

## 5mm ws2811 NeoPixel

### Picture



### Features and Benefits

- λ Intelligent reverse connect protection, the power supply reverse connection does not damage the IC.
- λ The control circuit and the LED share the only power source.
- λ Control circuit and RGB chip are integrated in a package of F5 components, form a complete control of pixel point.
- λ Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate.
- λ Built-in electric reset circuit and power lost reset circuit.
- λ Each pixel of the three primary color can achieve 256 brightness display, completed 16777216 color full color display, and scan frequency not less than 400Hz/s.
- λ Cascading port transmission signal by single line.
- λ Any two point the distance less than 2Meter transmission signal without any increase circuit.
- λ When the refresh rate is 30fps, cascade number are not less than 1024 points.
- λ Send data at speeds of 800Kbps.
- λ The color of the light were highly consistent, cost-effective..

### Applications

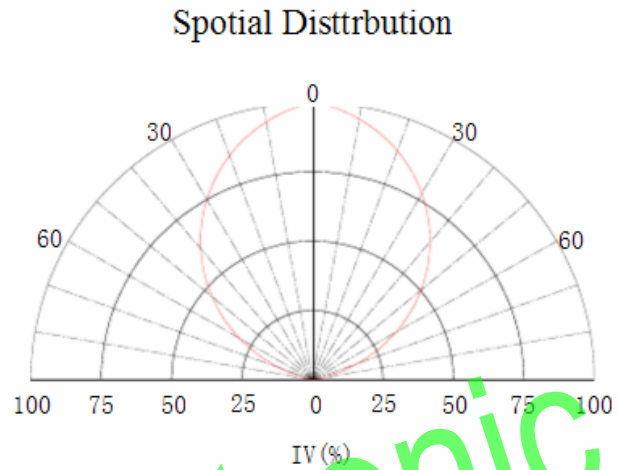
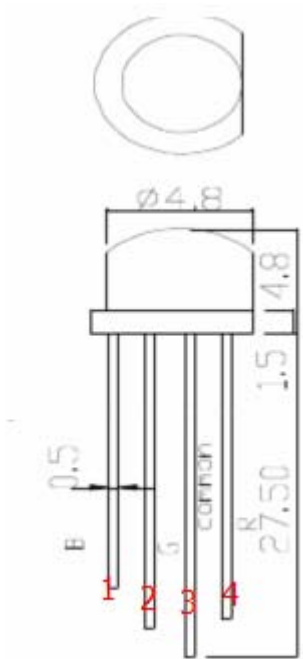
- λ Full-color module, Full color soft lights a lamp strip.
- λ LED decorative lighting, Indoor/outdoor LED video irregular screen.

### General description

5mm WS2811 chip built in led is a intelligent control LED light source that the control circuit and RGB chip are integrated in a package of F5 components. It internal include intelligent digital port data latch and signal reshaping amplification drive circuit. Also include a precision internal oscillator effectively ensuring the pixel point light color height consistent.

The data transfer protocol use single NZR communication mode. After the pixel power-on reset, the DIN port receive data from controller, the first pixel collect initial 24bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DO port. After transmission for each pixel, the signal to reduce 24bit. pixel adopt auto reshaping transmit technology, making the pixel cascade number is not limited the signal transmission, only depend on the speed of signal transmission.

## Mechanical Dimensions



## PIN function

| NO. | Symbol | Function description       |
|-----|--------|----------------------------|
| 1   | DIN    | Control data signal input  |
| 2   | VDD    | For Power supplier         |
| 3   | VSS    | Ground                     |
| 4   | DOUT   | Control data signal output |

### Absolute Maximum Ratings

| Parameter                      | Symbol    | Ratings            | Unit |
|--------------------------------|-----------|--------------------|------|
| Power supply voltage           | $V_{DD}$  | +3.5~+5.3          | V    |
| Input voltage                  | $V_I$     | -0.5~ $V_{DD}+0.5$ | V    |
| Operation junction temperature | $T_{opt}$ | -25~+80            | °C   |
| Storage temperature range      | $T_{stg}$ | -40~+105           | °C   |

### Electrical Characteristics ( $T_A=-20\sim+70^{\circ}C$ , $V_{DD}=4.5\sim5.5V$ , $V_{SS}=0V$ , unless otherwise specified)

| Parameter           | Symbol   | conditions          | Min         | Tpy  | Max         | Unit    |
|---------------------|----------|---------------------|-------------|------|-------------|---------|
| Input current       | $I_I$    | $V_I=V_{DD}/V_{SS}$ | —           | —    | $\pm 1$     | $\mu A$ |
| Input voltage level | $V_{IH}$ | $D_{IN}$ , SET      | $0.7V_{DD}$ | —    | —           | V       |
|                     | $V_{IL}$ | $D_{IN}$ , SET      | —           | —    | $0.3V_{DD}$ | V       |
| Hysteresis voltage  | $V_H$    | $D_{IN}$ , SET      | —           | 0.35 | —           | V       |

### Switching characteristics ( $T_A=-20\sim+70^{\circ}C$ , $V_{DD}=4.5\sim5.5V$ , $V_{SS}=0V$ , $F_{osc}=600KHZ$ )

| Parameter               | Symbol    | Condition                                           | Min | Tpy | Max | Unit    |
|-------------------------|-----------|-----------------------------------------------------|-----|-----|-----|---------|
| Transmission delay time | $t_{PLZ}$ | $CL=15pF, D_{IN} \rightarrow D_{OUT}, RL=10K\Omega$ | —   | —   | 300 | ns      |
| Fall time               | $t_{THZ}$ | $CL=300pF, O_{UTR}/O_{UTG}/O_{UTB}$                 | —   | —   | 120 | $\mu s$ |
| Input capacity          | $C_I$     | —                                                   | —   | —   | 15  | pF      |

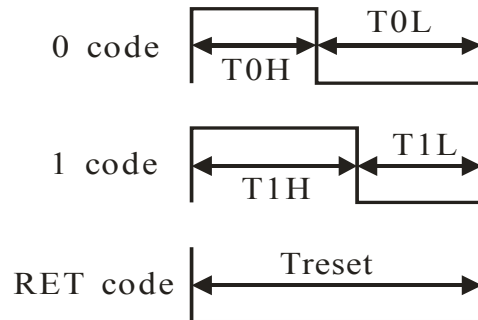
### RGB IC characteristic parameter

| Emitting color | Model   | Wavelength(nm) | Luminous intensity(mcd) | Voltage(V) |
|----------------|---------|----------------|-------------------------|------------|
| Red            | 13CBAUP | 620-625        | 400-500                 | 2.0-2.2    |
| Green          | 13CGAUP | 522-525        | 700-900                 | 3.0-3.4    |
| Blue           | 10R1MUX | 465-467        | 300-400                 | 3.0-3.4    |

Data transfer time(  $T_H+T_L=1.25\mu s\pm 600ns$ )

|     |                           |                  |             |
|-----|---------------------------|------------------|-------------|
| T0H | 0 code ,high voltage time | 0.35us           | $\pm 150ns$ |
| T1H | 1 code ,high voltage time | 0.9us            | $\pm 150ns$ |
| T0L | 0 code , low voltage time | 0.9us            | $\pm 150ns$ |
| T1L | 1 code ,low voltage time  | 0.35us           | $\pm 150ns$ |
| RES | low voltage time          | Above 50 $\mu s$ |             |

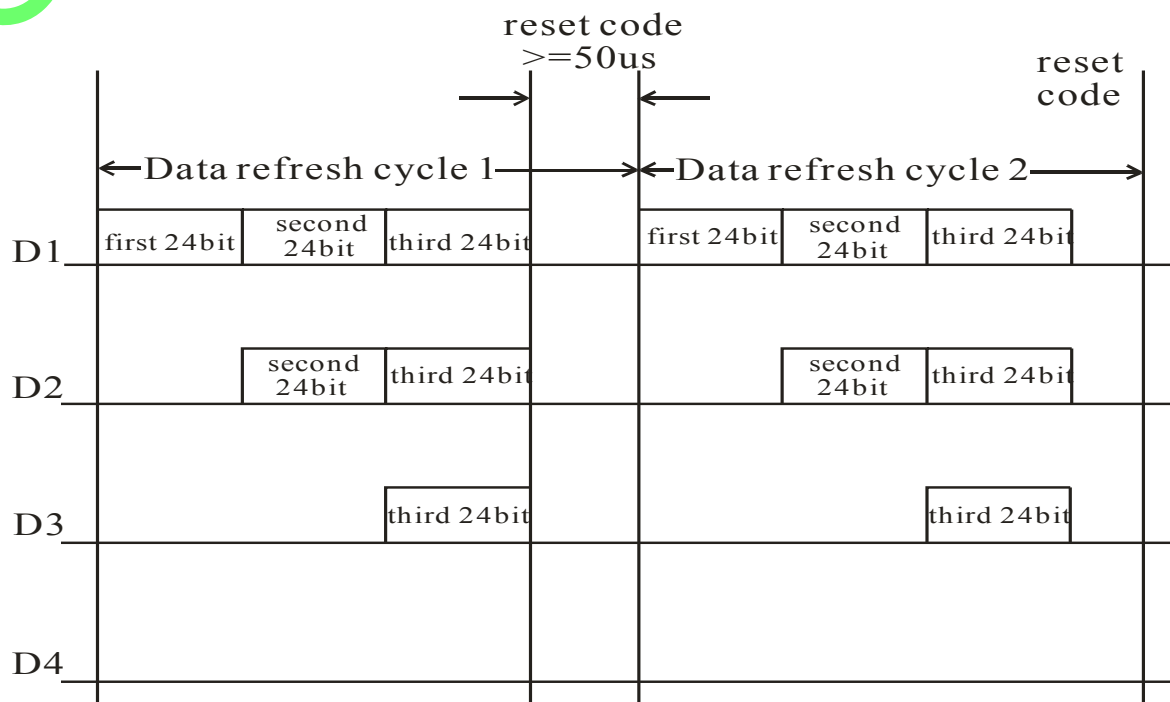
Sequence chart:



Cascade method:



Data transmission method:

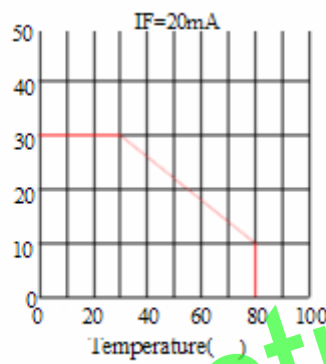
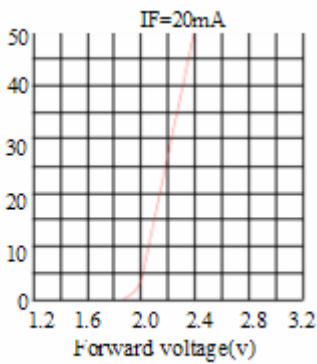


Note: The data of D1 is send by MCU, and D2, D3, D4 through pixel internal reshaping amplification to transmit.

**Composition of 24bit data:**

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

**Typical electrical-Optical Characteristics curves**



**Notes:**

The data are an typical presentation of the product, Contact customer service for details of technical information and warranty. The product is sensitive to static antistatic operation environment is recommended. Products are shipped in either bulk bag package or taping.

