Translated from Chinese (Simplified) to English - www.onlinedoctranslator.com

main feature

- ICcontrol circuit withledPoint lights share a single power source.
- Control circuit andRGBchip integrated in a4020In the packaged components, a complete external control pixel is formed.
- Built-in signal shaping circuit, any pixel receives the signal after waveform shaping and then outputs it to ensure that the line waveform distortion will not accumulate.
- Built-in power-on reset and power-down reset circuits.
- Three primary colors of each pixel can be realized256level brightness display, complete16777216Full true color display of all colors.
- Port scan frequency2KHz.
- Serial cascading interface, which can receive and decode data through one signal line.
- When the refresh rate30When frames per second, the number of cascades is not less than1024point.
- Data transmission speed up to800Kbps.
- The color of the light is highly consistent, and the cost performance is high.
- **Having a reverse power supply will not be damaged.**
- **The periphery does not require any electronic components including capacitors.**

Main application areas

- In the field of consumer electronics.
- ledLighting field.
- Computer and peripheral equipment \ game equipment \ various electrical equipment fields.

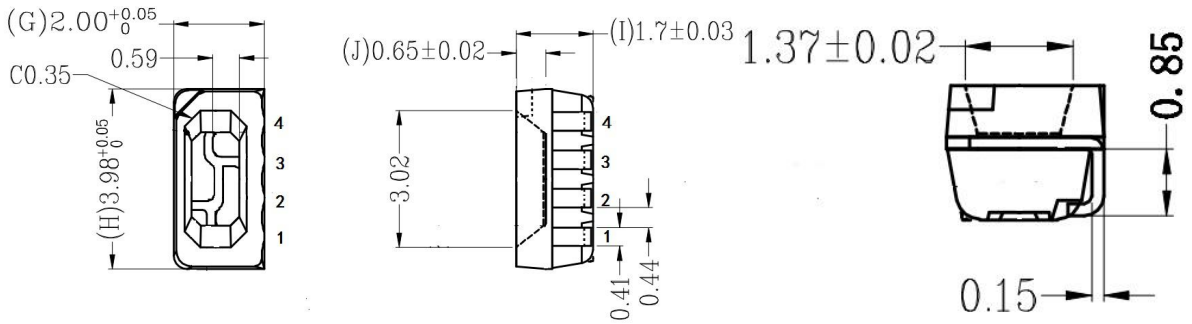
product description

WS2812B-4020It is an intelligent external control integrating control circuit and lighting circuit.ledLight source, each element is a pixel. The interior of the pixel contains an intelligent digital interface data latch signal shaping and amplifying drive circuit, as well as a high-precision internal oscillator and a programmable constant current control part, which effectively ensures that the color of the pixel light is highly consistent.

The data protocol adopts the communication method of single-line return-to-zero code. After the pixel point is reset after power-on, theDINThe terminal accepts the data transmitted from the controller, and the one sent first24bitAfter the data is extracted by the first pixel point, it is sent to the data latch inside the pixel point, and the remaining data is shaped and amplified by the internal shaping processing circuit and passed through.DOThe port starts to forward the output to the next cascaded pixel, and the signal decreases after each pixel is transmitted.24bit. The pixel adopts automatic shaping and forwarding technology, so that the cascaded number of the pixel is not limited by signal transmission, but only limited by the signal transmission speed requirement.

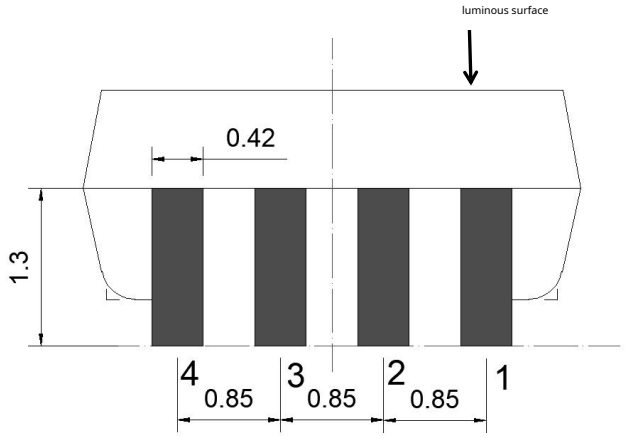
Gundam **2KHz** The port scanning frequency is high, and there will be no flickering phenomenon under the capture of the high-definition camera, which is very suitable for the use of high-speed mobile products. **280μs**Above**RESET**time, interrupts will not cause false resets, and can support lower frequency and cheapMCU. ledIt has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering angle, good consistency, low power and long life. Integrate the control circuit inledAbove, the circuit becomes simpler, the volume is smaller, and the installation is easier.

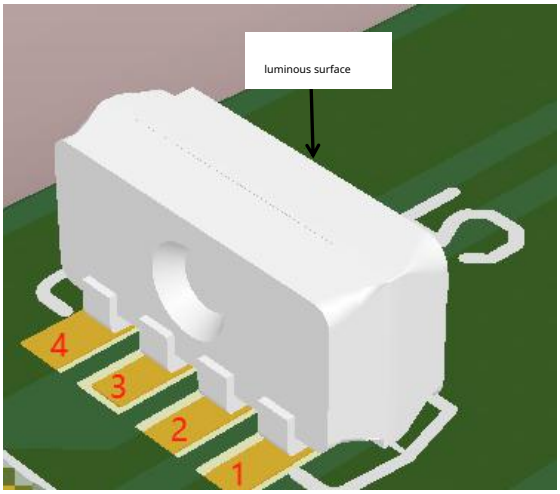
Mechanical Dimensions (Unitmm)



Top View **Side View** **Side View**

Recommended land design (mm)





3D Schematic

pin function

serial number	symbol	pin name	Function description
1	DIN	data input	Control data signal input
2	VDD	power supply	Power supply pins
3	DOUT	data output	Control data signal output
4	VSS	land	Signal ground and power ground

maximum rating(Unless otherwise specified,T_A=25°C,V_{SS}=0V)

parameter	symbol	Scope	unit
voltage	V_{DD}	+3.7~+5.3	V
Logic input voltage	V_I	- 0.3V~VDD+0.7V	V

Electrical parameters (Unless otherwise specified,T_A=25°C,V_{DD}=5V,V_{SS}=0V)

parameter	symbol	minimum	typical	maximum	unit	Test Conditions
Input Current	II	— —	— —	±1	μA	VI=VDD/VSS
high level input	V_{IH}	2.7V	— —	VDD+0.7V	V	D_{IN},SET
low level input	V_{IL}	- 0.3V	— —	0.7V	V	D_{IN},SET

Switching Characteristics (Unless otherwise specified,T_A=25°C,V_{DD}=5V,V_{SS}=0V)

parameter	symbol	minimum	typical	maximum	unit	Test Conditions
transmission delay time	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	— —

led characteristic parameter

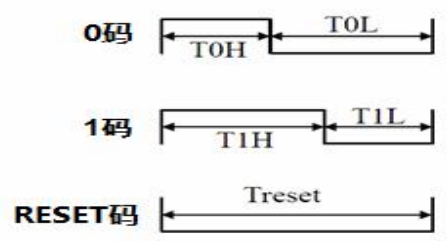
parameter	symbol	color	Quiescent current (center value):0.6mA				Test Conditions
			minimum	Typical value	maximum value	unit	(Working current)
light intensity	IV	Red	300		500	mcd	12mA
		Green	600		1000		
		Blue	200		300		
wavelength	λd	Red	620	- -	625	nm	12mA
		Green	515	- -	525		
		Blue	465	- -	475		

data transfer time

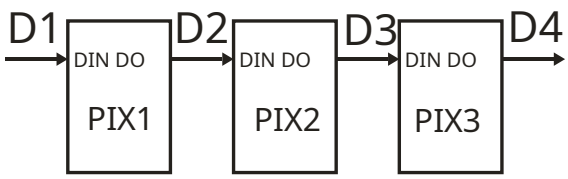
T0H	0 code, high time	220ns~380ns
T1H	1 code, high time	580ns~1μs
T0L	0 code, low time	580ns~1μs
T1L	1 code, low time	580ns~1μs
RES	Frame unit, low level time	280μs above

Timing Waveform

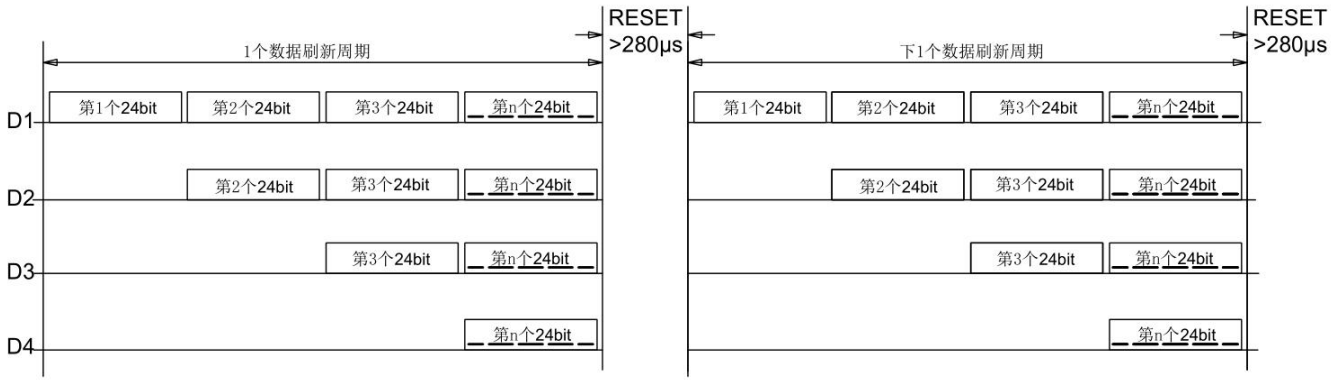
Input code:



connection method:



data transfer method



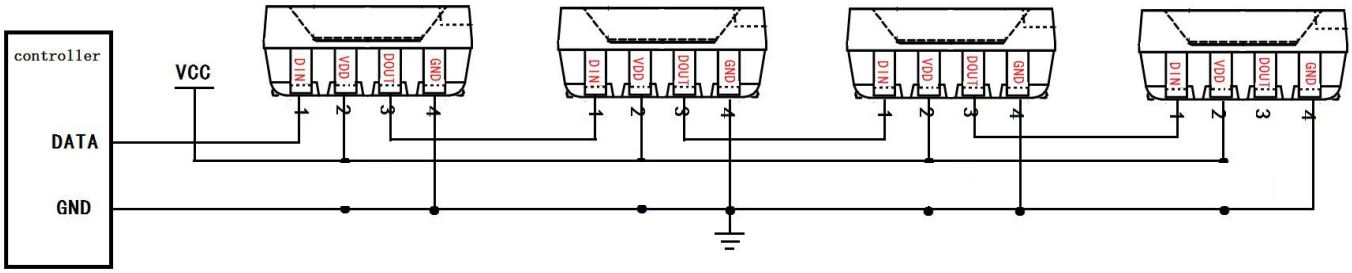
Note: of which D1 for MCU data sent by the terminal,D2,D3,D4 Automatically shape forwarded data for cascaded circuits.

24bit data 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 starter, according to GRB order to send data.

Typical application circuit: peripheral circuits do not need to add filter capacitors



Surface Mount Type led Precautions for use

1. describe

usually led It also has the same method of use as other electronic components, in order to allow customers to better use Huacaiwei electronic led products, see below led Protective precautions.

2. Precautions

2.1 Dust and Cleaning

led The surface is encapsulated with modified epoxy glue, and the epoxy glue is suitable for led The optical system and anti-aging properties play a good protective role. Epoxy adhesive is easy to stick to dust and keep the working environment clean. whenled There is dust on the surface within a certain limit, and it will not affect the luminous brightness, but we should still avoid the dust falling on the surface. led surface. It will be used first if the packaging bag is opened, and it has been installed.led The components should be stored in clean containers.

exist led When the surface needs to be cleaned, if a solution such as triamine ethylene or acetone is used, it will cause damage. led Dissolving on the surface, etc., do not use a soluble solution for cleaning led, an isopropyl solution can be used, before using any cleaning solution led There is dissolution.

Please do not use ultrasonic cleaning led, if the product must use ultrasound, then assess the impact led Some parameters, such as ultrasonic power, baking time and assembly conditions, etc., must be tested before cleaning to confirm whether it will affect led.

2.2 Moisture-proof packaging

TOP SMD LED Belongs to the humidity sensitive element, the led Packed in aluminum foil bags to avoid led Absorbs moisture during transportation and storage, and a desiccant is placed in the bag to absorb moisture. ifled absorbs water vapor, then led During reflow soldering, the water vapor will evaporate and expand, which may cause the colloid to separate from the bracket and damage it. led optical system. For this reason, moisture-proof packaging is designed to keep moisture out of the bag. The moisture resistance level of this product is:**LEVEL5a.** Table I: IPC/JEDEC J-STD-020 Specified material moisture resistance level (MSL)definition

Moisture class	Workshop life after unpacking	
	time	condition
LEVEL1	unlimited	≤30°C/85%RH
LEVEL2	1 year	≤30°C/60%RH
LEVEL2a	4 week	≤30°C/60%RH
LEVEL3	168 Hour	≤30°C/60%RH
LEVEL4	72 Hour	≤30°C160%RH
LEVEL5	48 Hour	≤30°C/60%RH
LEVEL5a	twenty four Hour	≤30°C/60%RH
LEVEL6	out of the box	≤30°C/60%RH

2.3 SMT Patch Description:

1.please at T<30°C,RH<60%use under conditions;

2.The time period from product unpacking to completion of reflow soldering is controlled within 24H Inside;

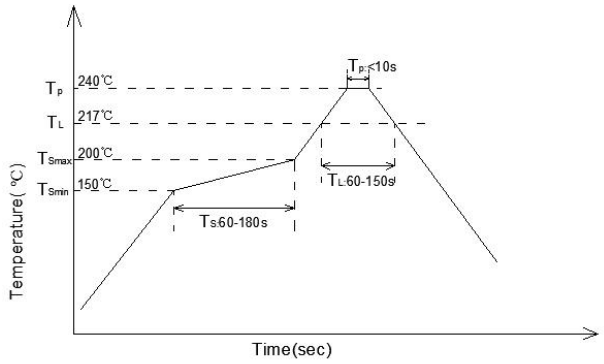
3.If it times out, you need to led The product is dehumidified and baked;

2.4 Dehumidification Requirements:75℃/>24H

3. reflow soldering

Proven by testing with the parameters listed below, the surface mount type led meets the JEDEC J-STD-020C standard. As a general guideline, it is recommended to follow the soldering temperature profile recommended by the manufacturer of the solder paste being used.

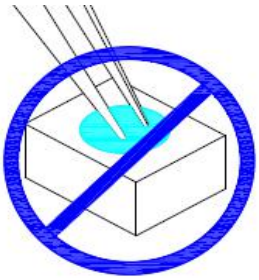
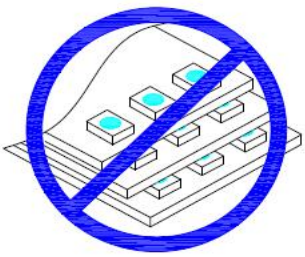
Temperature Curve Description	Lead-free reflow soldering
Minimum preheat temperature (Tsmin)	150°C
Maximum preheat temperature (Tsmax)	200°C
Preheat zone time (Tsmin to Tsmax)(ts)	60-180S
Average heating rate (Tsmax to Tp)	<3°C/S
liquidus temperature (TL)	217°C
Holding time in the liquid phase (tL)	60-150S
Peak temperature (Tp)	240°C
High temperature zone (peak temperature -5°C) residence time (tp)	<10S
Cooling rate	<6°C/S
Room temperature to peak temperature residence time	<6 min



Note:1. The above are general guidelines and may not apply to all PCB design and configuration for reflow soldering.

2. All temperatures refer to those measured on the top surface of the package body.

5. Product assembly process precautions

1. by using appropriate tools Tool grips from the side of the material	2. Do not use directly or sharply Metal pressed colloid surface, it may will damage the internal circuit	3. Do not stack module materials in one , it may damage the internal circuit	4.not available in PH<7 acidic sites
			

file change log

version number	state	Summary of Modifications	revision date	Revised by	approver
V1.0	N	new	20180913	Shen Jinguo	Yin Huaping
V1.1	M	Correction parameters	20190125	Shen Jinguo	Yin Huaping
V1.2	M	Correction of recommended pads Modify patch description	20190708	Shen Jinguo	Yin Huaping

Version number naming rules:

1.Add parameters or modify parameters, modify the second digit of the version number, such as:V1.0→V1.1

2.If there are many major version designs or modified parameters, modify the first part of the version number, such as:V1.0→V2.0,

the product model number plus the first digit of the version number, such as:WS28xx-V1 → WS28xx-V2

3.Status includes:N--new,A--Increase,M--Revise,D--delete