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

Lextar

PF09N01

Product Specification

No. 3, Gongye E. 3rd Road, Hsinchu Science Park, Hsinchu 30075, Taiwan
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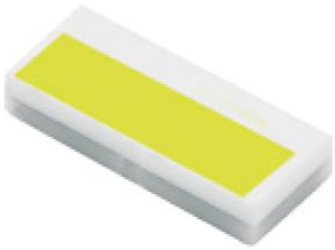
Approval Sheet

PF09N01
Product Specification

RoHS

Product	Core3 White LED
Part Number	PF09N01
Issue Date	2019/2/20



Feature

- ✓ White SMD LED (L x W x H) of 2.0 x 5.2 x 0.75 mm
- ✓ AEC-Q101 D and IEC 60810 qualification
- ✓ Dice Technology : InGaN
- ✓ Qualified according to JEDEC moisture sensitivity Level 1
- ✓ Environmental friendly ; RoHS compliance
- ✓ Packing : 1000/1500 pcs/reel

Applications

- ✓ Fog light
- ✓ Head lamp

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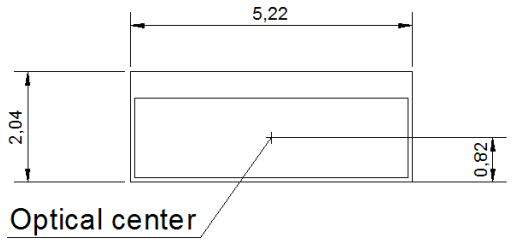
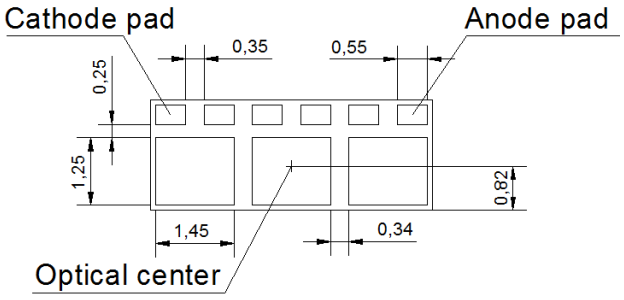
PKG Size:

2.0 mm *5.2 mm *0.75mm (LXWXH)

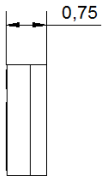


Top view

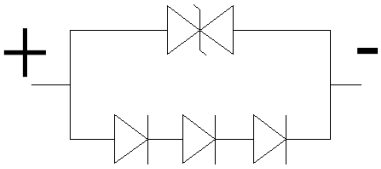


Bottom view

Other PADs are neutral

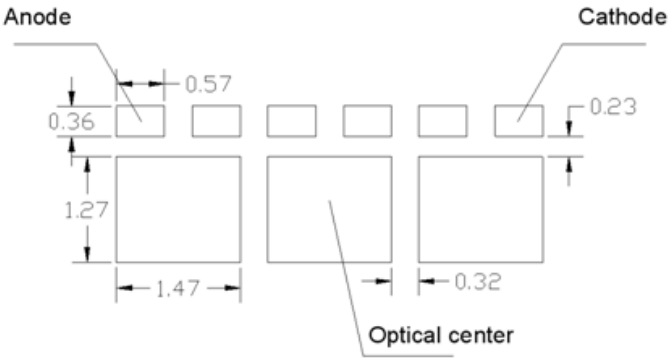


Side view



Equivalent Circuit

Recommend Soldering Pad Layout



Unit: mm, Tolerance: ±0.10mm

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Electro-Optical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage(1)	V_F	I_F = 1200 mA	9.1	9.5	9.9	V
Luminous Flux	ΦV		1000	1200	1600	Lm
View Angle	θ		110	120	130	deg
Electrical Thermal Resistance	$R_{th,elec}$		--	1.4	--	°C/W

(1) The Forward Voltage tolerance is ±0.05V

(2) The luminous flux tolerance is ±8%

(3) Thermal resistance is calculated from junction to solder

(4) Electric and optical data is tested at 50 ms pulse condition

(5) The color coordinates measurement tolerance is ±0.005

Absolute Maximum Ratings

Parameter	Symbol	value	Unit
DC Forward Current(1)	I_F	1500	mA
Power Dissipation	P_D	11.4	W
Pulse Forward Current (2)	I_{FP}	2000	mA
Storage Temperature	T_{stg}	-40 ~ +125	°C
Operating Temperature	T_{opr}	-40 ~ +125	°C
Junction Temperature	T_J	150	°C
Assembly Temperature	Tsld	260 (max. 10sec)	°C
ESD withstand voltage	$V_{ESD(HBM)}$	8	kV

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

(2) IFP shall be applied under condition as max duration time 400ms and 1/10 duty cycle.

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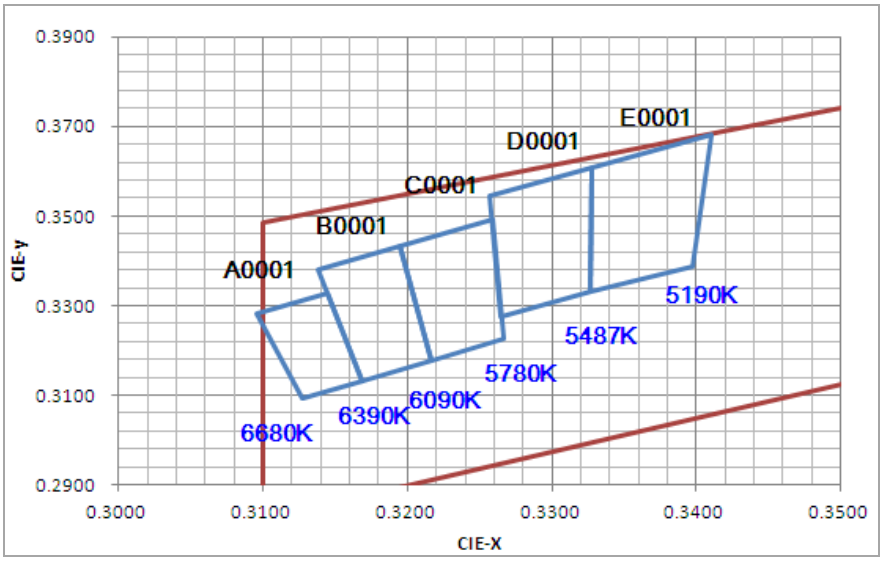
Chromaticity Coordinates



Bin code definition

V_F Rank	Luminous Flux Rank	CIE Rank
A	U3	A0001

V_F Rank	Condition	Min.	Max.
A	I_F = 1200 mA Ta=25℃	9.1	9.4
B		9.4	9.7
C		9.7	10.0
D		10.0	10.3

* The Forward Voltage tolerance is ±0.05V

Luminous Flux Rank	Condition	Min.	Max.
U2	I_F =1200mA Ta=25℃	1100	1200
U3		1200	1300
U4		1300	1400
U5		1400	1500

* The luminous intensity tolerance is ± 8%

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CIE Rank

CCT	CIE Rank	CIE X	CIE Y
6390 ~ 6680	A0001	0.3096	0.3283
		0.3145	0.3328
		0.3176	0.3083
		0.3134	0.3043
6090 ~ 6390	B0001	0.3138	0.3381
		0.3195	0.3433
		0.3216	0.3178
		0.3169	0.3133
5780 ~ 6090	C0001	0.3195	0.3433
		0.3259	0.3491
		0.3267	0.3228
		0.3216	0.3178
5490 ~ 5780	D0001	0.3257	0.3546
		0.3328	0.3608
		0.3327	0.3331
		0.3265	0.3276
5190 ~ 5490	E0001	0.3328	0.3700
		0.3415	0.3779
		0.3400	0.3443
		0.3327	0.3375

(1) Color bins are tested at IF = 1200mA 50ms pulse operation condition

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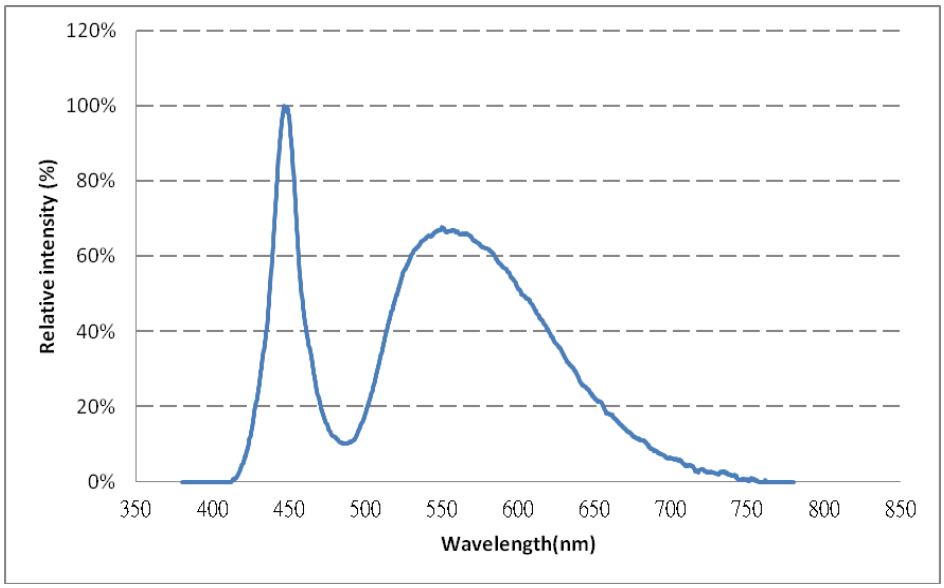
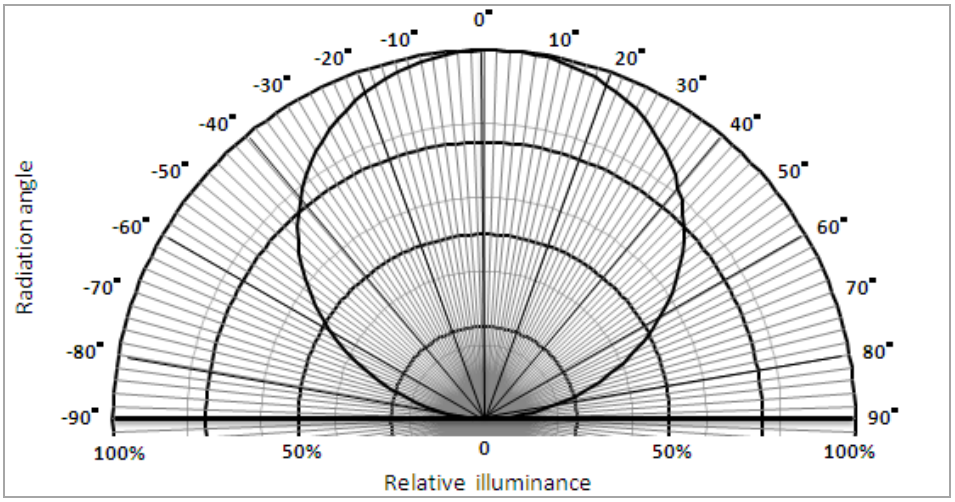
Spectrum



Radiation Pattern



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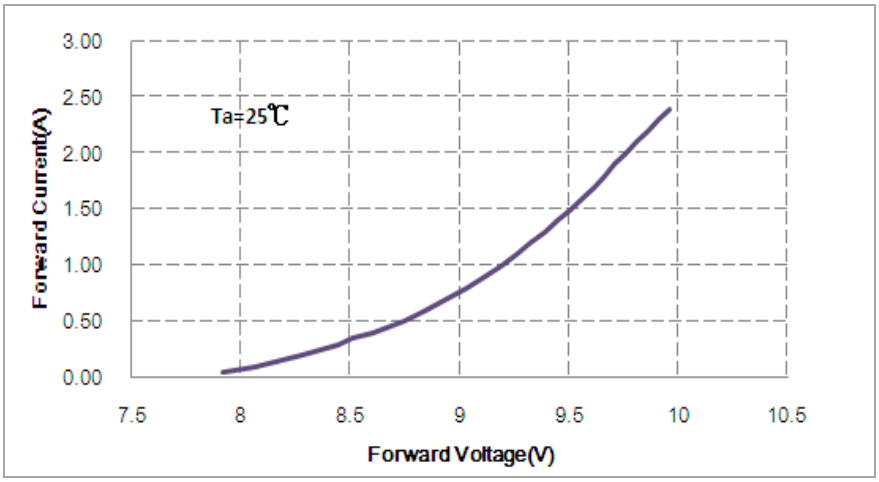
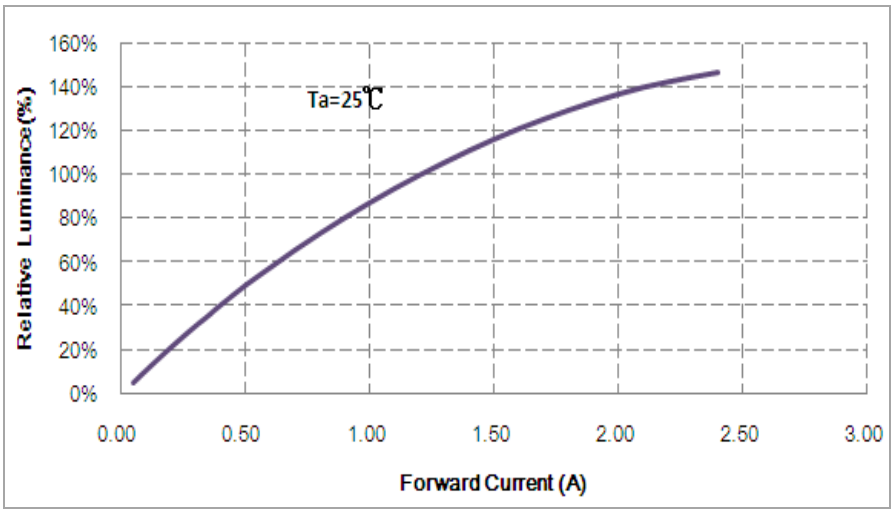
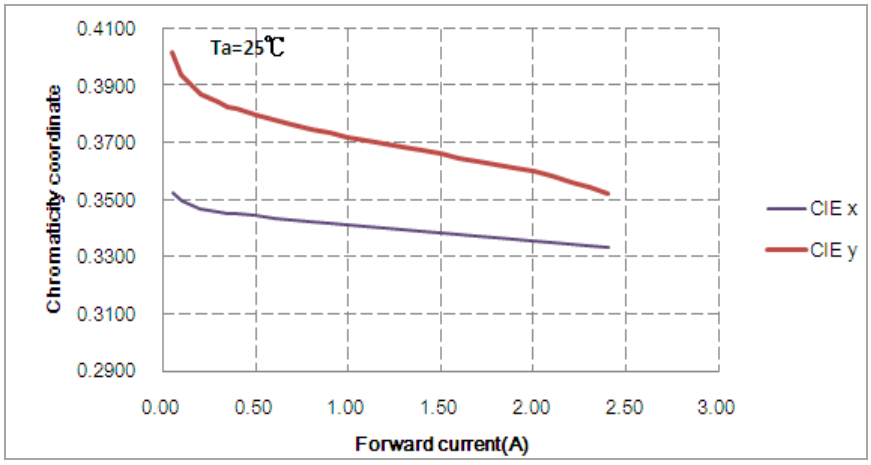
Forward Voltage vs. Forward Current



Forward Current vs. Relative Luminosity



Forward Current vs. Chromaticity Coordinate



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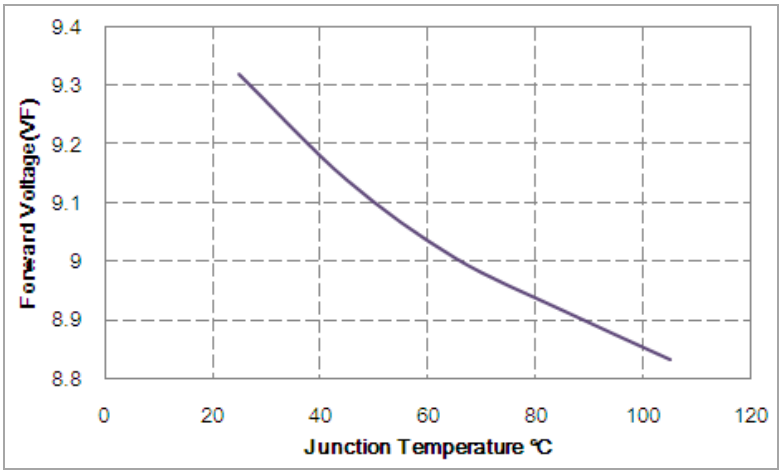
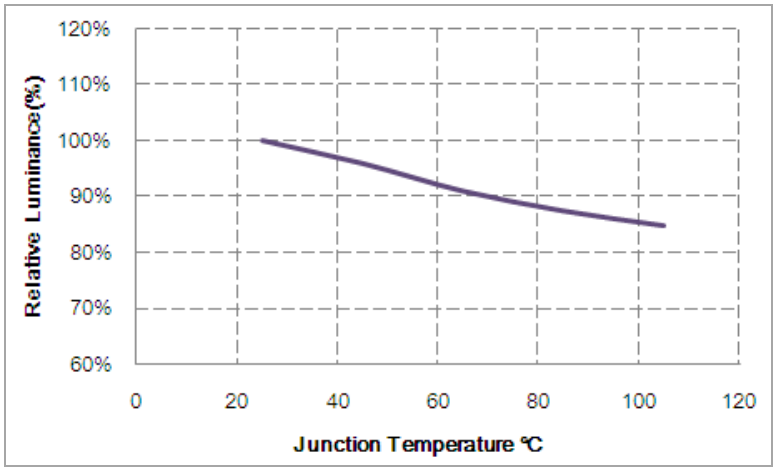
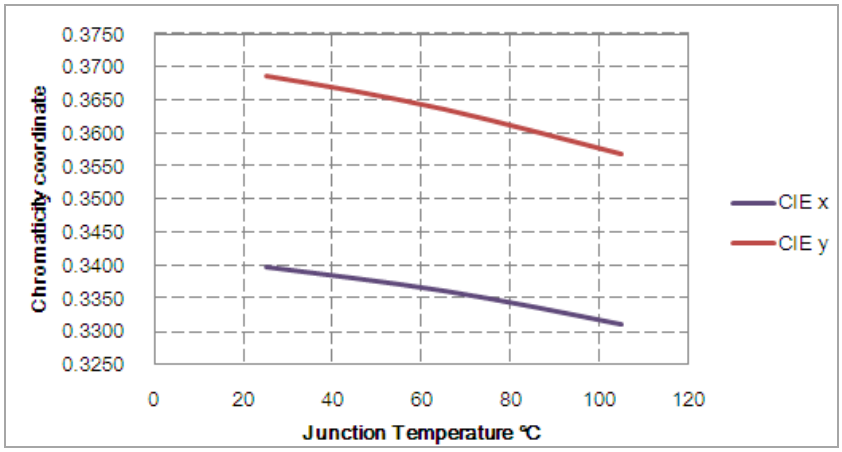
Relative Forward Voltage vs. Junction Temperature



Relative Luminous Intensity vs. Junction Temperature



Chromaticity Coordinate vs. Junction Temperature



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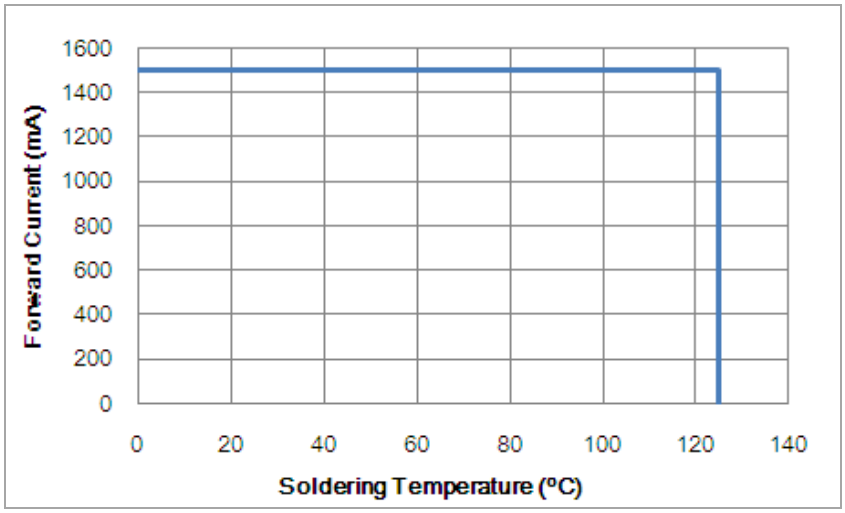
Forward Current Derating Curve



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Reliability test

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

Item	Reference Standard	Condition	Time/Cycle
Corrosion robustness	IEC 60068-2-43	(H2S) [25°C / 75 % rh / 10 ppm H2S / 21 days]	336 hrs
	IEC 60068-2-60	[25 °C / 75 % rh / 200 ppb SO2, 200 ppb NO2,10 ppb Cl2 / 21 days]	504 hrs

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Judgment Criteria

Item	Symbol	Test Condition	Judgment Criteria
Forward Voltage	Vf	1.2 A	ΔVf < 10 %
Luminous Flux	Iv	1.2 A	ΔIv < 20 %
Delta CIE	CIE-x ,CIE-y	1.2 A	△x,y <0.01

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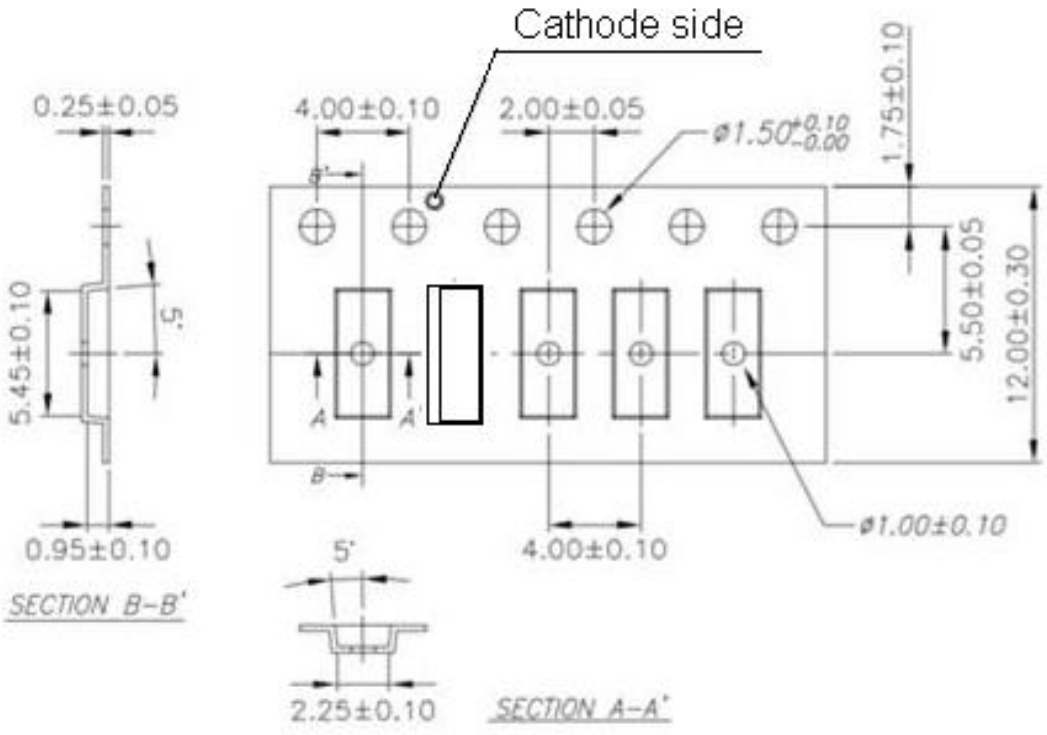
Emitter Pocket Tape Packing



Unit : mm

Item	Spec	Tol(+/-)	Item	Spec	Tol(+/-)
W	12.00	±0.30	P2	2.00	±0.05
E	1.75	±0.10	P0 x 10	40.00	±0.10
F	5.50	±0.05	T	0.25	±0.05
D0	1.50	±0.1	A0	2.25	±0.10
D1	1.50	±0.25	B0	5.45	±0.10
P0 P1	4.00	±0.10	K0	0.95	±0.10

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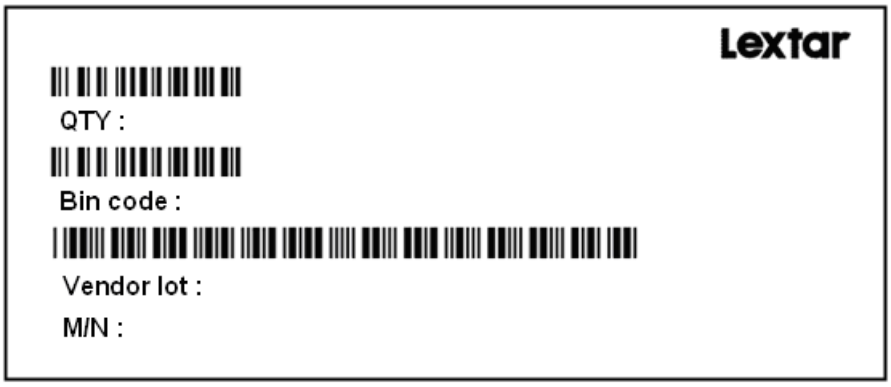
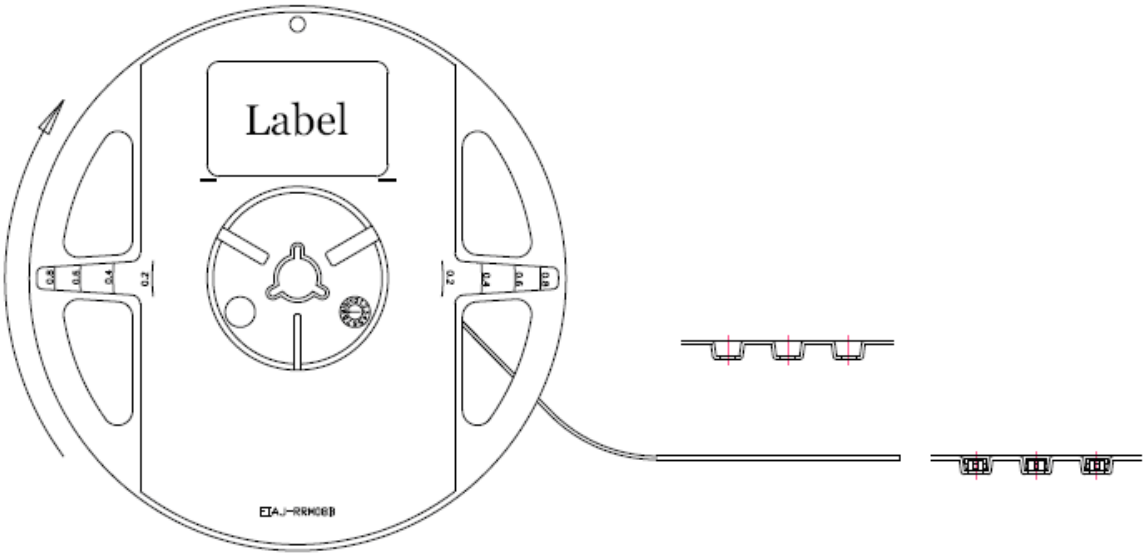
Label



Carrier Taping



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.

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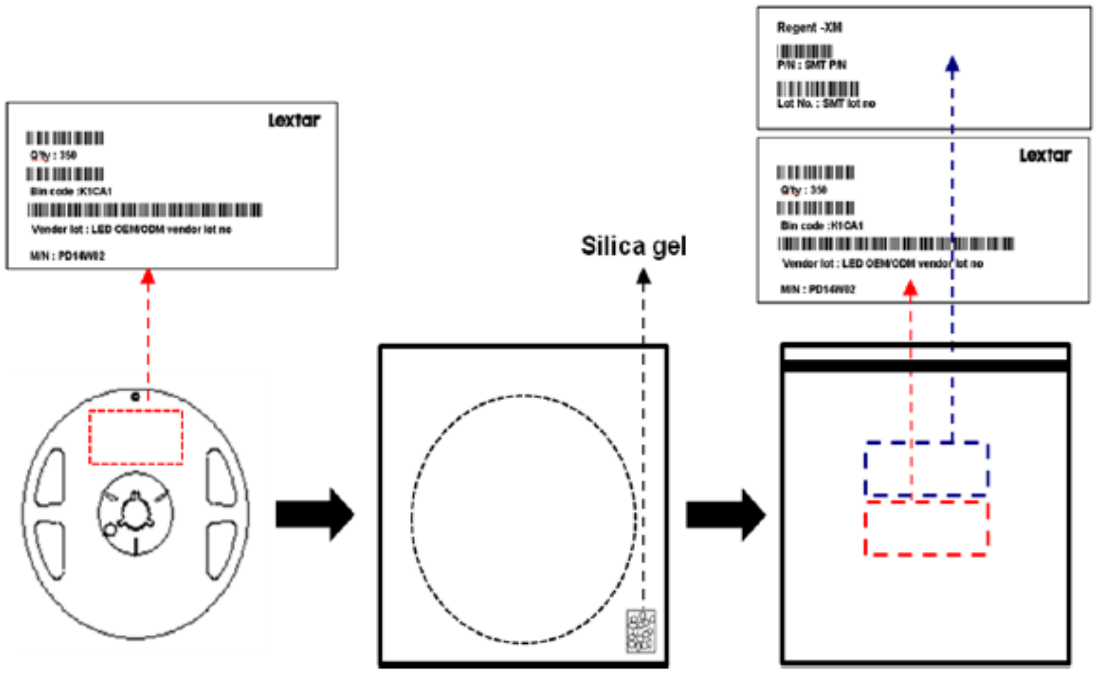
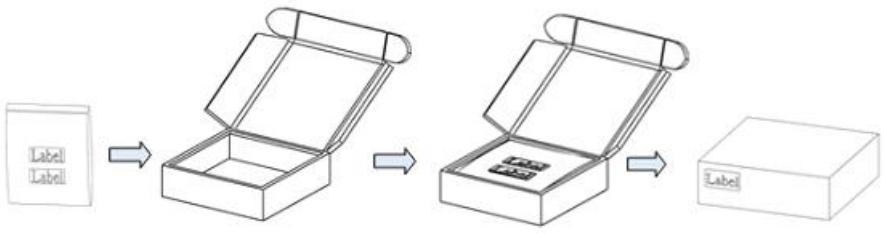
Shield Bag Taping



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



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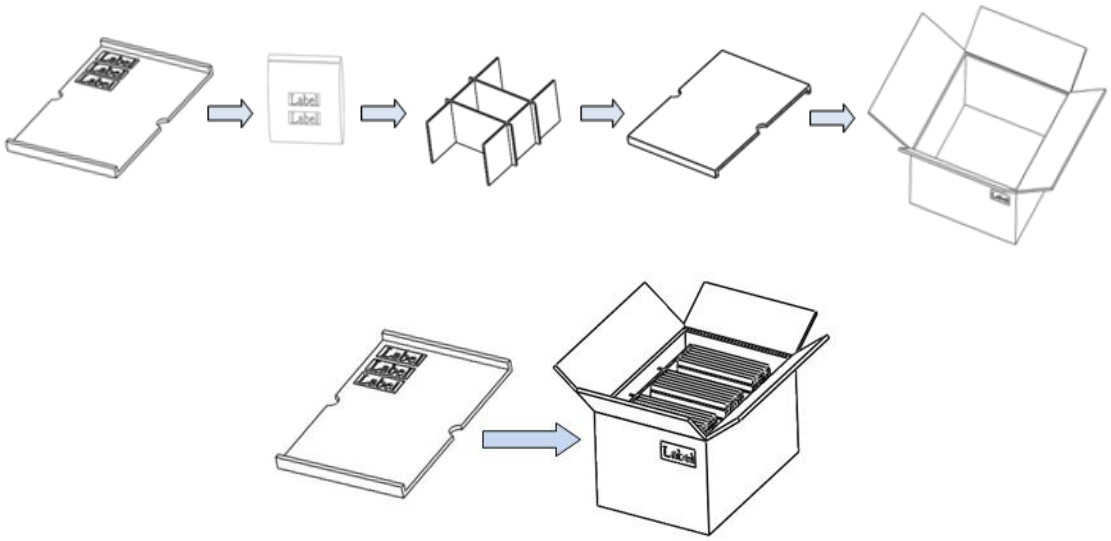
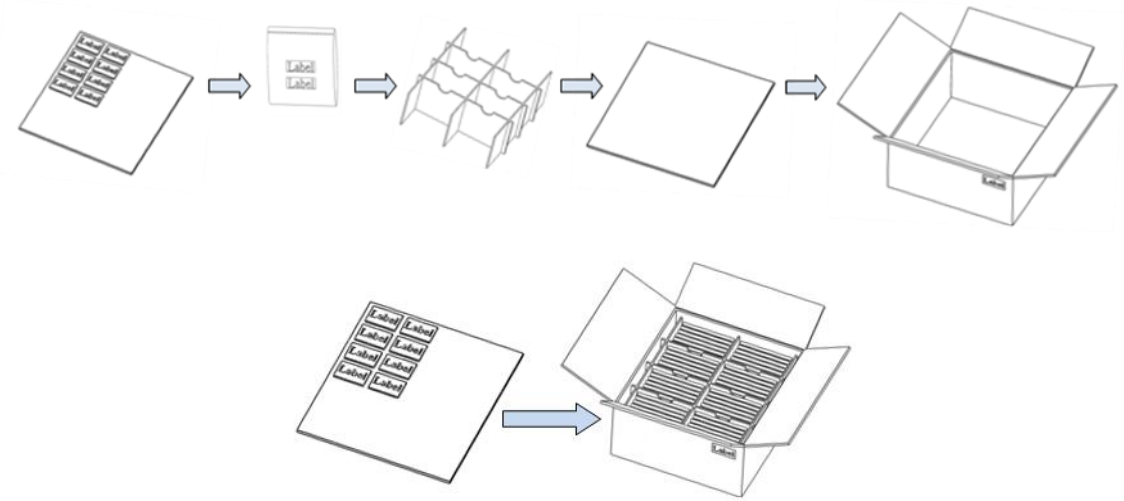
Medium Box



Large Box



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Safety Precautions

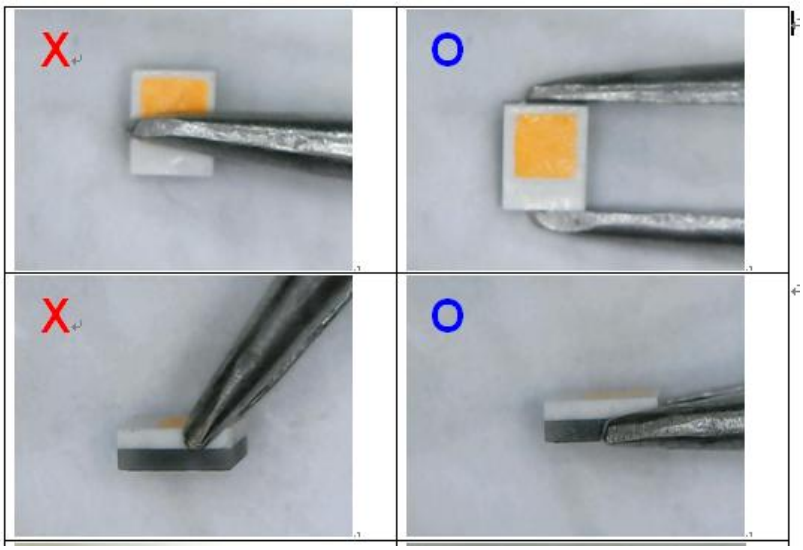
- The LED light output is too strong for human eyes without shield. Prevent eye contact directly more than seconds.
- Ensure operating under maximum rating.

Storage

- Before opening the package, the LEDs should storage under 30℃, 60% RH.
- After opening the package bag, the LEDs should be keep under 30℃, 60% 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: 60℃, 12hours (One time only).

Handling of LEDs

1. Under SMT process, mechanical stress on the LED surface should be avoided.
2. In general, LEDs should be handled from the side of the substrate, since the surface will be scratched or the white reflector will be peeled off.



3. There are no restrictions on the form of the pick and place nozzle, except that mechanical stress on the surface of LED must be prevented. Lextar recommend that the material of nozzle is the rubber or the silicone, which the property is soft to prevent break the LED.

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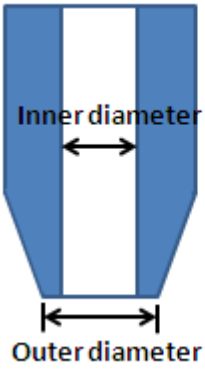


Nozzle Spec	
Outer diameter	Ψ 1.8 mm
Inner diameter	Ψ 1.4 mm
material	rubber or silicone

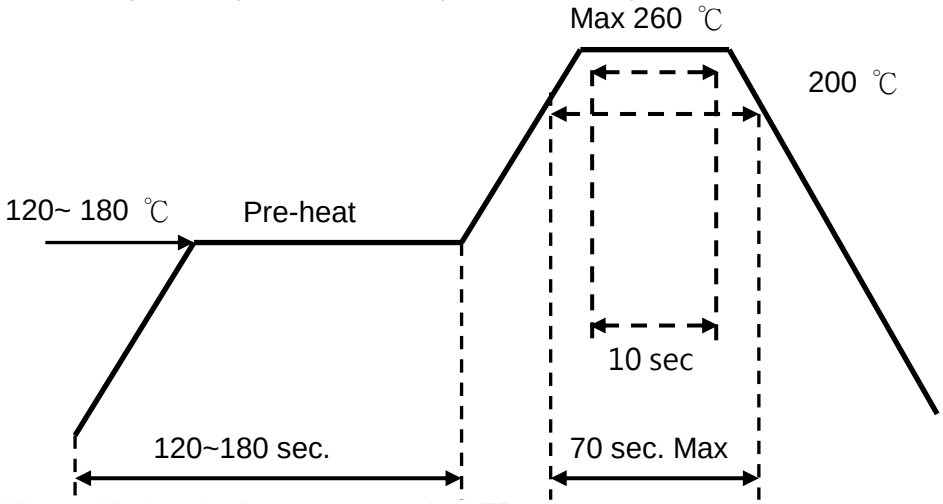
■Soldering Notice and Conditions

- When soldering LEDs, do not solder/reflow the same LED over two times.
- Recommend soldering conditions:

  Hand soldering: 350 ℃ max , 3 sec. max.

  Reflow soldering: Pre-heat 150 ℃ max , 180 sec. max.

  Peak 260 ℃ max , 10 sec. max.
- Reflow temperature profile as below: (lead-free solder)



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

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Revision History

Date	Contents	Writer	Approved
2015.10.05	Preliminary version	Jackyie	John Kuo
2017.09.11	Revised edition	SK Chen	Sean Tsai
2018.4.18	1. Delete AX/ F bin 2. Add Cx/Cy shift relative to current and temperature	SK Chen	Sean Tsai
2019.1.22	Revise the value of flux rank U5	SK Chen	
2019.2.20	P.17,18 add precaution of handling of LEDs	SK Chen	

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 automotive LED, lighting and LCD backlight. Lextar's manufacturing sites include Hsinchu and Chunan in Taiwan, and 3 in China Suzhou, Xiamen and Chuzhou. The company revenue reached USD 403 million in 2017.