



Specific Lighting Product Data Sheet

M03 CoB Product Series Data Sheet

Spec No.: DS23-2016-0112

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Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

LIGHT LED M03 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 3 6 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

M03: Ceeramic substrate with 15.85x15.85mm square.

Code 3: Light Emitting Surface

6: 9mm excluding dam

Code 4: Product Series

14: 14 Series

22: 22 Series

Code5: Color Temperature

27: 2700K at 85degC

30: 3000K at 85degC

40: 4000K at 85degC

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

Code6: Hue Bin by MacAdam Ellipses Step

T0: 2700~4000K MacAdam Ellipse / ANSI BIN

LIGHT LED M03 CoB Product Series

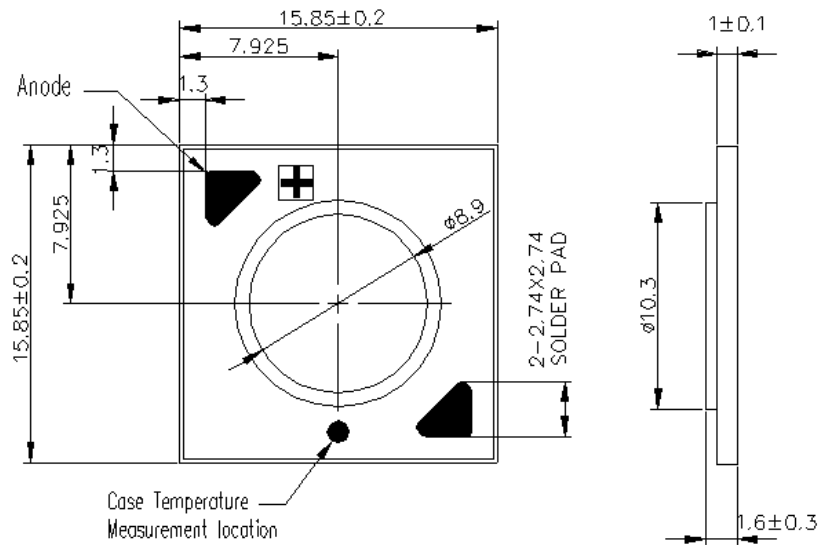
1.4 Product List

Part Number	Product Series	CCT	CRI	Color Bin			Lumen Bin	
				3SDCM	5SDCM	ANSI	-8%~+8%	-15%~+15%
LTPL-M03614ZS27-T0	14	2700K	80	☆	☆	☆	☆	☆
LTPL-M03614ZS30-T0	14	3000K	80	☆	☆	☆	☆	☆
LTPL-M03614ZS40-T0	14	4000K	80	☆	☆	☆	☆	☆
LTPL-M03622ZS27-T0	22	2700K	80	☆	☆	☆	☆	☆
LTPL-M03622ZS30-T0	22	3000K	80	☆	☆	☆	☆	☆
LTPL-M03622ZS40-T0	22	4000K	80	☆	☆	☆	☆	☆

LIGHT LED M03 CoB Product Series

2. Outline Dimensions

2.1 Form Factor of M036 series CoB

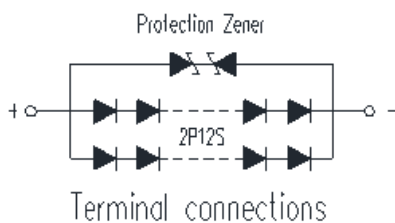


Notes

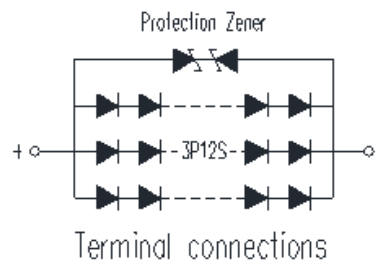
1. All dimensions are in millimeters.
2. Tolerance is ± 0.3 mm unless otherwise noted.
3. LED of equivalent circuit means all series/parallel in CoB package.

2.2 Internal Equivalent Circuit

14 Series Product



22 Series Product



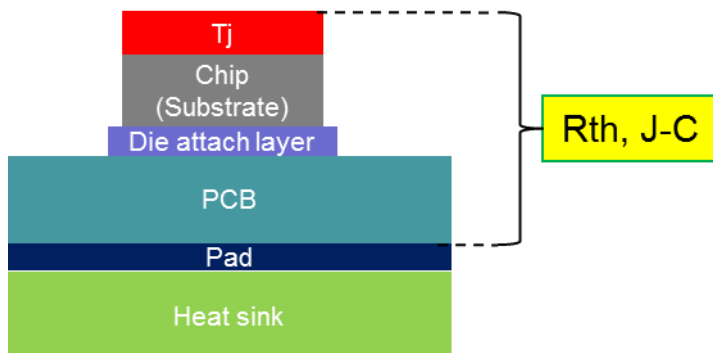
LIGHT LED M03 CoB Product Series

3. Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Product Series	Rating	Unit
Power Dissipation	P _O	14	16	W
		22	24	
Forward Current	I _F	14	400	mA
		22	600	
Junction Temperature	T _j		125	°C
Thermal Resistance, Junction-Case	R _{th, J-C}	14	1.7	°C/W
		22	1.2	
Operating Temperature Range	T _{opr}		-40 to 85	°C
Storage Temperature Range	T _{stg}		-40 to 100	°C
Breakdown Voltage(DC)	V _B		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 Rth is °C/W electrical.
5. The M03 CoB is recommended soldering temperature under 350degC and could not over 3.5sec.



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4. Electro-Optical Characteristics

4.1 Typical Performance

■ 14 Series Product

Dominant CCT	Product Series	Current (mA)	V _F (V) @25°C	Flux(lm) @25°C	V _F (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
2700K	14	350	37.1	1624	35.5	1446	125	116
3000K	14	350	37.1	1692	35.5	1506	130	121
4000K	14	350	37.1	1794	35.5	1596	138	128

■ 22 Series Product

Dominant CCT	Product Series	Current (mA)	V _F (V) @25°C	Flux(lm) @25°C	V _F (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
2700K	22	500	36.9	2340	35.3	2083	127	118
3000K	22	500	36.9	2438	35.3	2170	132	123
4000K	22	500	36.9	2584	35.3	2300	140	130

Notes

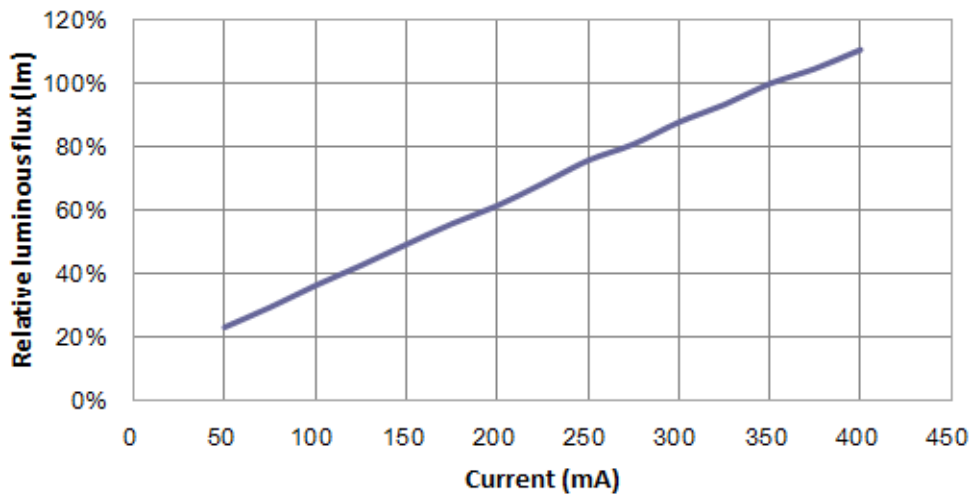
1. All of V_F value are typical, the real bin range please refer page 14 "V_F Binning Parameter".
2. All of flux value are typical, the real bin range please refer page 13 "Flux Binning Parameter".
3. Tolerance of flux is ±7%, tolerance of CCX/CCY is ±0.007, tolerance of CRI is ±2, and tolerance of V_F is ±3%.
4. Typical viewing angle is 120deg.

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4.2 Forward Current vs. Lumen and Voltage

■ 14 Series Product

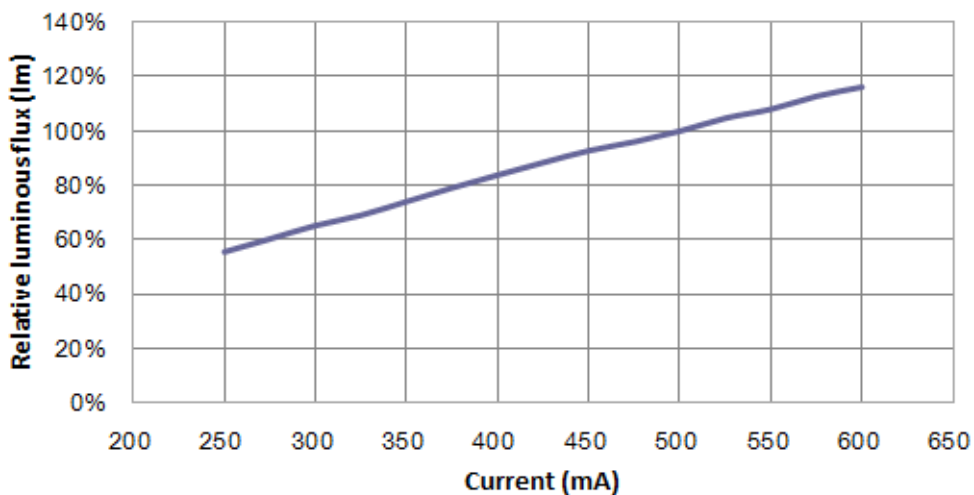
Current (mA)	V _F (V)	Flux (lm)		
		2700K	3000K	4000K
		CRI>80	CRI>80	CRI>80
50	31.8	377	393	417
75	32.3	479	499	529
100	32.7	591	616	653
125	33.1	693	722	765
150	33.6	801	834	885
175	34.0	907	945	1001
200	34.5	1000	1041	1104
225	35.0	1113	1159	1229
250	35.4	1232	1283	1360
275	35.8	1315	1369	1452
300	36.2	1428	1487	1576
325	36.7	1517	1581	1675
350	37.1	1624	1692	1794
375	37.5	1702	1773	1879
400	37.9	1798	1873	1985



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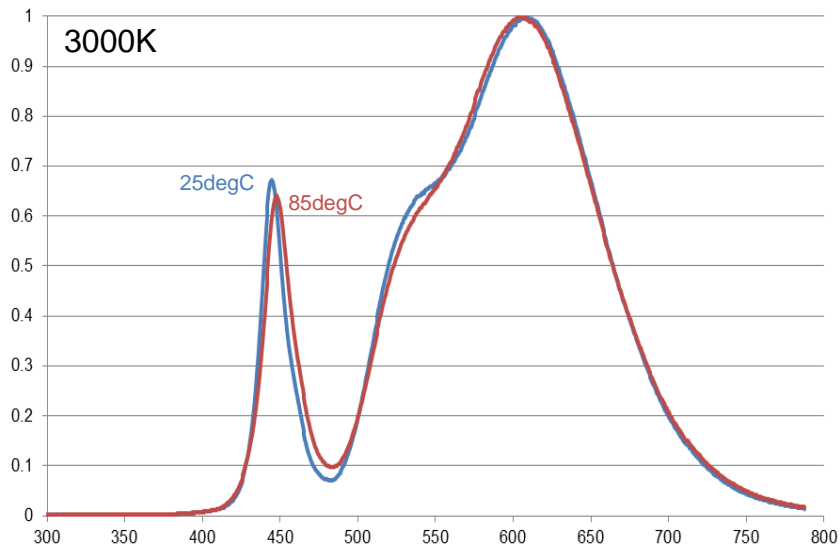
■ 22 Series Product

Current (mA)	V _F (V)	Flux (lm)		
		2700K	3000K	4000K
		CRI>80	CRI>80	CRI>80
250	33.9	1300	1354	1436
275	34.3	1411	1470	1558
300	34.6	1525	1589	1684
325	34.9	1616	1683	1784
350	35.2	1734	1806	1914
375	35.5	1852	1929	2044
400	35.7	1961	2042	2165
425	36.0	2069	2155	2284
450	36.3	2172	2262	2398
475	36.6	2248	2342	2482
500	36.9	2340	2438	2584
525	37.2	2453	2555	2708
550	37.5	2529	2634	2792
575	37.7	2639	2749	2914
600	38.0	2719	2833	3003

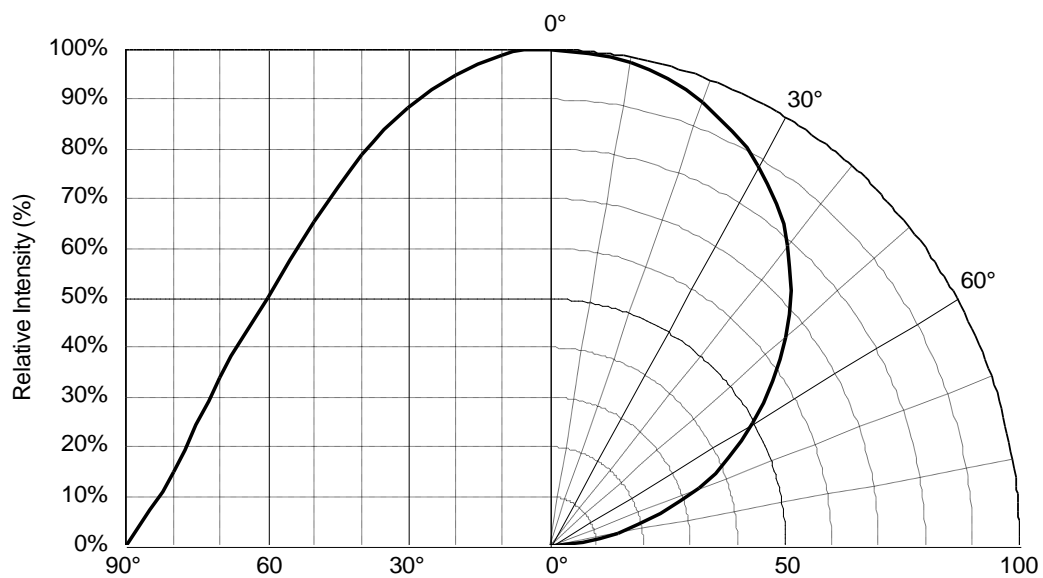


LIGHT LED M03 CoB Product Series

4.3 Relative Spectral Power Distribution at Typical Current

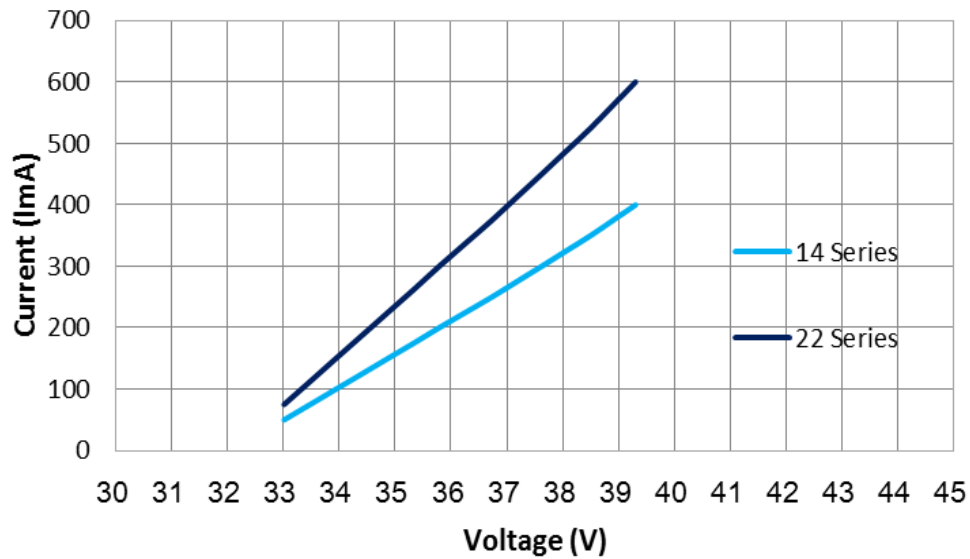


4.4 Radiation Characteristics

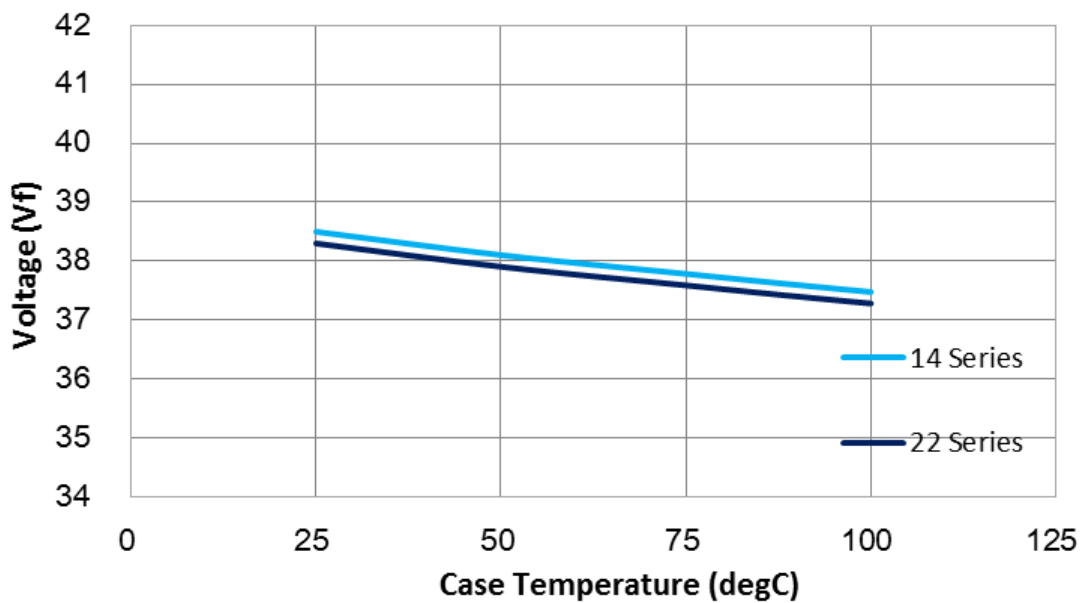


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4.5 Forward Current vs. Forward Voltage

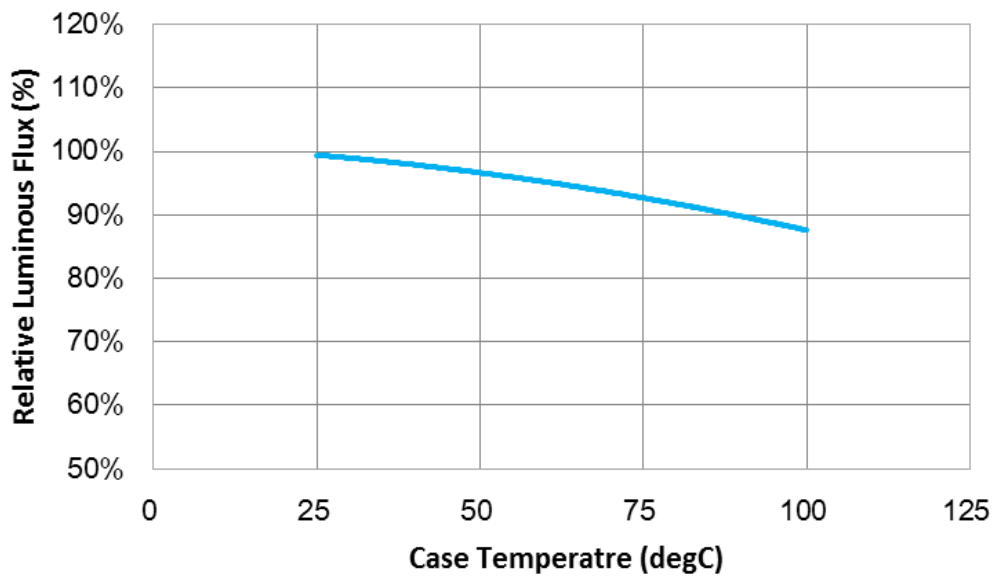


4.6 Forward Voltage vs. Junction Temperature

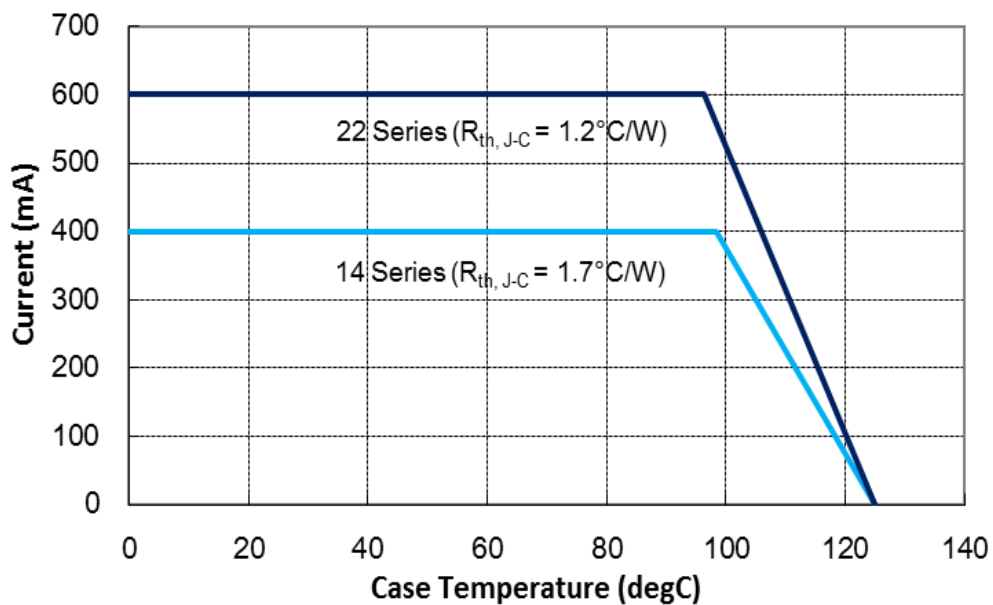


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4.7 Relative Intensity vs. Case Temperature



4.8 Forward Current Degrading Curve



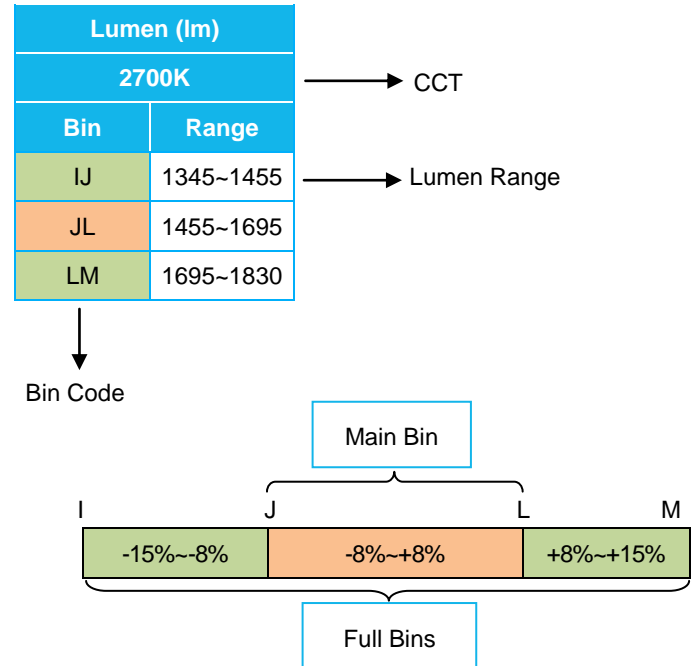
LIGHT LED M03 CoB Product Series

5. CoB Binning Definition

Flux Binning Parameter (25degC)

Lumen CODE List of M03 Series Product			
Parameter	Code	Unit	Lumen
Luminous Flux	I	lm	1345
	J		1455
	K		1570
	L		1695
	M		1830
	N		1975
	O		2130
	P		2300
	Q		2485
	R		2680
	S		2890
	T		3120

Example of M03 Series Product Bin (2700K 14 series)



14 Series Lumen Bin

Lumen (lm)					
2700K		3000K		4000K	
Bin	Range	Bin	Range	Bin	Range
IJ	1345~1455	IJ	1345~1455	JK	1455~1570
JK	1455~1570	JK	1455~1570	KL	1570~1695
KL	1570~1695	KL	1570~1695	LM	1695~1830
LM	1695~1830	LM	1695~1830	MN	1830~1975
MN	1830~1975	MN	1830~1975	NO	1975~2130

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■ 22 Series Lumen Bin

Lumen (lm)					
2700K		3000K		4000K	
Bin	Range	Bin	Range	Bin	Range
NO	1975~2130	NO	1975~2130	OP	2130~2300
OP	2130~2300	OP	2130~2300	PQ	2300~2485
PQ	2300~2485	PQ	2300~2485	QR	2485~2680
QR	2485~2680	QR	2485~2680	RS	2130~2300
RS	2680~2890	RS	2680~2890	ST	2890~3120

■ Forward Voltage Binning Parameter (25degC)

Parameter	Bin	Symbol	Min	Max	Unit	Condition
Forward Voltage	V1	V _F	33.6	42	V	I _F =Typical current

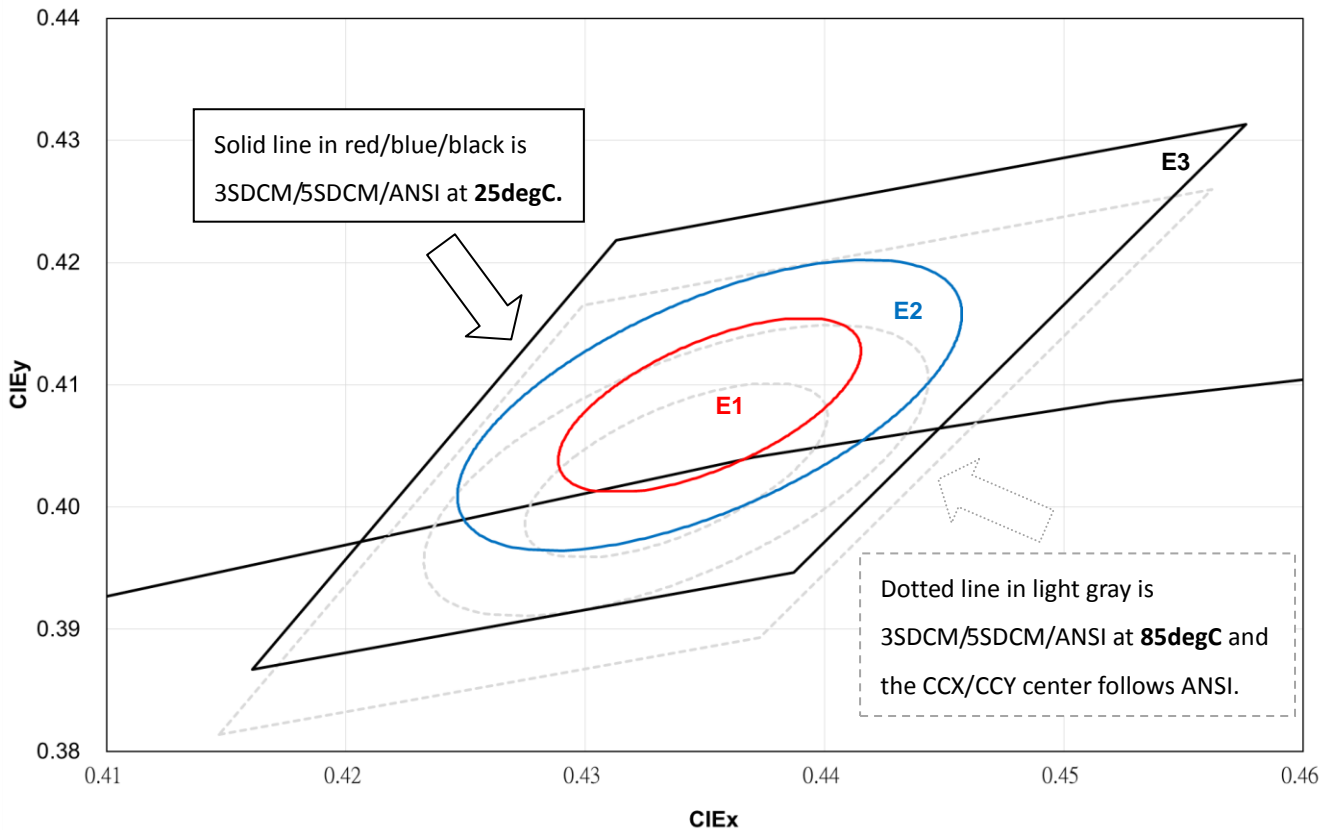
Note: Full Rank on Label

Example: V1/DF/D1

Forward Voltage Rank	Luminous Flux Rank	Color Rank
V1	DF	D1

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■ 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
2700	0.4582	0.4150	0.4578	0.4101	-0.0004	-0.0049
3000	0.4352	0.4083	0.4338	0.403	-0.0014	-0.0053
4000	0.3849	0.3856	0.3818	0.3797	-0.0031	-0.0059

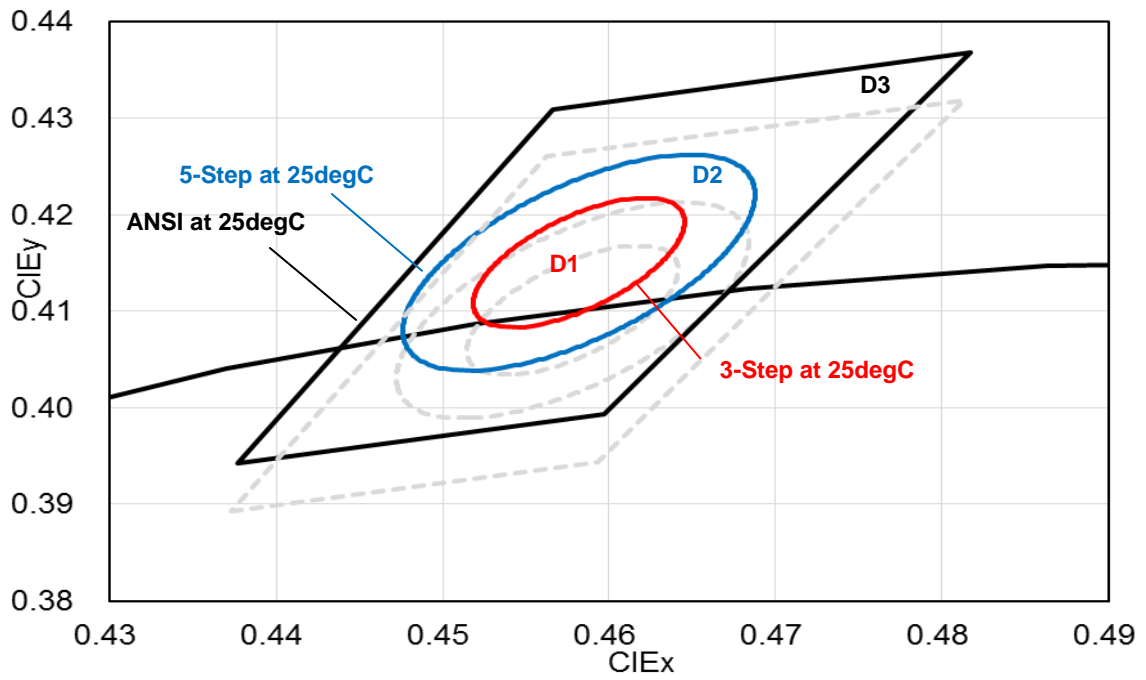
Notes

- 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: $SDCM = (g11*(x-x_0)^2 + 2*g12*(x-x_0)*(y-y_0) + g22*(y-y_0)^2)^{0.5}$

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■ M03 CRI80 2700K

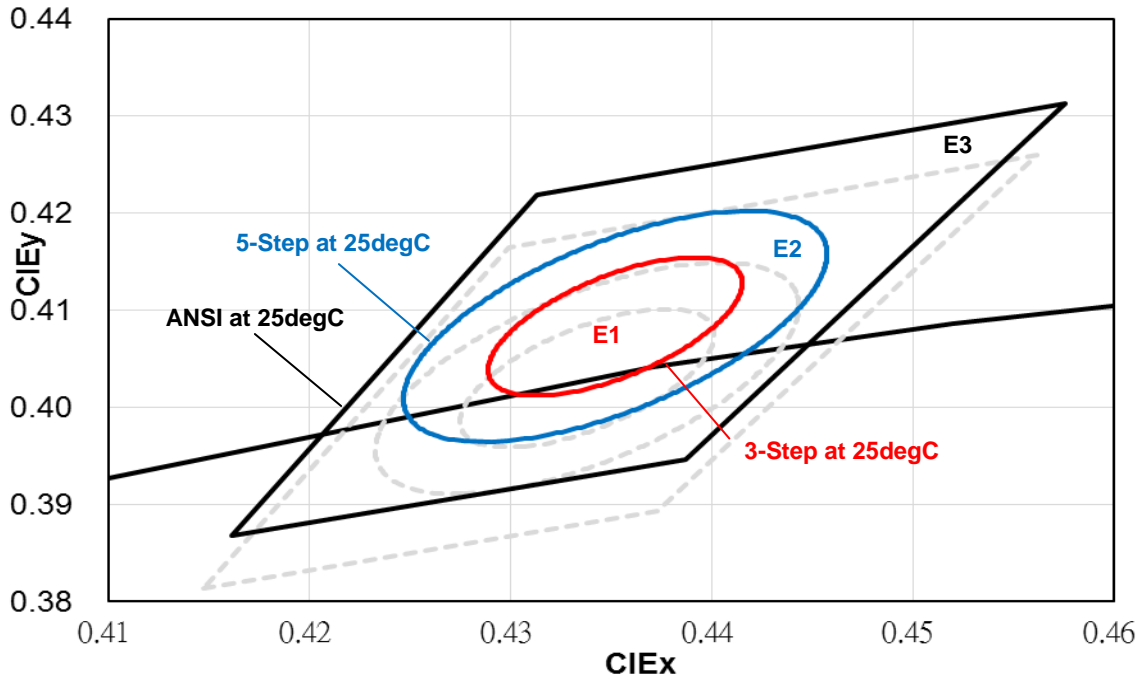
PN: LTPL-M036xxZS27-T0



LIGHT LED M03 CoB Product Series

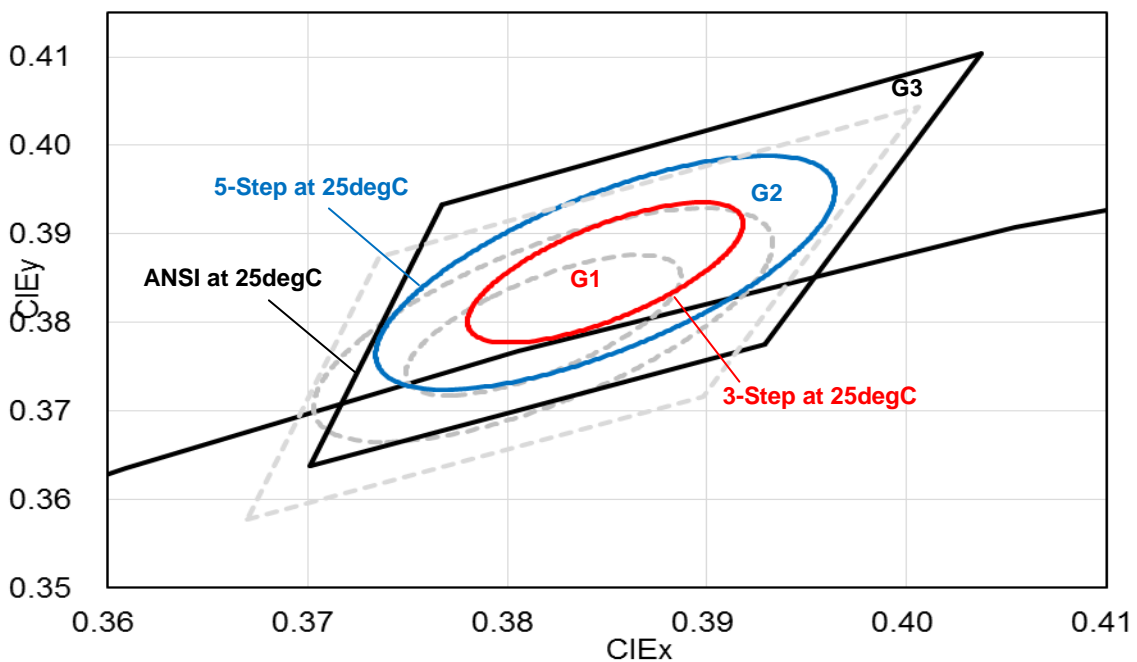
■ M03 CRI80 3000K

PN: LTPL-M036xxZS30-T0



■ M03 CRI80 4000K

PN: LTPL-M036xxZS40-T0



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6. Reliability Test Plan

No	Test item	Condition	Duration	Number of Failed	Result
1	High Temperature Operating Life	T _c =85°C, I _F =Typical Current	1K hours	0/10	Pass
2	Wet High Temperature Operating Life	60°C/90%RH, I _F =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 _a =120°C	1K hours	0/10	Pass
6	Low Temperature Storage Life	T _a =-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

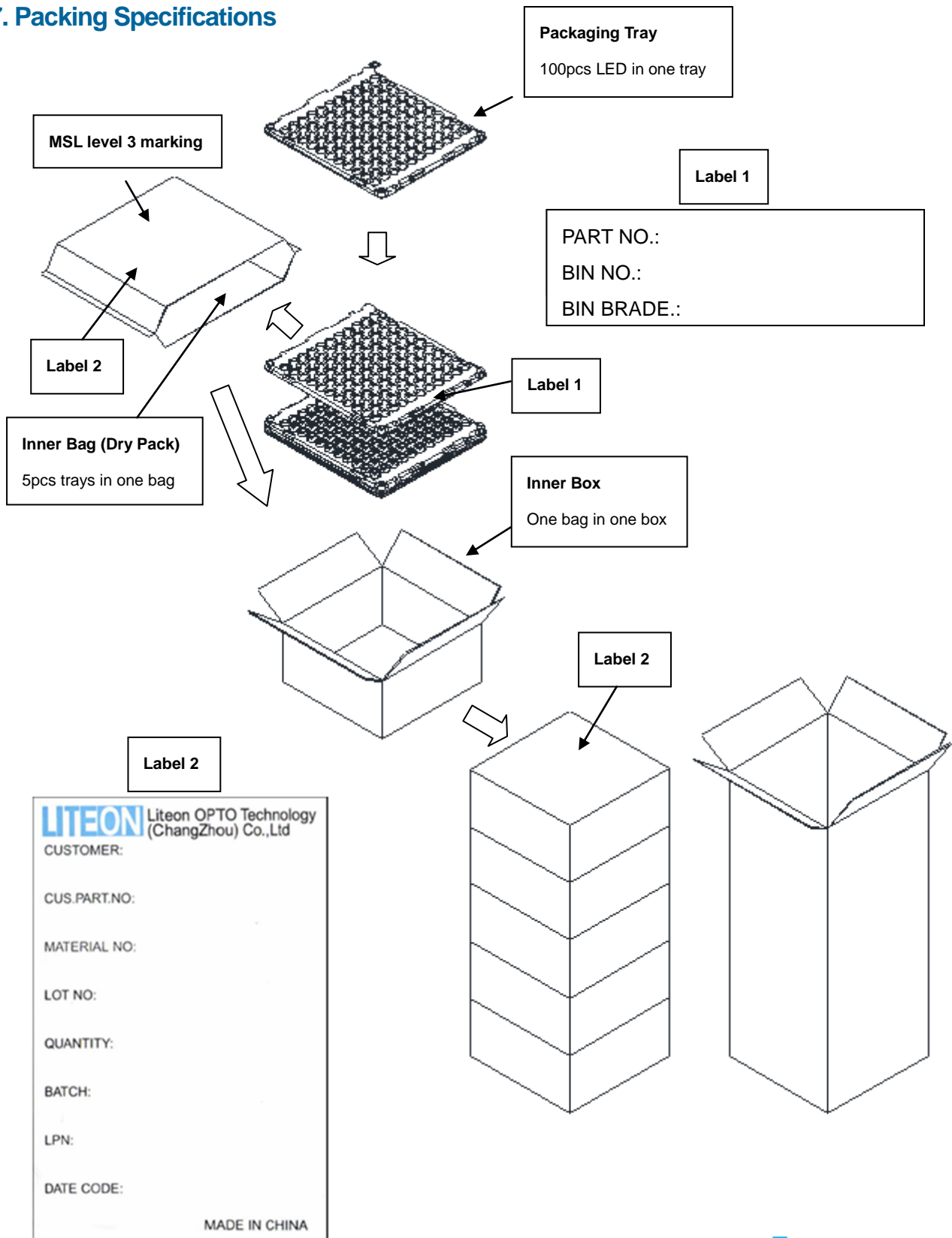
Item	Symbol	Test Condition	Criteria for Judgment	
			Min.	Max.
Forward Voltage	V _F	I _F =Typical Current		U.S.L. x 1.1
Luminous Flux	Lm	I _F =Typical Current	L.S.L. x 0.7	
CCX & CCY	X,Y	I _F =Typical Current		Shift<0.02

Notes

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

LIGHT LED M03 CoB Product Series

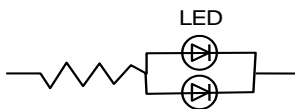
7. Packing Specifications



LIGHT LED M03 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, H₂S, NH₃, SO₂, 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.