

CUSTOMER : \_\_\_\_\_.

DATE : May 25, 2014 .

REV : REV. 0.1 .

# PRODUCT FAMILY DATA SHEET



**40W COB**

MODEL NAME : LEMWM28C80 Series



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# 1. Features

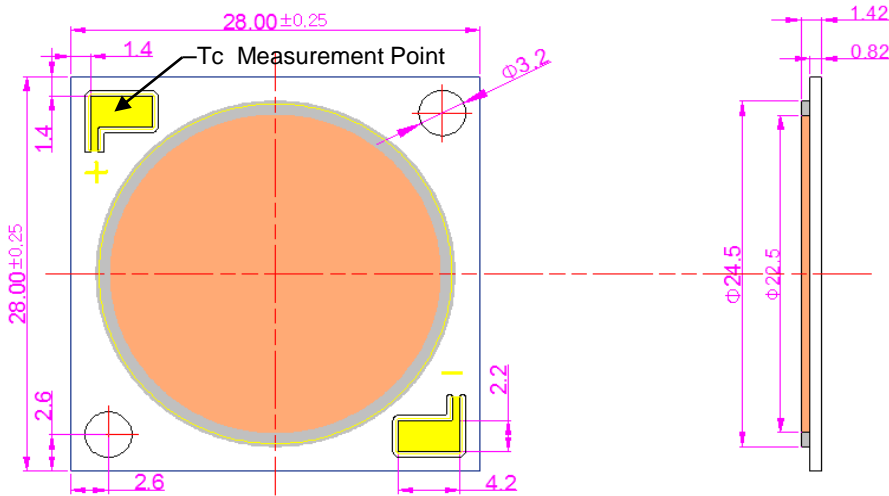
- External Dimensions 28.0×28.0×1.42mm (L × W × H)
- Internal Structure : Aluminum Base Chip on Board
- Compact High Flux Density Light Source
- Uniform High Quality Illumination
- ESD Withstand Voltage: Up to 2kV According to JESD22-A 114
- Energy Star / ANSI Compliant Color Binning Structure with 2SDCM
- RoHS Compliant

# 2. Applications

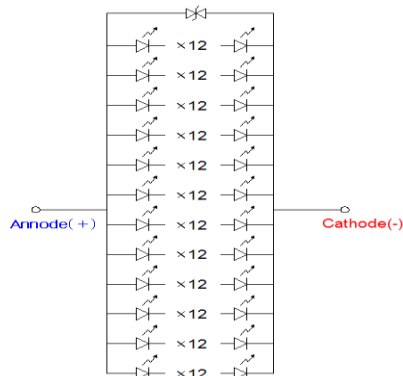
- Bulb, Downlight, Spotlight, High Bay Light, Flood Light, Outdoor Light

# 3. Outline Dimensions

( unit : mm )



## Circuit Diagram



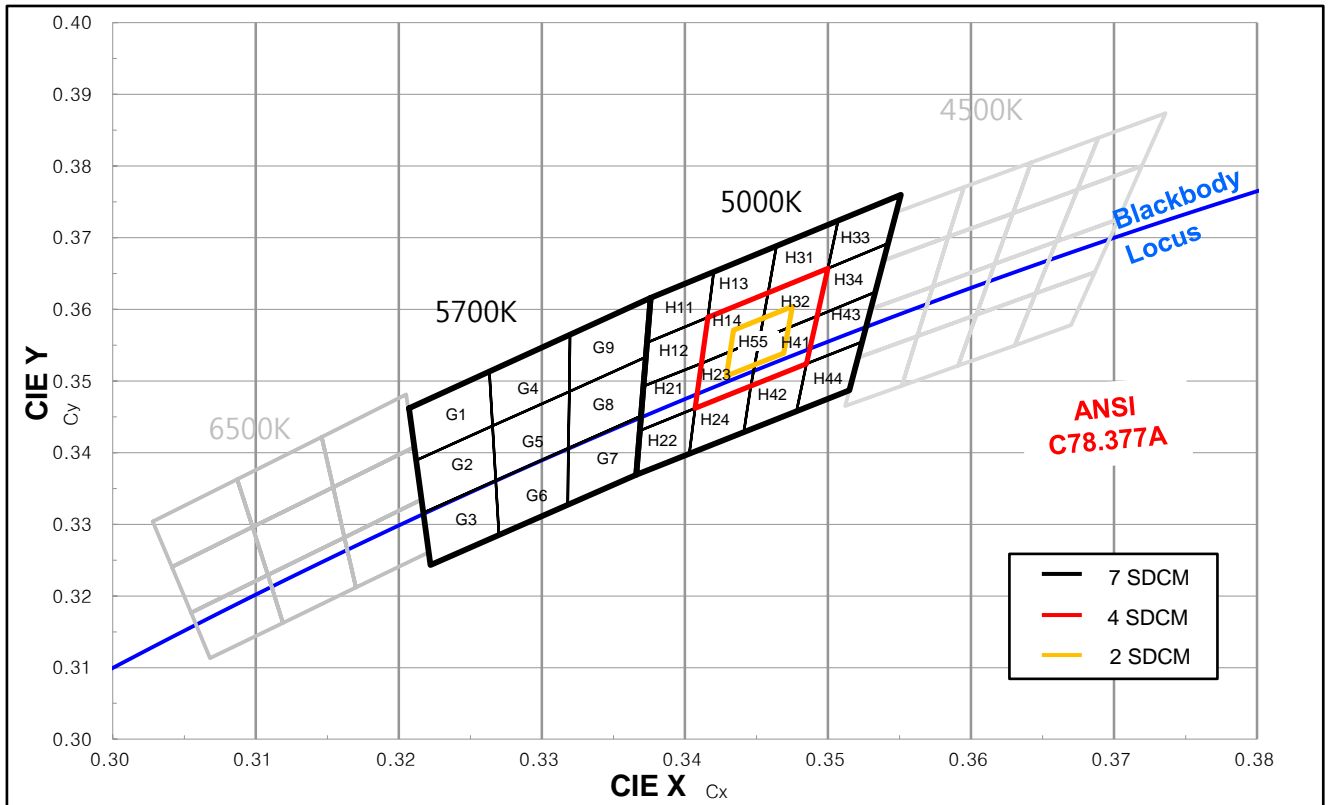
◆ Tolerances unless otherwise specified : ± 0.20mm

## 6. Flux Characteristics and Order Code

Color	Min. CRI	CCT	Vf @ 1040mA [V]	Luminous Flux [lm] @ 1040mA			Order Code
				Bin Code	Min.	Typ.	
Cool	80	5000 (H)	34.2 ~ 38.2 (Typ. 36.2)	C	4,626	5,140	LEMWM28C80HZxxxx
Neutral		4000 (J)			4,475	4,973	LEMWM28C80JZxxxx
Warm		3000 (L)			4,303	4,781	LEMWM28C80LZxxxx
Warm		2700 (M)			4,045	4,494	LEMWM28C80MZxxxx

## 7. Chromaticity Bins

LG Innotek complies with the ANSI C78.377A standard chromaticity bin structure. 4500K and 5000K have 16 micro bins, and 5700K and 6500K have 9 micro bins. LG Innotek offers a standard 7-SDCM with 4 & 2-SDCM option\*.

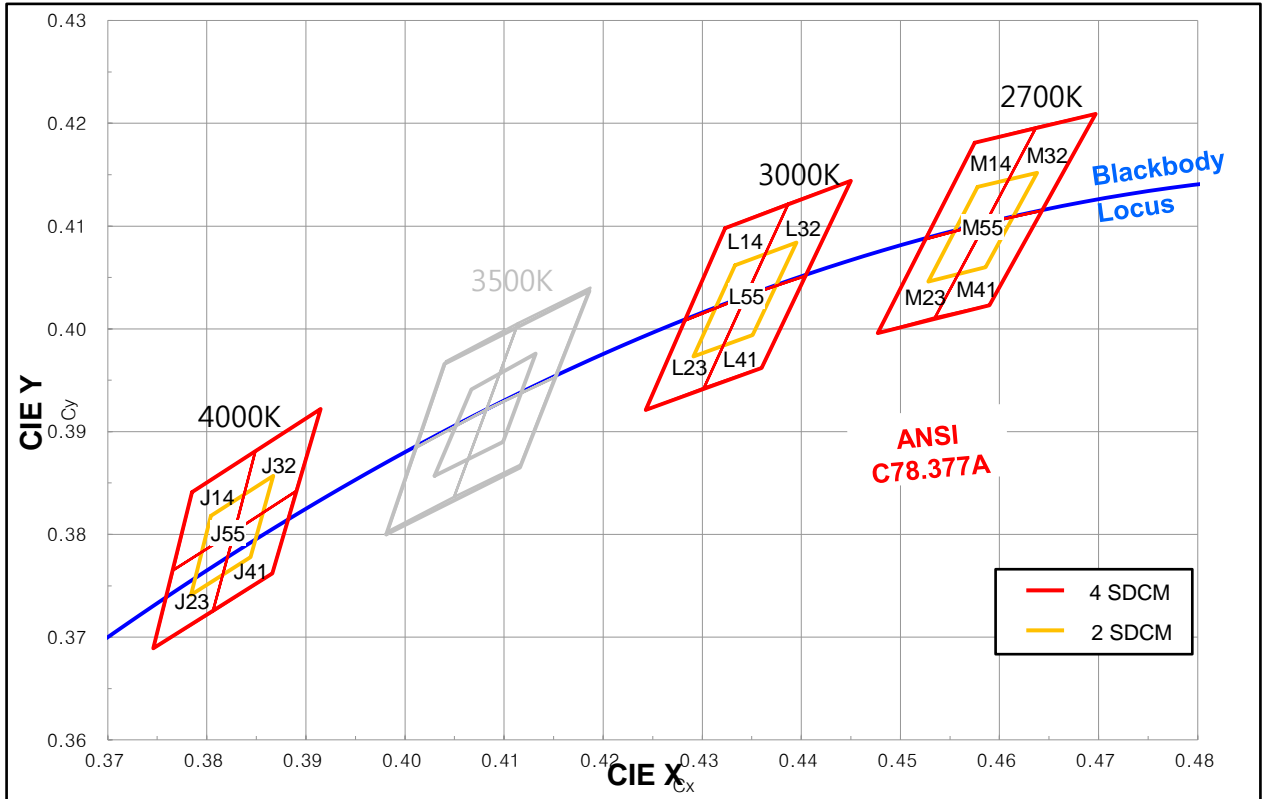


BIN	5000K		5700K	
	Cx	Cy	Cx	Cy
7 SDCM	0.3376	0.3616	0.3207	0.3462
	0.3366	0.3369	0.3222	0.3243
	0.3515	0.3487	0.3366	0.3369
	0.3551	0.3760	0.3376	0.3616
4 SDCM (Optional)	0.3416	0.3589		
	0.3407	0.3462		
	0.3485	0.3524		
	0.3500	0.3657		
2 SDCM (Optional)	0.3434	0.3571		
	0.3429	0.3507		
	0.3469	0.3539		
	0.3475	0.3604		

\* F, I color bins are not available but can be developed within 1 month based on demand.

## 7. Chromaticity Bins (Continued)

LG Innotek complies with the ANSI C78.377A standard chromaticity bin structure. 2700K, 3000K, 3500K and 4000K are offered in a standard 4-SDCM with a 2-SDCM option\*.

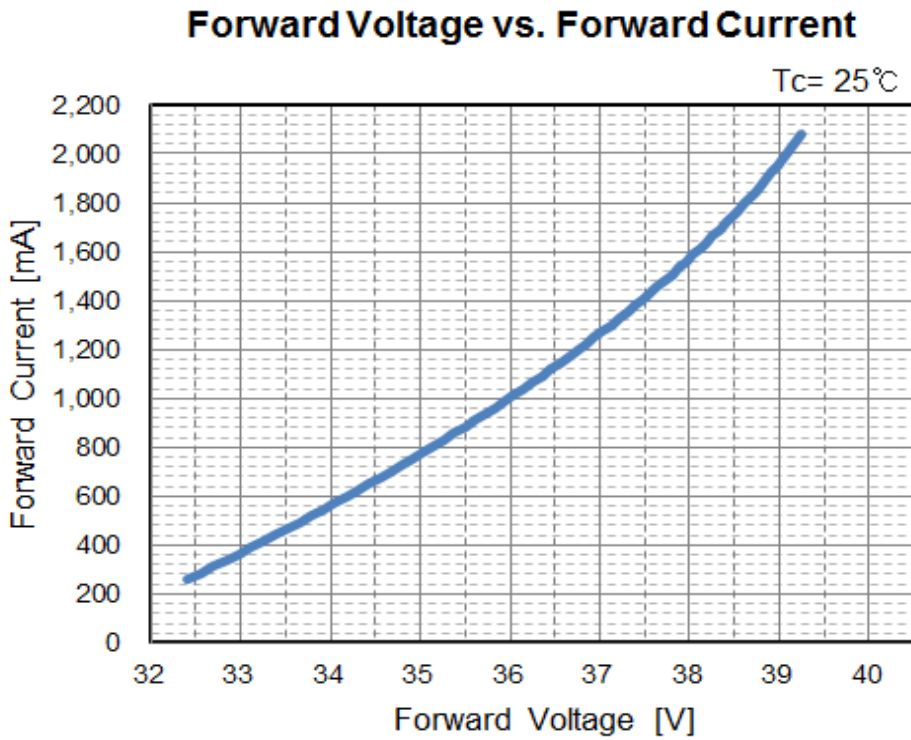


BIN	2700K		3000K		4000K	
	Cx	Cy	Cx	Cy	Cx	Cy
4 SDCM	0.4575	0.4181	0.4323	0.4098	0.3785	0.3841
	0.4477	0.3996	0.4243	0.3921	0.3746	0.3689
	0.4590	0.4023	0.4360	0.3962	0.3866	0.3762
	0.4697	0.4209	0.4450	0.4144	0.3915	0.3922
2 SDCM (Optional)	0.4578	0.4138	0.4333	0.4062	0.3804	0.3818
	0.4528	0.4046	0.4291	0.3973	0.3784	0.3741
	0.4586	0.4060	0.4351	0.3994	0.3844	0.3778
	0.4638	0.4152	0.4395	0.4084	0.3867	0.3857

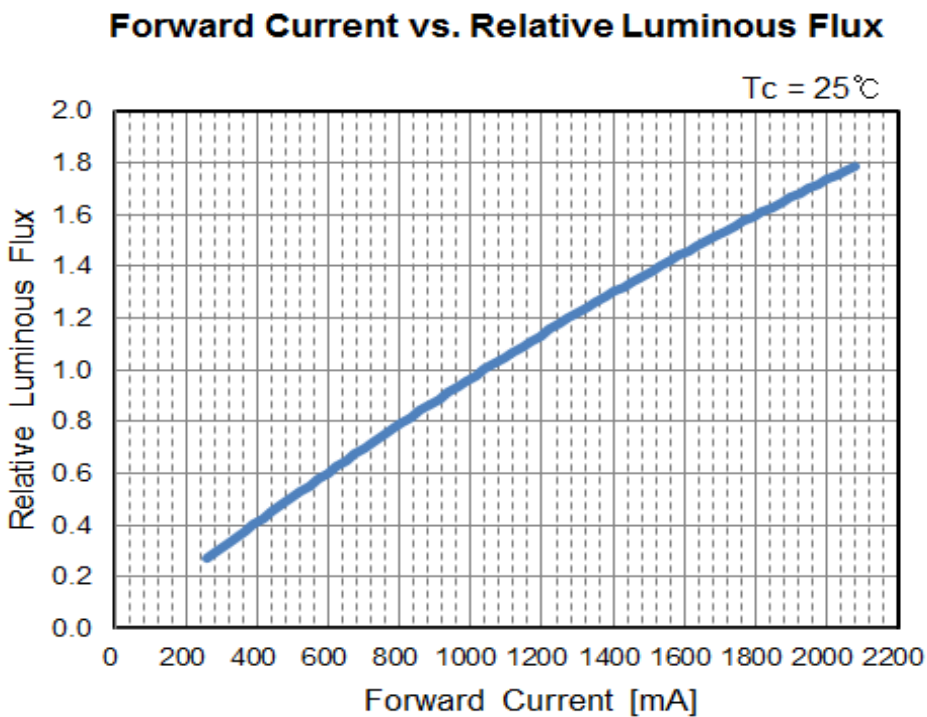
\* K color bin is not available but can be developed within 1 month based on demand.

## 8. Typical Characteristic Curves

- Forward Current vs. Forward Voltage

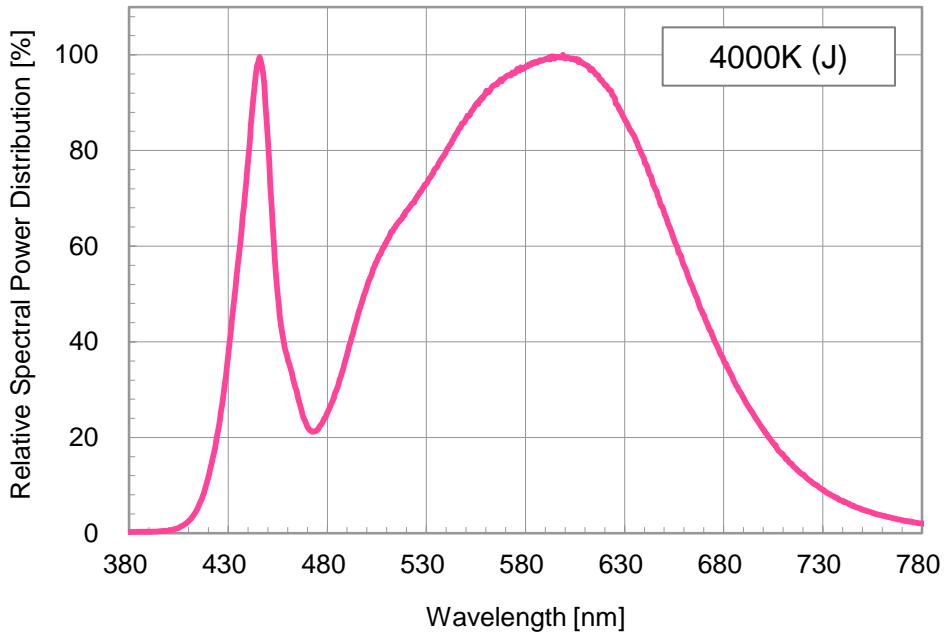
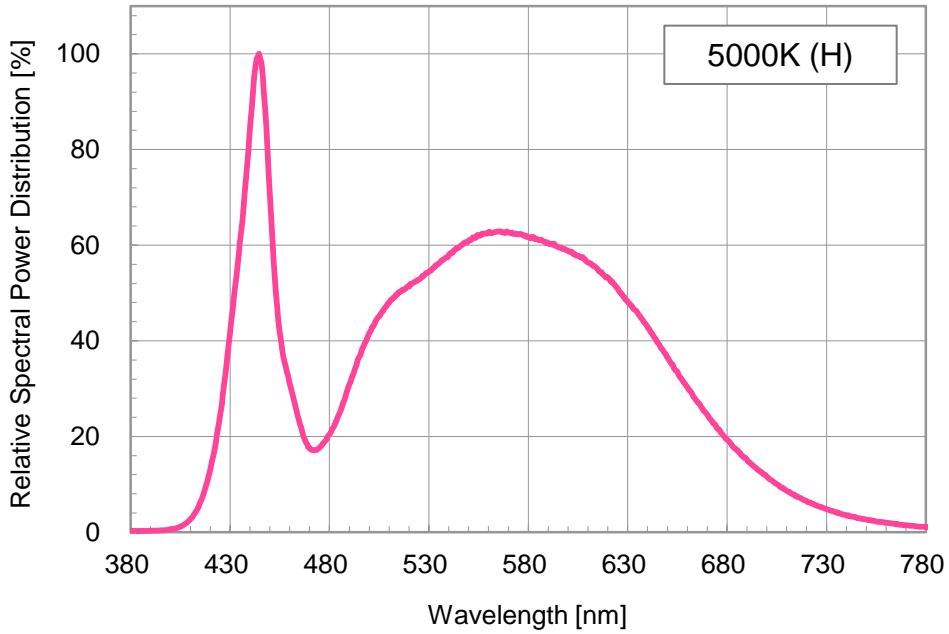


- Relative Luminous Flux vs. Forward Current



## 8. Typical Characteristic Curves

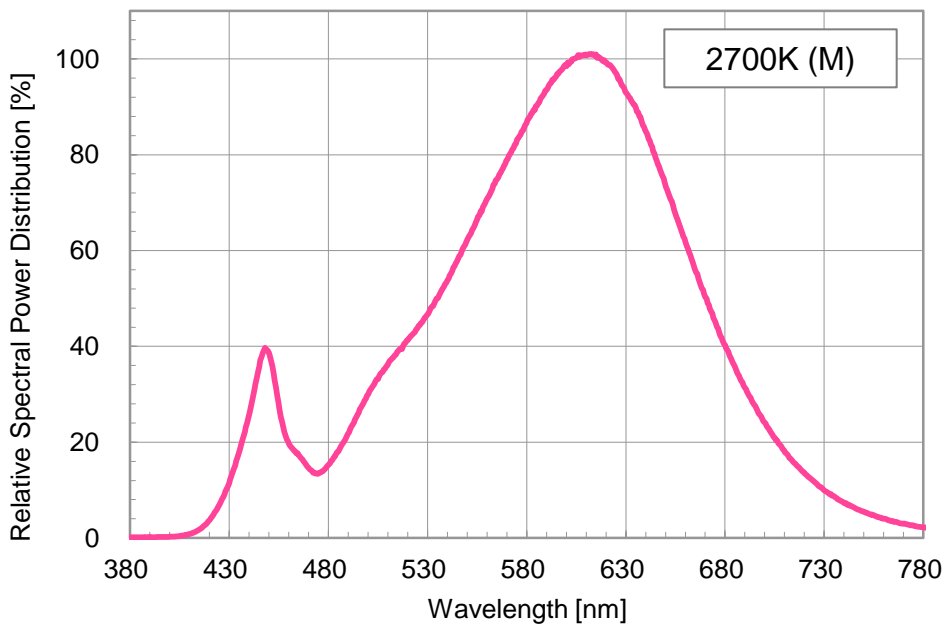
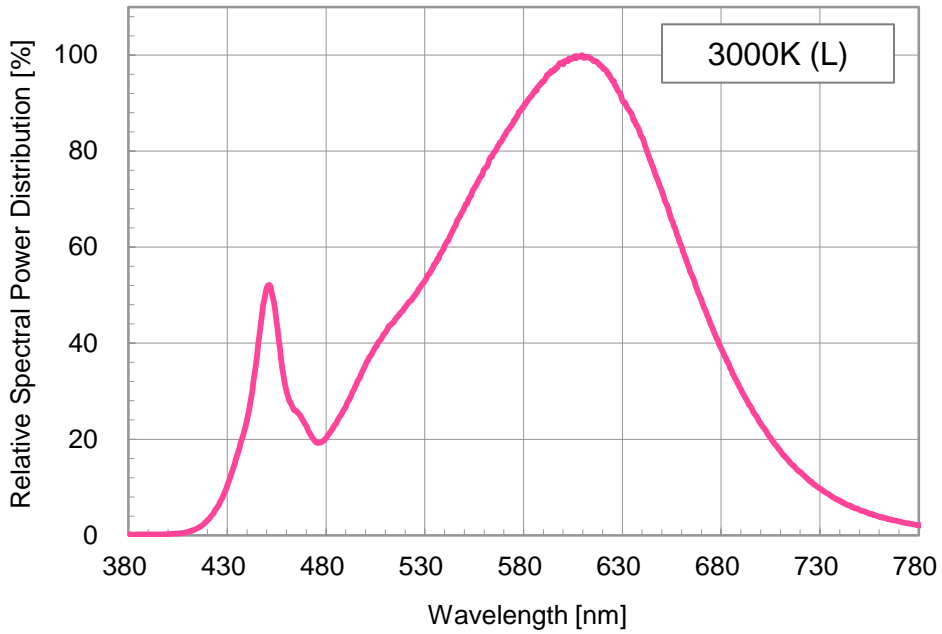
- Spectrum





## 8. Typical Characteristic Curves

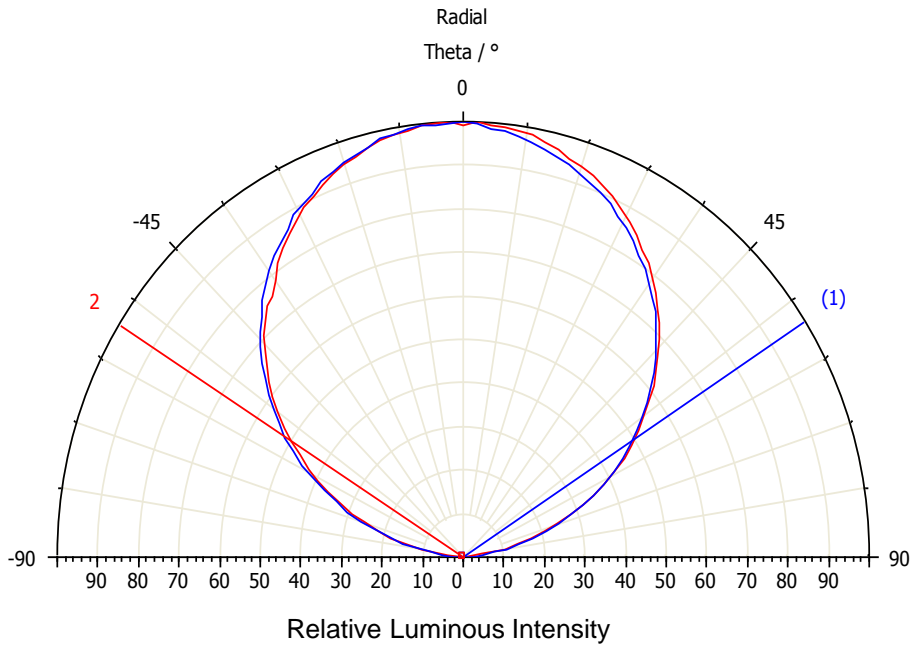
- Spectrum



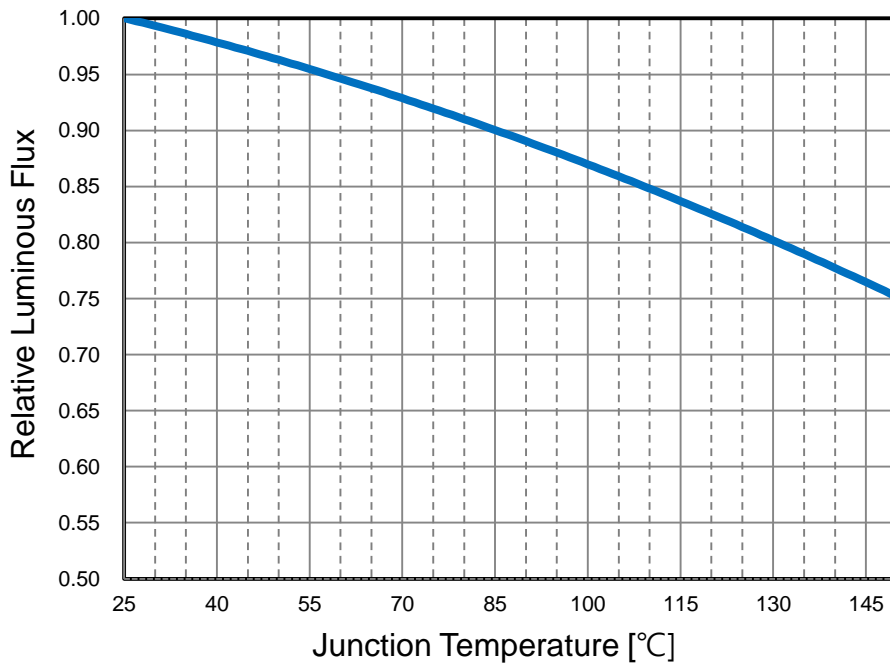
## 8. Typical Characteristic Curves

### ▪ Radiation Characteristics

$I_f = 1040\text{mA}$ ,  $T_a = 25^\circ\text{C}$

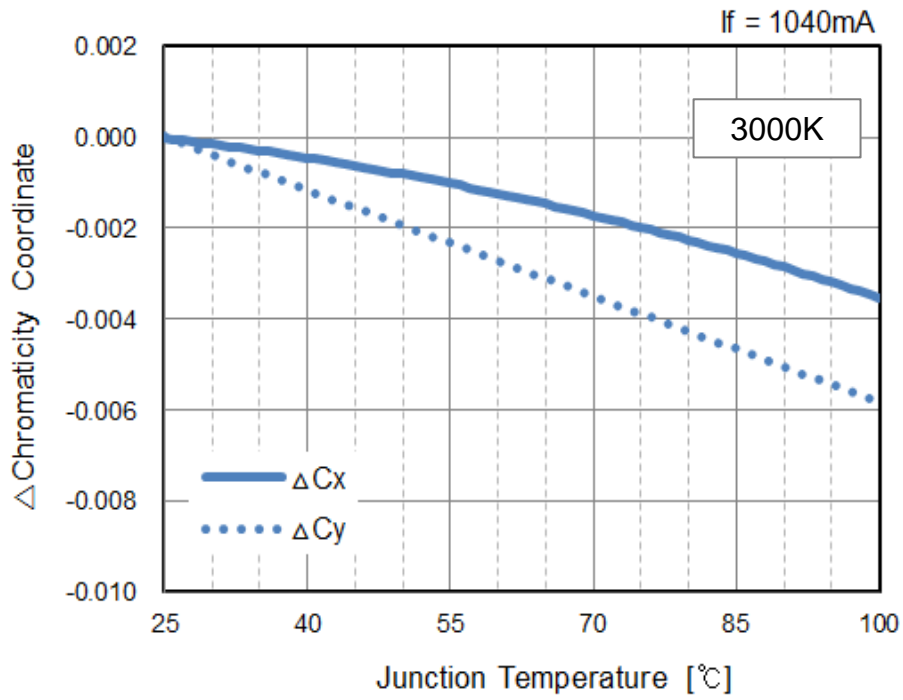


### ▪ Luminous Flux vs. Temperature



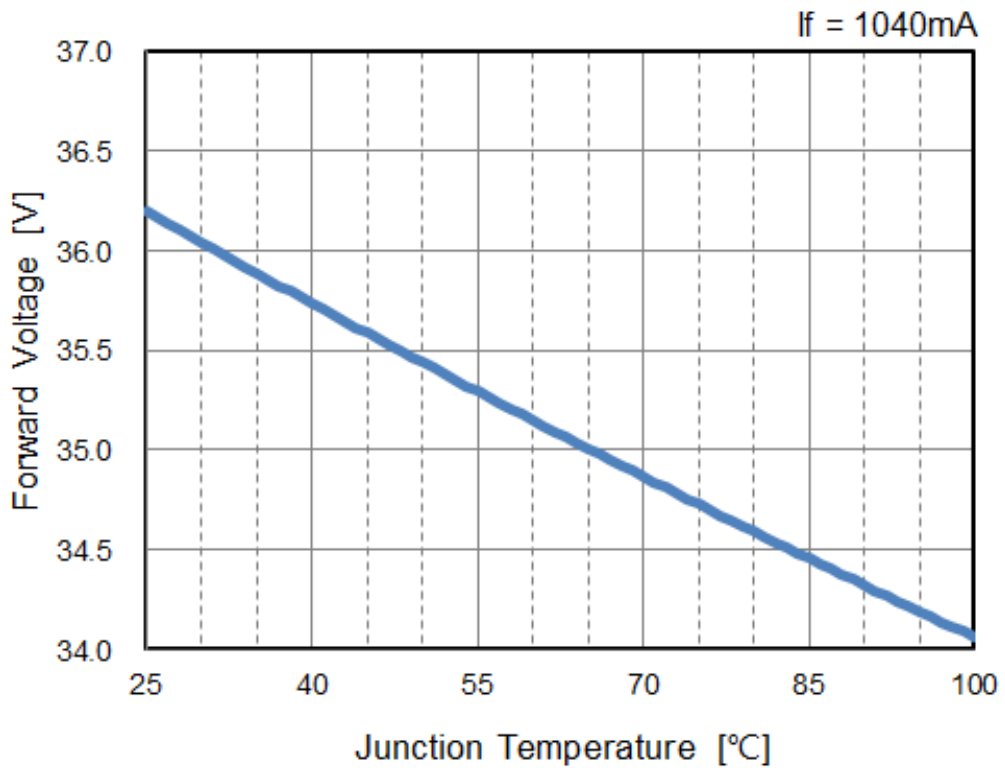
## 8. Typical Characteristic Curves

- Chromaticity Coordinate vs. Temperature



## 8. Typical Characteristic Curves

- Forward Voltage vs. Temperature



## 9. Reliability Test Items and Conditions

### 9-1. Failure Criteria

Item	Symbol	Test Condition	Criteria	
			Min	Max
Forward Voltage	V <sub>f</sub>	I <sub>f</sub> = 1040mA	-	Initial Value × 1.1
Luminous Flux	Φ <sub>v</sub>	I <sub>f</sub> = 1040mA	Initial Value × 0.7	-

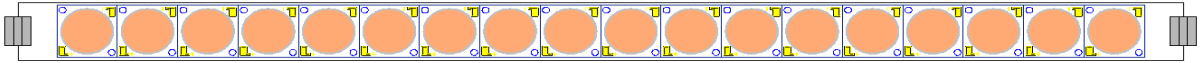
### 9-2. Reliability Test

No	Items	Test Conditions	Test Hours/ Cycles	Sample Size	Ac/Re
1	Room Temperature Operating Life (RTOL)	T <sub>a</sub> =25℃, I <sub>f</sub> =1040mA	1,000 hours	11 pcs	0/1
2	Wet High Temperature Operating Life (WHTOL)	T <sub>a</sub> =85℃, RH=85%, I <sub>f</sub> =1040mA	1,000 hours	11 pcs	0/1
3	High Temperature Operating Life (HTOL)	T <sub>a</sub> =85℃, I <sub>f</sub> =1040mA	1,000 hours	11 pcs	0/1
4	Low Temperature Operating Life (LTOL)	T <sub>a</sub> =-40℃, I <sub>f</sub> =1040mA	1,000 hours	11 pcs	0/1
5	High Temperature Storage Life (HTSL)	T <sub>a</sub> =100℃	1,000 hours	11 pcs	0/1
6	Low Temperature Storage Life (LTSL)	T <sub>a</sub> =-40℃	1,000 hours	11 pcs	0/1
7	Thermal Shock (TS)	100℃ ~ -40℃ Dwell : 30 min., Transfer : 3~5 min.	100cycle	11 pcs	0/1
8	Vibration	100~2000~100Hz Sweep 4min. 200m/s <sup>2</sup> , 3direction	48min.	5 pcs	0/1
9	Electrostatic Discharge Test Voltage 2kV (HBM)		3Times	11 pcs	0/1

## 10. Packing and Labeling of Product

### 10-1. Tube Outline Dimension

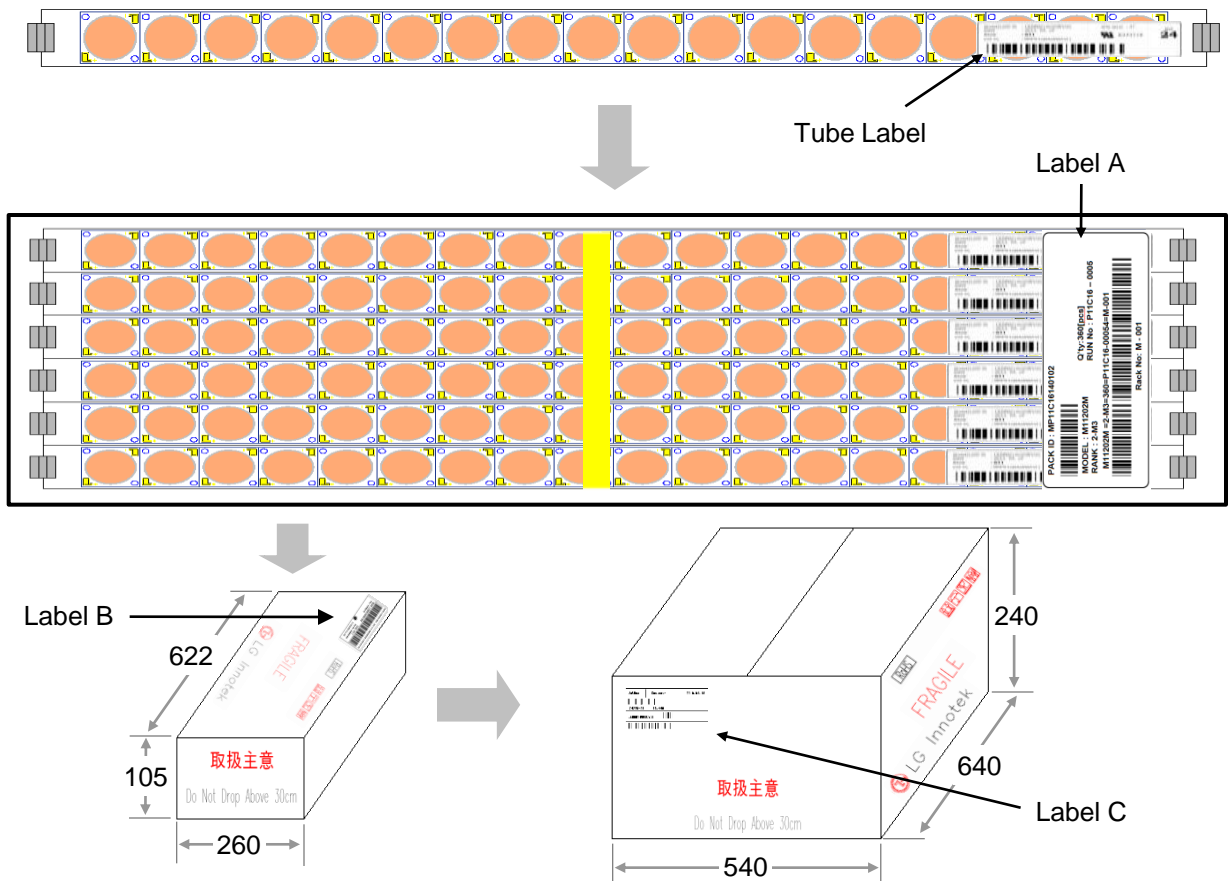
( unit : mm )



- Tube Packing Material: PET (Polyethylene Terephthalate)
- Tube Dimension : 540 × 30.9 × 4.3mm
- Units per Tube : 18 units

### 10-2. Packing Specifications

A rubber band ties 6 tubes (with a total of 108 units) that are then packed in a vacuum sealed packing bag along with desiccants (Silica Gel). 10 packing bags (with a maximum total of 1,080 units) are packed in an inner box where 4 inner boxes are placed into an outer box (for a maximum grand total of 4,320 units).



Types	Sizes (mm)		
	W	L	H
Inner Box	622	260	105
Outer Box	640	540	240

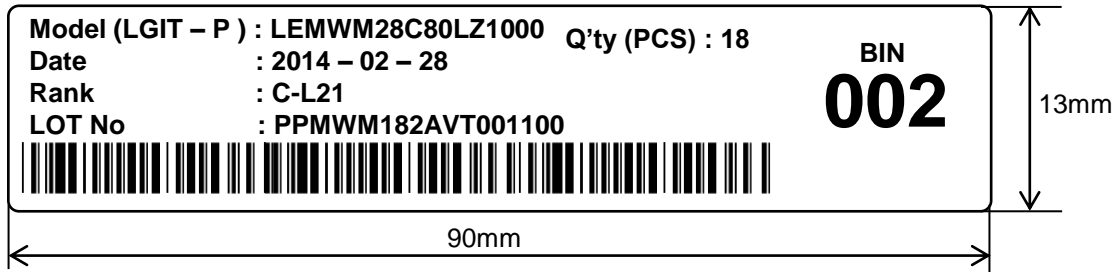
Tolerance : ±10mm

## 10. Packing and Labeling of Product

### 10-3. MES Label Structure

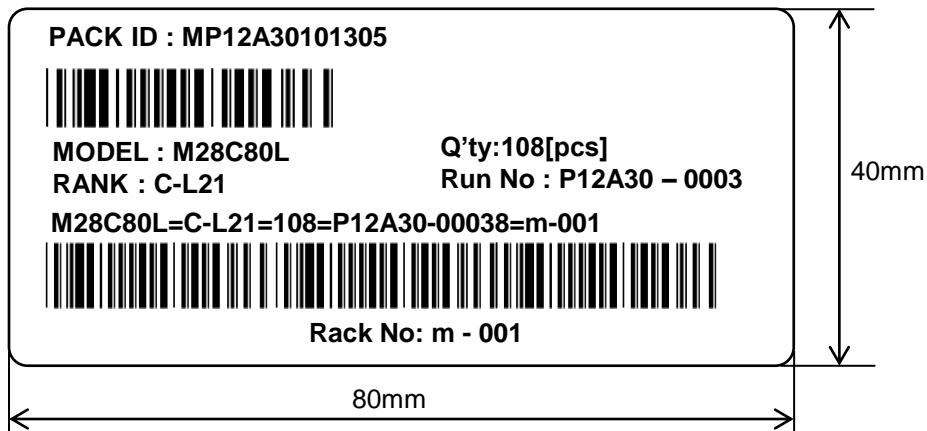
#### ※ Tube Label

Model(Company's Name - Location of manufacture) , Date, Rank, LOT No, Quantity



#### ※ Label A

PACK ID, MODEL, Rank, Quantity, Run No, Rack No



#### ※ Label B

INNER BOX ID, MODEL, Quantity, Date, Rank

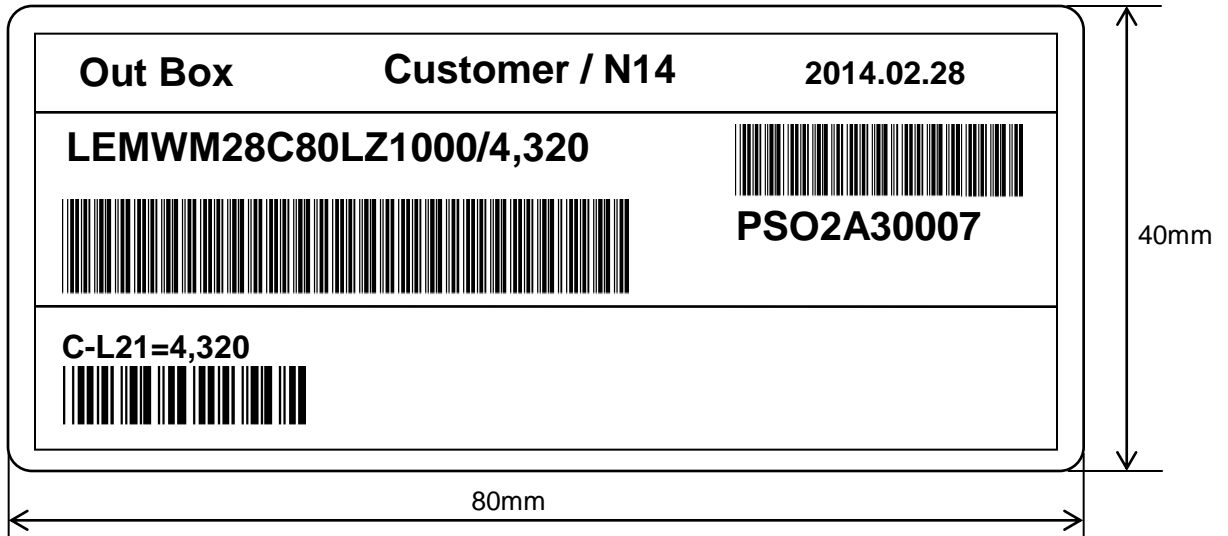


## 10. Packing and Labeling of Product

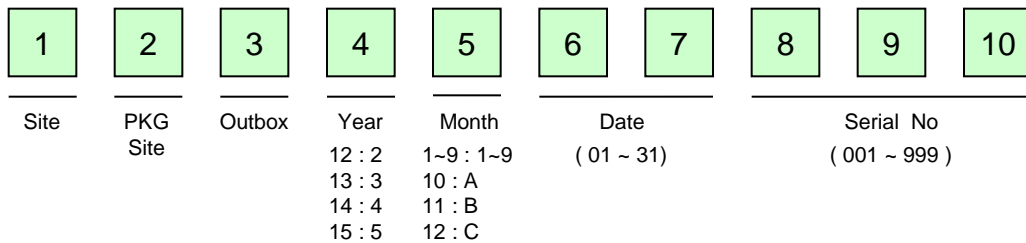
### 10-3. MES Label Structure

#### ※ Label C

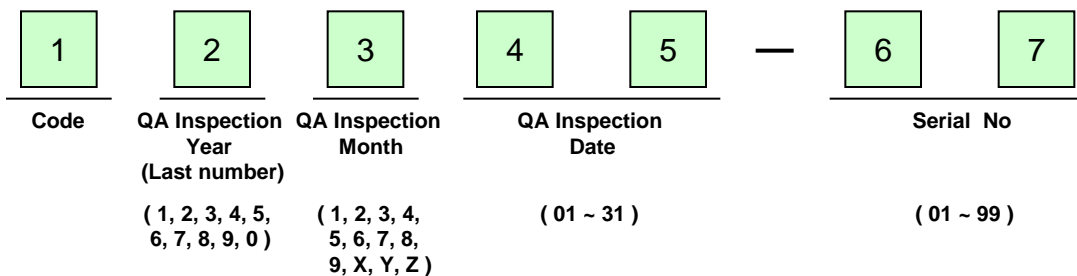
Specifying Customer, Date, Model Name, Quantity, Customer Part no, Outbox ID



#### ▪ Outbox ID. indication



#### ▪ Lot No. indication



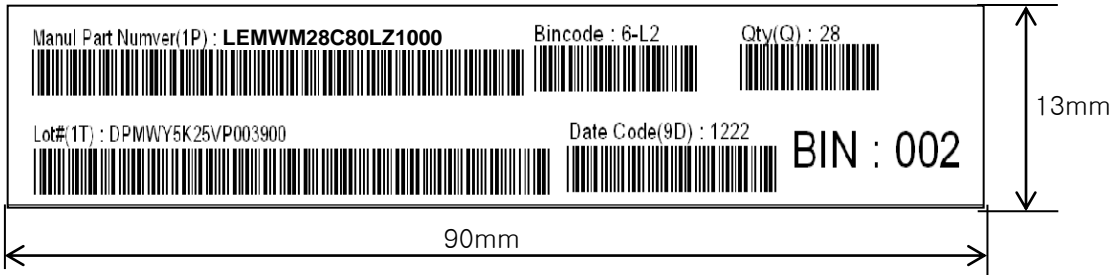


## 10. Packing and Labeling of Product

### 10-4. NEDA Label Structure

#### ※. Label A (Tube label)

Specifying Manufacturing Part Number, Quantity, Bin Code, Lot, Date Code

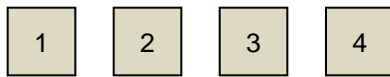


#### ※ Label B (Sealing label)

Specifying Manufacturing Part Number, Quantity, Bin Code, Lot, Date Code and Country of Origin



#### ▪ Date Code(9D)



Year  
01-99

Week  
01-52

#### ▪ Lot#(1T)

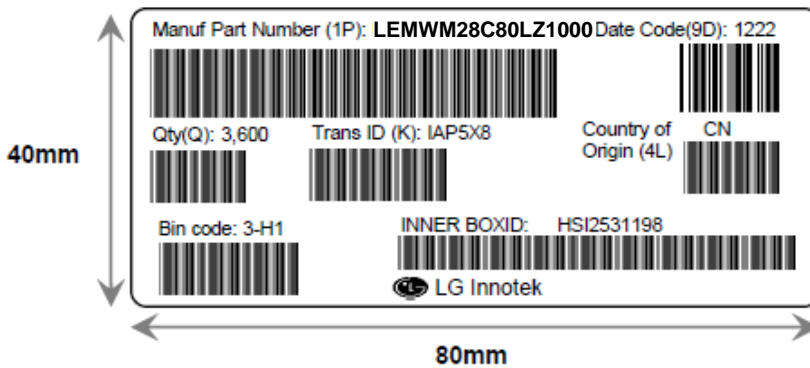
LG Innotek Trace Code

## 10. Packing and Labeling of Product

### 10-4. NEDA Label Structure

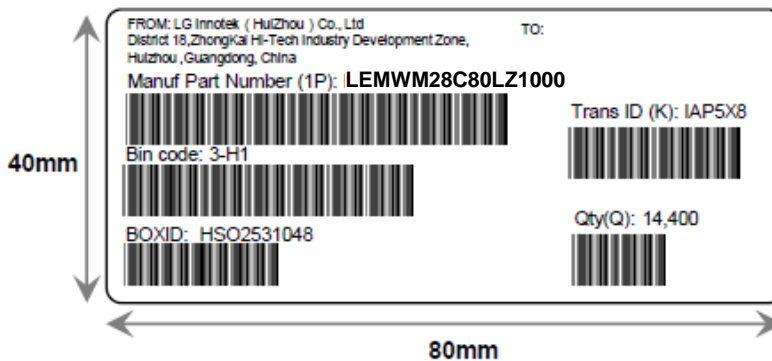
#### ※ Label C (Inner)

Specifying Manufacturing Part Number, Quantity, Bin Code, Trans ID, Date Code, Country of Origin and Inner Box ID



#### ※ Label C (Outer)

Specifying Manufacturing Site, Customer Address, Manufacturing Part Number, Bin Code, Box ID, Trans ID and Quantity



#### ▪ Box ID Indication

1	2	3	4	5	6	7	8	9	10
Site	Code	Outbox	Year	Month	Date		Serial No		
Paju: P Huizhou: H	S, P	Outbox: O Inbox: I	12 : 2 13 : 3 14 : 4 15 : 5	1~9 : 1~9 10 : A 11 : B 12 : C	( 01 ~ 31 )		( 001 ~ 999 )		

## 11. Cautions on Use

### 11-1. Overcurrent Protection

- Customers must apply current limiting devices for protection such as resistors or constant current LED drivers. Otherwise, a slight variation in voltage will cause a significant current shift where a catastrophic failure may occur.
- LG Innotek is not responsible for any damages or accidents caused if the operating or storage conditions exceed the absolute maximum ratings recommended in this document.

### 11-2. During Storage

- Proper temperatures and RH conditions for storage are 5 °C ~ 35 °C and RH 60%.
- Do not open the moisture-proof bag until the products are ready to be used.
- Store the products in a moisture-proof bag with desiccant (Silica gel) after opening.
- The products should be used within 168 hours after opening the bag under the recommended storage conditions.
- The products must be baked to remove moisture before usage if the silica gel loses its color. Conditions for baking are  $60 \pm 5^\circ\text{C}$ , 20% (RH) for a maximum duration of 24 hours

### 11-3. During Usage

- The product should not be directly exposed to environments containing hazardous substances.
- Please confirm performance and reliability properly if used under any of the following conditions;
  - Environments with a significant amount of moisture, dew condensation, briny air, and corrosive gas (Cl, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NOX, etc.)
  - Direct sunlight, outdoor exposure, and dusty locations
  - Water, oil, medical fluid, and organic solvents
- Avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.
- For designing a circuit, the current through the product must not exceed the absolute maximum rating.

## 11. Cautions on Use

### 11-4. Cleaning

- Avoid cleaning, since the silicone resin is eroded by the cleaning process.

### 11-5. Thermal Management

- The thermal design of the end product is of paramount importance.
- Please consider how the heat generated by the product will be managed when developing the system design.
- The generation of heat is greatly impacted by the input power, the junction to case thermal resistance of the COB and the performance of the thermal interface material combined with the proximity of other components in the system.
- It is necessary to make sure that the product is operated within the maximum ratings provided in the specifications.

### 11-6. Static Electricity

- If a voltage exceeding the absolute maximum rating is applied to the COBs, it will damage or destroy the product. Since the COBs are sensitive to static electricity and surge, it is strongly recommended to use a wristband or anti-electrostatic glove when handling the COBs where all devices including the equipment and machinery must be properly grounded.
- It is recommended that precautions should be taken against surge voltage to the equipment that mounts the COB.
- Damaged COBs will show some unusual characteristics such as a significant increase in leakage current, lower turn-on voltage, or malfunctioning at a low current level.
- When examining the final products, it is recommended to verify whether the assembled COBs are damaged by static electricity. Damaged COBs from static electricity can be identified by conducting a light-on test or a forward voltage test at a low current.

## 11. Cautions on Use

### 11-7. Recommended Circuits

- The current through each COB must not exceed the absolute maximum rating when designing the circuits.
- The LED driver must be designed to operate the COB by forward bias only.  
Reverse voltages can damage the COB.
- A constant current LED driver is recommended to power the COB.

### 11-8 Recommended Soldering Conditions

- Manual soldering is recommended.
- Lead-free soldering shall be implemented using a maximum 40W soldering bit under the conditions of 350°C or less within 3.5 seconds.

## 11. Cautions on Use

### 11-9. Safety Guideline for Human Eyes

- Do not directly look at the light when the COBs are on.
- Proceed with caution to avoid the risk of damage to the eyes when examining the COBs with optical instruments.

### 11-10. Manual Handling

- It is recommended to wear anti-static plastic gloves to prevent damage from static electricity and dirt or other contaminants.
- When using tweezers, please handle the aluminum substrate part and avoid touching the resin part.
- For mounting, please handle the side of the aluminum part.

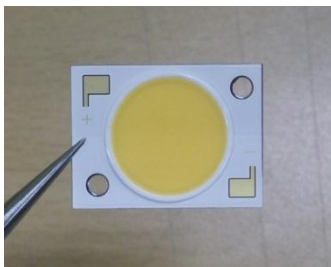


Fig.3 Proper Handling of the COB  
Using Tweezers

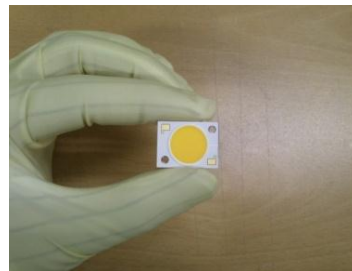


Fig.4 Proper Handling of the COB  
Using Anti-Static Gloves

## Appendix. Part Number Nomenclature

All COBs are tested and sorted by color, luminous flux and forward voltage where every COB in a tube has only a single color bin, luminous flux bin and forward voltage bin. However, the forward voltage bin information is not captured in the part number nomenclature.

A 16-digit part number is required when orders are placed. LG Innotek leverages the following part number nomenclature.

