No. 3, Gongye E. 3rd Road, Hsinchu Science Park, Hsinchu 30075, Taiwan
TEL：886-3-565-8800

Lextar

PC33N26 V0

Product Specification

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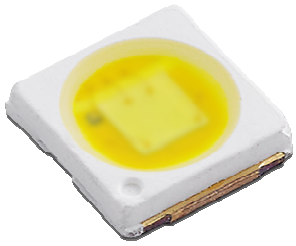
Approval Sheet

PC33N26 V0
Product Specification

RoHS AECQ101

Product	White SMD LED
Part Number	PC33N26 V0
Issue Date	2018/03/19



Feature

- ✓ White SMD LED (L x W x H) of 3.2 x 3.0 x 0.6 mm
- ✓ AEC-Q101 Rev. D and IEC 60810 qualification
- ✓ Dice Technology : InGaN
- ✓ Qualified according to JEDEC moisture sensitivity Level 2
- ✓ Cu Alloy with Gold plated lead frame
- ✓ Environmental friendly ; RoHS compliance
- ✓ ESD protection
- ✓ Packing : 1,000 / 2,000 / 3,000 pcs/reel

Applications

- ✓ DRL (Daytime Running Light)
- ✓ Position light

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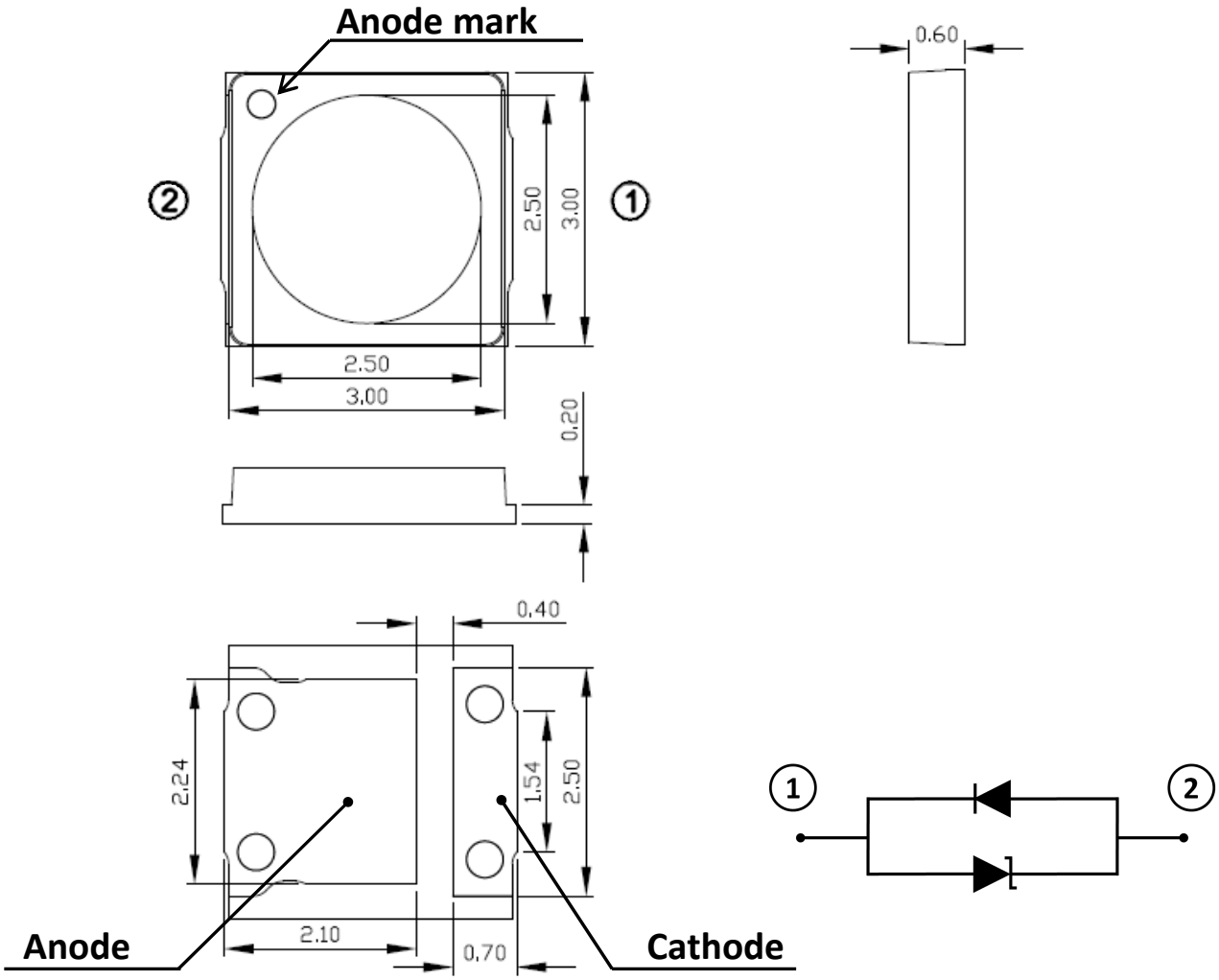
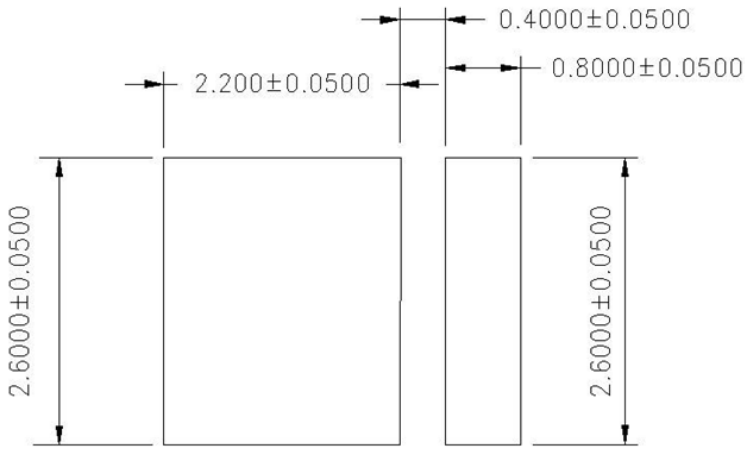
Outline Dimension



Unit: mm, Tolerance: ±0.1mm

Recommended Soldering Pad



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Electro-Optical Characteristics (Ta=25℃)

Parameter		Symbol	Condition	Typ.	Unit
Forward Voltage(1)		V_F	I_F = 350 mA	3.1	V
View Angle		θ		120	deg
Luminous Flux		Φ_V		122	lm
Chromaticity Coordinate	x	-		0.31	-
	y	-		0.32	-
Thermal Resistance		Rth		20	℃/W

* The Forward Voltage tolerance is ±0.05V

* The luminous intensity tolerance is ± 8%

* Tolerance of measurements of the Chromaticity Coordinate is ±0.005.

Absolute Maximum Ratings

Parameter	Symbol	value	Unit
DC Forward Current(1)	I_F	450	mA
Power Dissipation	P_D	1.48	W
Allowable Reverse Current	I_R	85	mA
Pulse Forward Current (2)	I_{FP}	900	mA
Storage Temperature	T_{stg}	-40 ~ +125	°C
Operating Temperature	T_{opr}	-40 ~ +125	°C
Junction Temperature	T_j	150	°C
ESD (HBM)	ESD_{HBM}	8000	V
Assembly Temperature	Tsld	260	°C

(1) Proper current rating must be observed to maintain junction temperature below maximum at all time

(2) IFP Condition: Duty 1/10, Pulse within 10msec

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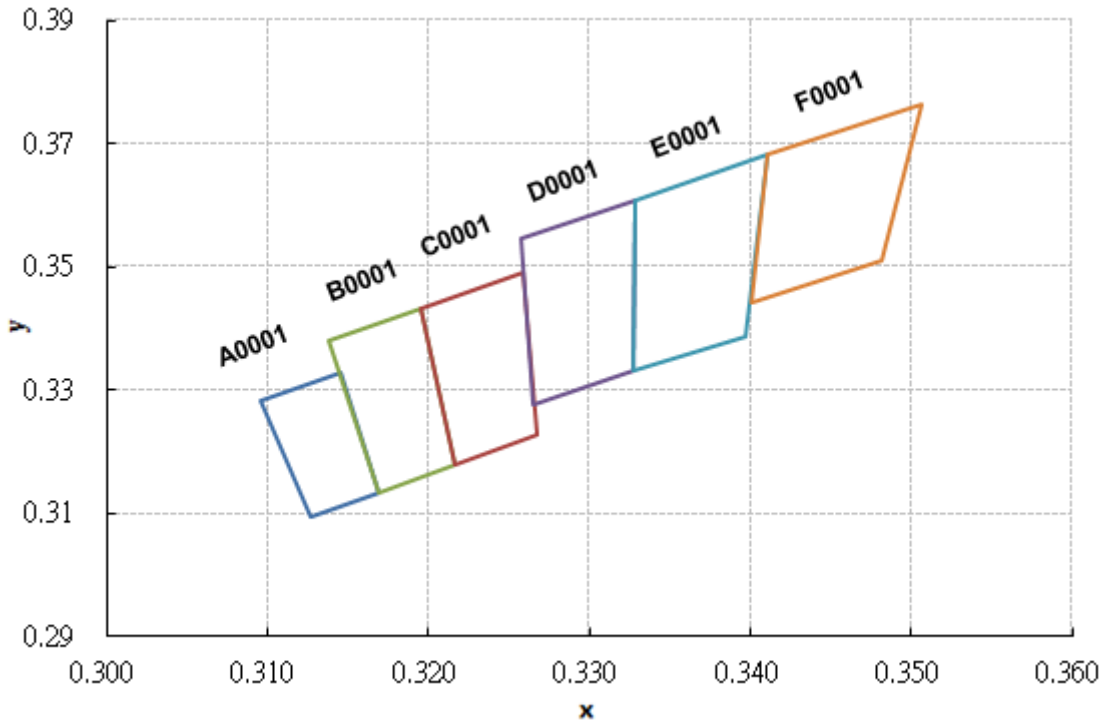

Bin code definition

V_F Rank	Luminous Flux Rank	CIE Rank
A	VT	A0001

V_F Rank	Condition	Min.	Max.	unit
A	I_F = 350 mA Ta=25℃	3.0	3.2	V
B		3.2	3.4	
C		3.4	3.6	

Luminous Flux Rank	Condition	Min.	Max.	unit
VR	I_F = 350 mA Ta=25℃	93.2	103.5	lm
VS		103.5	115.0	
VT		115.0	126.5	
VU		126.5	139.2	
VV		139.2	153.1	

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CIE Rank

	x1	y1	x2	y2	x3	y3	x4	y4
A0001	0.3096	0.3283	0.3145	0.3328	0.3169	0.3133	0.3127	0.3093
B0001	0.3138	0.3381	0.3195	0.3433	0.3216	0.3178	0.3169	0.3133
C0001	0.3195	0.3433	0.3259	0.3491	0.3267	0.3228	0.3216	0.3178
D0001	0.3257	0.3546	0.3328	0.3608	0.3327	0.3331	0.3265	0.3276
E0001	0.3328	0.3608	0.3410	0.3681	0.3397	0.3387	0.3327	0.3331
F0001	0.3410	0.3681	0.3506	0.3765	0.3482	0.3510	0.3400	0.3443

* The Forward Voltage tolerance is ±0.05V
* The luminous intensity tolerance is ± 8%
* Tolerance of measurements of the Chromaticity Coordinate is ±0.005.

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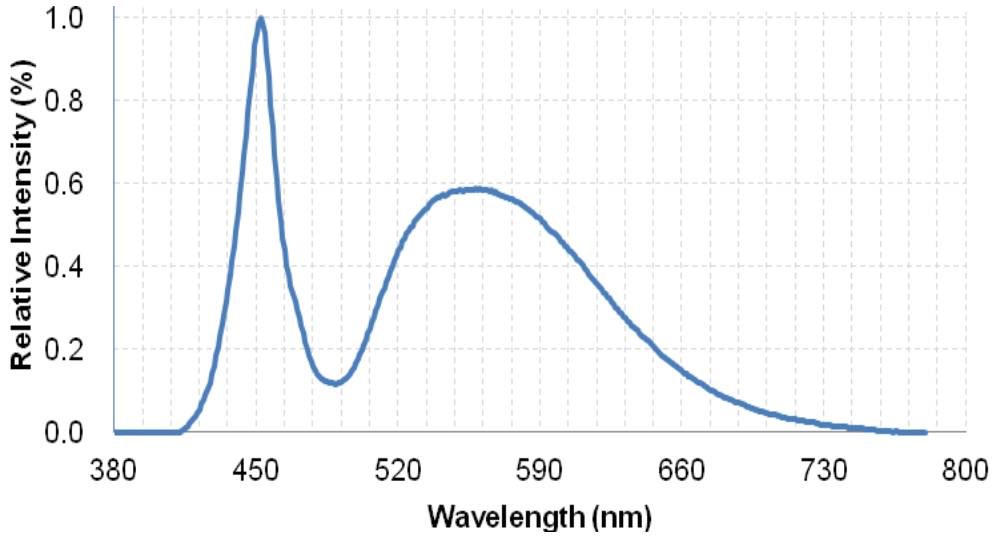
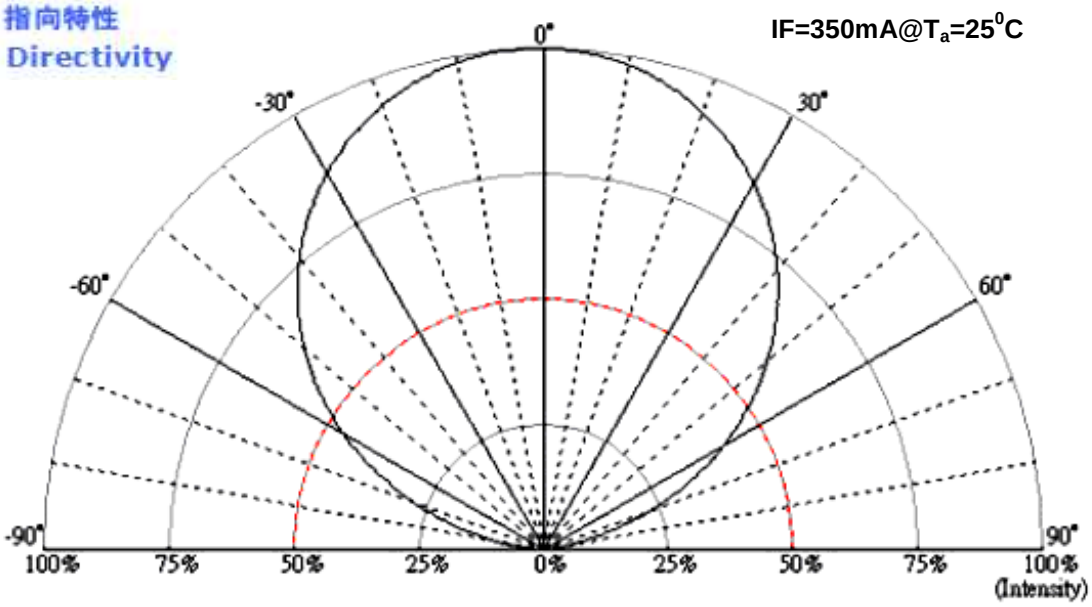
発光スペクトル
Spectrum

IF=350mA@T_a=25^{0}C



指向特性
Directivity

IF=350mA@T_a=25^{0}C



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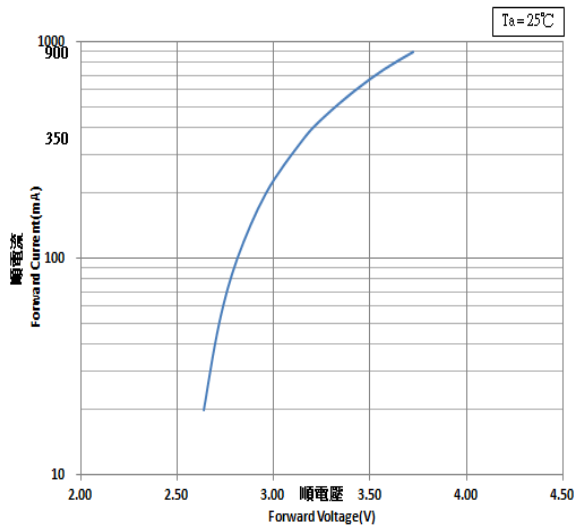
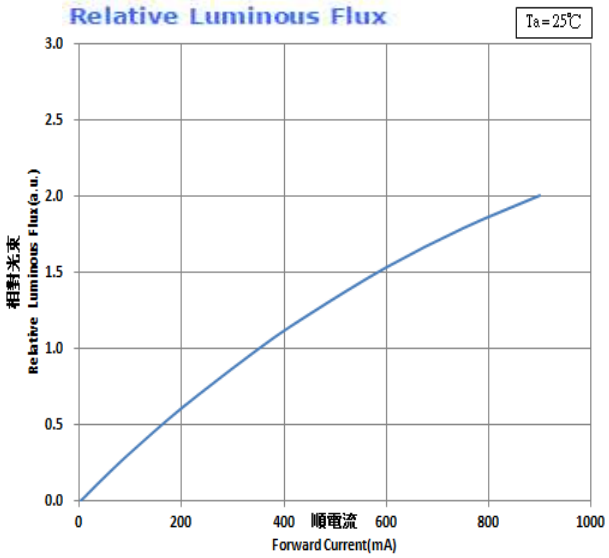
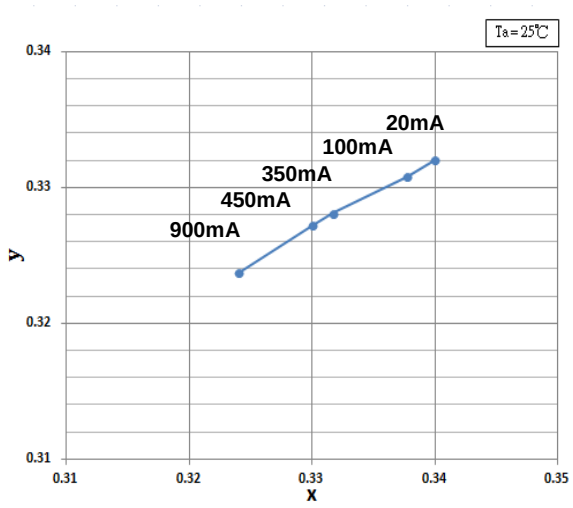
順電圧-順電流特性
Forward Voltage vs
Forward Current



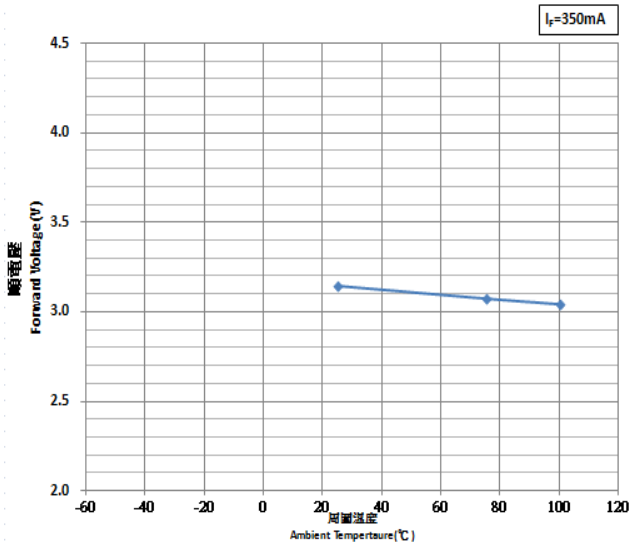
順電流-相対光束特性
Forward Current vs
Relative Luminous Flux



順電流-色度特性
Forward Current vs
Chromaticity Coordinate



周囲温度-順電圧特性
Ambient Temperature vs
Forward Voltage



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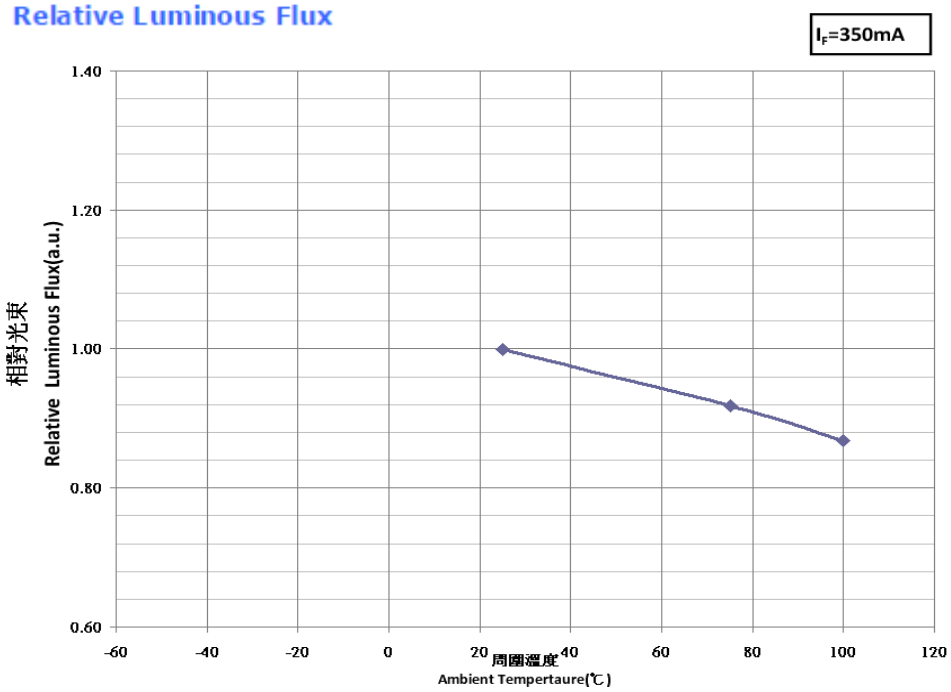
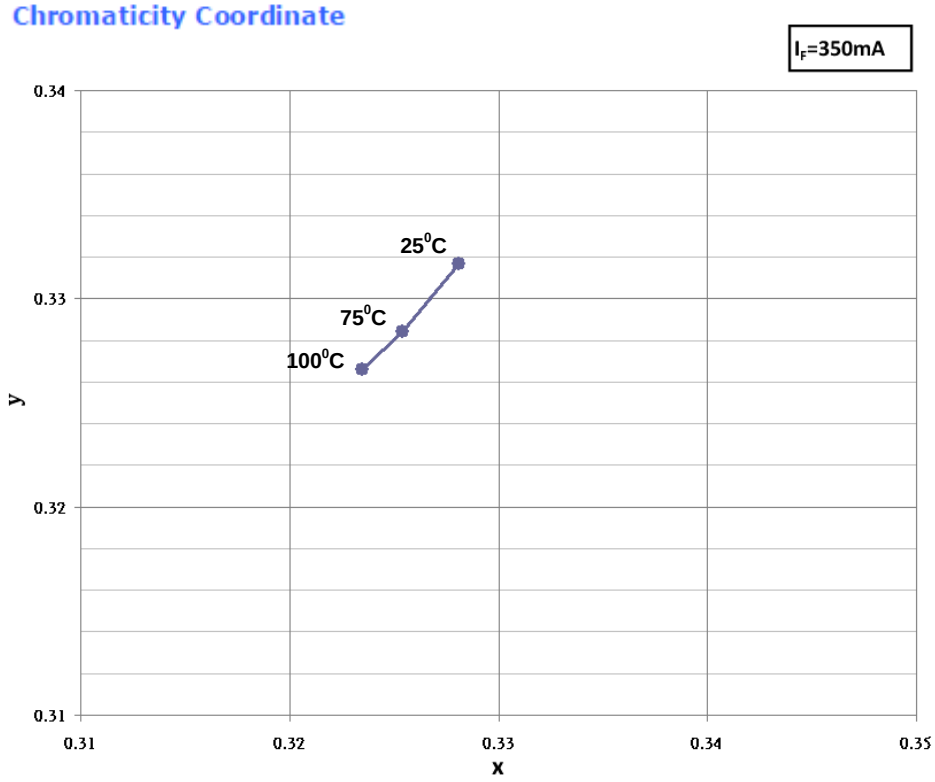
周囲温度-相対光束特性
Ambient Temperature vs Relative Luminous Flux



周囲温度-色度特性
Ambient Temperature vs Chromaticity Coordinate



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Reliability test

	Item	Reference Standard	Condition	Time/Cycle
1	Thermal shock	JESD22-A106	-40℃ to 125 ℃, 20 mins dwell, 5 min transfer time	1000 Cycles
2	Temperature Cycle	AEC-Q101 Rev. D	-55℃ to 125 ℃ 15 mins dwell at each high and low temperature extreme	1000 cycles
3	Power and Temperature Cycle	AEC-Q101 Rev. D	-40 ℃~ 125 ℃, IF=450mA, 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℃ / 60% RH	168 hours
5	High Temperature Storage	JESD22-A103	TA=105℃, 1000hrs	1000 hours
6	Low Temperature Storage	JESD22-A119	TA=-40℃, 1000hrs	1000 hours
7	High Temperature Operating Life	AEC-Q101 Rev. D	TA=105℃, IF=450mA	1000 hours
8	Low Temperature Operating Life	JESD22-A108	TA=-40℃, IF=450mA	1000 hours
9	Temperature Humidity Operating Life	AEC-Q101 Rev. D	85℃, RH=85%, 1000hrs, IF=450mA	1000 hours
10	Electrostatic Discharges	AEC-Q101 Rev. D	HBM 8 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_2S]	336 hours
	EN60068-2-60	[25 °C / 75 %RH / 200 ppb SO_2, 200 ppb NO_2,10 ppb Cl_2]	504 hours

Judgment Criteria

Item	Symbol	Test Condition	Judgment Criteria
Forward Voltage	Vf	350mA	ΔVf < 10 %
Luminous Flux	Iv	350mA	ΔIv < 20 %
Delta CIE	CIE-x ,CIE-y	350mA	△x,y <0.01

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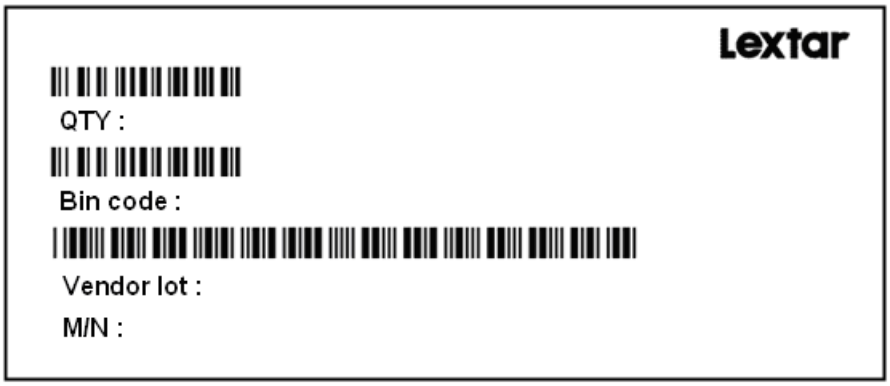
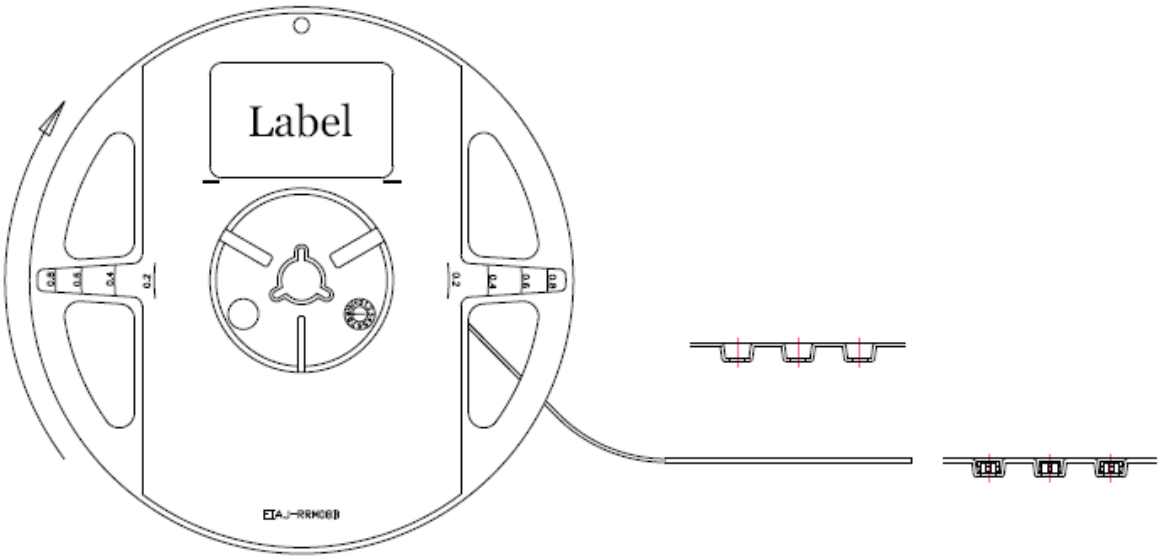
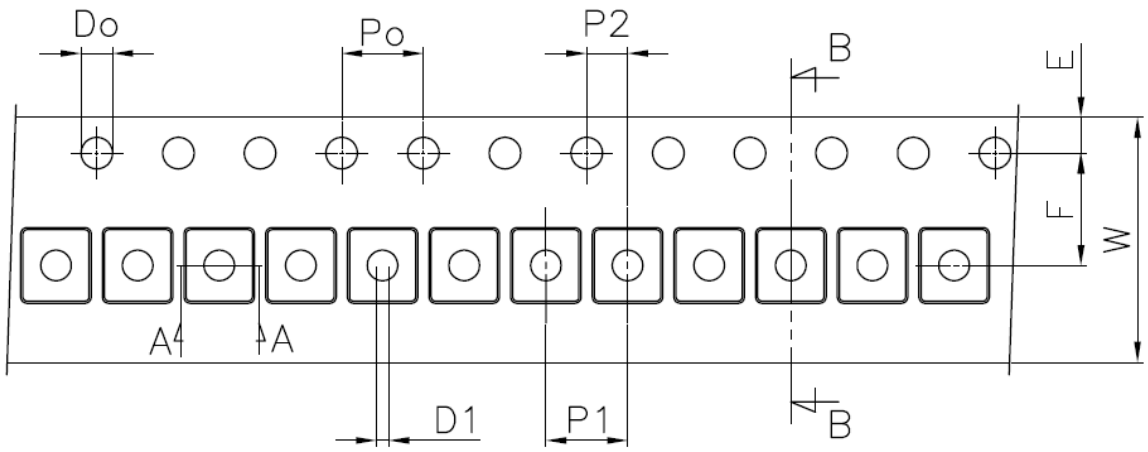
Label



Carrier Taping





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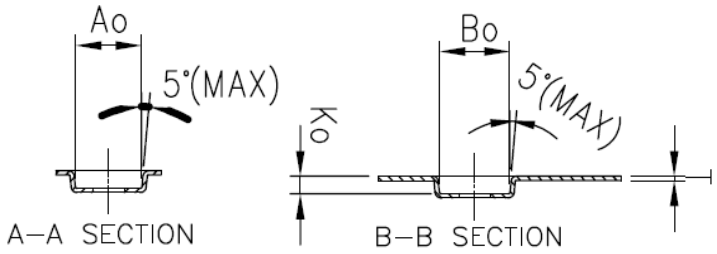


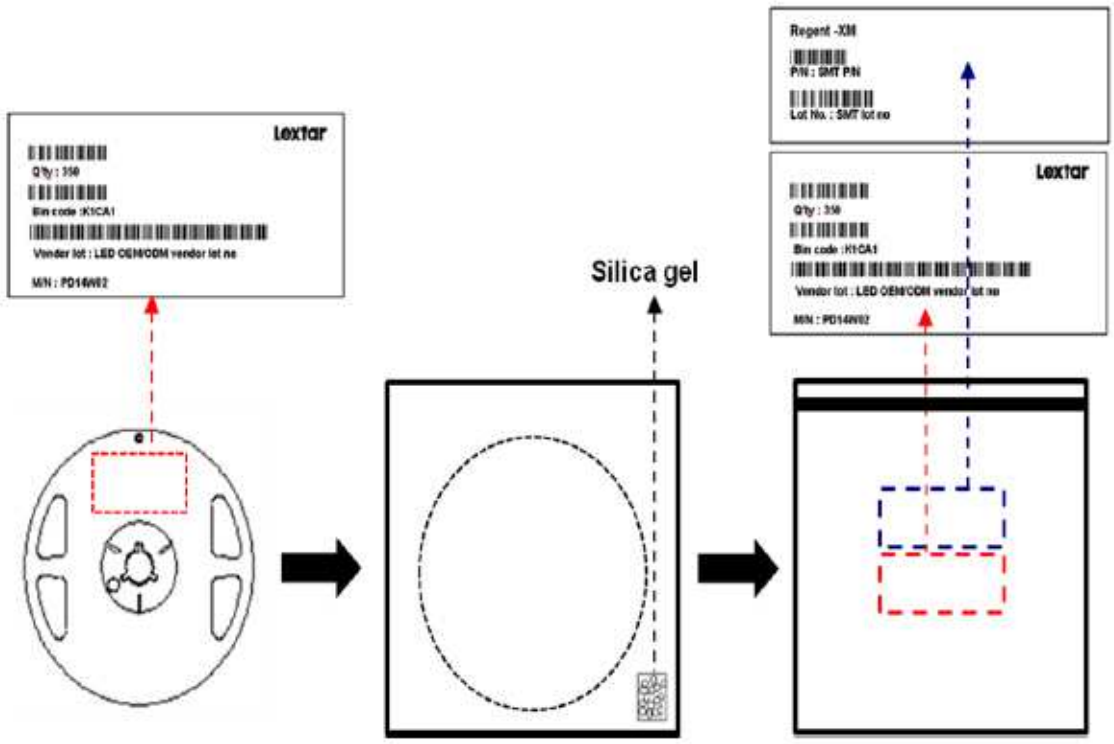
Unit:mm

symbol	Ao	Bo	Ko	Po	P1	P2	T
spec	3.25±0.10	3.50±0.10	0.78±0.10	4.00±0.10	4.00±0.10	2.00±0.05	0.20±0.05
symbol	E	F	Do	D1	W	10Po	
spec	1.75±0.10	5.50±0.05	$1.50^{+0.10}_{-0}$	1.50±0.10	12.0±0.30	40.00±0.20	

Notice:

1. 10 Sprocket hole pitch cumulative tolerance is ±0.20mm.
2. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
3. Ao & Bo measured on a place in the middle of the corner radii.
4. Ko measured from a place on the inside bottom of the pocket to top surface of carrier.
5. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
6. Surface resisivity 10^4 ~10^8 ohm/sq.

Shield Bag Taping



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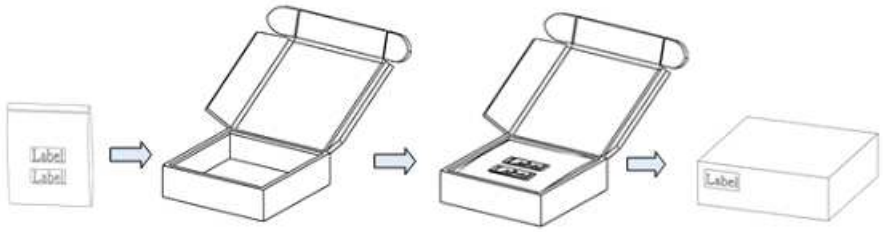
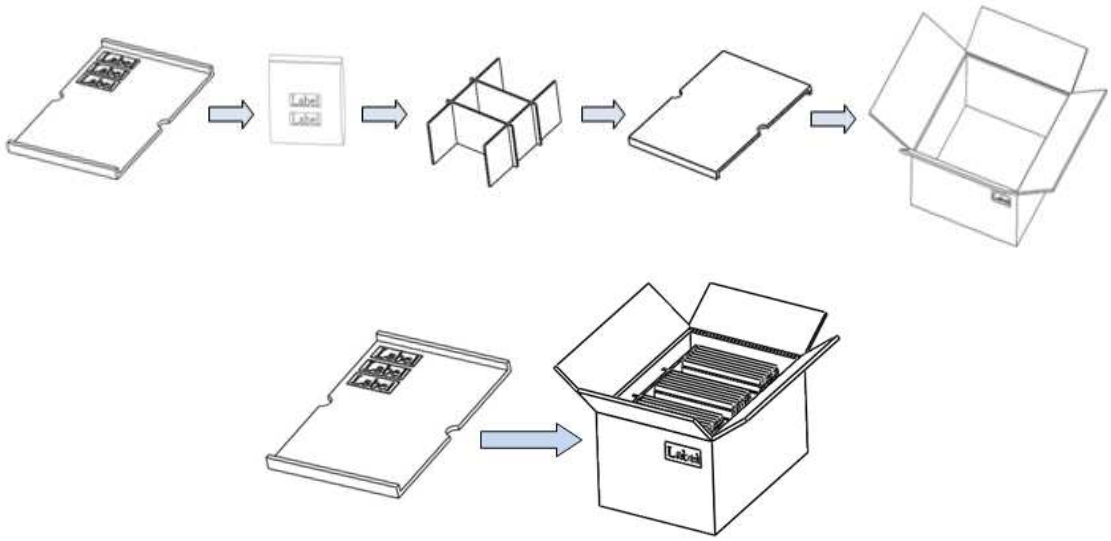
Packing Box

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

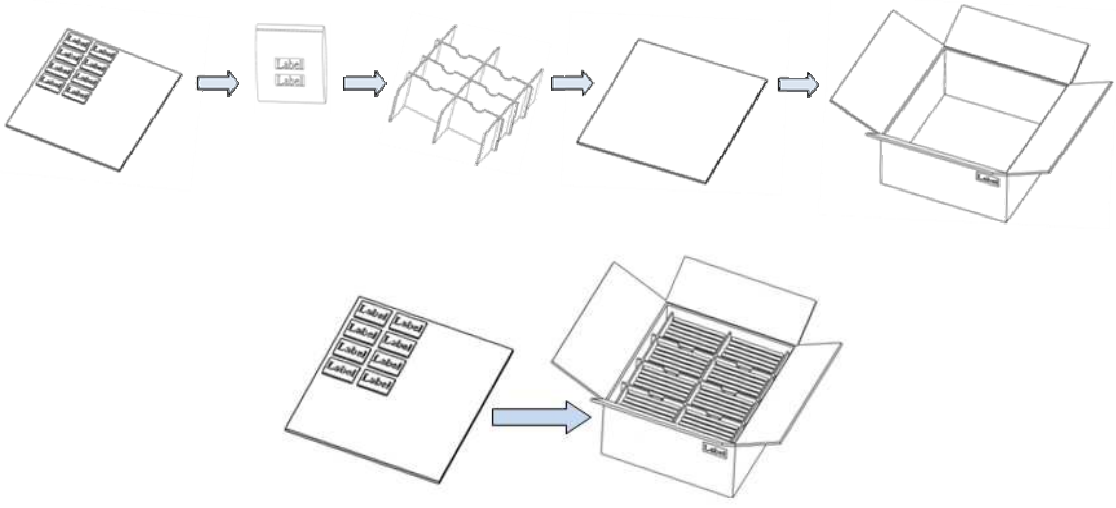
Small Box



Medium Box



Large Box



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Storage

- Product complies with JEDEC MSL 3 or equivalent. See IPC/JEDEC STD-020 for moisture-sensitivity details.
- Absorbed moisture in LED packages can vaporize and expand during soldering, which can cause interface delamination and result in optical performance degradation. Products are packed in moisture-proof aluminum bags to minimize moisture absorption during transportation and storage.
- After opening the moisture-proof aluminum bag, the products should go through the soldering process within the range of the conditions stated above. Unused remaining LEDs should be stored with silica gel desiccants in a hermetically sealed container, preferably the original moisture-proof bags for storage.
- After the “Period After Opening” storage time has been exceeded, the product should be baked.
- Although the leads or electrode pads (anode and cathode) of the product are plated with gold, prolonged exposure to a corrosive environment might cause the gold plated the leads or electrode pads to tarnish, and thus leading to difficulties in soldering. If unused LEDs remain, they must be stored in a hermetically sealed container.
  Lextar recommends using the original moisture-proof bag for storage.
- Do not use sulfur-containing materials in commercial products. Some materials, such as seals and adhesives, may contain sulfur. The contaminated plating of LEDs might cause an open circuit. Silicone rubber is recommended as a material for seals. Bear in mind, the use of silicones may lead to silicone contamination of electrical contacts inside the products, cause by low molecular weight volatile siloxane.
- To prevent water condensation, please avoid large temperature and humidity fluctuations for the storage condition.
- Before opening the package, the LEDs should storage under 30℃, 90% RH within 1 year from delivery date.
- After opening the package bag, the LEDs should be keep under 30℃, 70% RH. Recommend to use within 168 hrs. If unused LEDs remain, suggest to store into moisture proof bag or original package bag with moisture absorbent material such as silica gel. Reseal well is necessary.
- If the product exceeded the storage period or the moisture absorbent material faded away, baking treatment should be done by following conditions.
  Bake condition: 65±5℃, 24hours (One time only).

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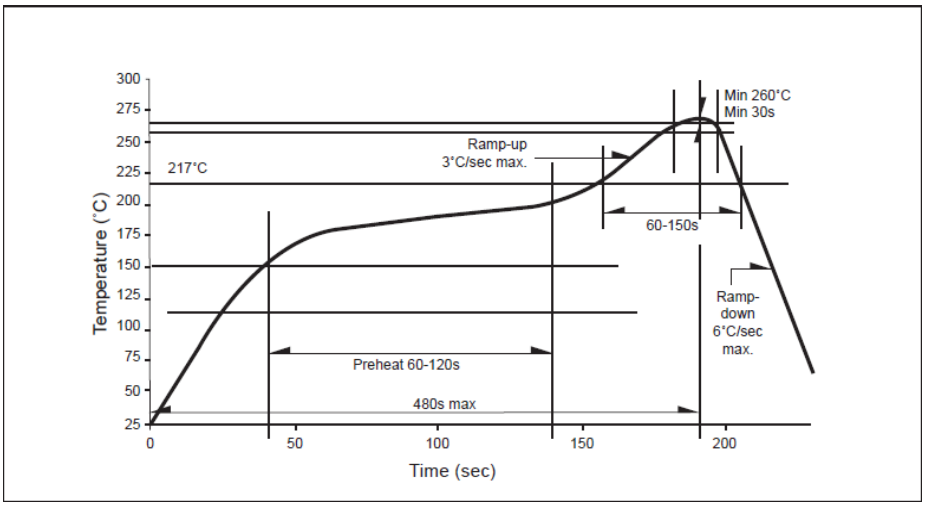
Soldering Notice and Conditions

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)

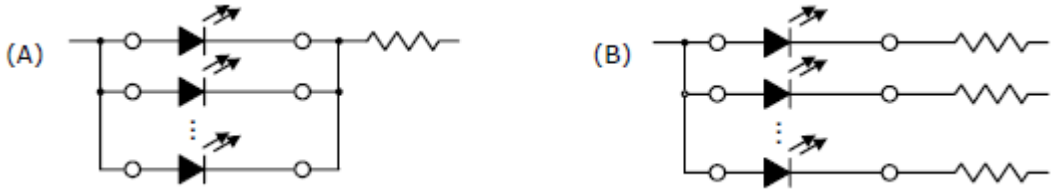
- This LED is designed to be reflow soldered on to a PCB. If dip soldered, Lextar cannot guarantee its reliability.
- Reflow soldering must not be performed more than twice. Hand soldering must not be performed more than once.
- Avoid rapid cooling. Ramp down the temperature gradually form the peak temperature.
- Nitrogen reflow soldering is recommended. Air flow soldering conditions can cause optical degradation, caused by heat and/or atmosphere.
- Since the silicone use in the encapsulating resin is soft, do not press on the encapsulant resin. Pressure can cause nicks, chip-outs, encapsulant delamination and deformation, and wire breaks, decreasing reliability.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- When soldering, do not apply stress to the LED while the LED is hot.
- After LEDs have been soldered, strongly recommend not to repair to keep the LEDs performance.

Directions for use

- When Designing a circuit, the current through each LED must not exceed the Absolute Maximum Rating.

Operating at a constant current per LED is recommended. In case of operating at a constant voltage, Circuit B is recommended.

If LEDs are operated with constant voltage using Circuit A, the current through the LEDs may vary due to the variation in Forward Voltage characteristics of the LEDs.



- LEDs should be operated in forward bias. Driving circuits must not subject LEDs to either forward or reverse voltage while off. Continuous reverse voltage can cause migration and LED damage.
- For stabilizing the LED characteristics, it is recommended to operate at greater than 10% nominal current.
- For outdoor use, necessary measures should be taken to prevent water, moisture and salt air damage.

■Handing Precautions

- Do not handle LEDs with bare hands, it may contaminate the LED surface and affect optical characteristics.

  In the worst case, catastrophic failure from excess pressure through wire-bond breaks and package damage may result.
- When handling the product with tweezers, be careful not to apply excessive force to the resin.

  Otherwise, the resin can be cut, chipped, delaminate or deformed, causing wire-bond breaks and catastrophic failures.
- Dropping the product may cause damage.
- Do not stack assembled PCBs together. Failure to comply can cause the portion of the product to be cut, chipped, delaminated and/or deformed. It may cause wire to break, leading to catastrophic failure.

■Design Consideration

- PCB warpage after mounting the products onto a PCB can cause the package to break. The LED should be placed in a way to minimize the stress on the LEDs due to PCB bow and twist.
- The position and orientation of the LEDs affect how much mechanical stress is exerted on the LEDs placed near the score lines.

  The LED should be placed in a way to minimize the stress on the LEDs due to board

flexing.

- Board separation must be performed using special jigs, not using hands.
- If an aluminum PCB is used, customer is advised to verity the PCB with the products before use.

  Thermal stress during use can cause the solder joins to crack.

Electrostatic Discharge (ESD)

- The products are sensitive to static electricity or surge voltage. ESD can damage a die and its reliability.
- When handling the products, the following measures against electrostatic discharge are strongly recommended:

  Eliminating the charge

  Grounded wriststrap, ESD footwear, clothes, and floors

  Grounded workstation equipment and tools

  ESD table/shelf mat made of conductive material
- Proper grounding is required for all devices, equipment, and machinery used in product assembly.

  Surge protection should be considered when designing of commercial product.
- If tools or equipment contain insulating materials such as glass or plastic, the following measures against electrostatic discharge are strongly recommended:

  Dissipating static charge with conductive material

  Preventing charge generation with moisture

  Neutralizing the charge with ionizers
- The customer is advised to check if the LEDs are damage by ESD when performing the characteristics inspection of the LEDs in the application.

  Damage can be detected with forward voltage measurement or a light-up test at low current (≤1mA).
- ESD damaged LEDs may have current flow voltage or no longer illuminate at a low current. (Failure Criteria: V_F<2.0V @ I_F=0.5mA)

Thermal Management

- Proper thermal management is an important when designing products with LEDs. LED die temperature is affected by PCB thermal resistance and LED Spacing on the board. Please design products in a way that the LED die temperature does not exceed the maximum Junction Temperature (T_j).
- Drive current should be determined for the surrounding ambient temperature (T_A) to dissipate the heat form the product.
- The following equations can be used to calculate the junction temperature of the

products.

1) $T_J=T_A+R_{\theta JA}\cdot W$ 2) $T_J=T_S+R_{\theta JS}\cdot W$

*T_J=LED junction temperature: °C

T_A=Ambient temperature: °C

T_S=Soldering temperature (cathode side): °C

$R_{\theta JA}$=Thermal resistance from junction to ambient: °C/W

$R_{\theta JS}$=Thermal resistance from junction to T_S measuring point≈25°C/W

W=Input power($I_F\times V_F$): W

Cleaning

- If required, isopropyl alcohol (IPA) should be used. Other solvents may cause premature failure to the LEDs due to the damage to the resin portion. The effects of such solvents should be verified prior to use.
  In addition, the use of CFCs such as Freon is heavily regulated.
- Ultrasonic cleaning is not recommended since it may have adverse effects on the LEDs depending on the ultrasonic power and how LED is assembled.
  If ultrasonic cleaning must be used, the customer is advised to make sure the LEDs will not be damaged prior to cleaning.

Eye Safety

- In 2006, International Electrical Commission (IEC) published IEC 62471:2006 Photobiological safety of lamps and lamp systems, which added LEDs in its scope.
  On the other hand, the IEC 60825-1:2007 laser safety standard removed LEDs from its scope. However, please be advised that some countries and regions have adopted standards based on the IEC laser safety standard IEC 60825-1:20112001, which still includes LEDs in its scope.
  Most of Lextar's LEDs can be classified as belonging into either the Exempt Group or Risk Group 1.
  High-power LEDs, that emit light containing blue wavelengths, may be classified as Risk Group 2.
  Please process with caution when viewing directly any LEDs driven at high current, or viewing LEDs with optical instruments which may greatly increase the damages to your eyes.
- Viewing a flashing light may cause eye discomfort. When incorporating the LED into your product, please be careful to avoid adverse effects on the human body caused by light stimulation.

Others

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- The LEDs described in this brochure are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment, measurement instruments and household appliances).
- Consult Lextar's sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as for airplanes, aerospace, submersible repeaters, nuclear reactor control system, automobiles, traffic control equipment, life support system and safety devices).
- The customer shall not reverse engineer by disassembling or analysis of the LEDs without having prior written consent from Lextar. When defective LEDs are found, the customer shall inform Lextar directly before disassembling or analysis.
- Both the customers and Lextar will agree on official specifications of supplied products before a customer's volume production.
- Specifications and appearance subject to change for improvement without notice.

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Revision History

Date	Contents	Writer	Approved
2016.01.05	Preliminary version	Johnny Lin	
2017.03.24	Update O.E. data	Bemore	
2017.08.07	1. Update features Cu Alloy with Gold plated LF – P.2 2. Update Reliability test – P.10 3. Soldering Notice and Conditions – P.14	Rudess	Bemore
2018.03.19	Add Rth – P.4	Rudess	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.