

Datasheet

LED Strip Specification

LED strip type:
WS2812B

Description:
WS2812B Digital Full-Color 5050 LED



Date:
11-7-2015

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Features and benefits

- 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 5050 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 400Hz/s.
- Cascading port transmission signal by single line.
- Any two point the distance more than 5m transmission signal without any increase circuit.
- When the refresh rate is 30 fps, cascade number are not less than 1024 points.
- Send data at speeds of 800 kbps.
- The color of the light were highly consistent, cost-effective.

Applications

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

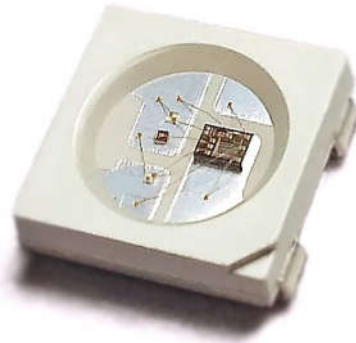
General description

WS2812B 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 current control part, effectively ensuring the pixel point light color height consistent.

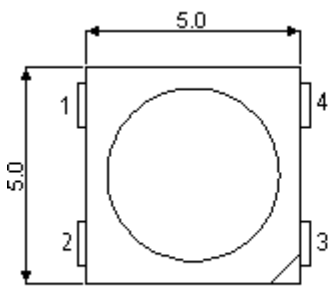
The data transfer protocol use single NZR communication mode. After the pixel power-on reset, the DIN port receive data from controller, the first pixel collect initial 24bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DOOUT 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.

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.

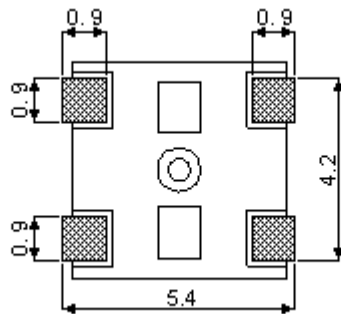
Photo



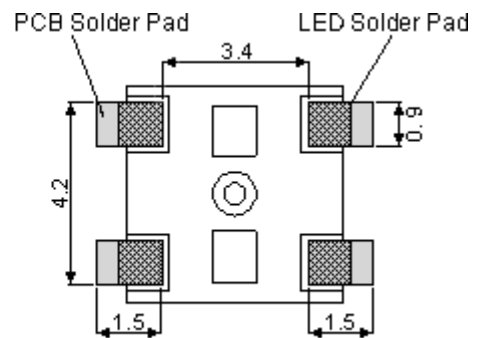
Mechanical dimensions



Top View



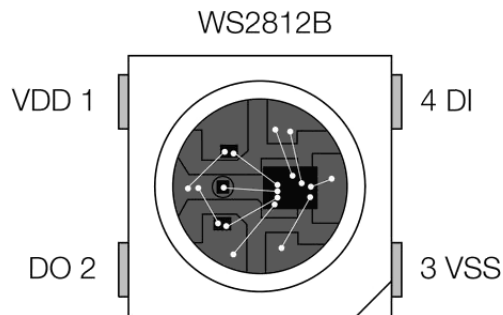
Back View



Solder Pad

Unit = mm

Pin configuration



Pin function

Pin number	Symbol	Function description
1	VDD	Power supply LED
2	DO	Control data signal output
3	VSS	Ground
4	DI	Control data signal input

Absolute maximum ratings

Parameter	Symbol	Ratings	Units
Power supply voltage	VDD	+3.5 to 5.3	V
	VI	-0.5 VDD +0.5V	V
Operating junction temperature	Topt	-25 to +80	°C
Storage temperature	Tstg	-40 to +105	°C

Electrical Characteristics

(TA=-20°C to +70°C, VDD=4.5V to 5.5V, VSS=0V, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typical	Max	Unit
Input current	II	VI=VDD/VSS			±1	µA
Input voltage level	VIH	DI, SET	0.7			VDD
	VIL	DI, SET		0.3		VDD
Hysteresis voltage	VH	DI, SET		0.35		V

Switching characteristics

(TA=-20°C to +70°C, VDD=4.5V to 5.5V, VSS=0V, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typical	Max	Unit
Transmission delay time	tPLZ	CL=15pF, DI to DO, RL=10KΩ			300	µs
Fall time	tTHZ	CL=300pF, OUTR/OUTG/OUTB			120	µs
Input capacity	CI				15	pF

RGB IC characteristic parameter

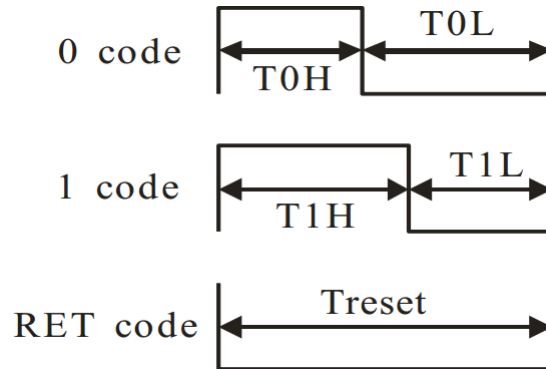
Emitting color	Model	Wavelength (nm)	Luminous intensity (mcd)	Voltage (V)
Red	13CBAUP	620 to 625	390 to 420	2.0 to 2.2
Green	13CGAUP	522 to 525	660 to 720	3.0 to 3.4
Blue	10R1MUX	465 to 467	180 to 200	3.0 to 3.4

Data transfer time

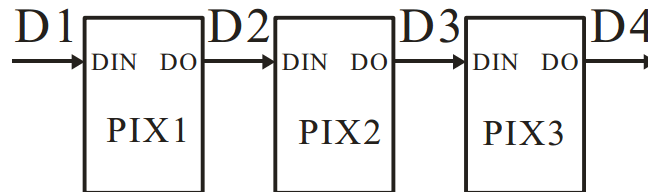
(TH+TL=1.25µs ±600ns)

Parameter	Conditions	Time	Tolerance
T0H	0 code, high voltage time	0.4µs	±150ns
T1H	1 code, high voltage time	0.8µs	±150ns
T0L	0 code, low voltage time	0.85µs	±150ns
T1L	1 code, low voltage time	0.45µs	±150ns
RES	low voltage time	Above 50µs	

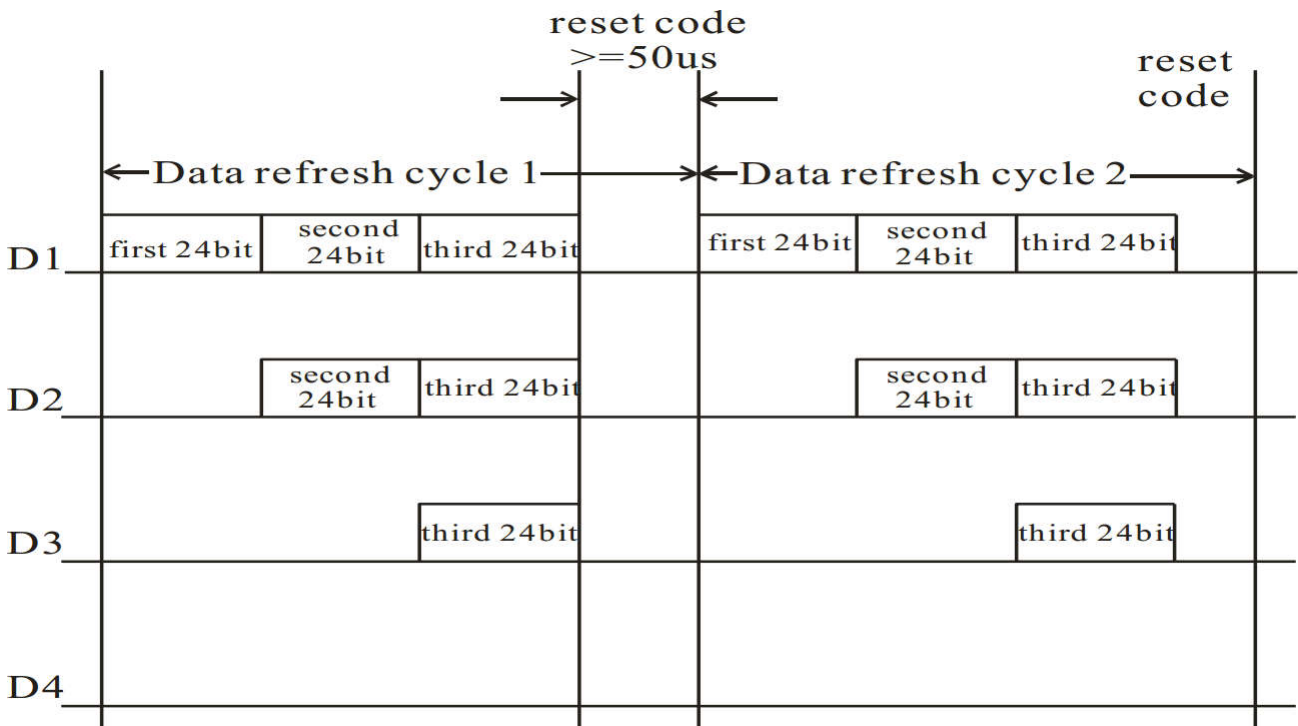
Sequence chart



Cascade method



Data transmission method

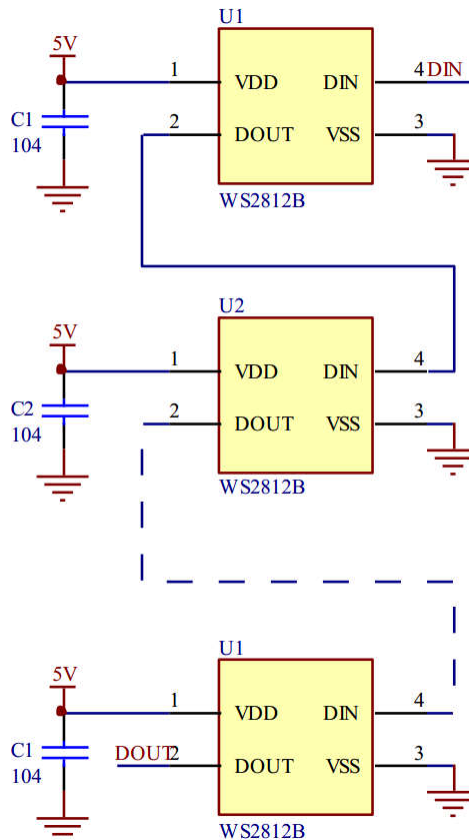


Note: The data of D1 is send by MCU, and D2, D3, D4 through pixel internal reshaping amplification to transmit.

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
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Typical application circuit



Certificate of Conformity:

EC Council Directive 2004/108/EC
Electromagnetic Compatibility
Registration No.: ATE20120944

Complies to the Standards:

- EN 55015: 2006 + A1: 2007 + A2: 2009
- EN 61000-3-2: 2006 + A1: 2009 + A2: 2009
- EN 61000-3-3: 2008
- EN 61547: 2009

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