1.30mm Height 2020 Package Top View
1W High Power White LED
Technical Data Sheet

Part No.: LL-HPR5050W6EB

Features:

- ◇ P-LCC-6 package.
- ◇ Small size (L×W×H: 5.00mm×5.00mm×1.30mm).
- ◇ Low profile.
- ◇ Colorless clear window.
- ◇ Super luminosity LED.
- ◇ Several colors available.
- ◇ Wide viewing angle.
- ◇ High performance.
- ◇ Industry standard footprint.
- ◇ The moisture sensitive level 3.
- ◇ Computable with automatic placement equipment.
- ◇ Soldering methods: Reflow soldering.
- ◇ The product itself will remain within RoHS compliant Version.

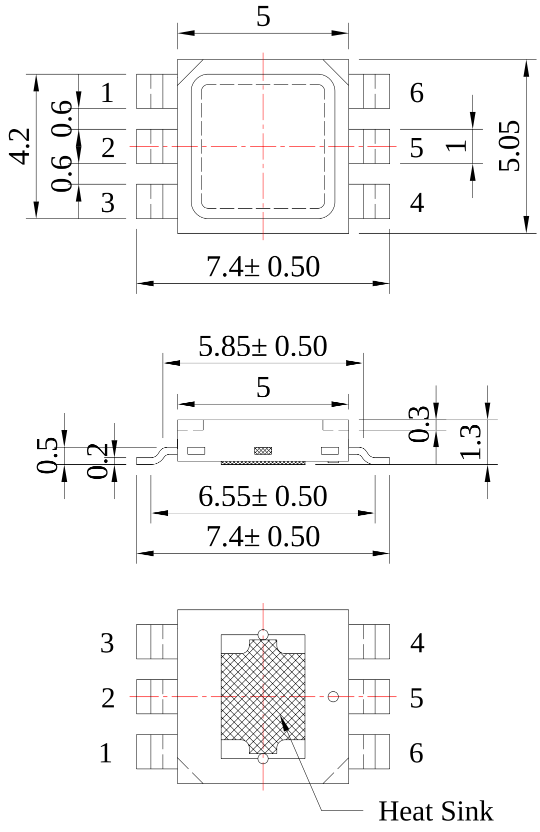
Descriptions:

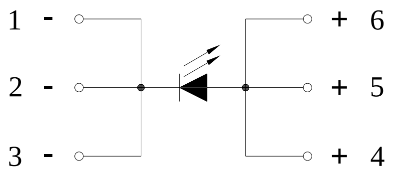
- ◇ The HPR5050 is available in soft red, orange, yellow, green, blue and white. Due to the Package design, the LED has wide viewing angle and optimized light coupling by inter reflector, this feature makes the SMT TOP LED ideal for light pipe Application. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

Applications:

- ◇ Reading lights (car, bus, aircraft).
- ◇ Portable (flashlight, bicycle).
- ◇ Mini-accent / Up lighters / Down lighters / Orientation.
- ◇ Bollards / Security / Garden.
- ◇ Cove / Under shelf / Task.
- ◇ Automotive rear combination lamps.
- ◇ Traffic signaling / Beacons / Rail crossing and Wayside.
- ◇ Indoor / Outdoor Commercial and Residential Architectural.
- ◇ Edge-lit signs (Exit, point of sale).
- ◇ LCD Backlights / Light Guides.
- ◇ Linear lighting.
- ◇ Channel letter.
- ◇ Portable lighting.
- ◇ Architectural & Landscaping lighting.
- ◇ Entertainment lighting.

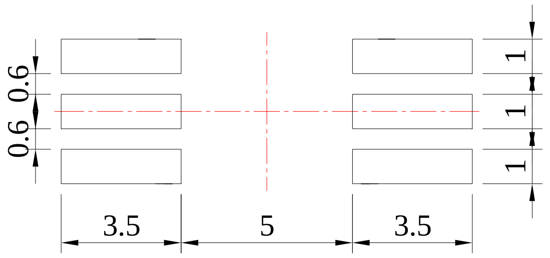
Package Dimension:





Polarity

Recommended Soldering Pad dimensions



Unit: mm
Tolerance: ± 0.10mm

Part No.	Chip Material	Lens Color	Source Color
LL-HPR5050W6EB	InGaN	Yellow Diffused	Warm White

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25mm (.010”) unless otherwise specified.
3. Specifications are subject to change without notice.

Absolute Maximum Ratings at Ta=25℃

Parameters	Symbol	Max.	Unit
Power Dissipation	PD	1,600	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	IFP	700	mA
Forward Current	IF	400	mA
Reverse Voltage	VR	5	V
Electrostatic Discharge (HBM)	ESD	800	V
Junction Temperature	T_J	125	℃
Operating Temperature Range	Topr	-40℃ to +90℃	
Storage Temperature Range	Tstg	-40℃ to +100℃	
Soldering Temperature	Tsld	260℃ for 5 Seconds	

Electrical Optical Characteristics at Ta=25℃

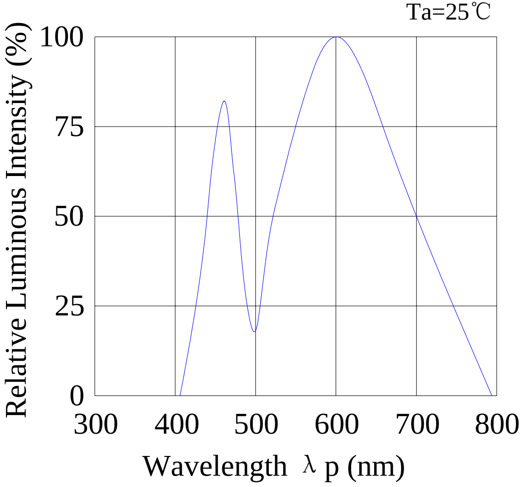
Parameters	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	20,000	25,000	---	mcd	IF=350mA (Note 1)
Luminous Flux	Φv	80	95	---	lm	IF=350mA (Note 1)
Viewing Angle	$2\theta_{1/2}$	---	120	---	Deg	IF=350mA (Note 2)
Chromaticity Coordinates	x	---	0.43	---		IF=350mA (Note 3)
	y	---	0.40	---		
Color Temperature	CCT	3,000	3,500	4,000	K	IF=350mA
Forward Voltage	VF	3.00	3.40	4.00	V	IF=350mA
Reverse Current	IR	---	---	100	μA	V_R=5V

Notes:

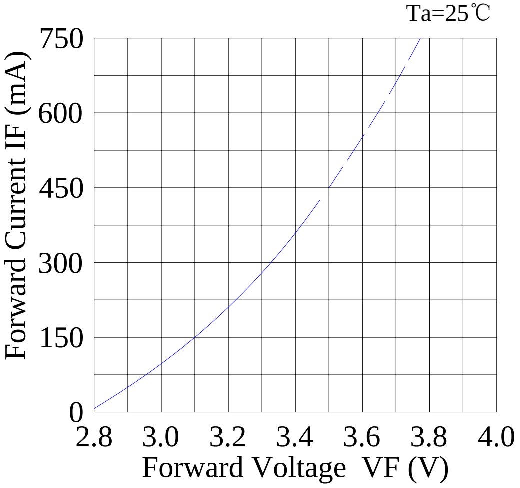
1. Luminous Intensity (Flux) Measurement allowance is ± 10%.
2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. It use many parameters that correspond to the CIE 1931 2°. X, Y, and Z are CIE 1931 2° values of Red, Green and Blue content of the measurement.

Typical Electrical / Optical Characteristics Curves
(25℃ Ambient Temperature Unless Otherwise Noted)

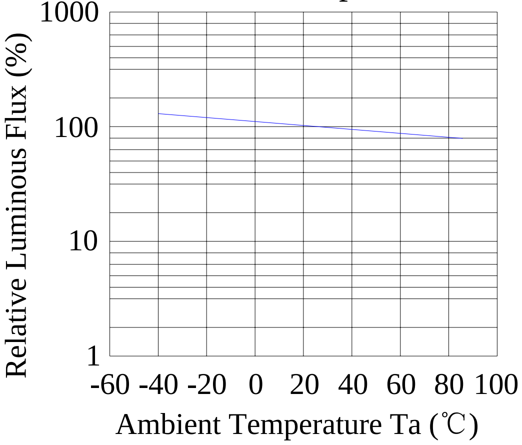
Spectrum Distribution



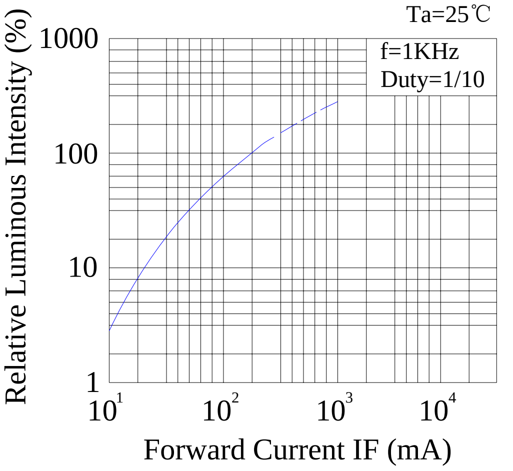
Forward Current & Forward Voltage



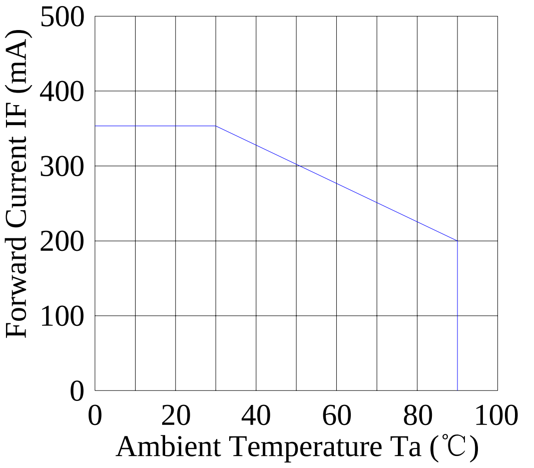
Luminous Flux & Ambient Temperature



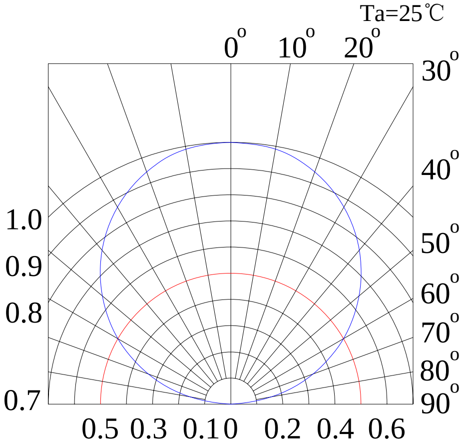
Luminous Flux & Forward Current



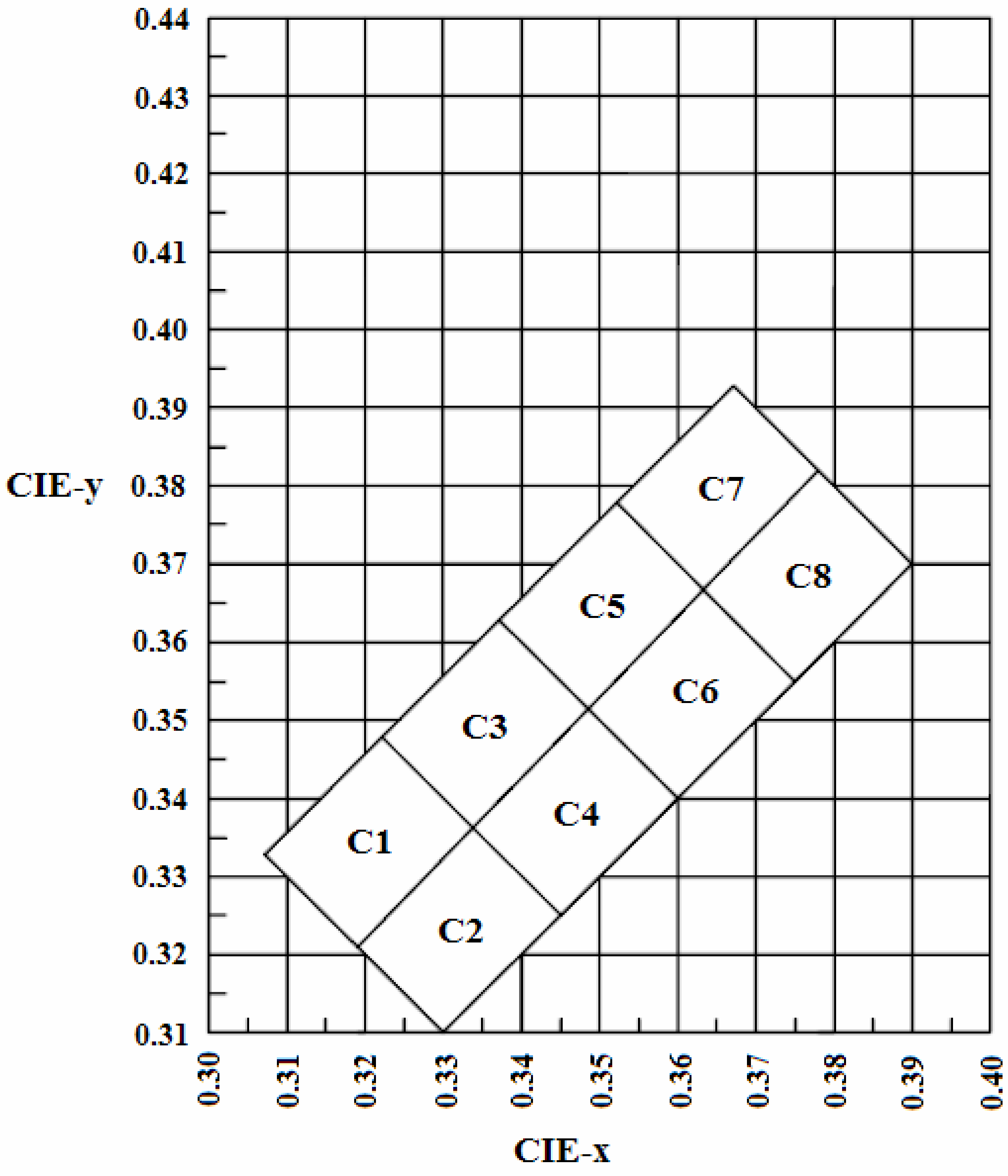
Forward Current Derating Curve



Radiation Diagram



CIE Chromaticity Diagram:



Chromaticity Coordinates Specifications for Bin Rank (IF=350mA):

Code	Sub-bin	Chromaticity Coordinates	1	2	3	4
	Full	X	0.3070	0.3670	0.3900	0.3300
		y	0.3330	0.3930	0.3700	0.3100
C	C1	X	0.3070	0.3220	0.3340	0.3190
		y	0.3330	0.3480	0.3360	0.3220
	C2	X	0.3190	0.3340	0.3450	0.3300
		y	0.3220	0.3360	0.3250	0.3100
	C3	X	0.3220	0.3370	0.3490	0.3340
		y	0.3480	0.3630	0.3520	0.3360
	C4	X	0.3340	0.3490	0.3600	0.3450
		y	0.3360	0.3520	0.3400	0.3250
	C5	X	0.3370	0.3520	0.3630	0.3490
		y	0.3630	0.3780	0.3670	0.3520
	C6	X	0.3490	0.3630	0.3750	0.3600
		y	0.3520	0.3670	0.3550	0.3400
	C7	X	0.3520	0.3670	0.3780	0.3630
		y	0.3780	0.3930	0.3820	0.3670
	C8	X	0.3630	0.3780	0.3900	0.3750
		y	0.3670	0.3820	0.3700	0.3550

Reliability Test Items And Conditions:

The reliability of products shall be satisfied with items listed below:

Confidence level: 90%.

LTPD: 10%.

1) Test Items and Results:

Test Item	Applicable Standards	Test Conditions	Note	Number of Damaged
Temperature Cycle	JEITA ED-4701 100 105	-40℃~25℃~100℃~25℃ 30min,5min,30min,5min	100 cycles	0/50
Thermal Shock	MIL-STD-202G	-40°C~100°C 30 mins, 30 mins	100 cycles	0/50
Moisture Resistance Cycle	JEITA ED-4701 200 203	25℃~65℃~-10℃ 90%RH 24hrs/1cycle	10 cycles	0/22
Solder Ability (Reflow Soldering)	JEITA ED-4701 300 303	TSOL=215±5°C, 3 sec (Lead Solder)	1time (over 95%)	0/22
High Temperature Storage	JEITA ED-4701 200 201	Ta=100℃	1000hrs	0/22
Temperature Humidity Storage	JEITA ED-4701 100 103	Ta=60℃, RH=90%	1000hrs	0/22
Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40℃	1000hrs	0/22
High Temperature Life Test		Ta=85℃, IF=200mA	1000hrs	0/22
Life Test		Ta=25°C IF=350mA	500hrs	0/22
High Humidity Heat Life Test		Ta=60℃, RH=90%, IF=300mA		
Low Temperature Life Test		Ta=-30°C IF=350mA	1000hrs	0/22
Resistance to Soldering Heat(Reflow Soldering)	JEITA ED-4701 300 301	Tsol=260 (±5)°C, 10sec (Pre treatment 30°C, 70%, 168hrs)	2 time	0/22
Vibration-variable Frequency	MIL-STE-883 Method 2007	20G min, 20 to 2000Hz, 4cycles, 4mins, Each x, y, z	---	0/22
Substrate Bending	JEITA ED-4702	3mm, 5±1 sec	1 time	0/22
Adhesion Strength	JEITA ED-4702	5N, 10±1 sec	1 time	0/22
Electrostatic Discharge Test	AEC (Q101-001)	Human body model 1000V (Forward and Reverse current conduct electricity, each 1 time)	---	0/22

2) Failure Criteria for Judging the Damage:

Item	Symbol	Test Conditions	Criteria for Judgment	
			Min.	Max.
Forward Voltage	VF	IF=350mA	---	Initial Data×1.1
Reverse Current	IR	VR=5V	---	100μA
Luminous Flux/Intensity	ΦV	IF=350mA	Initial Data×0.7	---
Resistance to Soldering Heat	---	IF=350mA	No dead lamps and visual damage	
Vibration-variable Frequency	---	IF=350mA	No dead lamps and visual damage	

Please read the following notes before using the product:

1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package, the LEDs should be kept at 30℃ or less and 90%RH or less.

2.3 The LEDs should be used within a year.

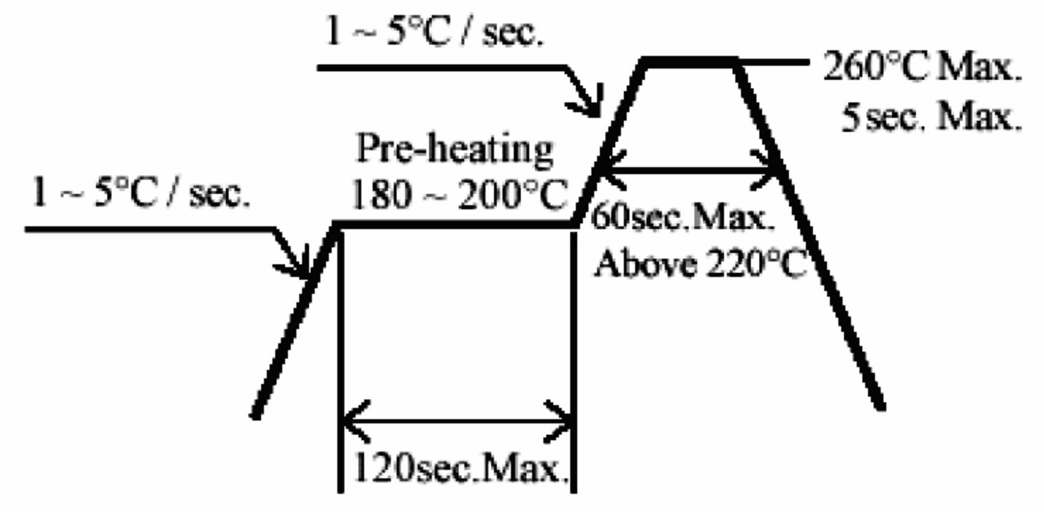
2.4 After opening the package, the LEDs should be kept at 30℃ or less and 70%RH or less.

2.5 The LEDs should be used within 168 hours (7 days) after opening the package.

2.6 If the moisture adsorbent material (silica gel) has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 60±5℃ for 24 hours.

3. Soldering Condition

3.1 Pb-free solder temperature profile.



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

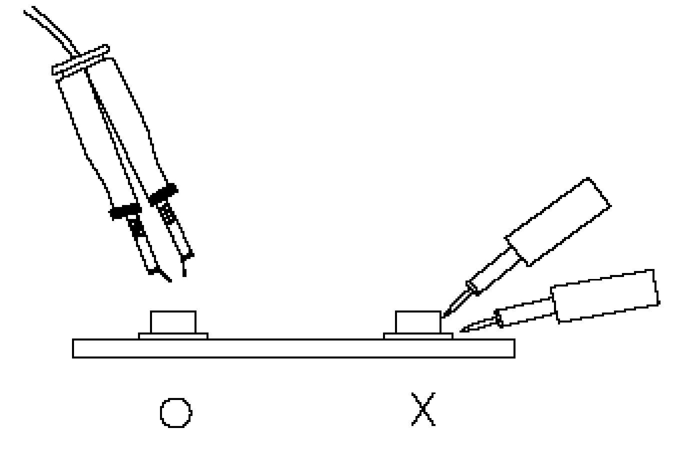
3.4 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260℃ for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



6. Caution in ESD

Static Electricity and surge damages the LED. It is recommended to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.