

Neopixel - WS2812B RGB LEDs

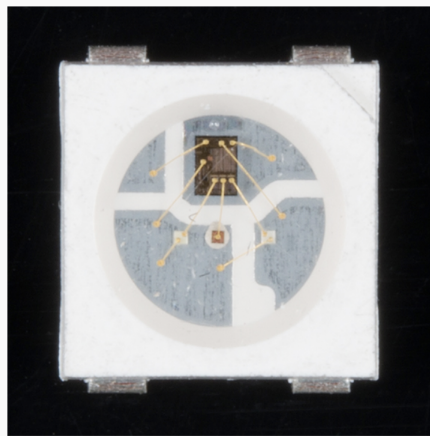
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Overview

What makes the WS2812B really special is the way its controlled. The IC embedded into the LED communicates via a very **unique one-wire** interface. With the help of some libraries, they're really very easy to control. Plus they're chain-able -- the output of one LED can be connected to the input of another to create strips of hundreds of LEDs. The more boards you have linked together, the fancier your animations can be!

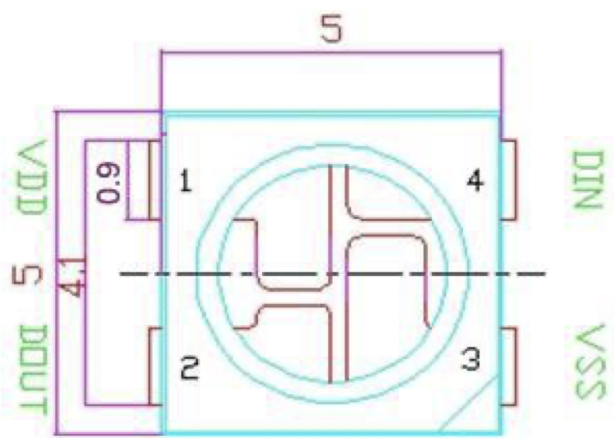


Pretty nifty view at the guts of the WS2812.



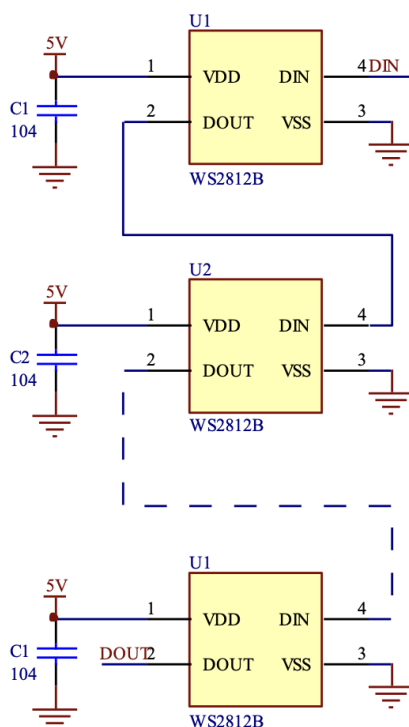
Another nifty view for the WS2812B.

Pinout



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

Typical Application



Best Practices

- Before connecting NeoPixels to any large power source (DC “wall wart” or even a large battery), add a **capacitor** (500–1000 μF at 6.3V or higher) across the + and – terminals as shown above. The capacitor buffers sudden changes in the current drawn by the strip.
- Place a **300 to 500 Ohm resistor** between the Arduino data output pin and the input to the first NeoPixel. The resistor should be at the end of the wire closest to the NeoPixel(s), not the microcontroller. *Some products already incorporate this resistor...if you're not sure, add one...there's no harm in doubling up! Also, newer NeoPixels are less picky about this.* Nothing's needed at the “out” end of a strip...you can leave the data out “floating.”
- Try to **minimize the distance** between the Arduino and first pixel, so the signal is clear. A meter or two is usually no problem. Much longer and things can become unreliable. *Individual NeoPixels can act as repeaters for long runs.*
- **Avoid connecting NeoPixels to a live circuit.** If you simply *must*, always **connect ground first**, then +5V, then data. Disconnect in the reverse order.
- If powering the pixels with a separate supply, apply power to the pixels before applying power to the microcontroller. Otherwise they'll try to power “parasitically” through the data line, which could spell trouble for the microcontroller.
- Observe the same precautions as you would for any **static-sensitive** part; ground yourself before handling, etc.
- NeoPixels powered by 5v ideally need a 5V data signal. **If using a 3.3V microcontroller you must use a logic level shifter** such as a [74AHCT125](#) or [74HCT245](#). See the “**Logic Level Shifting**” page for more details. If you are powering your NeoPixels with 3.7v directly from a LiPoly cell, a 3.3v data signal is OK.
- Make sure that your connections are secure. Alligator clips do not make reliable connections to the tiny solder pads on NeoPixel rings. Better to solder a small pigtail wire to the ring and attach the alligator clips to that.

- If your microcontroller and NeoPixels are powered from two different sources (e.g. separate batteries for each), **there *must* be a ground connection between the two.**

References

Reference	URL
Datasheet	https://cdn-shop.adafruit.com/datasheets/WS2812B.pdf
WS2812 Breakout Hookup Guide	https://learn.sparkfun.com/tutorials/ws2812-breakout-hookup-guide#ws2812-hardware-overview
Best Practices	https://learn.adafruit.com/adafruit-neopixel-uberguide/best-practices