



# PC35R23 V0 Product Specification

## Approval Sheet

PC35R23

Product Specification



<b>Product</b>	Red SMD LED
<b>Part Number</b>	PC35R23 V0
<b>Issue Date</b>	2021/07/14



### ■ Features

- ✓ Red SMD LED (L x W x H) of 3.4 x 3.3 x 1.9 mm
- ✓ AEC-Q101 Rev. D and IEC 60810 qualification
- ✓ Dice Technology : AlGaInP
- ✓ Qualified according to JEDEC moisture sensitivity Level 2
- ✓ Cu Alloy with Gold plated lead frame
- ✓ Environmental friendly ; RoHS compliance
- ✓ ESD protection
- ✓ Packing : 1,000 / 500 pcs/reel

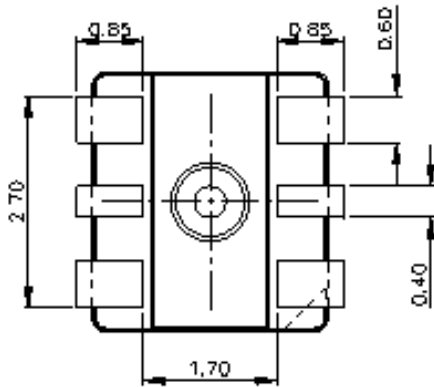
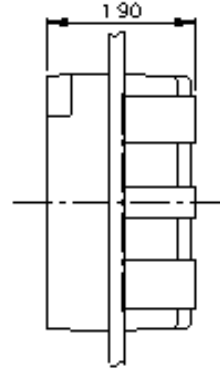
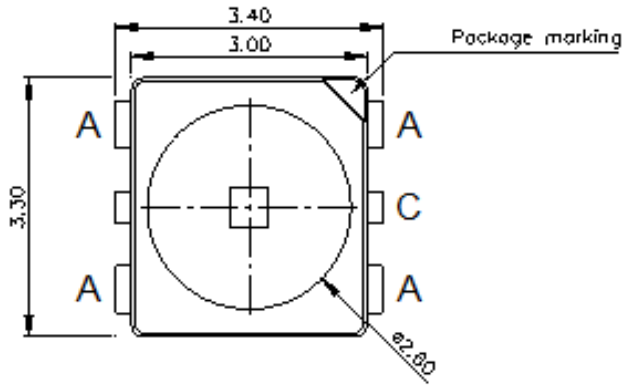
### ■ Applications

- ✓ Center high mounted stop light
- ✓ Stop light
- ✓ Rear Combination light
- ✓ Exterior Automotive Lighting
- ✓ Automotive Interior Lighting

Outline Dimension

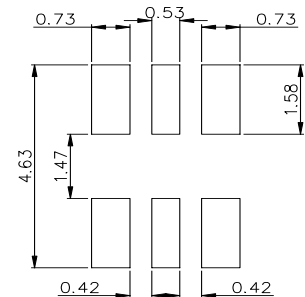
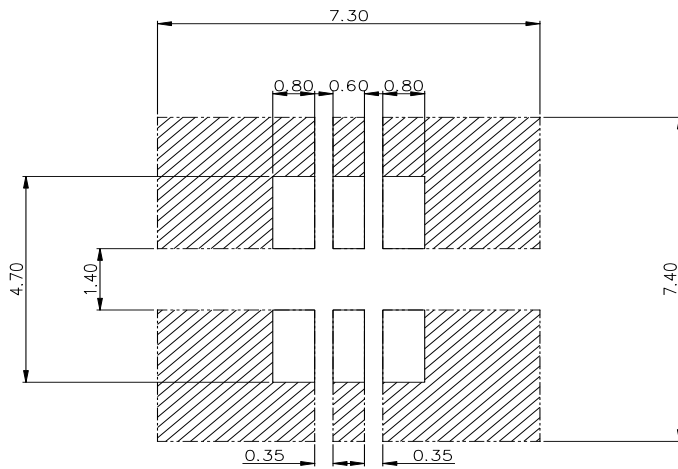
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Unit: mm, Tolerance:  $\pm 0.1\text{mm}$

Recommended Soldering Pad



- Exposed Cu for soldering
- Cu area with solder mask for heat dissipation

Performance

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■ **Electro-Optical Characteristics (Ta=25°C)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	$V_F$	$I_F = 140 \text{ mA}$	1.90	2.25	2.65	V
Dominant Wavelength	$\lambda_d$		612	620	635	nm
Luminous Intensity	$I_v$		4500	7500	9000	mcd
View Angle	$\theta$		120			deg
Thermal Resistance	$R_{th}$		60			°C/W

\* The Forward Voltage tolerance is  $\pm 0.05\text{V}$

\* The luminous intensity tolerance is  $\pm 8\%$

\* The Wavelength tolerance is  $\pm 0.5\text{nm}$

■ **Absolute Maximum Ratings**

Parameter	Symbol	value	Unit
DC Forward Current	$I_F$	200	mA
Power Dissipation	$P_D$	0.54	W
Pulse Forward Current <sup>(1)</sup>	$I_{FP}$	500	mA
Storage Temperature	$T_{stg}$	-40 ~ +125	°C
Operating Temperature	$T_{opr}$	-40 ~ +115	°C
Junction Temperature	$T_J$	125	°C
Junction Temperature for short time applications <sup>(2)</sup>	$T_J$	150	°C
ESD (HBM)	$ESD_{HBM}$	2000	V
Assembly Temperature	$T_{sld}$	260	°C

(1)  $I_{FP}$  Condition:  $t < 100 \mu\text{s}$  ;  $D = 0.001$  ;  $T_a = 25 \text{ }^\circ\text{C}$

(2) The median lifetime (L70/B50) for  $T_j = 150^\circ\text{C}$  is 100h.

**Binning**

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**Bin code definition**

V <sub>F</sub> Rank	Luminous Intensity Rank	Dominant Wavelength Rank
A	R2	A2000

**Forward Voltage (Ta=25°C, 140 mA)**

V <sub>F</sub> Rank	(Min) VF (V)	(Max.) VF (V)
A	1.90	2.05
B	2.05	2.20
C	2.20	2.35
D	2.35	2.50
E	2.50	2.65

**Luminous Intensity (Ta=25°C, 140 mA)**

Luminous Intensity Rank	Luminous Intensity	
	(Min.) I <sub>v</sub> (mcd)	(Max.) I <sub>v</sub> (mcd)
R1	4500	5600
R2	5600	7100
R3	7100	9000

**Dominant Wavelength (Ta=25°C, 140 mA)**

Wd Rank	(Min.) λ(nm)	(Max.) λ(nm)
A1000	612	616
A2000	616	620
A3000	620	624
A4000	624	630
A5000	630	635

\* The Forward Voltage tolerance is ±0.05V

\* The luminous intensity tolerance is ± 8%

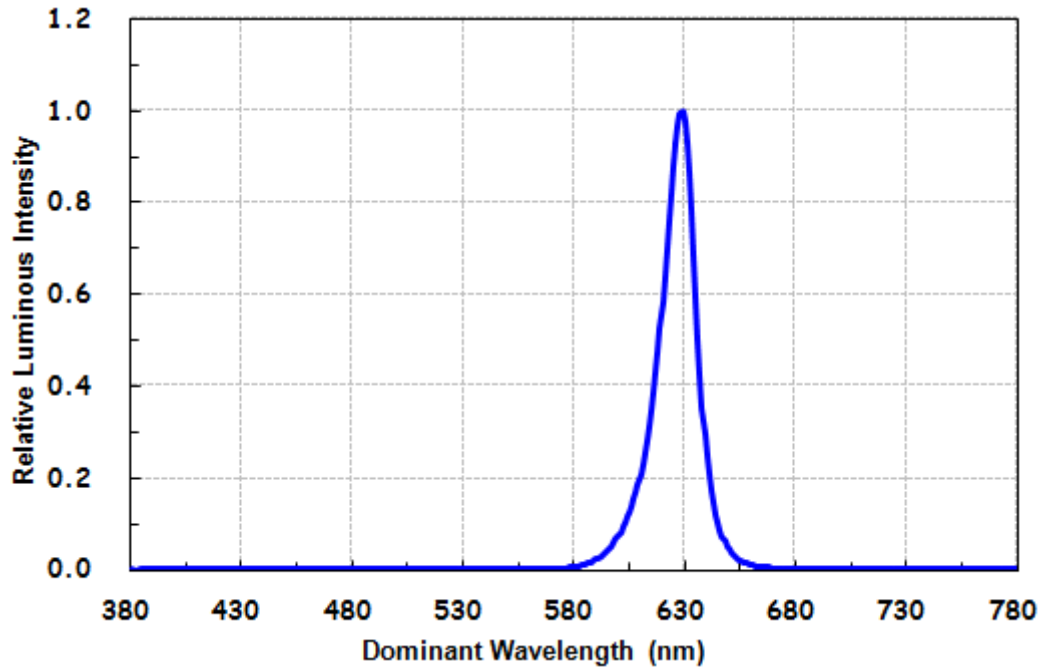
\* The Wavelength tolerance is ±0.5nm

## Characteristics

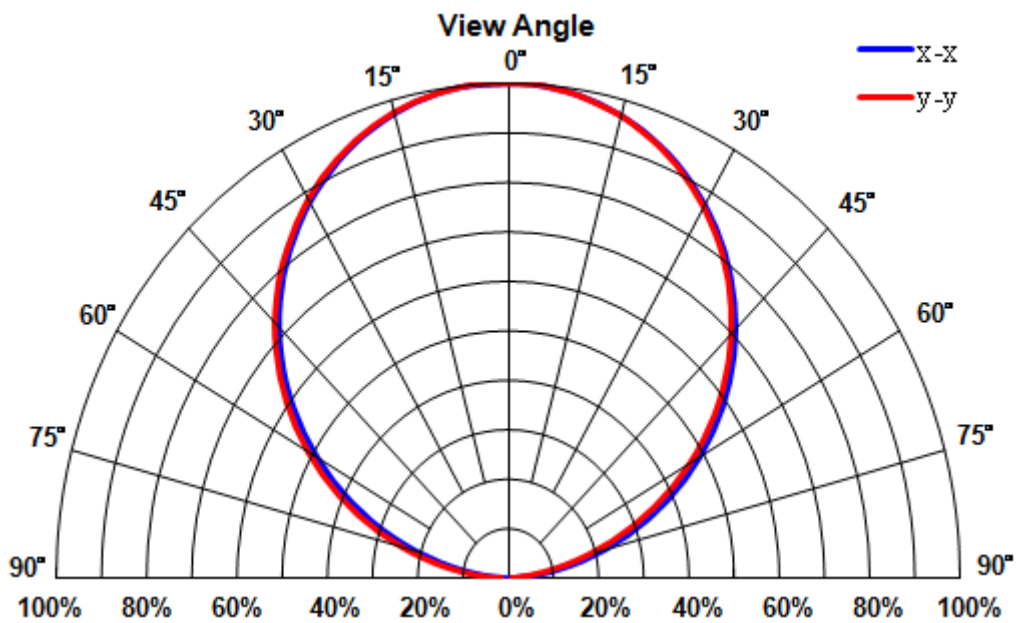
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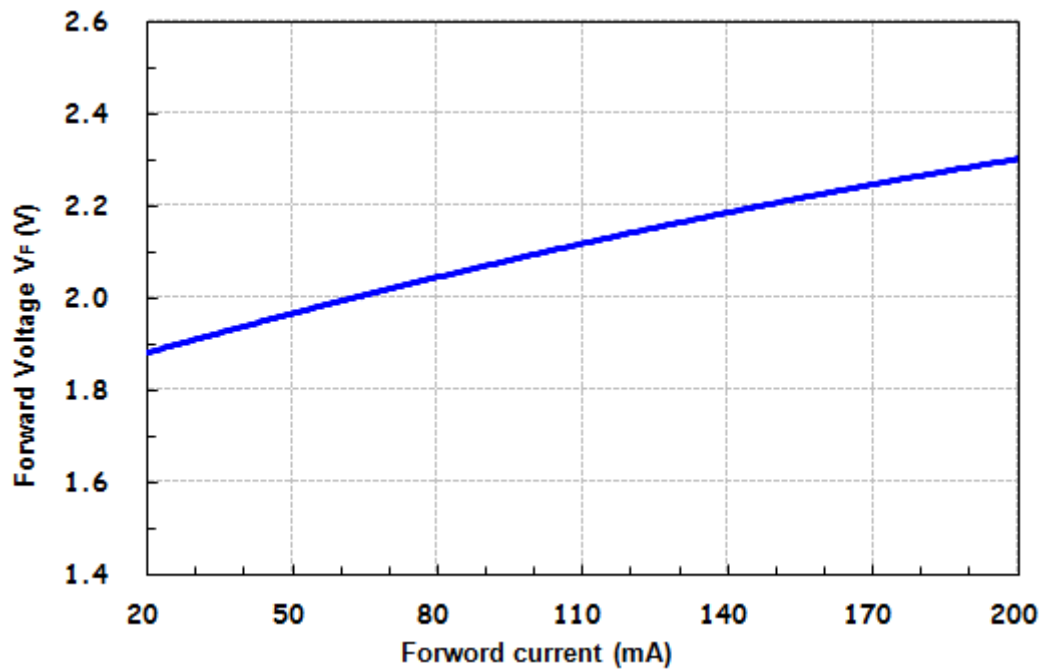
### Spectrum



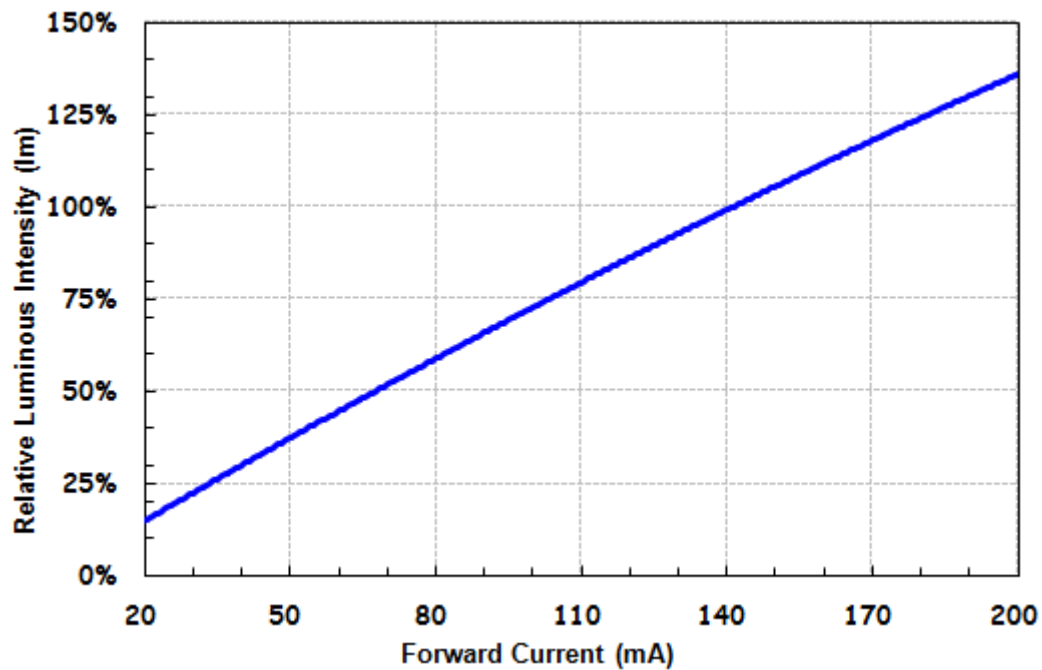
### Radiation Pattern



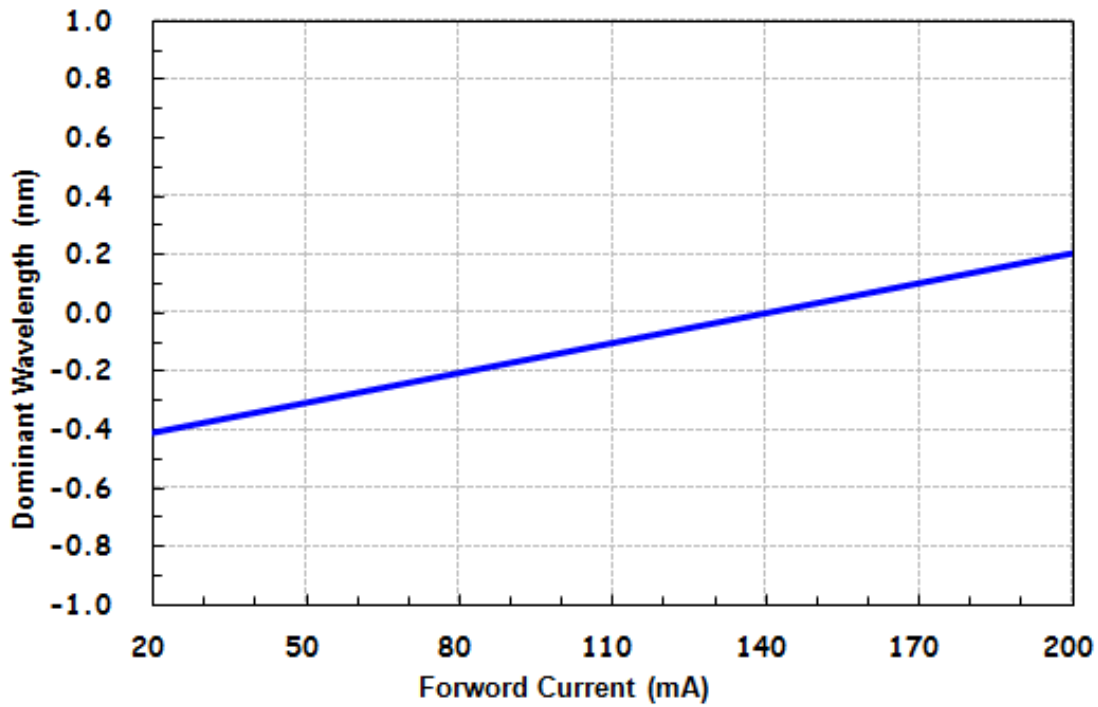
■ **Forward Voltage vs. Forward Current**



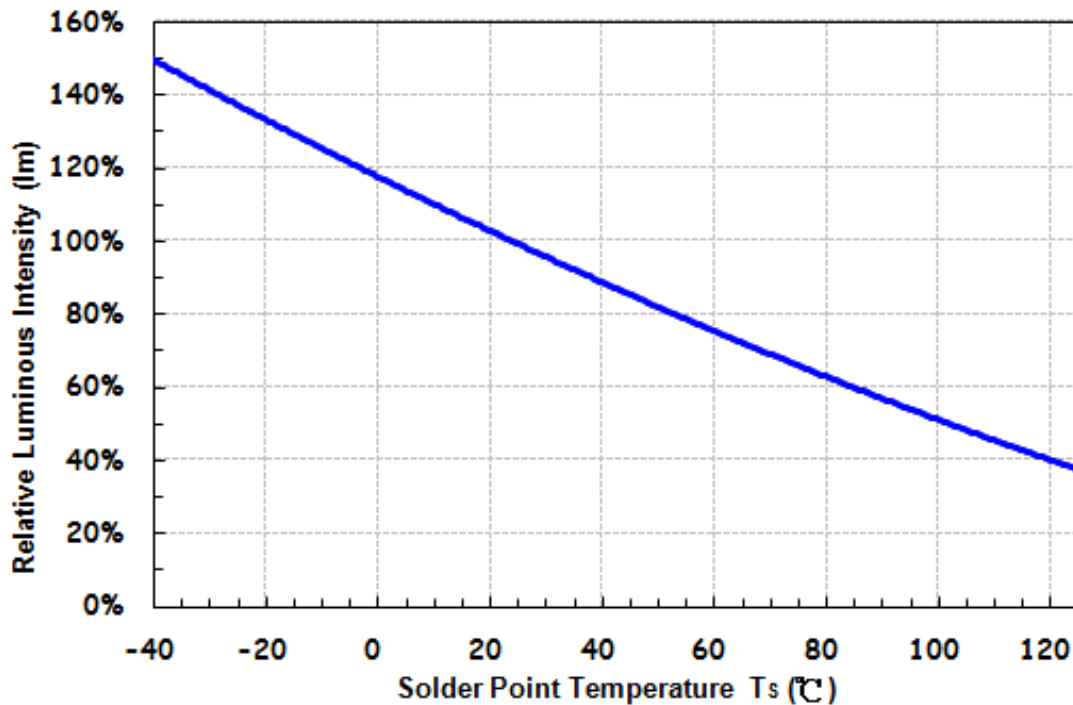
■ **Forward Current vs. Relative Luminous Intensity**



■ **Forward Current vs. Dominant Wavelength**

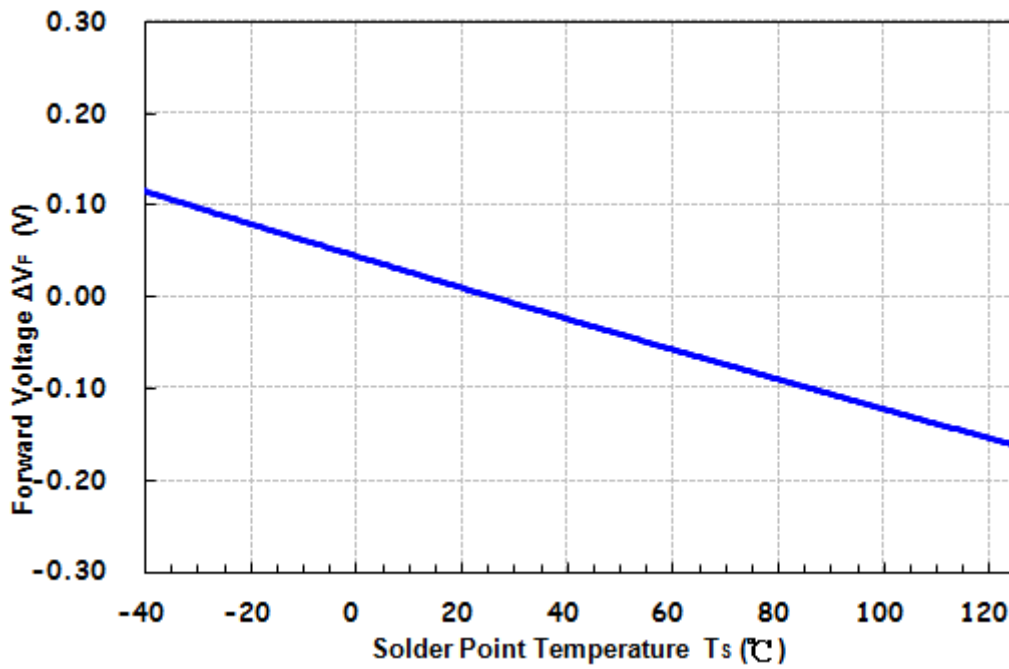


■ **Soldering Temperature vs. Relative Luminance,  $I_F=140\text{mA}$**

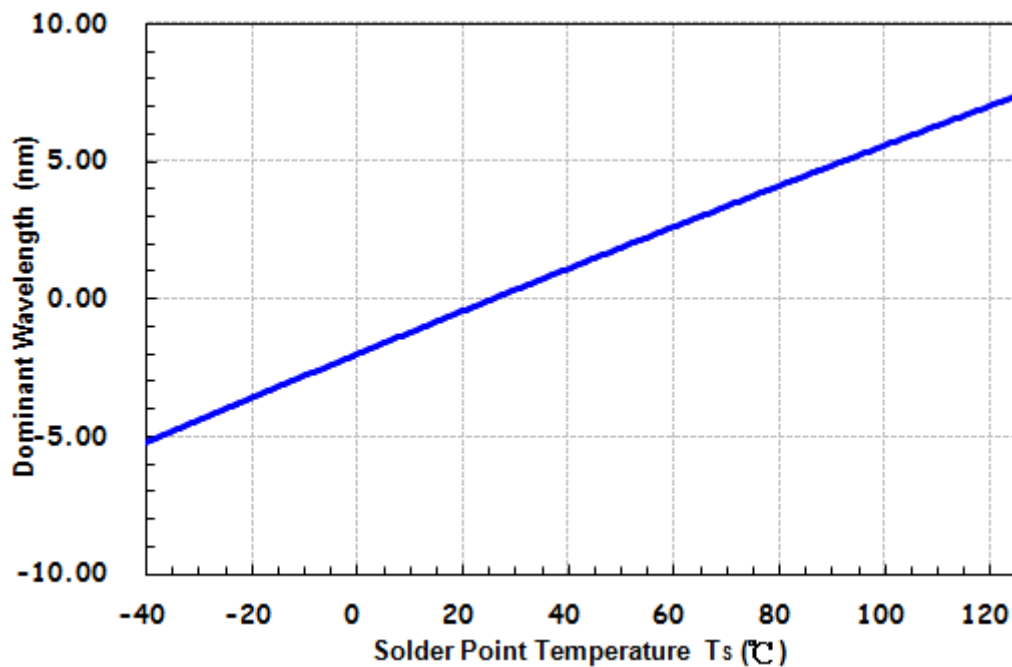




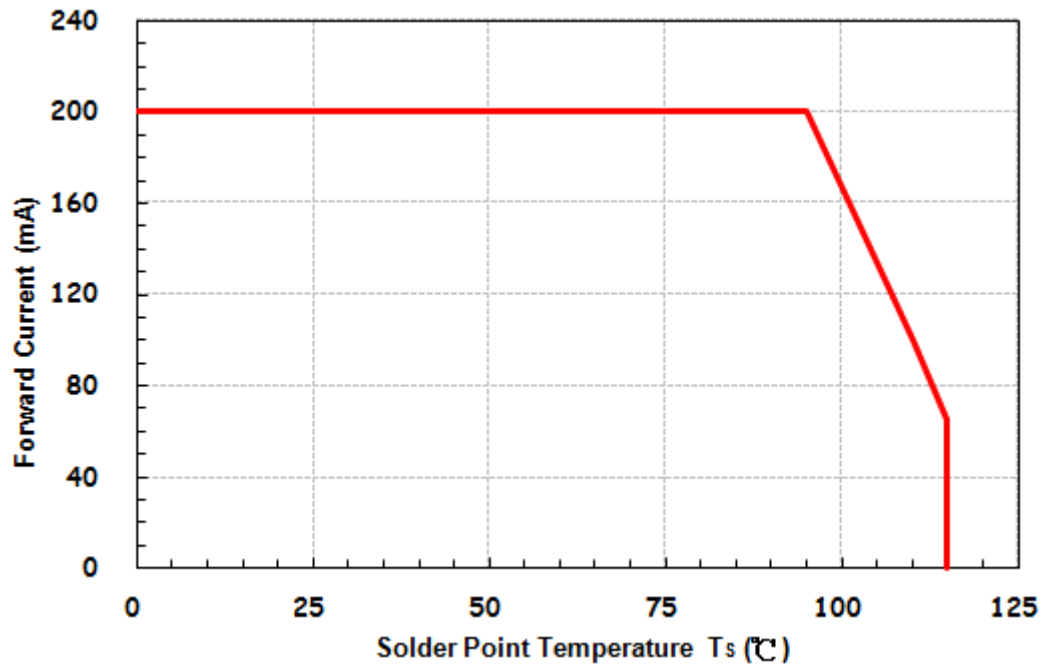
■ Soldering Temperature vs. Forward Voltage Shift,  $I_F=140\text{mA}$



■ Soldering Temperature vs. Dominant Wavelength,  $I_F=140\text{mA}$



■ Derating Curve



**Reliability**

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**Reliability test**

	Item	Reference Standard	Condition	Time/Cycle
1	Thermal shock	JESD22-A106	-40°C to 125 °C, 20 mins dwell, 5 min transfer time	1000 Cycles
2	Temperature Cycle	AEC-Q101 Rev. D	-55°C to 125 °C 15 mins dwell at each high and low temperature extreme	1000 cycles
3	Power and Temperature Cycle	AEC-Q101 Rev. D	-40 °C~ 125 °C, IF=200mA, Dwell/transfer time = 10 mins, 20 mins 1,000 cycles , on/off 15,000 cycles	15,000 cycles
4	MSL Level 2	J-STD-020	85°C / 60% RH	168 hours
5	High Temperature Storage	JESD22-A103	TA=105°C, 1000hrs	1000 hours
6	Low Temperature Storage	JESD22-A119	TA=-40°C, 1000hrs	1000 hours
7	High Temperature Operating Life	AEC-Q101 Rev. D	TA=105°C, IF=200mA	1000 hours
8	Low Temperature Operating Life	JESD22-A108	TA=-40°C, IF=200mA	1000 hours
9	Temperature Humidity Operating Life	AEC-Q101 Rev. D	85°C, RH=85%, 1000hrs, IF=200mA	1000 hours
10	Electrostatic Discharges	AEC-Q101 Rev. D	HBM 2 KV, 1.5KΩ, 100pF, 3 pulses, alternately positive or negative	

Item	Reference Standard	Condition	Time
Corrosion robustness	IEC 60068-2-43	(H2S) [25°C / 75 %RH / 10 ppm H <sub>2</sub> S]	336 hours
	EN60068-2-60	[25 °C / 75 %RH / 200 ppb SO <sub>2</sub> , 200 ppb NO <sub>2</sub> ,10 ppb Cl <sub>2</sub> ]	504 hours

**Judgment Criteria**

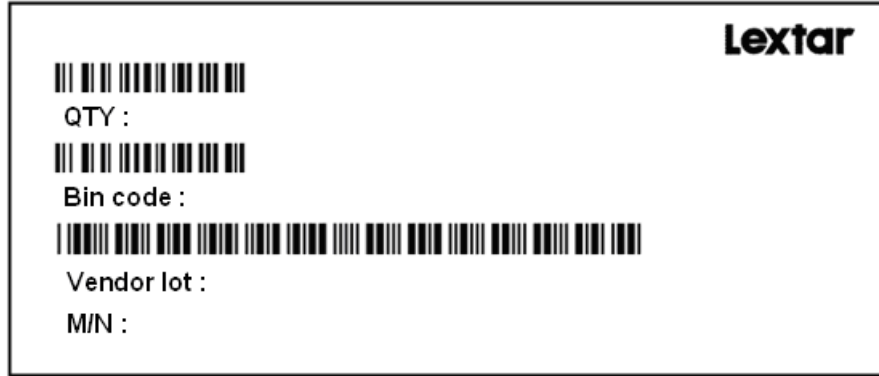
Item	Symbol	Test Condition	Judgment Criteria
Forward Voltage	V <sub>f</sub>	140 mA	ΔV <sub>f</sub> < 10 %
Luminous Flux	I <sub>v</sub>	140 mA	ΔI <sub>v</sub> < 20 %
Delta CIE	CIE-x ,CIE-y	140mA	Δx,y <0.01

## Packing

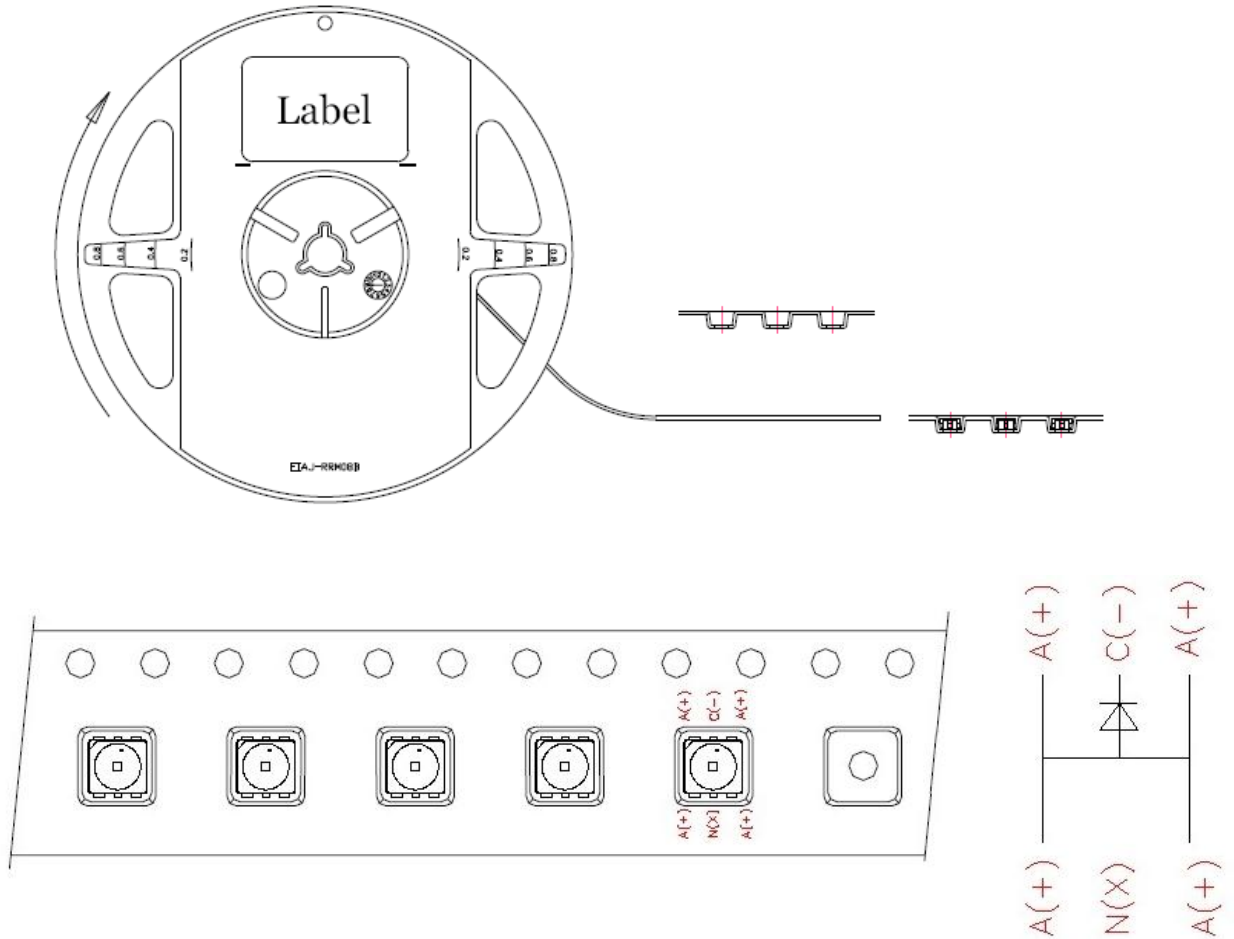
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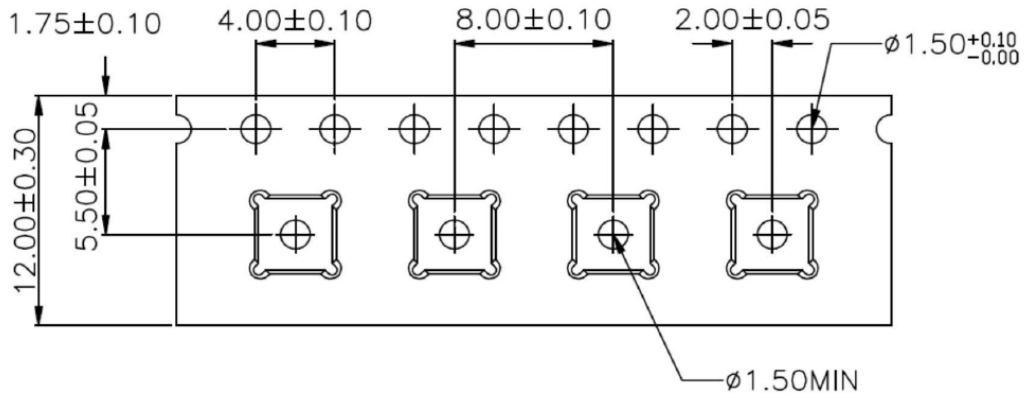
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### Label



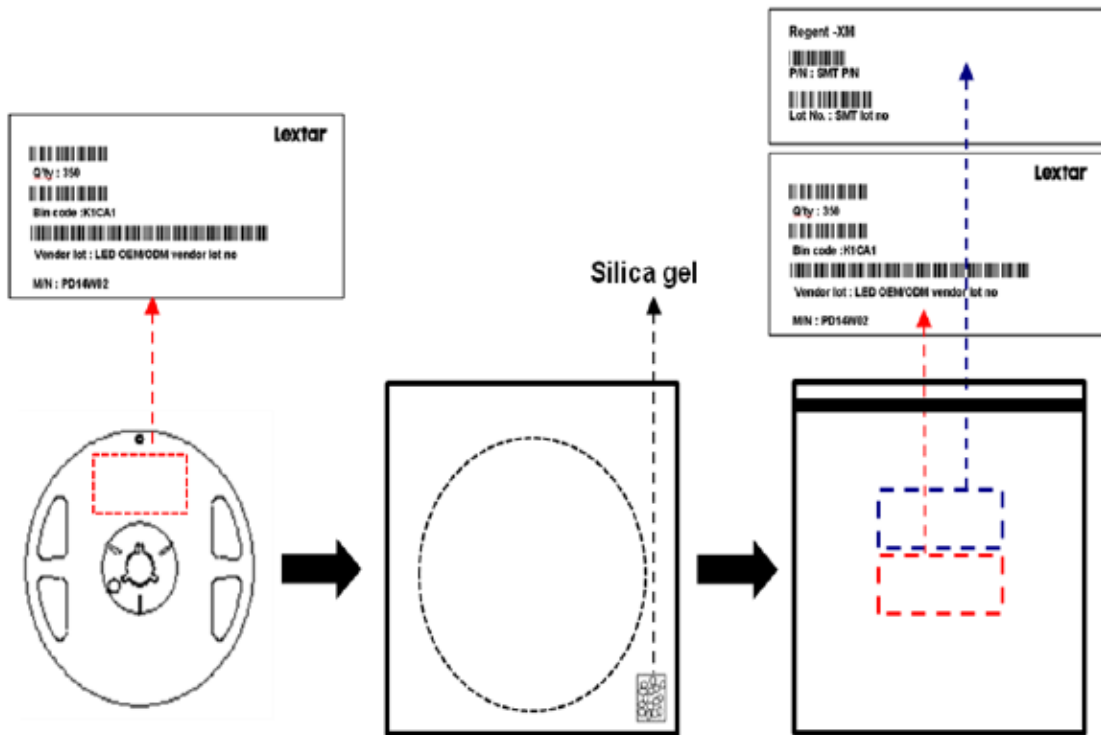
### Carrier Taping





(Unit : mm)

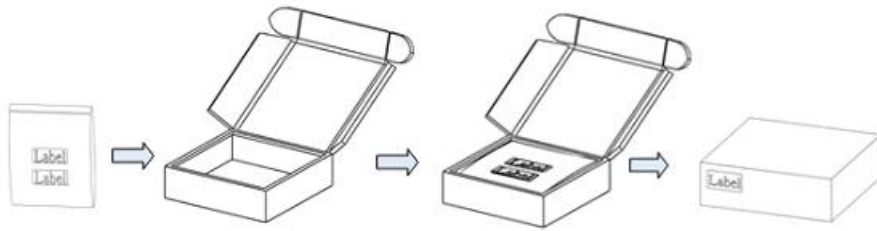
■ Shield Bag Taping



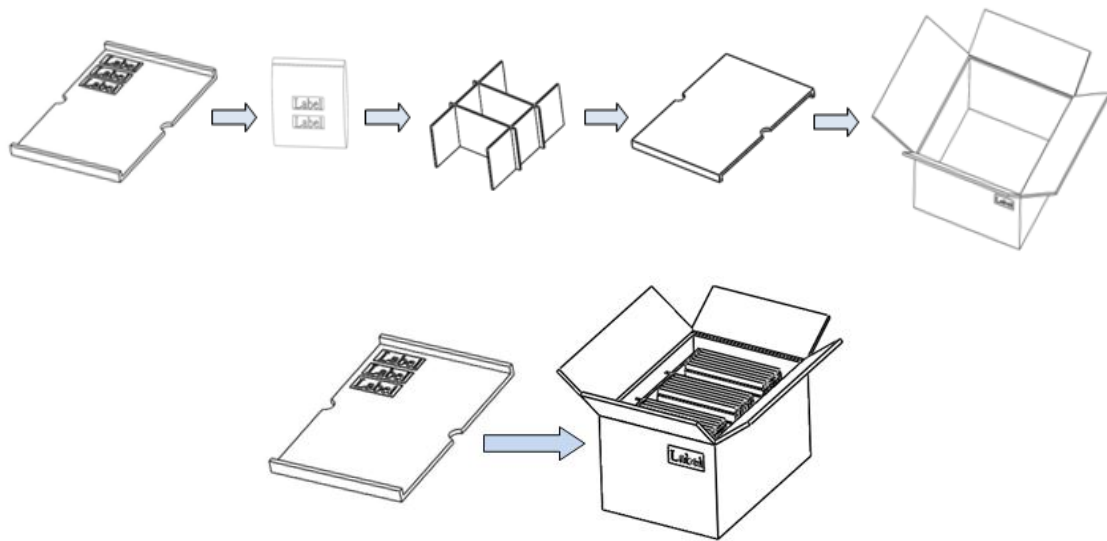
■ Packing Box

Type	Large Box		Medium Box		Small Box	
Dimension	541X511X276mm		385X303X260mm		283X235x70mm	
Maximum Reels	7"X12mm Reel	64/R	7"X12mm Reel	21/R	7"X12mm Reel	4/R
Minimum Reels	7"X12mm Reel	32/R	7"X12mm Reel	9/R	7"X12mm Reel	1/R

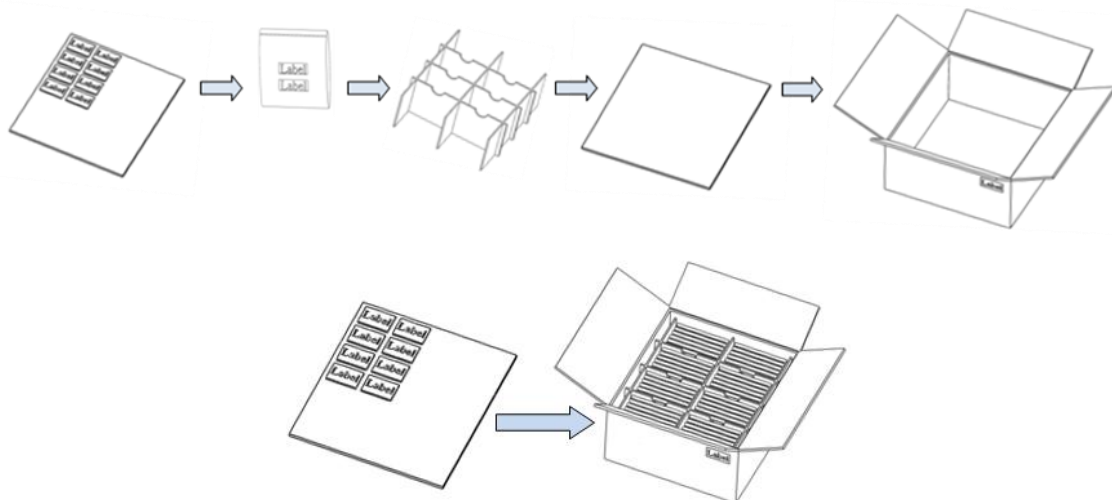
■ **Small Box**



■ **Medium Box**



■ **Large Box**



## Precautions

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### ■ Safety Precautions

- The LED light output is too strong for human eyes without shield. Prevent eye contact directly more than seconds.
- Ensure operating under maximum rating.

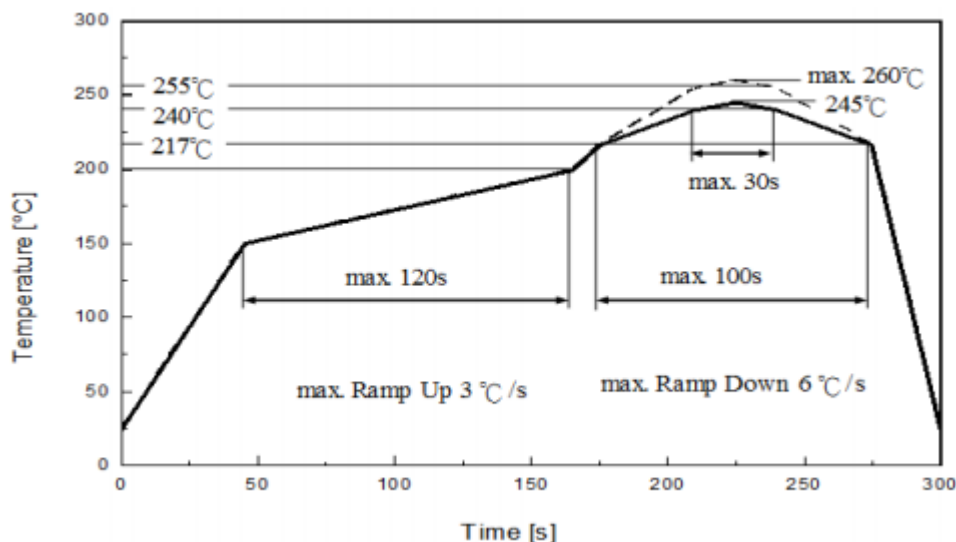
### ■ Storage

- Before opening the package, the LEDs should be kept at 40°C, 90% RH environment or less, and should be used within one year.
- After opening the package bag,  
The LEDs should be kept at 30°C, 60% RH environment or less.  
The LEDs should be soldered within 12 months ( 1 year ).  
If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with packages of moisture absorbent material (silica gel).
- If the package is over storage time, the LEDs should be pre-bake  $65 \pm 5$  °C / 12 hrs before use. (One time only).

### ■ Soldering Notice and Conditions

When soldering LEDs,

- Do not solder/reflow the same LED over two times.
- Reflow temperature profile as below: (lead-free solder)



Classification Reflow Profile (JEDEC J-STD-020D)

- When soldering, don't put stress on the LEDs
- After LEDs have been soldered, strongly recommend not to repair to keep the LEDs performance.

### ■ Static Electricity

- LED package is extremely sensitive to static electricity. It's recommended that anti-electrostatic glove and wrist band is necessary when handling the LEDs. All devices are also be grounded properly as well.
- Protection devices design should be considered in the LED driving circuit.

### ■ Cleaning

- If washing is required, recommend to use alcohol as a solvent.
- Recommend to avoid cleaning the LEDs by ultrasonic. If necessary, pre-test the LED is necessary to confirm whether any damage occur after the process.



## Revision History

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Product Specification

Date	Contents	Writer	Approved
2017.01.03	Preliminary version	SK	
2017.03.14	Update packing reel Q'ty		Bemore
2017.07.20	Update 1. Carrier Taping 2. Features (Cu Alloy with Gold plated LF)	Kelly	Bemore
2017.08.07	1. Update Reliability test – P.10 2. Soldering Notice and Conditions – P.14	Kelly	Bemore
2017.09.11	1. 新增 Recommended Soldering Pad 極性– P.3 2. Update O.E. Data – P.8~9	Kelly	Bemore
2018.01.10	1. Add Rth – P.4 2. Update Dominant Wavelength – P.5 3. Add De-rating Curve – P.10	Kelly	Bemore
2018.05.11	LED placed into carrier tape definition – P.12	Ray	Bemore
2018.12.25	Official version	Ray	Bemore
2020.02.14	Update carrier taping – P.13	Rick	Bemore
2021.07.19	Update Packing reel Q'ty – P.2	Rick	Bemore

## Smart Lighting Amazing Life

Lextar Electronics Corp. is the leading LED (Light Emitting Diode) maker integrating upper stream epitaxial, middle stream chip, and downstream package, SMT and LED lighting applications. Founded in May, 2008, Lextar is a subsidiary of AU Optronics, the leading TFT-LCD and solar PV manufacturer. Lextar's product applications include lighting and LCD backlight. Lextar's manufacturing sites include Hsinchu and Chunan in Taiwan, and Suzhou in China. The company turnover in 2010 is 266 million USD.