一、产品介绍

APA106-F8/F5/5050 是一个集控制电路与发光 RGB 芯片集成在一个 LED 封装的元器件中，构成一个完整的外控像素点，像素点内部包含了智能数字接口数据锁存信号整形放大驱动电路，还包含有高精度的内部振荡器，有效保证了像素点光的颜色高度一致。

数据协议采用单线归零码的通讯方式，像素点在上电复位以后，DIN 端接受从控制器传输过来的数据，首先送过来的 24bit 数据被第一个像素点提取后，送到像素点内部的数据锁存器，剩余的数据经过内部整形处理电路整形放大后通过 DO 端口开始转发输出给下一个级联的像素点，每经过一个像素点的传输，信号减少 24bit。像素点采用自动整形转发技术，使得该像素点的级联个数不受信号传送的限制，仅仅受限信号传输速度要求。

APA106-F8/F5/5050 提供三路恒流驱动及 256 级灰度调制输出。采用单线传输方式（DATA），内建再生，可提升传输距离。用于驱动显示灯光变换、各式字符变换、彩色动漫图案。根据不同控制器和客户不同形式要求，进行脱机或联机运行。

本产品具有性能优良，可视效果分明，级联方式简单；数据传输稳定、抗干扰能力强等特点。

Product introduction

APA106-F8/F5/5050Is a collection of control circuit and the luminous RGB chip integration in a LED packaging components, constitute a complete external control pixel, pixels inside contains intelligent digital interface data latch signal shaping amplifier drive circuit, also contains a high precision internal oscillator, effectively guarantee the highly consistent pixel light color。

Data protocol adopts single size zero communication, pixels in electricity after reset, DIN client receive the data from the controller transfer to come over, first of all the 24 bit data is sent after the first pixel extraction, to the inside of the pixel data latch, and the rest of the data through the internal plastic processing circuit plastic enlarged through the DO output port began to forward to the next cascaded pixel, every pixel of transmission, signal reduce 24 bit. Forward pixels using automatic plastic technology, makes the number of cascaded pixel is not restricted by the signal, only limited signal transmission speed requirements。

APA106-F8/F5/5050 Provide three road and 256 grey level modulation output constant current driver. Using single transport (DATA), built in regeneration, the transmission distance. Used to drive the display light transformation, transformation, color cartoon character designs. According to different forms of different controllers and customer requirements, to run the offline or online.

This product has good performance, visual effect is clear, simple cascade mode; Data transmission stability, strong anti-interference ability, etc。

二、产品特点

◆LED 输入电压 4.5V～6.5V，内置 LDO；

◆芯片带有防反接功能，避免客户接错线导致烧灯；

◆芯片内置 3 路恒流，每路电流是 14mA；
◆芯片内置稳压管，电源端需串电阻到 IC VDD 脚，无需外加稳压管
◆灰度调节电路（256 级辉度可调）
◆内置双 RC 振荡，并根 据数据线上信号进行时钟同步，在接受完本单元的数据后能自动将后续数据进行整形转发
◆内置上电复位电路
◆PWM 控制端能够实现 256 级调节，扫描频率不低于 1500Hz/s
◆串行接口级联接口，能通过一根信号线完成数据的接收与解码
◆当刷新速率 30 帧/秒时，低速模式级联数不小于 512 点，高速模式不小于 1024 点
◆数据发送速度可达 800Kbps

Product features

◆LED the input voltage of 4.5 V to 6.5 V, the built-in ";
◆Chip has anti reverse connection function;
◆Three channels of constant current are built in the chip,one channel is 14mA；
◆Chip bilt-in regulator tube, power supply side need to string of resistance to IC VDD feet, without additional regulator tube
◆Gray-scale adjusting circuit (luminance level 256 adjustable)
◆Built-in double RC oscillation, and according to the clock synchronization signal on the data line, after receive the data after completing this unit can automatically forwards the follow-up data for plastic
◆Built-in electric reset circuit
◆PWM control terminal can achieve a level 256 adjustment, not less than 1500 hz/s scanning frequency
◆Grade serial interface connection, can complete the data through a signal receiving and decoding
◆When the refresh rate of 30 frames per second, low-speed mode cascade number not less than 512 points, high-speed mode is not less than 1024 points
◆Data sending rate of up to 800 KBPS

三、Light color：Red、Green、Blue Color

Absolute maximum rating（Ta = 25℃)

Reverse current：100 μA
反向电流
Peak current（duty＝0.1,1KHz）：100 mA
峰值电流
Operating/Storage temperature range：-30℃～+85℃

存储温度范围

Derating linear from 25℃：0.4 mA/℃

Lead soldering temperature range：260℃ for 5 second

焊接温度范围

Electro-optical characteristics（TA = 25℃）

光电参数

RED COLOR：红色

Parameter 参数	Symbol 符号	Min 最小值	Typ. 中间值	Max 最大值	Unit 单位	Test Condition 测试条件
Forward voltage 正向电压	**V**F	4.5	5.5	6.5	V	**I**F＝20 mA
Luminous intensity 发光强度	**I**V	600	700	800	mcd	**I**F＝20 mA
Peak emission wavelength 峰值波长	λp	620	625	630	nm	—
Half intensity angle 发光角度	△Θ	—	30	—	deg	—

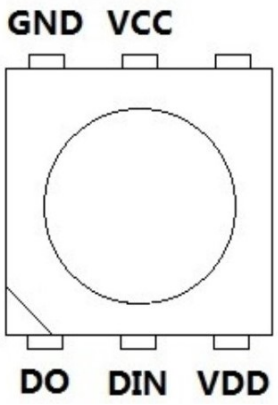
GREEN COLOR：绿色

Parameter 参数	Symbol 符号	Min 最小值	Typ. 中间值	Max 最大值	Unit 单位	Test Condition 测试条件
Forward voltage 正向电压	**V**F	4.5	5.5	6.5	V	**I**F＝20 mA
Luminous intensity 发光强度	**I**V	1300	1700	2000	mcd	**I**F＝20 mA
Peak emission wavelength 峰值波长	λp	515	520	525	nm	—
Half intensity angle 发光角度	△Θ	—	30	—	deg	—

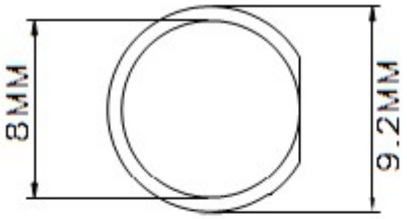
BLUE COLOR：蓝色

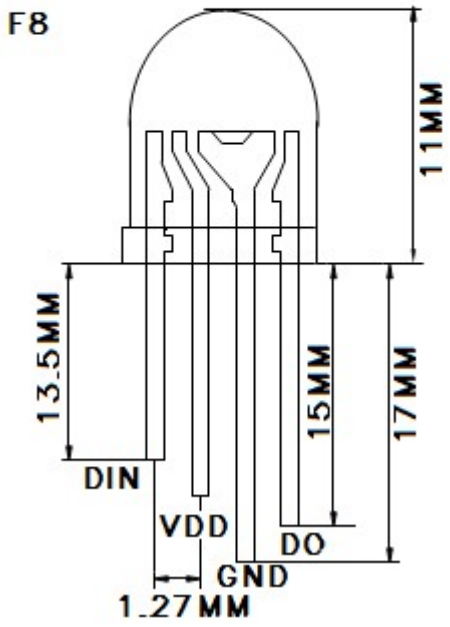
Parameter 参数	Symbol 符号	Min 最小值	Typ. 中间值	Max 最大值	Unit 单位	Test Condition 测试条件
Forward voltage 正向电压	**V**F	4.5	5.5	6.5	V	**I**F＝20 mA
Luminous intensity 发光强度	**I**V	400	450	500	mcd	**I**F＝20 mA
Peak emission wavelength 峰值波长	λp	460	465	470	nm	—
Half intensity angle 发光角度	△Θ	—	30	—	deg	—

四、Application diagram or Dimensions

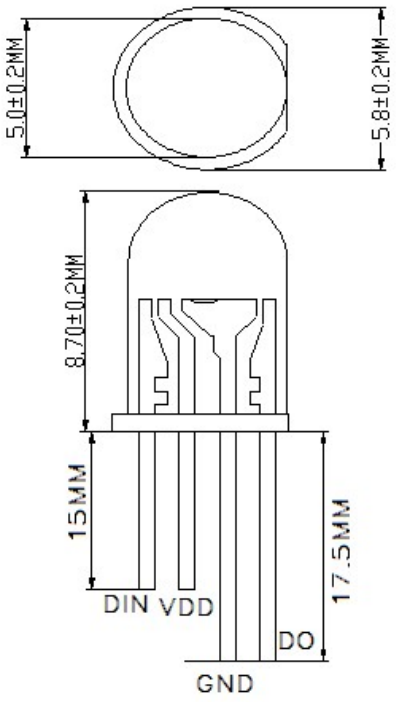

GND VCC
DO DIN VDD

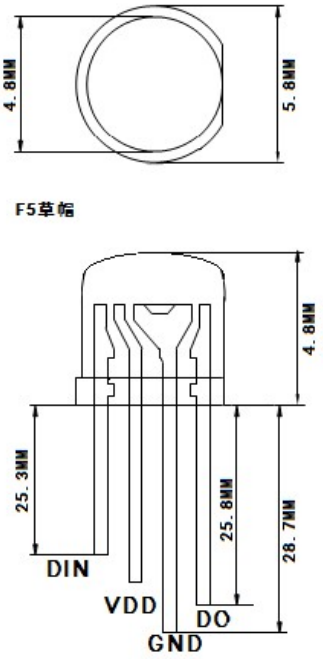
5050 灯


8MM
9.2MM


F8
11MM
13.5MM
15MM
17MM
DIN
VDD
DO
GND
1.27MM

F8 灯



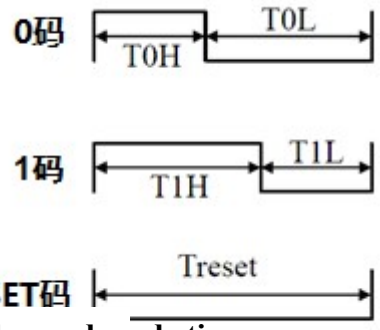


F5 灯

五、Product applicaticm

1、The input type

输入码型



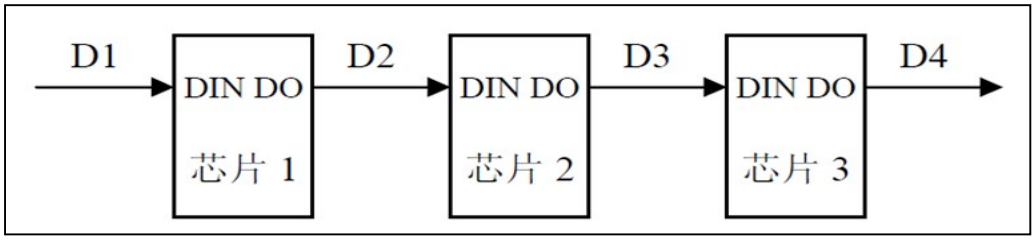
2、High speed mode time

高速模式时间

名称	描　述	典型值	容许误差
T0H	0 码，高电平时间	0.35μs	±150ns
T1H	1 码，高电平时间	1.36μs	±150ns
T0L	0 码，低电平时间	1.36μs	±150ns
T1L	1 码，低电平时间	0.35μs	±150ns
RES	RESET 码	50us	

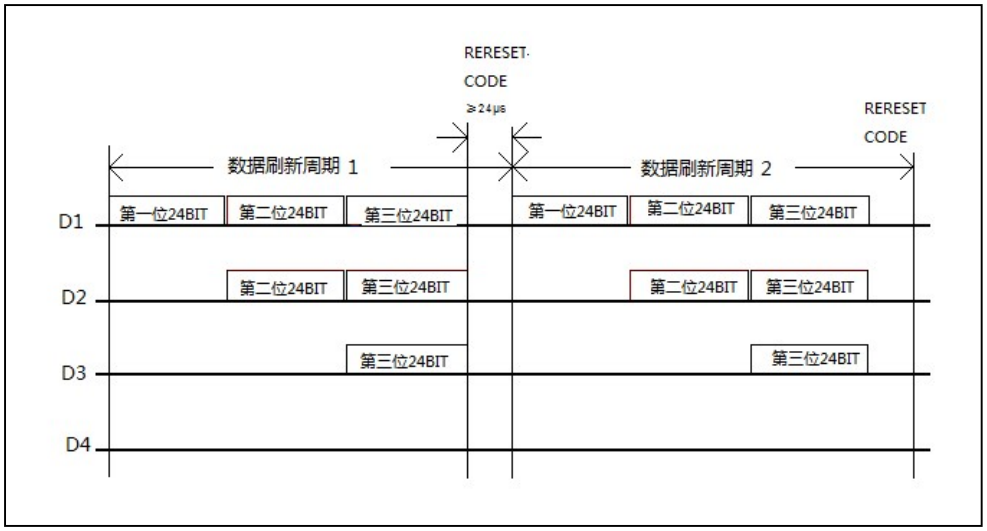
3、Connection methods

连接方法



4、Data transmission method

数据传输方法



Note: the D1 for MCU send data, D2, D3, D4 for cascade circuit automatic plastic forwarding data.

注：其中 D1 为 MCU 端发送的数据，D2、D3、D4 为级联电路自动整形转发的数据。

5、24 bit data structure

24bit 的数据结构

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0

Note: high, according to the order of the RGB sending data

注：高位先发，按照 RGB 的顺序发送数据

6、APA106-F8/F5/5050 application instructions

APA106-F8/F5/5050 应用说明