

Description

The RGBdigit consists of an empty 1" housing (see Package Dimensions) therein is a by RGBDigit.com designed PCB and a black stencil, glued with a transparent two-component epoxy which ensures that the PCB remains well in place and has a minimum possible crosstalks between the different segments.

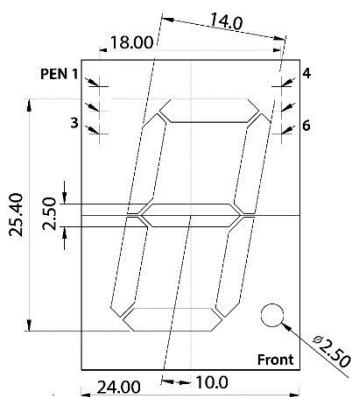
With a serial control on Pin 2 Data-in and data-out Pin 5 can with the appropriate library Arduino (Adafruit NeoPixel) provide each segment with a color. Each segment has an R, G, B LEDs that can be adjusted in 255 steps and therefore 16,581,375 color combinations are available for each segment of the digit.

Also, the ability to control the brightness for all LED's driven at 255 steps within the library. It should be noted that my experience is that I rarely use brightness values above 80. Also in color mixing the three colors seldomly are equally brightly lit. These two arguments results in a moderate power consumption.

RGBDigit features

- Digit size 1" = 25.40 mm
- Housing size 34.00 x 24.00 mm
- Full RGB colour Segment 0 to 255 16581375 gives colour combination's
- Adjustable brightness 0 to 255
- Simple wiring 3 in 3 out per digit
- 5V USB power supply
- Low power consumption see graph 1
- **Adafruit Arduino NeoPixel library driven**
- Black top surface with white diffused segments.
- Up to 10 digits cascading when using brightness < 80 and no full white color's

Package Dimensions



Notes:

1. All dimensions are in millimeter.
2. Unless otherwise stated, the tolerance is ± 0.25 mm.

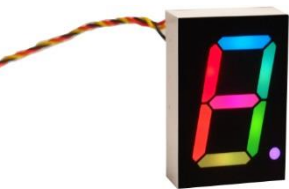
Pin function

Pin 1	5 V	Pin 4	5 V
Pin 2	Data in	Pin 5	Data out
Pin 3	GND	Pin 6	GND

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power supply voltage	VDD	+3.5~+5.3	V
Input voltage	VI	-0.5~VDD+0.5	V
Operation junction temperature	Topt	-25~+80	°C
Storage temperature range	Tstg	-55~+150	°C





Tech specs

- Up to 10 digits cascading when using brightness < 80
- Moderate Low power consumption at normal brightness use (set Brightness < 80) see graph 1
- Driven by **Adafruit NeoPixel Arduino library**
- Each segment of the RGBDigit's 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.
- Send data at speeds of 800Kbps.
- Each 1" RGBDigit contains 8 5050 RGB LED with Integrated Driver Chip

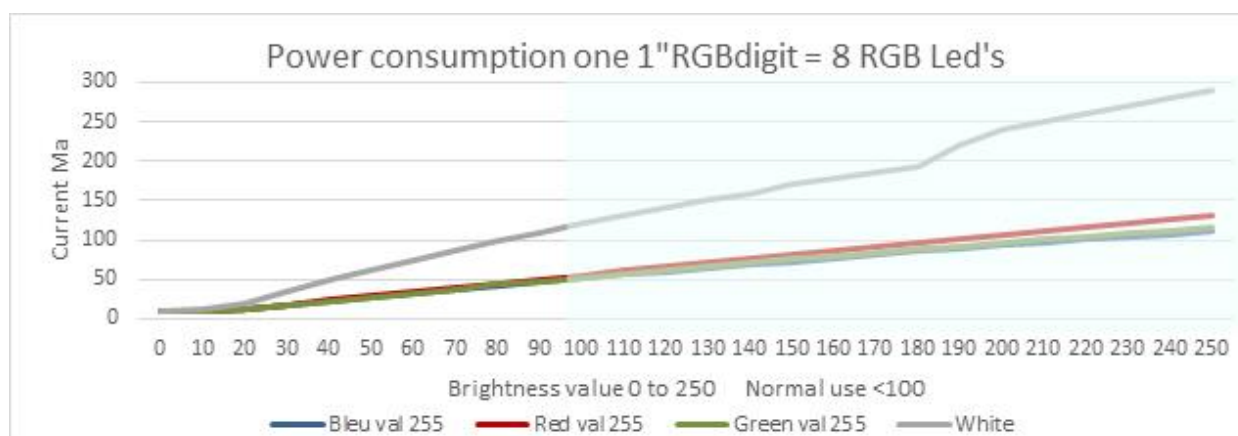
Safety regulation for proper use

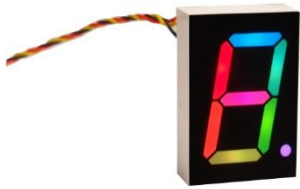
- See section Maximum Ratings for **Absolute Maximum Ratings**.
- Assure yourself that you connect the digit Pin's in the right order see Pin fuction table.
- Try not to connect the digit's to a live Arduino **ALWAYS POWER OFF**.
- When connecting NeoPixels to any live power source or microcontroller, **ALWAYS CONNECT GROUND** Pin 3 (-) BEFORE ANYTHING ELSE. Conversely, disconnect ground last when separating.

Note: Try to avoid this situation.

- Adding a +/- 470 ohm resistor between your microcontroller's data Pin2 and the data input on the first Digit can help prevent spikes on the data line that can damage your first pixel. Please add one between your micro and NeoPixels! Between the digit's no resistor is necessary.
- For more detailed safety/connection data See <https://learn.adafruit.com/adafruit-neopixel-uberguide/arduino-library>

graph 1





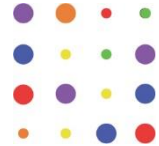
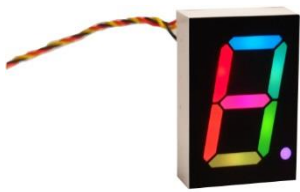
RGBDigit datasheet
1" full color single 7 Segment digit
Adafruit NeoPixel Arduino library driven



Electrical Characteristics (TA=-20~+70°C, VDD=4.5~5.5V,VSS=0V,unless otherwise specified)						
Parameter	Symbol	conditions	Min	Typ	Max	Unit
Input current	II	VI=VDD/VSS	—	—	±1	μ A
Input voltage level	VIH	DIN, SET	0.7VDD	—	—	V
	VIL	DIN, SET	—	—	0.3 VDD	V
Hysteresis voltage	VH	DIN, SET	—	0.35	—	V

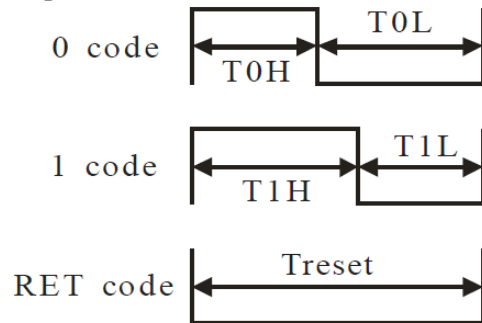
Switching characteristics (TA=-20~+70°C, VDD=4.5~5.5V,VSS=0V,unless otherwise specified)						
Parameter	Symbol	conditions	Min	Typ	Max	Unit
Operation frequency	Fosc2	—	—	800	—	KHz
Transmission delay time	tPLZ	CL=15pF,DIN→ DOUT,RL=10KΩ	—	—	300	ns
Fall time	tTHZ	CL=300pF,OUTR/O U TG/OUTB	—	0.35	120	μ s
Data transmission rate	FMAX	Duty ratio50%	400	—	—	Kbps
Input capacity	CI	—	—	—	—	pF



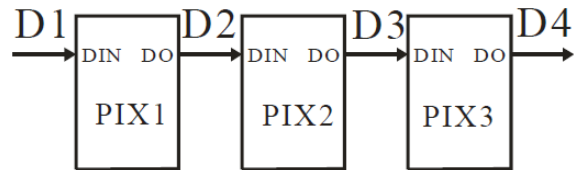


Data transfer time (TH+TL=1.25 μ s \pm 150ns)			
T0H	0 code ,high voltage time	0.4us	\pm 150ns
T1H	1 code ,high voltage time	0.85us	\pm 150ns
T0L	0 code , low voltage time	0.85us	\pm 150ns
T1L	1 code ,low voltage time	0.4us	\pm 150ns
RES	low voltage time	Above 50 μ s	

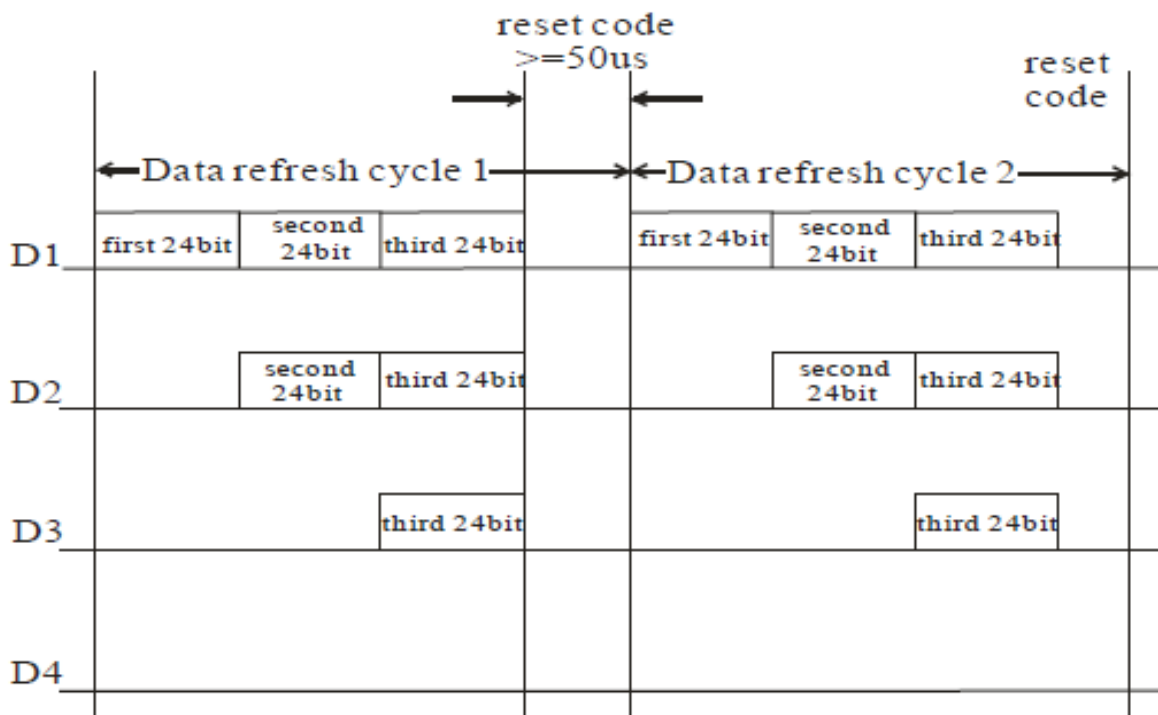
Sequence chart:



Cascade method:

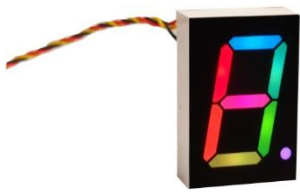


Data transmission method :



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





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

Typical application circuit:

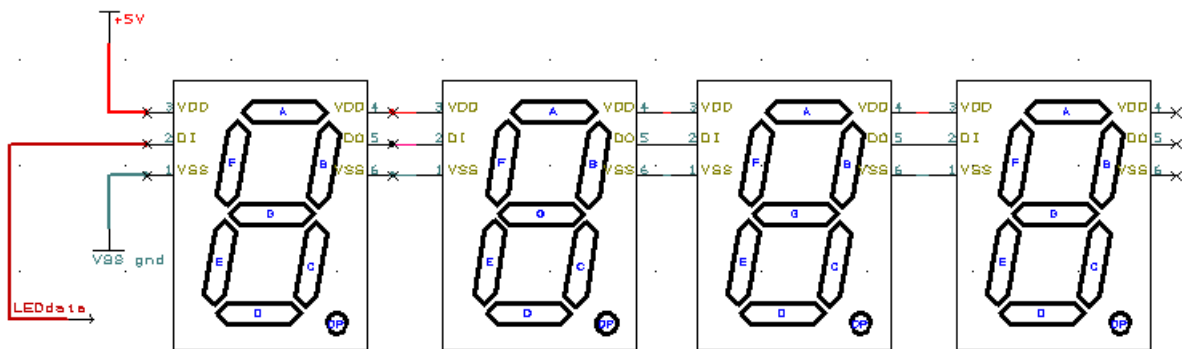


Table of Authorities

- <https://learn.adafruit.com/adafruit-neopixel-uberguide/arduino-library>
 - Download Adafruit Arduino library at
 - https://github.com/adafruit/Adafruit_NeoPixel
 - <http://www.adafruit.com/datasheets/WS2812B.pdf>
 - <http://www.world-semi.com/en/>
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