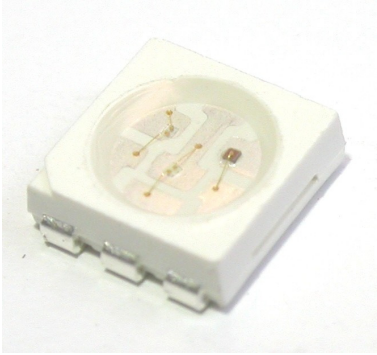
Powerlux Technology Co., Ltd.



Powerlux PLT-5050RGB
Top LED
Technical Datasheet
Version: 1.0

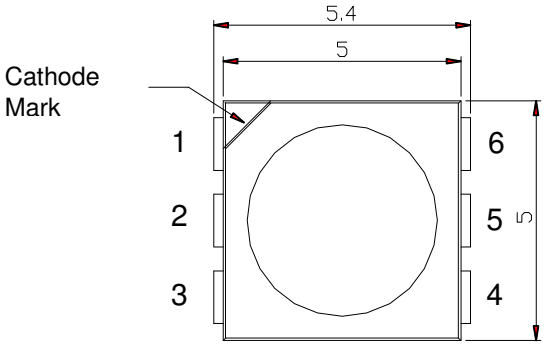
Features

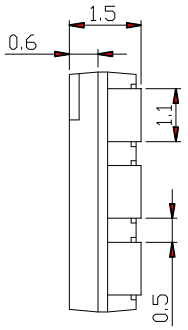
- High Luminous Intensity
- Wide Viewing Angle : 120°
- Reliable and robust
- ROHS compliant
- Suitable for all SMT assembly methods
- Qualified according to JEDEC moisture sensitivity Level 2a

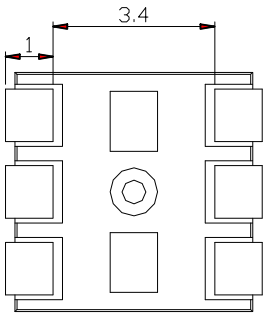
Typical Applications

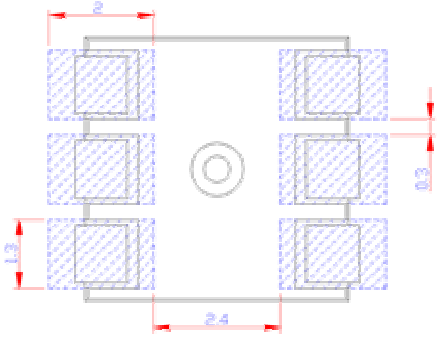
- Electronic signs and signals
- Indoor and Outdoor Displays
- Specialty lighting
- Small area illumination
- Backlighting

Mechanical Dimensions

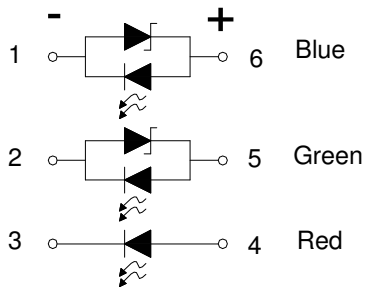








Recommended Soldering Pad



Notes:

1. All dimensions are in millimeters.
2 .Tolerances ± 0.2 mm

Absolute Maximum Ratings (Ta = 25ºC)

Item	Symbol	Value	Unit
DC Forward Current per Chip	IF	30	mA
Forward Peak Pulse Current	IFP [1]	100	mA
Reverse Voltage	VR	5	V
Power Dissipation	PD	180	mW
Operating Temperature	Topr	-30 ~ 85	ºC
Storage Temperature	Tstg	-40 ~ 100	ºC
LED Junction Temperature	Tj	125ºC	ºC

Notes :

[1] t ≤ 0.1ms, D = 1/10

Electro-Optical Characteristics (Ta = 25ºC, IF=20mA)

Item	Symbol	Chip	Value			
			Min.	Typ.	Max.	Unit
Luminous Intensity [2]	*IV* [3]	R	250	450	-	mcd
		G	600	1000	-	
		B	125	300	-	
Forward Voltage [4]	*VF*	R	1.8	2	2.4	V
		G	3	3.3	3.8	
		B	3	3.3	3.8	
Dominant Wavelength	*λd*	R	615	622	625	nm
		G	520	525	535	
		B	465	470	475	
View Angle	*2θ ½*	R/G/B		120		deg.
Reverse Current (at *VR* = *5*V)	*IR*	R/G/B	-	-	10	uA

Notes :

[2] Powerlux maintains a tolerance of ±10% on intensity and power measurements.

[3] *IV* is the luminous intensity output as measured with a cylinder.

[4] A tolerance of ±0.05V on forward voltage measurements

Wavelength Rank

Color	Dominant Wavelength (nm)
Red (@20mA)	615 ~ 620
	620 ~ 625
Green (@20mA)	520 ~ 525
	525 ~ 530
	530 ~ 535
Blue (@20mA)	465 ~ 470
	470 ~ 475

Dominant wavelength is measured with an accuracy of ±1 nm

Vf Rank

Red (V)		Green (V)		Blue (V)	
R1	1.8~2.1	G1	3.0~3.3	B1	3.0~3.3
R2	2.1~2.4	G2	3.3~3.6	B2	3.3~3.6

Forward voltage, Vf is measured with an accuracy of ±0.1V

Rank For Luminous Intensity

Rank	Red(mcd)	Green(mcd)	Blue(mcd)
A	460~565	910~1310	160~230
B	320~460	630~910	110~160
C	220~320	435~630	75~110
D	150~220	300~435	50~75

Luminous intensity, Iv is measured with an accuracy of ± 10% of tolerance.

Reliability Tests

Item	Condition	Note	Failures
Life Test	*Ta* = RT, *IF* = 30mA	1000hrs	0/22
IR Reflow	*Ts* = 255 ± 5ºC	3 time	0/22
Thermal Shock	*Ta* = -40ºC (15min) ~ 100º (15min) (Transfer time < 10sec)	200 cycles	0/22
Temperature Cycle	*Ta* = -40ºC (30min) ~ 100º (30min) (Transfer time < 15min)	200 cycles	0/22
Low Temperature Operating	*Ta* = -30ºC, *IF* = 20mA	1000hrs	0/22
High Temperature Storage	*Ta* = 100ºC	1000hrs	0/22
Low Temperature Storage	*Ta* = -40ºC	1000hrs	0/22
Temperature Humidity Storage	*Ta* = 85ºC, *RH* = 85%	1000hrs	0/22
Temperature Humidity Operating	*Ta* = 85ºC, *RH* = 85%, *IF* = 5mA	1000hrs	0/22

< Judging Criteria For Reliability Tests >

VF	USL[1] X 1.2
IR	USL X 2.0
ΦV	LSL [2] X 0.5

Notes :

[1] USL : Upper Standard Level

[2] LSL : Lower Standard Level.

Forward Current Characteristics, Tj=25℃

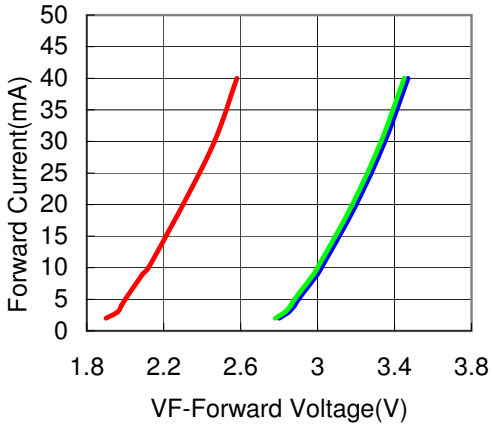


Fig 1. Forward Current vs. Forward Voltage

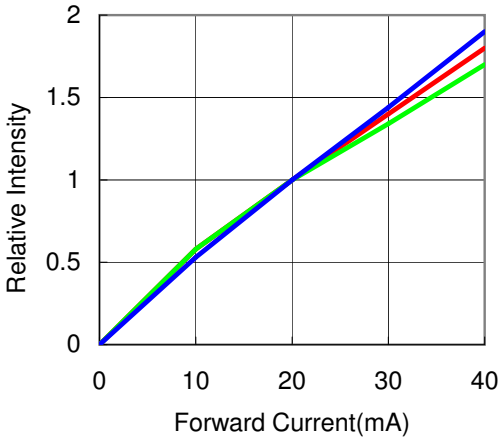


Fig 2. Relative Intensity vs. Forward Current

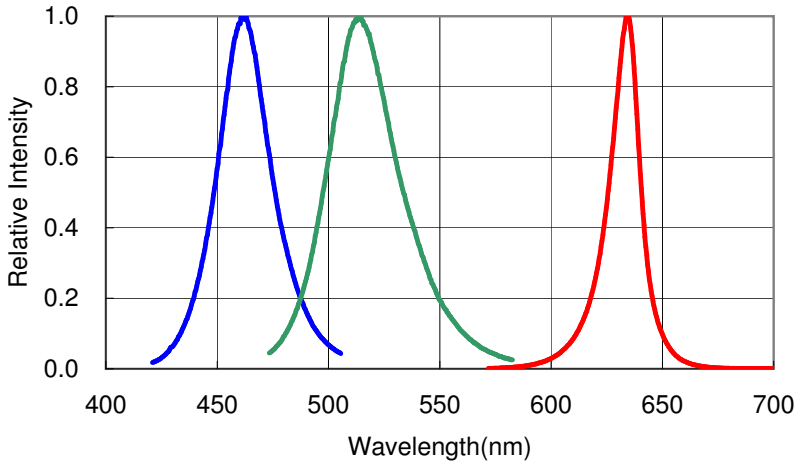


Figure 3. Relative Intensity vs. Wavelength

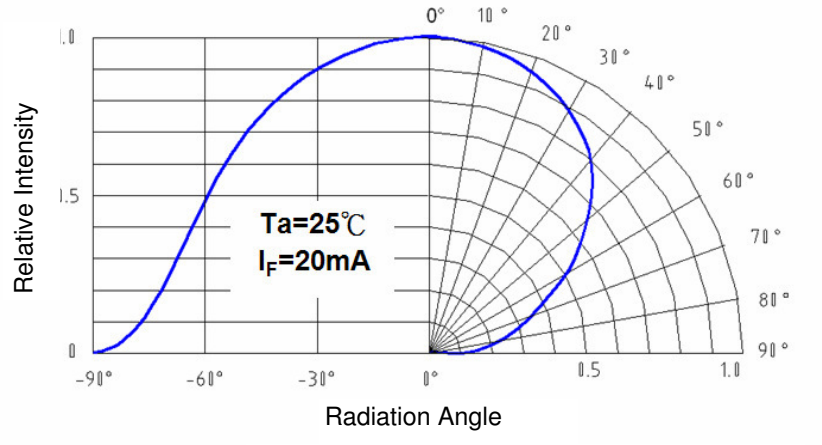
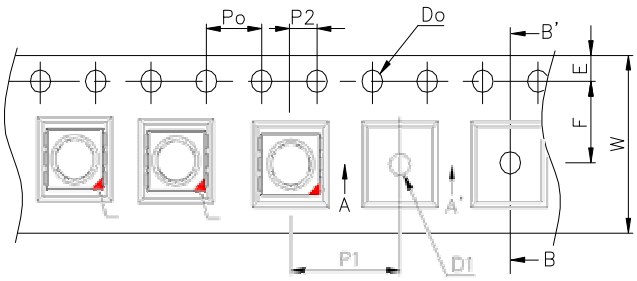
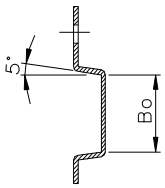


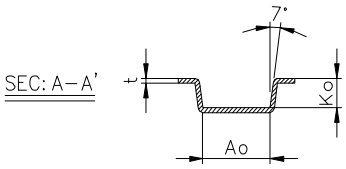
Figure 4. Beam Pattern Diagram

Taping And Packing



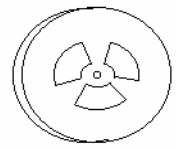


SEC: B–B'

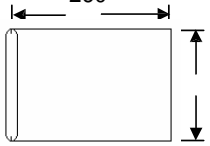


Item	Spec	Tol.(+/-)	Item	Spec	Tol.(+/-)
W	12	±0.20	P2	2	±0.05
E	1.75	±0.10	P0 x 10	40	±0.10
F	5.5	±0.05	B0	5.3	±0.10
D0	1.5	+0.1,-0	P1	8	±0.10
D1	1	±0.05			
P0	4	±0.1			

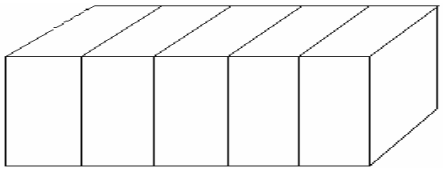
Unit: mm



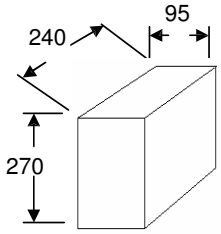
Diameter : 178 mm
Width : 17 mm
5050 ⇒ 1000 pcs/Reel Anti-Static Shielding Black Reel



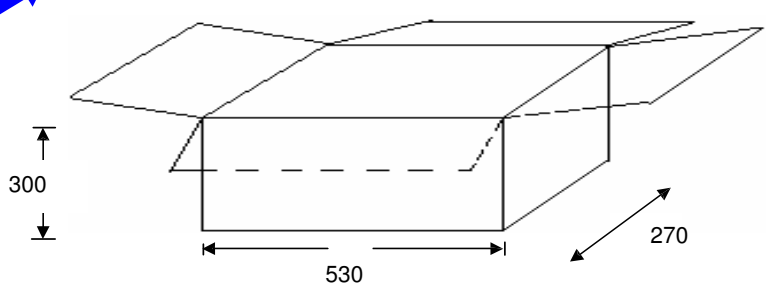
Anti-Static Shielding
1 Reel / Bag (T = 0.1 mm)



5 Inner Box/1 Carton
5050 ⇒ 25000 pcs/ 1Carton



5 Bags / 1Inner Box
5050 ⇒ 5000 pcs/ 1 Inner Box



Recommend IR Reflow Condition

Reflow Soldering		
	Lead Solder	Lead-free Solder
Pre-heat	120~150℃	180~200℃
Pre-heat time	120 sec. Max.	120 sec. Max.
Peak temperature	240℃ Max.	260℃ Max.
Soldering time	10 sec. Max.	10 sec. Max.
Condition	refer to temperature-profile (A)	refer to temperature-profile (B) (N_2 reflow is recommended.)

- After reflow soldering rapid cooling should be avoided.

Temperature-profile (Surface of MCPCB)

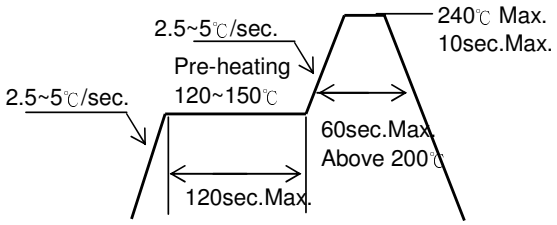


Figure 8a. Lead Solder Temperature Profile

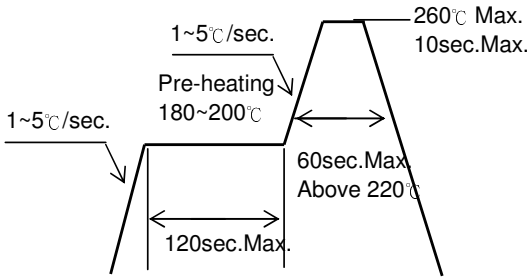


Figure 8b. Lead-free Solder Temperature Profile

- Occasionally there is a brightness decrease caused by the influence of heat or ambient during air reflow. It is recommended that the User use the nitrogen reflow method.
- Repairing should not be done after the LEDs have been soldered.
- Reflow soldering should not be done more than two times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.

Caution:

1. After open the package, the LED should be kept at 30℃, 60%RH or less. The LED should be soldered within 168 hours (7 days) after opening the package.
2. Heat generation must be taken into design consideration when using the LED.
3. Power must be applied resistors for protection, over current would be caused the optic damage to the devices and wavelength shift.
4. Manual tip solder may cause the damage to Chip devices, so advised that heat of iron should be lower than 15W with temperature control under 5 seconds at 230-260 deg. C.
   (The device would be got damage in reworking process, recommended under 5 seconds at 230-260 deg. C)
5. All equipments and machinery must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handing the LED.
6. Use IPA as a solvent for cleaning the LED. The other solvent may dissolve the LED package and the epoxy, Ultrasonic cleaning should not be done.
7. Damaged LED will show unusual characteristics such as leak current remarkably increases, turn-on voltage becomes lower and the LED gets unlight at low current.

NOTE.

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Powerlux reserves the right to make changes at any time without notice to any products in order to improve reliability, function or design.

Powerlux products are not authorized for use as critical components in life support devices or systems without the express written approval from the managing director of Powerlux.

JEDEC Information

JEDEC is used to determine what classification level should be used for initial reliability qualification. Once identified, the LEDs can be properly packaged, stored and handled to avoid subsequent thermal and mechanical damage during the assembly solder attachment and/or repair operation. The present moisture sensitivity standard contains six levels, the lower the level ,the longer the devices floor life.

PLCC 5050 series are certified at level 2a. This means PLCC 5050 series have a floor life of 4 weeks before PLCC 5050 series need to re-baked.

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Condition	Time (hours)	Condition	Time (hours)	Condition
1	Unlimited	≦30℃/85% RH	168 +5/-0	85℃/85% RH		
2	1 year	≦30℃/60% RH	168 +5/-0	85℃/60% RH		
2a	4 weeks	≦30℃/60% RH	696(1) +5/-0	30℃/60% RH	120 +1/-0	60℃/60% RH
3	168 hours	≦30℃/60% RH	192(1) +5/-0	30℃/60% RH	40 +5/-0	60℃/60% RH
4	72 hours	≦30℃/60% RH	96(1) +5/-0	30℃/60% RH	20 +5/-0	60℃/60% RH
5	48 hours	≦30℃/60% RH	72(1) +5/-0	30℃/60% RH	15 +5/-0	60℃/60% RH
5a	24 hours	≦30℃/60% RH	48(1) +5/-0	30℃/60% RH	10 +5/-0	60℃/60% RH
6	Time on tabel (TOL)	≦30℃/60% RH	TOL	30℃/60% RH		

Note:

(1)The standard soak time includes a default value of 24 hours for semiconductor manufacturer's exposure time (MET) between bake and bag, and includes maximum time allowed out of the bag at the distributor's facility.