Main Features

● ICControl circuit andledPoint light sources share a common power supply.

● Control circuit andRGBThe chip is integrated in a2.45*4.8*4.5mmThe square head and four legs are directly inserted into the packaged lamp bead to form a complete externally controlled pixel.

● Built-in signal shaping circuit, any pixel point receives the signal and then undergoes waveform shaping before output, ensuring that line waveform distortion will not accumulate.

● Built-in power-on reset and power-off reset circuits.

● The three primary colors of each pixel can be realized256Level brightness display, complete16777216True color display of 360 colors.

● Scanning frequency2KHz.

● Serial cascade interface, which can complete data reception and decoding through one signal line.

● The transmission distance between any two points does not exceed2No additional circuit is required.

● When the refresh rate30Frames/second, the number of cascades is not less than2048point.

● Data transmission speed can reach800Kbps.

● The color of light is highly consistent and cost-effective.

Main application areas

● ledFull color luminous character light string,ledFull color module,ledFull color soft light bar hard light bar,ledGuardrail pipe.

● ledPoint light source,ledPixel screen,ledSpecial-shaped screens, various electronic products, and electrical equipment marquees.
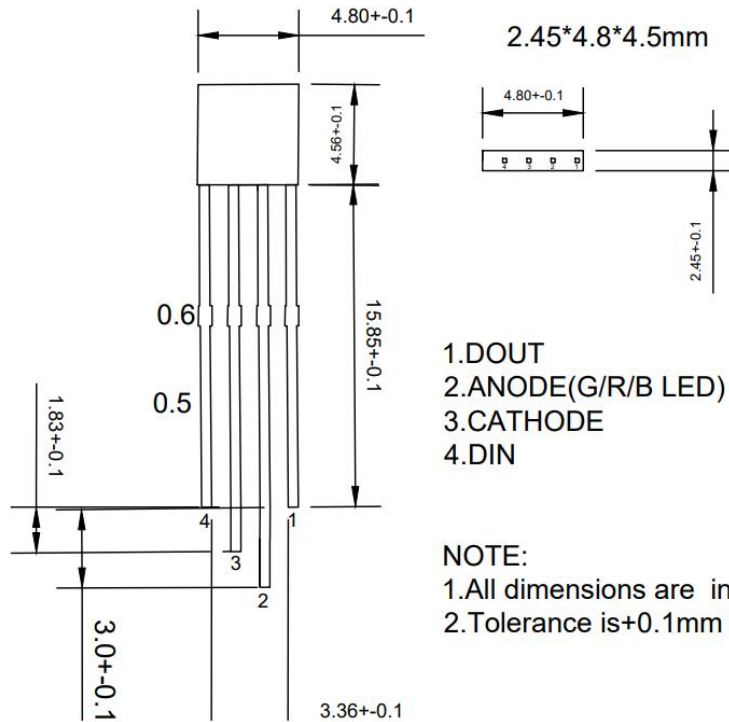
Product Overview

WS2812D-255-12MAIt is an intelligent external control system integrating control circuit and lighting circuit.ledLight source. Its appearance is similar to a plug-inledThe lamp beads are the same, and each element is a pixel. The pixel contains an intelligent digital interface data latch signal shaping amplification drive circuit, a high-precision internal oscillator and a constant current control part, which effectively ensures that the color of the pixel light is highly consistent.

The data protocol uses a single-line return-to-zero code communication method. After the pixel is reset after power-on,DINThe end receives the data transmitted from the controller, and the first24bitAfter the data is extracted by the first pixel, it is sent to the data latch inside the pixel. The remaining data is shaped and amplified by the internal shaping processing circuit and then passed throughDOThe port starts forwarding the output to the next cascaded pixel point. After each pixel point is transmitted, the signal decreases.24bitThe pixel point adopts automatic shaping and forwarding technology, so that the number of cascades of the pixel point is not limited by the signal transmission, but only by the signal transmission speed requirement.

ledIt has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering angle, good consistency, ultra-low power, and ultra-long life. The control circuit is integrated intoledAbove, the circuit becomes simpler, smaller in size, and easier to install.

V1.0

Mechanical Dimensions and Pinout(unitmm)

2.45*4.8*4.5mm

1.DOUT
2.ANODE(G/R/B LED)
3.CATHODE
4.DIN

NOTE:
1.All dimensions are in millineters.
2.Tolerance is+0.1mm unless otherwise noted.

Pin Function

Serial number	symbol	Pin Name	Functional Description
1	Dout	Data Output	Control data signal output
2	VDD	power supply	Power supply pin
3	GND	land	Signal ground and power ground
4	Din	Data Entry	Control data signal input

Maximum Ratings(Unless otherwise specified,TA=25℃,VSS = 0V)

parameter	symbol	scope	unit
Supply voltage	V_{DD}	+3.7~+5.3	V
Logic input voltage	V_I	VDD-0.5~VDD+0.5	V
Operating temperature	Topt	- 25～+80	℃
Storage temperature	Tsj	-55~+150	℃

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Electrical parameters(Unless otherwise specified,TA=-20～+70℃,VDD=4.5~5.5V,VSS = 0V)

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Low level output current	I_{dout}	11	12	14	mA	Vo=0.4V, Dout
Input Current	I_I	——	——	±1	μA	$V_I=V_{DD}/V_{SS}$
High level input	V_{IH}	$0.7V_{DD}$	——	——	V	D_{IN}, SET
Low level input	V_{IL}	——	——	$0.3V_{DD}$	V	D_{IN}, SET
Hysteresis voltage	V_H	——	0.35	——	V	D_{IN}, SET

Switching Characteristics(Unless otherwise specified,TA=-20～+70℃,VDD=4.5~5.5V,VSS = 0V)

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Oscillation frequency	$Fosc$	——	800	——	KHz	——
When transmission delay between	t_{PLZ}	——	——	300	ns	CL=15pF, DIN→DOUT, RL=10KΩ
Fall time	t_{THZ}	——	——	120	μs	CL=300pF, OUTR/OUTG/OUTB
Input Capacitance	C_I	——	——	15	pF	——

Lamp chip parameters

Red Light:

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Forward voltage	VF	1.8	2.0	2.2	V	IF=20mA
Luminous intensity	I_v	100	120	150	mcd	IF=20mA
Peak wavelength	λp	620	622.5	625	mm	——
Lighting Angle	$2\theta_{1/2}$	——	——	——	deg	——

Green Light:

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Forward voltage	V_F	3.0	3.2	3.4	V	IF=20mA
Luminous intensity	I_v	400	450	600	mcd	IF=20mA
Peak wavelength	λp	520	522.5	525	mm	——
Lighting Angle	$2\theta_{1/2}$	——	——	——	deg	——

Blu-ray:

parameter	symbol	Minimum	typical	maximum	unit	Test conditions
Forward voltage	V_F	3.0	3.2	3.4	V	IF=20mA
Luminous intensity	I_v	80	90	100	mcd	IF=20mA
Peak wavelength	λp	465	467.5	470	mm	——
Lighting Angle	$2\theta_{1/2}$	——	——	——	deg	——

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Timing waveform

Input code type:
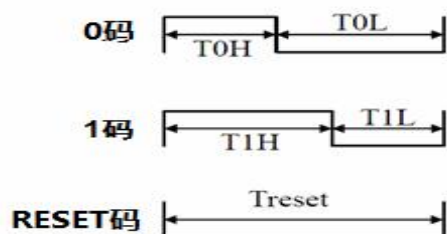
Connection method:
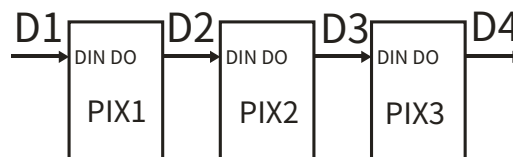
Data transfer time (TH+TL=1.25us±150ns):

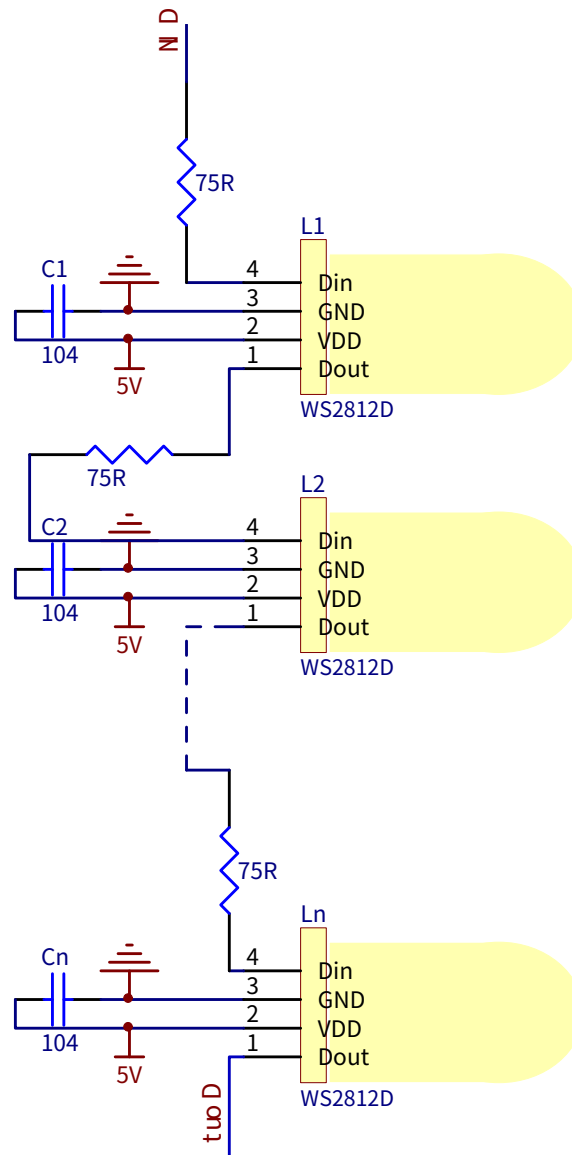|		
T0H	0Code, high level time	220ns~380ns
T1H	1Code, high level time	750ns~1us
T0L	0Code, low level time	750ns~1us
T1L	1Code, low level time	220ns~380ns
RES	Low level time	280usabove

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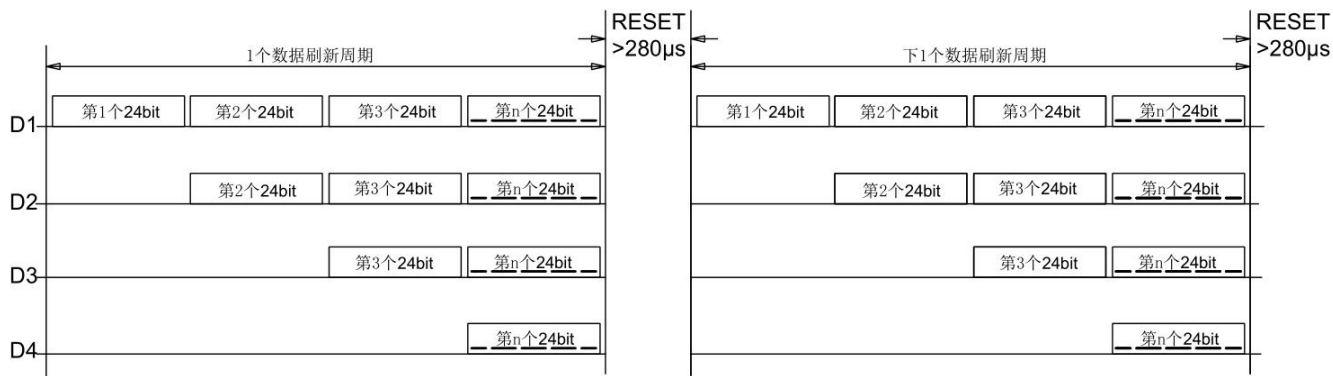
Note:D1forMCUThe data sent by the end,D2,D3,D4Automatically shapes forwarded data for cascaded circuits.

24bitData Structure

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

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Typical application circuit

D IN

75R

L1

4	Din
3	GND
2	VDD
1	Dout

C1
104
5V

WS2812D

75R

L2

4	Din
3	GND
2	VDD
1	Dout

C2
104
5V

WS2812D

75R

Ln

4	Din
3	GND
2	VDD
1	Dout

Cn
104
5V

WS2812D

D out

File Change Log

Version Number	state	Summary of the revised content	Revision Date	Revised by	Approver
V1.0	N	New	20240916	He Wenbin	Yin Huaping

V1.0

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

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