

DATA SHEET

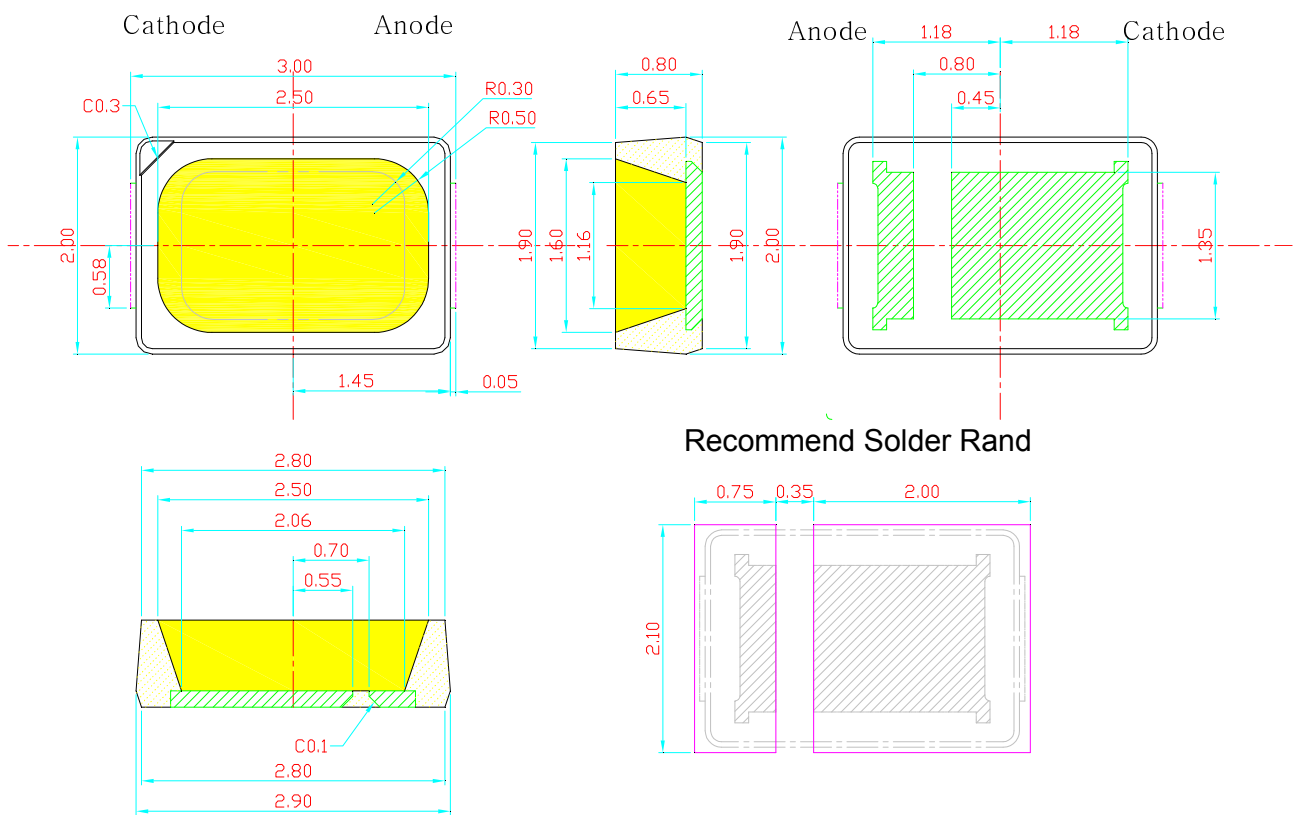
MODEL NAME	SMD LED
PART NUMBER	A103CKBKMNP9
PACKAGE	PLCC type
COLOR	White (GaN base)

Dimension

Type : LMT3020AS-W

Unit : mm

General Tolerance: +/- 0.10



- High brightness white-color surface mount LED.
- Lead frame package with individual 2 pins.
- Wide viewing angle(120°)
- Compact package outline (L x W x H) of 3.0 x 2.0 x 0.8 mm.
- Compatible to both of the lead and lead-free IR reflow soldering methods.
- Pb free package.

Specification

Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	I _F	30	mA
*Pulse Forward Current	I _{FP}	100	mA
Reverse Voltage	V _R	5	V
Power Dissipation	P _D	160	mW
Operating Temperature	T _{opr}	-40~+110	°C
Storage Temperature	T _{stg}	-40~+110	°C
Soldering Temperature	T _{slid}	Reflow Soldering : 260°C for 10sec Hand Soldering : 350°C for 3sec	

*I_{FP} Conditions : Pulse Width ≤10msec, and duty ≤1/10

Thermal Characteristics

(Ta=25°C)

Item	Symbol	Typical	Unit
Heat resistance	R _{js}	35	°C/W

*R_{js} = Heat resistance from Junction to Slug temperature (Ts)

* Using Lumens standard circuit board FR4, T=1.6mm, Copper foil t=1/2 OZ

Life Time by Junction temp.

Ta (at 20 m A)	Tj	AF	Life time
35 deg	70 deg	11.68	65,000 Hr
45 deg	80 deg	7.73	43,000 Hr
55 deg	90 deg	5.24	30,000 Hr

Initial Electrical/Optical Characteristics

(Ta=25°C)

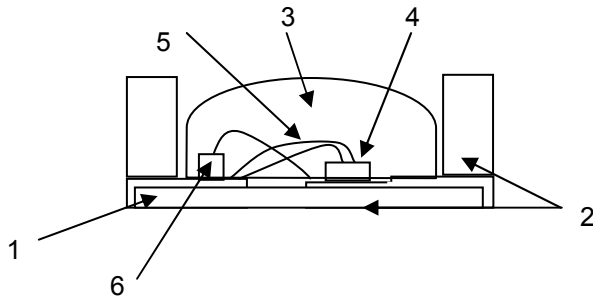
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	Z28	I _f =20mA	2.8		3.0	V
	Z30		3.0		3.2	
	Z32		3.2		3.4	
Luminous Intensity	S175	I _f =20mA	1750		1800	mcd
	S180		1800		1850	
	S185		1850		1900	
	S190		1900		1950	
	S195		1950		2000	
	S200		2000		2050	
	S205		2050		2100	
	S210		2100		2150	
	S215		2150		2200	
	S220		2200		2250	
S225	2250		2300			

* Luminous intensity is measured with an accuracy of +7%, -0%.

Material

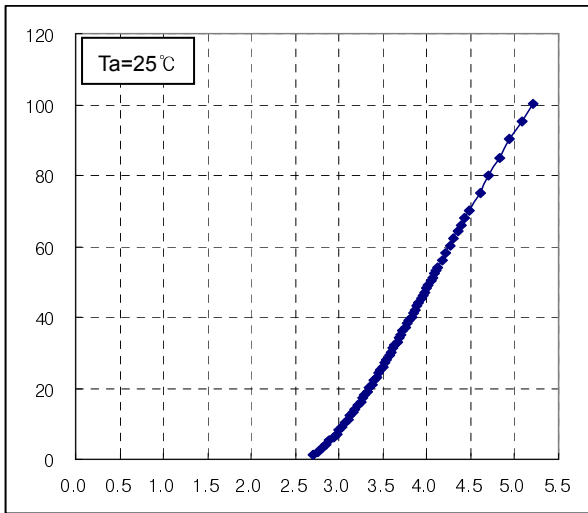
	Material
1. Lead-frame. / Soldering Leads	Cu Alloy With Ni, Ag Plating.
2. Package.	High Temperature Resistant Plastic, PPA.
3. Encapsulation	Silicon Resin. Or Epoxy Resin
4. Die	GaN based
5. Bonding wire	Au Chip : Ball Bonding / Lead-frame Ball Bonding
6.Zener Diode Option	Si

Note: Product is lead-free (Pb free).

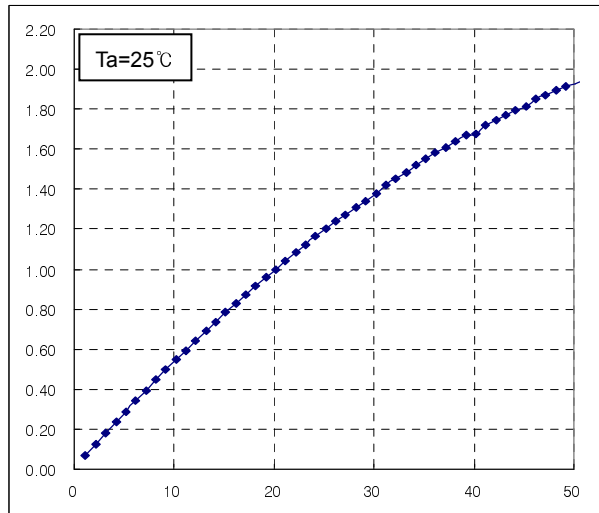


Optical & Electrical Characteristics

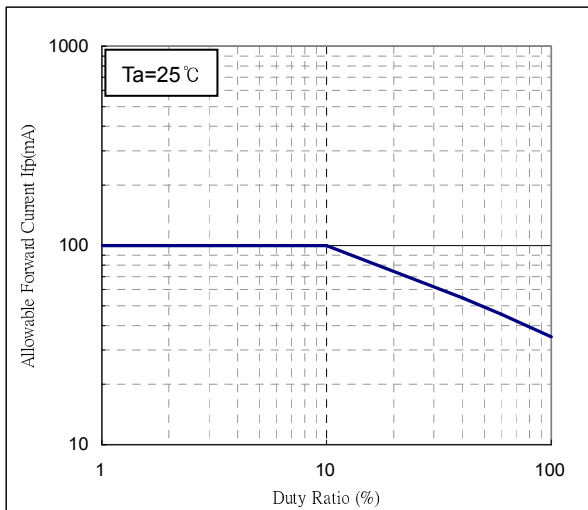
Forward Voltage vs. Forward Current



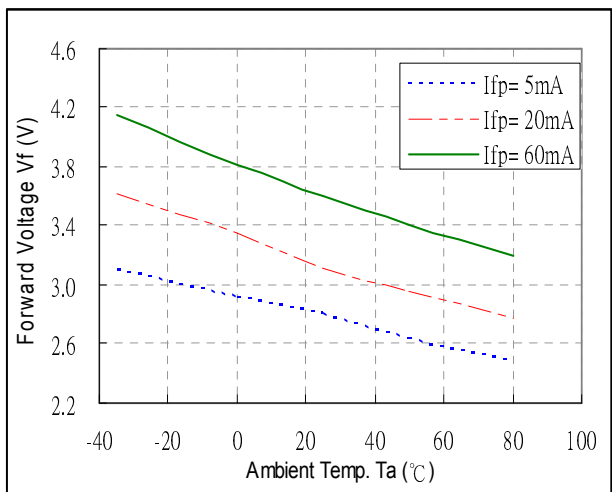
Forward Current vs. Relative Luminosity



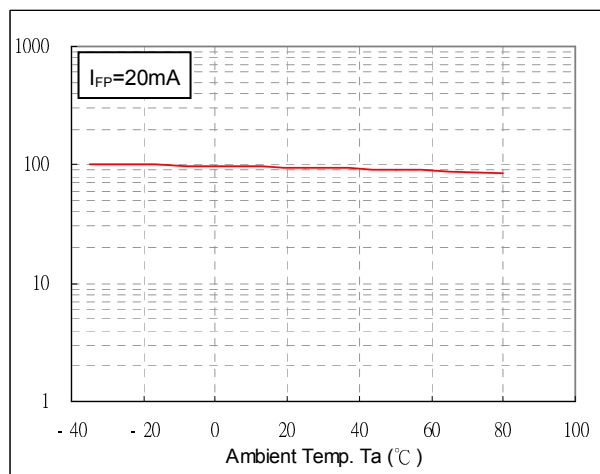
Duty Ratio vs. Allowable Forward Current



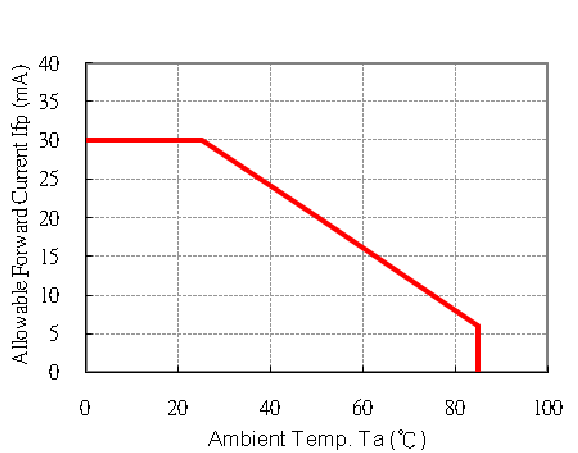
Ambient Temperature vs. Forward Voltage



Ambient Temperature vs. Relative Luminosity

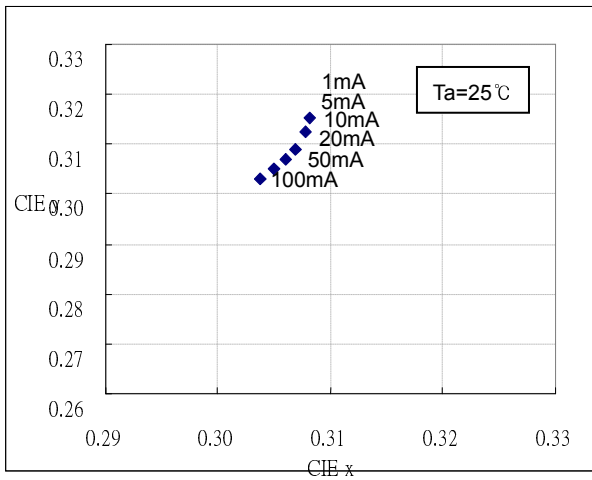


Ambient Temperature vs. Allowable Forward Current

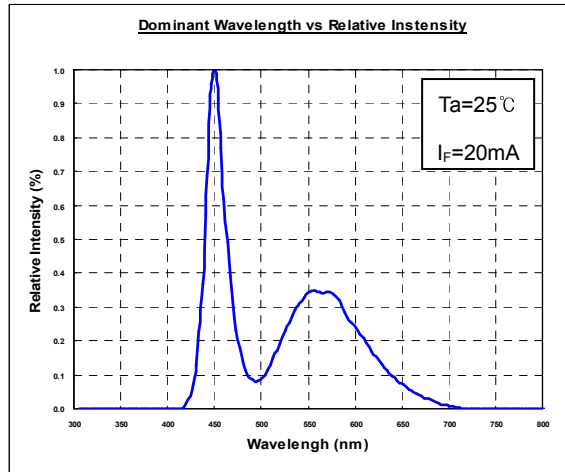


Lumens Semiconductor Lighting

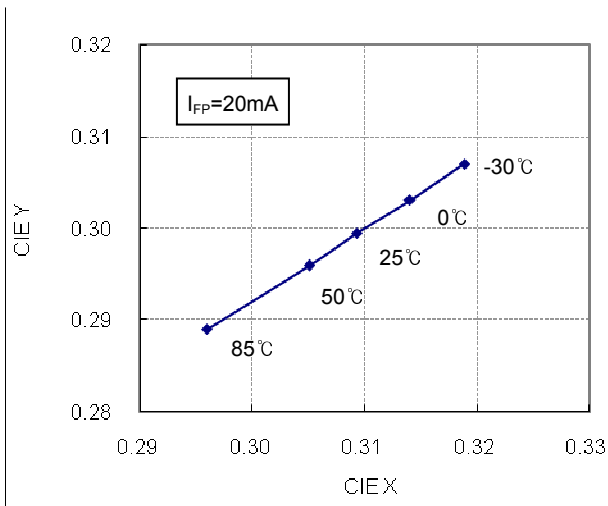
Forward Current vs. Chromaticity diagram



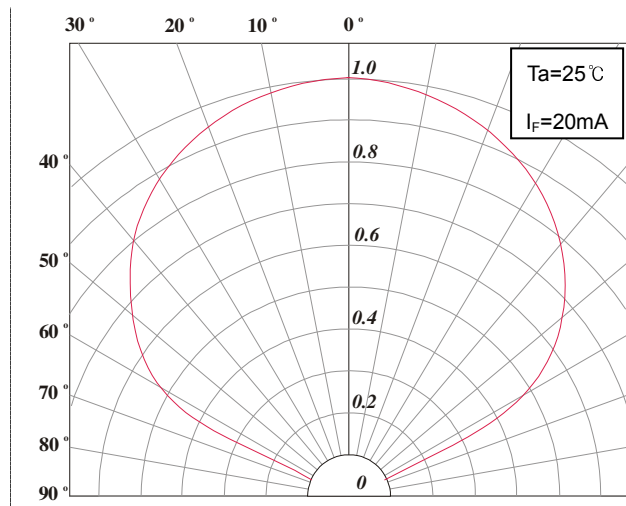
Spectrum



Ambient Temperature vs. Chromaticity Diagram



Directivity (X-X, Y-Y)



Recommended Soldering Temperature – Time Profile (Reflow Soldering)

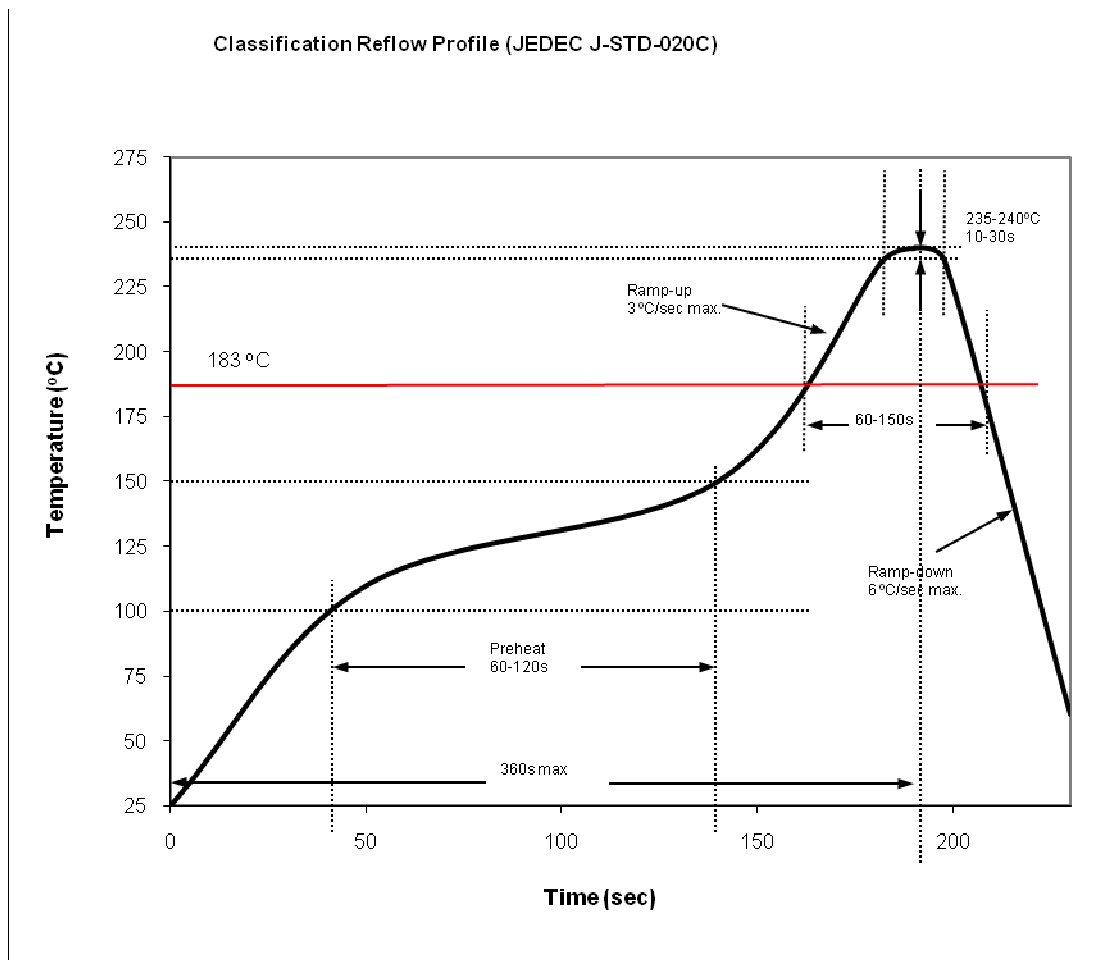
Surface Mounting Condition

In automatic mounting of the SMD LEDs on printed circuit boards, any bending, expanding and pulling forces or shock against the SMD LEDs should be kept min. to prevent them from electrical failures and mechanical damages of the devices.

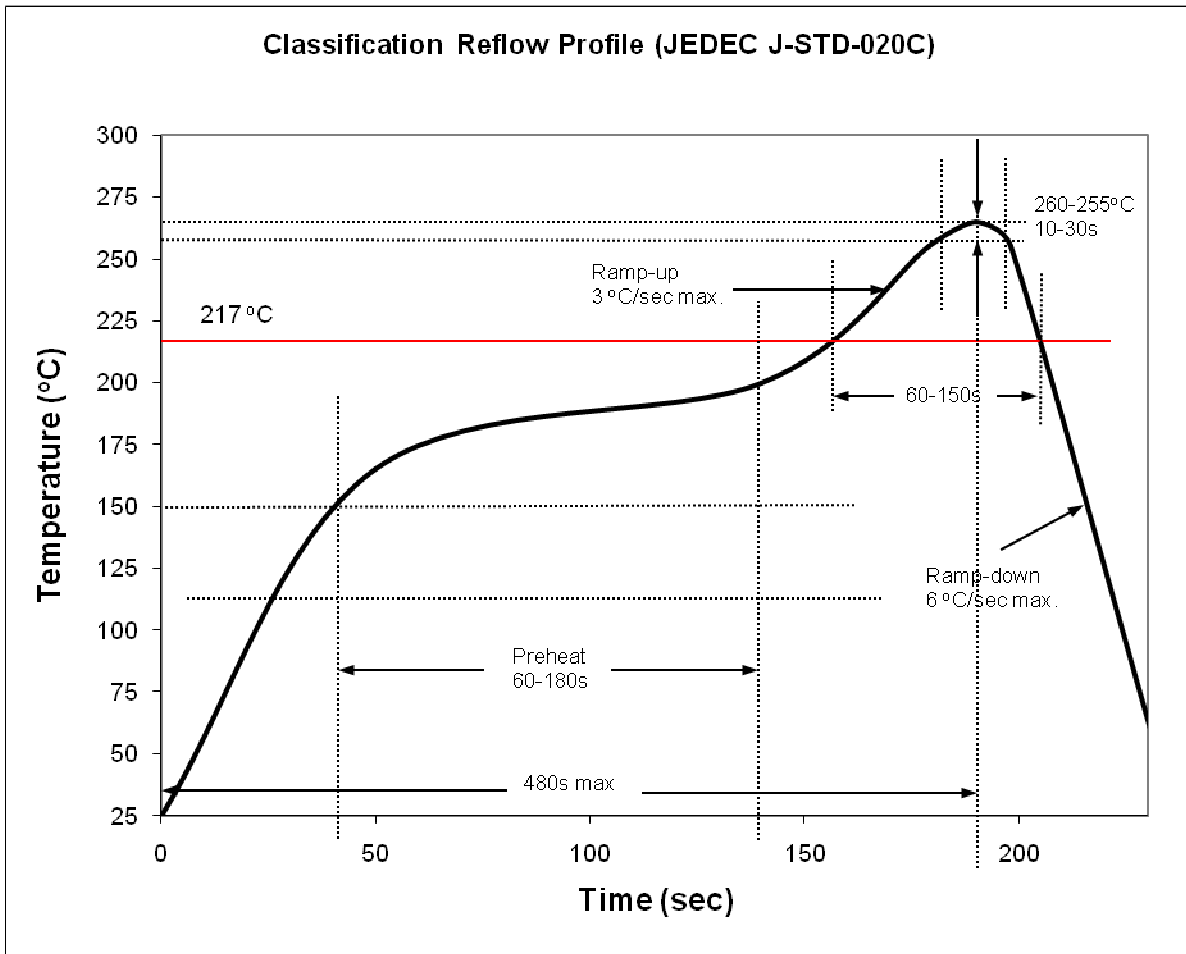
Soldering Reflow

- Soldering of the SMD LEDs should conform to the soldering condition in the individual specifications.
- SMD LEDs are designed for Reflow Soldering.
- In the reflow soldering, too high temperature and too large temperature gradient such as rapid heating/cooling may cause electrical & optical failures and damages of the devices.
- LUMENS cannot guarantee the LEDs after they have been assembled using the solder dipping method.

1) Lead Solder



2) Lead-Free Solder



3) Manual Soldering conditions.

- Lead Solder

Max. 300°C for Max. 3sec, and only one time.

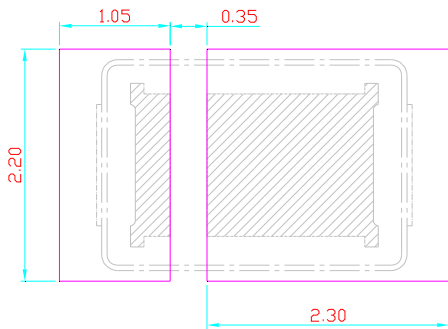
- Lead-free Solder

Max. 350°C for Max. 3sec, and only one time.

- There is possibility that the brightness of LEDs is decreased, which is influenced by heat or ambient atmosphere during reflow. It is recommended to use the nitrogen reflow method use the nitrogen reflow method.
- After LEDs have been soldered, repairs should not be done. As repairs is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will be damaged by repairing or not.
- Reflow soldering should not be done more than two times.

Recommended Solder Pattern

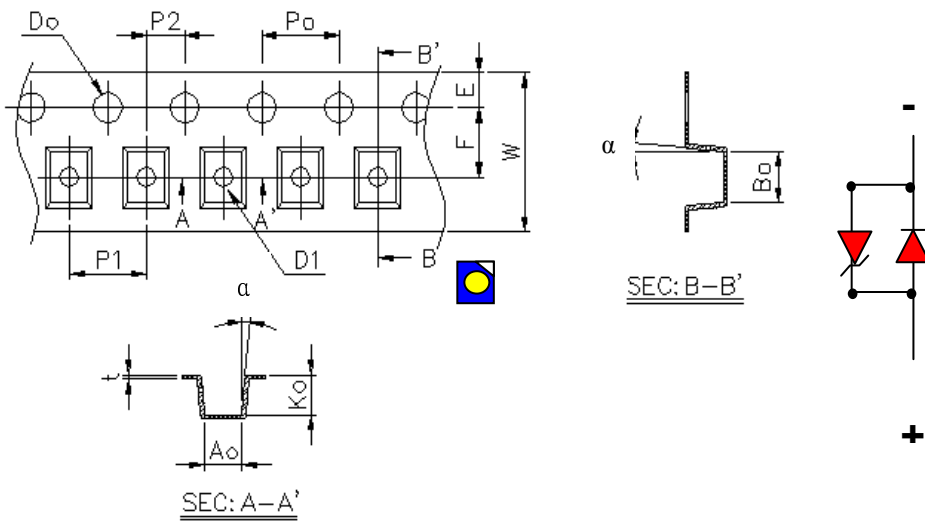
Unit : mm



Taping And Orientation.

Quantity: 2000 units/reel.

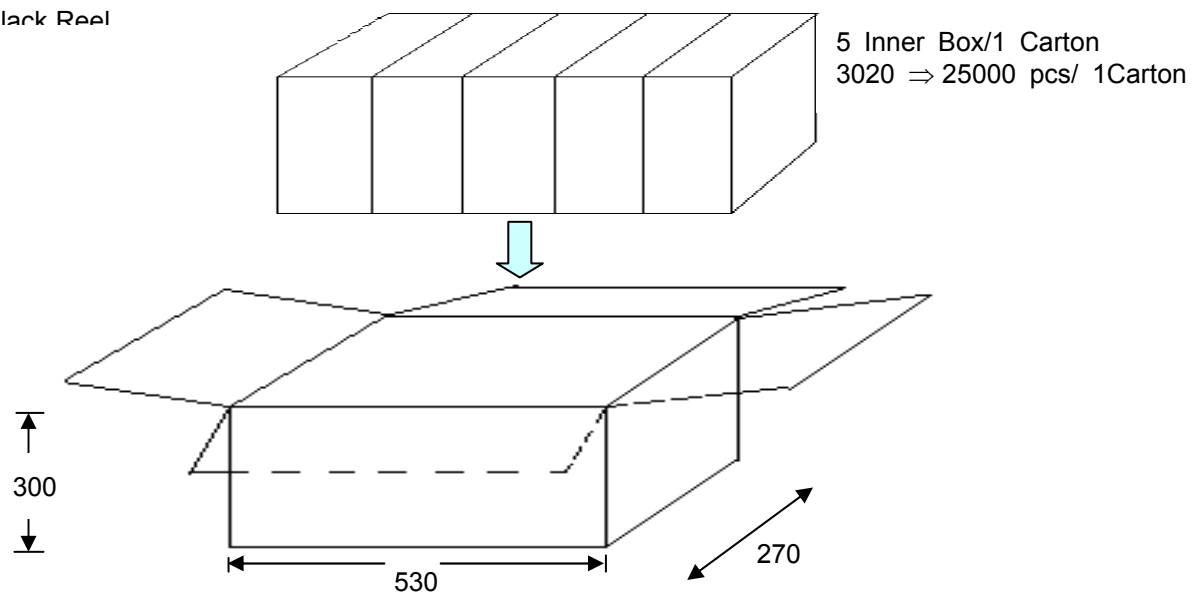
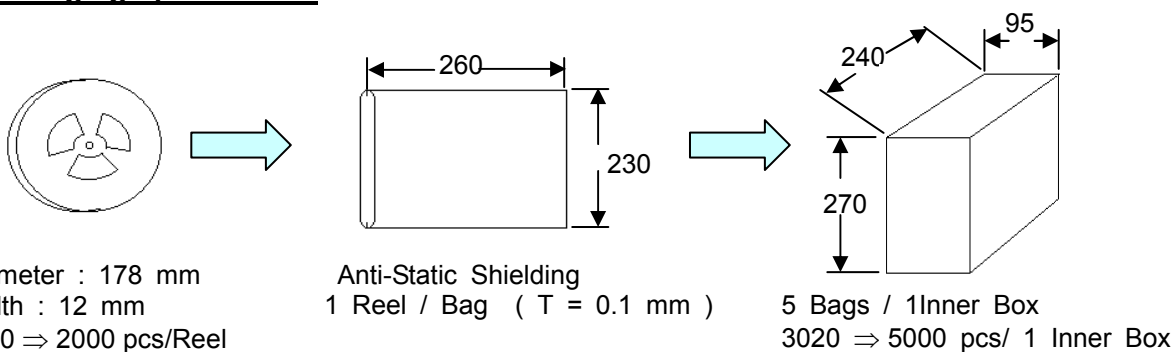
Diameters: 178 mm.



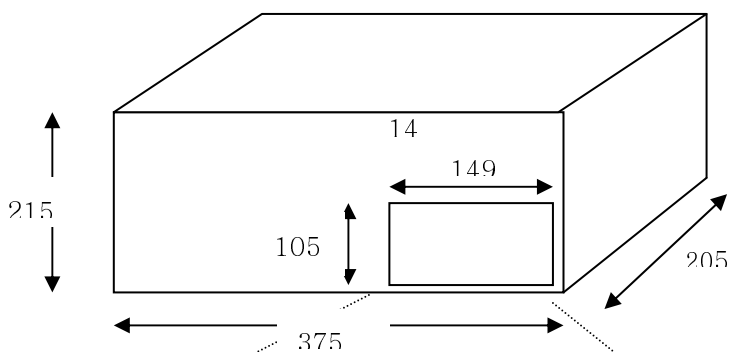
Item	Spec	Tol.(+/-)	Item	Spec	Tol.(+/-)
W	8.00	±0.20	P2	2.00	±0.05
E	1.75	±0.10	t	0.23	±0.05
F	3.50	±0.05	A0	2.25	±0.10
D0	1.50	+0.10, -0	B0	3.30	±0.10
D1	1.00	±0.10	K0	1.25	±0.10
P0	4.00	±0.05	α	Max 5°	

Unit : mm

Packaging Specification



Package Outlook:



Lumens	
Customer	
Part Number	
Quantity	
Date	
Remark	

Reliability Test

Product Type: LMT3020AS-W	Package: TOP LED	Chip Type: GaN
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Title: Qualification of Topview LMT3020AS package.
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Purpose: To qualify Topview LMT3020AS package.

Sample History: All parts are assembled and tested in LUMENS.

Product Reliability Qualification Plan:

All units are to be pre-conditioned before proceeding to the respective test.

	Conditions
<ul style="list-style-type: none">• Pre-conditioning as per JEDEC L 2A requirement (JESD22-A113-B)	<ul style="list-style-type: none">- Bake @ 125°C, 24 hrs.- Moisture soak @ 60°C/60% RH, 120 hrs.
<ul style="list-style-type: none">• IR re-flow soldering on FR4 board.	<ul style="list-style-type: none">- 3xIR re-flow soldering at 260°C/10 sec. min.(JEDEC)

Failure criteria:

-Electrical failures: - Vf shift $\geq 10\%$

-Light Output Degradation:
- % Iv shift $\leq -30\%$

-Visual failures:
- Broken or damaged package or lead
- Solderability < 95% wetting
- Dimension out of tolerance

Lumens Semiconductor Lighting

Reliability Test Matrix.

3X IR/Convective Reflow Process at Peak Temperature 260°C for 10-20 sec.

Pre-conditioning @ 60°C/60% RH for 120 hours.

Test Item	Standard Test Method (option)	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat (Reflow Soldering)	JEITA ED-4701 300 301	Tsld=260°C, 10sec (Pre treatment 30°C, 70%, 168hrs.)	2times	0/50
Solderability (Reflow Soldering)	JEITA ED-4701 300 303	Tsld=215±5°C, 3sec. (Lead Solder)	1time over95%	0/50
Thermal Shock	JEITA ED-4701 300 307	0°C~100°C 15sec. 15sec.	20cycles	0/50
Temperature Cycle	JEITA ED-4701 100 105	-40°C~25°C~100°C~25°C 30min. 5min. 30min. 5min.	100cycles	0/50
Moisture Resistance Cyclic	JEITA ED-4701 200 203	25°C ~ 65°C~ -10°C 90%RH 24hrs./1cycle	10 cycles	0/50
High Temperature Storage	JEITA ED-4701 200 201	Ta=100°C	1000hrs.	0/50
Temperature Humidity Storage	JEITA ED-4701 100 103	Ta=60°C, RH=90%	1000hrs.	0/50
Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40°C	1000hrs.	0/50
Steady State Operating Life Condition 1		Ta=25°C, IF=20mA	1000hrs.	0/50
Steady State Operating Life Condition 2		Ta=25°C, IF=35mA	500hrs.	0/50
On/Off Test		1min on.1min off, IF=20mA, Ta= -25°C, 60°C, 25°C,	30,000 cycle	0/50
Steady State Operating Life Condition 3		Ta=25°C, IF=20mA	10000hrs.	0/50
Steady State Operating Life of High Temperature		Ta=85°C, IF=5mA	1000hrs.	0/50
Steady State Operating Life of High Humidity Heat		60°C, RH=90%, , IF=25mA	500hrs.	0/50
Steady State Operating Life of Low temperature		Ta=-30°C, IF=20mA	1000hrs.	0/50
Vibration	JEITA ED-4701 400 403	100~2000~100Hz Sweep 4min. 200m/s2 3direction, 4cycles	48min.	0/50
Substrate Bending	JEITA ED-4702	3mm, 5±1sec.	1time	0/50
Adhesion Strength	JEITA ED-4702	5N, 10±1sec.	1time	0/50
Push/Pull test		≥1kgf	1time	0/100

Lumens Semiconductor Lighting

Cautions:

(1) Moisture Proof Package

The moisture proof package should be used to prevent moisture in the package as the moisture may cause damage to optical characteristics of the LEDs.

The aluminum bag with zipper is used for moisture proof package. And, the moisture absorbent material, Silica gel, is inserted into aluminum bag.

(2) Storage:

Storage Conditions

Before opening the package:

The LEDs should be kept at 30°C or less than 90%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material is recommended.

After opening the package:

After open the package, the LED should be kept at 30°C, 60%RH or less. The LED should be soldered within 168 hours (7 days) after opening the package. If unused LEDs remain, it should be stored in moisture proof condition.

(3) Heat Generation

Thermal design of the end products is of paramount importance. The heat generation must be taken into design consideration when using the LED. The coefficient of the temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components.

(4) Static Electricity

Static electricity or surge voltage damages the LEDs. All equipment and machinery must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handling the LEDs. When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test or a Vf test at a lower current. (below 1mA is recommended).

Criteria: Vf >2.0V at If=0.01 mA

(5) Cleaning

Use isopropyl alcohol as a solvent for cleaning the LEDs. The other solvent may dissolve the LEDs package and the epoxy.

Ultrasonic cleaning should not be done.

(6) Others

When using the LEDs, it must care that the reverse voltage will not exceed the absolute maximum rating.

The LED light is enough to injure human eyes, so it should avoid looking at LED light directly.

NOTE.

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