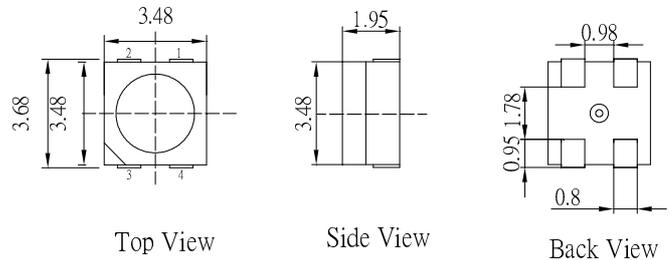


■Features

- Intelligent reverse connect protection, the power supply reverse connection does not damage the IC.
- The control circuit and the LED share the only power source.
- Control circuit and RGB chip are integrated in a package of 3535 components, form a complete control of pixel point.
- Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate.
- Built-in electric reset circuit and power lost reset circuit.
- Each pixel of the three primary color can achieve 256 brightness display, completed 16777216 color full color display, and scan frequency not less than 2000KHz
- The reception and decoding of cascading data can be completed by a Serial Interface.
- Any two point the distance more than 3m transmission signal without any increase circuit.
- When the refresh rate is 30fps, cascade number are not less than 1024 points.
- Send data at speeds of 800Kbps.
- The color of the light were highly consistent, cost-effective..

■Outline Dimension



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

Unit: mm
Tolerance: ±0.20mm
unless otherwise noted

■Applications

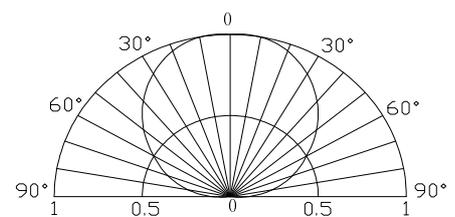
- LED decorative lighting, Indoor/outdoor LED video irregular screen
- Full-color module, Full color soft lights a lamp strip.

■Absolute Maximum Rating

(Ta=25°C)

| Item | Symbol | Value | 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 | T _{stg} | -40 ~ +105 | °C |

■Directivity



■Electrical Characteristics (Ta=20~+70°C, VDD=4.5~5.5V, Vss=0V, unless otherwise specified)

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---------------------|-----------------|------------------------------------|--------------------|------|---------------------|------|
| Input current | I _I | V _I =V _{DD} /V | - | - | ±1 | μA |
| Input voltage level | V _{IH} | D _{IN} , SET | 0.7V _{DD} | - | - | V |
| | V _{IL} | D _{IN} , SET | - | - | 0.3 V _{DD} | |
| Hysteresis voltage | V _H | D _{IN} , SET | - | 0.35 | - | |

■ **Switching characteristics** (TA=-20~+70°C , VDD=4.5~5.5V, VSS=0V, unless otherwise specified)

| Parameter | Symbol | Condition | Min | Tpy | Max | Unit |
|-------------------------|------------------|--------------------------|-----|-----|-----|------|
| Transmission delay time | t _{PLZ} | CL=15pF, DIN→DO, RL=10KΩ | — | — | 300 | ns |
| Fall time | t _{FHZ} | CL=300pF, OUTR/OUTG/OUTB | — | — | 120 | μs |
| Input capacity | C _i | — | — | — | 15 | pF |

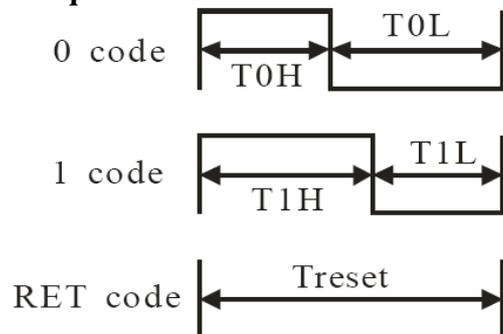
■ **LED characteristic parameter**

| | Ref. Value |
|---|------------|
| Quiescent Current | 0.7mA |
| RGB Channel Constant Current | 16mA |
| RED Brightness (Central Value) | 600mcd |
| GREEN Brightness (Central Value) | 1200mcd |
| BLUE Brightness (Central Value) | 300mcd |
| WHITE Brightness (Central Value) | 2100mcd |
| RED Wavelength | 620-630nm |
| GREEN Wavelength | 520-530nm |
| BLUE Wavelength | 465-475nm |

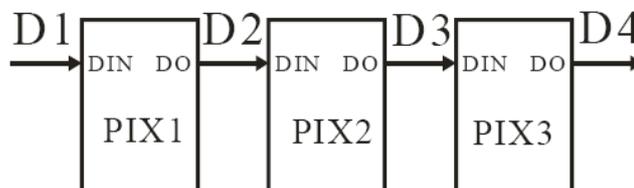
■ **Data transfer time**

| | | |
|-----|---------------------------|-------------|
| T0H | 0 code, high voltage time | 220ns~380ns |
| T1H | 1 code, high voltage time | 580ns~1.6μs |
| T0L | 0 code, low voltage time | 580ns~1.6μs |
| T1L | 1 code, low voltage time | 220ns~420ns |
| RES | low voltage time | > 280μs |

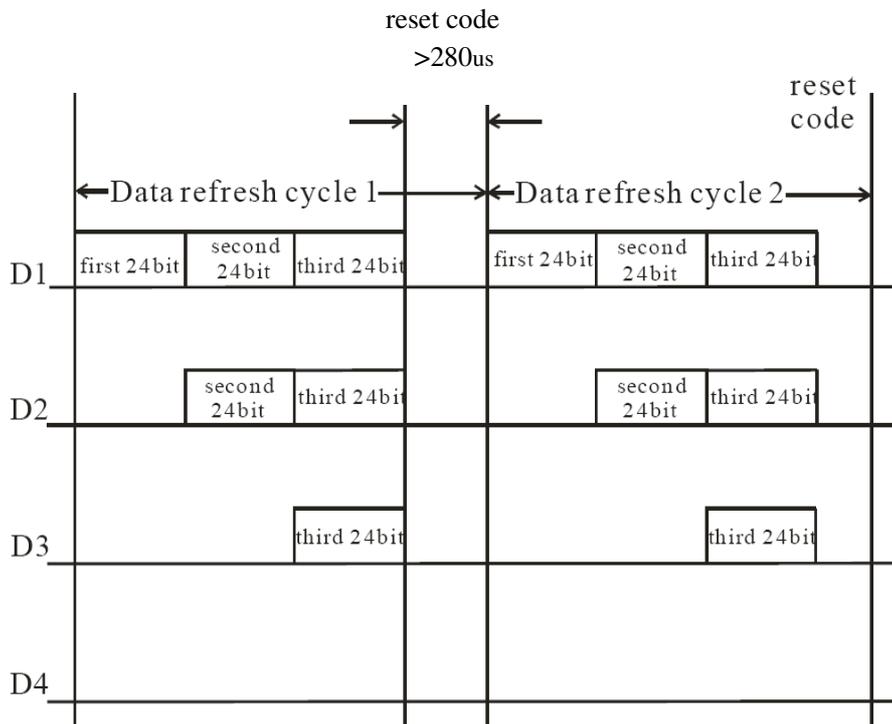
■ **Sequence chart:**



■ **Cascade method:**



■Data transmission method:



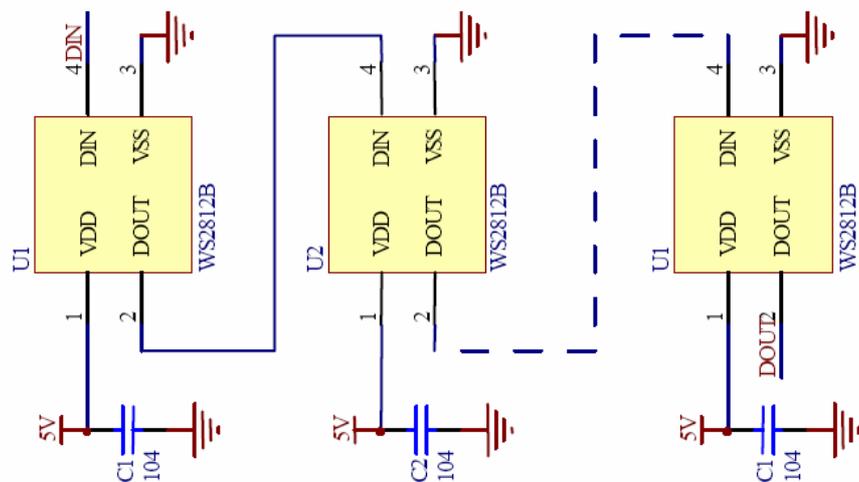
Note: The data of D1 is send by MCU,and D2, D3, D4 through pixel internal reshaping amplification to transmit.

■Composition of 24bit data:

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

Note: Follow the order of GRB to send data and the high bit sent at first.

■Typical application circuit:



■ **How to control OSTW3535C1A(WS281X)with Arduino:**

The arduino to control all the lights bead mainly use a named “Adafruit_NeoPixel - master” file package, you can click this web https://github.com/adafruit/Adafruit_NeoPixel download it. and you can also click this web <http://www.tuicool.com/articles/IbaAJbE> download. If you have to download this file, Unzip each library, remove the “-master” from the name of the folder then put the files in [here](#)!(Ps:Ok, explain here I think it’s so easy, but for the arduino fresh user, this is very necessary and important!!)

This file is a sealed the function library and mainly use in module has the follow functions.Then i will be an example to explain its used several functions.

```
#include "Adafruit_NeoPixel.h"
```

```
// First you should include the header file in the beginning of the program!
```

```
#define PIN 6
```

```
#define led_numbers 8
```

```
// This define the pin number connected of pixels in strip and you control the pixels number
```

```
// Parameter 1 = number of pixels in strip
```

```
// Parameter 2 = pin number (most are valid)
```

```
// Parameter 3 = pixel type flags, add together as needed:
```

```
// NEO_KHZ800 800 KHz bitstream (most NeoPixel products w/WS2812 LEDs)
```

```
// NEO_KHZ400 400 KHz (classic 'v1' (not v2) FLORA pixels, WS2811 drivers)
```

```
// NEO_GRB Pixels are wired for GRB bitstream (most NeoPixel products)
```

```
// NEO_RGB Pixels are wired for RGB bitstream (v1 FLORA pixels, not v2)
```

```
Adafruit_NeoPixel strip = Adafruit_NeoPixel(led_numbers, PIN, NEO_GRB + NEO_KHZ800);
```

```
// 1.In this functions the led_numbers is number of sequential NeoPixels in the strip, if you want //modify number can change it then actual using.
```

```
// 2.PIN represents and development board which one port, even by arduino board should be as //same as the above the port you can set it to your chosen port.
```

```
// 3.A value indicating the type of NeoPixels that are connected,this example just being extra //descriptive.If you have a supply of classic “V1” Flora pixels, those require NEO_KHZ400 + NEO_RGB to be //passed here.
```

```
void setup()
```

```
{
```

```
strip.begin();
```

```
strip.show();
}
// This function only perform step, the strip.begin() to prepare the for NeoPixels output. About //strip.show() is not necessary,
that function mainly pushes data out to the pixels, in this station the //pixels no color. This is to initialize all pixels for "off" .
void loop()
{
  uint8_t i=0,a=0;
  uint32_t color = strip.Color(R, G, B);
  while(a<10)
  {
    for(i=0;i<9;i++)
    {
      if(i==a) strip.setPixelColor(i, color);
      else strip.setPixelColor(i, 0);
    }
    strip.show();
    delay(50);
    a++;
  }
}
```

1. strip.Color(R, G, B) in this function is set up the pixels color,you can set up the number 0-255, the 255 is pixels maximum brightness, for example we can set strip.Color(255, 255, 0) the main is set red and blue color maximum brightness .

2. strip.setPixelColor(i, color) in this function the 'i' is the pixels numbers along the strip, in this examples the 'i' numbered 0 through 8. If you want the ninth pixels lit you shout set the 'i' number is 8, this color is set of in the strip. Color(R, G, B),it is a 32-bit that merges the red ,green and blue values. If you want change the color you can change the R,G,B values.

3. strip.show(), this function is output once you set up the color, if not have time delay the color appear jumpy station. So suggest if you want the pixels output smooth you can give the function are delayed.

To this the function is used by the example is introduced, this program will appear color flow effect. If you change the program a little the result will be change. For the above explanation is insufficient, please reference <https://learn.adafruit.com/adafruit-neopixel-uberguide/arduino-library>

■ General descriptionC

OSTW3535C1A is a intelligent control LED light source that the control circuit and RGB chip are integrated in a package of 5050 components. It internal include intelligent digital port data latch and signal reshaping amplification drive circuit.

Also include a precision internal oscillator and a 12V voltage programmable constant curre-nt control part, 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 resha-ping transmit technology, making the pixel cascade number is not limited the signal transmission, only depend on the speed of signal transmission. RESET time>280 μs , it won't cause wrong reset while interruption, it supports the lower frequency and inexpensive MCU. Refresh Frequency updates to 2KHz, Low Frame Frequency and No Flicker appear in HD Video Camera, it improve excellent display effect.

LED with low driving voltage, environmental protection and energy saving, high brightness, scattering angle is large, good consistency, low power, long life and other advantages.

The control chip integrated in LED above becoming more simple circuit, small volume, convenient installation.

■Storage

· Storage Conditions

Before opening the package:

The LEDs should be kept at 30°C or less and 60%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material (silica gel) is recommended.

· After opening the package:

Soldering should be done right after opening the package (within 24hrs).

Keeping of a fraction, sealing and Temperature: 5~30°C Humidity: Less than 30%.

If the package has been opened more than 24Hours, components should be dried for 12hrs, at 60±5°C.

· Optosupply LED electrode sections are comprised of a silver plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid conditions which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration may cause difficulty during soldering operations. It is recommended that the User use the LEDs as soon as possible.

· Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

■Soldering Heat Reliability :

Reflow soldering Profile

· Reflow soldering should not be done more than two times.

· When soldering, do not put stress on the LEDs during heating.

· After soldering, do not warp the circuit board.

· Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the

characteristics of the LEDs will or will not be damaged by repairing.

| Solder=Low Lead Free |
|---|
| Average ramp-up rate = 3°C/sec. max. |
| Preheat temperature: 160°~200°C |
| Preheat time = 120 sec. max. |
| Ramp-down rate = 6°C/sec. max. |
| Peak temperature = 245°C max. |
| Time within 3°C of actual peak temperature = 25 sec. max. |
| Duration above 220°C is 40 sec. max. |

