连云港美华电子科技有限公司
Lianyungang Meihua Electronics Technology Co.,Ltd

产品规格书
DATA SHEET

Part No：MHP5050ICRGBCT
REV.1

本产品符合 ROHS 指令有关限制有害物质的环保要求.

日期 DATE	拟制 PREPARED	审核 VERIFIED	批准 APPROVED
2022-06-10	Bob		Sunny
客户签回　CUSTOMER'S APPROVAL			

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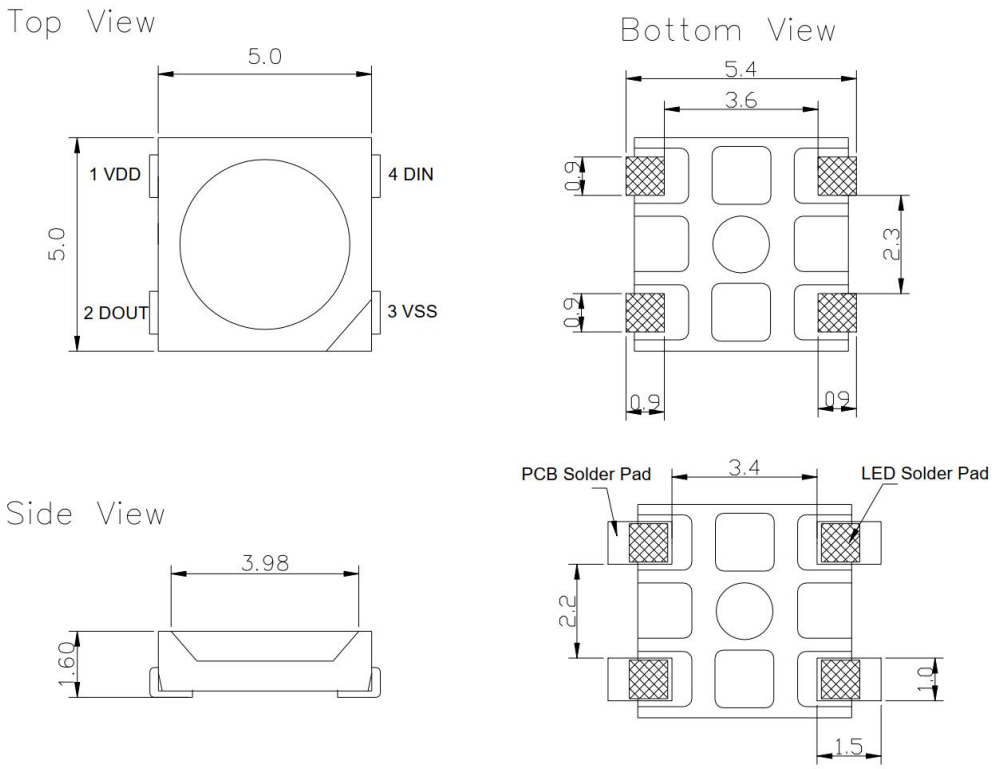
产品外观尺寸 PACKAGE DIMENSIONS



■ **Function Instructions of Pin**

No.	Pad Name	Function	Note
1	VDD	Chip supply voltage	
2	DOUT	Data output	
3	VSS	Ground	
4	DIN	Data input	

注意 NOTES :

1. 所有尺寸均为 mm(英寸)
   All dimensions are in millimeters. (inches)
2. 如无特殊说明，公差为 0.10mm(0.004")
   Tolerance is ±0.10mm(0.004") unless otherwise specified.

	连云港美华电子科技有限公司	
	P/N：MHP5050ICRGBCT	LED PLCC

产品特性 FEATURES

- 高可靠性和高稳定性
  High intensity and reliability
- 高品质、和低功耗、低成本
  High quality, Low power requirement and low cost
- 全彩型
  Full-color type
- IC 易兼容、易装配
  IC compatible, Easy assembly
- 符合 RoHS 指令要求
  ROHS COMPLIANC
- 无铅产品
  Pb FREE PRODUCTS

产品特征 Description

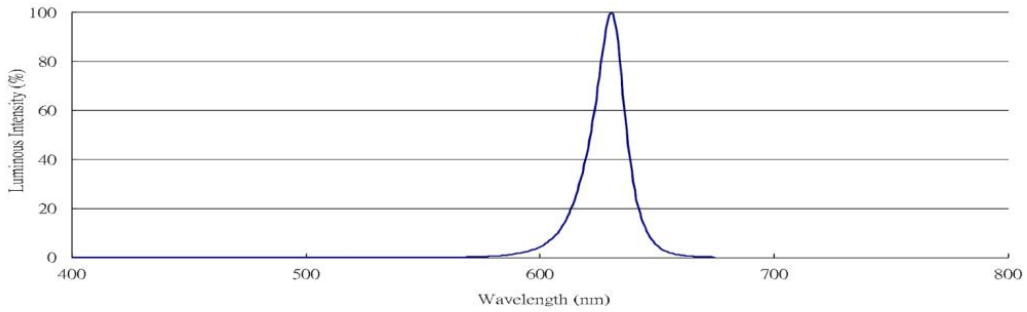
- 5050 规格封装
  5050 package
- 顶部发光
  Top view LED
- 胶体颜色：无色透明
  Lens Color： Water clear
- 发光颜色 Emitted color：
  1. 红色: Red
  2. 绿色: Green
  3. 蓝色： Blue

Chip Optical Properties

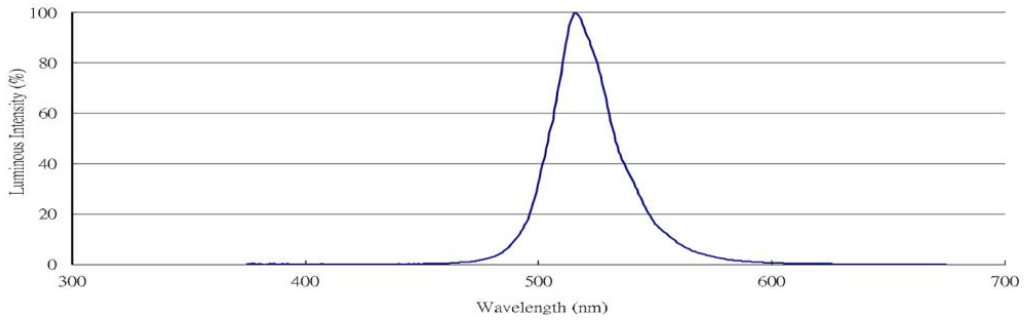
COLOR	Dominant wavelength(nm)	Flux (lm)	Current （mA）	Voltage (V)
RED	620~625	0.5~1.8	12	5
GREEN	525~535	1.8~3.5	12	5
BLUE	465~475	0.5~1.2	12	5

Chip Spectral Distribution

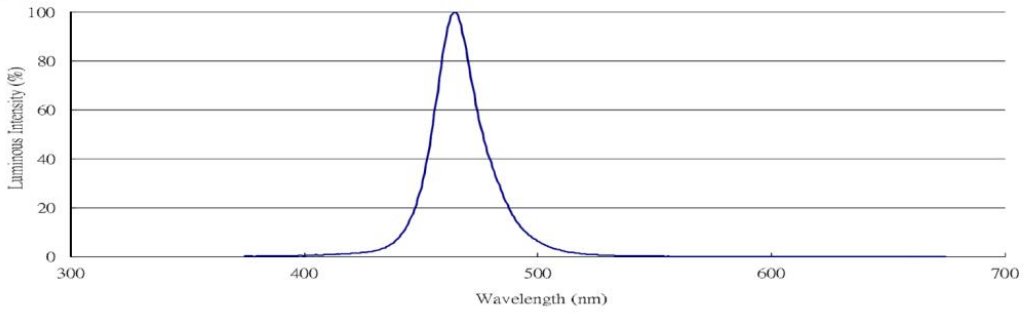
Red:



Green:



Blue:



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	P/N:MHP5050ICRGBCT	LED PLCC

Parameter Limitation（Unless otherwise specified： Ta=25℃,VDD=5.0V,VSS=0V）

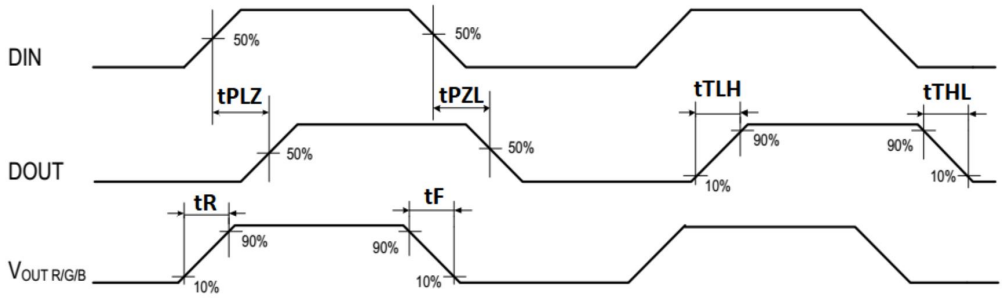
参数 Parameter	符号 Symbol	极限值 Rating	单位 Unit
芯片电源电压 Chip Supply Voltage	VDD	3.0~7.5	V
输入电压 Input Voltage	Vin	-0.5~5.5	V
GRB 输出驱动电流 GRB Output Driving Current	Io	15	mA
功率 Power	PD	400	mW
PWM	F_{PWM}	3~5	kHz
工作温度 Work Temp	Topt	-40~85	℃
储存温度 Storage Temp.	Tstg	-40~85	℃

Electrical Characteristics (Ta=-40~+85℃, VDD=3.0V~7.5V, VSS=0V)

参数 Parameter	符号 Symbol	最小 Min	典型 Typ	最大 Max	单位 Unint	备注 Note
芯片电源电压 Chip supply Voltage	VDD	3	5	7.5	V	
睡眠电流 Sleep Current	I_{SLEEP}	0.6	0.8	1	mA	
高电平输入 High-level Input	V_{IH}	VDD*0.7		VDD	V	Din
低电平输入 Low-level Input	V_{IL}	0		VDD*0.3	V	Din
GRB 最大吸收电流 G、 R、 B Maximum Sink current	I_{sink}		12	15	mA	VDD-VfLED ≧ 1.2V

Dynamic Parameter (Ta = 25° C, VDD=5.0V, VSS = 0V)

参数 Parameter	符号 Symbol	最小 Min	典型 Typ	最大 Max	单位 Unint	备注 Note
传输延迟时间 Transmission delay time	tPLZ			200	ns	Din → Dout, CL=30pF
	tPZL			200	ns	
上升时间 Rise time	tTLH			400	ns	
下降时间 Fall time	tTHL			400	ns	
上升时间 Rise time	tR			400	ns	G、 R、 B=12Ma CL=30pF
下降时间 Fall time	tF			400	ns	
数据传输速度 Data transmission speed	Fdata		800	1100	KHZ	



Function and Sequential Description

1. 编码顺序 Coding Sequence

MCU 数据通过单线总线接口与芯片通信。通信协议采用极性归零码模式，每个码必须具有低电平。该通信协议中每个代码的起始级别为高级别，高级别的时间宽度区分“0”代码或“1”代码。

MCU data is communicated with chip through single wire bus interface. The communication protocol adopts polarity return to zero code mode, and each codes must have low level. The starting level of each codes in this communication protocol is high level, and the time width of high level distinguish "0" code or "1" code.

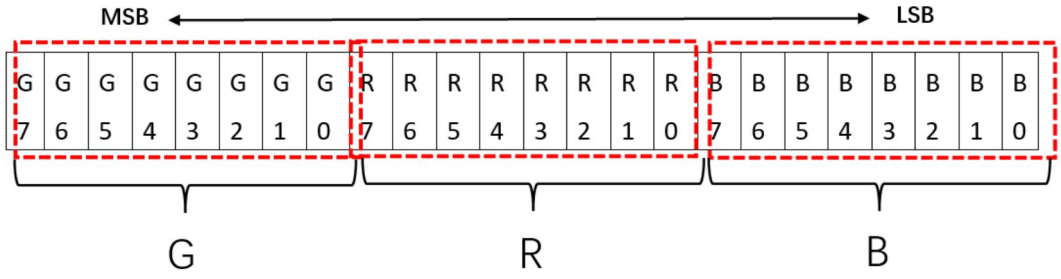
（VDD=5V）

Name	Description	Min.	Typ.	Max.	Tolerance	Unit
T0H	0 Code， high level time		0.295		0.05	us
T1H	1 Code， high level time		0.595		0.05	us
T0L	0 Code， Low level time		0.595		0.05	us
T1L	1 Code， low level time		0.295		0.05	us
Trst	Reset code low level time	80				us

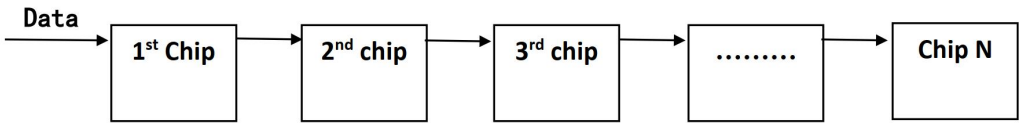
2. 协议数据格式 Protocol Data Format

根据该原理，第一芯片的 Trst+24 位数据+第二芯片的 24 位数据+…+第 N 芯片 24 位数据+Trst A 24 位灰度级数据结构：前部高字节，以 G、R 和 B 顺序发送数据

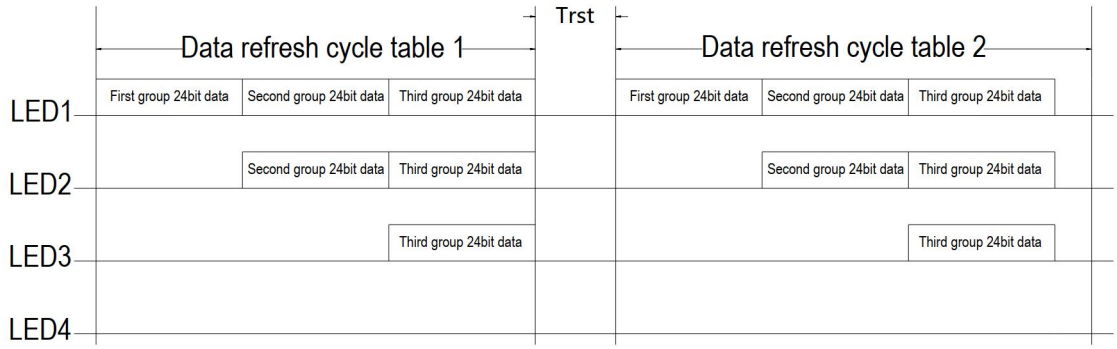
According to the Principle, Trst + 24-bit data for first chip + 24-bit data for second chip +... + Nth chip 24-bit data +Trst A 24-bit grey-scale data structure: high bytes in front part, sends data with G, R, and B order



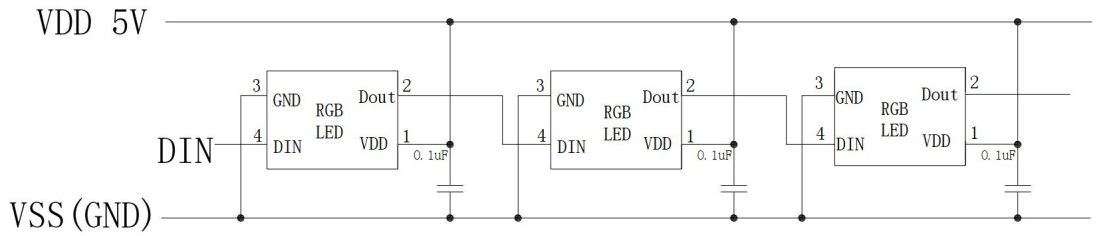
2.1 2.1 系统拓扑视图 System Topology View



2.2 Data Transmission Mode（Take 4LEDs for example）

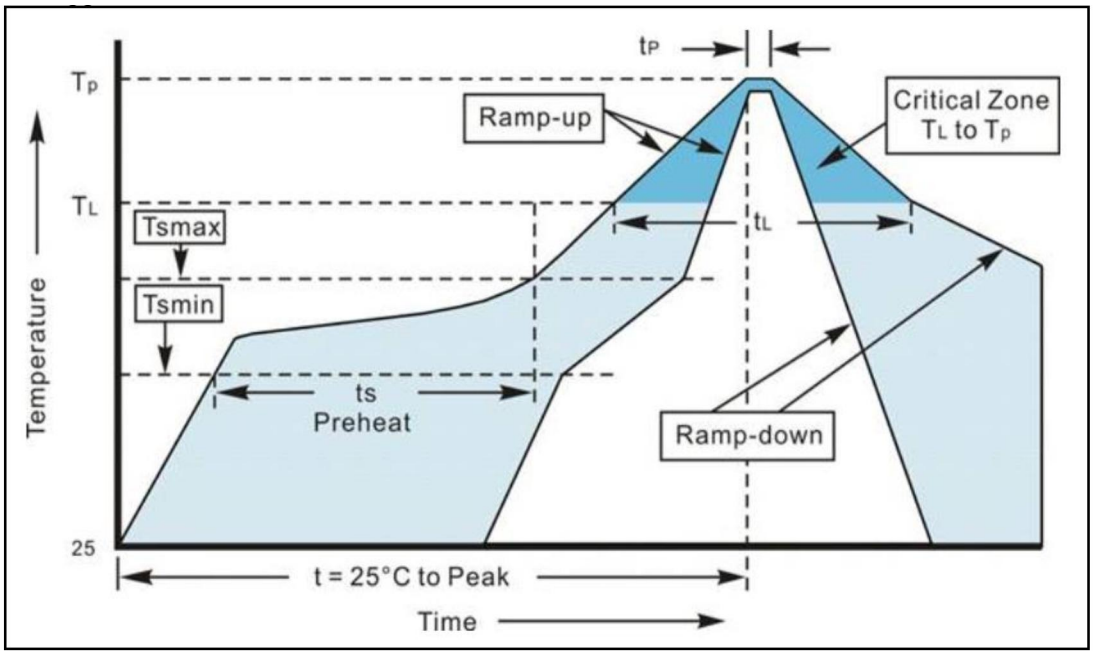


Suggested Application Current：



（备注：根据标准设计原则，每个封装的电源输入引脚需要添加一个 0.1uF 旁路电容器。您可以根据测试结果决定是否免除 0.1uF 电容器。此外，应将 33R 阻尼电阻器串联到输入端子）
(Remarks: According to the standard design principle, the power input pin of each package needs to add a 0.1uF bypass capacitor. You can decide whether to exempt the 0.1uF capacitor according to the test results. Beesides, it is should to connect a 33R damping resistor in series to the input terminal)

建议回流曲线 Suggested Reflow Profile



Temperature curve features	leaded solder	Lead-free solder
Average heating rate (TSmax to TP)	Max 3℃/second	Max 3℃/second
Preheating: minimum temperature (Tsmin)	100℃	150℃
Preheating: maximum temperature (Tsmax)	150℃	200℃
Warm-up: time (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Time to maintain high temperature: Temperature (TL)	183℃	217℃
Time to maintain high temperature: Time (tL)	60-150 seconds	60-150 seconds
Peak/Classification temperature (TP)	215℃	245℃
Time at actual peak temperature (TP) 5℃	<10 seconds	<10seconds
Cooling speed	Max 6℃/Second	Max 6℃/Second
Time required to reach peak temperature from 25℃	Max 6min.	Max 6min.

Note: All temperatures are measured on the surface of the package body

储藏 STORAGE

1. 发光二极管在出厂后可在温度 30 度以下，湿度 60％以下的环境内保存 1 年。The LED should be stored at 30℃ or less and 60% RH or less after being shipped from MH and the storage life limits are 1 year.

2. 在产品准备使用前请不要打开防潮袋。Do not open moisture proof bag before the products are ready to use.

3. 打开包装后：产品暴露在温度 30 度以下湿度 60％以下的 24 小时内用完，若仍然有剩余，请一定要放到防潮柜内储存。After opening the package: The LED's floor life is 24 hr under 30℃ or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

4. 如果吸湿性材料（硅胶）已用完或发光二极管已超过存储时间，应使用以下条件进行烘烤处理，处理：60±5℃烘烤 5 小时。If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time,baking treatment should be performed using the following conditions.Baking treatment: 60±5℃ for 5 hours.

3. 请避免保存在温度变化明显，尤其是高湿度的地方 Please avoid rapid transitions in ambient temperature, especially, in high humidity environments where condensation can occur.

使用注意事项 Application Restrictions

1. 生产环境：建议在 20℃~30℃&30%~60%RH 下作业。
Production environment: it is recommended to operate at 20 DEG ~30 DEG &30%~60%RH

2. 维修温度建议控制在 280℃以下，持续加热时间不超过 30S。
The service temperature shall be controlled below 280 degrees, and the continuous heating time shall not exceed 30S.

3. 维修时避免尖锐物体直接戳到胶体，取料时建议夹取板材两端。
When repairing, the sharp object should be directly punched into the colloid, and when picking the material, it is recommended to clamp both ends of the PCB.

其他注意事项 Others

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4. 静电放电（静电放电）ESD (Electrostatic Discharge
产品敏感的静电或冲击电压。当使用产品时静电放电会损坏模具及其可靠性。对静电放电的措施强烈推荐消除电荷接地的手环，防静电鞋，衣服和地板等 The products are sensitive to static electricity or surge voltage. ESD can damage a die and its reliability. When handling the products, the following measures against electrostatic discharge are strongly recommended:Eliminating the charge Grounded wrist strap, ESD footwear, clothes, and floors

5. 发光二极管正向电流方向使用，驱动电路的设计必须使 LED 在关闭的状态下不经受正向或逆向电压，如果反向电压不断应用于发光二极管，它可以导致 LED 损坏。
cause migration resulting in LED damage.
The LEDs should be operated with forward bias. The driving circuit must be designed so that the LEDs are not subjected to forward or reverse voltage while it is off. If reverse voltage is continuously applied to the LEDs, it may cause migration resulting in LED damage.

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