WS 2812B -V 5/RGB

Intelligent external control and integrated LED light source

main features

The ● IC control circuit shares a power supply with the LED point light source.

The ● control circuit is integrated with the RGB chip in a 5050 package component, forming a complete external control pixel point.

● built-in signal shaping circuit, any pixel receives the signal after the waveform shaping and then output, to ensure that the line waveform distortion will not accumulate.

● built-in electrical reset and drop reset circuit.

The ●'s three-base color per pixel achieves a 256-level brightness display, and completes the full true color display of 16,777,216 colors.

The ● port scan frequency is 2KHz / s.

The ● serial cascade interface can receive and decode the data through a signal line.

● When the refresh rate is 30 frames / second, the number of cascades is not less than 1,024 points.

● data is speeds up to 800Kbps.

● -rays are highly consistent in color and cost-effective.

The ● has power backconnections without damage.

The ● periphery does not require all of the electronic components including the capacitance.

Main should, use the field

The ● consumer electronics sector.

● LED Lighting lighting field.

● Computer and Peripherals \ Game Equipment \ Various electrical equipment areas.

Product overview

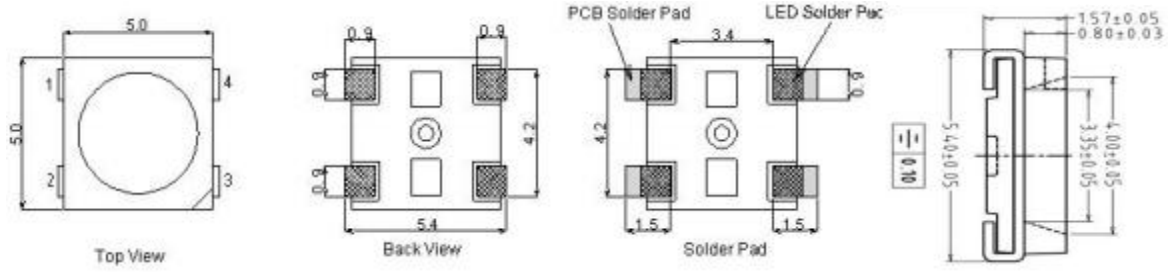
WS 2812B-V 5 is an intelligent external control LED light source that integrates control circuit and light-emitting circuit. Its shape is the same as a 5050LED bead, and each element is a pixel point. The pixel interior contains the intelligent digital interface data latch signal shaping amplifier drive circuit, but also contains the high-precision internal oscillator and programmable current control part, effectively ensure that the color of the pixel light is highly consistent.

Data protocol using single line to zero code communication mode, pixels in the electrical reset, DIN end accept the data transmitted from the controller, first sent 24bit data by the first pixel extraction, to the data latch, inside the pixel after internal shaping circuit after the remaining data through DO port forwarding output to the next cascade pixel, each pixel transmission, the signal reduced 24bit. The pixels use the automatic shaping and forwarding technology, so that the cascade number of the pixels is not limited by the signal transmission, and is only limited by the signal transmission speed requirements.

Up to 2KHz of port scanning frequency, in the high-definition camera capture will not flash phenomenon, perfect for high-speed mobile products. For the RESET time of more than 280 μ s, the interruption will not cause false reset, which can support a lower frequency and cheaper MCU.

LED has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering Angle, good consistency, ultra-low power and super-long life. Integrating the control circuit into the LED, the circuit becomes simpler, smaller, and easier to install.

Mechanical dimensions (in mm)



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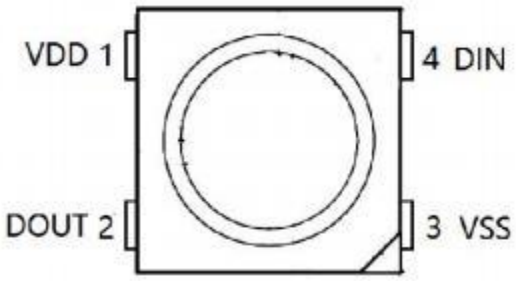
Lead-end arrangement



Feet function

order no	symbol	Tube foot name	functional description
1	VDD	source	Power supply pipe foot
2	D OUT	presentation of information	Control the data signal output
3	V SS	the earth	Signal grounding and power supply grounding
4	DIN	data-in	Control the data signal input

maximum rating (TA=25℃ ,VSS=0V)

parameter	symbol	scope	unit
supply voltage	VDD	+3.7~+5.3	V
Logical input voltage	VI	**-0.3V ~VDD +0.7V**	V
working temperature	To pt	-40~+65	℃
storage temperature	Ts tg	-40~+85	℃

Electrical parameters (TA=25℃， VDD=5V ， VSS=0V)

parameter	symbol	minimum	typical case	maximum	unit	test condition
input currenton	II	____	____	±1	μA	VI=VDD/VSS
high-level input	VIH	0.63VDD	____	VDD +0.7V	V	DIN，SET
Low level input	VIL	-0.3V	____	0V.7	V	DIN，SET

switching characteristic (TA=25℃， VDD=5V ， VSS=0V)

parameter	symbol	Min.	Typ.	max	unit	test condition
propagation delay time	tPLZ	____	____	300	ns	CL = 15pF,DIN→DOUT,RL= 10KΩ
drop-out time	tTHZ	____	____	120	μs	CL =300pF ,OUTR /OUTG /OUTB
input capacitance	CI	____	____	15	pF	____

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LED Property Parameters (TA=25℃， VDD=5V ， VSS=0V)

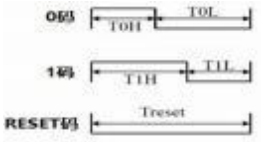
parameter	symbol	pigment	Static current (center value): 0.6mA				test condition DC =5V
			least value	represent ative	crest value	unit	working current
intensity	I V	Re d	300	310	500	m cd	12mA
		G reen	600	780	1000		
		B lue	200	215	300		
wavelength	λ d	Re d	620	621	630	n m	12mA
		G reen	515	520	525		
		B lue	465	471	475		

Data transfer time

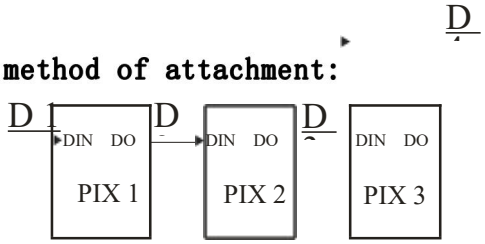
T 0H	0, high level time	220ns ~380ns
T 1H	1 yard, high level time	580ns ~1μ s
T 0L	0, low level time	580ns ~1μ s
T 1L	One yard, with a low-level time	**580ns ~1μ s**
RES	Frame units, low-level time	280 μ s Up

Time sequence waveform

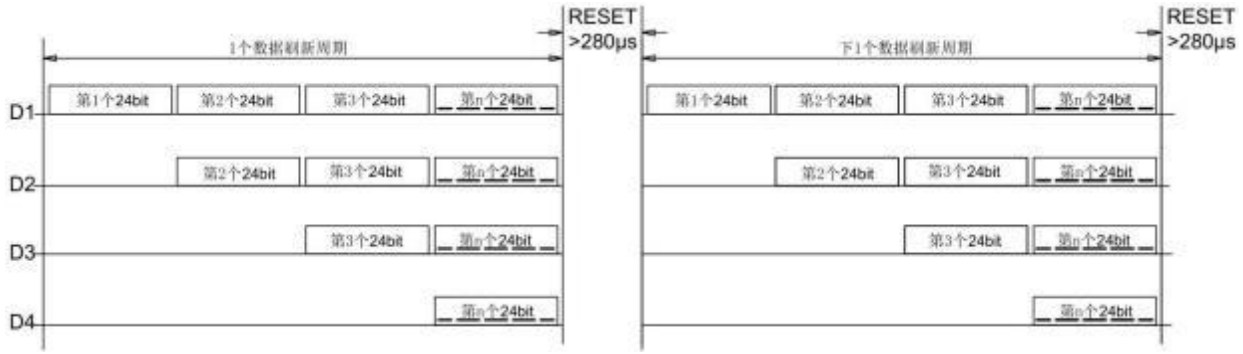
Input type:



method of attachment:



The Data Transfer Method



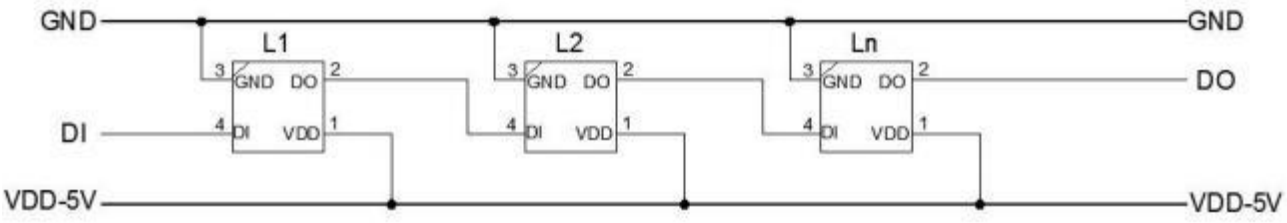
Note: D 1 is the data sent by the MCU terminal, and D 2, D 3 and D 4 are the data shaping and forwarded automatically by the cascade circuit.

24 The b i t Data structure

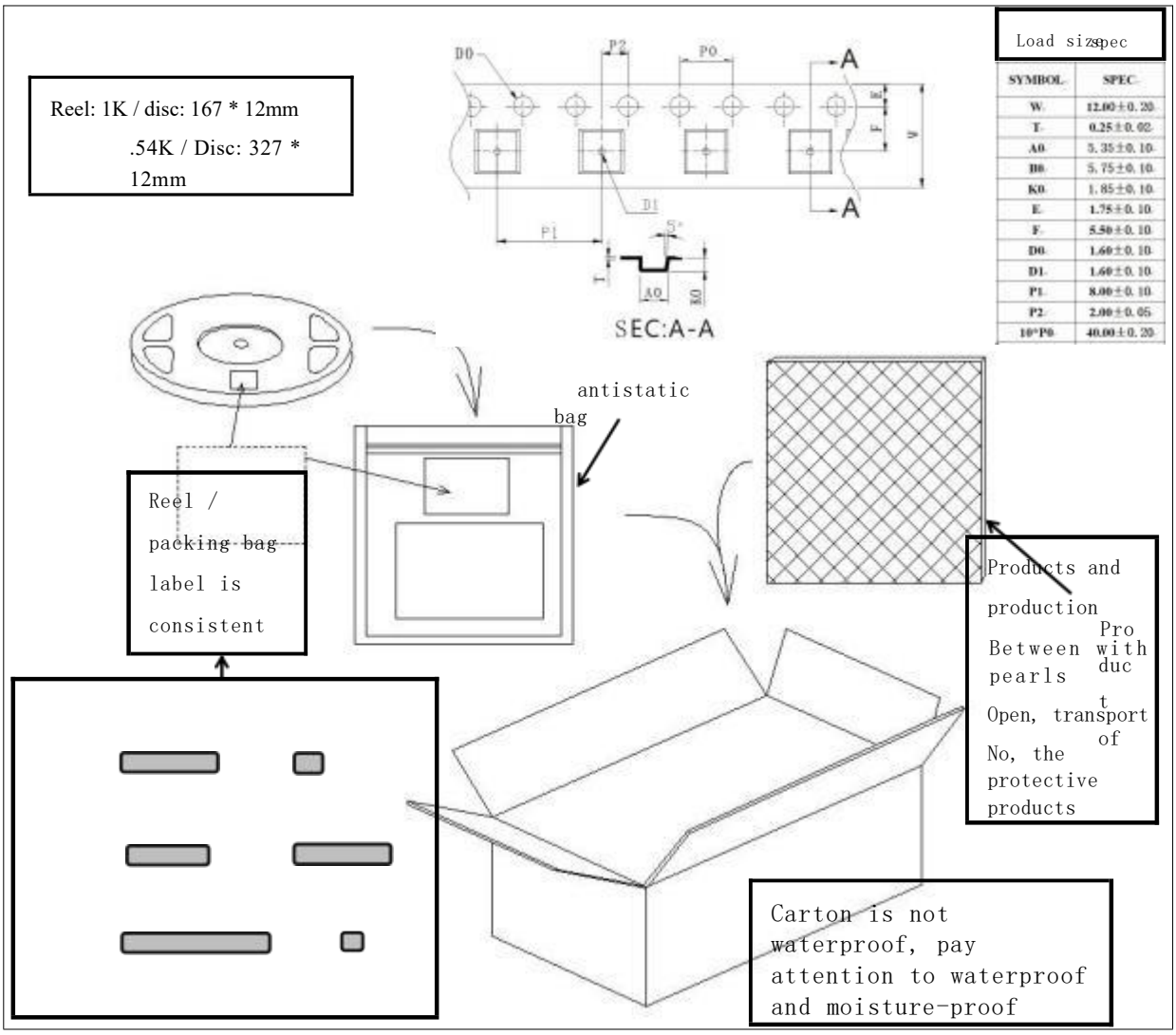
G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4	R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

Note: At a high start, send the data in the order of GRB.

Typical application circuit



packaging standard:



Notes for using the surface-mounted LED

1. description:

Usually, LED also has the same use method as other electronic components. In order to make customers better use Huancai Wei's LED products, please see the LED protection precautions below.

Notes: 2.1. Dust and cleaning

The surface of LED is encapsulated with modified epoxy glue, which plays a good role in protecting both the optical system and the anti-aging performance of LED. Epoxy adhesive is easy to stick to the dust, and keep the working environment clean. When the LED surface has a certain limit of dust, it will not affect the luminous brightness, but we should still avoid the dust from falling to the LED surface. Those who open the packaging bags are preferred, The LED-mounted components shall be stored in a clean container, When the LED surface needs to be cleaned, If a solution such as triaminethylene or acetone can dissolve the LED surface, Do not clean the LED with a soluble solution, A solution of this isopropyl group can be used, Determine for dissolving LED before using any cleaning solution; Please do not clean the LED by the ultrasound method, If the product has to use ultrasound, So to evaluate some parameters affecting the LED, Such as the ultrasonic power, Time of baking and conditions of assembly, It must be tested before cleaning, Verify if affecting the LED.

2.2. Moisture-proof packaging

LED belongs to the wet sensitive element. LED is packaged in the bag of aluminum film to avoid moisture absorption by LED during transportation and storage. desiccant is placed in the package to absorb moisture. If the LED absorbs the water gas, then the water gas evaporates and expands when the LED overreturns, potentially separating the colloid from the bracket and damaging the optical system of the LED. For this reason, the anti-humidity packaging is designed to avoid the moisture in the packaging bag, but usually the protection time can only last for 1 to 2 months. The moisture-proof grade (MSL) is: 5a. For SMT, please conduct MSL control according to the material moisture-proof grade (MSL) definition as specified in IPC / JEDECJ-STD-020.

moisture resistant grade	Workshop life after packing and unpacking	
	time	condition
LEVEL 1	unrestricted	≤ 30℃/85%RH
LEVEL 2	In 1 year	≤ 30℃/60%RH
LEVEL 2a	4 Weeks	≤ 30℃/60%RH
LEVEL 3	168 Hours	≤ 30℃/60%RH
LEVEL 4	72 Hours	≤ 30℃160%RH
LEVEL 5	48 Hours	≤ 30℃/60%RH
LEVEL 5a	**24 Hours**	**≤30℃/60%RH**
LEVEL 6	Take it out and use it	≤ 30℃/60%RH

32. S M T patch description:

2.3. 1 It is recommended that LED unsack before SMT and put it into the oven for dehumidification and drying (70~75℃ baking 24H);

2.3.2 The product is removed from the oven to the high temperature welding completion (including multiple reflux welding, tin immersion, peak welding, heating maintenance and other high temperature operations / operations), and the time period is controlled within 24 (under T <30℃, RH <60%);

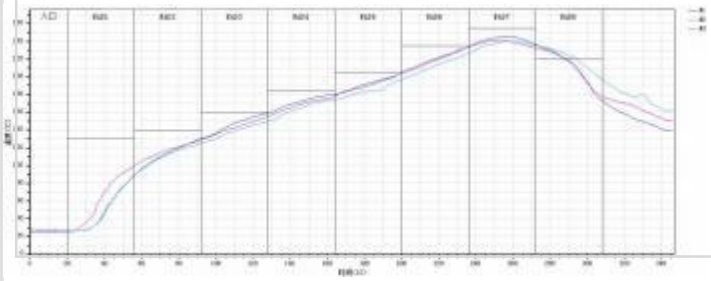
2.3.3 The L E D patch shall be completed as soon as possible on the PCBA after the printed tin paste, with no more than 1H recommended;

.3.42. LED for production surplus, machine throwing and maintenance materials can not be used directly if exposed to air for a long time. It is recommended to be used after dehumidification and drying. Volume of baking: 70~75℃ * 24H or bulk baking: 120℃ * 4H.

3. Welding

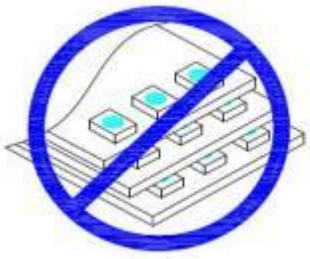
Application LED shall conform to JEDECJ-STD-020C, as general guidelines as recommended by the tin paste manufacturer or as recommended below.

Temperature curve description	scope
30℃ to 150℃	1~4 ℃/s
30℃ to 150℃	60~120 s
The constant temperature slope ranges from 150℃ to 200℃	0~3 ℃/s
The constant temperature time ranged from 150℃ to 200℃	60~120 s
Fluid phase temperature	217℃
Peak temperature	245℃



Note: 1. All the above temperatures refer to the temperature measured on the surface of the package body

4. Precautions during the product installation process

1. Side the material by using appropriate tools	2. Do not directly press the colloidal surface with the hand or sharp metal, which may damage the internal circuit	3. Do not pile up the module material together, which may damage the internal circuit	4. Not available in acidic sites with PH <7
			

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File change record

version number	state	Modify the content summary	Revised date	Revised	approver
V 1.0	N	new-built	20170523	Shen Jinguo	Yin Huaping
V 1. 1	M	maximum rating	20171009	Shen Jinguo	Yin Huaping
V 1.2	M	Maximum rating, transmission time	20180207	Shen Jinguo	Yin Huaping
V 2.0	M	Electrical parameters	20180412	Shen Jinguo	Yin Huaping
V 3.0	M	Notes section	20180719	Shen Jinguo	Yin Huaping
V 4.0	M	Logical input voltage; luminance value calibration	20180822	Shen Jinguo	Yin Huaping
V 5.0	M	IC upgrade, power backis not damaged; no electronic components including capacitance	20190323	Shen Jinguo	Yin Huaping
V 5. 1	M	Notes during product installation process; SMT patch description	20200722	Shen Jinguo	Yin Huaping
V 6.0	M	The colloid was changed to fog, and the model was changed to WS 2812B-V 5 / W	2021/ 12/2	Yu xinghui	Yin Huaping
V 6. 1	A	Increase the storage and operating temperature range	2022/9/8	Yu xinghui	Yin Huaping