Rev : 006

Product Family Data Sheet

LC040B – COB(Chip On Board) LED

Introduction

Features

- 40W COB LED : 21.5 x 21.5 x t 1.9 (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

Contents

1. Absolute Maximum Rating

1) Operation Forward Current (T_a = 25°C) 1,620mA
2) LED Junction Temperature (T_J) ..... 150°C
3) Operating Temperature Range (T_{opr}) ..... -40°C ~ 105°C
4) Storage Temperature Range (T_{stg}) ..... -40°C ~ 120°C
5) Power Dissipation (P_D) 60W

2. Characteristics

1) Electro-Optical characteristics (T_a : 25°C)

Item	Unit	Condition	Rank			Min	Typ	Max
Luminous Flux[1]	lm[2]	I_F = 1,080 mA	2700K	4J	41	3695	-	4050
					42	4050	-	4400
					43	4400	-	4750
					44	4750	-	5100
			3000K	4J	41	3810	-	4175
					42	4175	-	4535
					43	4535	-	4895
					44	4895	-	5255
			3500K	4J	41	3960	–	4340
					42	4340	–	4720
					43	4720	–	5100
					44	5100	–	5480
			4000K	4J	41	4075	-	4465
					42	4465	-	4855
					43	4855	-	5245
					44	5245	-	5635
			5000K	4J	41	4115	-	4505
					42	4505	-	4900
					43	4900	-	5295
					44	5295	-	5690
Forward Voltage	V[3]	I_F = 1,080 mA	YH			32.5	35.5	38.5
CRI[4]		I_F = 1,080 mA	-			80	-	-
Thermal Resistance ($R_{th,j-c}$)	℃/W	–	–				0.8	
View Angle	°	I_F = 1,080 mA	-			-	115°	-

Note :

1) Samsung LED tested in pulsed condition. T_J=25°C, pulse width is 10ms at rated test current.
2) Samsung LED has ±7% tolerance of flux measurements.
3) Samsung LED has ±5% tolerance of forward voltage measurements.
4) Samsung LED has ±1 tolerance of CRI measurements.

3. Binning Structure

(Condition : I_F = 1,080 mA, T_a : 25°C)

1) VF Binning

CCT	Product Code	VF Rank	VF (V)		
			Min	Typ	Max
2700K	SPHWW1HDNE25**YH**W34J	YH	32.5	35.5	38.5
3000K	SPHWW1HDNE25**YH**V34J	YH	32.5	35.5	38.5
3500K	SPHWW1HDNE25**YH**U34J	YH	32.5	35.5	38.5
4000K	SPHWW1HDNE25**YH**T34J	YH	32.5	35.5	38.5
5000K	SPHCW1HDNE25**YH**RT4J	YH	32.5	35.5	38.5

2) Color Binning

CCT	Product Code	Color Rank	Chromaticity Bins
2700K	SPHWW1HDNE25YH**W3**4J	W3	WA
3000K	SPHWW1HDNE25YH**V3**4J	V3	VA
3000K	SPHWW1HDNE25YH**U3**4J	U3	UA
4000K	SPHWW1HDNE25YH**T3**4J	T3	TA
5000K	SPHCW1HDNE25YH**RT**4J	RT	RW, RX, RY, RZ

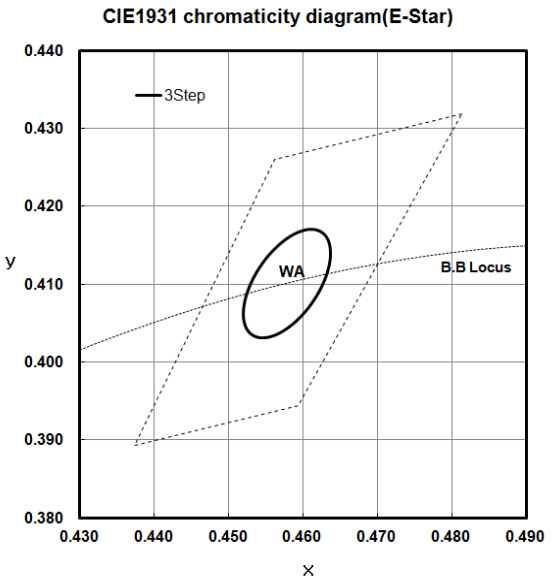
3) Luminous Flux Binning

CCT	Product Code	Flux Rank	Flux Bin	Range (lm)		
				Min	Typ	Max
2700K	SPHWW1HDNE25YHW3**4J**	4J	41	3695	-	4050
			42	4050	-	4400
			43	4400	-	4750
			44	4750	-	5100
3000K	SPHWW1HDNE25YHV3**4J**	4J	41	3810	-	4175
			42	4175	-	4535
			43	4535	-	4895
			44	4895	-	5255
3000K	SPHWW1HDNE25YHU3**4J**	4J	41	3960	–	4340
			42	4340	–	4720
			43	4720	–	5100
			44	5100	–	5480
4000K	SPHWW1HDNE25YHT3**4J**	4J	41	4075	-	4465
			42	4465	-	4855
			43	4855	-	5245
			44	5245	-	5635
5000K	SPHCW1HDNE25YHRT**4J**	4J	41	4115	-	4505
			42	4505	-	4900
			43	4900	-	5295
			44	5295	-	5690

4. Chromaticity Coordinates

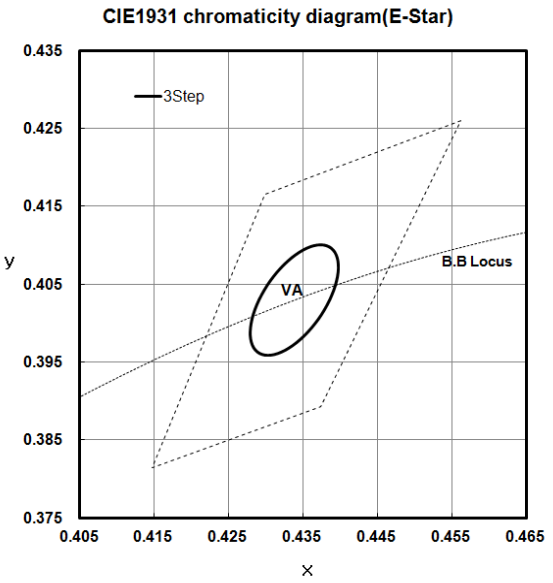
(Condition : I_F = 1.080 mA, T_a : 25°C)

1) 2700K



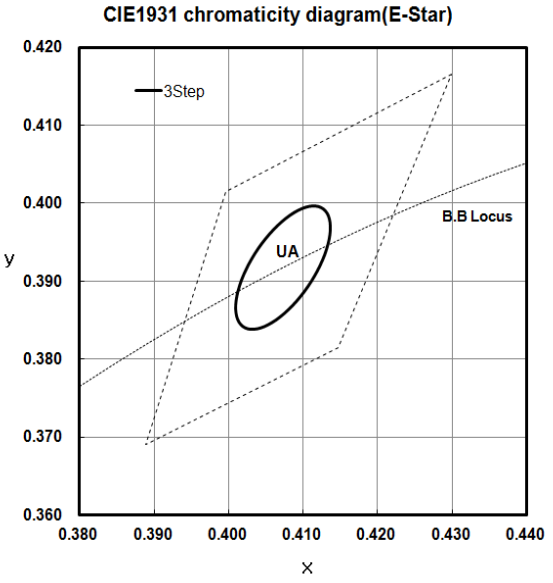
Macadam Ellipse 3step (WA)				
x	y	θ	a	b
0.4578	0.4101	53.7	0.0081	0.0042

2) 3000K



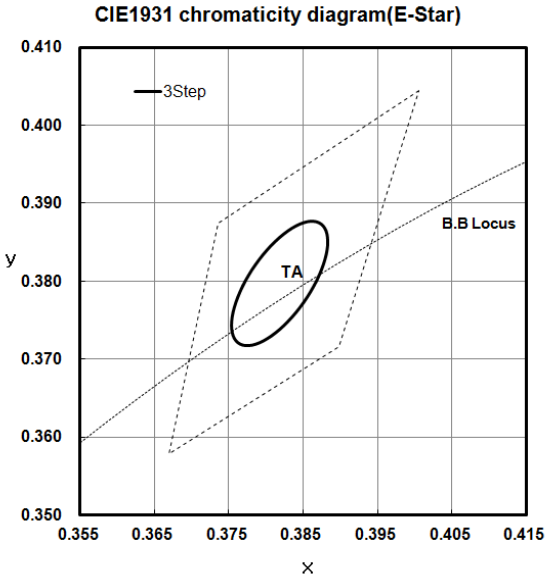
Macadam Ellipse 3step (VA)				
x	y	θ	a	b
0.4338	0.4030	53.22	0.0083	0.0041

3) 3500K



Macadam Ellipse 3step (UA)				
x	y	θ	a	b
0.4037	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

5) 5000K

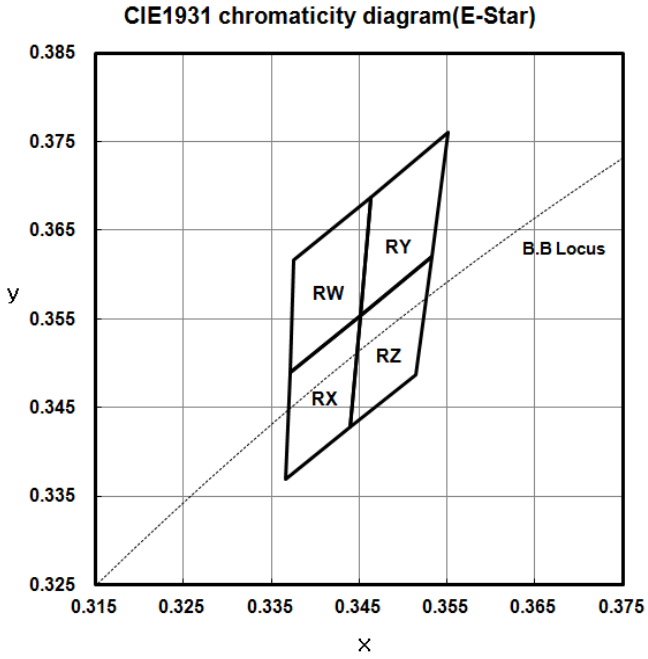


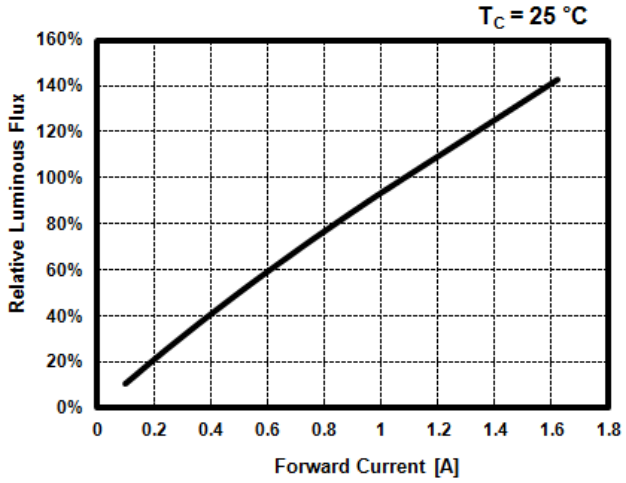
Table	CIE X	CIE Y
RW	0.3376	0.3616
	0.3463	0.3687
	0.3451	0.3554
	0.3371	0.3490
RX	0.3371	0.3490
	0.3451	0.3554
	0.3440	0.3428
	0.3366	0.3369
RY	0.3463	0.3687
	0.3551	0.3760
	0.3533	0.3620
	0.3451	0.3554
RZ	0.3451	0.3554
	0.3533	0.3620
	0.3515	0.3487
	0.3440	0.3428

Note :

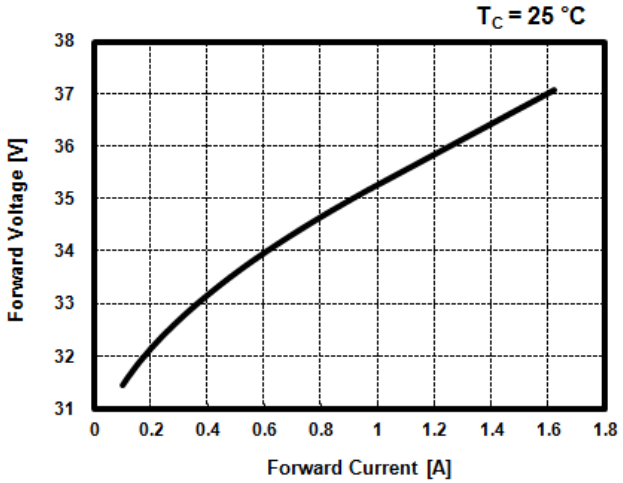
1) The Chromaticity Coordinates refers to ANSI C78.377-2008
2) Samsung LED has ±0.005 tolerance of chromaticity(x,y).

5. Typical Characteristics Graph

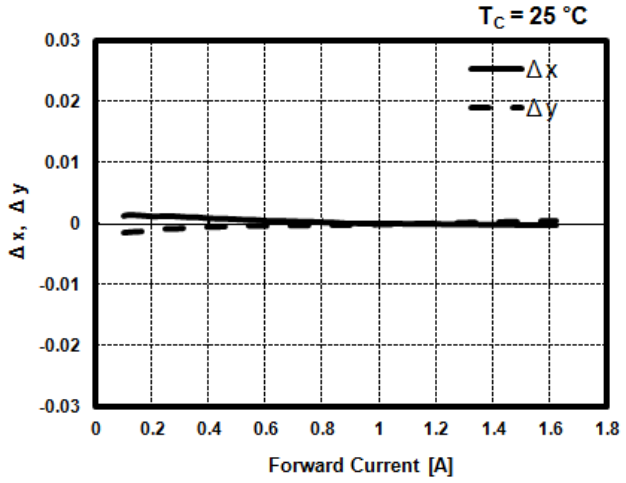
Forward Current vs. Relative Luminous Flux



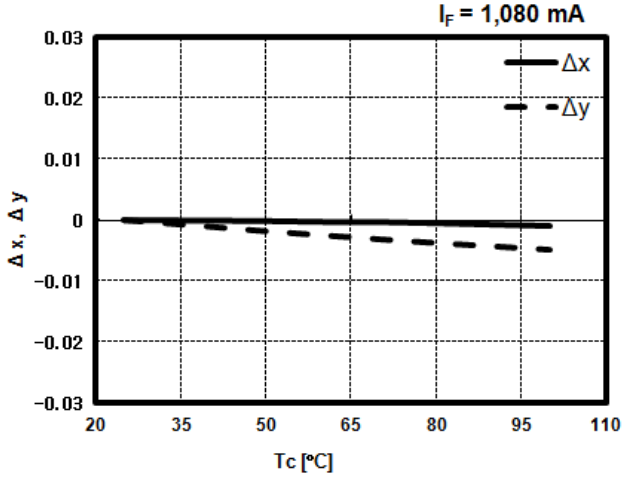
Forward Current vs. Forward Voltage



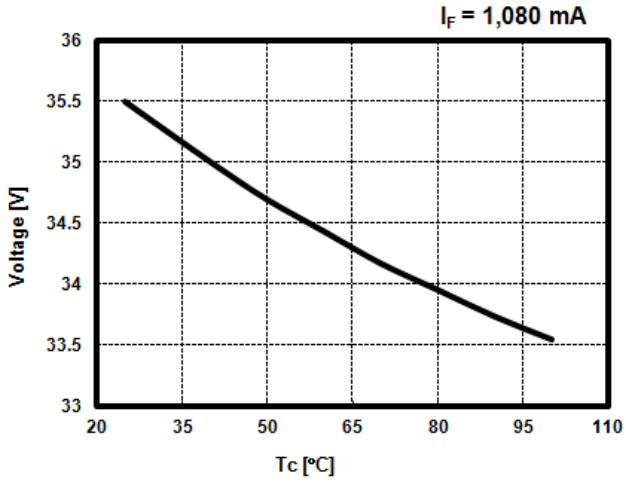
Forward current vs. Chromaticity Coordination



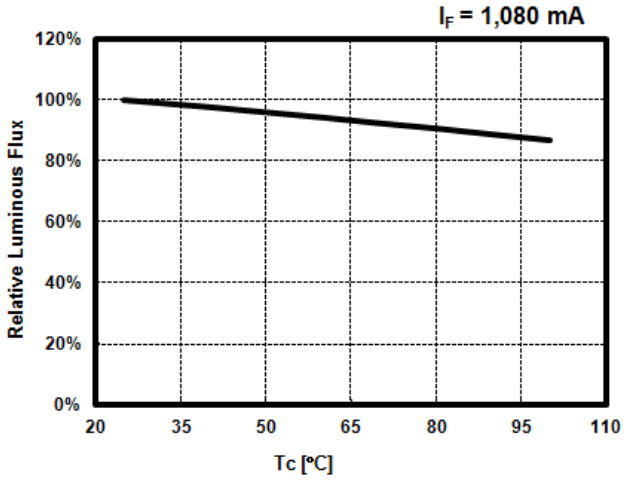
Temperature vs. Chromaticity Coordination



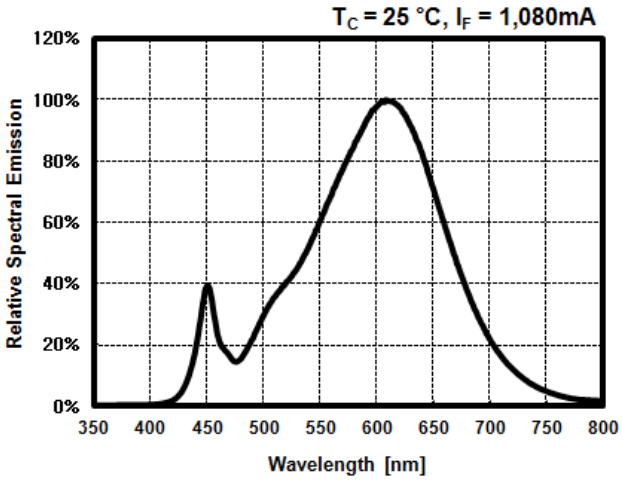
Temperature vs. Voltage



Temperature vs. Relative Luminous Flux



Relative Spectral Emission



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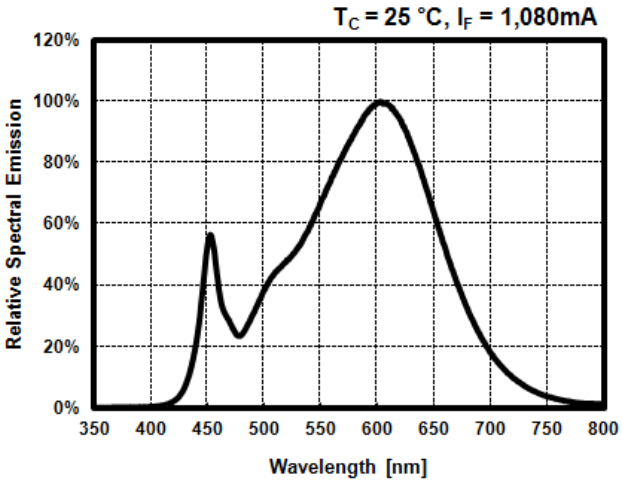

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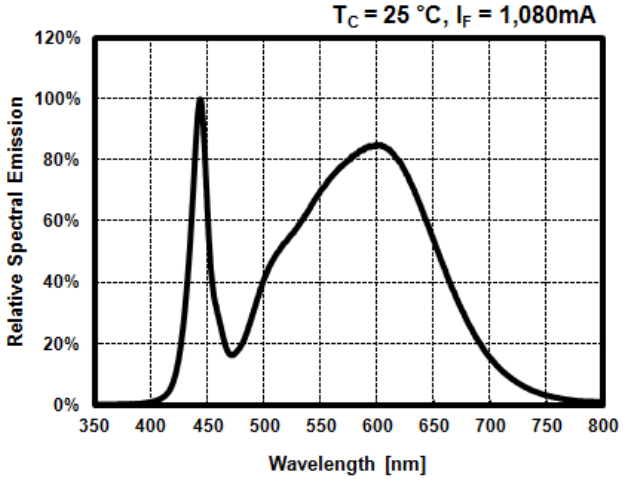
<3500K>



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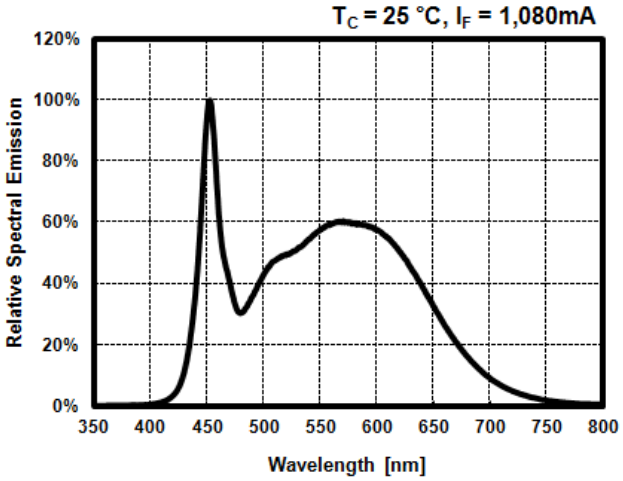
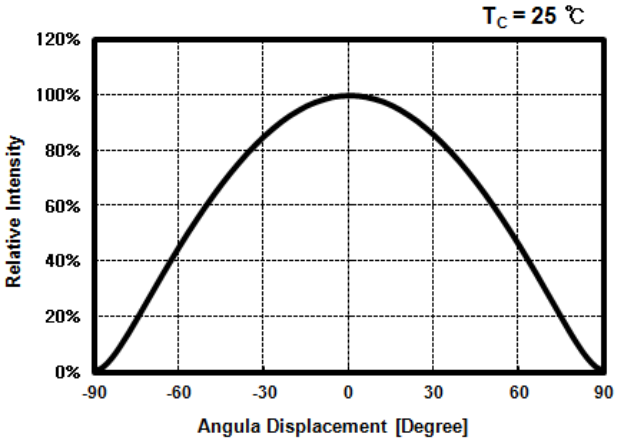
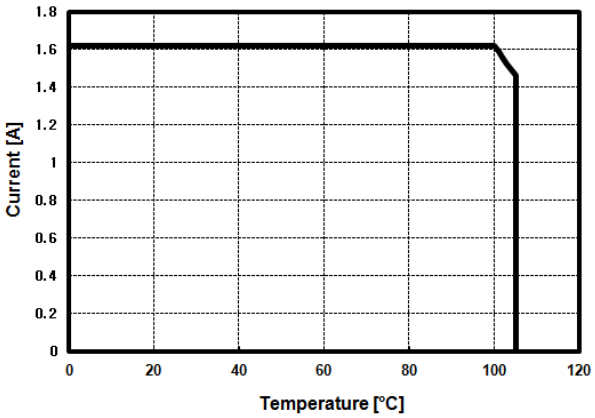


<5000K>

Radiation Pattern



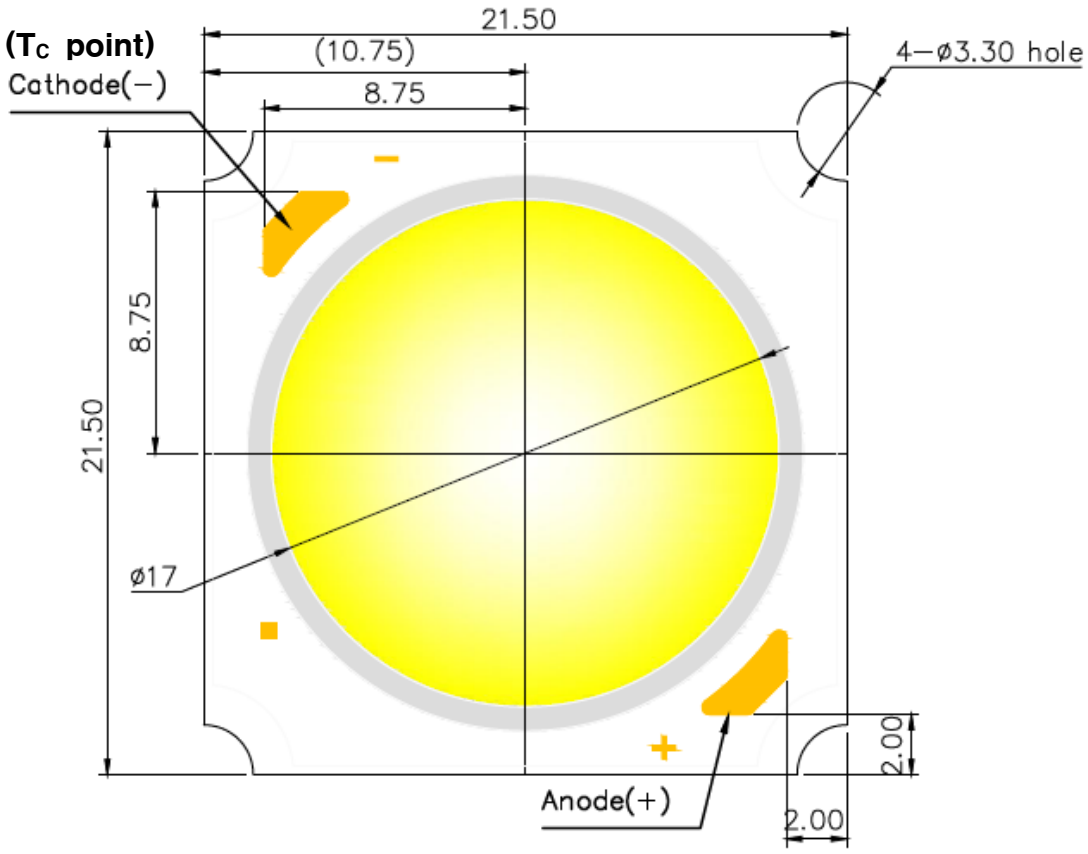
Derating Curve

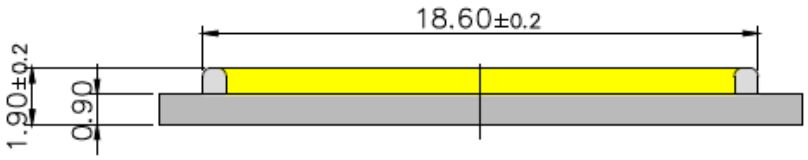


6. Outline Drawing & Dimension

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 1620 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 1080 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 ㏁, R2 : 1.5 ㏀, C : 100 pF	5 times (± 5 kV)
ESD(MM)	R1 : 10 ㏁, R2 : 0 ㏀, C : 200 pF	5 times (± 0.5 kV)
Vibration	20~80㎐(Displacement:0.06inch, Max 20G) 80~2㎑ (Max 20G) Min. Frequency ↔ Max. Frequency 4min transfer	4 times
Shock	1500G, 0.5ms, Every 6faces (3axis X 2faces)	5 times
Salt Spray	35°C, salt water 5% 8h spray → 16h leaving alone	2 cycles

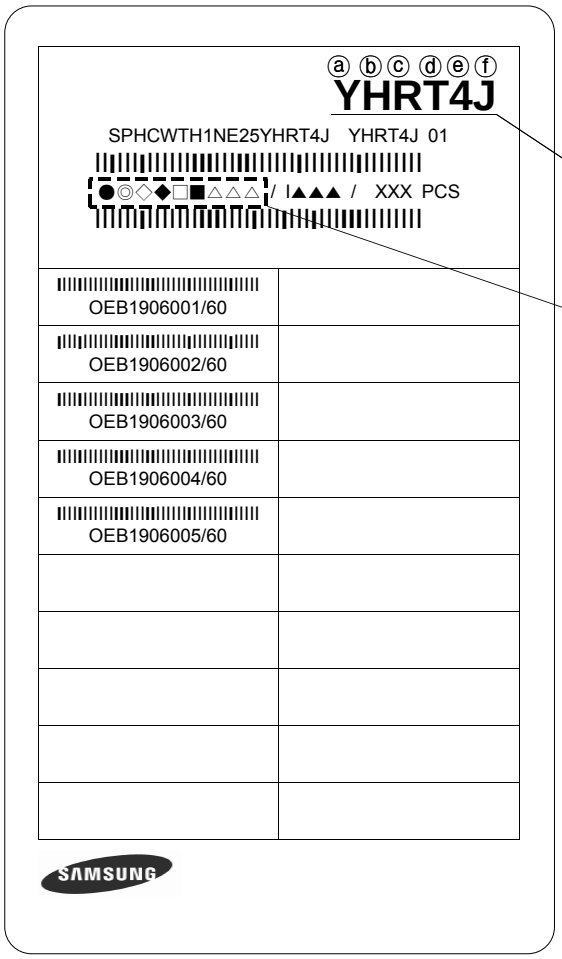
2) Criteria for Failure

Item	Symbol	Test Condition [T_a = 25°C]	Limit	
			Min.	Max.
Forward Voltage	V_F	1620 mA	L.S.L. × 0.9	U.S.L. × 1.1
Luminous flux	Im	1620 mA	L.S.L. × 0.7	U.S.L. × 1.3

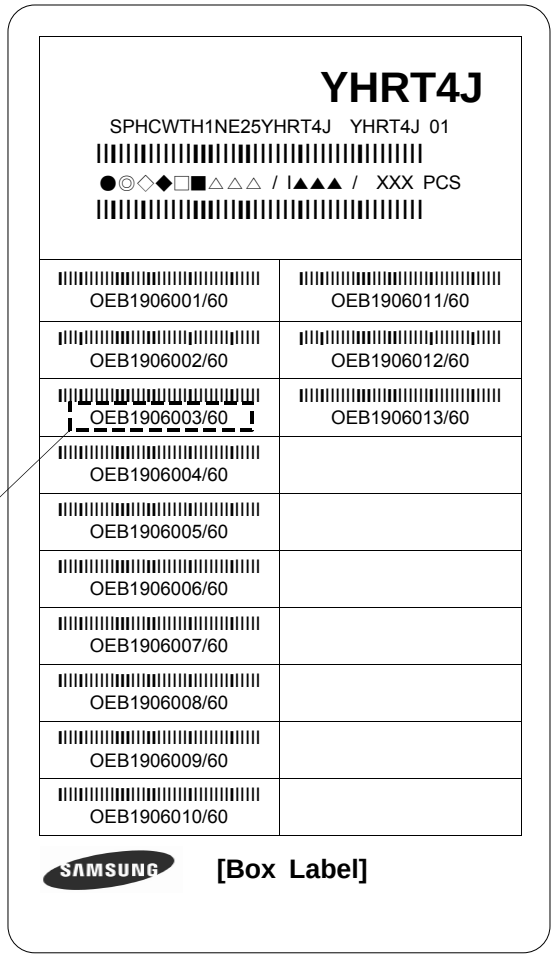
* U.S.L. : Upper Standard Level L.S.L. : Lower Standard Level

8. Label Structure

* Bag & Inner box



* Box



Rank Code

Lot number

Tray number /Q'ty

[Box Label]

N.B) Denoted rank is the only example.

Rank Code

ⓐⓑ : Forward Voltage (V_F) Rank (refer to page. 4)

ⓒⓓ : Chromaticity Coordinate Rank (refer to page. 5)

ⓔⓕ : Luminous Flux (Φ_V) Rank (refer to page. 4)

9. Lot Number

The Lot number is composed of the following characters

●◎◇◆□■△△△ / I▲▲▲ / 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...)

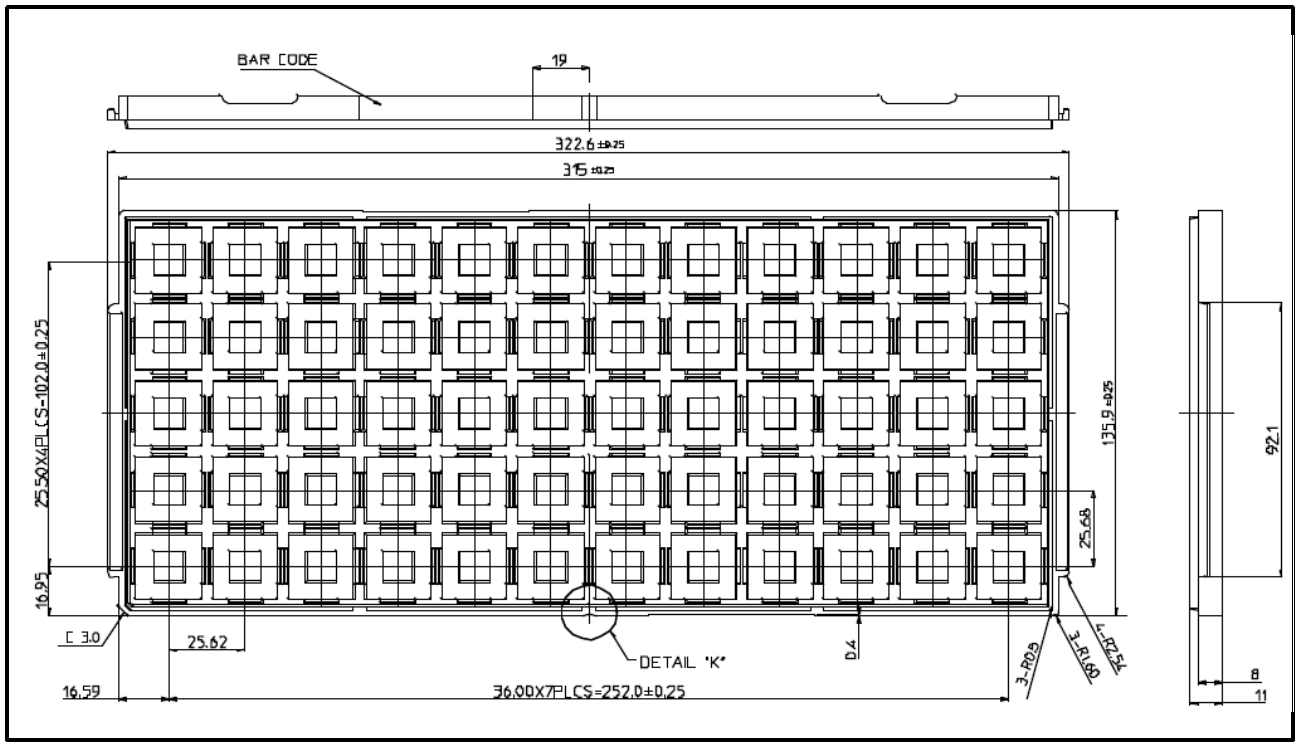
□ : Month (1 ~ 9, A~C)

■ : Day (1 ~ 9, A, B ~ V)

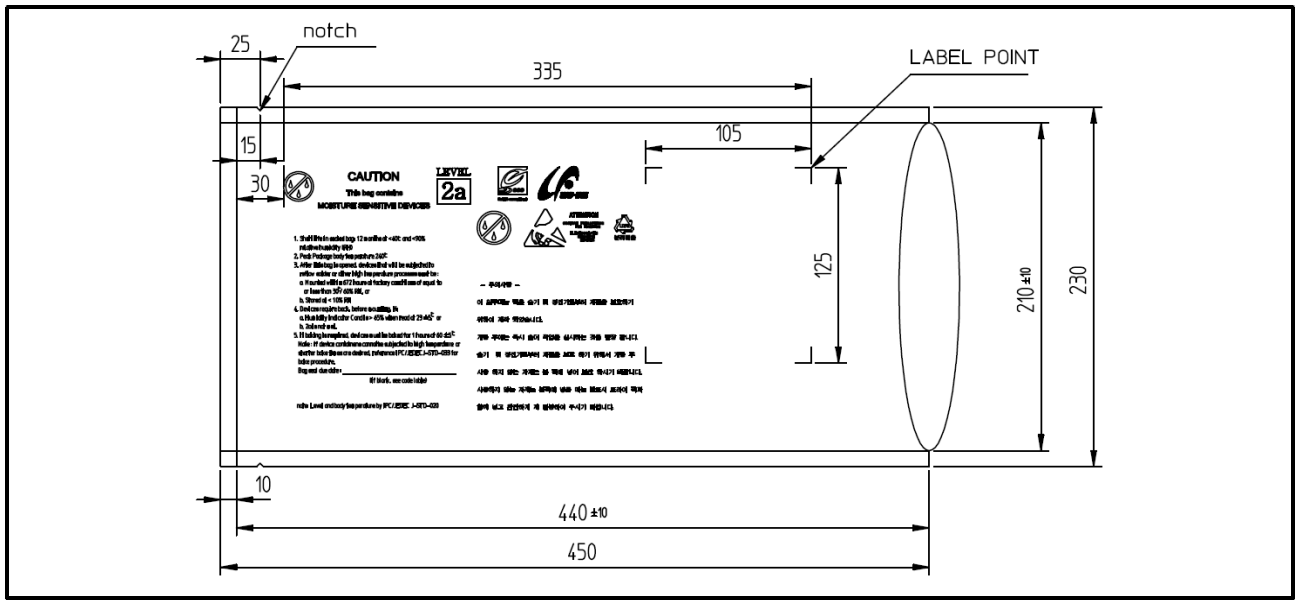
△ : SAMSUNG LED Product number (1 ~ 999)

▲ : Tray Number (1 ~ 999)

10. Tray Dimension



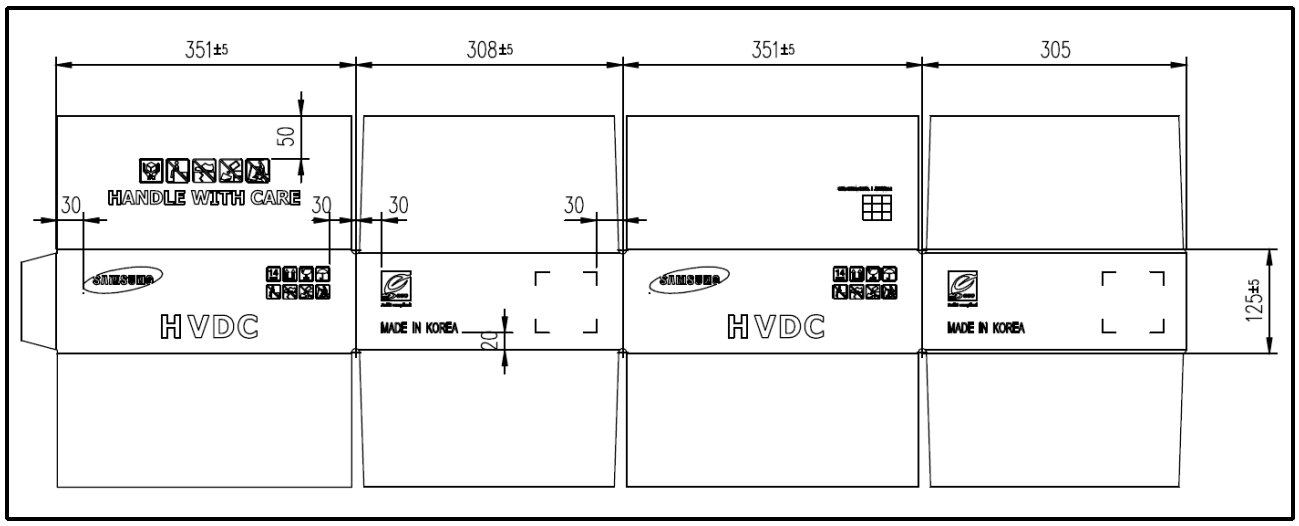
11. Aluminum Bag Dimension



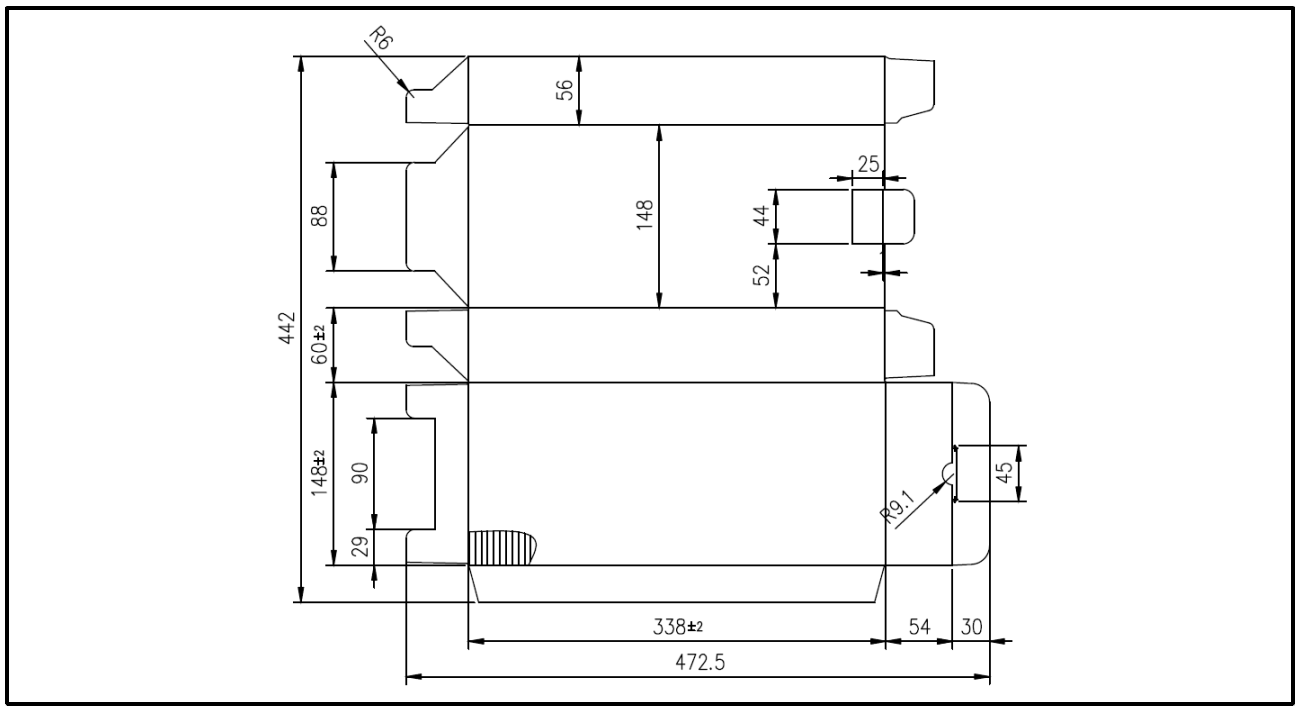
Silica gel & Humidity Indicator Card in Aluminum Bag

12. Box & Pad Dimension

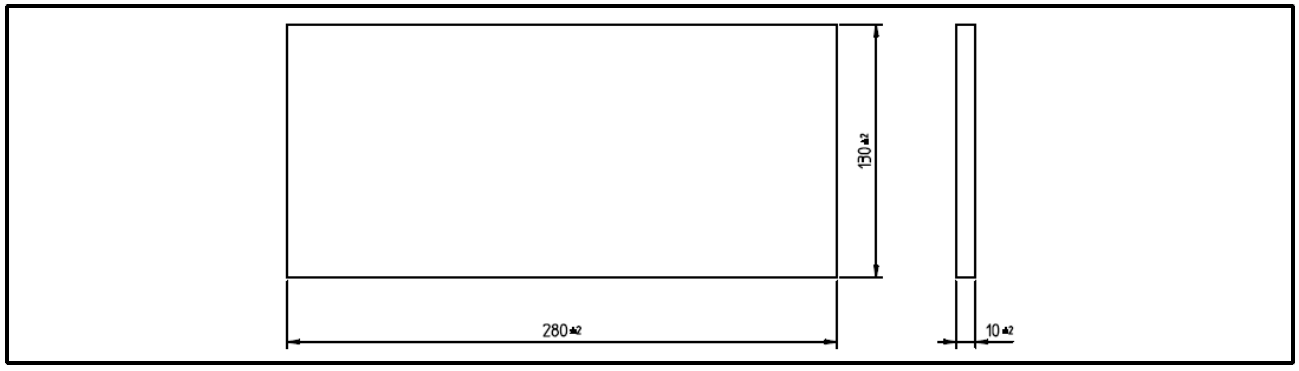
1) Out BOX



2) Inner BOX



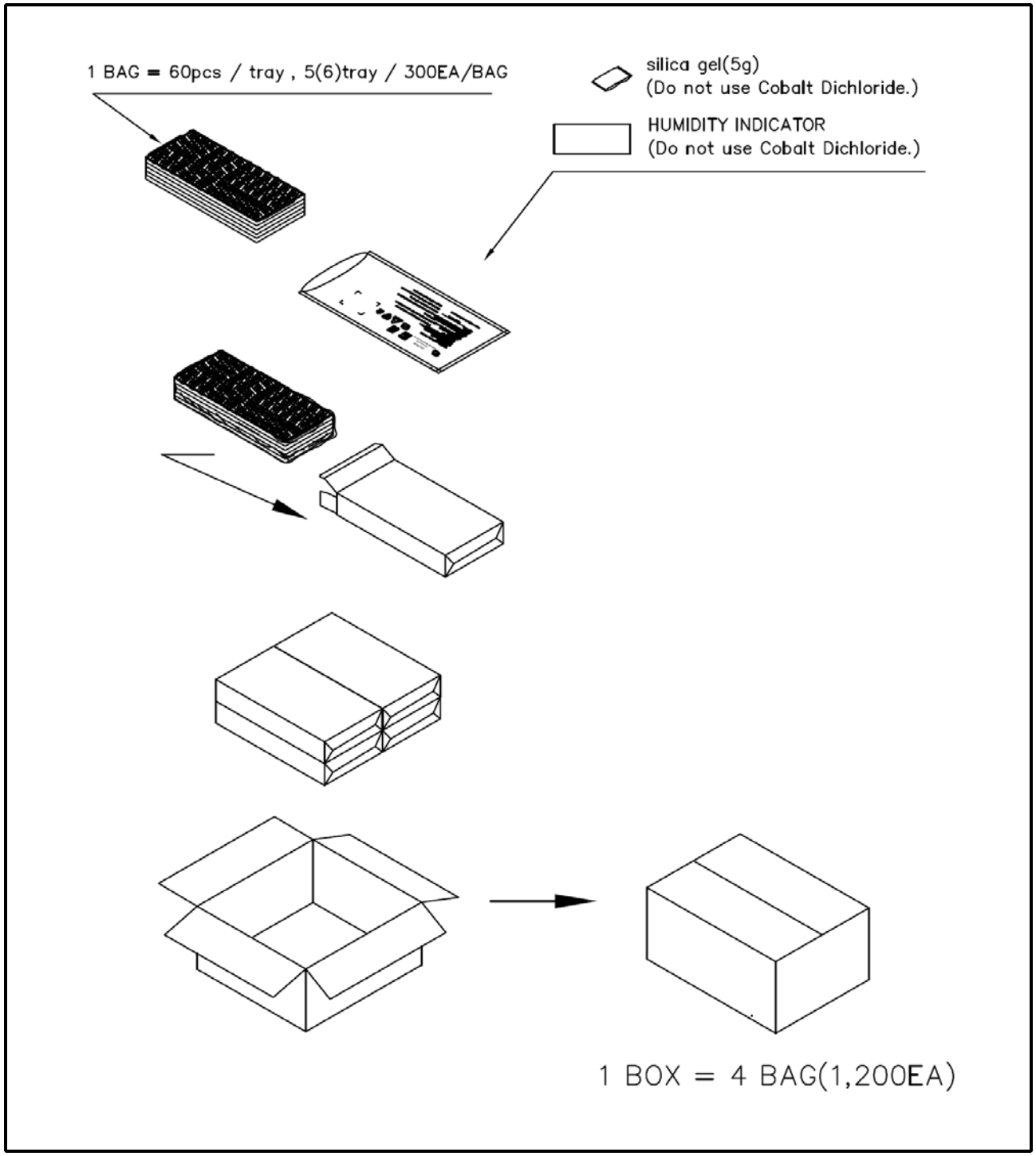
3) Pe-foam PAD



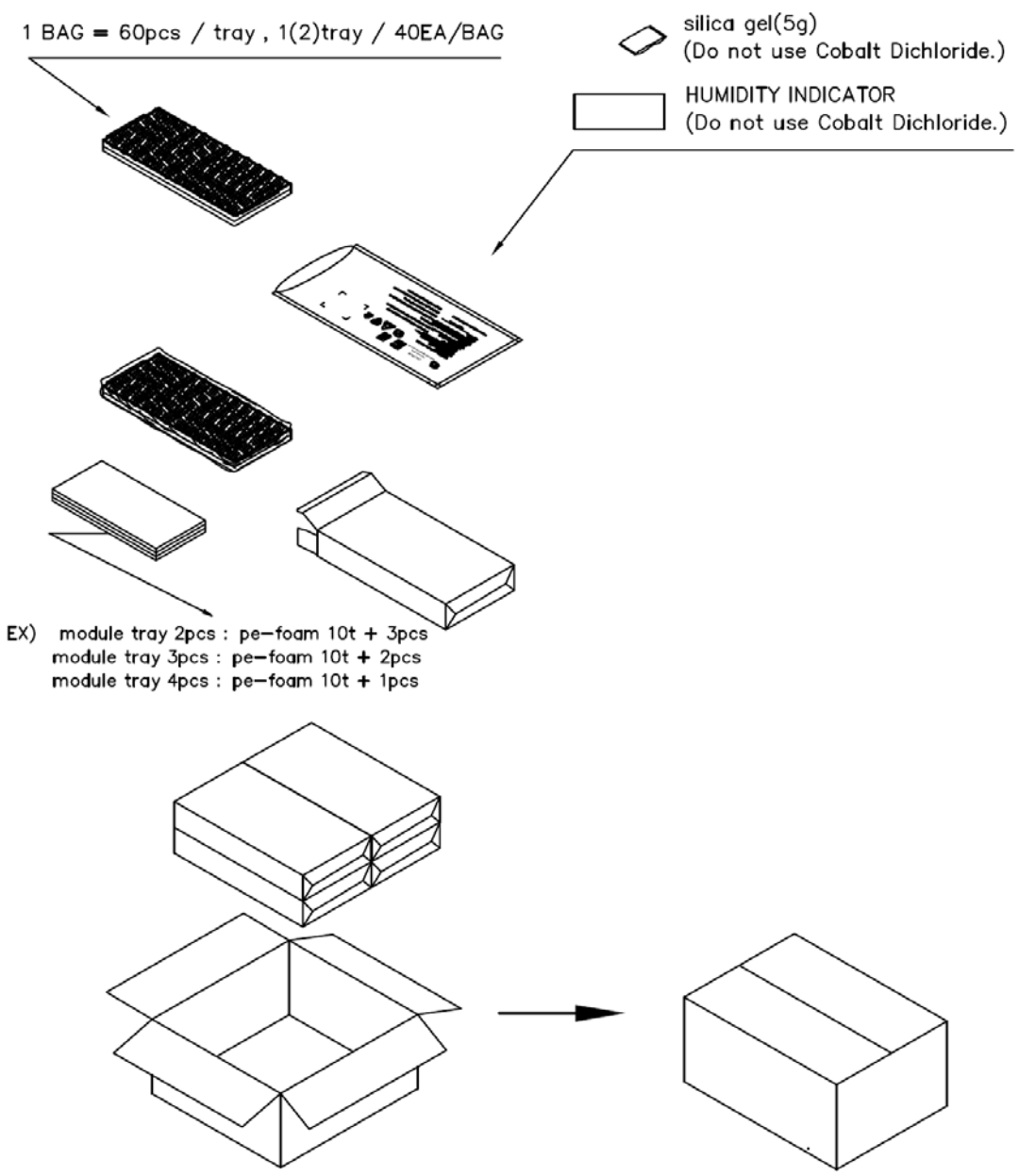
13. Packing Structure

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

Max Amount(pcs)		
Tray	Al Bag	Box
60	300	1200



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˚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

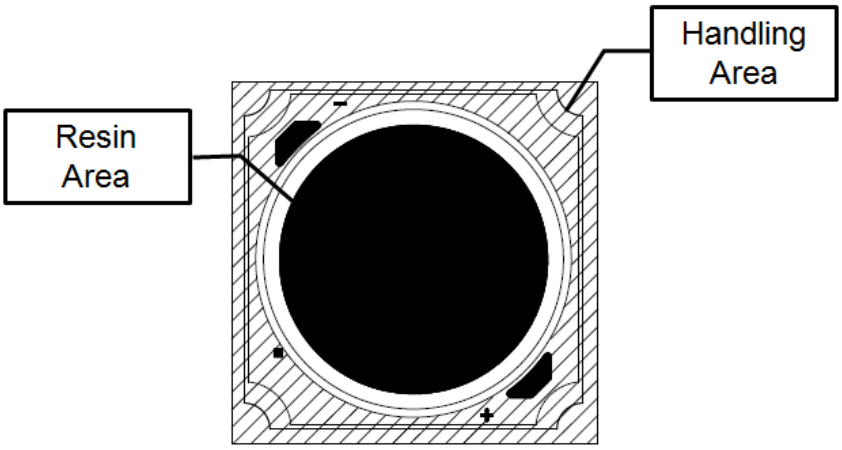
4) Devices require bake, before mounting, if :
   a. Humidity Indicator Card is > 65% when read at 23 ± 5˚C, or
   b. 2a is not met.

5) If baking is required, devices must be baked for 1 hours at 60 ± 5˚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.

Revision History
(LC040B)

Date	Revision History	Writer	
		Drawn	Approved
2013.10.07	1st Version	HH.KIM	HK.KIM
2013.10.21	2nd Version	HH.KIM	HK.KIM
2013.10.31	3rd Version	HH.KIM	HK.KIM
2013.12.18	4th Version	HH.KIM	MY.SON
2014.01.08	5th Version	HH.KIM	MY.SON
2014.02.19	6th Version	HH.KIM	MY.SON

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