



**Product NO: FZ2812-5050**





## Product Overview:

- The FZ2812-5050 is an intelligent external control LED light source that integrates a control circuit and a light-emitting circuit. Its appearance is the same as a 5050 LED bulb, and each element is a pixel. The interior of the pixel contains an intelligent digital interface data latch signal, a shaping and amplification driving circuit, an anti reverse connection circuit, a high-precision internal oscillator and a high-precision constant current control module, which effectively ensures the high consistency of the color of the light of the pixel. This LED has two-way signal transmission, which will not affect the overall color display in the case of single pixel damage.
- The data protocol adopts the communication mode of single line return to zero code. After the pixel is powered on and reset, the DIN end receives the data transmitted from the controller. The first 24-bit data sent is extracted by the first pixel, and sent to the data latch inside the pixel. The remaining data is shaped and amplified by the internal shaping processing circuit, transmitted and then output to the next cascaded pixel through the DO port. After each pixel transmitted, The signal is reduced by 24-bits. The pixel adopts automatic shaping and forwarding technology, so that the number of cascaded pixels is not limited by signal transmission, but only limited by the requirements of signal transmission speed.
- After the BIN end receives the data signal and devours 24-bit data, compare it with the DIN end data. If the DIN end has no signal, the BIN end has received the signal. Switch to the BIN end to receive the input signal to ensure that the damage of one IC will not affect the cascade transmission of the signal, and control the IC to remain in the receiving state of the BIN port until the next boot after power failure is reconfirmed.
- The port scanning frequency up to 2KHz will not flicker under the capture of an HD camera, which is very suitable for high-speed mobile products.
- Reset time above 250us will not cause false reset in case of interruption, and can support MCU with lower frequency and low price.



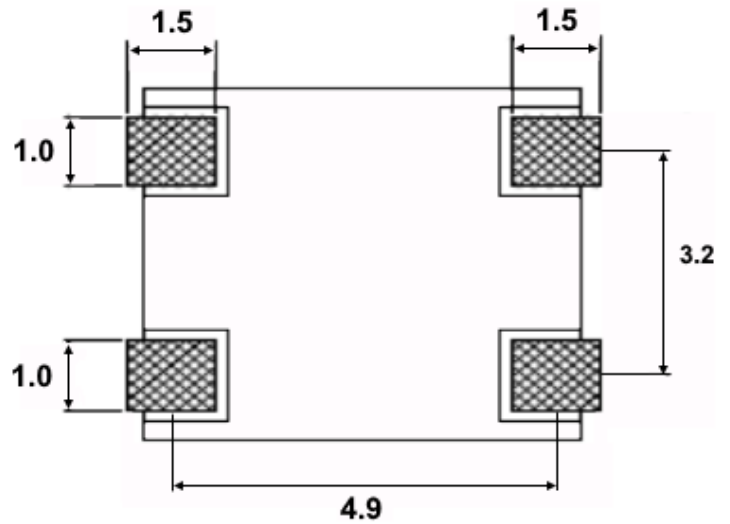
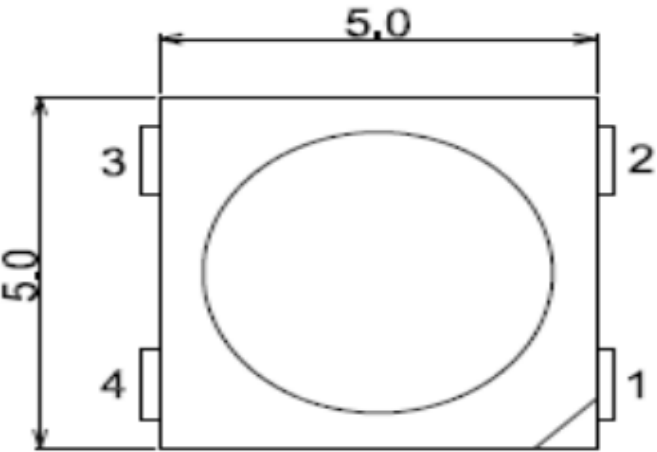
## **Main Features:**

- **All components are integrated in the 5050 package, and no other peripheral components are required to form a complete external control pixel.**
- **Intelligent reverse connection protection, 5V power supply will not damage components when connected reversely.**
- **Built in signal shaping circuit, any pixel receives the signal and then outputs it after waveform shaping to ensure that line waveform distortion will not accumulate.**
- **The three primary colors of each pixel can achieve 256 levels of brightness and complete the full truth color display of 16777216 colors.**
- **Port scanning frequency 2KHz / S**
- **Serial cascade interface can receive and decode data through a signal line.**
- **Breakpoint continuous transmission, an additional signal line is added to realize two-way signal transmission, which will not affect the overall display effect when a single pixel is damaged.**
- **When the transmission distance between any two points is no more than 5m, there is no need to add any circuit.**
- **When the refresh rate is not less than 1024 frames / second, the refresh rate is not less than 30.**
- **The data transmission speed can reach 800kbps, the color of light is highly consistent, and the cost performance is high.**

## **Application:**

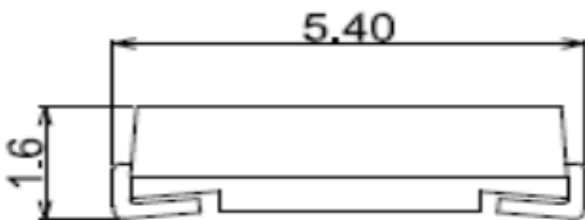
- **Led full-color luminous character lamp string, led full-color soft lamp strip, hard lamp strip, LED guardrail tube.**
- **LED point light source, LED pixel screen, LED special-shaped screen.**

**Mechanical Drawings:**

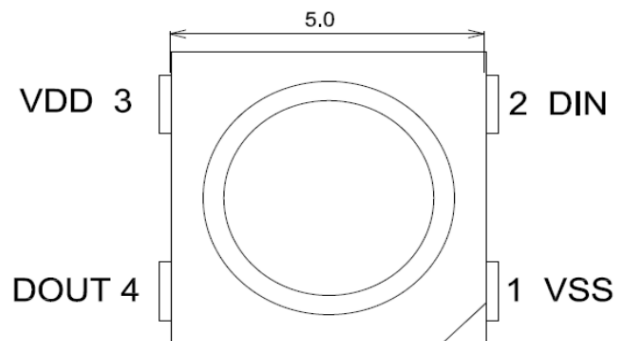


**Recommended land pattern  
(Top-down View)**

\*Dimensions are in mm



**Pin Assignment:**



## Electrical Characteristics:

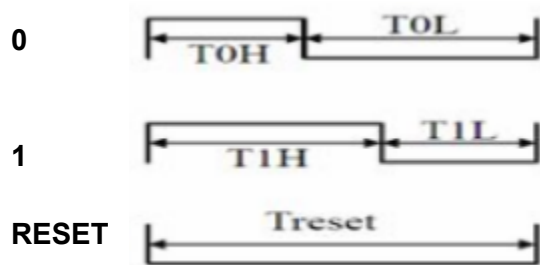
|                | Symbol | Min | Typical | Max | Unit | Note      |
|----------------|--------|-----|---------|-----|------|-----------|
| Work Voltage   | Vdd    | 3.0 | 5.0     | 7.0 | V    |           |
| Work Current   | Idd    | -   | 0.1     | 0.2 | mA   | No Load   |
| Push Current   | Iol    | -   | 25      | -   | mA   | @Vds+1.0V |
| Operation Temp | Temp   | 0   | 25      | 60  | °C   |           |

|                      | Symbol  | Test Current | Min  | Typical | Max  | Unit |
|----------------------|---------|--------------|------|---------|------|------|
| Leakage Current      | IR      | VR = 5V      | -    | 5       | -    | uA   |
| Angle                | 2 θ 1/2 | IF = 20mA    | -    | 120     |      |      |
| Brightness           | IV      | IF = 20mA    | 200  | -       | 400  | mcd  |
|                      |         |              | 1000 | -       | 1500 |      |
|                      |         |              | 200  | -       | 400  |      |
| Test Current         | IF      | -            | -    | 20      | -    | mA   |
| Wavelength           | CCT     | IF = 20mA    | 620  | -       | 625  | nm   |
|                      |         |              | 520  | -       | 525  |      |
|                      |         |              | 460  | -       | 425  |      |
| Crystallization Temp | TJ      | IF = 20mA    | -    | 125     | -    | °C   |
| Thermal Resistance   | RJP     | IF = 20mA    | -    | 8       | -    | °C/W |

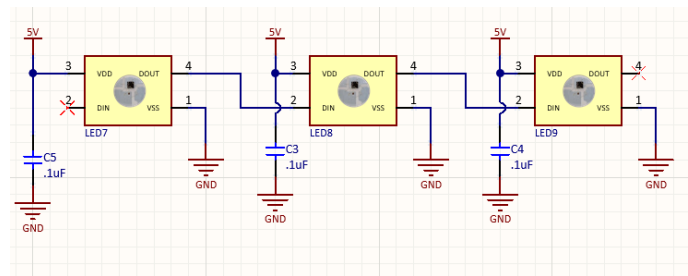
### Data Transmission Time:

|     |   |               |
|-----|---|---------------|
| T0H | 0 | 220ns - 480ns |
| T1H | 1 | 750ns - 2us   |
| T0L | 0 | 750ns - 2us   |
| T1L | 0 | 220ns - 480ns |
| RES | - | 300us         |

### Timing Waveform:



### Application Circuit:



### Reflow Instruction:

\*While not required, it is recommended to use .1uF caps for decoupling

|                                   | Lead-Containing Reflow Soldering | Lead-Free Reflow Soldering |
|-----------------------------------|----------------------------------|----------------------------|
| Minimum Preheating Temperature    | 100°C                            | 150°C                      |
| Maximum Preheating Temperature    | 150°C                            | 200°C                      |
| Preheating Zone Time              | 60s - 120s                       | 60s - 180s                 |
| Average Heating Rate              | <3°C/S                           | <3°C/S                     |
| Liquid Phase Temperature          | 183°C                            | 217°C                      |
| Holding Time In Liquid Phase Zone | 60s - 150s                       | 60s - 150s                 |
| Peak Temperature                  | 215°C                            | 245°C                      |

## Reflow Instruction (Cont.):

|   | Lead-Containing Reflow Soldering | Lead-Free Reflow Soldering |
|---|----------------------------------|----------------------------|
| Residence Time In High Temperature Zone (Peak Temperature - 5 °C) | <10S                             | <10S                       |
| Cooling Rate  | <6°C/S                           | <6°C/S                     |
| Residence Time From Room Temperature To Peak Temperature          | <6min                            | <6min                      |

## Transportation, Storage and Use:

- **SMD LED material structure is susceptible to absorb moisture in the air. The moisture absorption of the product can cause the deterioration of product quality. Symptoms of moisture damage can include reduced brightness when powered on. Moreover, if the moisture absorption is uneven, reflow soldering at too high of temperatures will cause great stress damage.**
- **The storage condition of the product after sealing in the anti-static aluminum foil bag is 5-30 °C, the humidity is less than 60% RH, and the storage period is 3 months. When it needs to be baked again for more than 3 months, it can be opened for use. The baking condition is 70 ± 5 °C, 6h. The bulk products have been disassembled (not on the carrier belt or disc), and the baking condition is 150 °C ± 5 °C for 3h. The product must be used within 24 hours after opening the sealed packaging bag. The unused products must be stored in the drying oven or 70 °C oven. The product is an electrostatic sensitive device. Static electricity and surge can damage SMD LED devices. Attention should be paid to anti-static protection during use. High brightness will hurt people's eyes. Pay attention to avoid direct light-emitting devices to people's eyes.**



### Soldering Conditions:

|                | Temperature | Time  | Power |
|----------------|-------------|-------|-------|
| Soldering Iron | °C300≤      | ≤2sec | ≤25W  |

### Reflow Soldering Temperature Zone Setting:

|               |               |               |               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 130°C/<br>45s | 150°C/<br>45s | 170°C/<br>45s | 190°C/<br>45s | 220°C/<br>45s | 235°C/<br>45s | 180°C/<br>45s | 150°C/<br>45s |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|