

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_j = 25°C)

Nominal CCT	Minimum CRI	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
3500K	70	220	227	MP-5050-810P-35-70
	80	190	210	MP-5050-810P-35-80
	90	160	180	MP-5050-810P-35-90
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 CCT¹	Minimum CRI
MP: Mid Power LED	5050: 5.0 mm x 5.0 mm	810P: Package code	27: 2700K 30: 3000K 35: 3500K 40: 4000K 50: 5000K 57: 5700K 65: 6500K	70: CRI>70 80: CRI>80 90: 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 Bins¹

Flux Bin	Binning @ 45 mA, T _j = 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 $\pm 7\%$.

Forward Voltage Bins¹

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

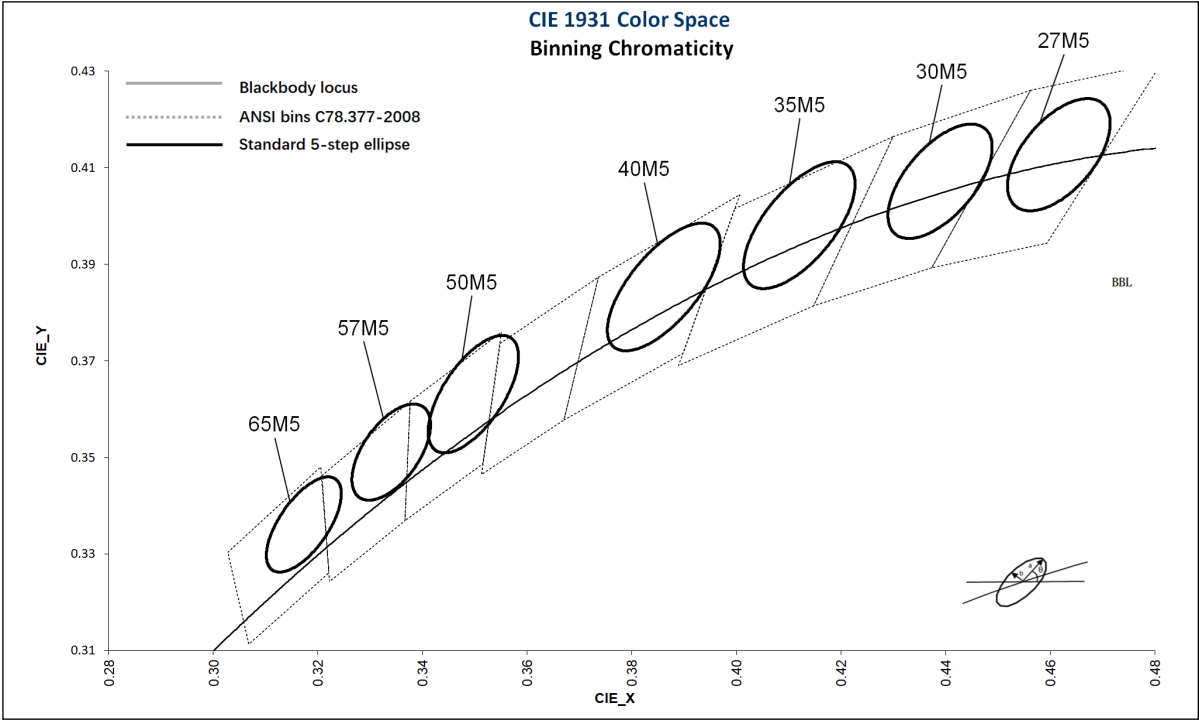
Note:

1. The Forward Voltage measurement tolerance is $\pm 3\%$.



Binning Structure

Chromaticity Binning Diagram ^{1,2}



Color Bins

Color Code	Center point		Radius		Angle(deg)
	x	y	a	b	Φ
27M5	0.4616	0.4127	0.0135	0.0070	53.42
30M5	0.4389	0.4072	0.0139	0.0068	53.13
35M5	0.4120	0.3981	0.0155	0.0069	54.00
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: $I_f=45\text{ mA}$, $T_j= 25^{\circ}\text{C}$.
- 2. The Chromaticity Coordinate measurement tolerance is ± 0.005 .



Absolute Maximum Ratings^{1,2}

Parameter	Symbol	Values	Unit
Forward Current	I_f	240	mA
Pulse Forward Current	I_{fp}	360	mA
Power Dissipation	P_d	5520	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^{1,2,3}

Parameter ($I_f=45\text{ mA}$, $T_j=25^\circ\text{C}$)		Symbol	Value	Unit
Forward Voltage	Minimum	$V_{f\text{ min}}$	20	V
	Typical	$V_{f\text{ typ}}$	21.6	
	Maximum	$V_{f\text{ max}}$	23	
Viewing Angle		$2\theta_{1/2}$	120	°
Thermal Resistance		$R_{\text{th J-C}}$	2	°C/W

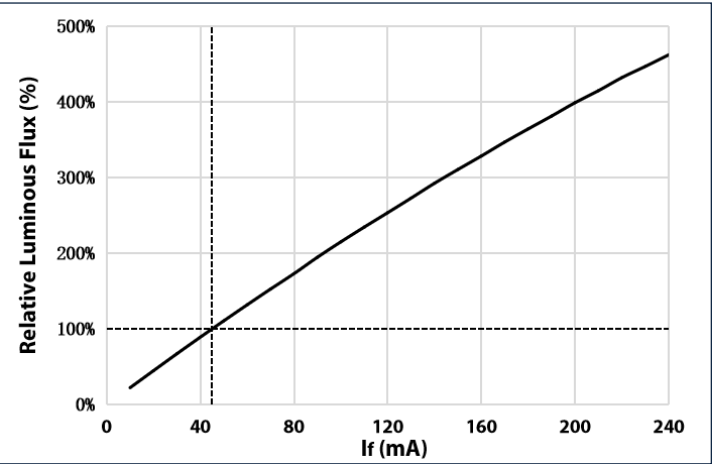
Notes:

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.



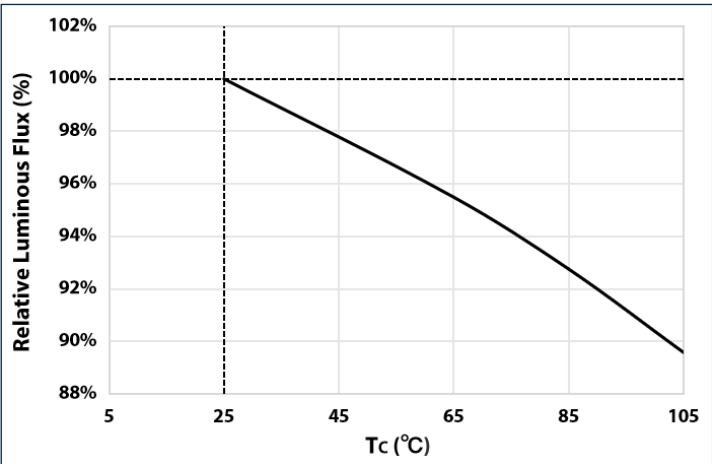
Relative Luminous Flux vs Forward Current

T_j = 25°C



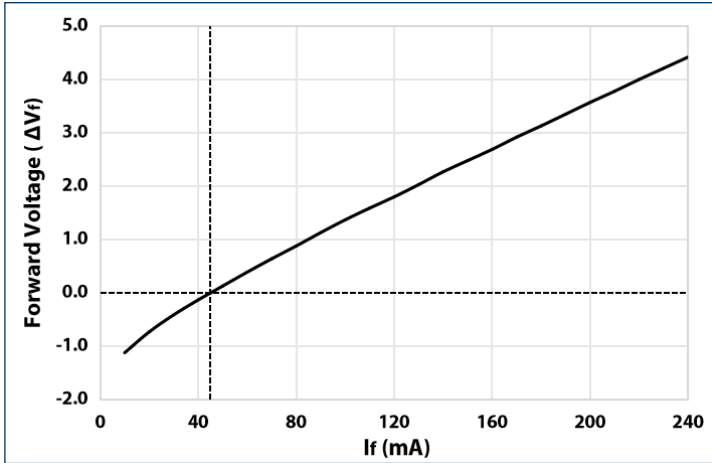
Relative Luminous Flux vs Temperature

I_f = 45 mA



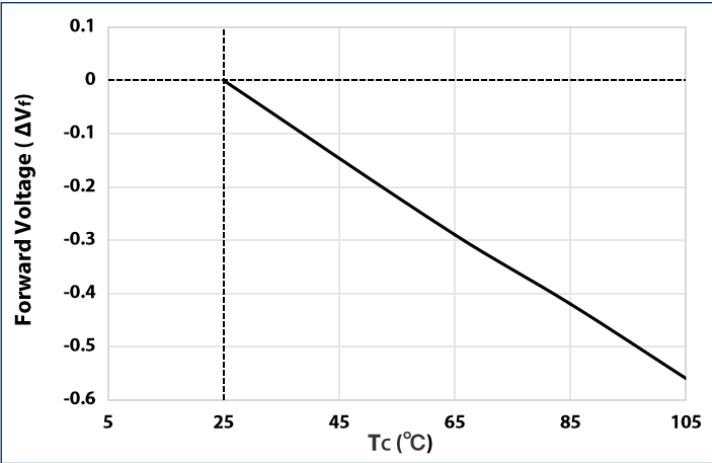
Forward Voltage vs Forward Current

T_j = 25°C

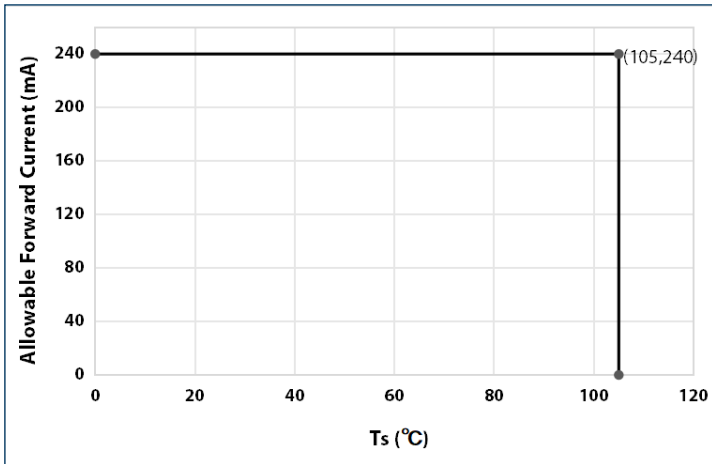


Forward Voltage vs Temperature

I_f = 45 mA



Allowable Forward Current vs Temperature

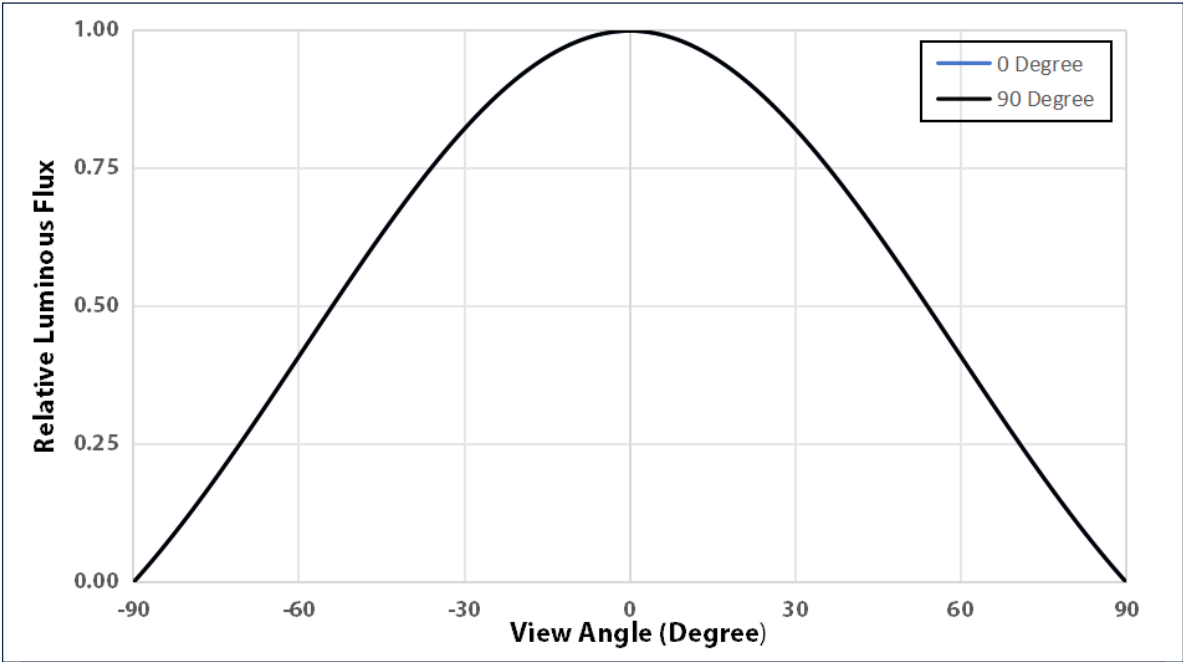




Angular Distribution and Typical Spectrum

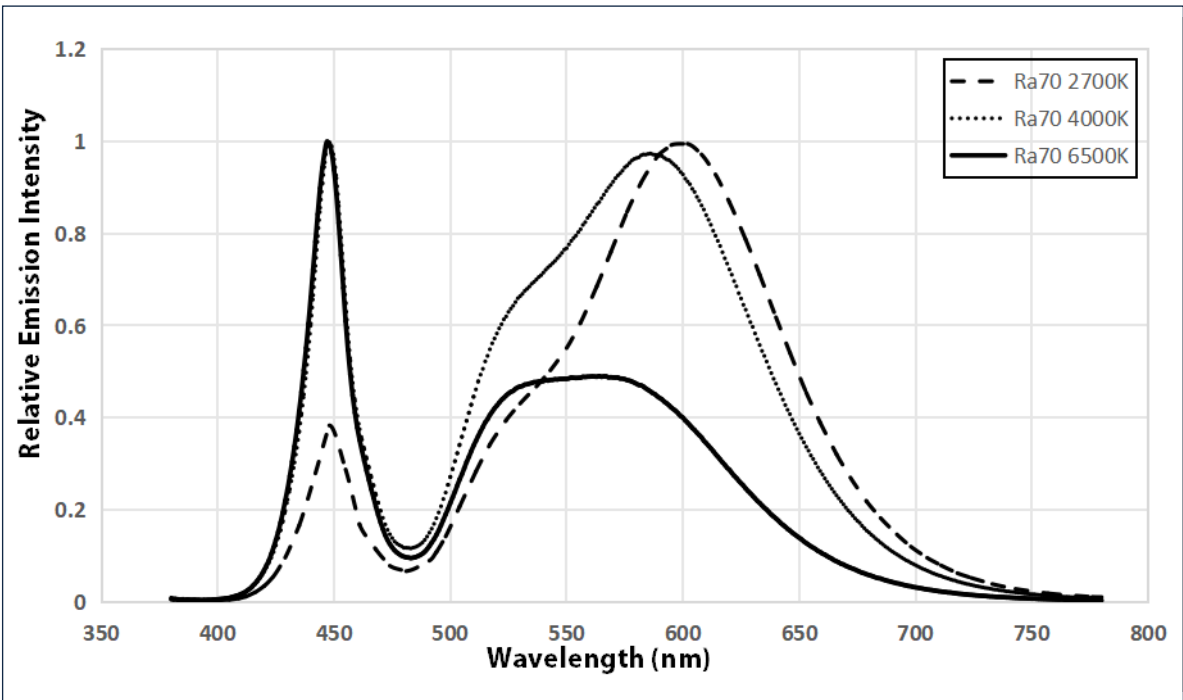
Angular Distribution

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



Relative Spectral Power Distribution

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

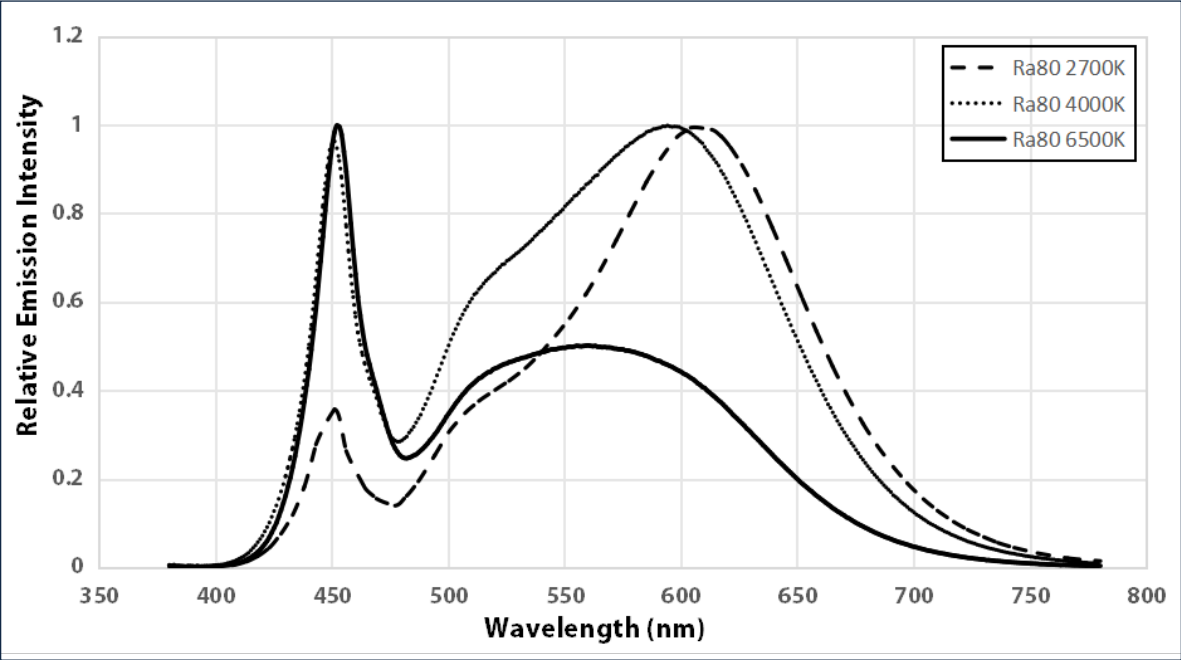




Angular Distribution and Typical Spectrum

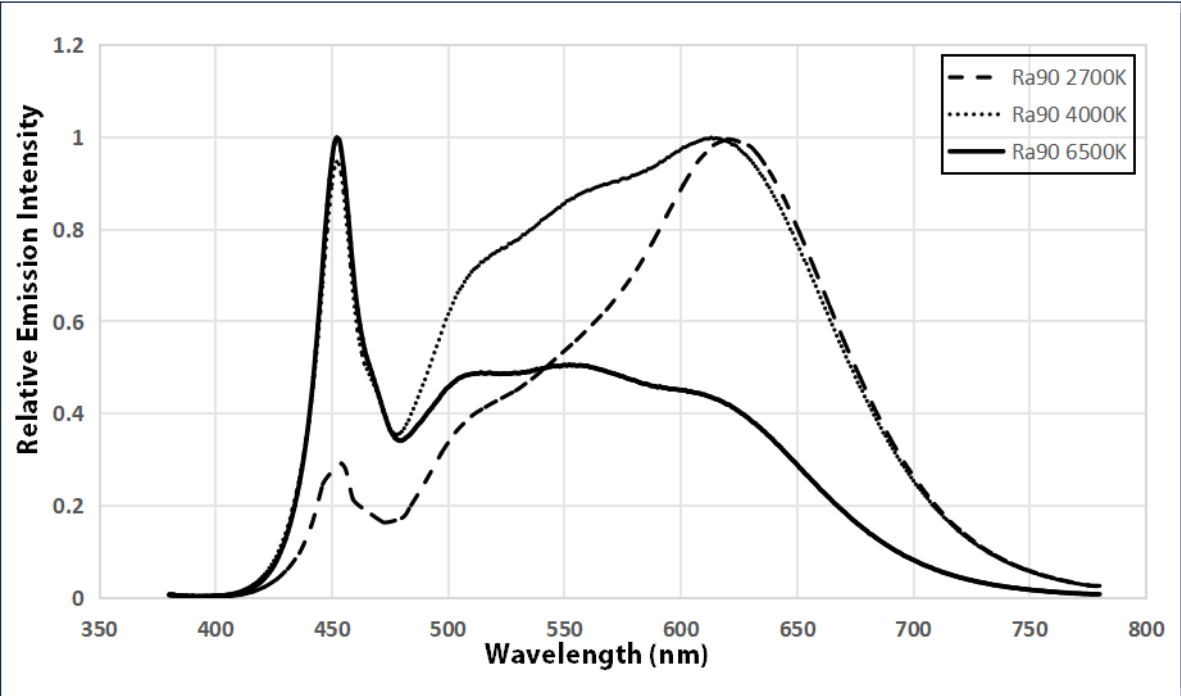
Relative Spectral Power Distribution

Ra>80, T_j= 25°C



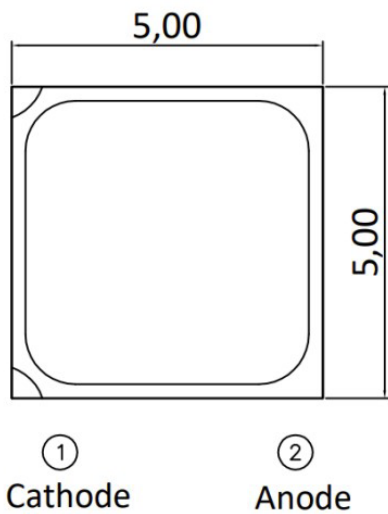
Relative Spectral Power Distribution

Ra>90, T_j= 25°C

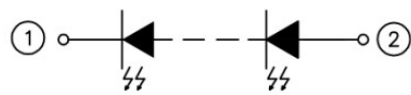




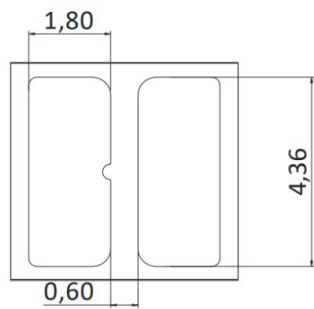
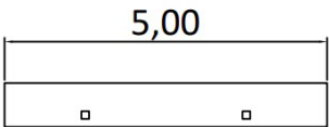
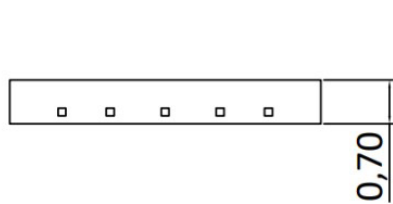
Mechanical Dimensions^{1,2}



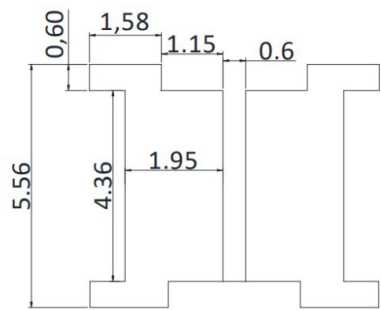
8 Series 1 Parallel



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.



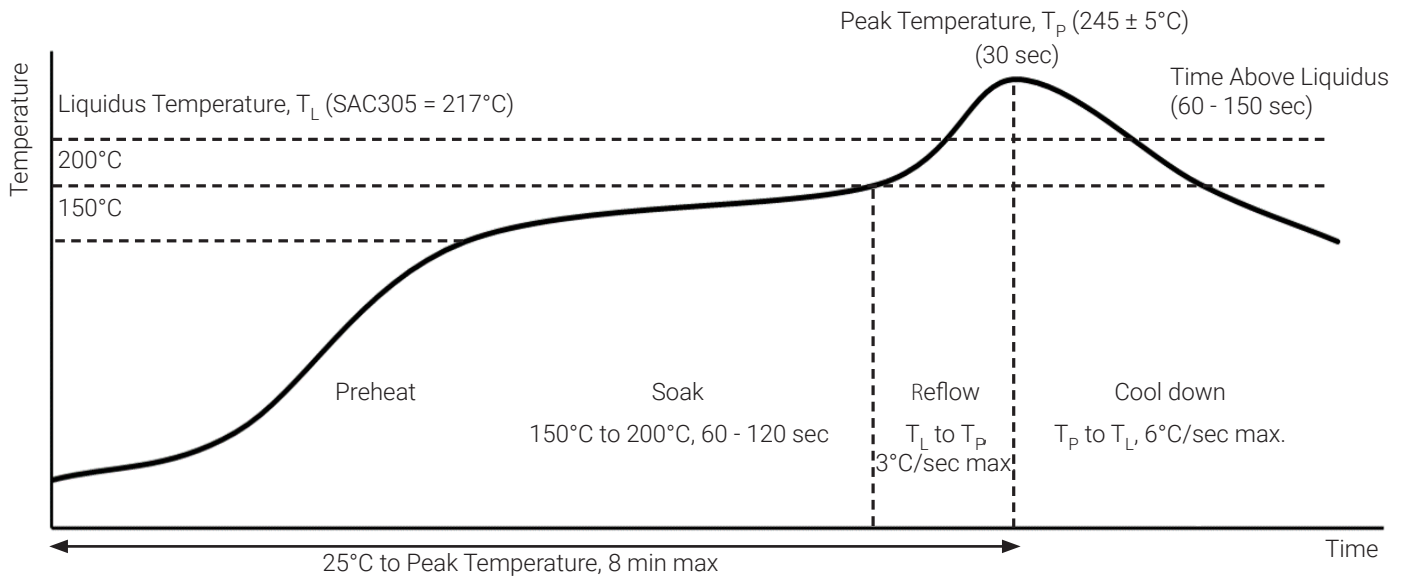
Mechanical Characteristics

JEDEC Moisture Sensitivity^{1, 2}

Level	Floor Life	
	Time	Conditions
3	168 Hours	≤30°C / 60% RH

- Notes:
- 1. Please note that the above MSL level based on the MSL qualification rating.
 - 2. This LED has silver-plated pads, and for LEDs with silver plating, MSL3 environment control is required to protect silver-plated surface from oxidation, even though the products may be qualified as MSL1 or 2.

Soldering Profile



SMT Solder Rework Temperature Guidelines

Parameter	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

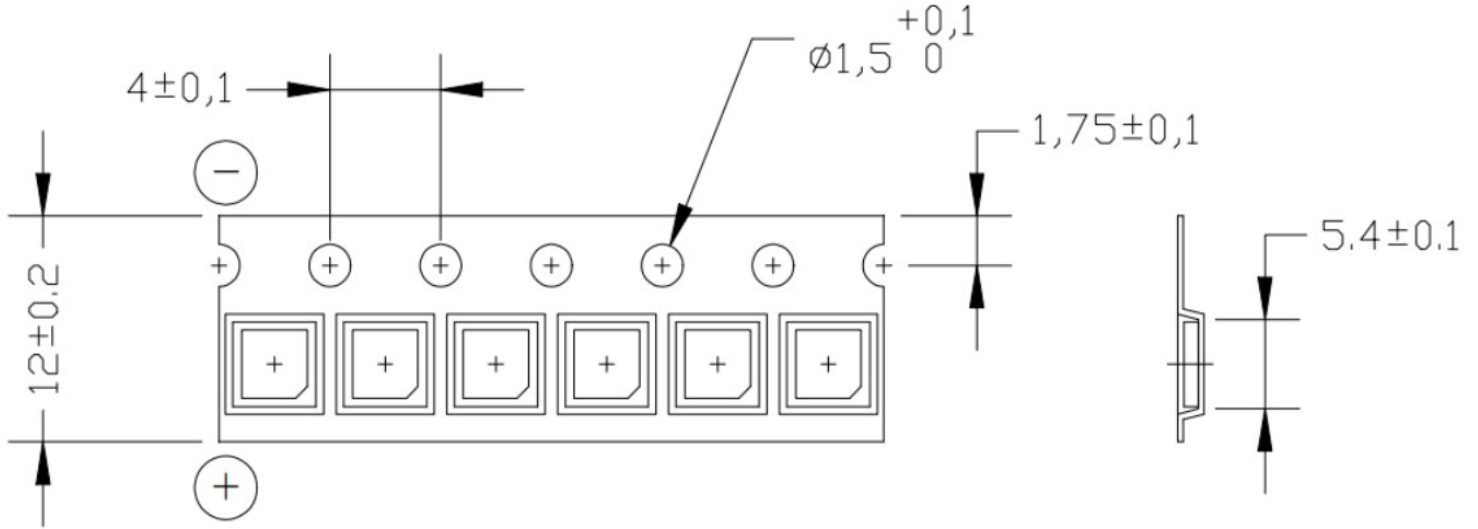
Notes:

1. 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.
2. Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
3. Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. All the temperatures refer to the application PCB measured adjacent to the package body.
4. The actual profile shall be optimized per the PCB design and configuration.
5. Key visual and LED performance characteristics to consider include solder bridging, solder voiding, solder balling, LED component placement or shifting, potential contamination that may impact light emissions, and the functional performance of the LED.
6. Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
7. 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->
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.



Tape and Reel Outline

Tape Package Dimensions^{1,2,3,4}



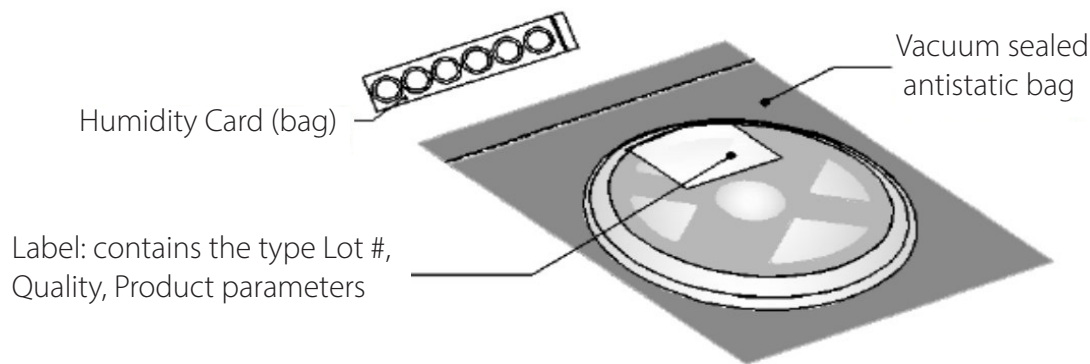
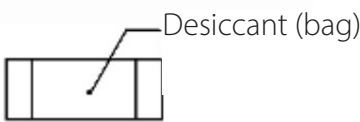
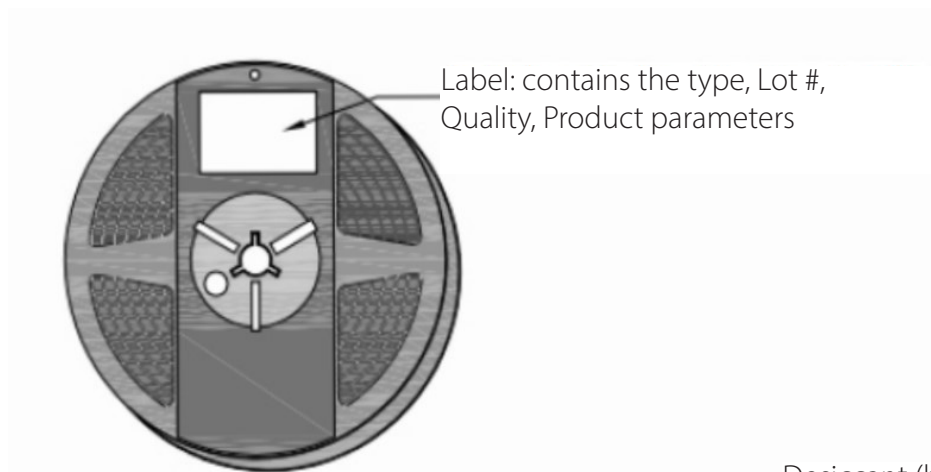
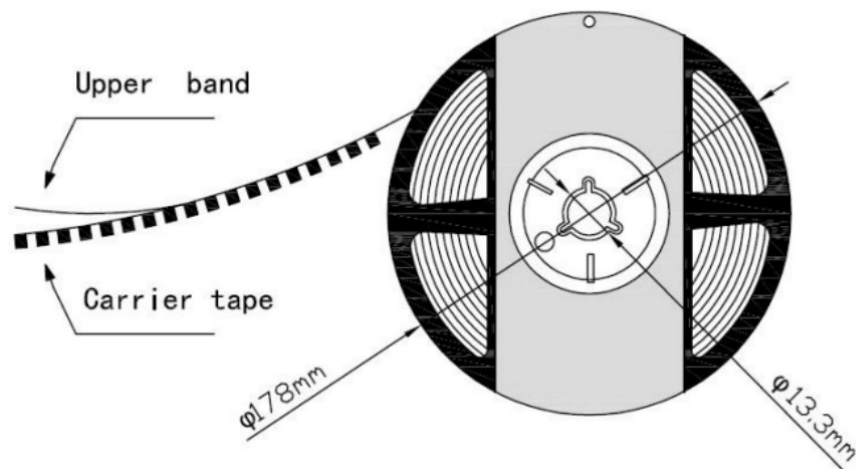
Notes:

1. Quantity: Max 2000 pcs per reel.
2. Cumulative Tolerance: Cumulative Tolerance/10 pitches to be ± 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° to the carrier tape.
4. Package: P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof package.



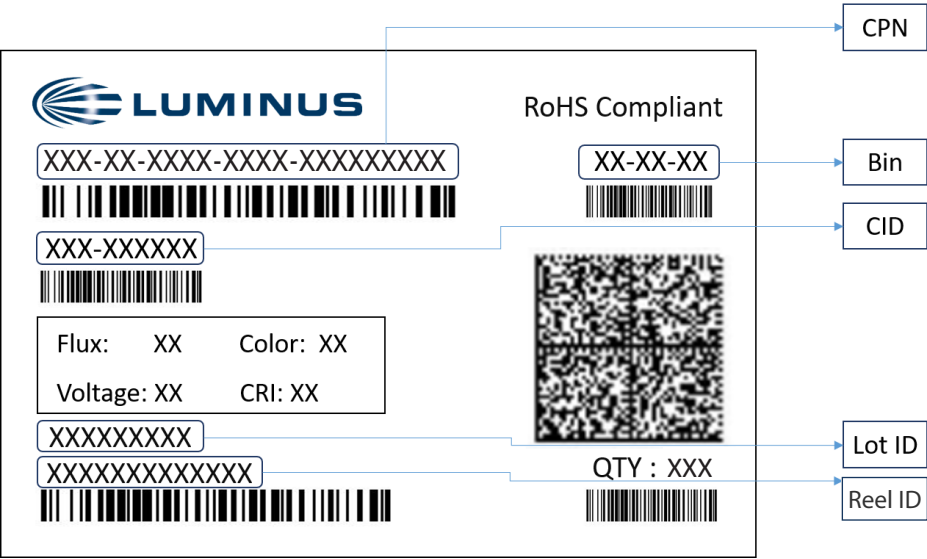
Tape and Reel Outline

Reel Package Dimensions





Shipping Label

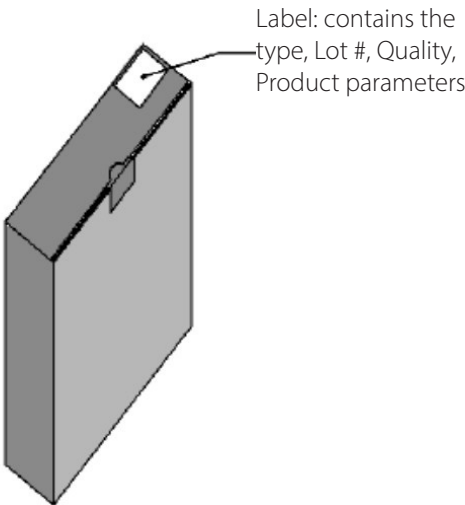
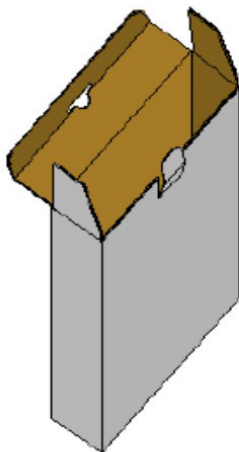


Label Fields:

- 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

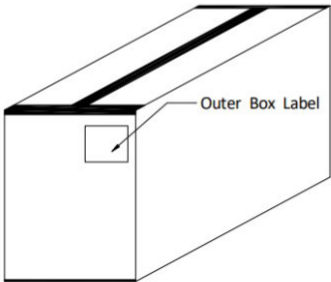
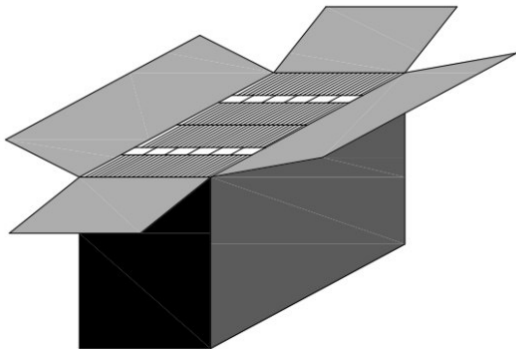


Packaging boxes



*Capacity 4/8 reels per box

Outer Box



*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
02	03/13/2025	Update Forward Current value, Allowable Forward Current vs Temperature plot, add 3500K CCT, update template



About Luminus

Luminus has been dedicated to lighting innovation, collaborating closely with industry leaders to address complex challenges. Initially focused on enhancing energy efficiency and light quality, we've since expanded our efforts to ensure seamless integration of our LED solutions across various applications. Our partnerships span diverse sectors, from agriculture to automotive, where we tailor our products to meet specific needs. As a solutions-driven company, Luminus is committed to illuminating the way forward, both indoors and outdoors, for a brighter and more sustainable future.

To learn more about our lighting solutions, visit www.luminus.com.

