深圳市像素之光科技有限公司
SPECIFICATIONS
产品规格书

Specification 规 格:	8mm integrate RGB LED lamp with automatic color fadin
Part No 型号:	F8-C

APPROVED SIGNATURES 客户确认		
Purchase Dept. 采购部	Quality Dept. 品质部	Engineering Dept. 技术部

一、产品概述：Product overview:

　　F8-LED 是一款集成高质量单线级联恒流驱动 IC 和高质量 RGB LED 芯片的外控恒流集成灯珠。其中内置控制 IC 具有高可靠，低功耗，抗干扰性能高和恒流精度高的特点，而内部集成优选高质量的 LED 芯片，具有发光一致性优良，白光效果纯正，光衰小的优点。将 2 者优点相结合，同时带来体积小，外围元件少，版面干净的特点。通过外部控制器控制，可展现幻彩，动画以及高标准视频效果。

　　F8-LED is a kind of external control constant current integrated lamp bead which integrates high quality single line cascade constant current driver IC and high quality RGB LED chip. Among them, the built-in control IC has the characteristics of high reliability, low power consumption, high anti-interference performance and high constant current accuracy, while the internal integrated optimization of high-quality LED chip has the advantages of good luminous consistency, pure white light effect and small light attenuation. Combining the advantages of the two, it has the advantages of small volume, less peripheral components and clean layout. Through the control of external controller, it can show the illusion color, animation and high standard video effect.

二、功能特点：Functional features:

- 默认输出恒流值 12mA，高恒流精度，便于降低内置灯珠功耗
- 默认上电不亮灯
- 灰度调节电路（256 级辉度可调）
- 内置高精度和高稳定性振荡器
- 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
- 整形转发强化技术，单线数据传输，可无限级联。数据传输频率 800Kbps/秒

- Default output constant current value 12mA, high constant current accuracy, easy to reduce the power consumption of built-in lamp beads

- Default power on does not light up

- Gray level adjustment circuit (256 level brightness adjustable)

- Built in high-precision and high stability oscillator

- Serial interface cascade interface, which can receive and decode data through a signal line

- Shaping and forwarding enhancement technology, single line data transmission, unlimited cascade. Data transmission frequency 800kbps / S
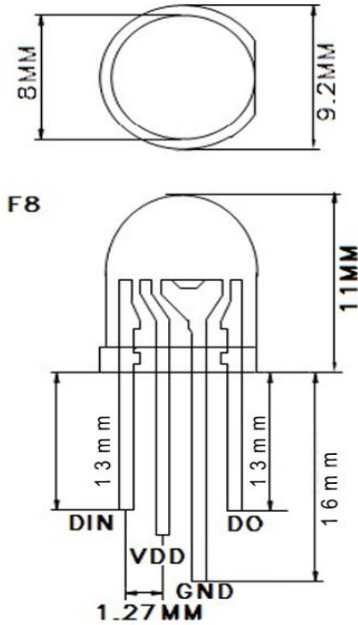
三、应用领域：application area

　　圣诞灯串，圣诞装饰，节日灯，全彩模组，发光字等多场景色产品，
　　Christmas lamp string, Christmas decoration, holiday lamp, full-color module, luminous characters and other scenery products,

四、机械尺寸，脚位图：Mechanical dimension, foot map:

F8

注明：
1. 以上标示单位：毫米。
   1. The above indication unit: mm.
2. 除特别标示外，尺寸公差为±0.1 毫米。
   2. Unless otherwise indicated, the dimensional tolerance shall be ± 0.1mm.

五、脚位说明（4PIN）：Description of foot position

序号	符号	功 能 描 述
		YF923-F5-F8-LED
1	DIN	显示数据输入 Display data input
2	VDD	内部电源正及 RGB 正 Internal power supply positive and RGB positive
3	GND	信号地及电源地 Signal ground and power ground
4	DO	显示数据级联输出 Display data cascade output

六、最大额定值：Maximum rating

（如无特殊说明，T_A ＝ 25 ℃，V_{SS} ＝ 0 V）

参数	符号	范围	单位
逻辑电源电压	Vdd	＋2.5 ～ ＋7.5	V
输出端口耐压	Vout	9	V
逻辑输入电压	Vi	－0.5 ～ Vdd＋0.4	V
工作温度	Topt	－40～ ＋90	℃

七、开关特性：Switching characteristics

（如无特殊说明，Ta＝ －40 ～ ＋85 ℃，Vss＝ 0 V，Vdd＝ 4.5 ～ 5.5 V）

参数	符号	最小	典型	最大	单位	测试条件
振荡频率	FOSC1	－	800	－	KHz	Vdd ＝5V
	FOSC2	－	10	－	MHz	Vdd ＝5V
传输延迟时间	Tflz	－	－	300	ns	Cl＝ 15 pF，D_{IN} → D_{OUT}，R1 ＝ 10 kΩ
下降时间	Tthz	－	－	120	μs	Cl ＝ 300 pF，OUTR／OUTG／OUTB
数据传输率	Fd	－	800	－	Kbps	占空比 50 ％
输入电容	Ci	－	－	15	pF	－

八、内置光源参数：Built in light parameters:

发光颜色	主波长（nm）	发光强度（mcd）	工作电流（mA）	工作电压（V）
R	620-630	600-800	12	2.0-2.2
G	515-525	1300-2000	12	3.0-3.3
B	460-470	400-500	12	3.0-3.3

九、功能说明：Function description

　　F8-LED 灯珠采用单线通讯方式，采用归零码的方式发送信号。芯片在上电复位以后，接收 DIN 端打来的数据，接收够 24 bit 后，DO 端口开始转发数据，供下一个芯片提供输入数据。在转发之前，DO 口一直拉低。此时灯珠将不接收新的数据，内置 RGB 芯片根据接收到的 24 bit 数据后产生的不同占空比信号，展现不同亮度。如果 DIN 端输入信号为 RESET 信号，芯片将接收到的数据送显示，芯片将在该信号结束后重新接收新的数据，在接收完开始的 24 bit 数据后，通过 DO 口转发数据，灯珠在没有接收到 RESET 码前，RGB 亮度保持不变，当接收到 200us 以上低电平 RESET 码后，灯珠内部 RGB 芯片将根据刚才接收到的 24 bit 数据后产生的不同占空比信号，展现不同亮度。

F8-led lamp bead adopts single line communication mode and sends signal by zeroing code. After the chip is powered on and reset, it receives the data from the din terminal. After receiving enough 24 bits, the do port starts to forward the data for the next chip to provide input data. Before forwarding, the do port is pulled down. At this time, the lamp beads will not receive new data, and the built-in RGB chip will display different brightness according to the different duty cycle signals generated after receiving 24 bit data. If the input signal of DIN terminal is reset signal, the chip will send the received data to display, and the chip will receive new data after the end of the signal. After receiving the start 24 bit data, the chip will forward the data through the do port. Before the lamp bead receives the reset code, the RGB brightness remains unchanged. When the low-level reset code above 200us is received, the RGB inside the lamp bead The chip will display different brightness according to the different duty cycle signals generated by the 24 bit data just received.
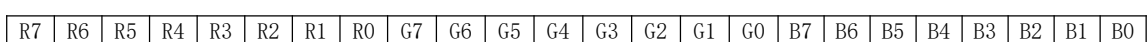
1）芯片级联方法：Chip cascade method:
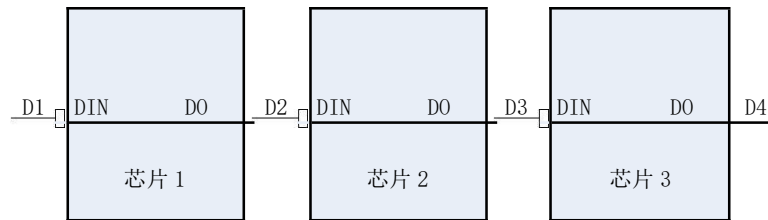
2）数据传输：Data transmission:
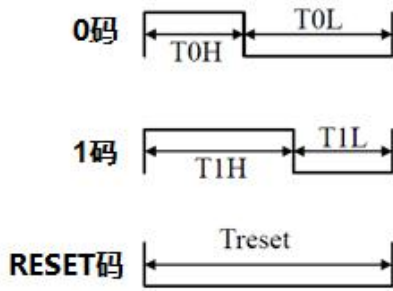

注：其中 D1 为 MCU 端发送的数据，D2、D3、D4 为级联电路自动整形转发的数据。

Note: D1 is the data sent by MCU, D2, D3 and D4 are the data automatically reshaped and forwarded by cascade circuit.

3）24bit 数据结构　　　24 bit data structure

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

注：高位先发，按照 RGB 的顺序发送数据 Note: high bit first, send data in the order of RGB

4）时序波形图 Time series oscillogram

5）信号传输定义：Definition of signal transmission

名称	描　述	典型值	容许误差
T0H	0 码，高电平时间	0.295μs	± 0.05us
T1H	1 码，高电平时间	0.595μs	± 0.05us
T0L	0 码，低电平时间	0.595μs	± 0.05us
T1L	1 码，低电平时间	0.295μs	± 0.05us
RES	RESET 码	≥80us	

十、应用线路图：Application wiring diagram:

电源电压 5V（如下图示）