WS2814F

Single Line256Grayscale four channels Constant currentleddriveIC

Main Features

- **R,G,B,W**Output port withstand voltage20V,DINPort withstand voltage9V.
- The chip has a built-in voltage regulator.24VThe following power supplies only need to connect resistors toIC VDDNo external voltage regulator tube is required.
- Built-in signal shaping circuit, any pixel receives a signal and then outputs it after waveform shaping, ensuring that line waveform distortion will not accumulate.
- Built-in power-on reset and power-down reset circuits.
- PWMThe control end can achieve256Level adjustment, scanning frequency2KHz.
- The serial cascade interface can complete data reception and decoding through one signal line.
- The transmission distance between any two points does not exceed2No additional circuit is required.
- The color of light is highly consistent and cost-effective.
- When the refresh rate30Frames/second, the number of cascades is not less than1024point.
- Data transmission speed can reach800Kbps.

Main application areas

- ledFull color luminous character light string,ledFull color soft light bar hard light bar,ledGuardrail pipe.
- ledPoint light source,ledPixel screen,ledSpecial-shaped screen.

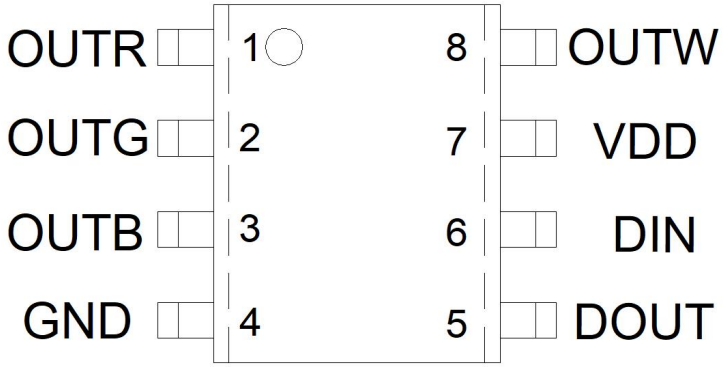
Product Overview

WS2814It is a four-channelledDrive control dedicated circuit, the chip contains intelligent digital interface data latch signal shaping amplification drive circuit, High-precision internal oscillator and20VHigh-voltage programmable constant current output driver and high-precision constant current control module effectively ensure the pixel The color of the point light is highly consistent.

The data protocol uses a single-line return-to-zero code communication method. After the chip is powered on and reset,DINThe end receives the data transmitted from the controller and first sends Coming32bitAfter the data is extracted by the first chip, it is sent to the data latch inside the chip, and the remaining data is shaped and amplified by the internal shaping circuit. After the bigDOThe port starts forwarding the output to the next cascaded pixel point. After each pixel point is transmitted, the signal decreases.32bit. Chip uses The automatic shaping and forwarding technology makes the cascade number of the pixel points not limited by the signal transmission, but only limited by the signal transmission speed requirement.

The data latch inside the chip is based on the received32bitData, inOUTR,OUTG,OUTB,OUTWThe control end generates different Duty cycle control signal, waitingDINTerminal InputRESETWhen a signal is received, all chips will send the received data to each segment synchronously. After the end, new data is received again.32bitAfter the data isDOThe port forwards data. The chip does not receiveRESETBefore the code, OUTR,OUTG,OUTB,OUTWThe original output of the pin remains unchanged.**280μs**Above low level**RESET**After the code is Received32bit PWMData pulse width output toOUTR,OUTG,OUTB,OUTWOn the pin.

Terminal arrangement



Lead-out terminal function

Pin Number	symbol	Pin Name	Functional Description
1	OUTR	ledDriver Output	RED(red)PWMControl output
2	OUTG	ledDriver Output	GREEN(green)PWMControl output
3	OUTB	ledDriver Output	BLUE(blue)PWMControl output
4	GND	land	Signal ground and power ground
5	DOUT	Data Output	Display data cascade output
6	DIN	Data Entry	Display data input
7	VDD	Logic Power Supply	ICpowered by
8	OUTW	ledDriver Output	WHITE(white)PWMControl output

Maximum Ratings（T_A=25°C,V_{SS}=0V）

parameter	symbol	scope	unit
Logic supply voltage	V_{DD}	+3.7~+5.3	V
Logic input voltage	V_I	VDD-0.7~VDD+0.7	V
R,G,B,WOutput port withstand voltage	Vout	20	V
Operating temperature	Topt	- 40～+85	℃
Storage temperature	Tsj	-40~+150	℃
Electrostatic immunity	ESD	≧4	KV

Electrical parameters (TA=25°C,VDD=4.5~5.5V,VSS=0V)

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
R,G,B,WLow Level output current	IOL	15.5	16.5	17.5	mA	
Low level output current	Idout	10	— —	— —	mA	Vo=0.4V,DOUT
Input Current	II	— —	— —	±1	μA	VI=VDD/VSS
High level input	VIH	0.7VDD	— —	— —	V	DIN
Low level input	VIL	— —	— —	0.3 VDD	V	DIN
Hysteresis voltage	VH	— —	0.35	— —	V	DIN

Switching Characteristics (TA=25°C,VDD=4.5~5.5V,VSS=0V)

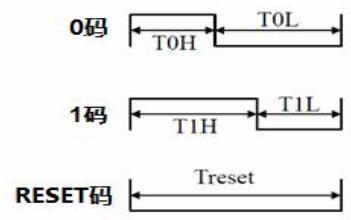
parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Transmission delay time	tPLZ	— —	— —	300	ns	CL=15pF, DIN→DOUT, RL=10KΩ
Fall time	tTHZ	— —	— —	120	μs	CL=300pF, OUTR/OUTG/OUTB/OUTW
Data transfer rate	*FMAX*	600	— —	— —	Kbps	Duty Cycle50%
Input Capacitance	CI	— —	— —	15	pF	— —

Data transfer time

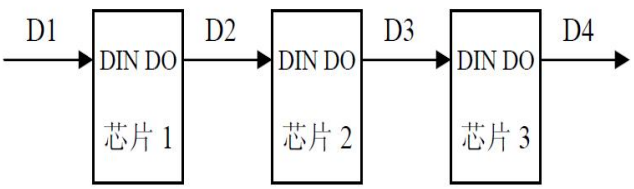
T0H	0Code, High level time	220ns~380ns
T1H	1Code, High level time	580ns~1μs
T0L	0Code, low level time	580ns~1μs
T1L	1Code, low level time	580ns~1μs
RES	Frame unit, low level time	280μsabove
TDATA	Data cycle	⩾1.25us

Timing waveform

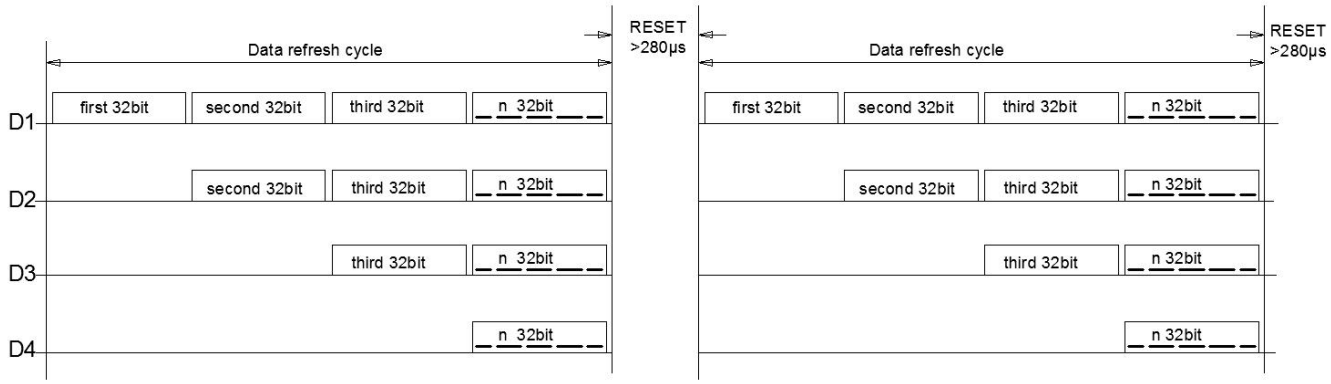
Input code type:



Connection method:



Data transmission method



Note:D1forMCUThe data sent by the end,D2,D3,D4Automatically shapes forwarded data for cascaded circuits.

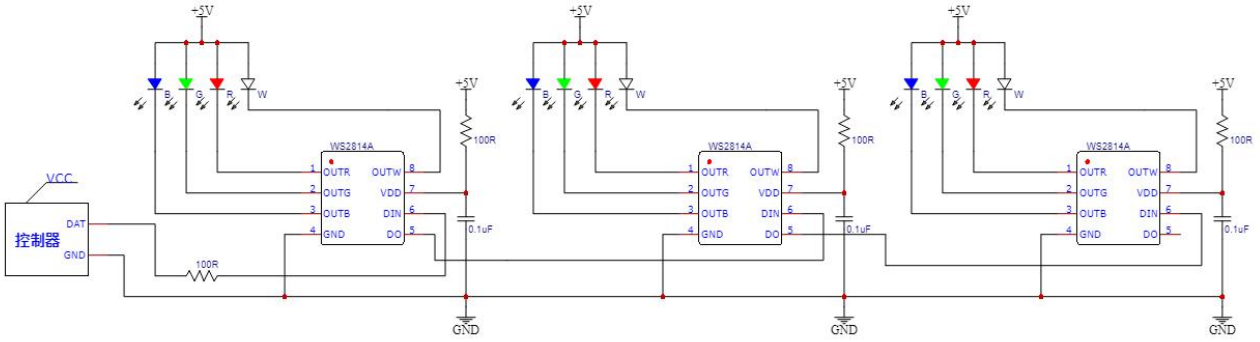
32bitData Structure

W7	W6	W5	W4	W3	W2	W1	W0	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0

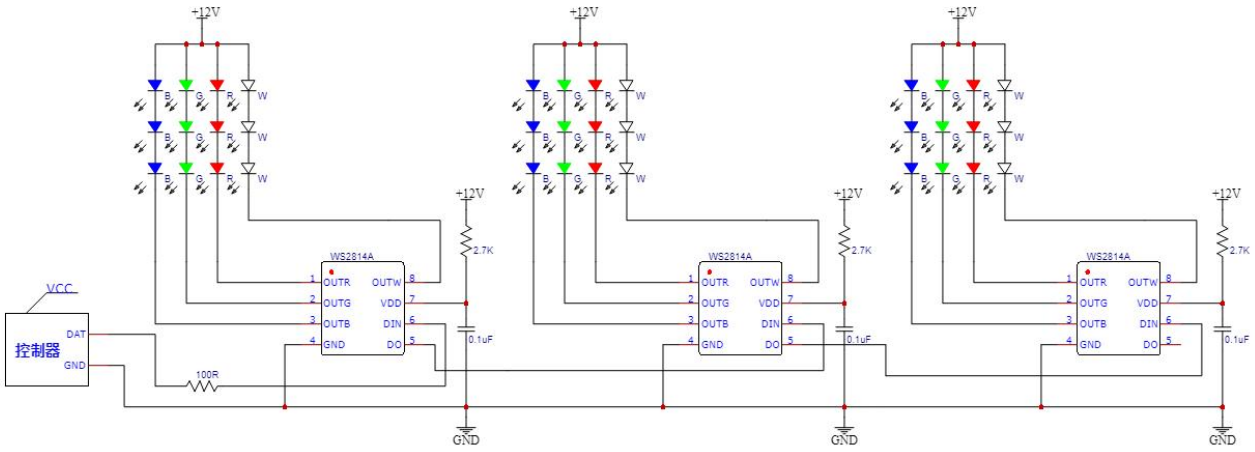
Note: High position first, according toWRGBThe data is sent in the order specified.

Typical application circuit

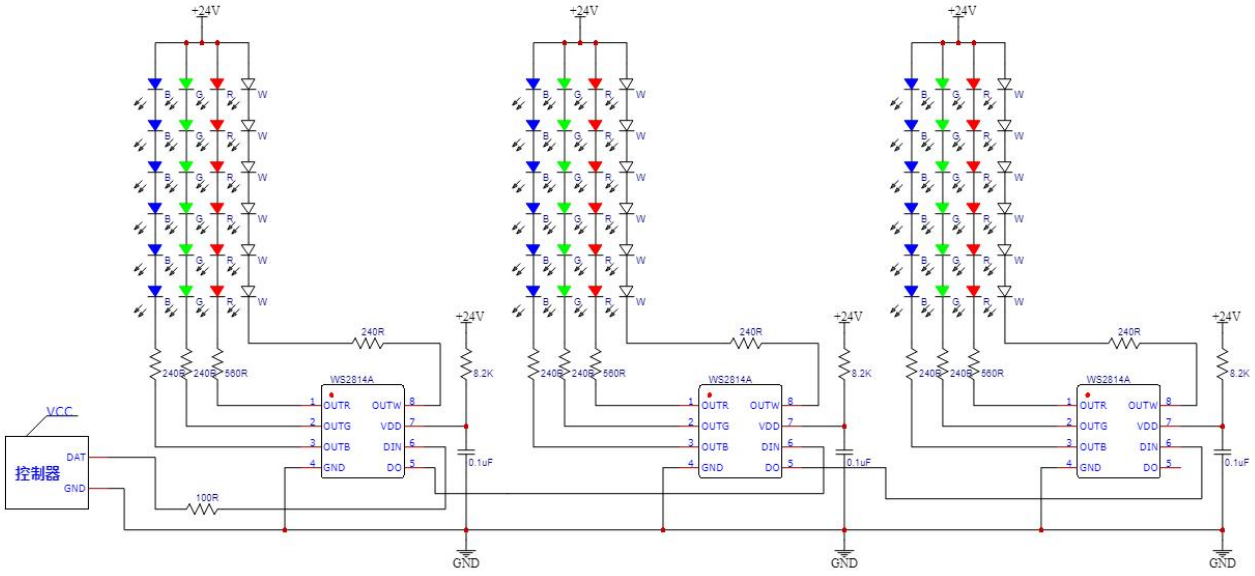
1.5V供电应用参考电路（每通道带1颗LED）：



2.12V供电应用参考电路（每通道带3颗LED）：

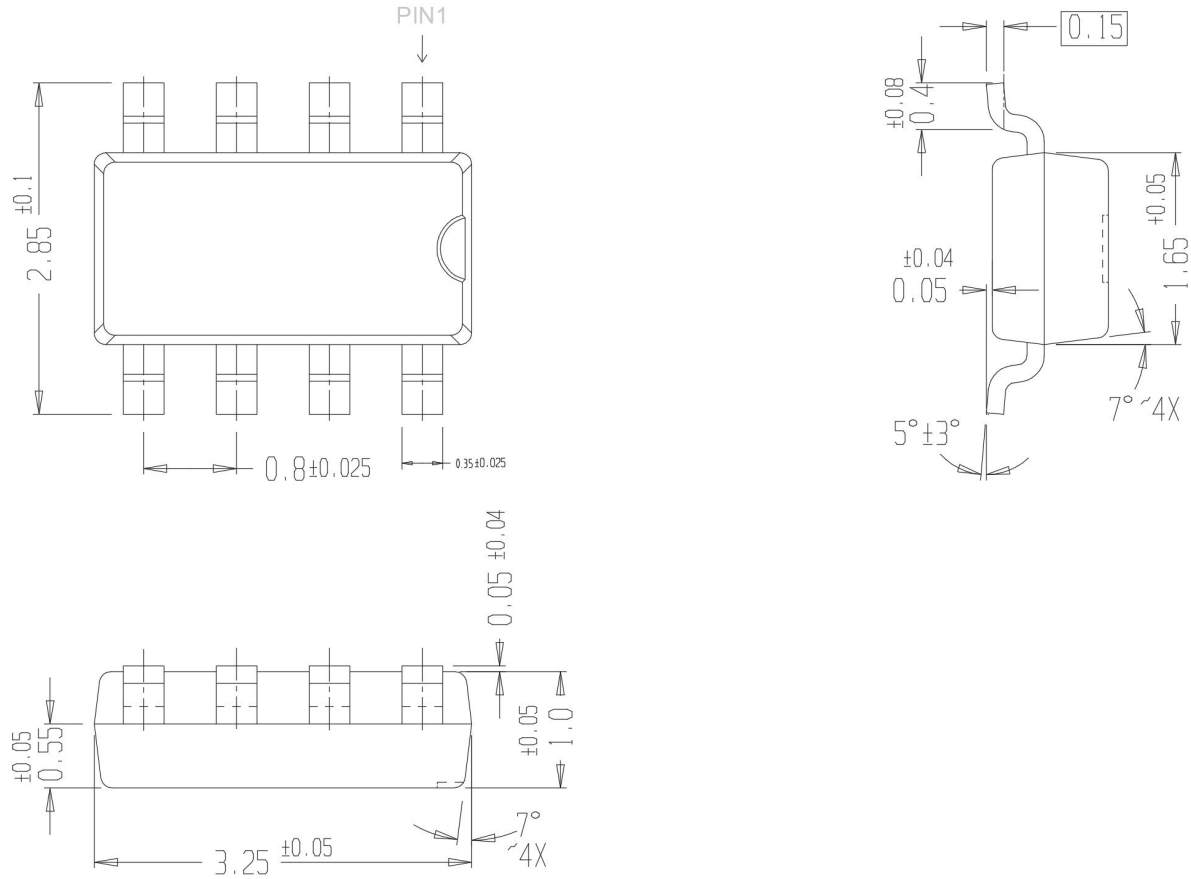


3.24V供电应用参考电路（每通道带6颗LED）：



Package diagram and parameters

-FSOP8Encapsulation



File Change Log

Version Number	state	Summary of the revised content	Revision Date	Revised by	Approver
V1.0	N	New	20221027	Hu Jin	Yu Xinghui
V1.1	M	Modify pin definition	20230328	Hu Jin	Yu Xinghui

Note: Initial version numberV1.0; After each revision is approved, the version number is sequentially increased by "0.1" ;

The statuses include:N--New,A--Increase,M--Revise,D--delete.