

PRODUCT SPECIFICATION

Part Number PLH5050CA6-WCRGB2

Details

• 5.0 x 5.0 x 1.6mm RGB LED with integrated IC.

Applications

- Full color LED string light
- LED full color module
- LED guardrail tube
- LED scene lighting
- LED point light
- LED pixel screen
- LED shaped screen

Features

- Top SMD internal integrated high quality external control line serial cascade constant current IC; 5Vapplication; default on electric lights.
- Control circuit and the RGB chip in SMD 5050 components, to form a complete control of pixel, color mixing uniformity and consistency.
- The two-wire synchronous control.
- The three RGB output control, 8Bit (256) color; 5Bit (32) to adjust the brightness
- The three constant current drive, self-detection function specific signal.
- The maximum frequency of 30MHZ serial data input.
- The double data transmission, built-in support uninterrupted oscillation PWM output, can maintain a static image.

Package Outline Dimensions & Pin Configuration







Pin Configuration



Figure 2. IN-PC55TBTRGB Pin Configuration

Notes: 1. Dimension in millimeter, tolerance is ±0.1mm unless otherwise noted.

Number	Symbol	Pin Name	Function Description
1	SDI	Data Input	control signal Input data
2	СКІ	CLK Input	control signal Input Clock data
3	GND	Ground	The signal and power supply grounding
4	VCC	Power	power supply pin
5	СКО	CLK Output	control signal output Clock data
6	SDO	Data Input	control signal output data

Soldering Pad Size

Absolute Maximum Rating (Ta = 25 °C, VSS=0V)

Parameter	Symbol	Range	Unit
Power supply voltage	VDD	-0.5~+5.5	V
Logic input voltage	VIN	-0.3 ~VDD+0.3	V
Operating temperature	Торт	-20 ~ +80	°C
Storage temperature	Тѕтв	-50 ~ +120	°C
ESD pressure(HBM)	Vesd	4K	V

LED Characteristics $(Ta = 25^{\circ}C)$

Calar	20mA				
Color	Wavelength(nm)	Light Intensity(mcd)			
Red	620-630	400-700			
Green	515-530	1000-1500			
Blue	460-475	300-500			

Recommended Operating Ranges (unless otherwise specified, Ta=-20 ~ +70 °C, VDD=4.5 ~ 5.5V,VSS=0V)

Parameter	Symbol	Min.	Тур.	Max	Unit	Test conditions
The chip supply voltage	Vdd	-	5.0	5.3	V	-
R/G/B port pressure	VDS,MAX	-	-	17	V	-
The maximum LED output current	Imax	-	-	20	mA	-
The clock high level width	TCLKH	-	-	>30	ns	-
The clock low level width	TCLKL	-	-	>30	ns	-
Data set up time	TSETUP	-	-	>10	ns	-
The frequency of PWM	Fpwm	-	1.2	-	KHZ	-
Static power consumption	IDD	_	1	-	mA	-

Featured Descriptions

(1) Series data structure

t								
o I	*32	LED1	LED2	LED3	LED4		LED N	1*3
- Sta	art Frame	LED Frame			- Dield	1		- End Fr
				Ja	a F1610			
Star	t Fram	e 32 Bits			_			
000	0 0000	0000 0000	0000 0000	0000 0000				
-	8 Bits	8 Bits	8 Bits	8 Bits	-			
LED	Frame	32 Bits						
		DIUS	ODEEN	PED	7			
111	Global	BLUE	GREEN	KED	_			
3 Bits	5 Bits	8 Bits	8 Blts	8 Bits				
End	Frame	32 Bits						
End	Frame	32 Bits	1111 1111	1111 1111				
End	Frame 1 1111 8 Bits -	32 Bits	1111 1111 8 Bits	1111 1111 8 Bits				
End	Frame	32 Bits	1111 1111 8 Bits Date	1111 1111 8 Bits	Duty Cycle			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB	1111 1111 8 Bits	Duty Cycle			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00	1111 1111 8 Bits	Duty Cycle 0/256			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00 0000 00	1111 1111 8 Bits a .LSB 00 01	Duty Cycle 0/256 1/256			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00 0000 00 0000 00	a .LSB 00 01 10	Duty Cycle 0/256 1/256 2/256			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00 0000 00 0000 00	a .LSB 00 01 10	Duty Cycle 0/256 1/256 2/256			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00 0000 00 0000 00 - -	a Bits 00 01 10 10 10 10 10 10 10 10 10 10 10	Duty Cycle 0/256 1/256 2/256			
End	Frame	32 Bits	1111 1111 8 Bits Date MSB 0000 00 0000 00 0000 00 	a Bits 00 01 10 10 10 10 10 10 10 10 10 10 10	Duty Cycle 0/256 1/256 2/256			

_	_
_	-
_	_
11111101	253/256
1111 1110	254/256
1111 1111	255/256

(3) PWM input / output signal relationship

(4) 5-Bit (level 32) brightness adjustment (simultaneous control of OUTR\OUTG\OUTB three ports current):

Data	Driving Current
MSBLSB	
00000	0/31
00001	1/31
00010	2/31
-	-
-	-
-	-
-	-
-	-
-	-
11101	29/31
11110	30/31
11111	31/31

(5) Refresh Rate

Frame rate = 1/((64+(32* points))*CKI (cycle), (unit: frames per second)Such as: 1024 points, CKI frequency is 1MHZ, is =30 frames per second frame rate.

Typical Application Circuit

To avoid circuity surge from damaging the IC, protection resistor is suggested to be added in the circuit design. Capacitors are also suggested to be added to enhance the stability of IC performance.

**When used in LED strip where LED pitch is short, protection resistors are suggested to be placed at signal line input/ output and clock line input/output. Suggested resistor values at $R1 = R0 \sim 500$ ohms.

**When used in module or general applications where pitch is long, protection resistor value needs to be adjusted based on pitch distance and line material.

LED Performance Graph

Ordering Information

Product	Emission Color	IV(mcd)	Orderable Part Number
	R	400-700	
PLH5050CA6-WCRGB2	G	1000-1500	PLH5050CA6-WCRGB2
	В	300-500	

Precautions

Please read the following notes before using the product:

1. Storage

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

1.2 Before opening the package, the LEDs should be kept at 30°C or less and 80%RH or less.

1.3 The LEDs should be used within a year.

1.4 After opening the package, the remaining LEDs should be kept in a resealed bag.

1.5 The LEDs require mandatory baking before usage. Baking treatment listed below.

1.6 If the moisture adsorbent material has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

*Baking treatment: 60±5°C for24 hours.

Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (Ts _{max} to Tp)	3°C/second max.
Preheat: Temperature Min (Ts _{min})	150°C
Preheat: Temperature Min (Ts _{max})	200°C
Preheat: Time (ts min to ts max)	60-180 seconds
Time Maintained Above: Temperature (T _L)	217 °C
Time Maintained Above: Time (t _L)	60-150 seconds
Peak/Classification Temperature (T _P)	240 °C
Time Within 5°C of Actual Peak Temperature (tp)	<10 seconds
Ramp-Down Rate	6°C/second max.
Time 25 °C to Peak Temperature	<6 minutes max.

Note: Excessive soldering temperature and / or time might result in deformation of the LED lens or catastrophic failure of the LED.

3. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260°C 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.

4. 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.

5. Caution in ESD

Static Electricity and surge damages the LED. It is recommended to use a wristband or antielectrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.Re: da

	Record of Revisions			
Rev.	Comments	Page	Date	
0	Released Spec		03/21/22	