

LC013B – CRI90



Introduction

Features


- 13W COB LED : 17.0 x 17.0 x t 1.5 (mm)
- InGaN/GaN MQW LED with long-time reliability
- Lead (Pd) free product - RoHS compliant

Applications

- Spot / Downlighting
- LED Retrofit Bulbs
- Outdoor illumination
- Other applications

SAMSUNG ELECTRONICS

95, Samsung2-Ro, Giheung-Gu,
Yongin-City, Gyeonggi-Do 446-711, KOREA

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1. Absolute Maximum Rating

- 1) Operation Forward Current ($T_a = 25^\circ\text{C}$) 660 mA
- 2) LED Junction Temperature (T_J) 150°C
- 3) Operating Temperature Range (T_{opr}) $-40^\circ\text{C} \sim 105^\circ\text{C}$
- 4) Storage Temperature Range (T_{stg}) $-40^\circ\text{C} \sim 120^\circ\text{C}$
- 5) Power Dissipation (P_D) 25W

2. Characteristics

- 1) Electro-Optical characteristics ($T_a : 25^\circ\text{C}$)

Item	Unit	Condition	Rank		Min	Typ	Max	
Luminous Flux ¹⁾	lm ²⁾	$I_F = 360 \text{ mA}$	2700K	1F	11	1060	-	1175
					12	1175	-	1290
					13	1290	-	1405
					14	1405	-	1520
			3000K	1F	11	1080	-	1200
					12	1200	-	1320
					13	1320	-	1440
					14	1440	-	1560
			3500K	1F	11	1115	-	1235
					12	1235	-	1355
					13	1355	-	1475
					14	1475	-	1595
			4000K	1F	11	1145	-	1270
					12	1270	-	1395
					13	1395	-	1520
					14	1520	-	1645
Forward Voltage	V ³⁾	$I_F = 360 \text{ mA}$	YH		32.5	35.5	38.5	
CRI ⁴⁾		$I_F = 360 \text{ mA}$	-		90	-	-	
Thermal Resistance ($R_{th,j-c}$)	$^\circ\text{C}/\text{W}$	-	-			1.6		
View Angle	$^\circ$	$I_F = 360 \text{ mA}$	-		-	115 $^\circ$	-	

Note :

- 1) Samsung LED tested in pulsed condition. $T_J=25^\circ\text{C}$, pulse width is 10ms at rated test current.
- 2) Samsung LED has $\pm 7\%$ tolerance of flux measurements.
- 3) Samsung LED has $\pm 5\%$ tolerance of forward voltage measurements.
- 4) Samsung LED has ± 1 tolerance of CRI measurements.

3. Binning Structure

(Condition : $I_F = 360 \text{ mA}$, $T_a : 25^\circ\text{C}$)

1) VF Binning

CCT	Product Code	VF Rank	VF (V)		
			Min	Typ	Max
2700K	SPHWW1HDNA27YHW31F	YH	32.5	35.5	38.5
3000K	SPHWW1HDNA27YHV31F	YH	32.5	35.5	38.5
3500K	SPHWW1HDNA27YHU31F	YH	32.5	35.5	38.5
4000K	SPHWW1HDNA27YHT31F	YH	32.5	35.5	38.5

2) Color Binning

CCT	Product Code	Color Rank	Chromaticity Bins
2700K	SPHWW1HDNA27YHW31F	W3	WA
3000K	SPHWW1HDNA27YHV31F	V3	VA
3500K	SPHWW1HDNA27YHU31F	U3	UA
4000K	SPHWW1HDNA27YHT31F	T3	TA

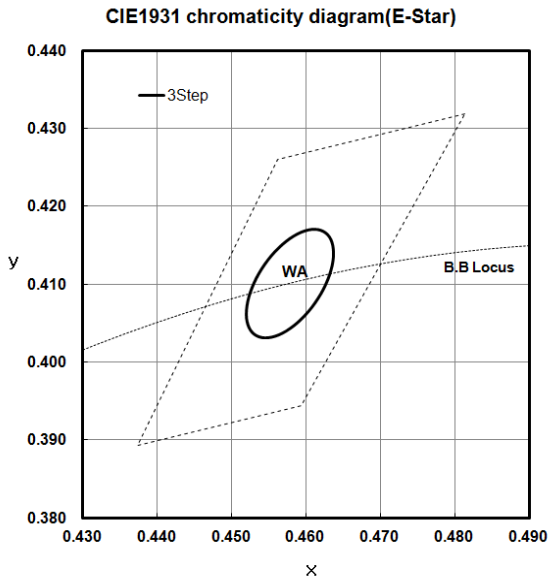
3) Luminous Flux Binning

CCT	Product Code	Flux Rank	Flux Bin	Range (lm)		
				Min	Typ	Max
2700K	SPHWW1HDNA27YHW31F	1F	11	1060	-	1175
			12	1175	-	1290
			13	1290	-	1405
			14	1405	-	1520
3000K	SPHWW1HDNA27YHV31F	1F	11	1080	-	1200
			12	1200	-	1320
			13	1320	-	1440
			14	1440	-	1560
3500K	SPHWW1HDNA27YHU31F	1F	11	1115	-	1235
			12	1235	-	1355
			13	1355	-	1475
			14	1475	-	1595
4000K	SPHWW1HDNA27YHT31F	1F	11	1145	-	1270
			12	1270	-	1395
			13	1395	-	1520
			14	1520	-	1645

4. Chromaticity Coordinates

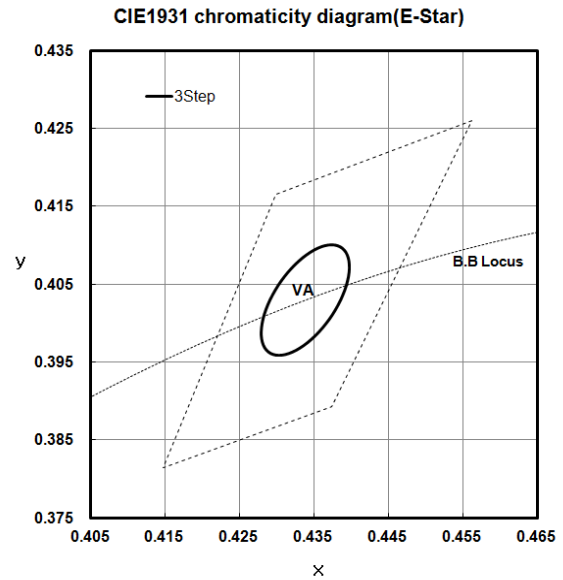
(Condition : $I_F = 360 \text{ mA}$, $T_a = 25^\circ\text{C}$)

1) 2700K



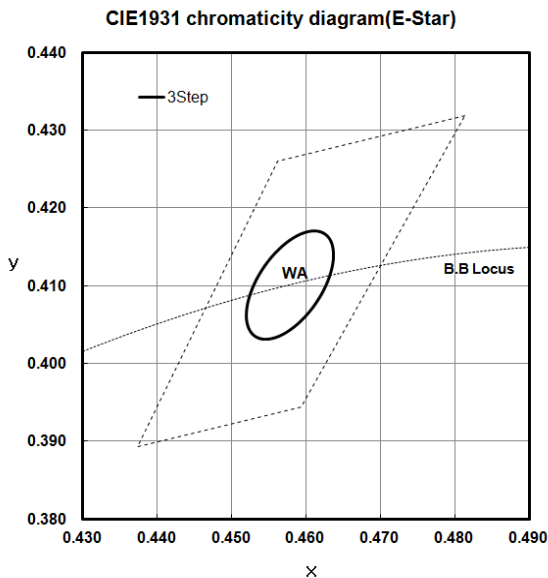
Macadam Ellipse 3step (WA)				
x	y	θ	a	b
0.4578	0.4101	53.7	0.0081	0.0042

2) 3000K



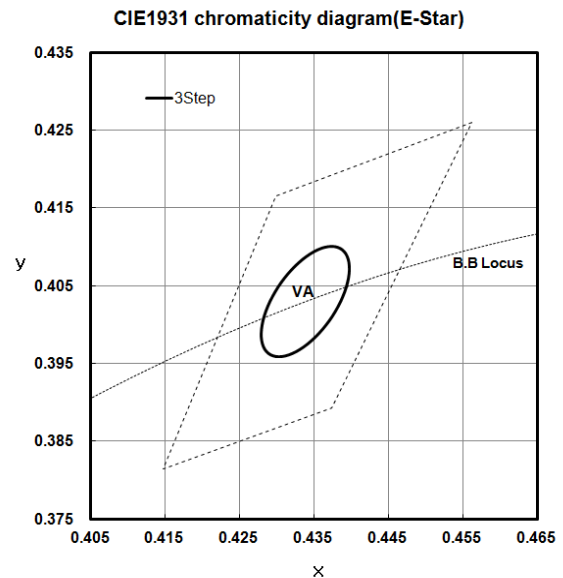
Macadam Ellipse 3step (VA)				
x	y	θ	a	b
0.4338	0.4030	53.22	0.0083	0.0041

3) 3500K



Macadam Ellipse 3step (UA)				
x	y	θ	a	b
0.4073	0.3917	54.0	0.0093	0.0041

4) 4000K



Macadam Ellipse 3step (TA)				
x	y	θ	a	b
0.3818	0.3797	53.72	0.0094	0.0040

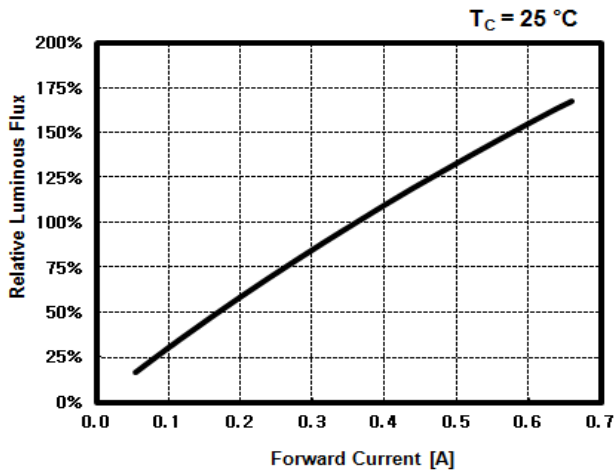
Note :

- 1) The Chromaticity Coordinates refers to ANSI C78.377-2008
- 2) Samsung LED has ± 0.005 tolerance of chromaticity(x,y).

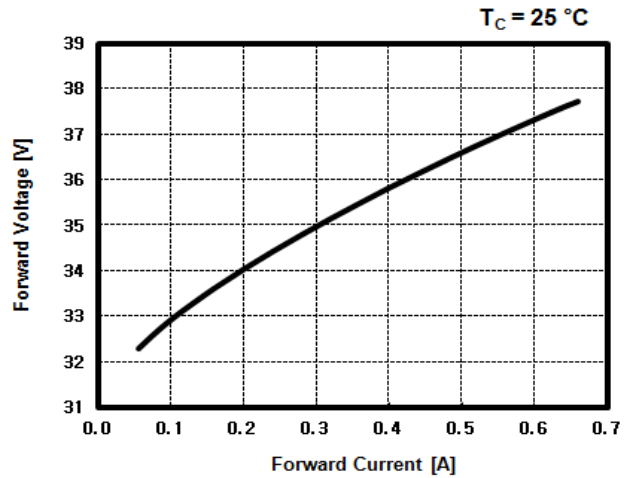
5. Typical Characteristics Graph

* These graphs show typical values. (Ta : 25°C)

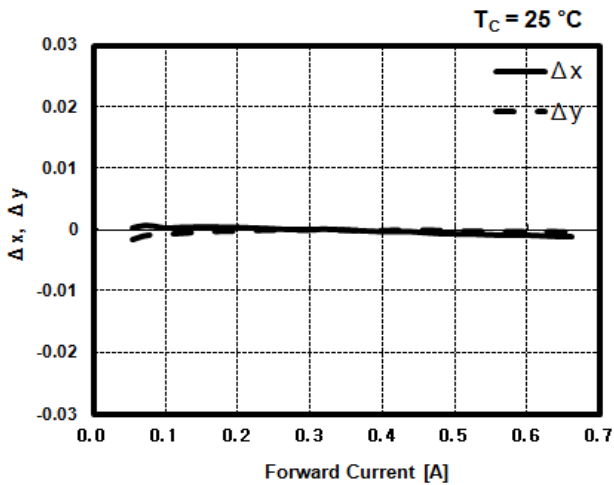
Relative Luminous Flux vs. Forward Current



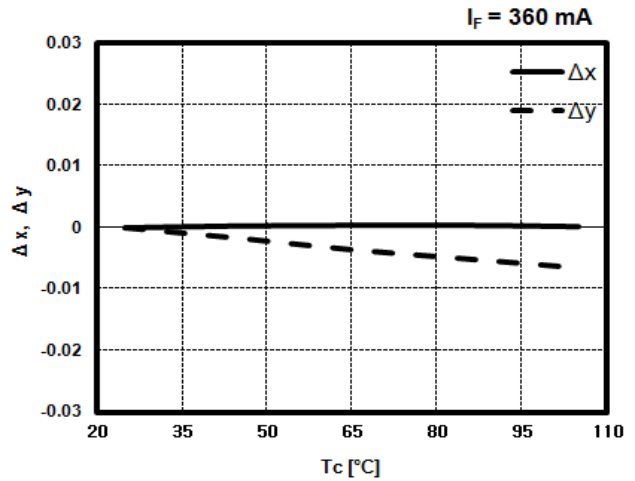
Forward Voltage vs. Forward Current



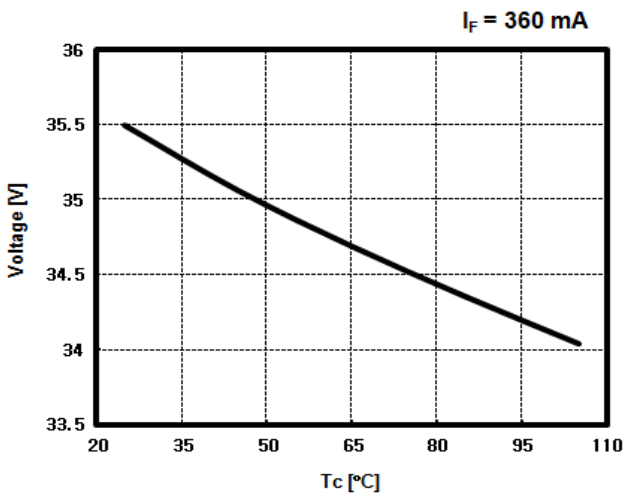
Chromaticity vs. Forward Current



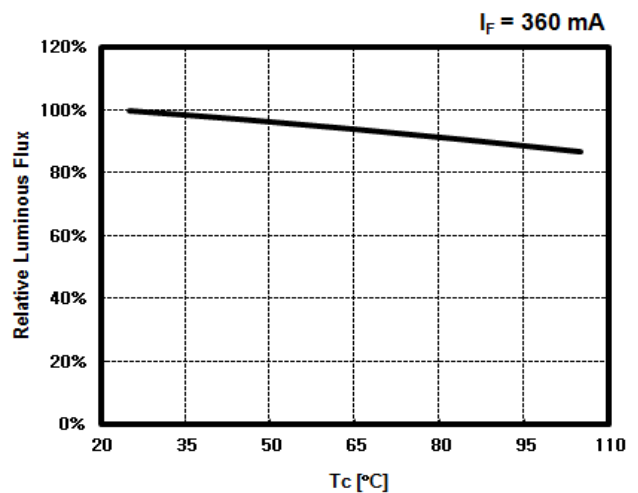
Chromaticity vs. Temperature



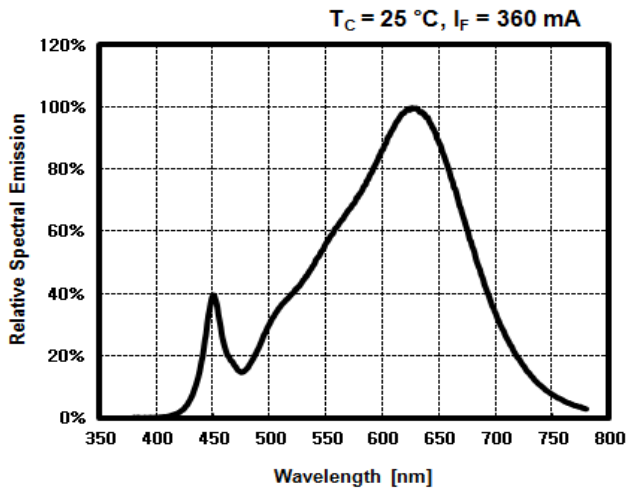
Forward Voltage vs. Temperature



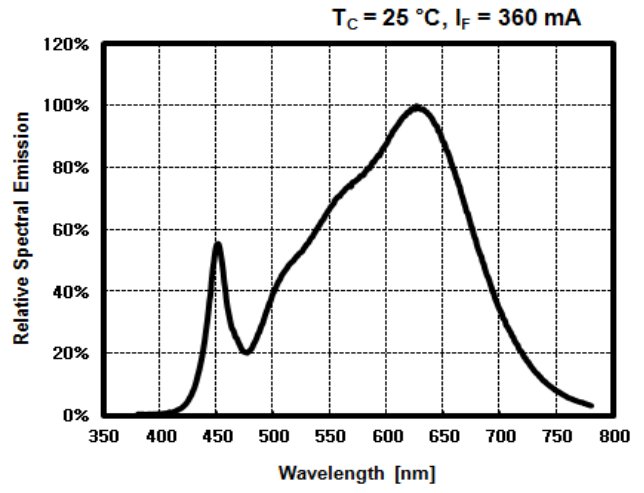
Relative Luminous Flux vs. Temperature



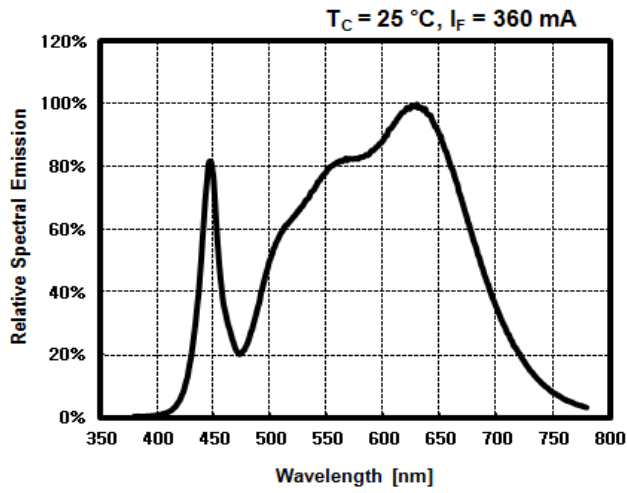
Relative Spectral Emission



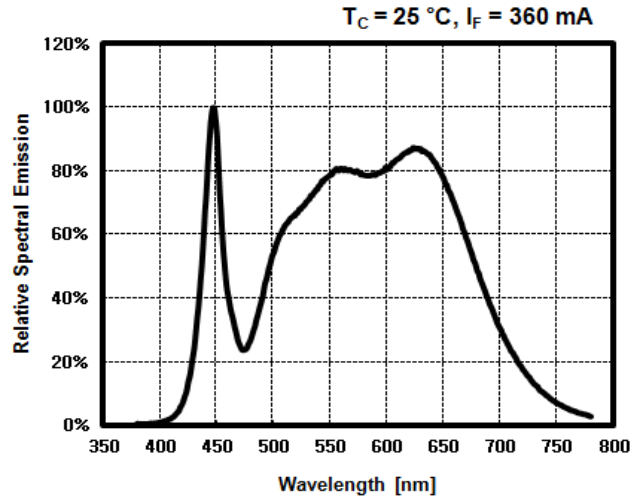
<2700K>



<3000K>

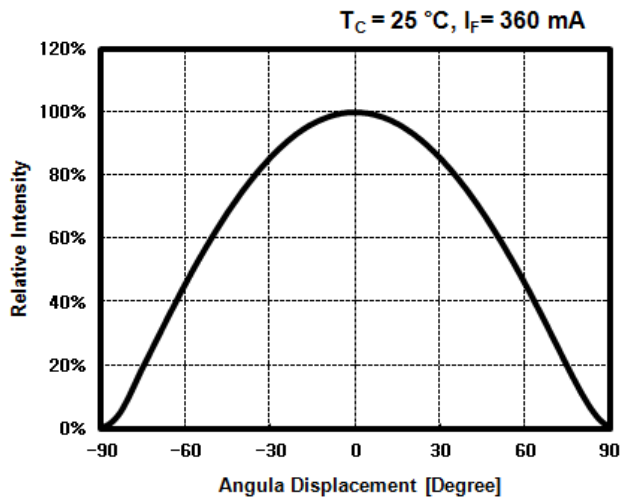


<3500K>

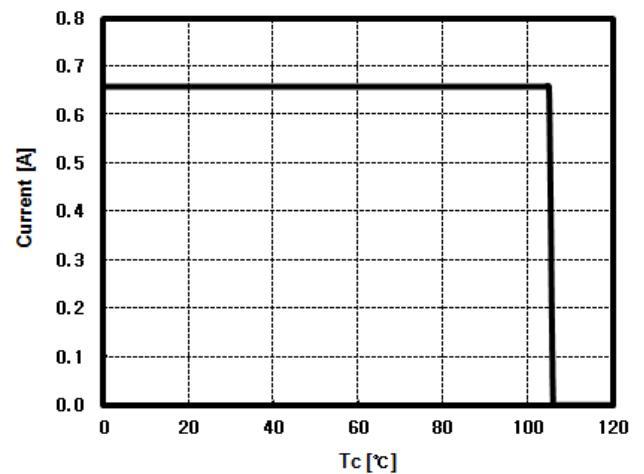


<4000K>

Radiation Pattern

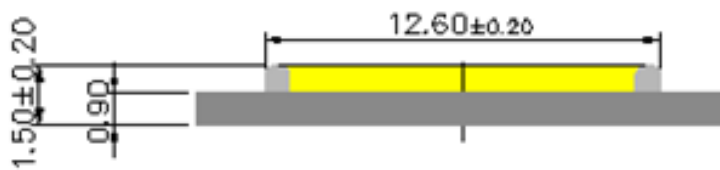
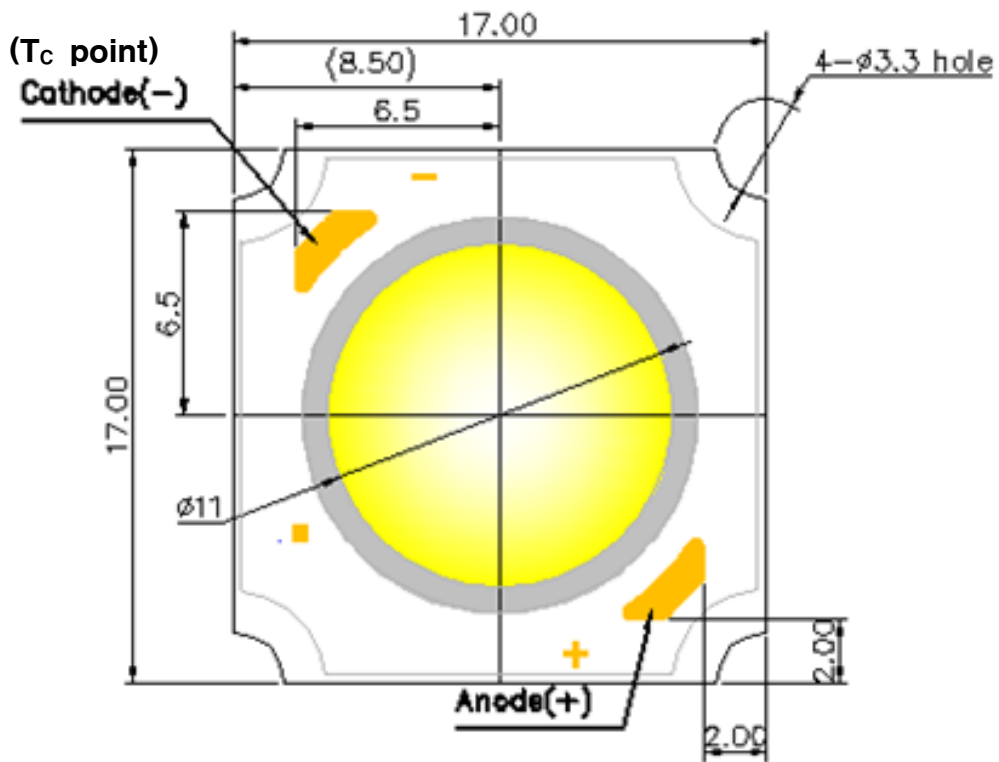


Derating Curve



6. Outline Drawing & Dimension

unit : mm
Tolerance : ± 0.15



7. Reliability Test Items and Conditions

1) Test Items

Test Items	Test Conditions	Test Hours/Cycles
Room Temperature life test	25°C, I _F = Max	1,000 h
High Temperature humidity life test	85°C, 85% RH, DC Derating I _F = Max	1,000 h
High Temperature life test	105°C, DC Derating I _F = Max	1,000 h
Low Temperature life test	-40°C, DC 660 mA	1,000 h
High Temperature Storage	120°C	1,000 h
Low Temperature Storage	-40°C	1,000 h
Thermal Shock	-45°C/15min → 125°C/15min Temperature changes in 5min.	200 cycles
Temperature Cycle On/Off test	-40 / 85°C, each 20min, 100min transfer Power On/off each 5min, DC 360 mA	100 cycles
Temperature humidity Cycle Storage	-10°C ↔ 25°C, 95%RH ↔ 85°C, 95%RH [24h/1Cycle]	100 cycles
ESD(HBM)	R1 : 10 MΩ, R2 : 1.5 kΩ, C : 100 pF	5 times (± 5 kV)
ESD(MM)	R1 : 10 MΩ, R2 : 0 kΩ, C : 200 pF	5 times (± 0.5 kV)
Vibration	20~80Hz(Displacement:0.06inch, Max 20G) 80~2kHz (Max 20G) Min. Frequency ↔ Max. Frequency 4min transfer	4 times
Shock	1500G, 0.5ms, Every 6faces (3axis X 2faces)	5 times

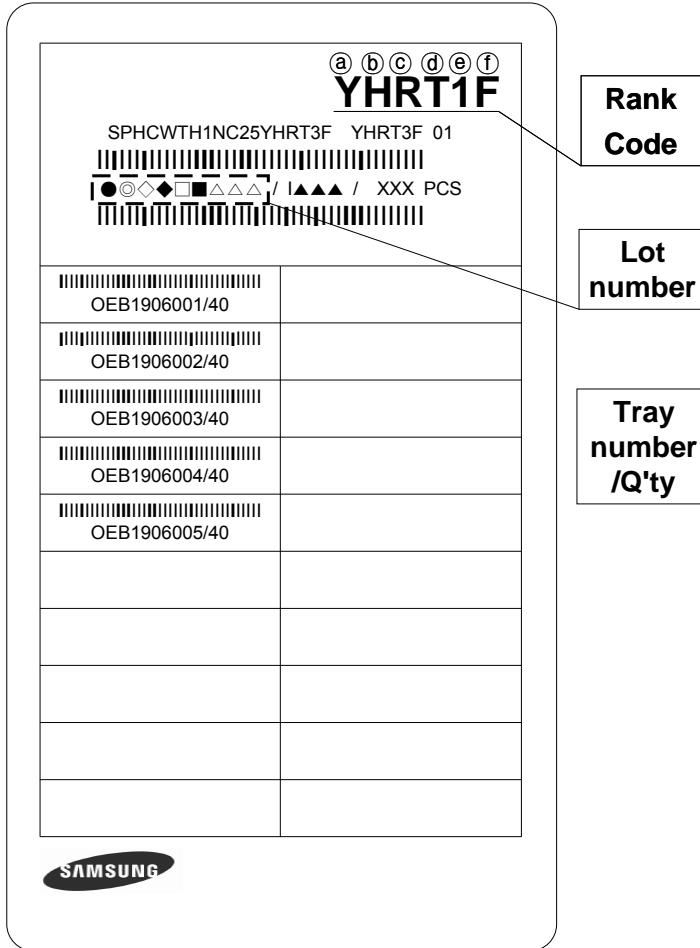
2) Criteria for Failure

Item	Symbol	Test Condition [T _a = 25°C]	Limit	
			Min.	Max.
Forward Voltage	V _F	660 mA	L.S.L. × 0.9	U.S.L. × 1.1
Luminous flux	Im	660 mA	L.S.L. × 0.7	U.S.L. × 1.3

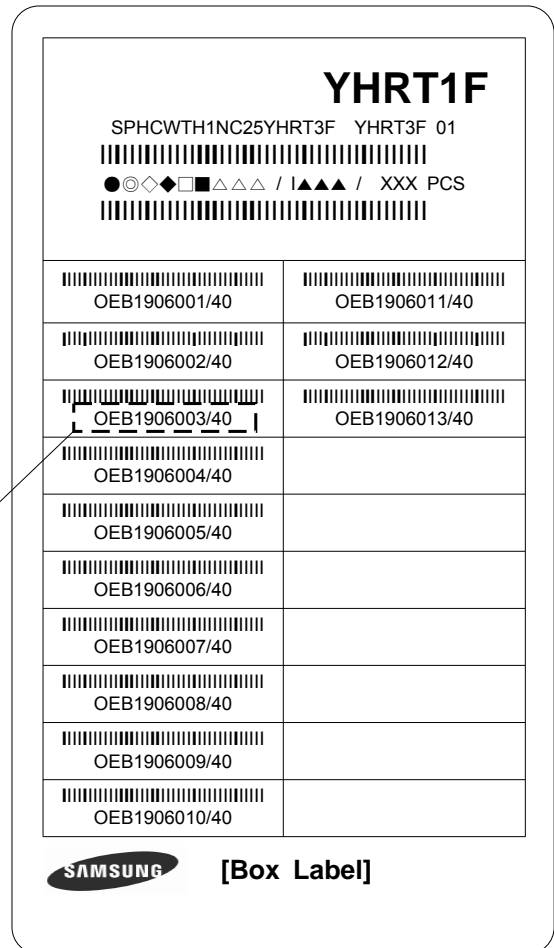
* U.S.L. : Upper Standard Level L.S.L. : Lower Standard Level

8. Label Structure

* Bag & Inner box



* Box



N.B) Denoted rank is the only example.

Rank Code

- (a)(b) : Forward Voltage (V_f) Rank (refer to page. 4)
- (c)(d) : Chromaticity Coordinate Rank (refer to page. 5)
- (e)(f) : Luminous Flux (Φ_v) Rank (refer to page. 4)



9. Lot Number

The Lot number is composed of the following characters

●◎◇◆□■△△△ / |▲▲▲ / xxx PCS

● : Production Site (S:SAMSUNG ELECTRONICS, G:Gosin China, A:Aprosystems)

◎ : L (LED)

◇ : Product State (A:Normality, B: Bulk, C:First Production, R:reproduction, S:Sample)

◆ : Year (U:2010, V:2011, W:2012, X:2013, Y:2014...)

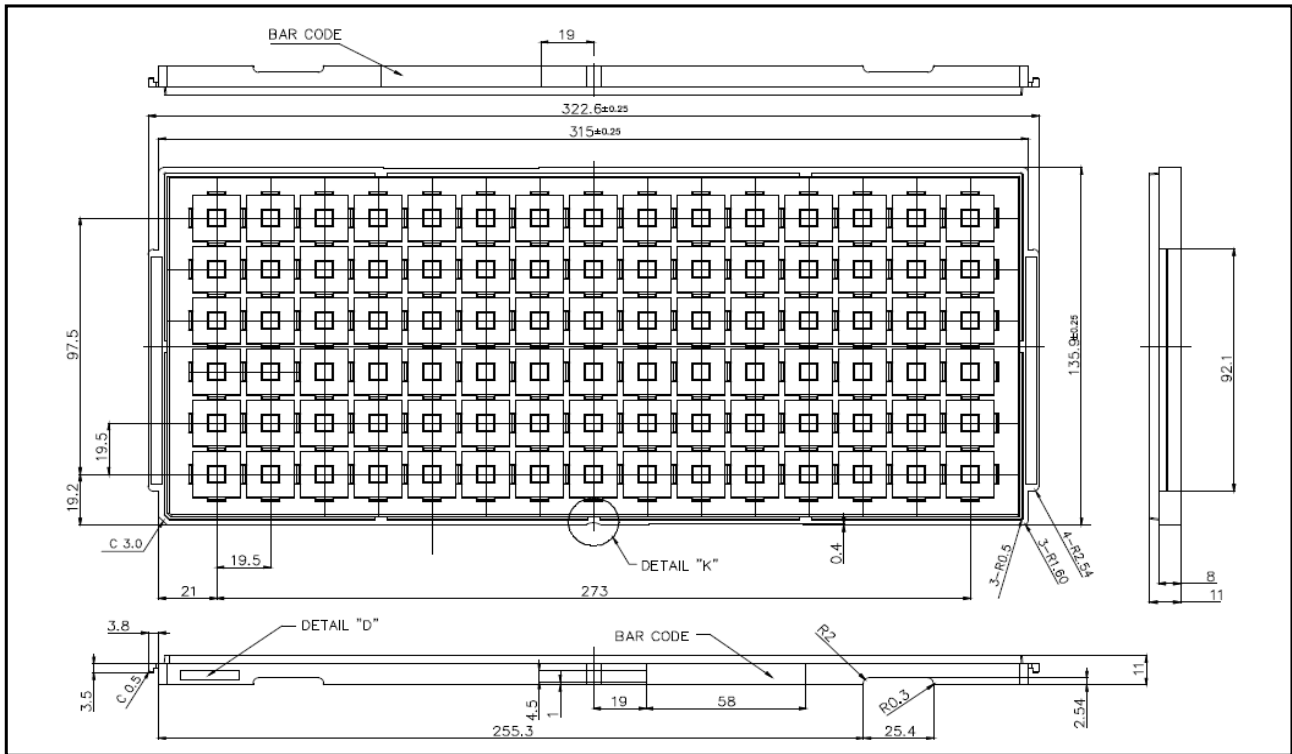
□ : Month (1 ~ 9, A~C)

■ : Day (1 ~ 9, A, B ~ V)

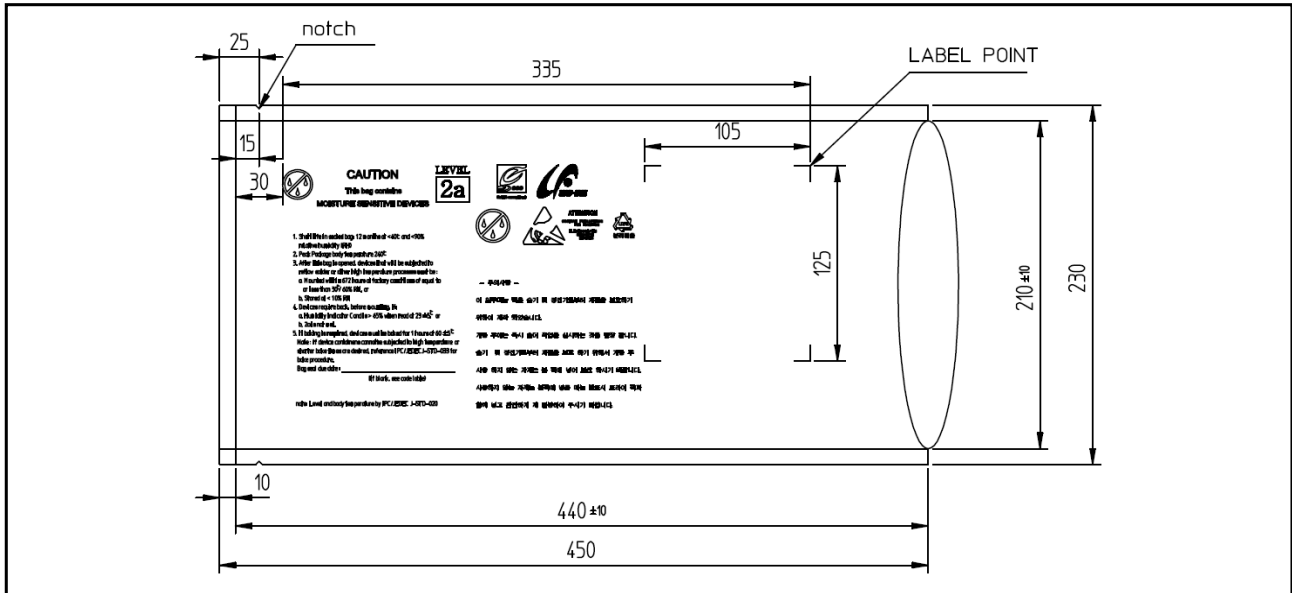
△ : SAMSUNG LED Product number (1 ~ 999)

▲ : Tray Number (1 ~ 999)

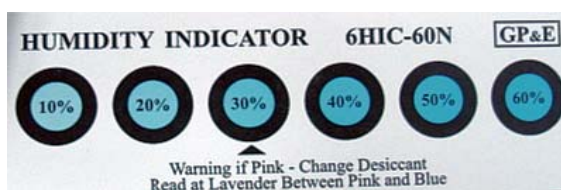
10. Tray Dimension



11. Aluminum Bag Dimension

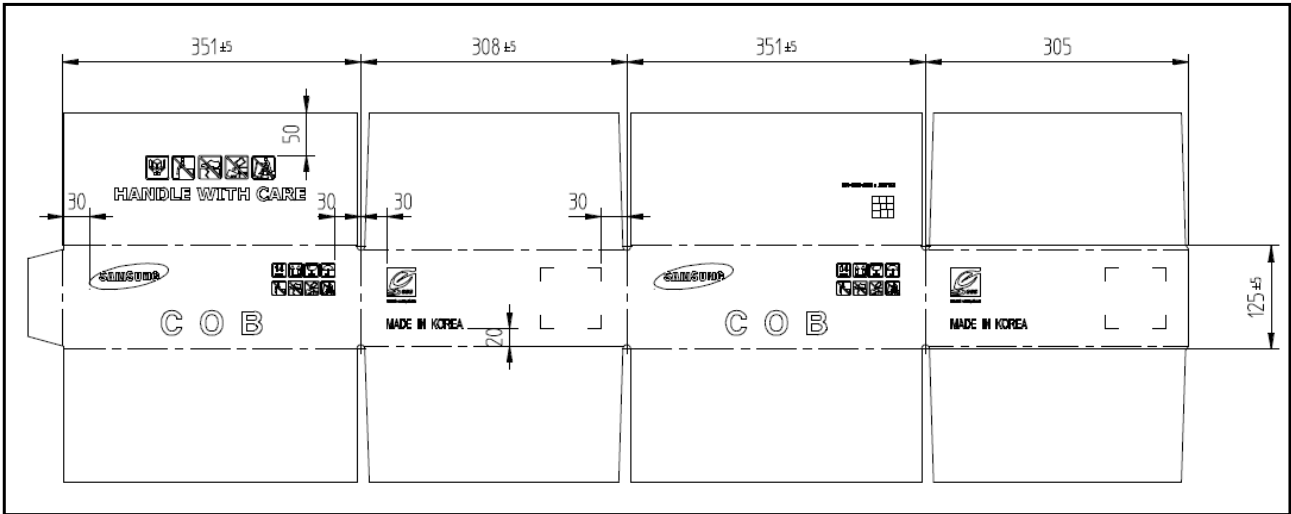


Silica gel & Humidity Indicator Card in Aluminum Bag

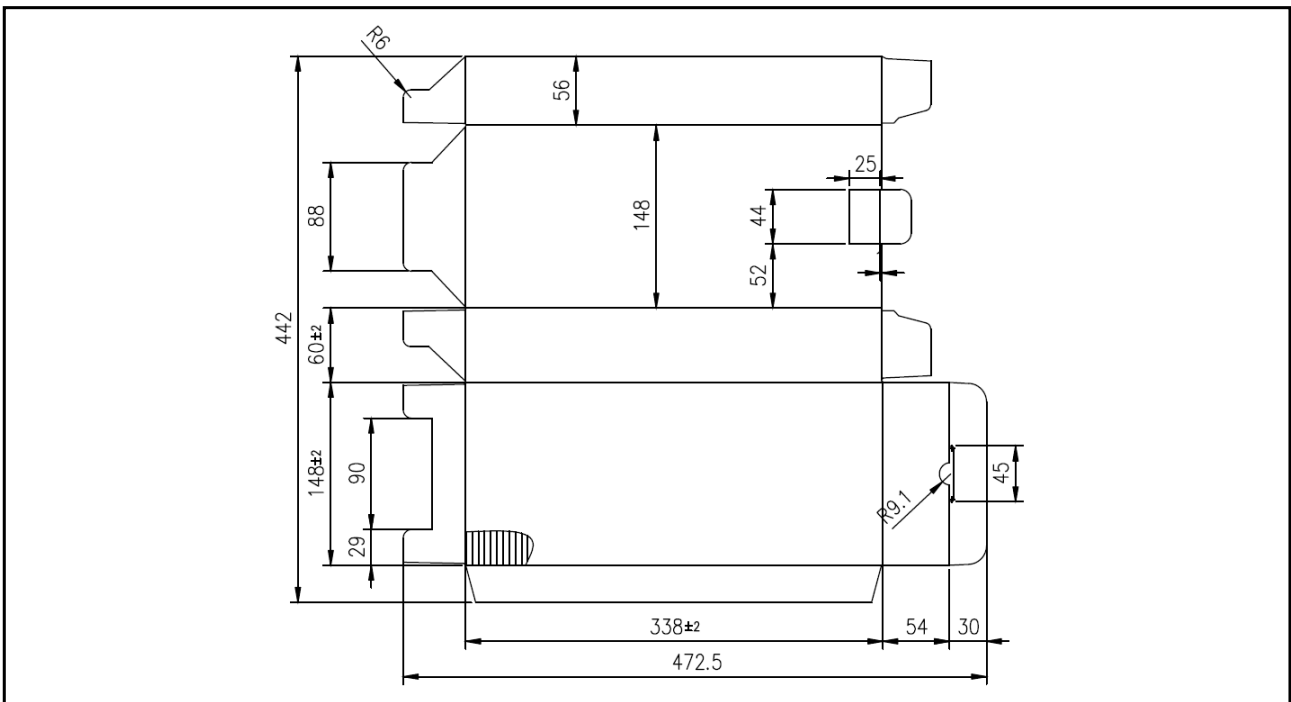


12. Box & Pad Dimension

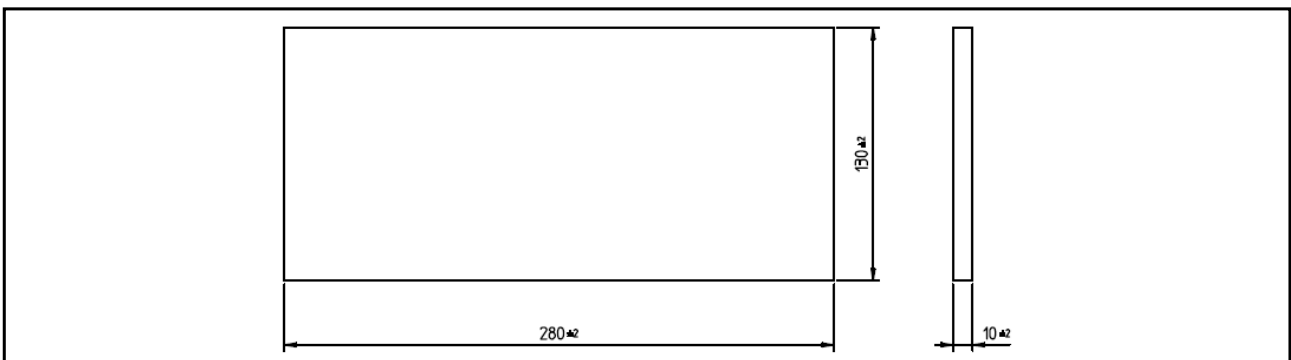
1) Out BOX



2) Inner BOX



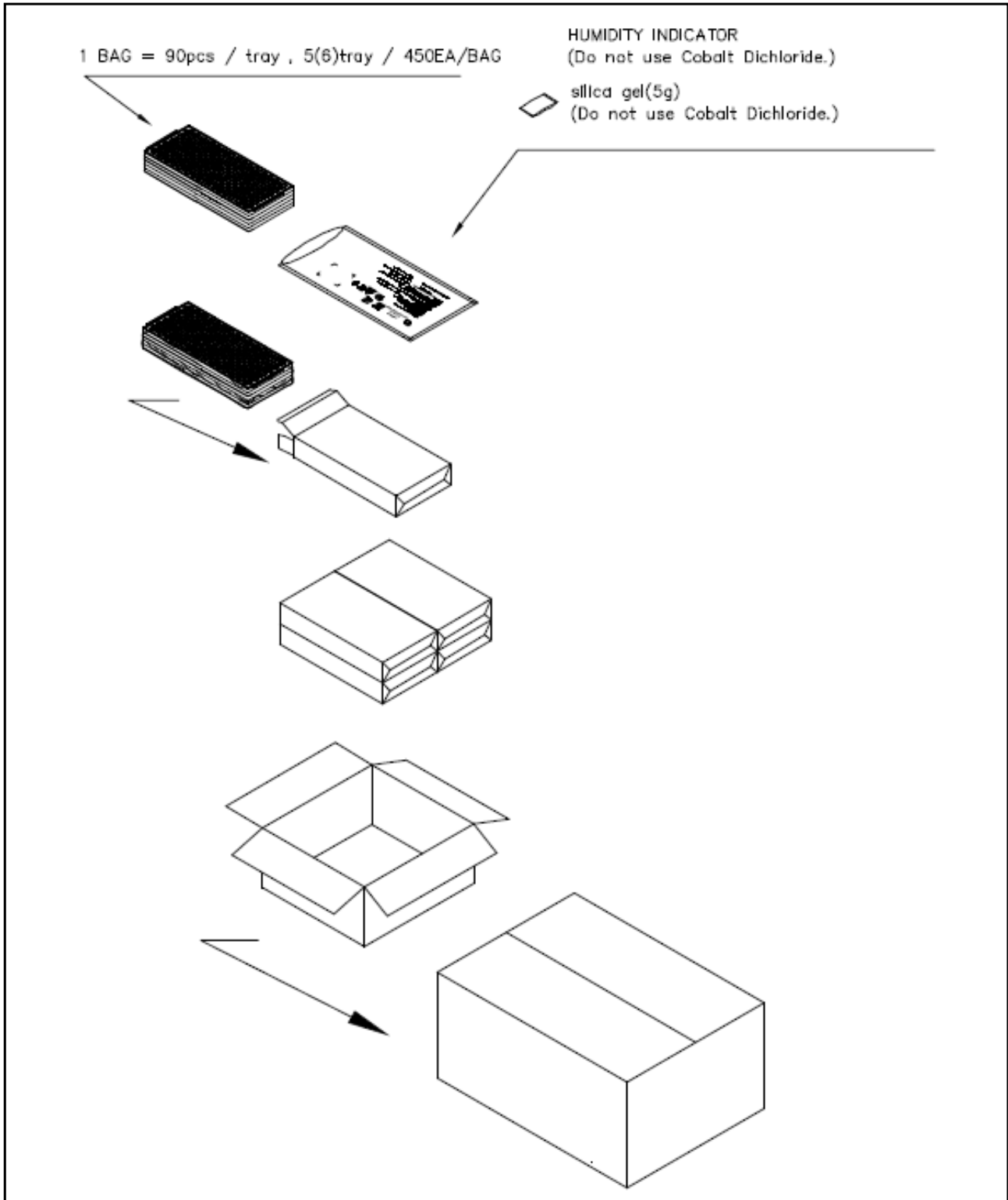
3) Pe-foam PAD



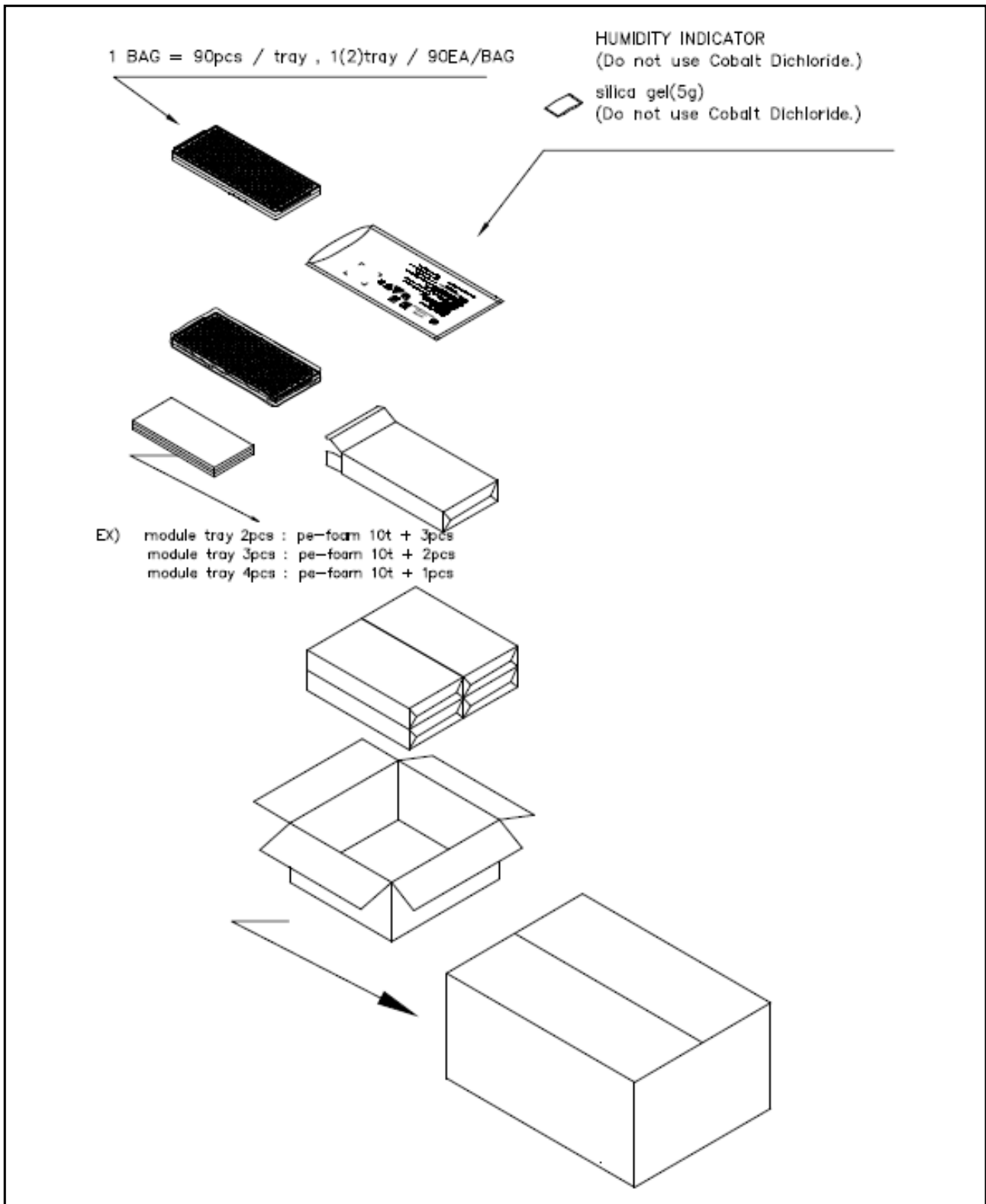
13. Packing Structure

1-1). Tray Packing (When 5 Trays)

Max Amount(pcs)		
Tray	Al Bag	Box
90	450	1800



1-2). Tray Packing (When Less than 5 Trays)



- EX) Module tray 2pcs : Pe-foam(10t) * 3pcs
- Module tray 3pcs : Pe-foam(10t) * 2pcs
- Module tray 4pcs : Pe-foam(10t) * 1pcs

14. Precaution for use

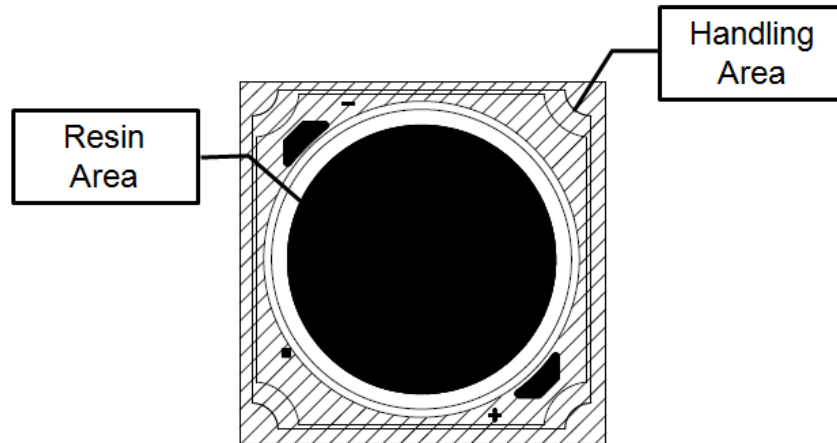
- 1) Shelf life in sealed bag : 12 months at $< 40^{\circ}\text{C}$ and $< 90\%$ relative humidity(RH)
- 2) Peak package body temperature : 240°C .
- 3) After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be :
 - a. Mounted within 672 hours at factory conditions of equal to or less than 30°C / 60% RH, or
 - b. Stored at $< 10\%$ RH
- 4) Devices require bake, before mounting, if :
 - a. Humidity Indicator Card is $> 65\%$ when read at $23 \pm 5^{\circ}\text{C}$, or
 - b. 2a is not met.
- 5) If baking is required, devices must be baked for 1 hours at $60 \pm 5^{\circ}\text{C}$
Note : If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC / JEDEC J-STD-033 for bake procedure.
- 6) The LEDs are sensitive to the static electricity and surge current.
It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.

Damaged LEDs may show some unusual characteristics such as increase in leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

7) Please do not following behavior in resin area.

(Handling, Pressing, Touching, Rubbing, Contacting tweezers, Cleaning)

But it's ok in handling area.



8) VOCs (volatile organic compounds) may be occurred by adhesives, flux, hardener or organic additives which is used in luminaires (fixture) and LED silicone bags are permeable to it. It may lead a discoloration when LED expose to heat or light.

This phenomenon can give a significant loss of light emitted(output) from the luminaires (fixtures).

In order to prevent these problems, we recommend you to know the physical properties for the materials used in luminaires, It requires to select carefully.