

Fig 1. Relative Spectral Distribution vs. Wavelength Characteristic



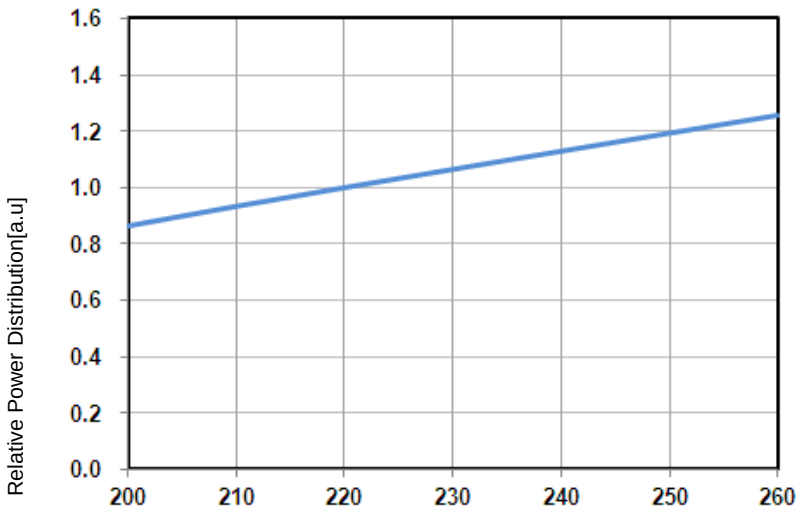
Relative Luminous Distribution

Fig 2. Relative Luminous Flux vs. Voltage at T_a =25℃, 230V



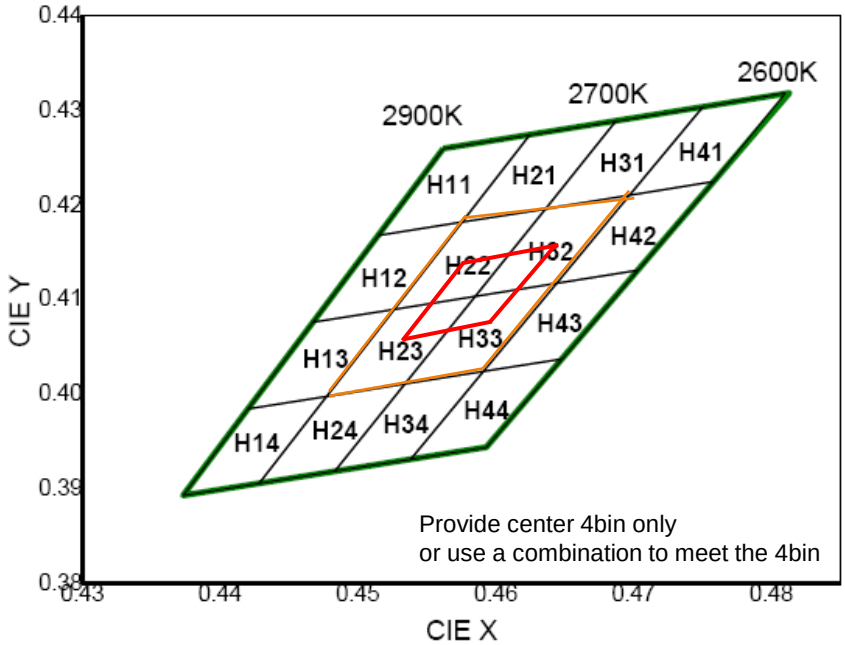
Relative Power Distribution

Fig 3. Relative Power Distribution vs. Voltage at T_a =25℃, 230V



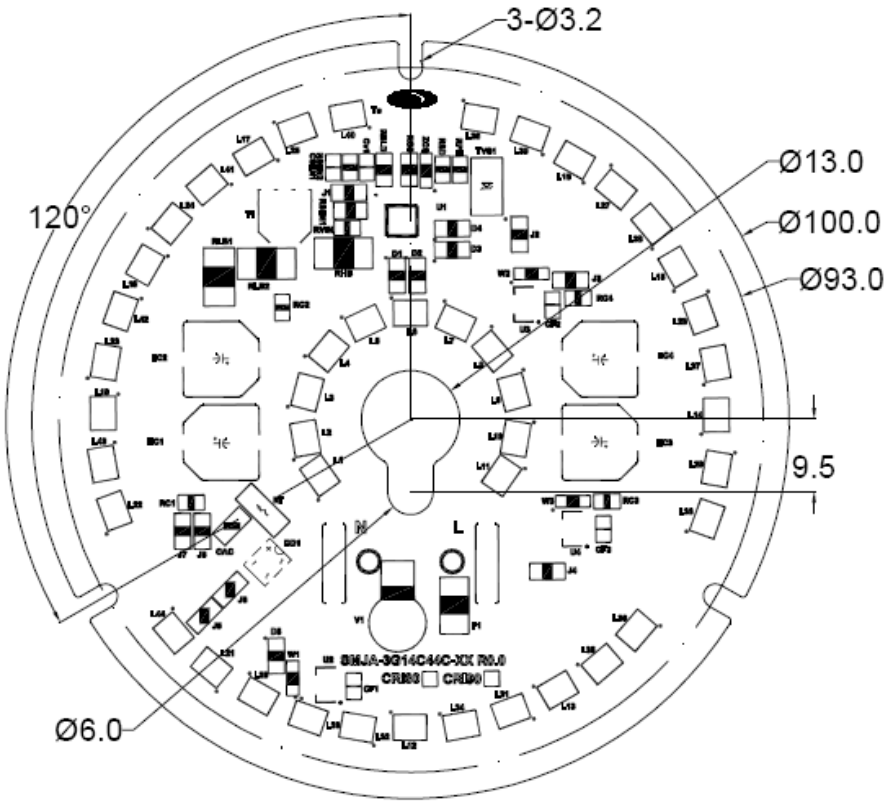
Color Bin Structure

Fig 4. CIE Chromaticity Diagram



H11		H21		H31		H41	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4562	0.4260	0.4625	0.4275	0.4687	0.4289	0.4750	0.4304
0.4515	0.4168	0.4575	0.4182	0.4636	0.4197	0.4697	0.4211
0.4575	0.4182	0.4636	0.4197	0.4697	0.4211	0.4758	0.4225
0.4625	0.4275	0.4687	0.4289	0.4750	0.4304	0.4810	0.4319
H12		**H22**		**H32**		**H42**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4515	0.4168	0.4575	0.4182	0.4636	0.4197	0.4697	0.4211
0.4468	0.4077	0.4526	0.4090	0.4585	0.4104	0.4644	0.4118
0.4526	0.4090	0.4585	0.4104	0.4644	0.4118	0.4703	0.4132
0.4575	0.4182	0.4636	0.4197	0.4697	0.4211	0.4758	0.4225
H13		**H23**		**H33**		**H43**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4468	0.4077	0.4526	0.4090	0.4585	0.4104	0.4644	0.4118
0.4420	0.3985	0.4477	0.3998	0.4534	0.4012	0.4591	0.4025
0.4477	0.3998	0.4534	0.4012	0.4591	0.4025	0.4648	0.4038
0.4526	0.4090	0.4585	0.4104	0.4644	0.4118	0.4703	0.4132
H14		**H24**		**H34**		**H44**	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4420	0.3985	0.4477	0.3998	0.4534	0.4012	0.4591	0.4025
0.4373	0.3893	0.4428	0.3906	0.4483	0.3919	0.4538	0.3932
0.4428	0.3906	0.4483	0.3919	0.4538	0.3932	0.4593	0.3944
0.4477	0.3998	0.4534	0.4012	0.4591	0.4025	0.4648	0.4038

Mechanical Dimensions



Notes :

(1) All dimensions are in millimeters. (Tolerance unless noted : ±0.2)

(2) Scale : None

Marking Information

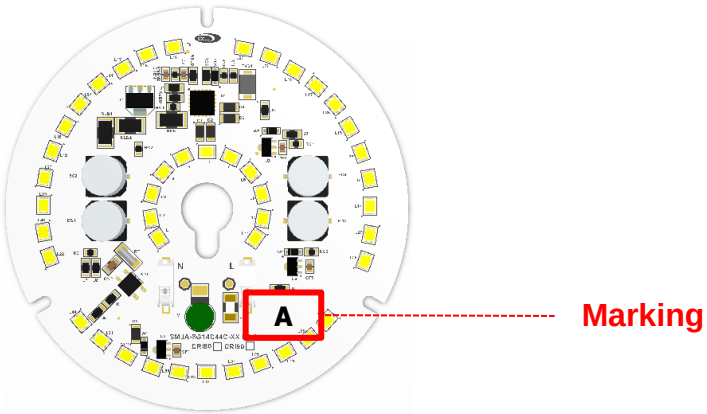
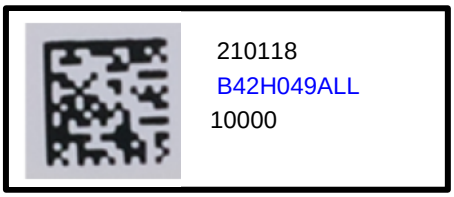


Fig 1. 2D Marking point



① SMT Date (YYMMDD, 6 Digits)
② MP Information (10 Digits) + Lot no.(1Digit)
③ Series Number (5 Digits)

Table 1. MP information

B42 H 04 9 ALL
① ② ③ ④ ⑤

FLUX	BIN
1860 lm	B86
2040 lm	C04
2050 lm	C05
2140 lm	C14

CCT
A~H

BIN *
MC
ME
03
C4
04

CRI **
8
9

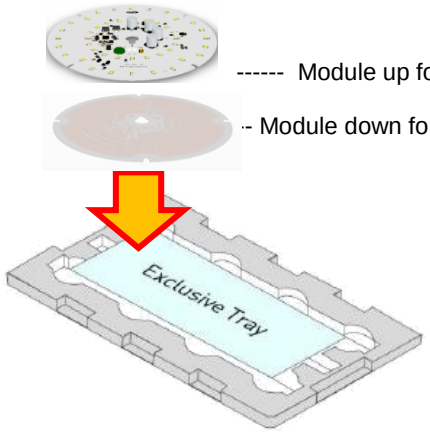
VF
ALL

*
0A : All Bin
03 : Center 4bin Mixing(3-step)
04 : Center 4bin Mixing(4-step)
MC : XMC center 1Bin (3-step)

**
8 : CRI80
9 : CRI90

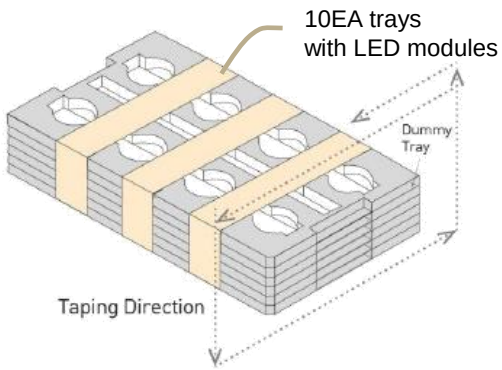
Packing

1. Tray information



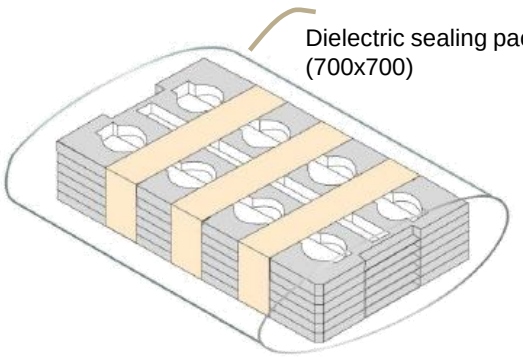
- 16 PCS LED modules packed per tray

2. Tray stack and taping

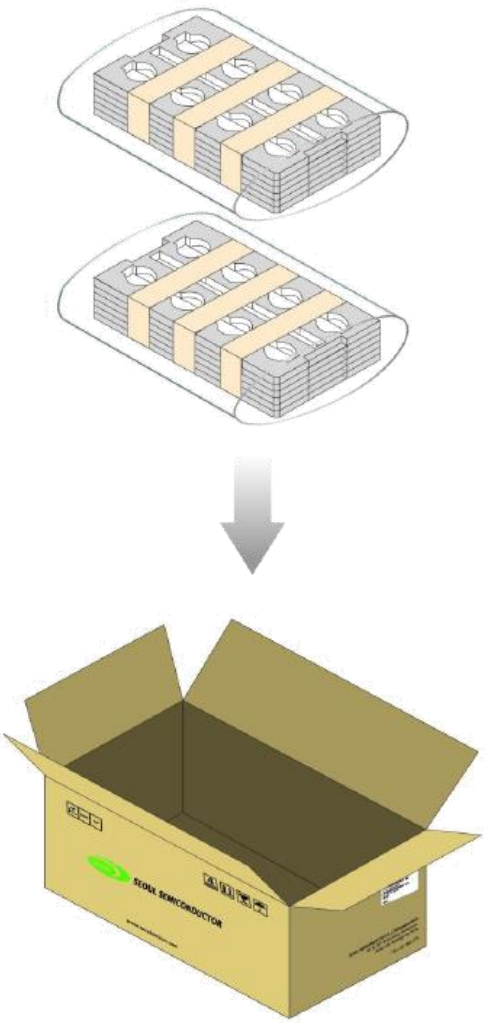


- 10 LED module trays
  and additional 1 dummy trays up of box
- Add silica gel (1EA) on top of the tray

3. Sealing packing



4. Box information & packing



- 160 PCS modules per BOX 1EA

  - 1Box : 16 PCS per tray x 10 trays = 160 PCS

Notes

- Information for rank mixing
  - Tray and sealing packing should not include rank mixing.
  - Rank mixing is possible in the box.

Label Information

Model No.	**SMJA-3G14C44C-XX01(1)**
Rank	**B42H049ALL(2)**
Type	**4 Step / CRI 90**
Quantity	**XXX**
Date	**YYMMDDXXXXX-8XXXXXX(3)**
SEOUL	**SEOUL SEMICONDUCTOR CO.,LTD.**

Reference

(1) The model number designation is explained as follow

SMJA : Seoul Semiconductor internal code

3	: 230Vac	G	: Traic Dim& Flicker free
14	: About power consumption	C	: WD-S30T
44	: PKG Q'ty	C	: 3528

(2) It represents the LED module rank that consists of nine characters.

(3) YYMMDD : Produced date.
XXXXX : Lot No.
8XXXXXX : SSC internal product code(SAP)

Note

(1) It is attached to the top left corner of the box.

TOTAL Quantity

XXX

SEOUL **SEOUL SEMICONDUCTOR CO.,LTD.**

Notes

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

Precaution for Use

(1) Please review the Acrich Application Note for proper protective circuitry usage.
(2) Please note, Acrich products run off of high voltage, therefore caution should be taken when working near Acrich products.
(3) DO NOT touch any of the circuit board, components or terminals with body or metal while circuit is active.
(4) Please do not add or change wires while Acrich circuit is active.
(5) Long time exposure to sunlight or UV can cause the lens to discolor.
(6) Please do not use adhesives to attach the LED that outgas organic vapor.
(7) Please do not use together with the materials containing Sulfur.
(8) Please do not assemble in conditions of high moisture and/or oxidizing gas such as Cl, H_2S, NH_3, SO_2, NO_x, etc.
(9) Please do not make any modification on module.
(10) Please be cautious when soldering to board so as not to create a short between different trace patterns.

Precaution for Use

(11) 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

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device

Handling of Silicone Resin for LEDs

(1) Acrich series is encapsulated with silicone resin for high optical efficiency.
(2) Please do not touch the silicone resin area with sharp objects such as pincette(tweezers).
(3) Finger prints on silicone resin area may affect the performance.
(4) Please store LEDs in covered containers to prevent dust accumulation as this may affect performance.
(5) Excessive force more than 3000gf to the silicone lens can result in fatal or permanent damage with LEDs.
(6) Please do not cover the silicone resin area with any other resins such as epoxy, urethane, etc.

Handling with regards to static electricity

(1) The Acrich products use an integrated circuit (IC) which can be damaged when exposed to static electricity. Please handle using equipment that prevents static electricity. Do not touch unless ESD protection is used.
(2) The Acrich product should also not be installed in end equipment without ESD protection.

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 Acrich

(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.

Revision History

Revision	Date	Page	Remarks
R0.0	2021-01-29	All	First Release