

# PLCC 5050 0.2W RTB 3in1 Datasheet



## Features :

- High Luminous Intensity
- Based on Blue/Green : InGaN, Red : AlGaInP technology
- Wide viewing angle : 120°
- Excellent performance and visibility
- Suitable for all SMT assembly methods
- IR reflow process compatible
- Environmental friendly; RoHS compliance

## Typical Applications :

- Signal and Symbol Luminaire
- Indoor and Outdoor Displays
- Backlighting (illuminated advertising, general lighting)
- Interior Automotive Lighting

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## General Information

### Introduction

Ultra high luminous efficacy, combined with the flexibility in design due to its slim and miniature size, PLCC LED Series are optimized to be used as lighting for signboard.

### Ordering Code Format

2  
X1
T  
X2
04  
X3-X4
X2  
X5-X6
M1  
X7-X8
XX  
X9-X10
000  
X11-X13
XXX  
X14-X16

X1		X2		X3-X4		X5-X6		X7-X8	
Type		Component		Series		Wattage		Color	
2	Emitter	T	PLCC	04	5050	X2	0.2W	M1	RGB

X9-X10		X11-X13		X14-X16	
Internal code		PCB Board		Serial Number	
-	-	000	-	-	-

## Absolute Maximum Ratings

Absolute maximum ratings ( $T_s=25^{\circ}\text{C}$ )

Parameter	Symbol	Value	Units
DC Forward Current	(R)	35	mA
	(T/B)	30	
Pulse Forward Current ( $t_p \leq 100\mu\text{s}$ , Duty cycle=0.25)	$I_{\text{pulse}}$	80	mA
		100	
Reverse Voltage	$V_R$	5	V
LED Junction Temperature	$T_J$	115	$^{\circ}\text{C}$
Operating Temperature	-	-40 ~ +85	$^{\circ}\text{C}$
Storage Temperature	-	-40 ~ +125	$^{\circ}\text{C}$
ESD Sensitivity (HBM)	$V_B$	2,000	V
Soldering Temperature	$T_s$	Reflow Soldering : 255~260 $^{\circ}\text{C}$ /10~30sec Manual Soldering : 350 $^{\circ}\text{C}$ /3sec	

Notes:

- The values are based on 1-die performance.
- \*  $I_{\text{FP}}$  condition: pulse width  $\leq 0.1\text{msec}$  and duty  $\leq 1/10$ .

## Characteristics

Parameter	Symbol	Value	Units
Viewing Angle	(Typ.) $2\theta_{1/2}$	120	Degree
Forward voltage	(R)	2.3	V
	(T/B)	3.3	
CCT/Wavelength	(R)	620-630	nm
	(T)	520-535	
	(B)	460-475	
JEDEC Moisture Sensitivity	-	Level 2a <b>Floor Life</b> Conditions: $\leq 30^{\circ}\text{C}$ / 60% RH <b>Soak Requirements(Standard)</b> Time (hours): 120+1/-0 Conditions: 60 $^{\circ}\text{C}$ / 60% RH	-

Note:

$2\theta_{1/2}$  is the off-axis angle where the luminous intensity is half of the axial luminous intensity.

## Luminous Flux Characteristic

Luminous Intensity Characteristics,  $I_f=20\text{mA}$  and  $T_j=25^\circ\text{C}$

Color	Group	Min Luminous Intensity (mcd)	Max Luminous Intensity (mcd)	Forward Current (mA)	Order Code
Red	B0	400	500	20	2T04X2M100000001
	B1	500	600		
	B2	600	700		
	C0	700	850		
	C1	850	1000		
True Green	C2	1000	1150	20	
	C3	1150	1300		
	C4	1300	1450		
	C5	1450	1600		
	C6	1600	1750		
	C7	1750	1900		
	D0	1900	2150		
Blue	A5	250	300	20	
	A6	300	350		
	A7	350	400		
	B0	400	500		
	B1	500	600		

**Note:**

The luminous Intensity performance is guaranteed within published operating conditions. Edison Opto maintains a tolerance of  $\pm 10\%$  on Intensity measurements.

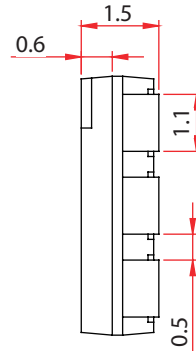
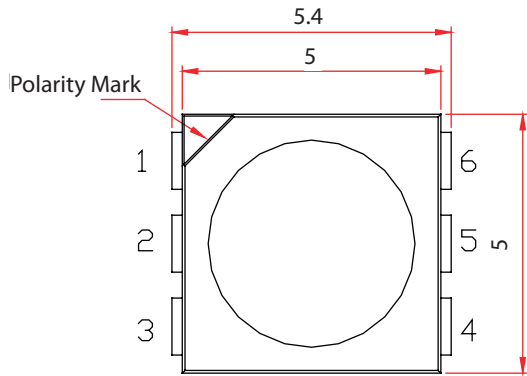
## Wavelength & Voltage Bin Structure

Color	Group	Min. Wavelength (nm)	Max. Wavelength (nm)	Min. Voltage (V)	Max. Voltage (V)
Red	A	620	630	1.6	1.9
	B			1.9	2.2
	C			2.2	2.5
	D			2.5	2.8
True Green	E	520	525	2.8	3.1
	F			3.1	3.4
	G			3.4	3.7
	H			3.7	4.0
	I	525	530	2.8	3.1
	J			3.1	3.4
	K			3.4	3.7
	L			3.7	4.0
	M	530	535	2.8	3.1
	N			3.1	3.4
	O			3.4	3.7
	P			3.7	4.0
Blue	E	460	465	2.8	3.1
	F			3.1	3.4
	G			3.4	3.7
	H			3.7	4.0
	I	465	470	2.8	3.1
	J			3.1	3.4
	K			3.4	3.7
	L			3.7	4.0
	M	470	475	2.8	3.1
	N			3.1	3.4
	O			3.4	3.7
	P			3.7	4.0

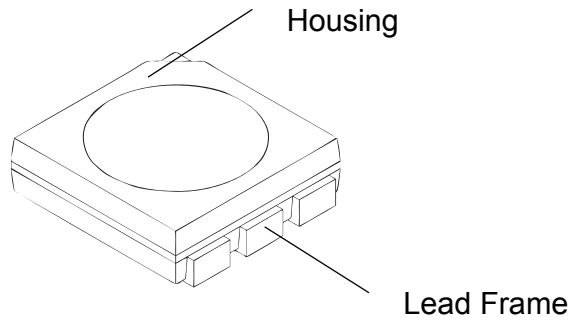
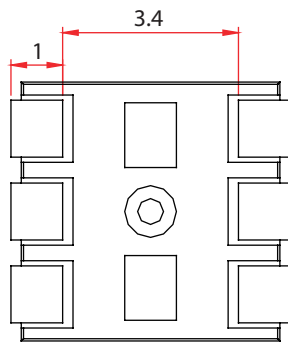
Note:  
Forward voltage measurement allowance is  $\pm 0.1V$ .

## Mechanical Dimensions

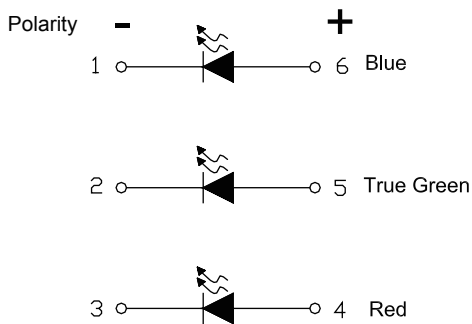
### Emitter Type Dimension



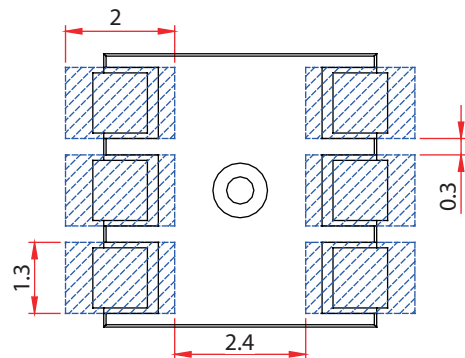
Unit: mm  
Tolerance:  $\pm 0.2\text{mm}$



### Circuit



### Solder Pad

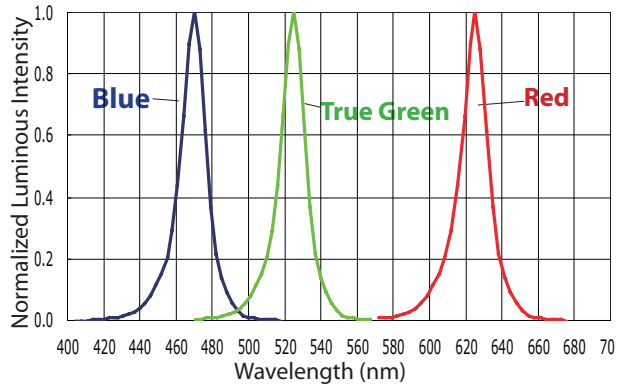


#### Notes:

1. All dimensions are measured in mm.
2. Tolerance :  $\pm 0.2\text{ mm}$

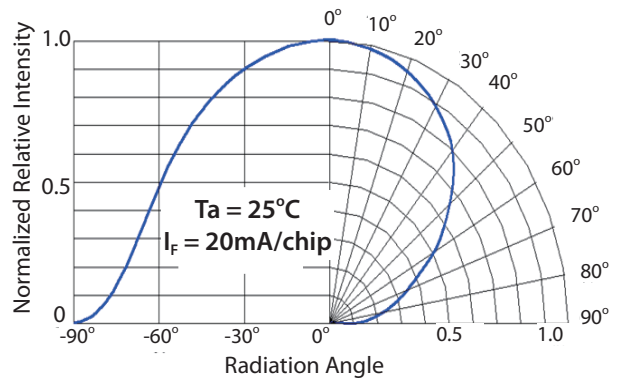
## Characteristic Curve

### Color Spectrum



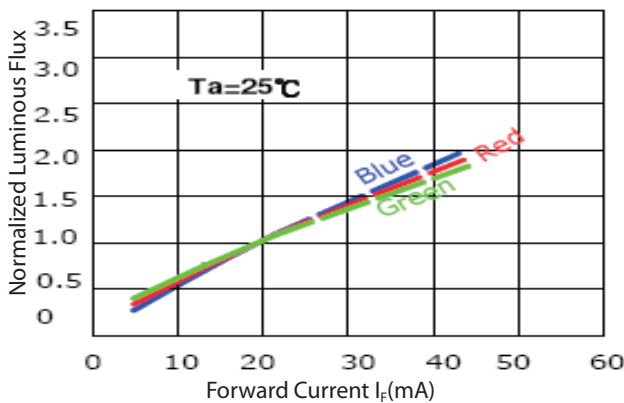
Color Spectrum for PLCC 5050 series

### Radiation Diagram



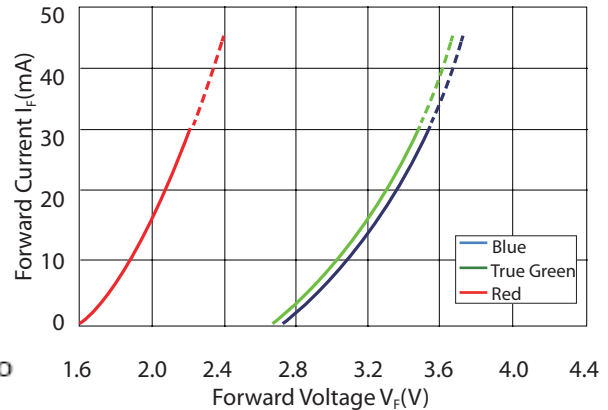
Beam pattern diagram for PLCC 5050 series

### Luminous Flux vs. Forward Current



Forward current vs. luminous flux at  $T_a = 25^\circ\text{C}$  for PLCC 5050 series

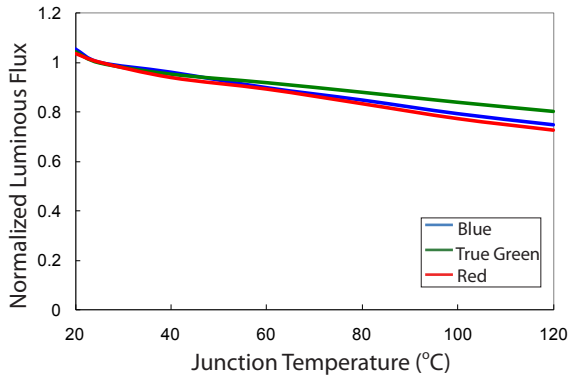
### Forward Voltage vs. Forward Current



Forward current vs. forward voltage for PLCC 5050 series

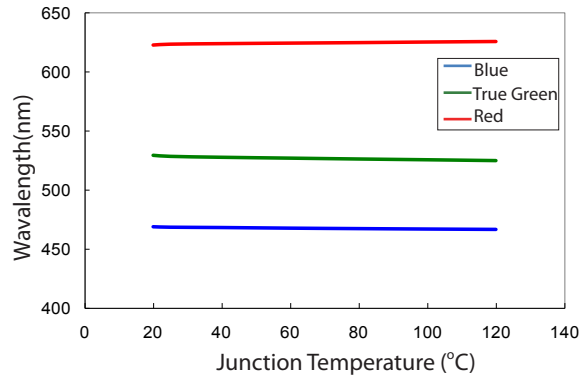


### Luminous Flux vs. Forward Current



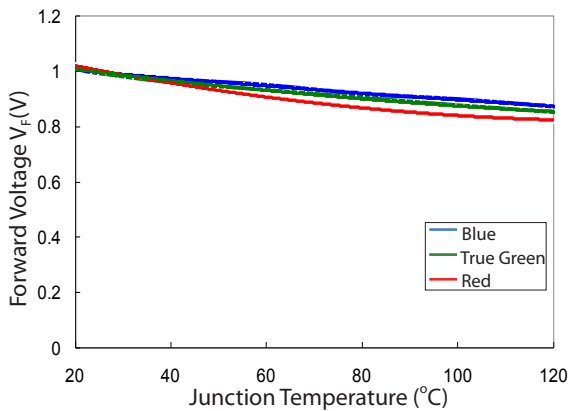
Luminous Intensity vs. Forward Current for PLCC 5050

### Wavelength vs. Junction temperature



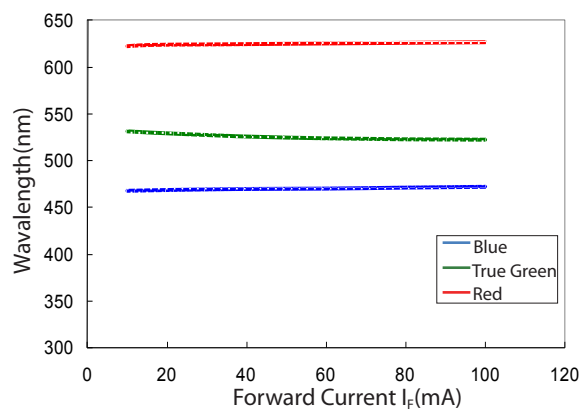
Wavelength vs. Junction Temperature(°C) for PLCC 5050

### Forward Voltage vs. Junction temperature



Wavelength vs. Forward Current for PLCC 5050

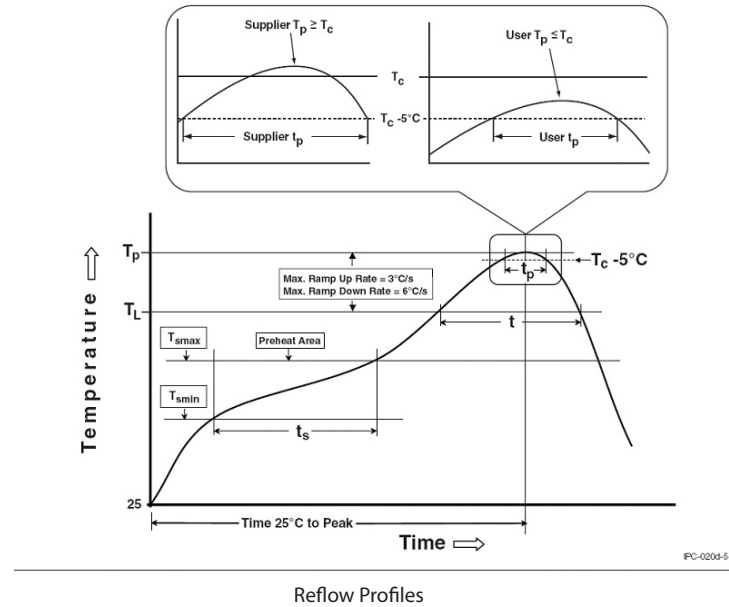
### Wavelength vs. Forward Current



Wavelength vs. Forward Current for PLCC 5050

## Reflow Profile

The following reflow profile is from IPC/JEDEC J-STD-020D which provided here for reference.



## Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak	
Temperature min ( $T_{smin}$ )	150 °C
Temperature max ( $T_{smax}$ )	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second max.
Liquidous temperature ( $T_L$ )	217 °C
Time at liquidous ( $t_l$ )	60-150 seconds
Peak package body temperature ( $T_p$ )*	255 °C ~260 °C *
Classification temperature ( $T_c$ )	260 °C
Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_c$ )	30** seconds
Average ramp-down rate ( $T_p$ to $T_{smax}$ )	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

### Notes:

- \* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.
- \*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

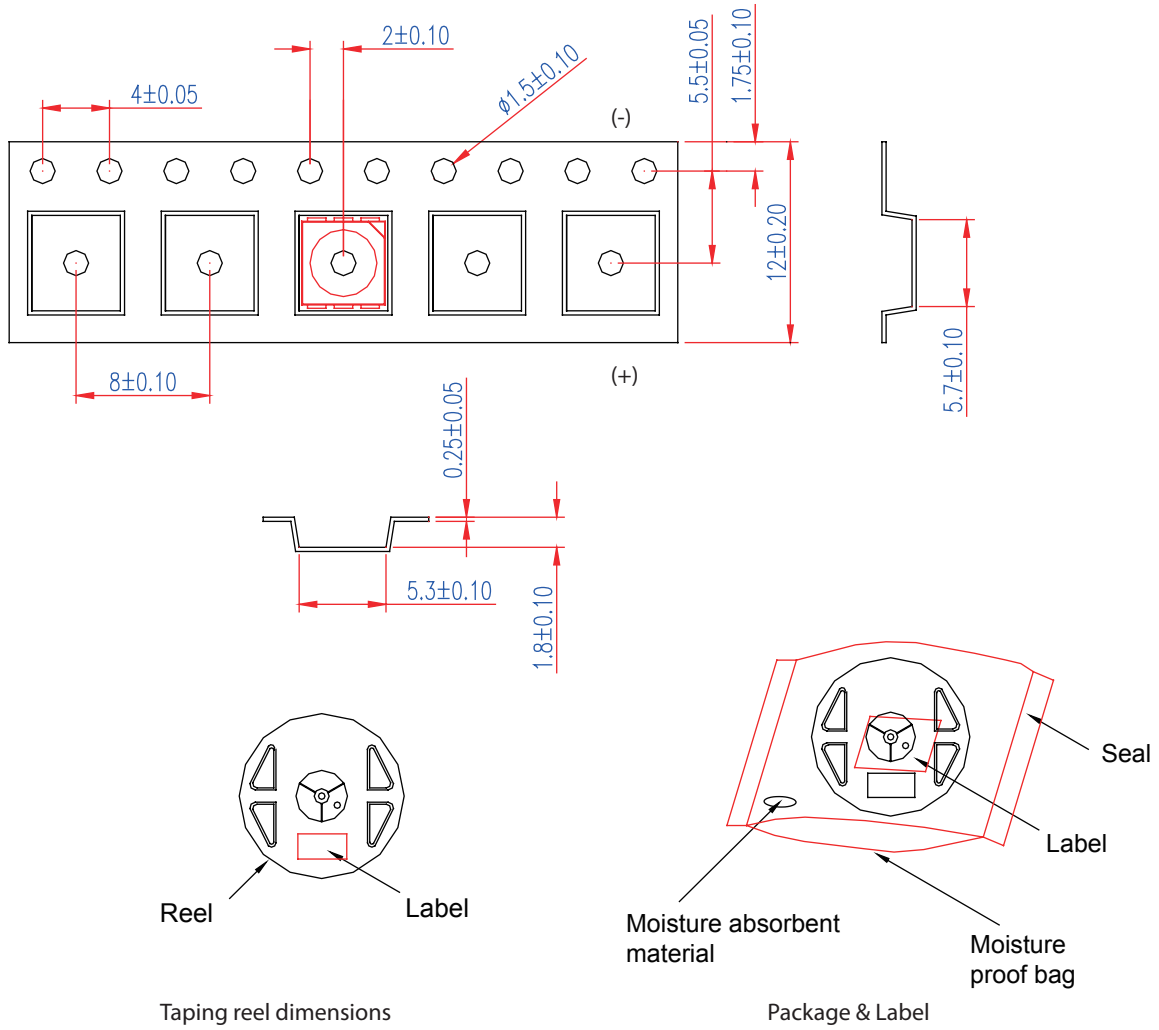
## Reliability

NO .	Test Item	Test Condition	Remark
1	Temperature Cycle	-40°C~100°C 30, 30, mins	100 Cycle
2	Thermal Shock	-40°C~100°C 15, 15 mins ≤ 10 sec	100 Cycle
3	Resistance to Soldering Heat	T <sub>SOL</sub> =260°C, 30 sec	3 times
4	Moisture Resistance	25°C~65°C 90% RH 24 hrs / 1 cycle	10 Cycle
5	High-Temperature Storage	T <sub>A</sub> =100°C	1,000 hrs
6	Humidity Heat Storage	T <sub>A</sub> =85°C RH=85%	1,000 hrs
7	Low-Temperature Storage	T <sub>A</sub> =-40°C	1,000 hrs
8	Operation Life test	25°C	1,000 hrs
9	High Temperature Operation Life test	85°C	1,000 hrs
10	High Humidity Heat Life Test	85°C, 85%RH	1,000 hrs
11	ON/OFF Test	30 sec ON, 30 sec OFF	1.5W times

## Failure Criteria

Item	Criteria for Judgment	
	Min.	Max.
Lumen Maintenance	85%	-
$\Delta u'v'$	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 $\mu$ A
Resistance to Soldering Heat	No dead lamps or visual damage	

## Product Packaging Information



## Revision History

Versions	Description	Release Date
1	Establish order code information	2014/11/26
2	1. Add the Characteristic curve 2. Update luminous flux characteristic 3. Revise the name of datasheet	2014/08/22

## About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at [www.edison-opto.com](http://www.edison-opto.com)

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