



# Specific Lighting Product Data Sheet

## M07 CoB Product Series Data Sheet

Spec No.: DS23-2016-0110

Effective Date: 12/15/2016

Revision: -

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

# LIGHT LED M07 CoB Product Series

## 1. Description

The LiteON CoB Product series is a revolutionary, energy efficient and ultra-compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting. It gives you total design freedom and unmatched brightness, creating a new opportunities for solid state lighting to displace conventional lighting technologies.

### 1.1 Features

- Compact high flux density light source
- Uniform high quality illumination
- Streamlined thermal path
- MacAdam compliant binning structure  
More energy efficient than incandescent, halogen and fluorescent lamps
- Instant light with unlimited dimming
- RoHS compliant and Pb free

### 1.2 Benefits Features

- Enhanced optical control
- Clean white light without pixilation
- Uniform consistent white light
- Significantly reduced thermal resistance and increased operating temperatures
- Lower operating costs
- Reduced maintenance costs
- ESD rating is 8KV in HBM

### 1.3 Naming Rule

**L    T    PL - M    0    7    4    X    X    Z    S    X    X    -    X    X**  

Code1
Code2
Code3
Code4
Code5
Code6

**Code 1: Product Line**

PL: High Power LED.

**Code 2: Package Type/Platform**

M07: Ceeramic substrate with 27x27mm square.

**Code 3: Light Emitting Surface**

4: 22mm excluding dam

**Code 4: Product Series**

52: 52 Series

80: 80 Series

**Code5: Color Temperature**

30: 3000K at 85degC

57: 5700K at 85degC

65: 6500K at 85degC

**Note: The Color Temperature follow ANSI C78.377A Doc.**

**Code6: Hue Bin by MacAdam Ellipses Step**

T0: 3000K MacAdam Ellipse / ANSI BIN

F1: 5700~6500K MacAdam Ellipse / ANSI BIN

## LIGHT LED M07 CoB Product Series

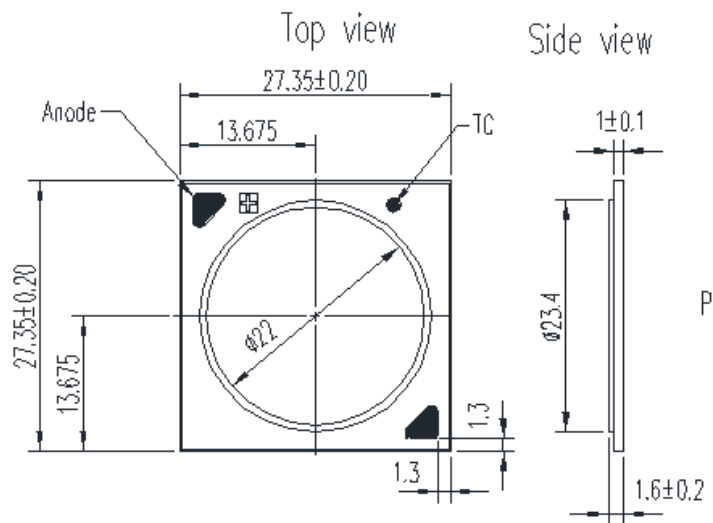
### 1.4 Product List

Part Number	Product Series	CCT	CRI	Color Bin			Lumen Bin	
				3SDCM	5SDCM	ANSI	-8%~+8%	-15%~+15%
LTPL-M07452ZS30-T0	52	3000K	80	☆	☆	☆	☆	☆
LTPL-M07452ZS57-F1	52	5700K	80		☆	☆		☆
LTPL-M07452ZS65-F1	52	6500K	80		☆	☆		☆
LTPL-M07480ZS30-T0	80	3000K	80	☆	☆	☆	☆	☆
LTPL-M07480ZS57-F1	80	5700K	80		☆	☆		☆
LTPL-M07480ZS65-F1	80	6500K	80		☆	☆		☆

# LIGHT LED M07 CoB Product Series

## 2. Outline Dimensions

### 2.1 Form Factor of M074 series CoB

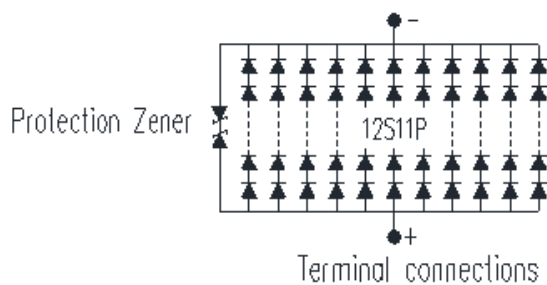


#### Notes

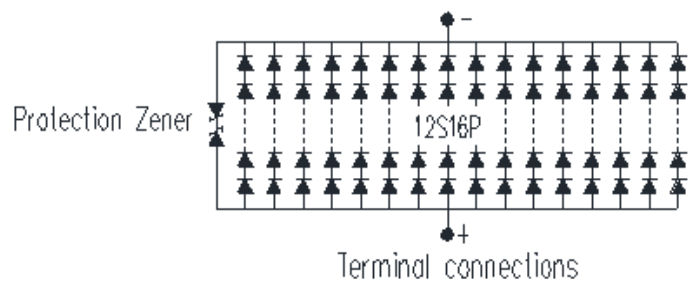
1. All dimensions are in millimeters.
2. Tolerance is  $\pm 0.3$ mm unless otherwise noted.
3. LED of equivalent circuit means all series/parallel in CoB package.

### 2.2 Internal Equivalent Circuit

#### 52 Series Product



#### 80 Series Product



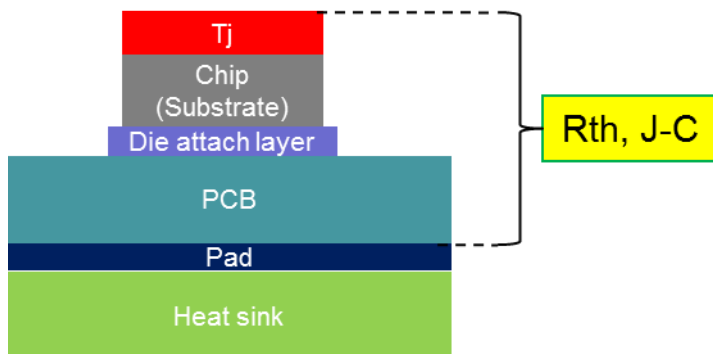
# LIGHT LED M07 CoB Product Series

## 3. Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Product Series	Rating	Unit
Power Dissipation	P <sub>O</sub>	52	86	W
		80	129	
Forward Current	I <sub>F</sub>	52	2200	mA
		80	3200	
Junction Temperature	T <sub>j</sub>		125	°C
Thermal Resistance, Junction-Case	R <sub>th, J-C</sub>	52	0.32	°C/W
		80	0.24	
Operating Temperature Range	T <sub>opr</sub>		-40 to 85	°C
Storage Temperature Range	T <sub>stg</sub>		-40 to 100	°C
Breakdown Voltage(DC)	V <sub>B</sub>		2.25	KV
Electrostatic Discharge	ESD		8	KV

### Notes

1. The pulse mode condition is 1/10 duty cycle with 100 msec pulse width.
2. Forbid to be operated at reverse voltage condition.
3. ESD spec is reference to AEC-Q101-001 HBM.
4. The unit of R<sub>th</sub> is °C/W electrical.
5. The M07 CoB is recommended soldering temperature under 350degC and could not over 3.5sec.



# LIGHT LED M07 CoB Product Series

## 4. Electro-Optical Characteristics

### 4.1 Typical Performance

#### ■ 52 Series Product

Dominant CCT	Product Series	Current (mA)	V <sub>F</sub> (V) @25°C	Flux(lm) @25°C	V <sub>F</sub> (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
3000K	52	1400	35.9	7807	34.4	6948	155	144
5700K	52	1400	35.9	8197	34.4	7296	163	152
6500K	52	1400	35.9	8275	34.4	7365	165	153

#### ■ 80 Series Product

Dominant CCT	Product Series	Current (mA)	V <sub>F</sub> (V) @25°C	Flux(lm) @25°C	V <sub>F</sub> (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
3000K	80	2050	35.9	10755	34.4	8927	146	127
5700K	80	2050	35.9	11293	34.4	8884	153	126
6500K	80	2050	35.9	11400	34.4	8963	155	127

### Notes

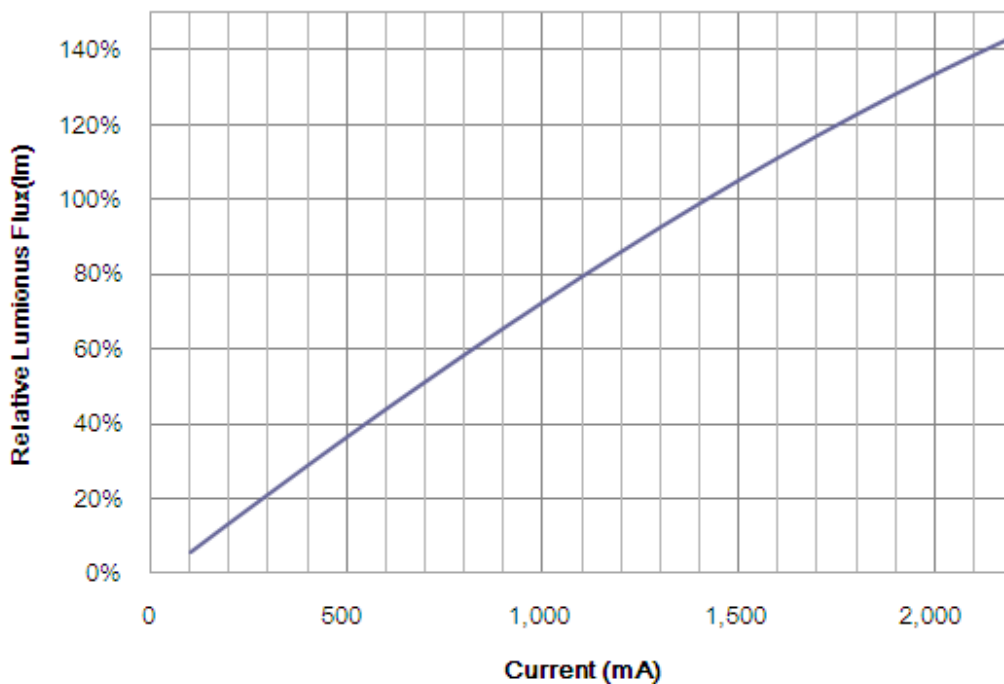
1. All of V<sub>F</sub> value are typical, the real bin range please refer page 12 "V<sub>F</sub> Binning Parameter".
2. All of flux value are typical, the real bin range please refer page 11 "Flux Binning Parameter".
3. Tolerance of flux is ±7%, tolerance of CCX/CCY is ±0.007, tolerance of CRI is ±2, and tolerance of V<sub>F</sub> is ±3%.
4. Typical viewing angle is 120deg.

# LIGHT LED M07 CoB Product Series

## 4.2 Forward Current vs. Lumen and Voltage

### ■ 52 Series Product

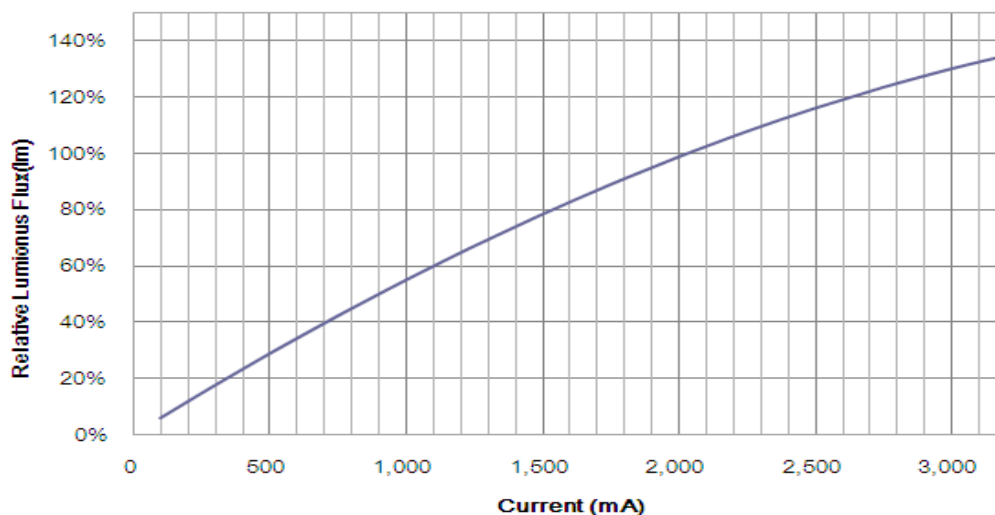
Current (mA)	V <sub>F</sub> (V)	Flux (lm)		
		3000K	5700K	6500K
		CRI>80	CRI>80	CRI>80
100	30.9	459	482	487
200	31.4	1094	1149	1160
300	31.9	1717	1802	1820
500	32.9	2919	3065	3094
700	33.6	4066	4269	4310
1000	34.7	5720	6006	6063
1200	35.2	6846	7188	7256
1400	35.9	7807	8197	8275
1600	36.3	8697	9132	9219
1800	36.9	9614	10094	10190
2000	37.3	10440	10962	11066
2200	37.9	11230	11792	11904



# LIGHT LED M07 CoB Product Series

■ 80 Series Product

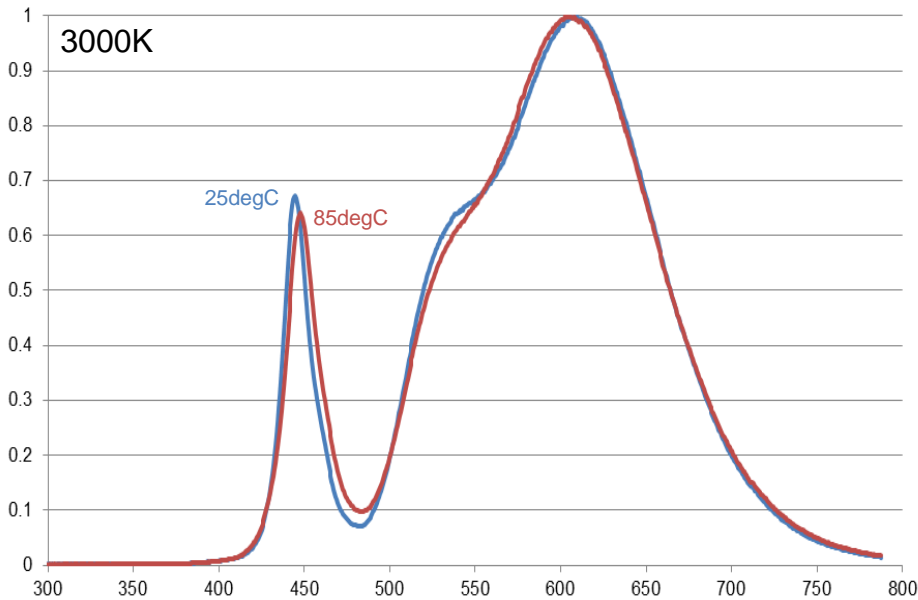
Current (mA)	V <sub>F</sub> (V)	Flux (lm)		
		3000K	5700K	6500K
		CRI>80	CRI>80	CRI>80
100	29.7	655	687	694
200	30.1	1281	1345	1357
300	30.5	1897	1991	2010
500	31.2	3093	3248	3279
750	32.2	4526	4752	4798
1000	33.0	5886	6180	6239
1250	33.8	7171	7530	7601
1500	34.6	8379	8798	8882
1750	35.2	9507	9983	10078
2000	35.8	10556	11083	11189
2050	35.9	10755	11293	11400
2250	36.4	11520	12096	12211
2500	36.9	12400	13020	13144
2750	37.3	13193	13852	13984
3000	37.7	13897	14592	14731
3200	38.0	14394	15114	15258



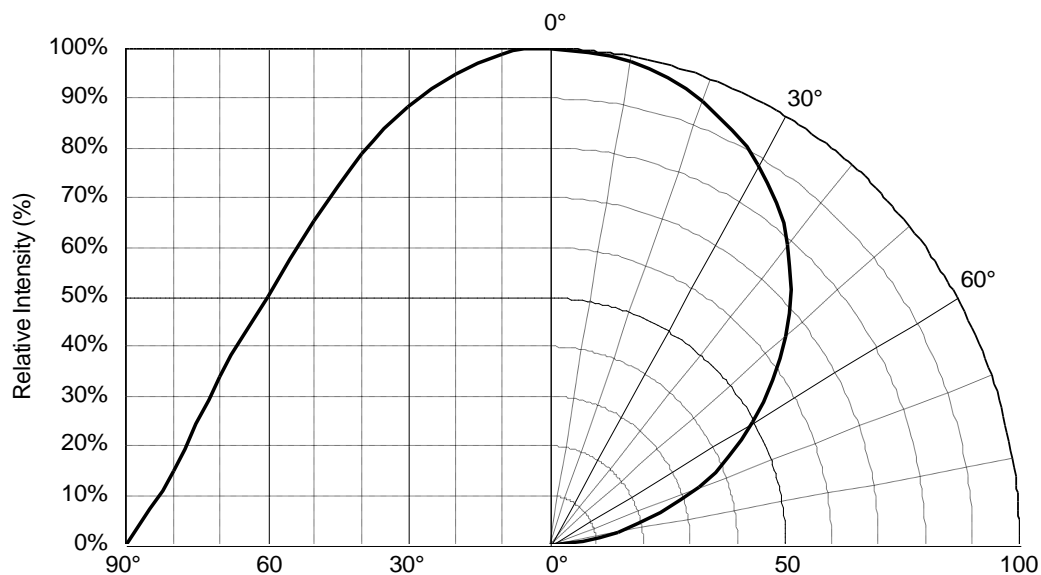


# LIGHT LED M07 CoB Product Series

## 4.3 Relative Spectral Power Distribution at Typical Current

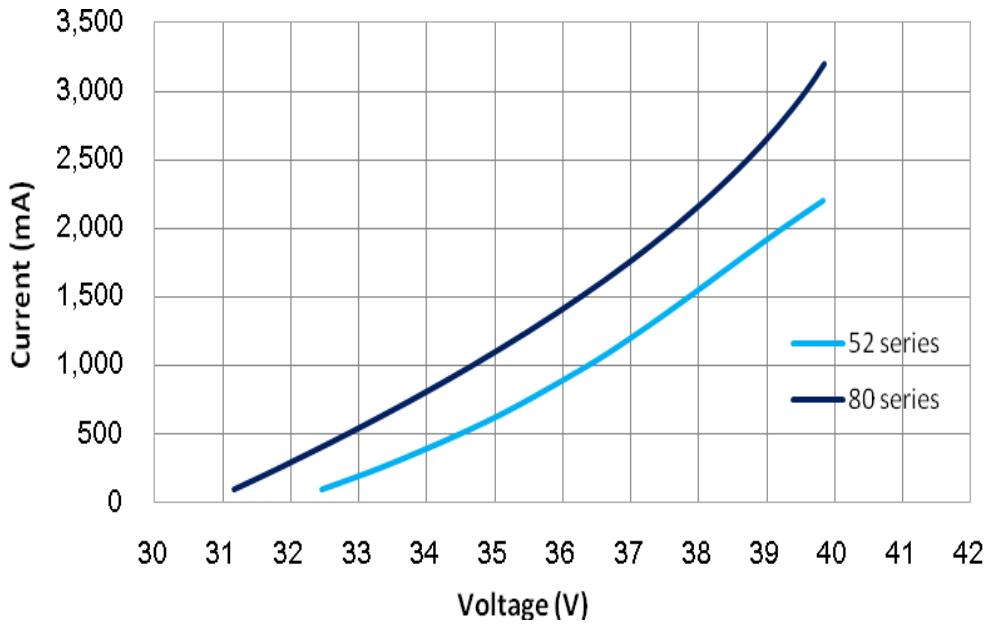


## 4.4 Radiation Characteristics

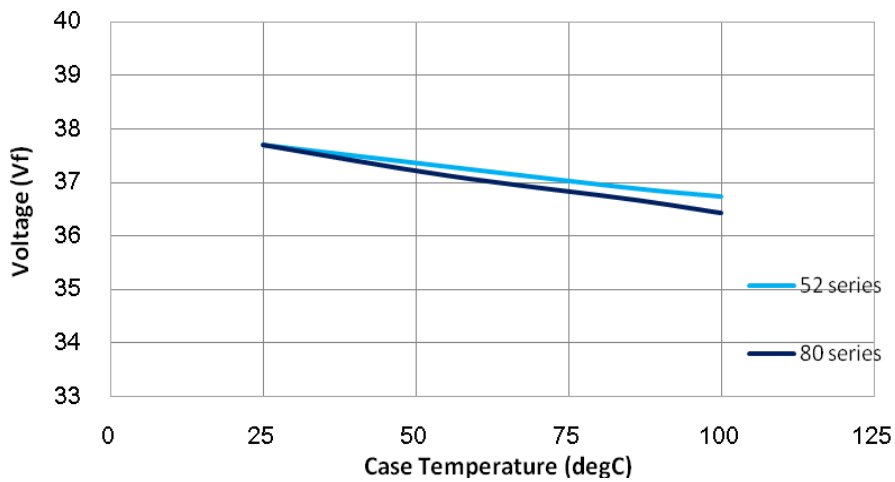


# LIGHT LED M07 CoB Product Series

## 4.5 Forward Current vs. Forward Voltage

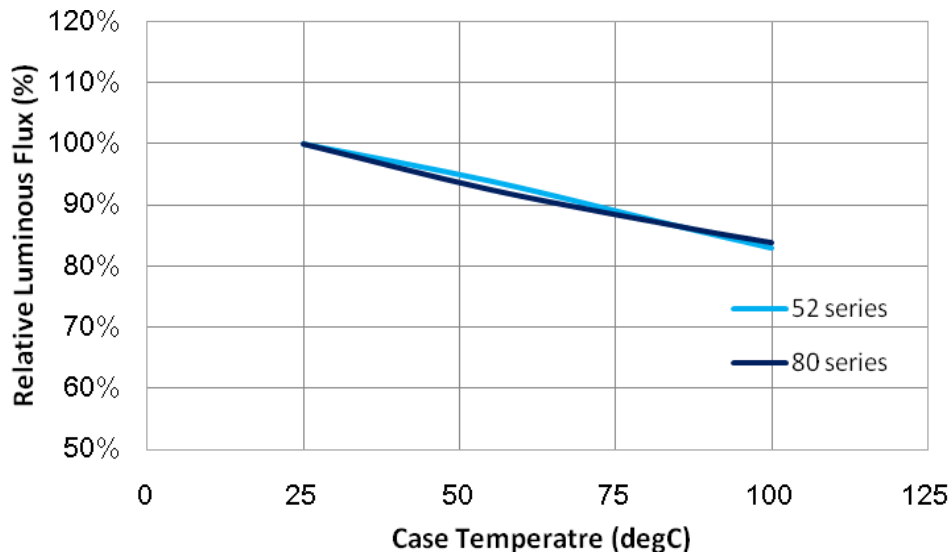


## 4.6 Forward Voltage vs. Case Temperature

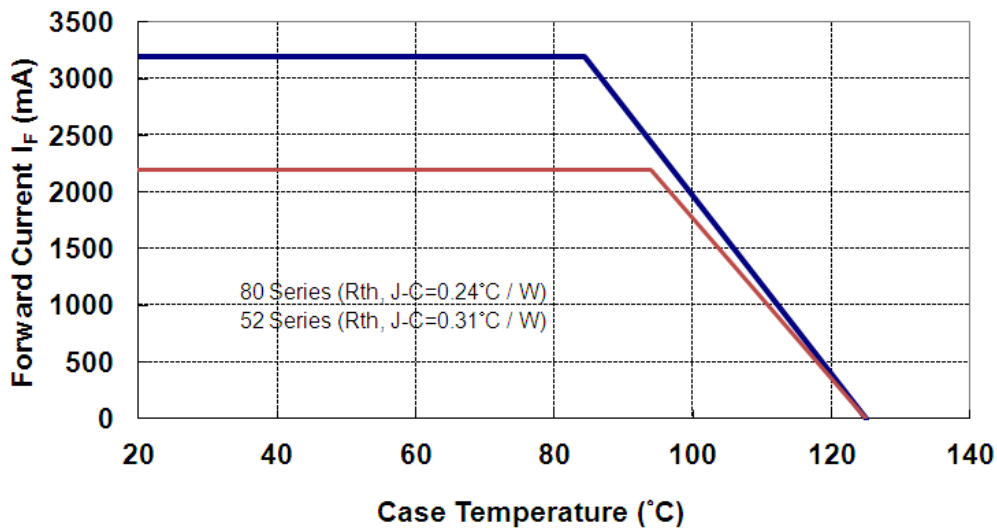


# LIGHT LED M07 CoB Product Series

## 4.7 Relative Intensity vs. Case Temperature



## 4.8 Forward Current Degrading Curve



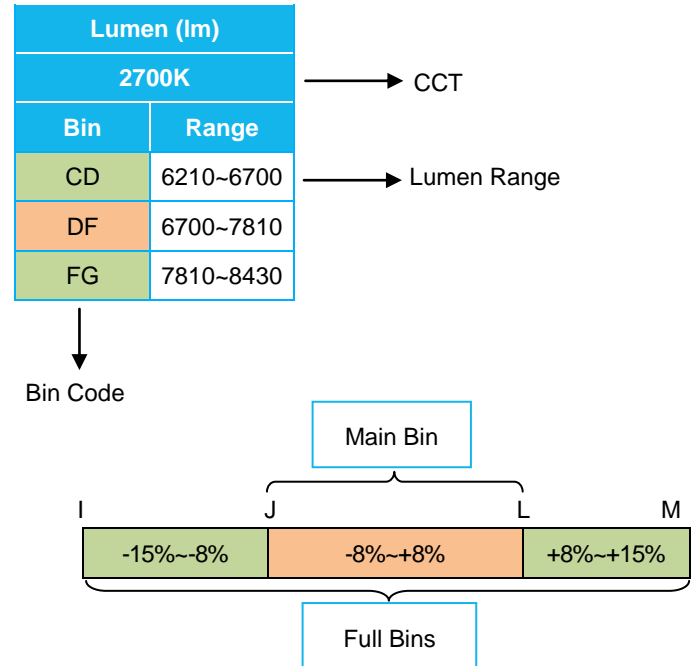
# LIGHT LED M07 CoB Product Series

## 5. CoB Binning Definition

### Flux Binning Parameter (25degC)

Lumen <b>CODE</b> List of M07 Series Product			
Parameter	Code	Unit	Lumen
Luminous Flux	B	lm	5755
	C		6210
	D		6700
	E		7235
	F		7810
	G		8430
	H		9100
	I		9820
	J		10600
	K		11440
	L		12350
	M		13330

### Example of M07 Series Product Bin (3000K 52 series)



### 52 Series Lumen Bin

Lumen (lm)					
3000K		5700K		6500K	
Bin	Range	Bin	Range	Bin	Range
CD	6210~6700	DE	6700~7235	DE	6700~7235
DE	6700~7235	EF	7235~7810	EF	7235~7810
EF	7235~7810	FG	7810~8430	FG	7810~8430
FG	7810~8430	GH	8430~9100	GH	8430~9100
GH	8430~9100	HI	9100~9820	HI	9100~9820

# LIGHT LED M07 CoB Product Series

## ■ 80 Series Lumen Bin

Lumen (lm)					
3000K		5700K		6500K	
Bin	Range	Bin	Range	Bin	Range
GH	8430~9100	HI	9100~9820	HI	9100~9820
HI	9100~9820	IJ	9820~10600	IJ	9820~10600
IJ	9820~10600	JK	10600~11440	JK	10600~11440
JK	10600~11440	KL	11440~12350	KL	11440~12350
KL	11440~12350	LM	12350~13330	LM	12350~13330

## ■ Forward Voltage Binning Parameter (25degC)

Parameter	Bin	Symbol	Min	Max	Unit	Condition
Forward Voltage	V1	V <sub>F</sub>	33.6	42	V	I <sub>F</sub> =Typical current

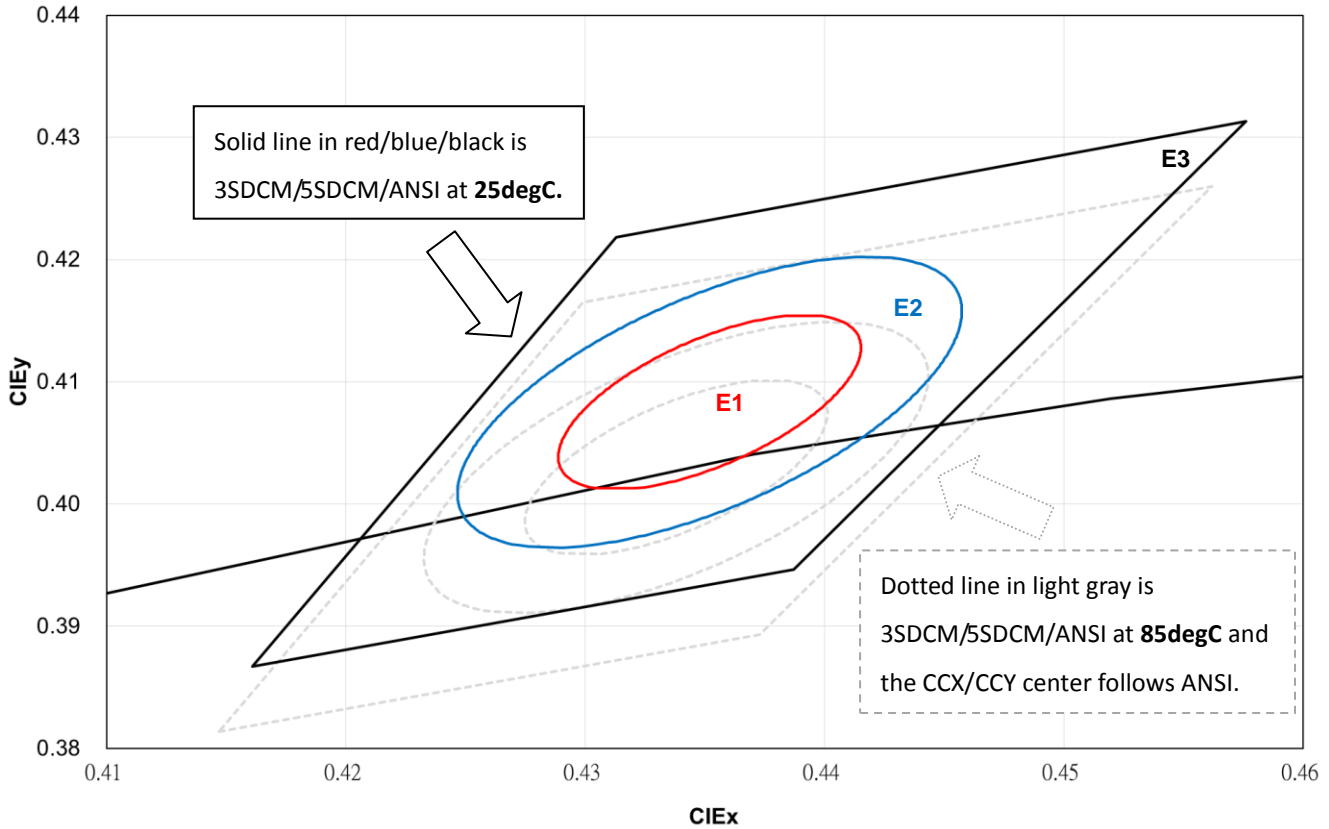
**Note: Full Rank on Label**

Example: V1/CE/D1

Forward Voltage Rank	Luminous Flux Rank	Color Rank
V1	CE	D1

# LIGHT LED M07 CoB Product Series

■ Example of LiteOn CoB MacAdam Ellipse Color Definition (Ex: 3000K)



CIE Center Point						
CCT	25degC (LiteOn Spec.)		85degC (ANSI)		Hot/Cold Factor	
	CCX	CCY	CCX	CCY	CCX	CCY
3000	0.4369	0.4067	0.4338	0.4030	-0.0031	-0.0037
5700	0.3322	0.3471	0.3287	0.3417	-0.0035	-0.0054
6500	0.3170	0.3354	0.3123	0.3282	-0.0047	-0.0072

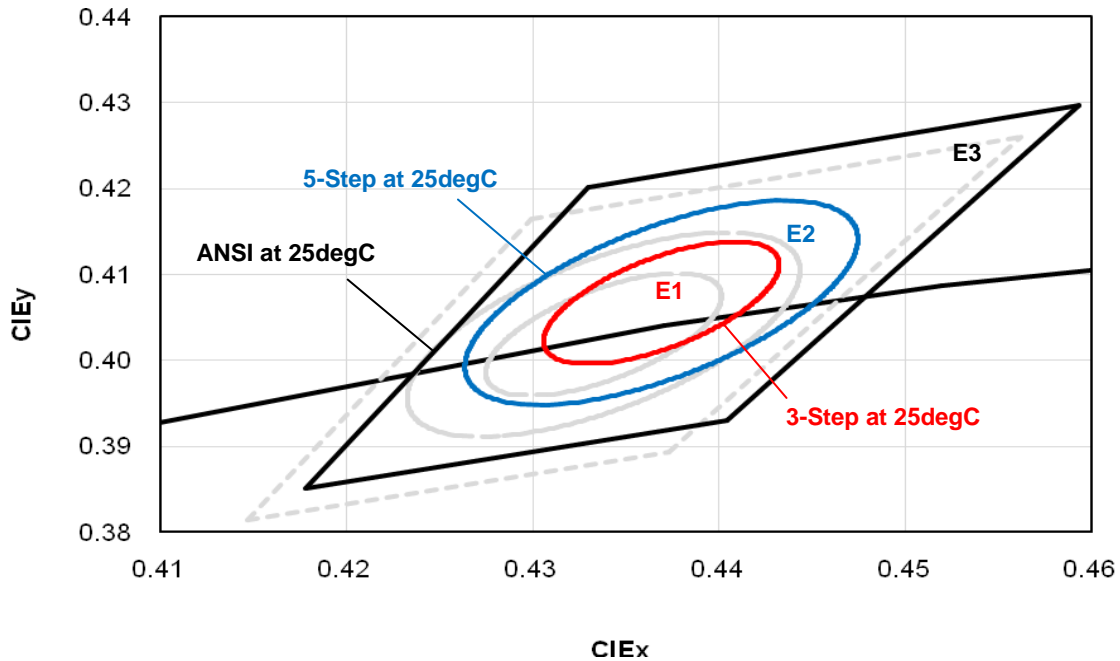
**Notes**

- LiteOn tester and shipping spec follow the color bin with 25degC CCX/CCY center.
- The Hot/Cold factor means the CCX/CCY shift from 25degC to 85degC.
- The Hot/Cold shift is measured by LiteOn CAS 140B instrument system.
- The ellipse equation expression:  $SDCM = (g11*(x-x_0)^2 + 2*g12*(x-x_0)*(y-y_0) + g22*(y-y_0)^2)^{0.5}$

# LIGHT LED M07 CoB Product Series

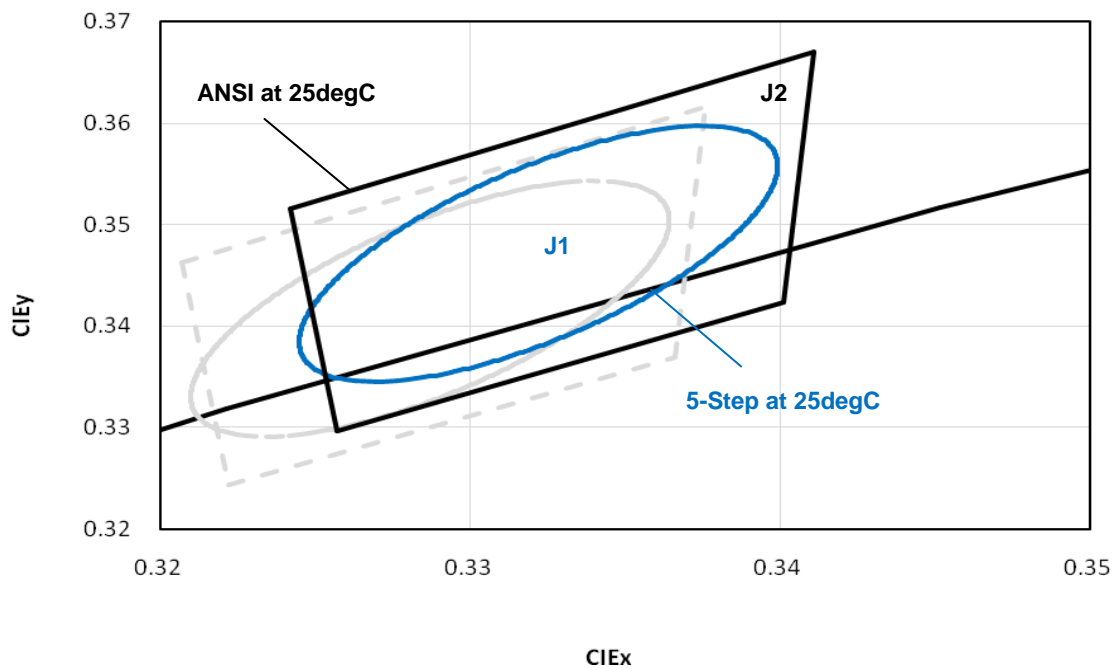
■ M07 CRI80 3000K

PN: LTPL-M074xxZS30-T0



■ M07 CRI80 5700K

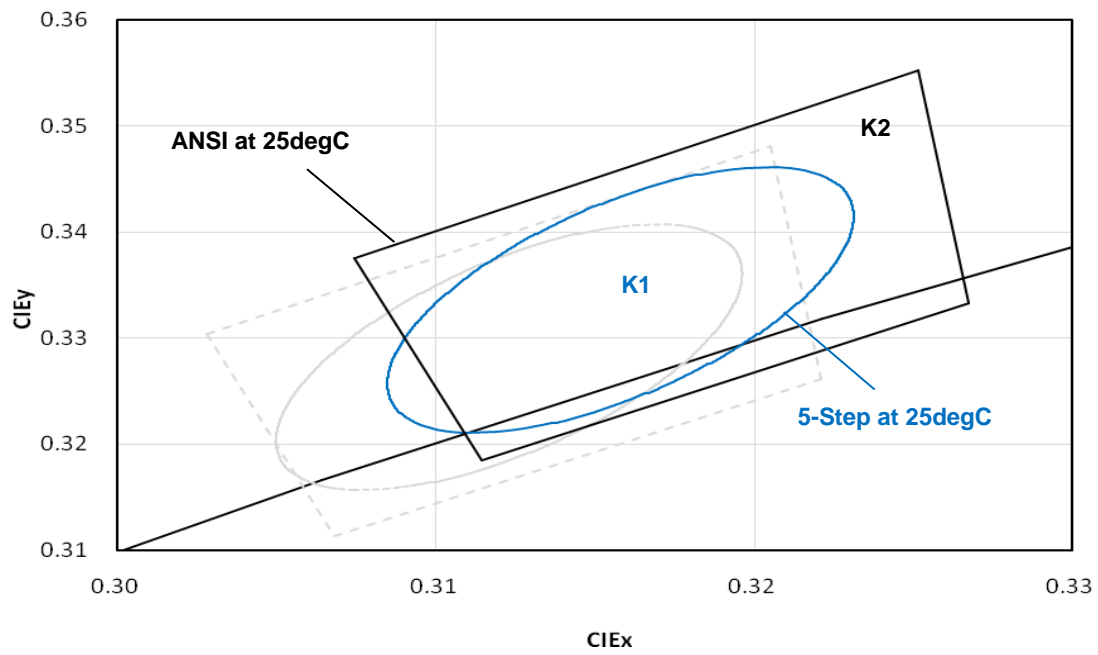
PN: LTPL-M074xxZS57-F1



# LIGHT LED M07 CoB Product Series

■ M07 CRI80 6500K

PN: LTPL-M074xxZS65-F1





# LIGHT LED M07 CoB Product Series

## 6. Reliability Test Plan

No	Test item	Condition	Duration	Number of Failed	Result
1	High Temperature Operating Life	T <sub>c</sub> =85°C, I <sub>F</sub> =Typical Current	1K hours	0/10	Pass
2	Wet High Temperature Operating Life	60°C/90%RH, I <sub>F</sub> =Typical Current(DC) 30 mins ON/OFF	1K hours	0/10	Pass
3	Thermal Shock	-40°C to 125°C, 15minutes dwell, <10 seconds transfer, measurement in every 250 cycles	500 cycles	0/10	Pass
4	Fast Switch Cycling Test	40000cycles, 2 mins On/Off, Room temperature(25°C+/-5°C), measurement in every 5000 cycles	40K cycles	0/10	Pass
5	High Temperature Storage Life	T <sub>a</sub> =120°C	1K hours	0/10	Pass
6	Low Temperature Storage Life	T <sub>a</sub> =-55°C	1K hours	0/10	Pass
7	Mechanical Shock	1500G, 0.5ms pulse, 5 shocks each 6 axis	30 Times (5 shocks each 6 axis)	0/10	Pass
8	Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20G for approximately minute 1.5mm, each applied three times per axis over 6 hrs.	18 hrs (3 times per axis over 6 hrs)	0/10	Pass

### Criteria for Judging the Damage

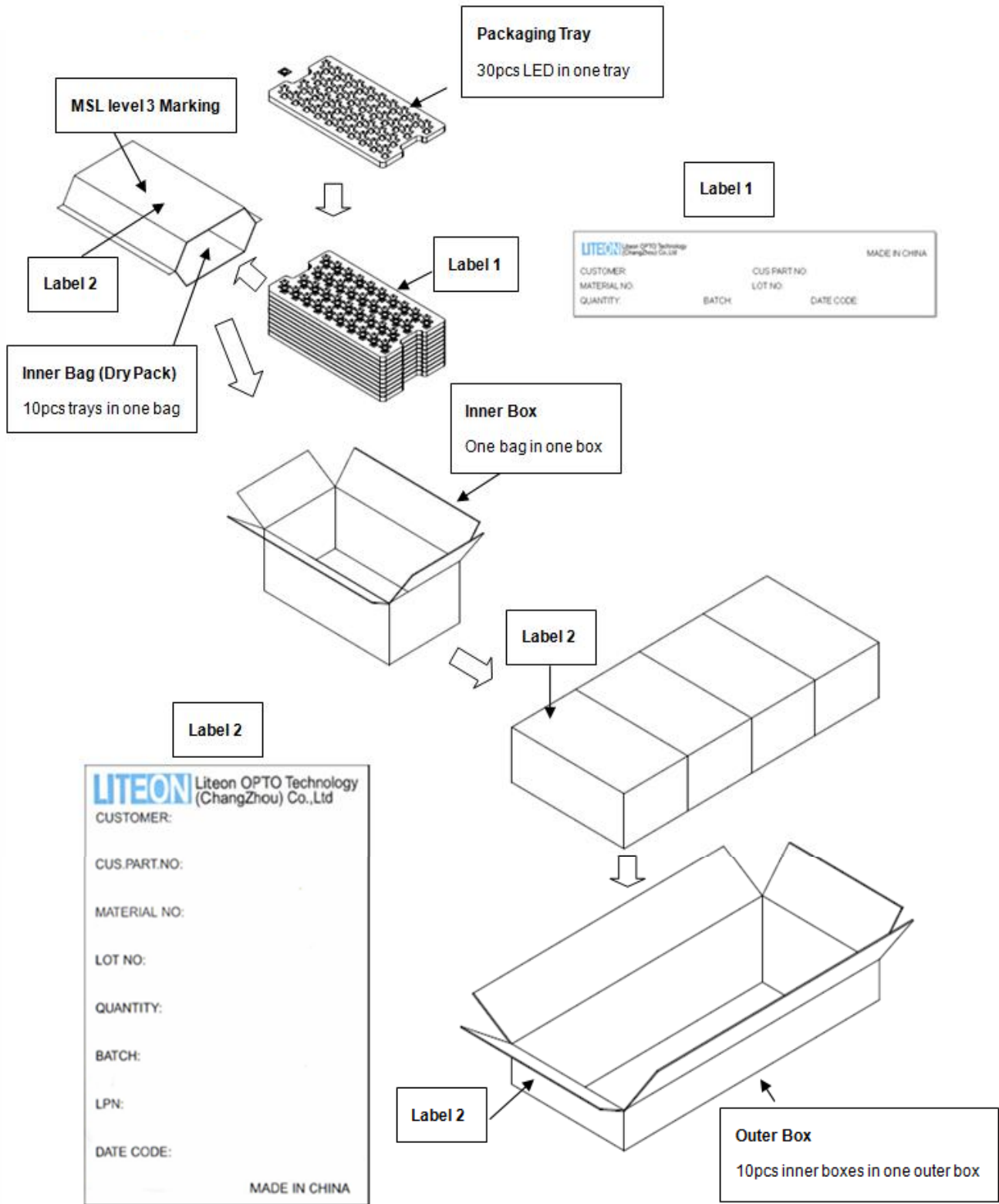
Item	Symbol	Test Condition	Criteria for Judgment	
			Min.	Max.
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =Typical Current		U.S.L. x 1.1
Luminous Flux	Lm	I <sub>F</sub> =Typical Current	L.S.L. x 0.7	
CCX & CCY	X,Y	I <sub>F</sub> =Typical Current		Shift<0.02

### Notes

1. Operating life tests are mounted on thermal heat sink
2. Storage items are only component, not put on heat sink.

# LIGHT LED M07 CoB Product Series

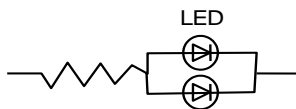
## 7. Packing Specifications



# LIGHT LED M07 CoB Product Series

## 8. Cautions

**8.1** An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in circuit below.



(A) Recommended circuit.

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

**8.2** Do not put any pressure on the light emitting surface either by finger or any hand tool and do not stack the COB products. Stress or pressure may cause damage to the wires of the LED array.

**8.3** This product is not designed for the use under any of the following conditions, please confirm the performance and reliability are well enough if you use it under any of the following conditions

- Do not use sulfur-containing materials in commercial products including the materials such as seals and adhesives that may contain sulfur.
- Do not put this product in a place with a lot of moisture (over 85% relative humidity), dew condensation, briny air, and corrosive gas (Cl, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NOX, etc.), exposure to a corrosive environment may affect silver plating.

### ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or “no light up” at low currents.

To verify for ESD damage, check for “light up” and  $V_F$  of the suspect LEDs at low currents.