GREELED
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12V Pixel led

WS2815B RGB Datasheet

Specification

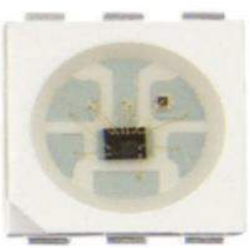
Model No.: WS2815B-RGB

Product: 12V SMD5050 0.15W Pixel led

Document No.: SPC-TOP-C/230016

Issue Date :10-04-2023

Version: E-23



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Greeled Approval		Customer Approval	
Aduit	Confirmation	Aprroval	Audit
Mr Chiang	Ms Lee		
Date:		□ Qualified	□ Disqualified
Reason:			

1.Product feature:

- ●The control circuit and RGB chips are integrated in one SMD5050 package as one pixel,Built in various of function units.
- ●Adopt led chips in series design,Default current 10mA,Improve energy efficiency.
- ●12V single pixel addressable,Improve Voltage-drop Issue.
- ●It have backup data to prevent signal interrupt.(Break-Point resume function)
- ●The PWM Scanning Frequency up to 4khz
- ●Each color 8Bits,256 Gray scale, 256*256*256=16777216 true color display.
- ●Data transmission rate up to 800kbps
- ●The pixel cascades number is not less than 1024 pixels at 30 frame per second.
- ●The data transmit base on SPI Communication protocol

2.Working principle description:

The WS2815B-RGB led adopt single data signal communication method, The data encoding adopt RZ code. The Din of led receive data from signal source,locking 24bit data and send them to data latch, PWM scanning unit deal 24bit data and send relative duty ratio signal to relative Emitting chips OUTR,OUTG,OUTB.

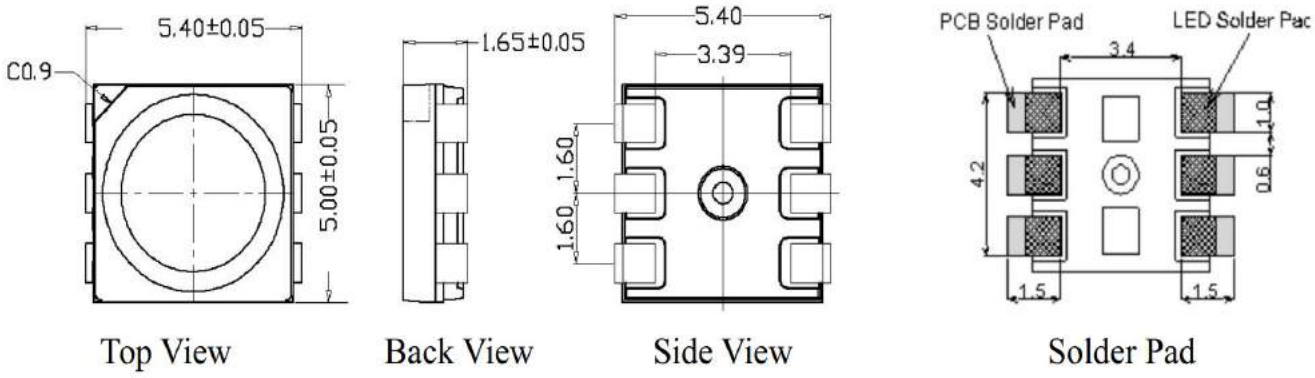
At the same time, Reshaping and amplify extra data,Forwarding them to subsequent led via Dout of led. Based on this rule. The data reduce 24bit pass through every pixel. All Emitting chips receive relative duty ratio signal and Emitting color.

The data auto-reshaping forwarding technology to ensure that the number of cascaded pixel is not limited. The more cascaded pixels request the higher data transmission rate.

3.Application:

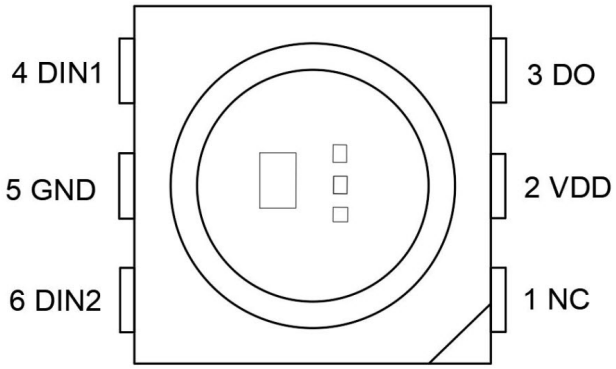
- ● Billboard,light box,Device,Cabinet decoration
- ● The Component of light source.

4.Package dimension:



Remarks: All dimensions are marked in millimeters and the tolerance is ±0.15 mm, unless otherwise specified.

5.Pin diagram and function description：



No.	Symbol	Function description
1	NC	Empty feet
2	VDD	Power supply
3	DO	Control data signal output
4	DIN1	Control data signal input
5	GND	Ground
6	DIN2	Backup data

6.RGB chip characteristic parameter Ta=25℃ at 12mA：

Color	Wavelength(nm)	Light Intensity（mcd）	Lumen（LM）
Red	620-630	200-400	0.6-1.0
Green	520-535	600-1000	2.0-3.0
Blue	460-475	150-300	0.5-0.8

7.Maximum rating (if no special instructions,Ta=25℃， VSS=0V):

Parameter	Symbol	Range	Unit
Voltage	VDD	+9.5～+15	V
Logic input voltage	VI	-0.3～+5.7	V
R/G/B Output current	IOUT	10	mA
Working temperature	Topt	-40～+85	℃
Storage temperature	Tstg	-50～+85	℃
ESD pressure（Device mode）	VESD	200	V
ESD pressure（body mode）	VESD	4000	V

8.Electrical characteristics (if no special instructions, Ta=25℃):

Parameter	Symbol	Min	Typical	Max	Unit
The chip supply Voltage	VDD	10.5	12	13.5	V
R/G/B port output drive current	IOUT	-	10	-	mA
High level input voltage	VIH	2.7	4	5.7	V
Low level input voltage	VIL	-0.3	1	1.5	V
Static power	IDD	-	2	-	mA
PWM Frequency	fPWM	-	4	-	KHZ

9.Switch characteristics (if no special instructions, Ta=25℃):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Data transfer rate	fDIN	-	800	-	KHz	-
Transmission delay time	tPLZ	-	-	300	ns	-

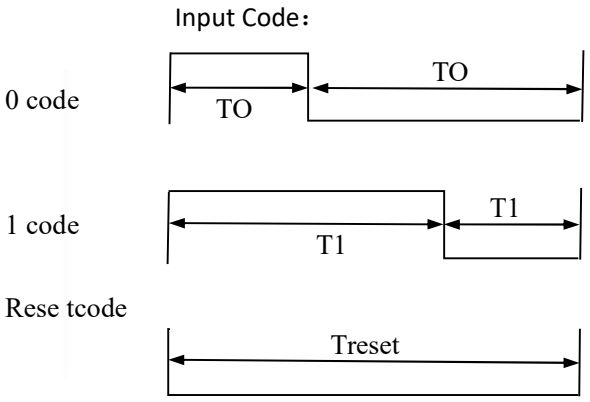
10.Data transmission time(TH+TL≥1.25μs)

Name	Description	Min	Typical	Max	Allowable error	Unit	
T0H	0 code, high level time	0.22	-	0.38	±0.05	US	
T1H	1 code, high level time	0.58	-	0.84	±0.05	US	
T0L	0 code, low level time	0.9	-	5	±0.05	US	
T1L	1 code, low level time	0.6	-	5	±0.05	US	
TRST	Reset code， low level time	280	-	-	-	US	

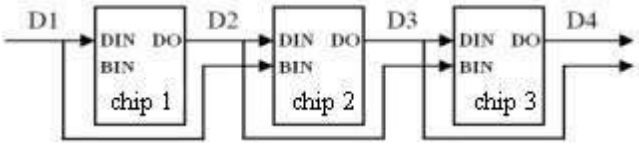
11.Coding timing diagram:

The chip protocol adopt unipolar return-to-zero code, and every symbol must have be converted. Each symbol of this protocol starts with a high level, and the time width of the high level determines the "0" code or the "1" code.

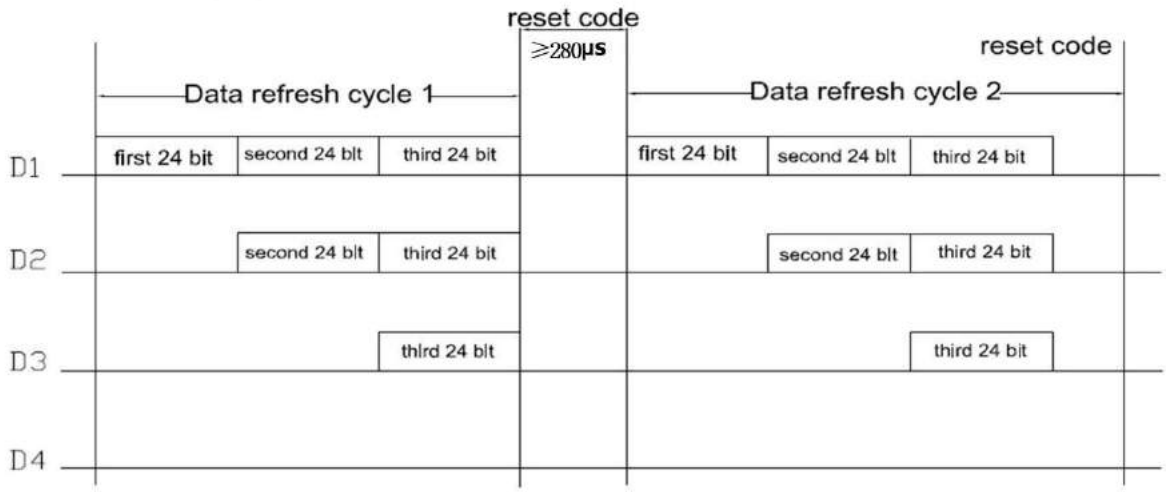
Input Code：



Connection Mode：



12.Data transmission method（Ta=25℃）:



Note: D1 is the data sent by the MCU, and D2, D3, and D4 are the data that the cascade circuit automatically reshapes and forwards.

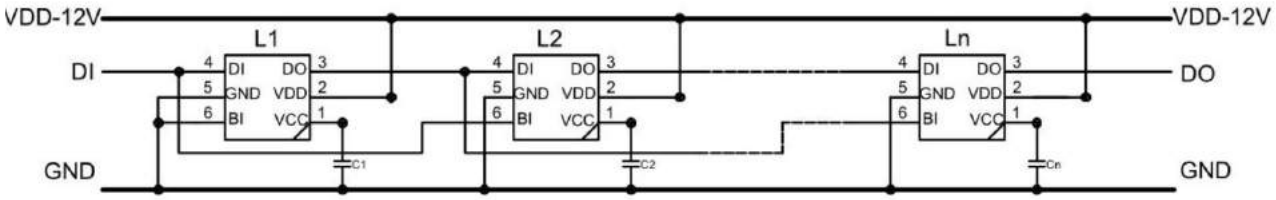
13.Data structure (Ta=25℃):

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: The high bit is sent first, and the data is sent in the order of GRB (G7 → G6 →……B0).

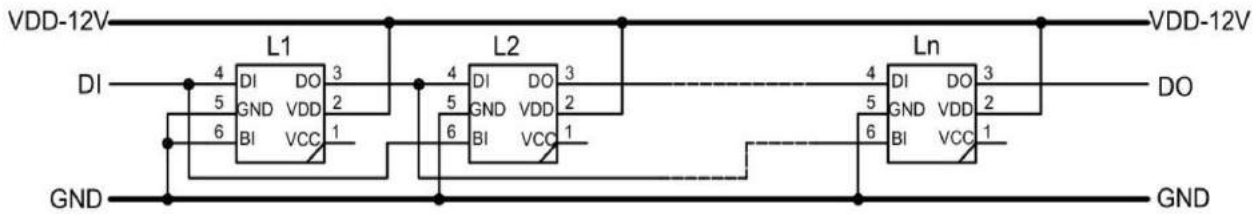
14.Typical application circuit:

1. **Recommended application circuit**



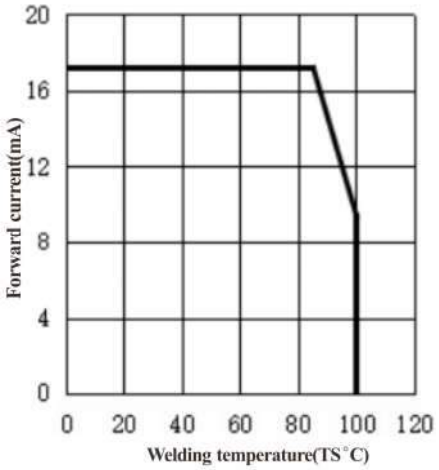
Remarks: C1 is bypass filter capacitor.

2. **For complicated wiring & space-saving**

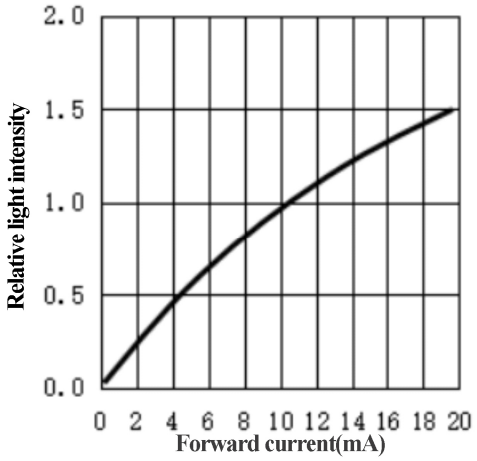


15.Typical optical characteristic curve:

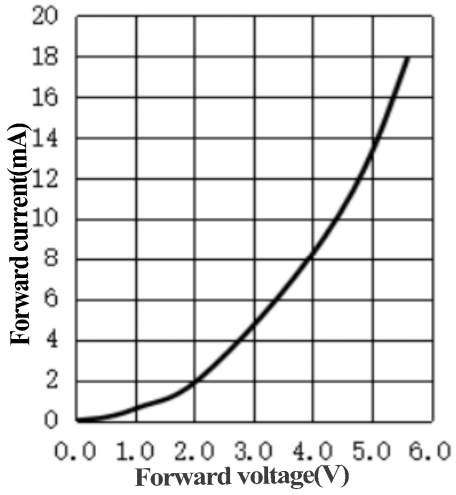
Welding temperature VS Forward current



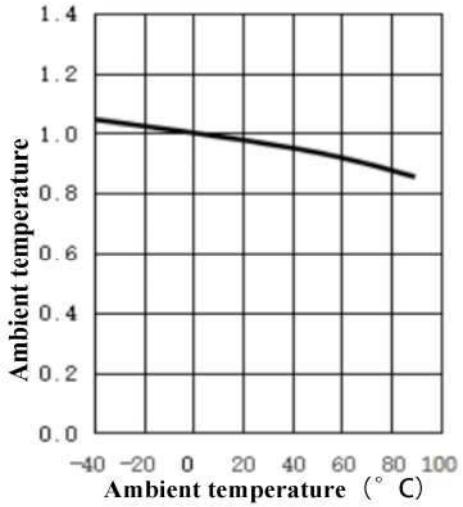
Forward current VS Relative light intensity



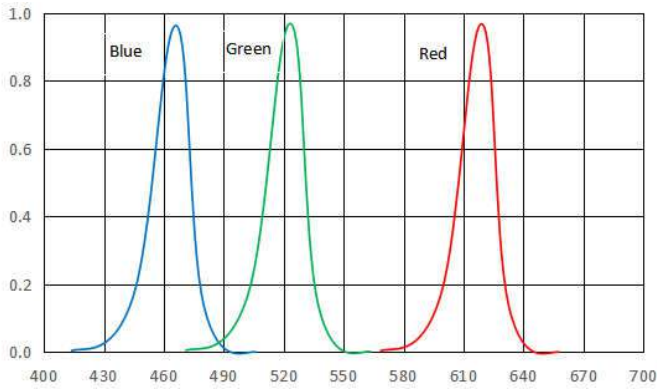
Forward voltage VS Forward current



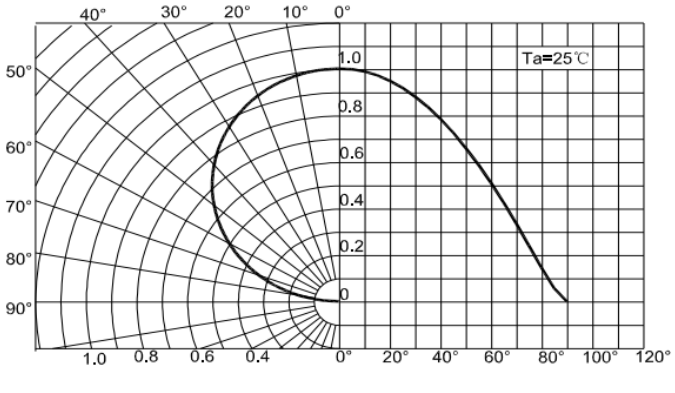
Ambient temperature VS Rrelative light intensity



Relative spectral distribution chart



Relative spectral distribution chart



16.Packing specifications: