

# MP-5050-810P

## High Power LED



### Features

- High efficacy
- CRI Options: Minimum 70, 80, 90
- Low thermal resistance
- Compatible with automatic placement equipment
- Compatible with infrared reflow solder process



### Applications

- Replacement lamps
- General lighting
- Architectural/Decorative lighting
- Indoor & Outdoor sign board back light

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## Ordering Information

Ordering Part Numbers (Test condition = 45 mA, T<sub>j</sub> = 25°C)

Minimum CRI	Nominal CCT	Luminous Flux		Ordering Part Number
		Minimum Flux (lm)	Typical Flux (lm)	
2700K	70	200	213	MP-5050-810P-27-70
	80	180	198	MP-5050-810P-27-80
	90	150	170	MP-5050-810P-27-90
3000K	70	210	222	MP-5050-810P-30-70
	80	190	205	MP-5050-810P-30-80
	90	160	180	MP-5050-810P-30-90
4000K	70	230	237	MP-5050-810P-40-70
	80	200	218	MP-5050-810P-40-80
	90	170	190	MP-5050-810P-40-90
5000K	70	230	237	MP-5050-810P-50-70
	80	200	218	MP-5050-810P-50-80
	90	170	190	MP-5050-810P-50-90
5700K	70	220	234	MP-5050-810P-57-70
	80	200	215	MP-5050-810P-57-80
	90	170	188	MP-5050-810P-57-90
6500K	70	220	232	MP-5050-810P-65-70
	80	200	213	MP-5050-810P-65-80
	90	170	185	MP-5050-810P-65-90



## Ordering Information

### Part Number Nomenclature

**MP**

**5050**

**810P**

**##**

**##**

Product Family	Package Type	Package Configurator	Nominal CCT <sup>1</sup>	Minimum CRI
<b>MP:</b> Mid Power LED	<b>5050:</b> 5.0 mm x 5.0 mm	<b>810P:</b> Package code	<b>27:</b> 2700K <b>30:</b> 3000K <b>40:</b> 4000K <b>50:</b> 5000K <b>57:</b> 5700K <b>65:</b> 6500K	<b>70:</b> CRI>70 <b>80:</b> CRI>80 <b>90:</b> CRI>90

**Note:**

1. Correlated Color Temperatures (CCT)



## Binning Structure

Each mid power product shipped will be labeled with its specific flux and voltage bins. Not all bins listed are available in all CCTs and CRIs.

### Flux Bins<sup>1</sup>

Bin Code	Binning @ 45 mA, T <sub>j</sub> = 25°C	
	Minimum Flux (lm)	Maximum Flux (lm)
JF	150	160
JG	160	170
JH	170	180
JK	180	190
JL	190	200
JM	200	210
JN	210	220
JP	220	230
JQ	230	240
JR	240	250
JS	250	260

**Note:**

1. The Luminous Flux measurement tolerance is ±7 %.

### Forward Voltage Bins<sup>1</sup>

Voltage Bin	Binning @ 45 mA, T <sub>j</sub> = 25°C	
	Minimum Voltage (V)	Maximum Voltage (V)
1Q	20	21
1R	21	22
1S	22	23

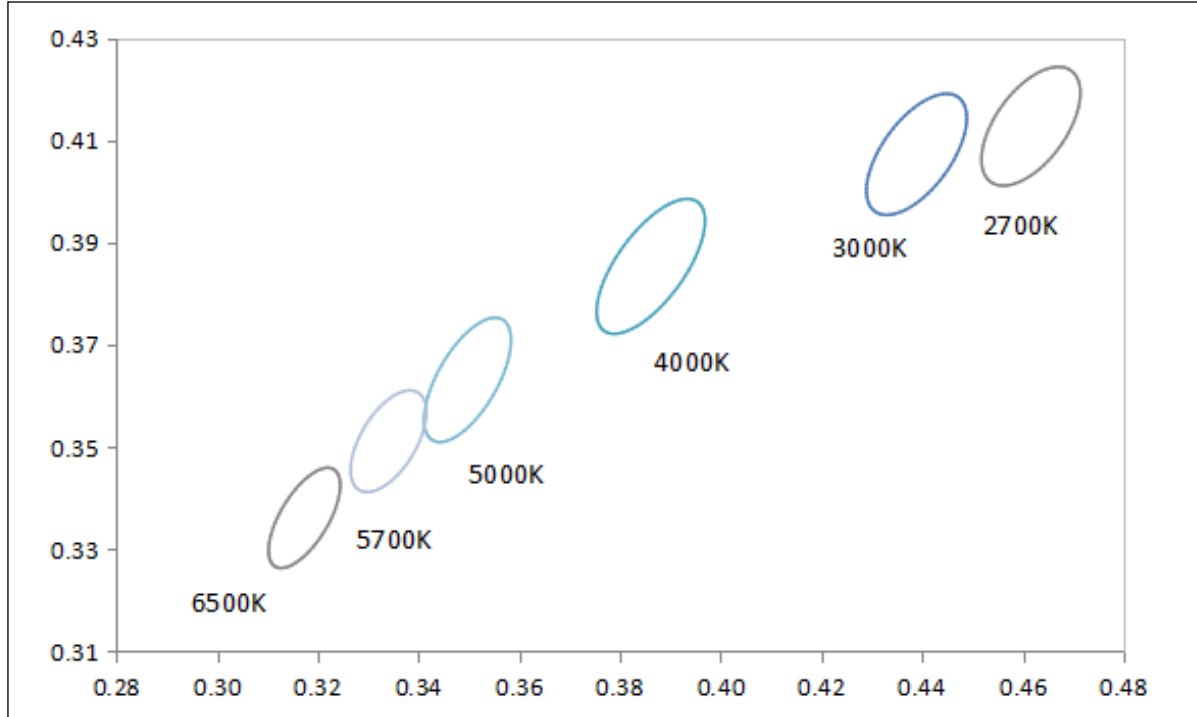
**Note:**

1. The Forward Voltage measurement tolerance is ±0.2 V.



## Binning Structure

Chromaticity Binning Diagram <sup>1,2</sup>



### Color Bins

Color Code	Center point		Radius		Angle(deg)
	x	y	a	b	$\phi$
27M5	0.4616	0.4127	0.0135	0.0070	53.42
30M5	0.4389	0.4072	0.0139	0.0068	53.13
40M5	0.3861	0.3853	0.0157	0.0067	53.43
50M5	0.3497	0.3631	0.0137	0.0059	59.37
57M5	0.334	0.3511	0.0112	0.0055	58.35
65M5	0.3173	0.3361	0.0112	0.0048	58.34

**Note:**

1. Test condition:  $I_f=45$  mA,  $T_j= 25^\circ\text{C}$ .
2. The Chromaticity Coordinate measurement tolerance is  $\pm 0.005$ .



## Absolute Maximum Ratings<sup>1,2</sup>

Parameter	Symbol	Values	Unit
Forward Current	$I_f$	400	mA
Pulse Forward Current	$I_{fp}$	250	mA
Power Dissipation	$P_d$	4480	mW
Reverse Voltage	$V_r$	5	V
Junction Temperature	$T_j$	120	°C
Operating Temperature Range	$T_{opr}$	-40~+105	°C
Storage Temperature Range	$T_{stg}$	-40~+105	°C
Soldering Temperature	$T_{sld}$	230°C or 260°C for 10 sec	°C

**Notes:**

1. Frequency 10 KHz, duty ratio  $\leq 10\%$ .
2. The forward pulse current is the maximum current used by the chip at 25°C.



## Characteristics<sup>1,2,3</sup>

Parameter ( $I_f=45\text{ mA}$ , $T_j=25^\circ\text{C}$ )		Symbol	Value	Unit
Forward Voltage	Minimum	$V_{f\text{ min}}$	20.8	V
	Typical	$V_{f\text{ typ}}$	21.6	
	Maximum	$V_{f\text{ max}}$	22.4	
Viewing Angle		$2\theta_{1/2}$	120	°
Thermal Resistance		$R_{\text{th J-C}}$	2	°C/W
Electrostatic Discharge		$V_{\text{ESD}}$	2000	V

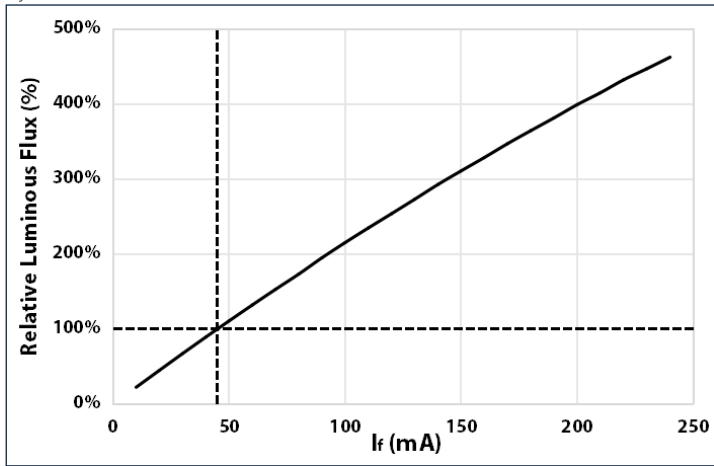
**Notes:**

1. To prevent damage refer to operating conditions and derating curves for appropriate maximum operating conditions.
2. Maximum operating case temperature combined with maximum drive current defines the total maximum operating condition for the device.  
To prevent damage, please follow derating curves for all operating conditions.
3. Mid power LEDs are designed for operation up to an absolute maximum forward drive current as specified below. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to typical forward drive currents. Actual device lifetimes will also depend on case temperature. Refer to the current vs. case temperature derating curves for further information.



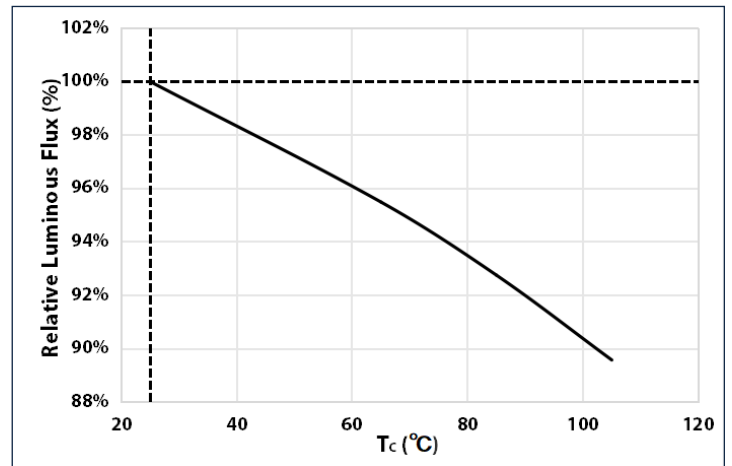
**Relative Luminous Flux vs Forward Current**

$T_j = 25^\circ\text{C}$



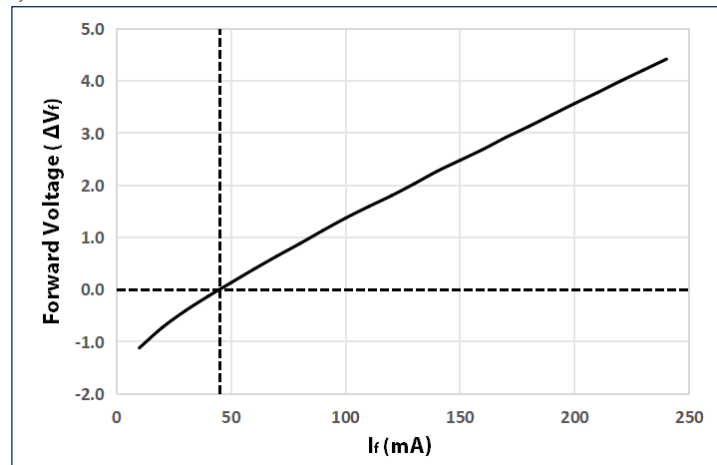
**Relative Luminous Flux vs Temperature**

$I_f = 45\text{ mA}$



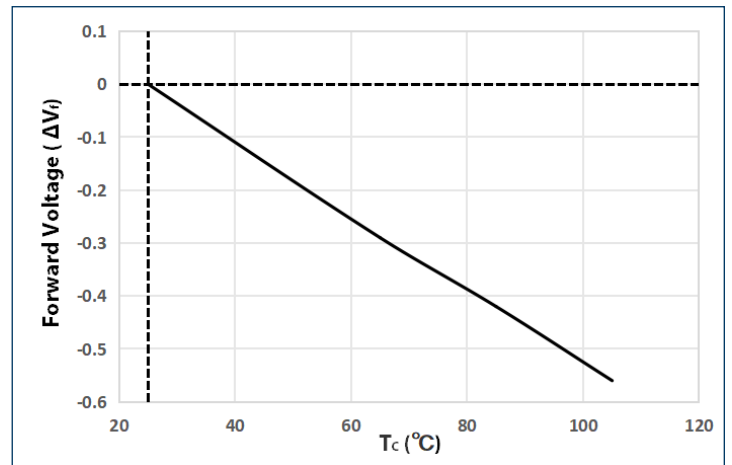
**Forward Voltage vs Forward Current**

$T_j = 25^\circ\text{C}$

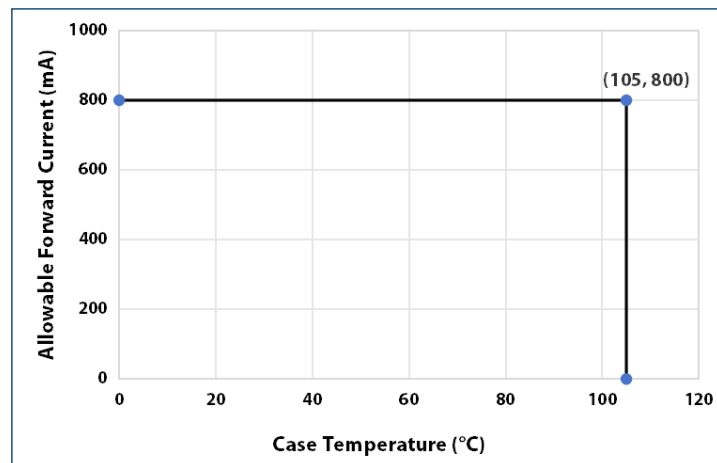


**Forward Voltage vs Temperature**

$I_f = 45\text{ mA}$



**Allowable Forward Current vs Temperature**



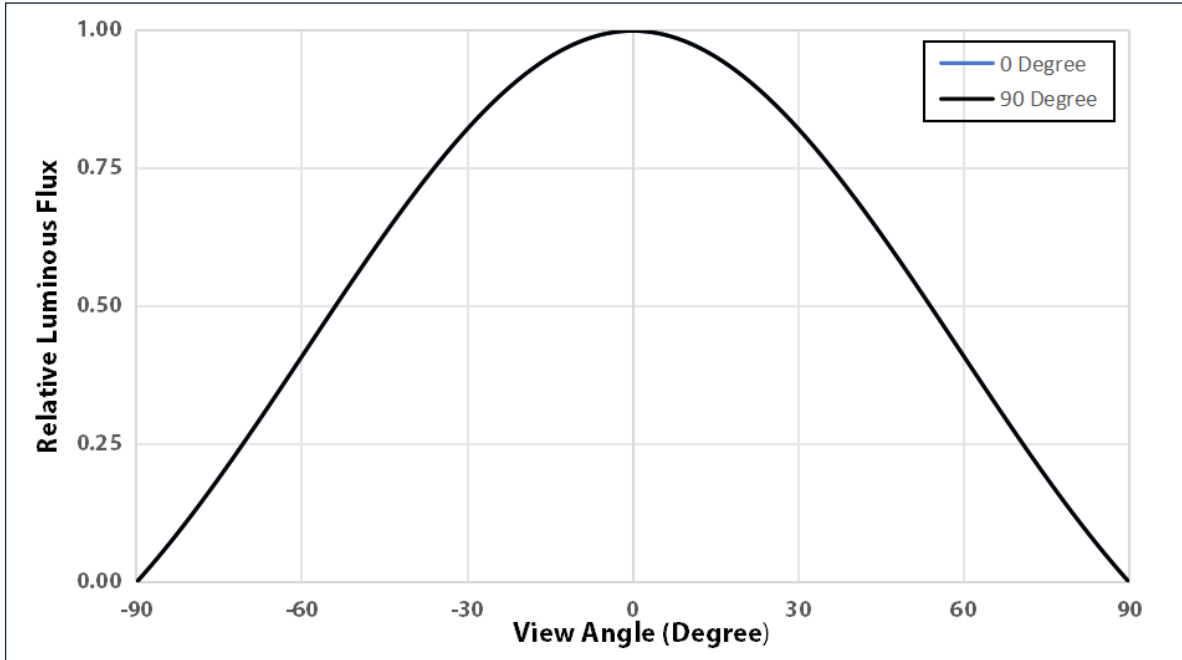




## Angular Distribution and Typical Spectrum

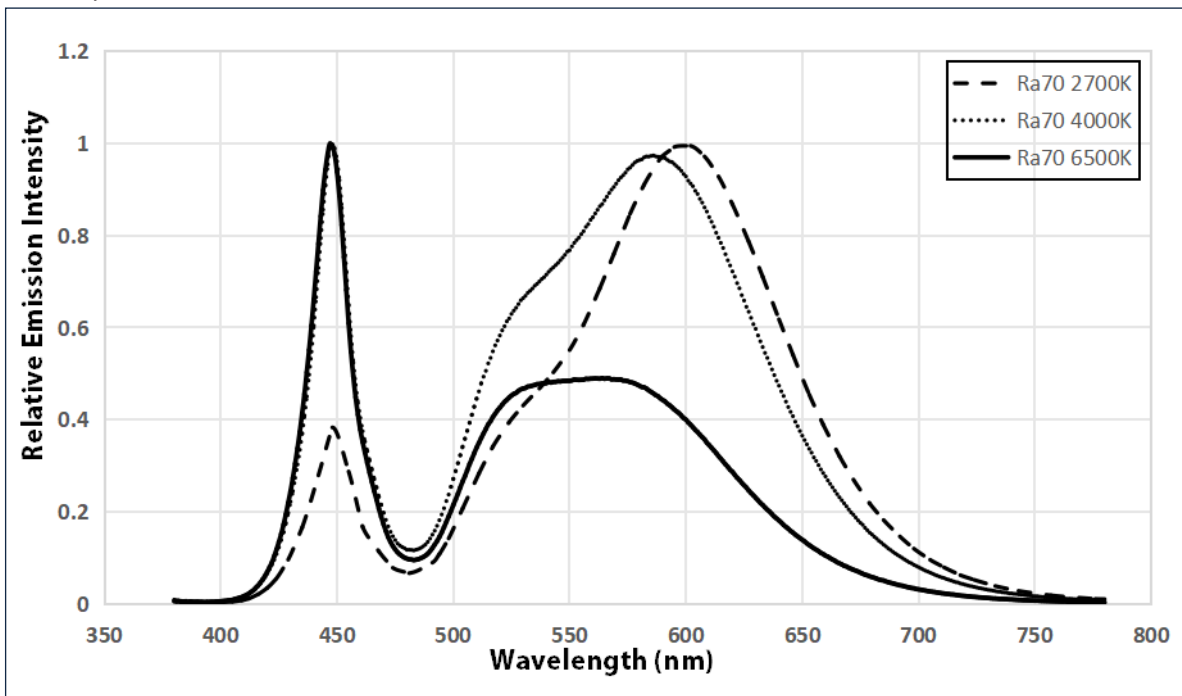
### Angular Distribution

$T_j = 25^\circ\text{C}$



### Relative Spectral Power Distribution

$R_a > 70, T_j = 25^\circ\text{C}$

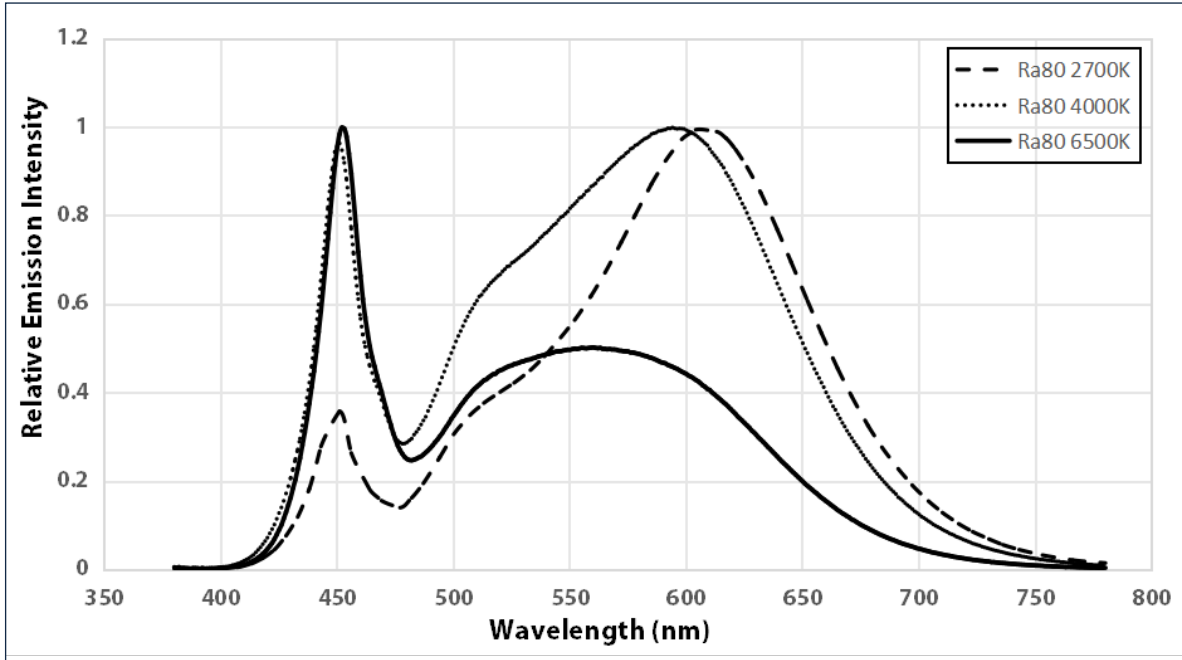




## Angular Distribution and Typical Spectrum

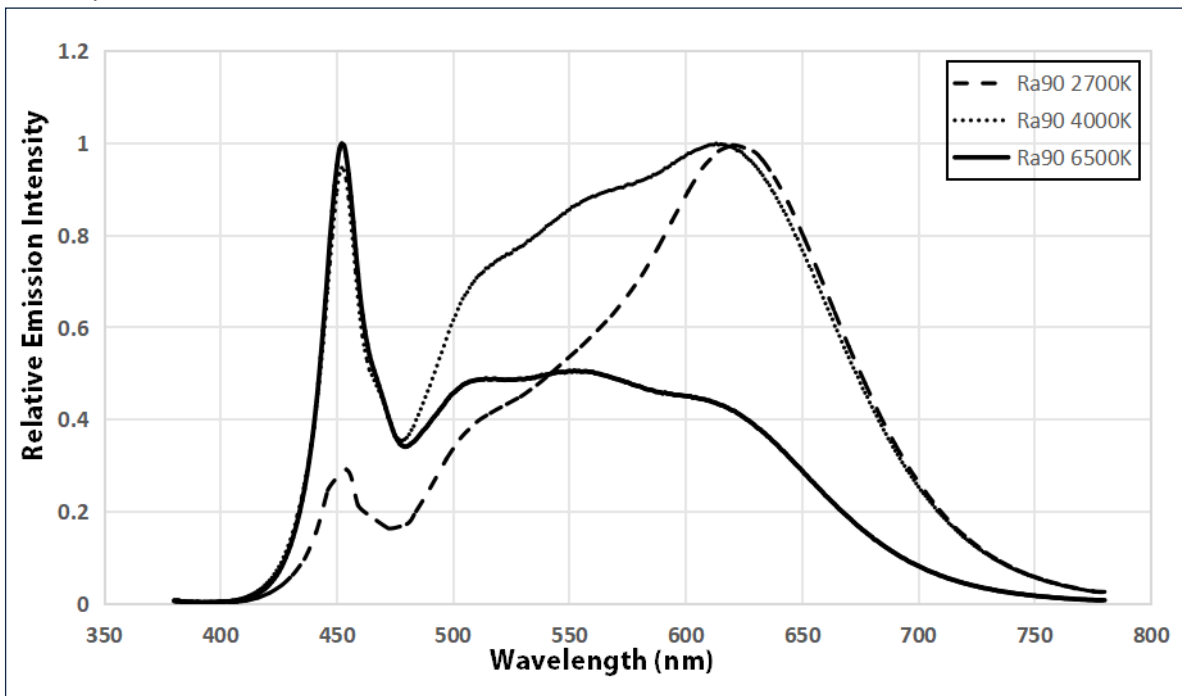
### Relative Spectral Power Distribution

Ra>80, T<sub>j</sub>= 25°C



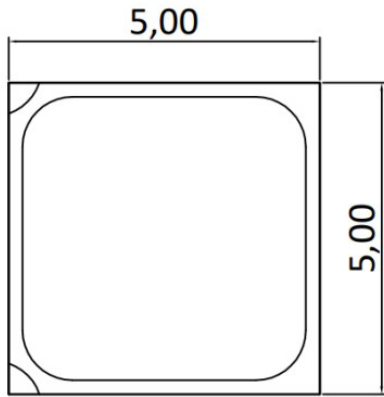
### Relative Spectral Power Distribution

Ra>90, T<sub>j</sub>= 25°C





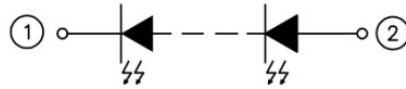
## Mechanical Dimensions<sup>1,2</sup>



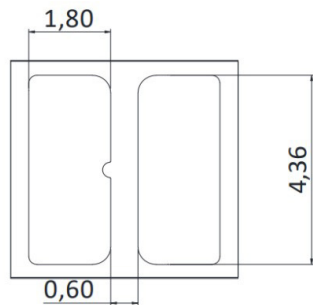
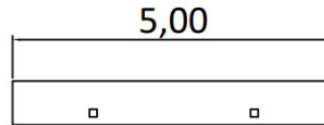
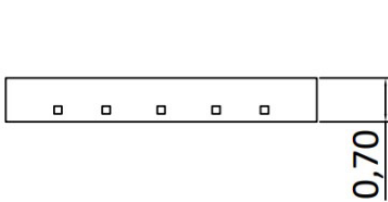
①  
Cathode

②  
Anode

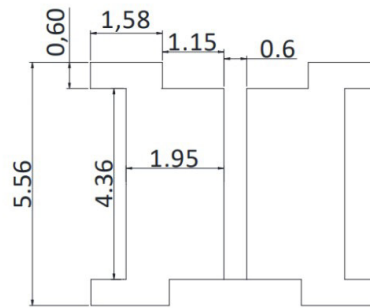
8 Series 1 Parallel



Polarity



Bot. view



Soldering patterns

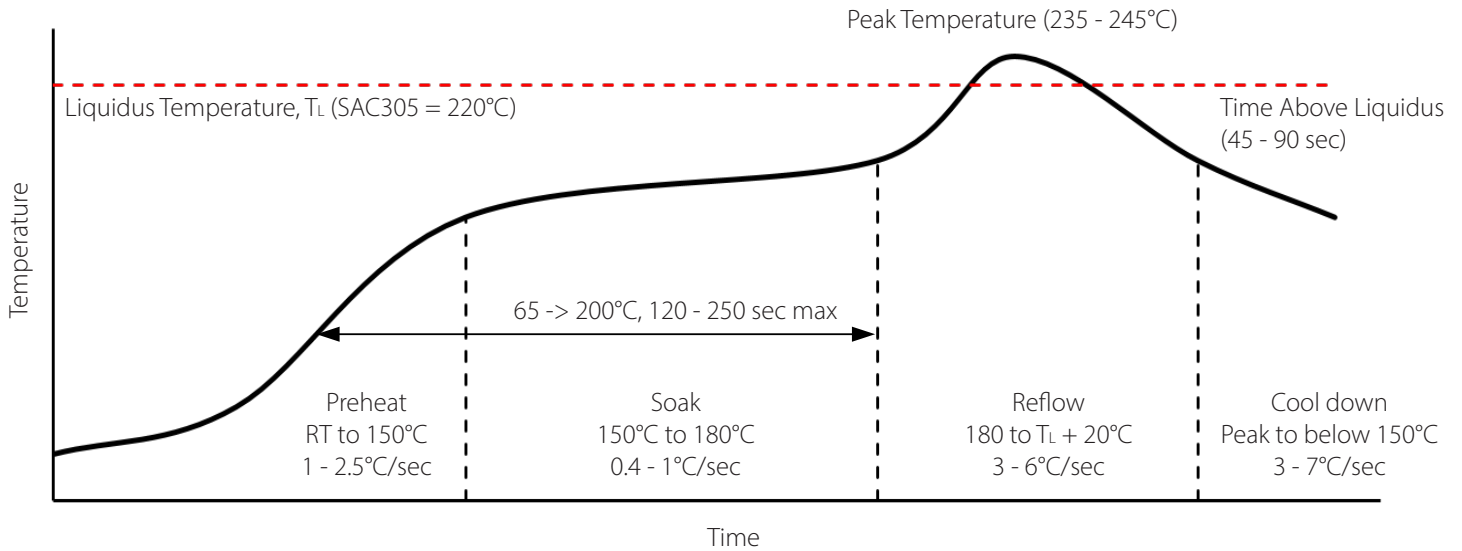
Recommended Solder Pad Pattern

**Note:**

1. The tolerance unless mentioned is  $\pm 0.2\text{mm}$ , unit = mm.
2. The soldering pad pattern is only for reference and can be modified according to actual requirements.



## Soldering Profile



SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	

**Notes:**

- Product complies to Moisture Sensitivity Level 3 (MSL 3).
- The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
- During the pick and place process, axial forces on the dome (or window) should not exceed 0.5 Newtons (N).
- Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
- Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. Temperature is referenced to the center of the PCB.
- Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
- These are general guidelines. Consult the solder paste manufacturer's datasheet for guidelines specific to the alloy and flux combination used in your application. For more information, please refer to:

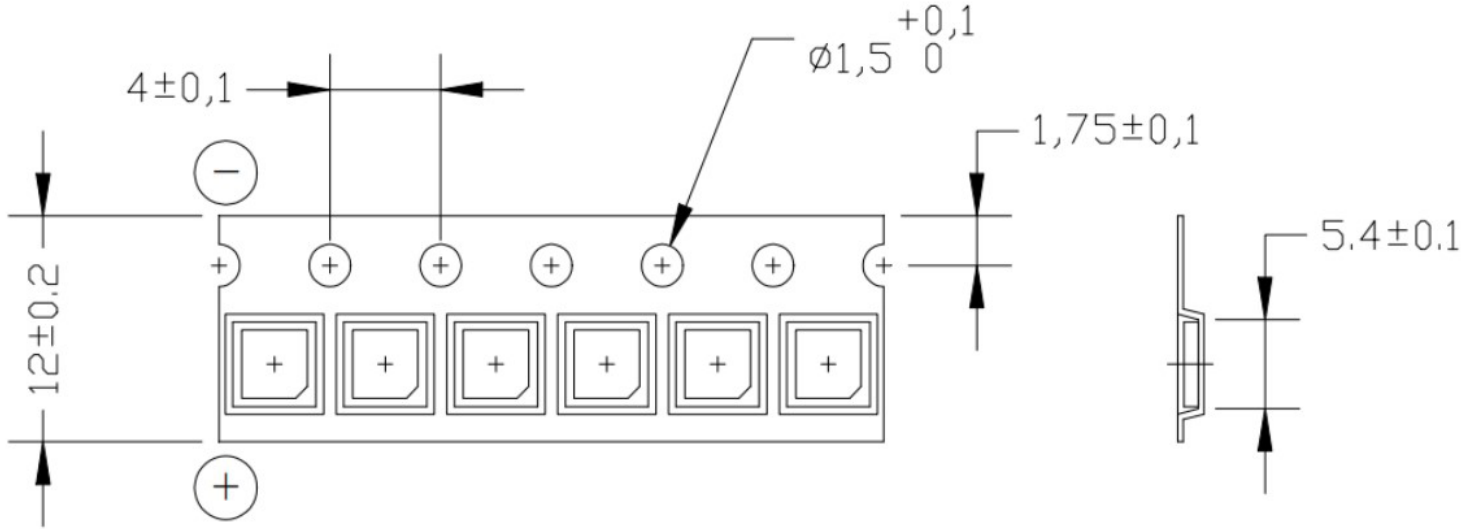
<https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components->

- For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.



## Tape and Reel Outline

### Tape Package Dimensions<sup>1,2,3,4</sup>



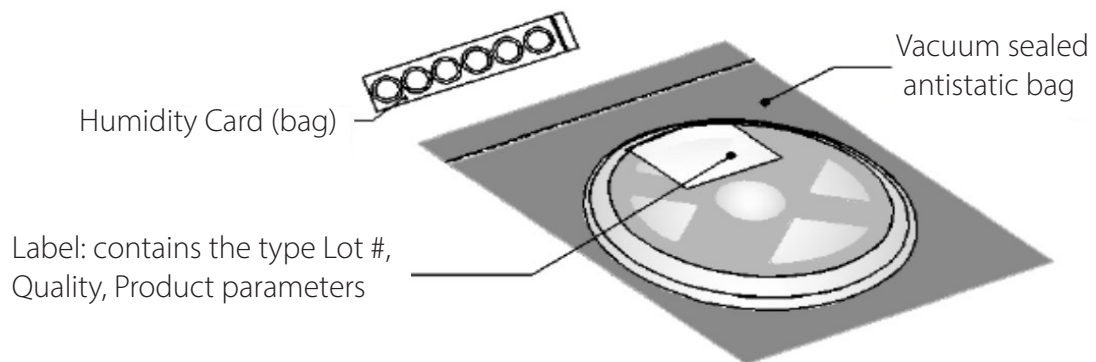
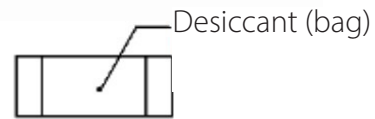
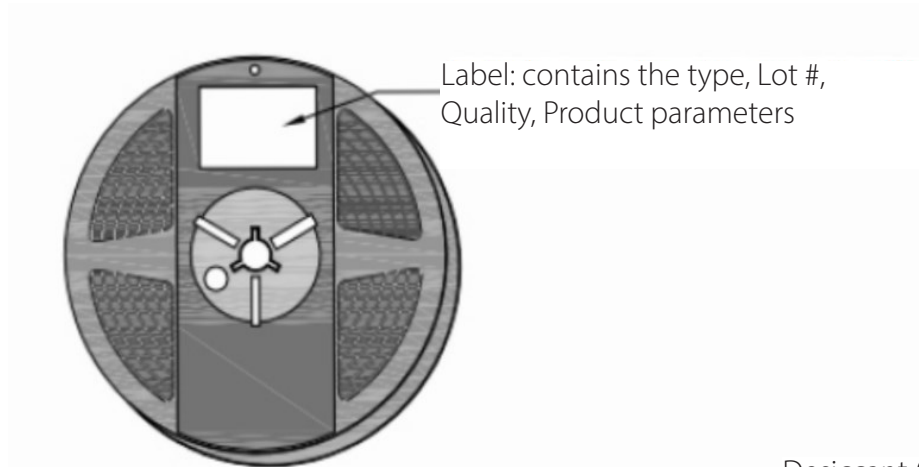
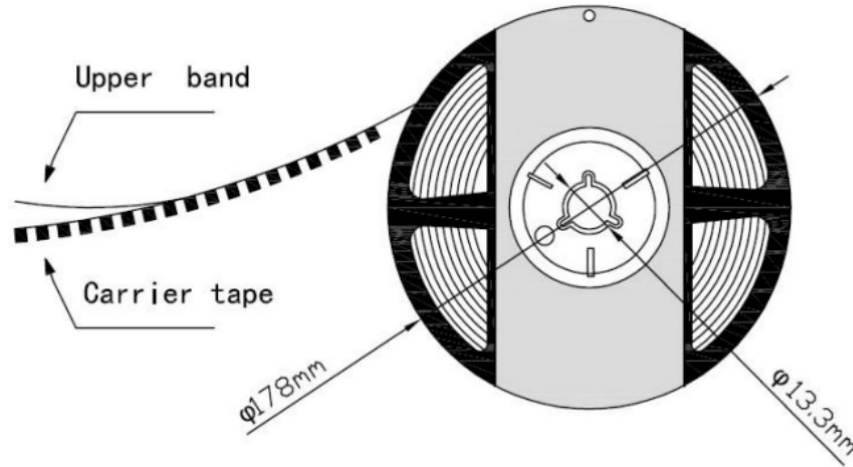
#### Notes:

1. Quantity: Max 2000 pcs per reel.
2. Cumulative Tolerance: Cumulative Tolerance/10 pitches to be  $\pm 0.2$  mm.
3. Adhesion Strength of Cover Tape Adhesion strength to be 0.1-0.7 N when the cover tape is turned off from the carrier tape at the angle of  $10^\circ$  to the carrier tape.
4. Package: P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof package.



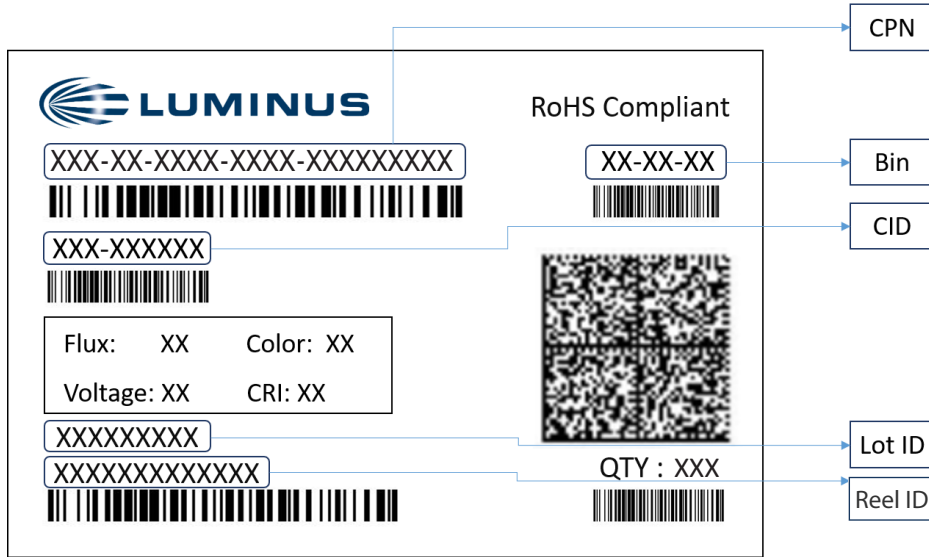
## Tape and Reel Outline

### Reel Package Dimensions





## Shipping Label

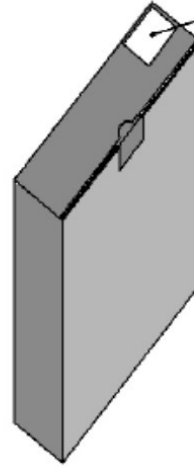
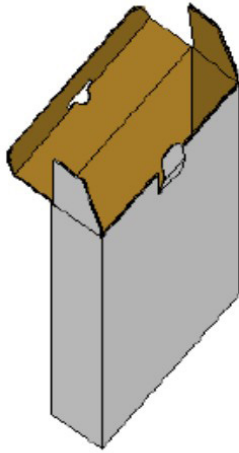


### Label Fields:

- CPN: Luminus ordering part number
- CID: Customer's part number
- QTY: Quantity of parts per reel
- Flux: Bin as defined on page 4
- Voltage: Bin as defined on page 4
- Color: Bin as defined on page 5
- CRI: Bin as defined on page 2
- Lot ID & Reel ID: For Luminus internal use



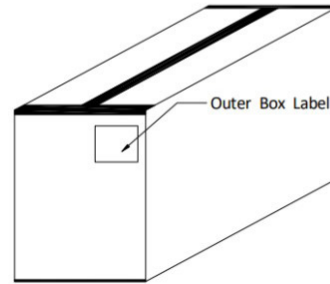
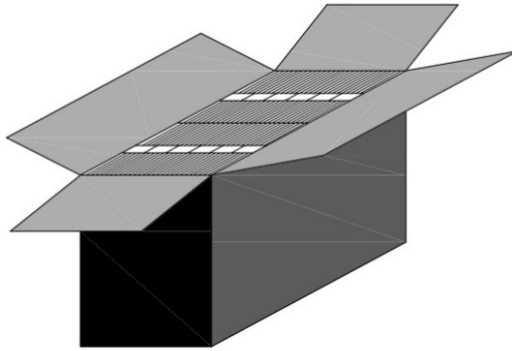
## Packaging boxes



Label: contains the  
type, Lot #, Quality,  
Product parameters

\*Capacity 4/8 reels per box

Outer Box



Outer Box Label

\*Capacity 24/48 reels per box





## Notes

### Static Electricity

1. The products are sensitive to static electricity, and care should be taken when handling them.
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear a anti-electrostatic wristband or an anti-electrostatic gloves when handling the LEDs.
3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

### Storage

1. This device is rated at MSL 3 per JEDEC J-STD-020 standard.
2. Recommended storage condition: 5°C to 30°C and relative humidity 60 % RH in the original package
3. After this bag is opened, devices that will be applied to infrared reflow, vapor phase reflow, or equivalent soldering process must be:
  - a) Completed within 168 hours
  - b) Stored at less than 60 %RH
  - c) If not completely used within 168 hours, seal the remaining in the moisture barrier bag
4. Devices require baking before mounting, if 3 a) is not met.
5. If baking is required, devices must be baked under below conditions: 24 hours at 60°C±5°C



## Revision History

Rev	Date	Description of Change
01	12/12/2024	Initial release