

## SPECIFICATION DATASHEET

1309H2xxxxxx

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### 1309H2



- 18.2W maximum power capability
- High brightness LED
- Dimension : 13.5 x 13.5 x 1.55 mm
- Precondition : JEDEC Level 2a
- Lead-free reflow soldering application
- RoHS compliant

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## 1. Product description

### (1) Description

- The Ergon series LED is designed for the high power operation to get the high flux output applications.
- It is ideal for the light source for general illumination applications, custom designed solutions.

### (2) Features

- Maximum drive current up to 500mA
- Low thermal resistance as low as 1.8°C/W
- Viewing angle of 115 degrees
- Precondition JEDEC Level 2a
- RoHS compliant

### (3) Applications

- Indoor lighting, Outdoor lighting, Industrial lighting

## 2. Absolute maximum ratings

Parameters	Symbol	Value	Unit
Power dissipated	Pd	18.2	W
Rated forward current	If	500	mA
Maximum junction temperature capability(1)	Tj	125	°C
Maximum case temperature capability(1)	Tc	105	°C
Operating temperature	Top	- 30 ~ +100	°C
Storage temperature	Tst	- 40 ~ +100	°C

- (1) Proper current derating must be observed to maintain junction temperature below the Maximum.

### 3. Electro-optical characteristics (T<sub>j</sub>=85°C)

Parameters	Symbol	I <sub>f</sub> (mA)	Typ.	Unit
Forward voltage	V <sub>f</sub>	270	34.8	V
Viewing angle FWHM	2θ <sub>1/2</sub>	270	115	degrees
Thermal resistance junction to solder pad	R <sub>thj-a</sub>		1.8	°C/W

- Lumens maintains a tolerance of ±3% on forward voltage measurements.

### 4. Electro-optical chart (Sorting current, I<sub>f</sub>=270mA)

Product Description	CRI (Ra)	CCT (K)	I <sub>f</sub> (mA)	V <sub>f</sub> (V), typ. at T <sub>c</sub> =65°C	P <sub>d</sub> (W), typ. at T <sub>c</sub> =65°C	Φ <sub>v</sub> (lm), typ. at T <sub>c</sub> =25°C	lm/W, typ. at T <sub>c</sub> =25°C	Φ <sub>v</sub> (lm), typ. at T <sub>c</sub> =65°C	lm/W, typ. at T <sub>c</sub> =65°C
1309H2-827	80	2700	270	34.0	9.2	1480	158	1340	146
1309H2-830		3000	270	34.0	9.2	1550	165	1410	154
1309H2-835		3500	270	34.0	9.2	1560	167	1420	155
1309H2-840		4000	270	34.0	9.2	1640	175	1490	162
1309H2-850		5000	270	34.0	9.2	1670	178	1520	166
1309H2-857		5700	270	34.0	9.2	1590	170	1440	157
1309H2-927	90	2700	270	34.0	9.2	1280	137	1160	126
1309H2-930		3000	270	34.0	9.2	1340	143	1220	133
1309H2-935		3500	270	34.0	9.2	1350	144	1230	134
1309H2-940		4000	270	34.0	9.2	1350	144	1230	134
1309H2-950		5000	270	34.0	9.2	1390	148	1260	137
1309H2-S27	95	2700	270	34.0	9.2	1100	117	1000	109
1309H2-S30		3000	270	34.0	9.2	1190	127	1080	118
1309H2-S35		3500	270	34.0	9.2	1200	128	1090	119
1309H2-S40		4000	270	34.0	9.2	1220	130	1110	121

- Lumens maintains a tolerance of ±7% on flux measurements.
- Lumens maintains a tolerance of ±3% on forward voltage measurements.
- Lumens maintains a tolerance of ±2 on CRI measurements.
- T<sub>c</sub>(Case temperature)=65 °C is equal to T<sub>j</sub>(Junction temperature)=85 °C.

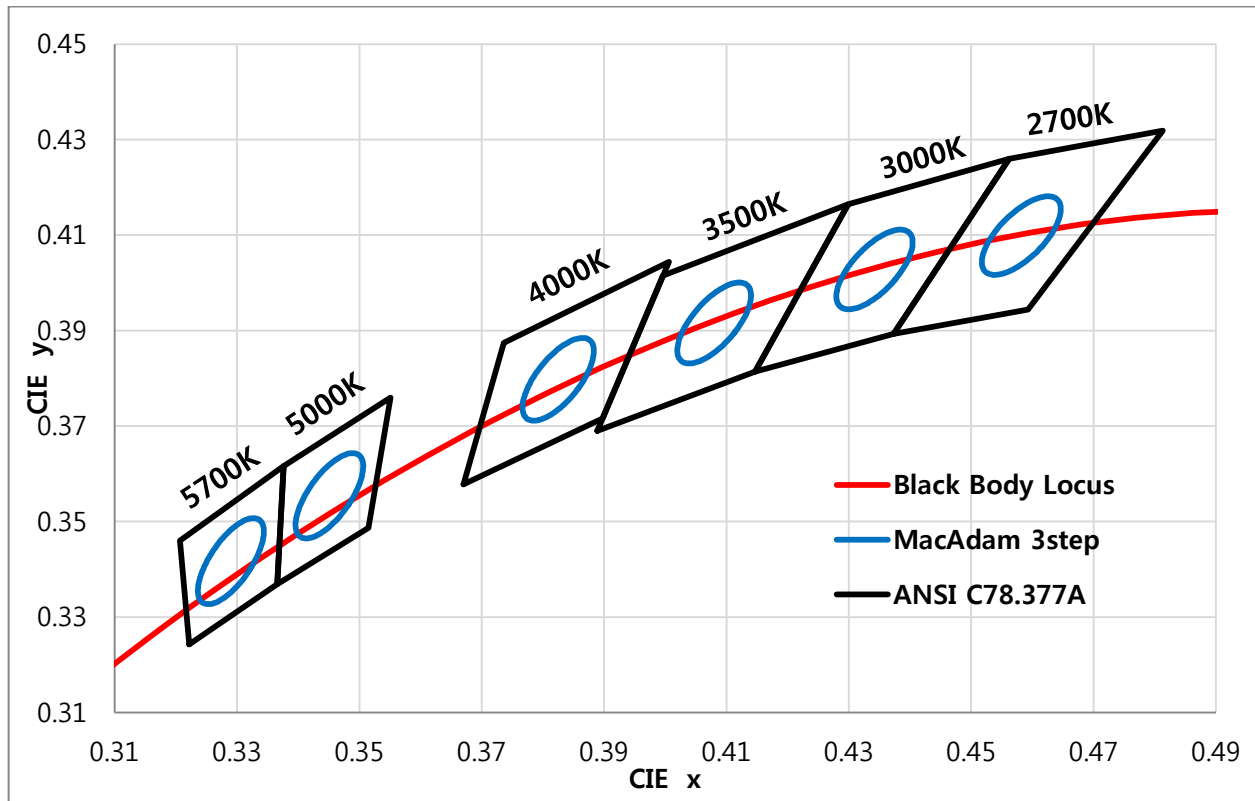
## 5. Luminous flux characteristics (Sub current, If=350 & 500mA)

Product Description	CRI (Ra)	CCT (K)	If (mA)	Vf(V), typ. at Tc=65°C	Pd(W), typ. at Tc=65°C	Φv(lm), typ. at Tc=25°C	lm/W, typ. at Tc=25°C	Φv(lm), typ. at Tc=65°C	lm/W, typ. at Tc=65°C
1309H2-827	80	2700	350	34.8	12.2	1870	151	1695	139
1309H2-830		3000	350	34.8	12.2	1960	158	1784	146
1309H2-835		3500	350	34.8	12.2	1970	159	1797	147
1309H2-840		4000	350	34.8	12.2	2070	167	1885	155
1309H2-850		5000	350	34.8	12.2	2110	170	1923	158
1309H2-857		5700	350	34.8	12.2	2010	162	1822	150
1309H2-927	90	2700	350	34.8	12.2	1610	130	1468	120
1309H2-930		3000	350	34.8	12.2	1690	136	1543	127
1309H2-935		3500	350	34.8	12.2	1700	137	1556	128
1309H2-940		4000	350	34.8	12.2	1700	137	1556	128
1309H2-950		5000	350	34.8	12.2	1750	141	1594	131
1309H2-S27	95	2700	350	34.8	12.2	1390	112	1265	104
1309H2-S30		3000	350	34.8	12.2	1500	121	1366	112
1309H2-S35		3500	350	34.8	12.2	1510	122	1379	113
1309H2-S40		4000	350	34.8	12.2	1540	124	1404	115

Product Description	CRI (Ra)	CCT (K)	If (mA)	Vf(V), typ. at Tc=65°C	Pd(W), typ. at Tc=65°C	Φv(lm), typ. at Tc=25°C	lm/W, typ. at Tc=25°C	Φv(lm), typ. at Tc=65°C	lm/W, typ. at Tc=65°C
1309H2-827	80	2700	500	36.3	18.2	2570	139	2320	128
1309H2-830		3000	500	36.3	18.2	2690	145	2450	135
1309H2-835		3500	500	36.3	18.2	2710	146	2460	136
1309H2-840		4000	500	36.3	18.2	2850	154	2590	143
1309H2-850		5000	500	36.3	18.2	2900	157	2640	145
1309H2-857		5700	500	36.3	18.2	2760	149	2500	138
1309H2-927	90	2700	500	36.3	18.2	2220	120	2010	111
1309H2-930		3000	500	36.3	18.2	2320	125	2120	117
1309H2-935		3500	500	36.3	18.2	2340	126	2130	117
1309H2-940		4000	500	36.3	18.2	2340	126	2130	117
1309H2-950		5000	500	36.3	18.2	2410	130	2190	121
1309H2-S27	95	2700	500	36.3	18.2	1910	103	1730	95
1309H2-S30		3000	500	36.3	18.2	2060	111	1870	103
1309H2-S35		3500	500	36.3	18.2	2080	112	1890	104
1309H2-S40		4000	500	36.3	18.2	2120	115	1920	106

- Lumens maintains a tolerance of  $\pm 7\%$  on flux measurements.
- Lumens maintains a tolerance of  $\pm 3\%$  on forward voltage measurements.
- Lumens maintains a tolerance of  $\pm 2$  on CRI measurements.
- Tc(Case temperature)=65°C is equal to Tj(Junction temperature)=85°C.

## 6. Chromaticity diagram & coordinates



- Lumens maintains a tolerance of  $\pm 0.005$  on chromaticity (CCx, CCy)

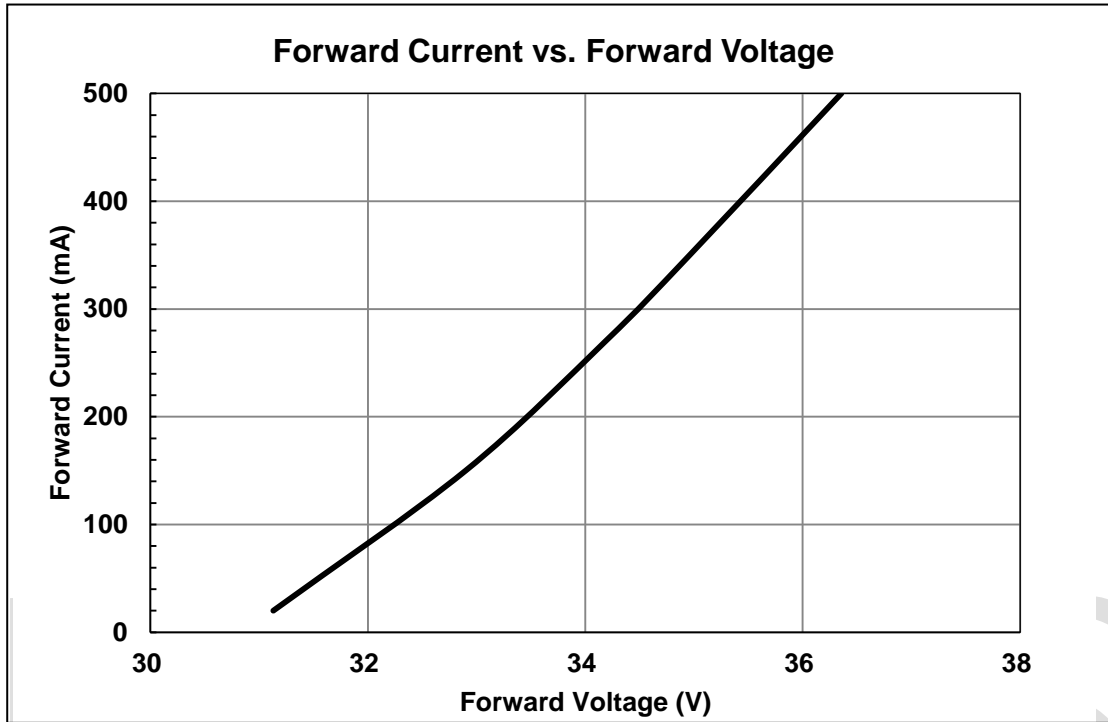
CCT(K)	x	y	CCT(K)	x	y	CCT(K)	x	y
5700K	0.3222	0.3243	4000K	0.3670	0.3578	3000K	0.4147	0.3814
	0.3207	0.3462		0.3736	0.3874		0.4299	0.4165
	0.3376	0.3616		0.4006	0.4044		0.4562	0.4260
	0.3366	0.3369		0.3898	0.3716		0.4373	0.3893
5000K	0.3366	0.3369	3500K	0.3889	0.3690	2700K	0.4373	0.3893
	0.3376	0.3616		0.3996	0.4015		0.4562	0.4260
	0.3551	0.3760		0.4299	0.4165		0.4813	0.4319
	0.3515	0.3487		0.4147	0.3814		0.4593	0.3944

### \* 3-step MacAdam Ellipse Color Definition

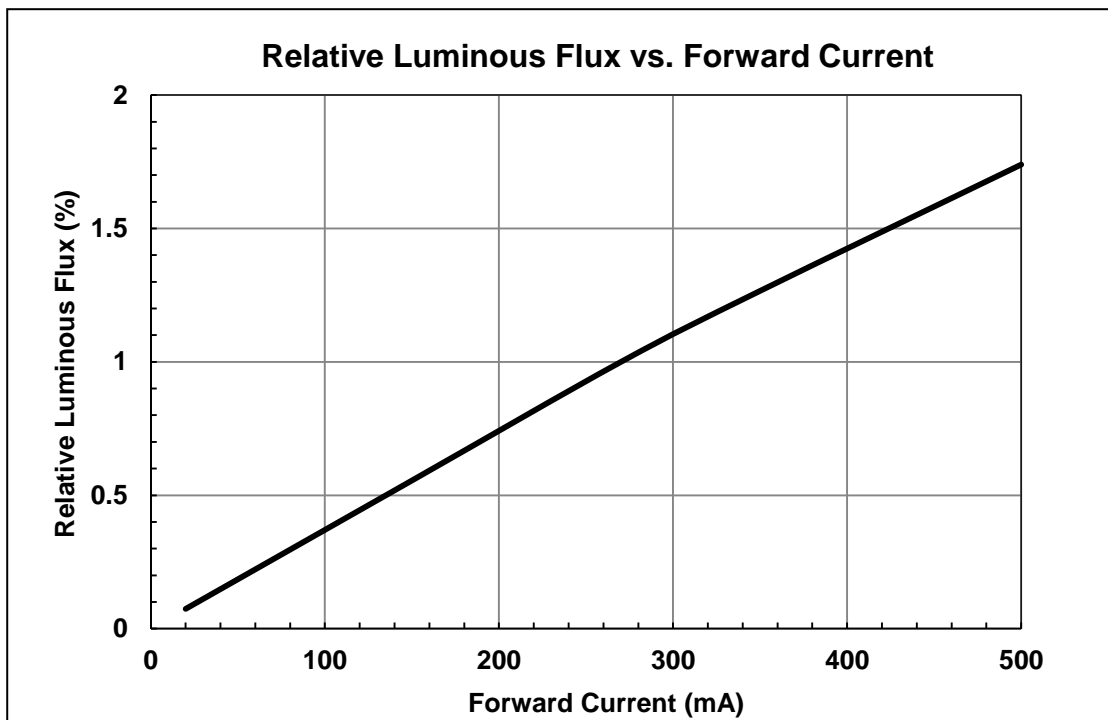
CCT(K)	Center		Ellipse Parameter		
	x	y	Axis a	Axis b	Angle(°)
5700K	0.3287	0.3417	0.00745	0.00320	59.1
5000K	0.3447	0.3553	0.00822	0.00354	59.6
4000K	0.3818	0.3797	0.00939	0.00402	53.7
3500K	0.4073	0.3917	0.00927	0.00414	54.0
3000K	0.4338	0.4030	0.00834	0.00408	53.2
2700K	0.4578	0.4101	0.00810	0.00420	53.7

## 7. Characteristic Graphs (T<sub>j</sub>=85°C)

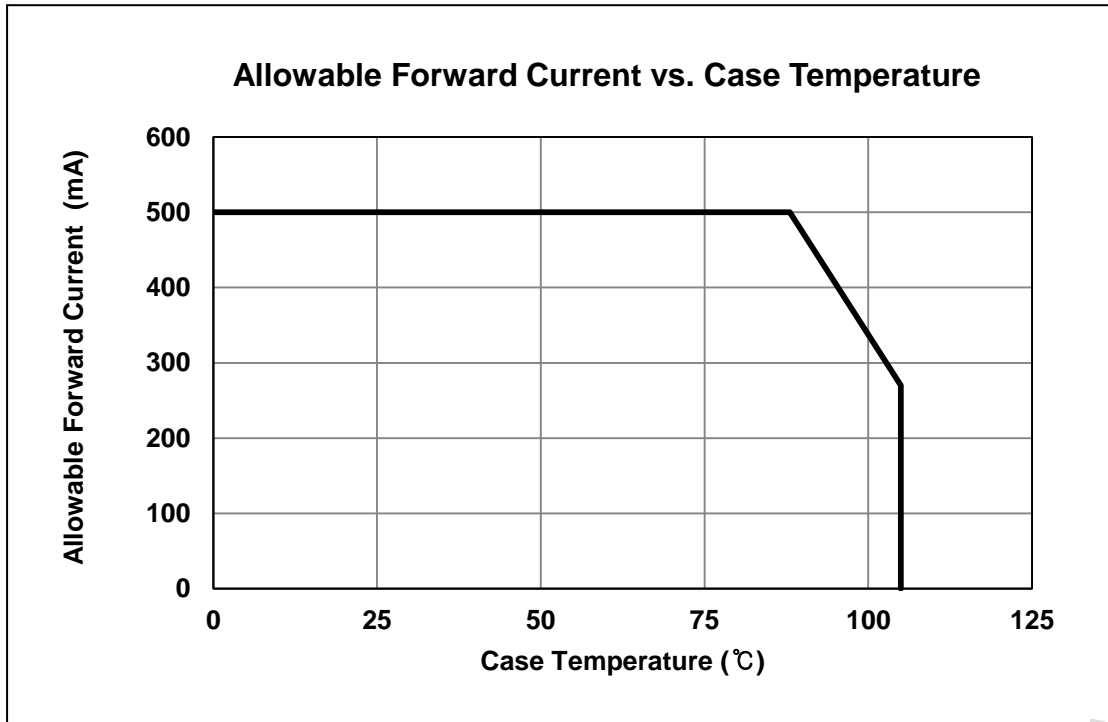
(1) Typical Forward Current vs. Forward Voltage



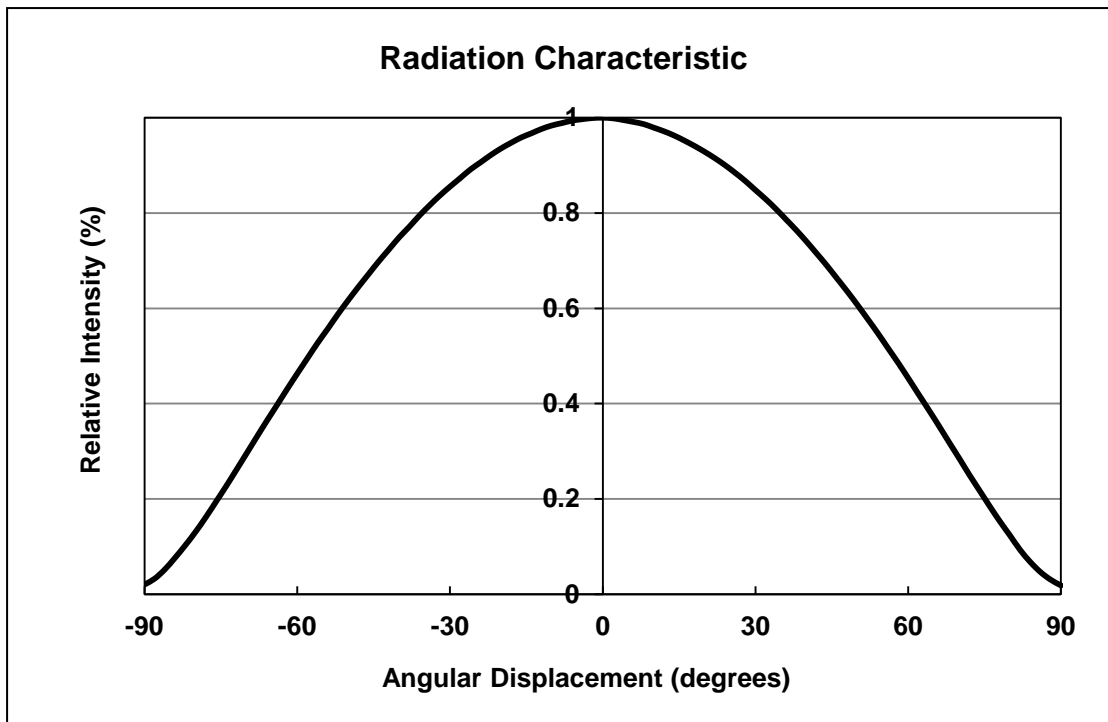
(2) Typical Relative Luminous Flux vs. Forward Current



### (3) Typical Allowable Forward Current with Ambient Temperature

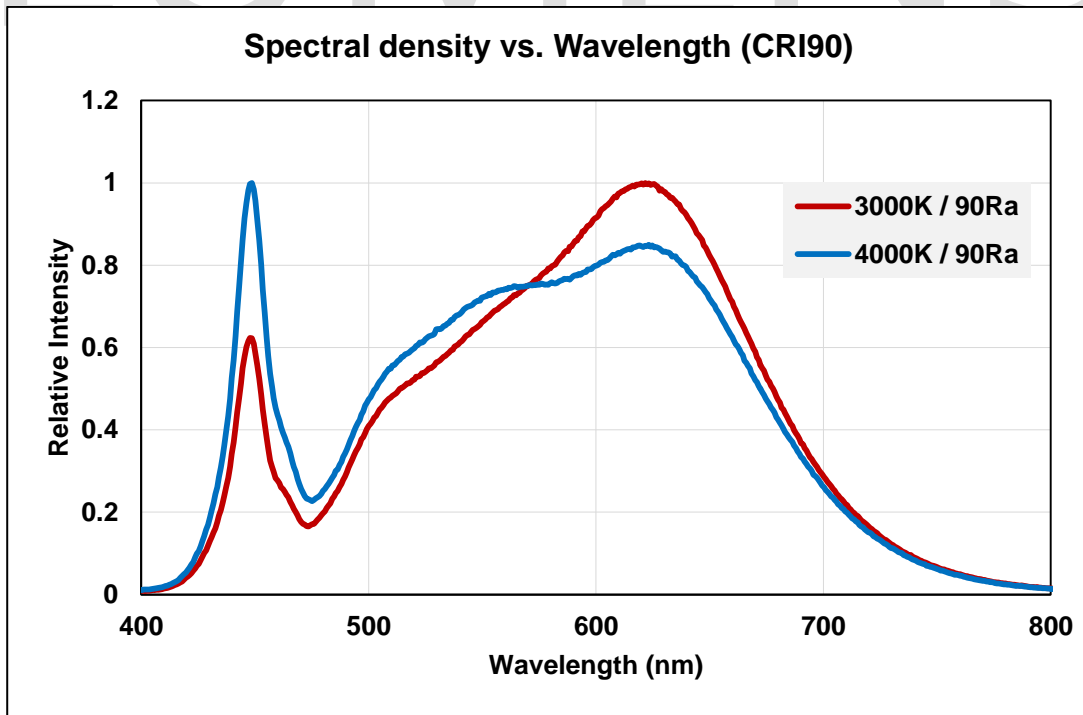
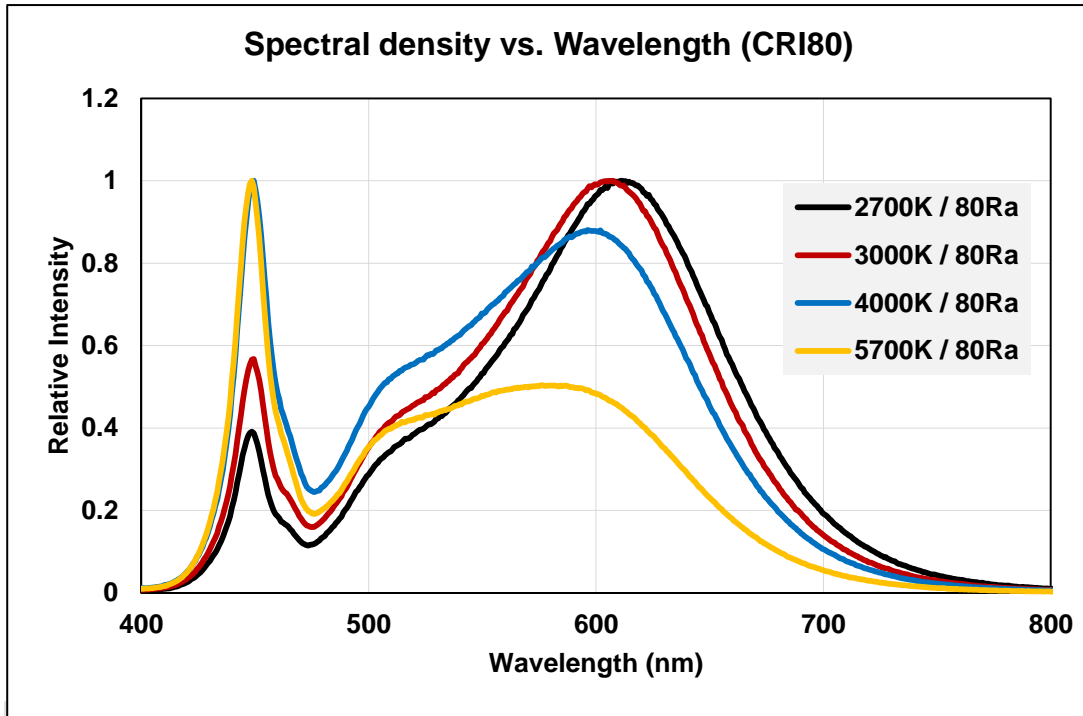


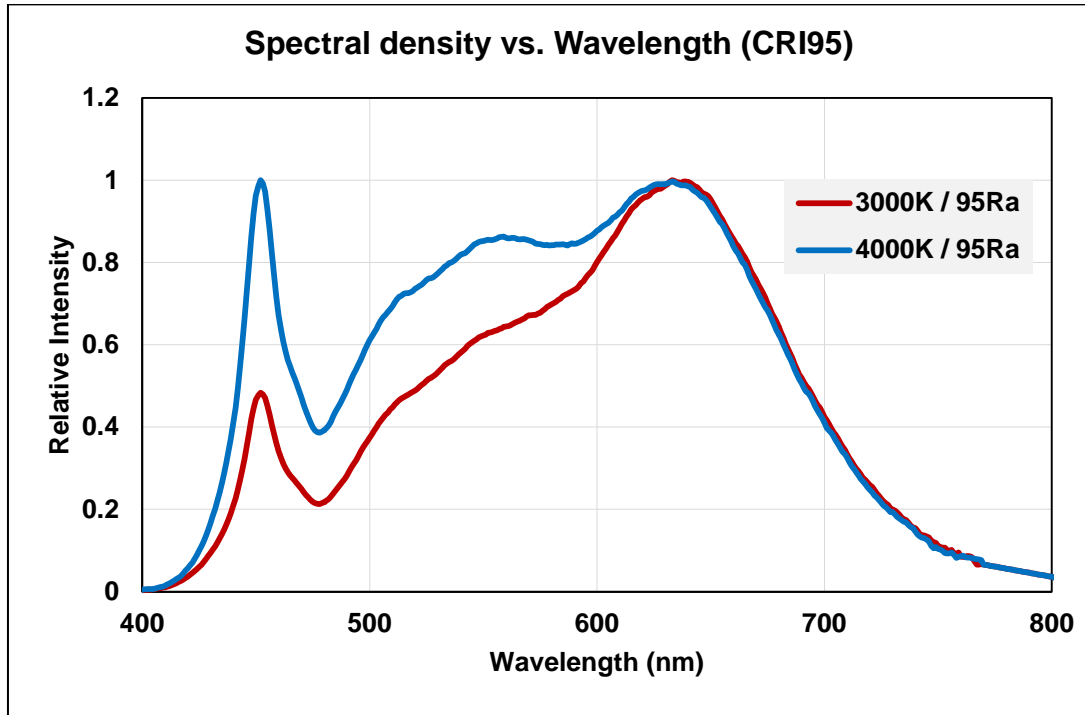
### (4) Typical Spatial Radiation Characteristic





## (5) Spectrum



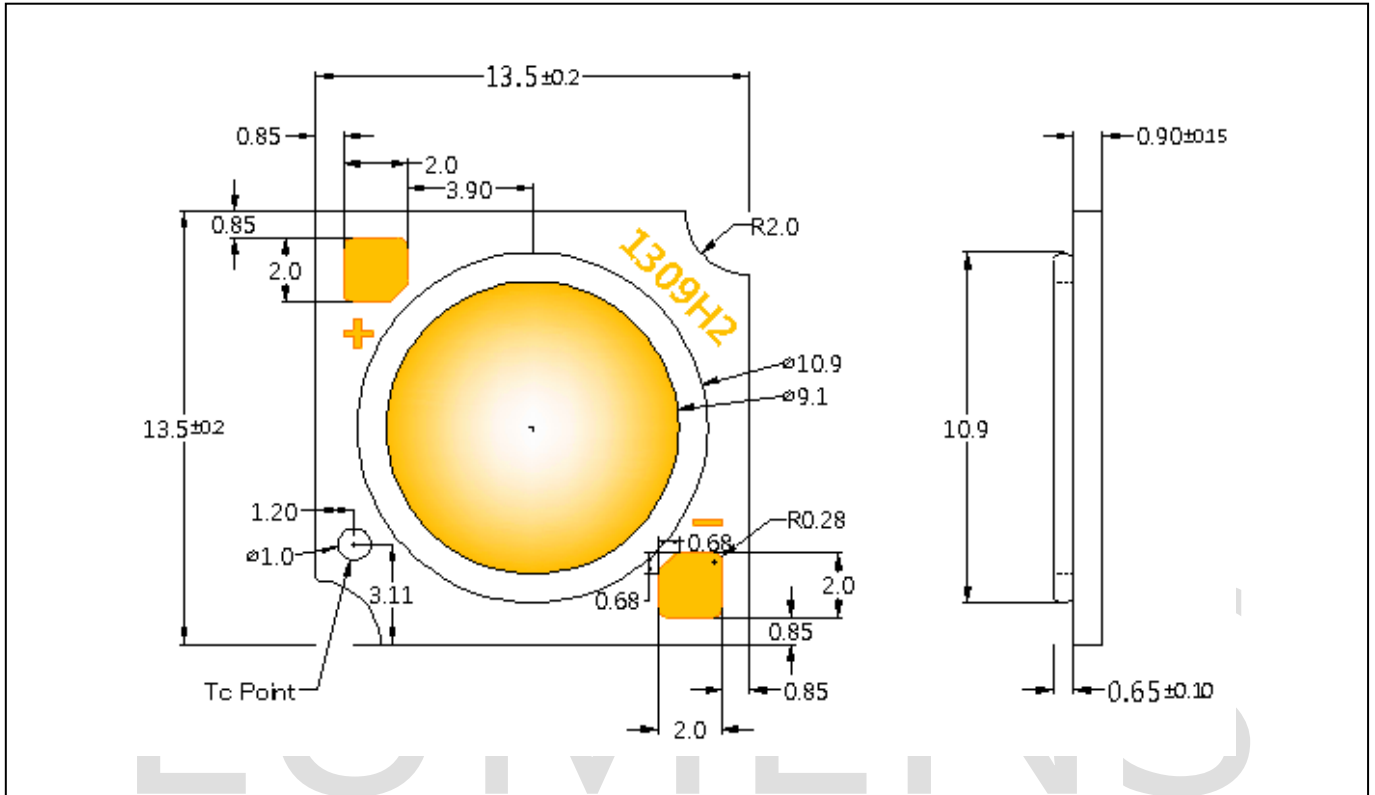


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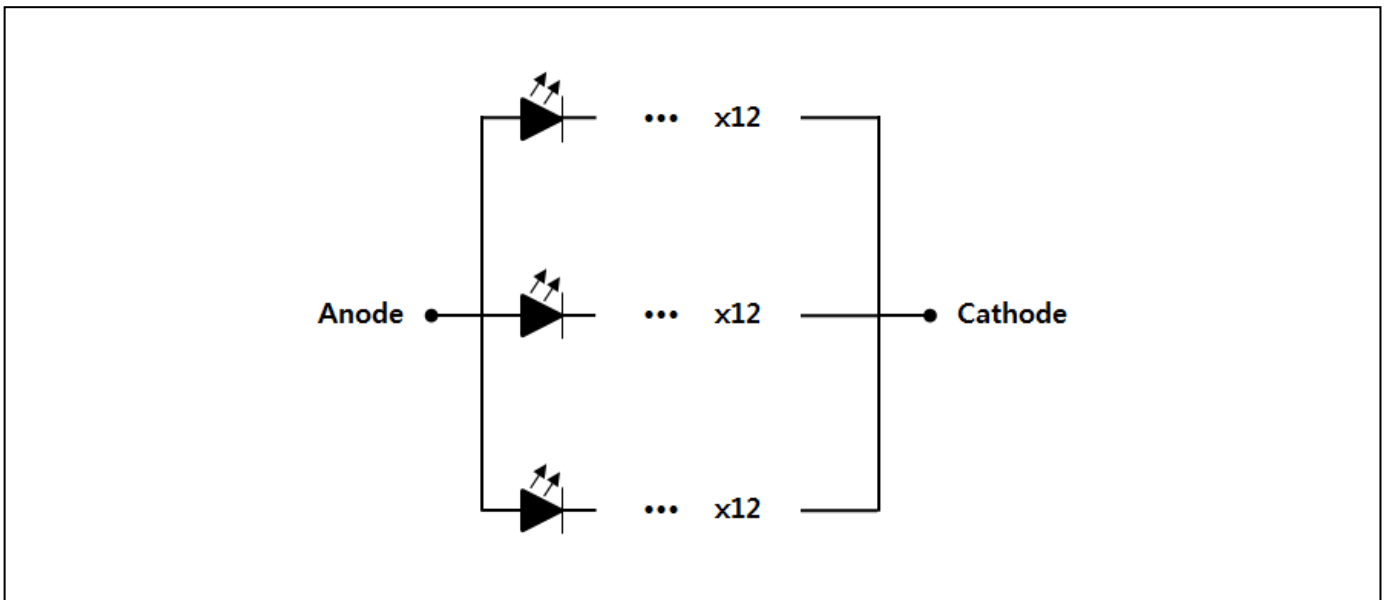
## 8. Outline Dimensions

- Package outline (Width x Length x Height) of 13.5 x 13.5 x 1.55mm
- Undefined tolerance is  $\pm 0.2$  mm

(Unit : mm)

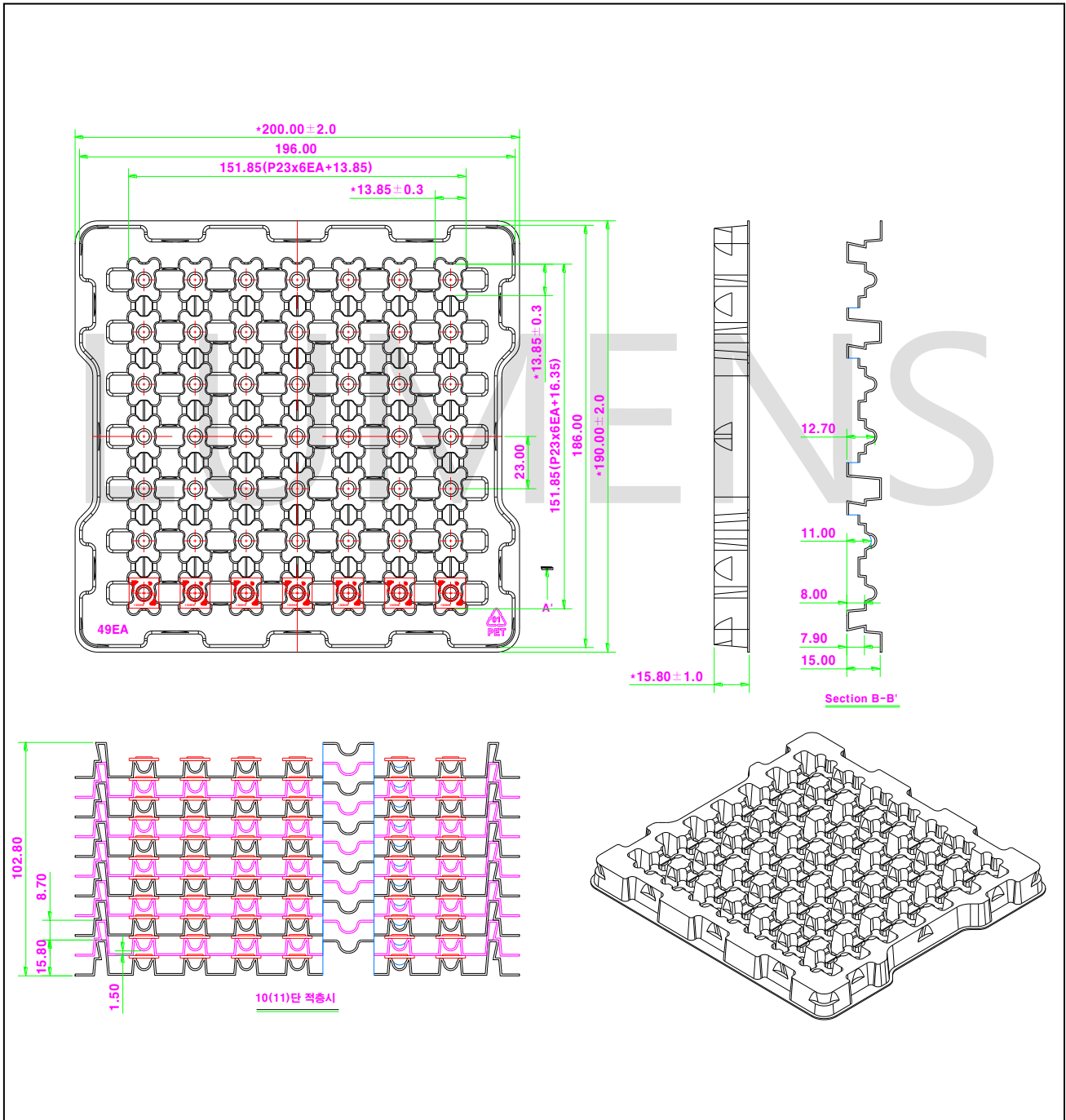


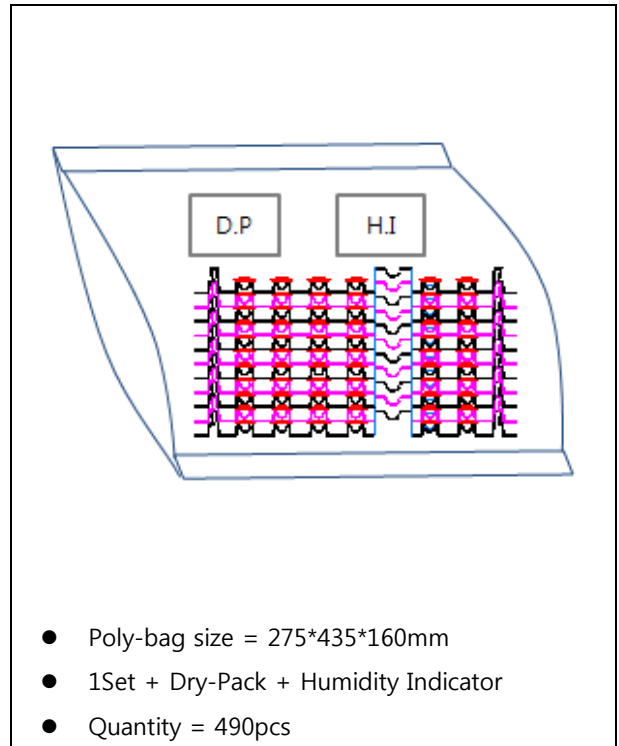
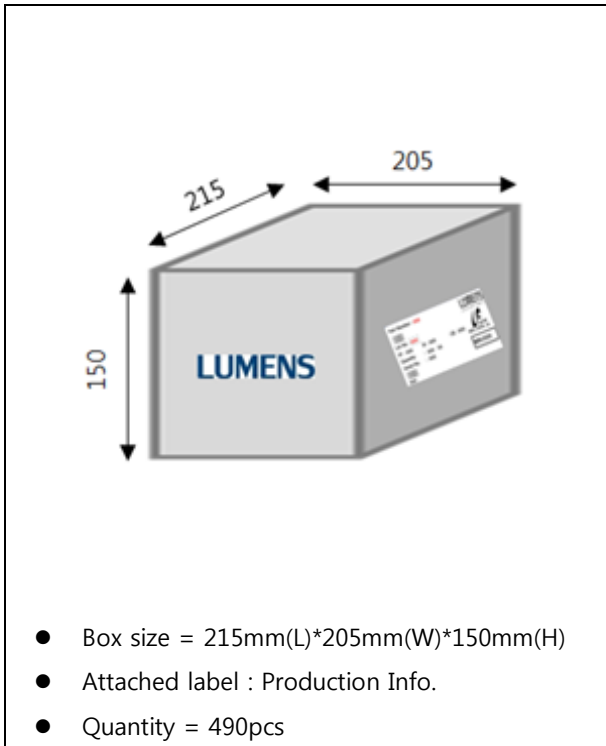
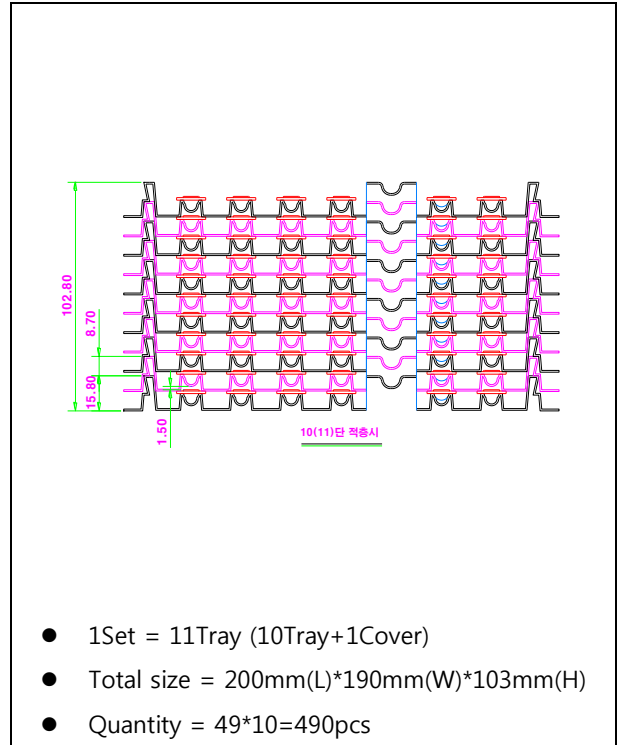
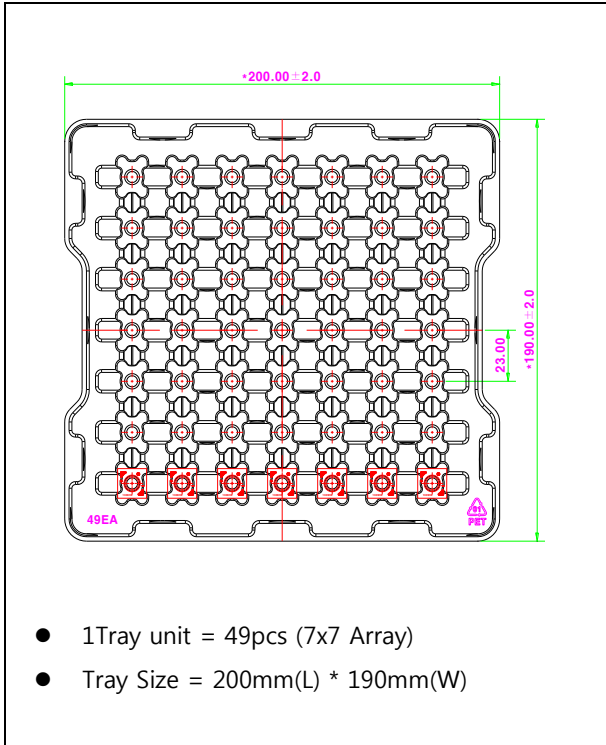
## 9. Circuit Design



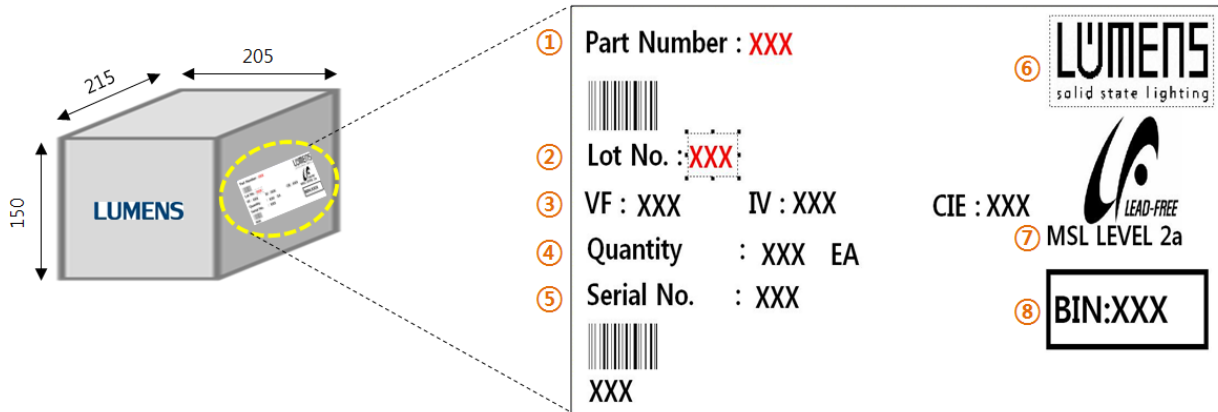
## 10. Packing

- 49pcs modules per tray
- 10 trays in one Carton
- Tray Size : L x W=200 x 190(mm), 7X 7=49pcs.
- Carton Size : 215mm x 205mm x 150mm
- Undefined tolerance is  $\pm 2$  mm





## 11. Label Format



No.	ITEM	REMARK	DESCRIPTION
①	PART NUMBER (Product Code)	XXXXH2xxxxxx	H2 COB (Size, Watt, Type, CRI, CCT, Version)
②	LOT NUMBER	xx-xxx – YYMMDDW -Lxxx	Production Input (Input date, Product model size, Lot no. ) Y(Year), M(Month), D(Day)
③	VF / IV / CIE	VF : Forward voltage IV : Luminous flux CIE : CRI + CCT	VF : xx - xx IV : xx - xx CIE : 827 (80Ra + 2700K)
④	QUANTITY	xxx EA	Total Q'ty
⑤	SERIAL NUMBER	xxx-YYMMDD	Y(Year), M(Month), D(Day)
⑥	COMPANY LOGO	LOGO	-
⑦	MSL LEVEL	Moisture Sensitivity Level	ex) MSL1 ~ 6
⑧	BIN No.	00xx ~ 90xx	TEST Bin No.

## 12. Product Code

Color Code	Product Code					Remark
827	1309H2827xxx	1318H2827xxx	2025H2827xxx	2032H2827xxx	3040H2827xxx	CRI80
830	1309H2830xxx	1318H2830xxx	2025H2830xxx	2032H2830xxx	3040H2830xxx	
835	1309H2835xxx	1318H2835xxx	2025H2835xxx	2032H2835xxx	3040H2835xxx	
840	1309H2840xxx	1318H2840xxx	2025H2840xxx	2032H2840xxx	3040H2840xxx	
850	1309H2850xxx	1318H2850xxx	2025H2850xxx	2032H2850xxx	3040H2850xxx	
857	1309H2857xxx	1318H2857xxx	2025H2857xxx	2032H2857xxx	3040H2857xxx	
927	1309H2927xxx	1318H2927xxx	2025H2927xxx	2032H2927xxx	3040H2927xxx	CRI90
930	1309H2930xxx	1318H2930xxx	2025H2930xxx	2032H2930xxx	3040H2930xxx	
935	1309H2935xxx	1318H2935xxx	2025H2935xxx	2032H2935xxx	3040H2935xxx	
940	1309H2940xxx	1318H2940xxx	2025H2940xxx	2032H2940xxx	3040H2940xxx	
S27	1309H2S27xxx	1318H2S27xxx	2025H2S27xxx	2032H2S27xxx	3040H2S27xxx	CRI95
S30	1309H2S30xxx	1318H2S30xxx	2025H2S30xxx	2032H2S30xxx	3040H2S30xxx	
S35	1309H2S35xxx	1318H2S35xxx	2025H2S35xxx	2032H2S35xxx	3040H2S35xxx	
S40	1309H2S40xxx	1318H2S40xxx	2025H2S40xxx	2032H2S40xxx	3040H2S40xxx	

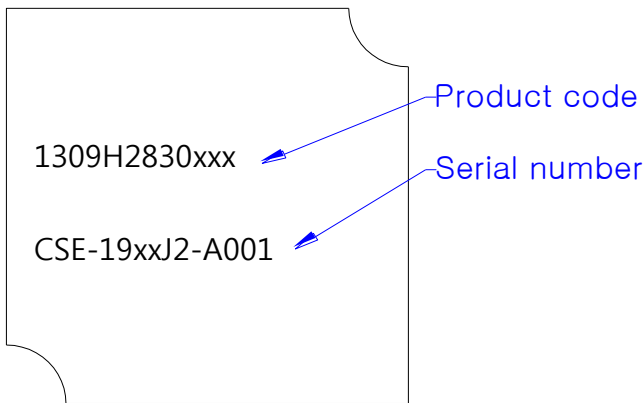
### ● Product Code Nomenclature detail

Size + Watt (2) (2)	Type (2)	CRI (1)	CCT (2)	Version (3)
XXXX	H2	8 : 80Ra	27 : 2700K	xxx
		9 : 90Ra	30 : 3000K	
		S : 95Ra	35 : 3500K	
			40 : 4000K	
			50 : 5000K	
			57 : 5700K	

### ● Serial number Nomenclature detail

Item (1)	Product (1)	Type (1)	Date (YYMM) (4)	Input # (2)	Machine (1)	Lot number (3)
C : COB	A	A	1910	AX : A1~A9	A	001
	B	B		BX : B1~B9	B	002
	C	C		CX : C1~C9	C	003
	D	D		DX : D1~D9	D	004
	⋮	⋮		⋮	⋮	⋮
	Z	Z		ZX : Z1~Z9	Z	999

- **Marking**



### 13. Reliability test items and conditions

Item	Reference	Test Conditions	Duration Cycle
Thermal Shock	EIAJ ED-4701	Ta = - 40°C (30min) ~ 100°C (30min)	100 Cycle
Room temperature Operating Life Test	Internal Reference	Ta = 25°C, If = Maximum current	1,000 Hours
High Temperature Operating Life Test	Internal Reference	Ta = 85°C, If = Sorting current	1,000 Hours
High Temperature High Humidity Life Test	Internal Reference	Ta = 85°C, 85% RH	1,000 Hours
Low Temperature Storage Test	Internal Reference	Ta = -40°C	1,000 Hours
High Temperature Storage Test	Internal Reference	Ta = 100°C	1,000 Hours

#### (1) Criteria for judging the damage

Item	Symbol	Condition	Criteria for Judgment	
			MIN	MAX
Forward Voltage	Vf	If = 270mA	-	USL (1) × 1.1
Luminous Intensity	Φv	If = 270mA	LSL (2) × 0.7	-

- USL : Upper Standard Level
- LSL : Lower Standard Level



## 14. Cautions

### (1) Moisture-Proof Package

- 1.1 When moisture is absorbed into the LED package it may vaporize and expand products during soldering. There is a possibility that this may cause exfoliation of the contacts and damage to the optical characteristics of the LEDs. For this reason, the moisture-proof package is used to keep moisture to a minimum in the package.
- 1.2 A package of a moisture-absorbent material (silica gel) is inserted into the shielding bag. The silica gel changes its color from blue to pink as it absorbs moisture.

### (2) Current limiting

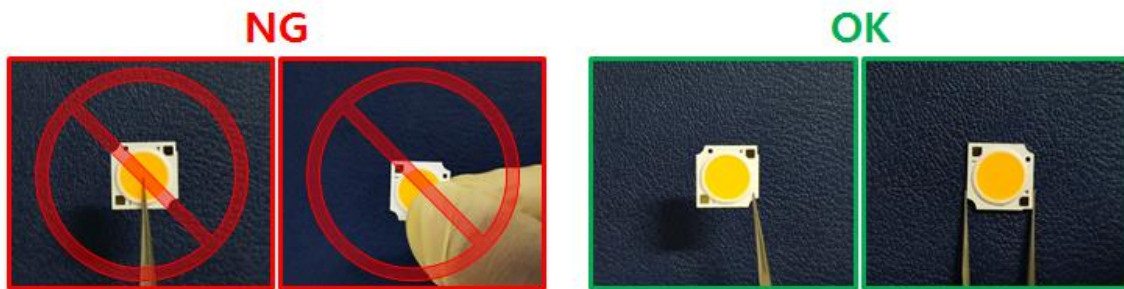
A resistor should be used to limit current spikes that can be caused by voltage fluctuations. Otherwise damage could occur.

### (3) Storage Conditions

- 3.1 Before opening the package: The LEDs should be kept at 30°C or less and 90%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture-proof packaging with moisture-absorbent material (silica gel) is recommended.
- 3.2 After opening the package: The LEDs should be kept at 30°C or less and 70%RH or less. The LEDs should be soldered within 168 hours (7 days) after opening the package. If unused LEDs remain, they should be stored in moisture-proof packages, such as sealed containers with packages of moisture-absorbent material (silica gel). It is also recommended to return the LEDs to the original moisture-proof bag and to reseal the moisture-proof bag again.
- 3.3 If the moisture-absorbent material (silica gel) has faded away or the LEDs have exceeded the recommended storage time, baking treatment should be performed using the following conditions.  
Baking treatment: more than 24 hours at 65±5°C
- 3.4 Lumens LED electrode sections are comprised of a silver-plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid condition which may cause difficulty environments during soldering operations. It is recommended that the user uses the LEDs as soon as possible.
- 3.5 Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

## (4) Handling of Silicone (Lens) LEDs

- 4.1 Avoid silicone resin parts especially with sharp tools such as tweezers.
- 4.2 Avoid leaving fingerprints on silicone lens part.



## (5) Usage

- 5.1 Do not exceed the values given in this specification.

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