

Datasheet

LED Strip Specification

LED strip type:
WS2812 (GS8208) 12V

Description:
WS2812 12V Digital Full-Color 5050 LED



Date:
15-3-2017

Features and benefits

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- 12v operating supply voltage with 7805 module inside The control circuit and the LED share the only power source.
- Default 17.5mA constant current output, the minimum is 11mA Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate.
- Use e-RZ code, serial data frequency 800kHz.
- 8-bits data transfer, 12bits build-in GAMMA correction of PWM display
- Built-in PWM technology, supports 8kHz PWM refresh rate
- With resumable data transfer function, single chip damage does not infect data transmission
- Built-in automatic test mode, power-on and power-off protection.
- ESD; 2KV
- Working environment is from -40 ° C to + 85 ° C

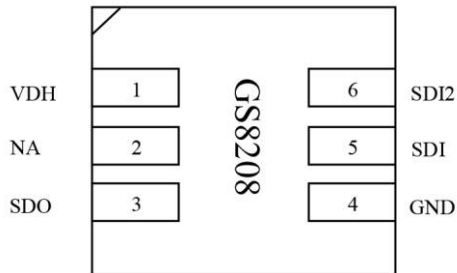
Applications

- Full-color module, Full color soft lights a lamp strip.
- LED decorative lighting, Indoor/outdoor LED video irregular screen.

General description

The GS8208 is a 3-channel constant current LED drive with resumable data transfers and. There are three open-drain constant current outputs, with a build-in PWM of grayscale. The range of input power is from +9V to +15V, and voltage-endurance of LED port is +12V. There is a built-in 12bits GAMMA correction module. PWM maximum refresh frequency is 8kHz. The GS8208 use the e-RZ (extended return to zero code) as the signal transmission mode, which can control the output current channel by channel and cascade infinitely. GS8208 provides two-signal data input as redundant control, which ensures the transmission of the signal if any single chip damages. There is the built-in power-on and power-off protection in the drive, which can enhance the service life of the chip. It also has the automatic test function while power on, which is convenient for the customer to test. The GS8208 provides SOP8 packaging, working environment is from -40 °C to + 85 °C.

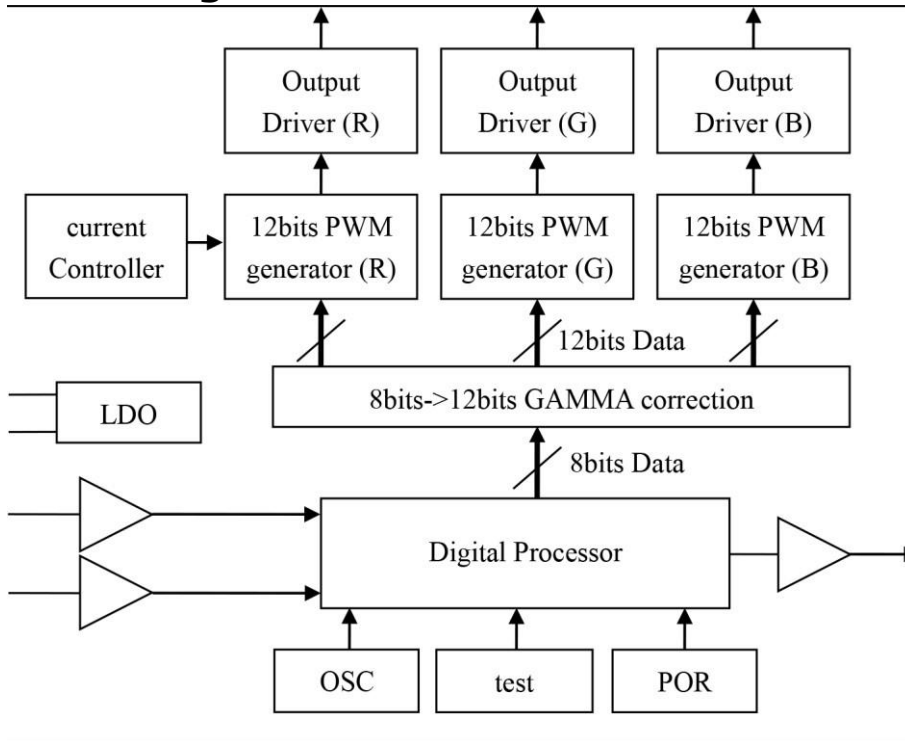
Pin Configuration with LED



Pin Description

Pin name	type	Function
VDH	P	12V Power Supply
GND	P	Chip Ground
OUTR.....OUTB	OUT	Constant-current outputs, connected to LED
SDI	IN	Series data input
SDI2	IN	Redundant series data input
SDO	OUT	Series data output

Block diagram



Parameter	Symbol	Ratings	Units
Power source	VDH	-0.4~15V	V
On-chip Power Source	VCC	-0.4~6V	V
Input Logic Voltage	SDI	-0.5~VDH+0.5	V
Maximum output current	IOUT	18	mA
Output voltage-endurance	VDS	15	V
Ground current	IGND	55	mA
Power dissipation	Pd	400	mW
Working temperature	TOP	-40~85	oC
Storage temperature	Tstg	-55~150	oC
ESD	HBM	2000	V

**Absolute
maximum ratings**

Electrical Characteristics

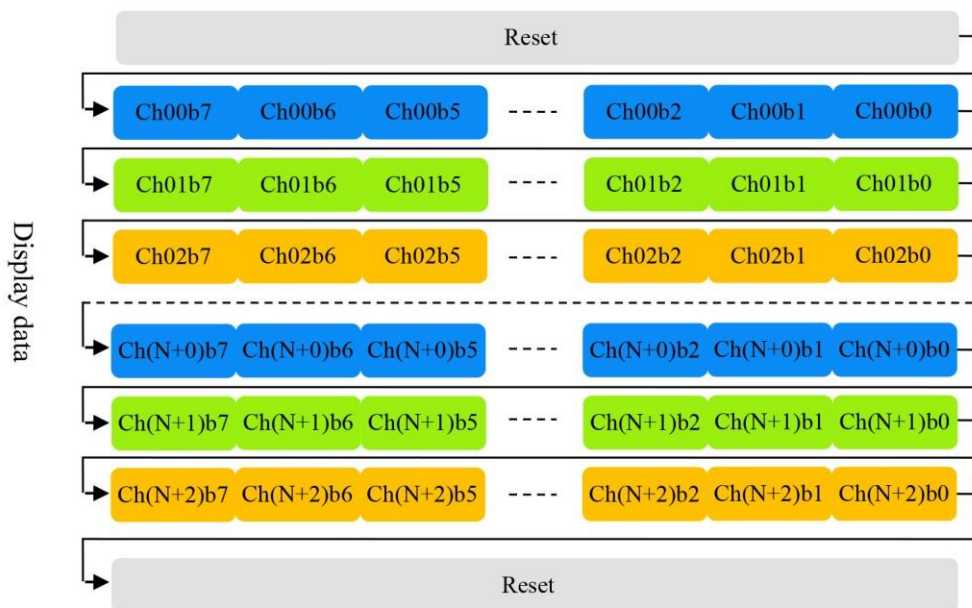
Parameter	Symbol	Conditions	Min	Typical	Max
Power supply	VDH	9	12	15	V
Internal Power supply	VCC	4	5	6	V
High Input Logic Voltage	VIH	4			V
Low Input Logic Voltage	VIL			1	V
Output current	IOUT	11	11		mA
Static current	Ichip		2.5		mA
Power dissipation	Pd			150	mW
Current variation (CH)	dIOUT	Iout = 15mA	1,5%	3%	%
Current variation (CHIP)	dIOUT2	Vout = 1.2V	3%	6%	%
Voltage range of outputs	VOUT		1.2	12	V
External Power Res	RVDH	VDH=12V	50		ohm
External Power Cap	CVDH	0.1			uF

Switching characteristics

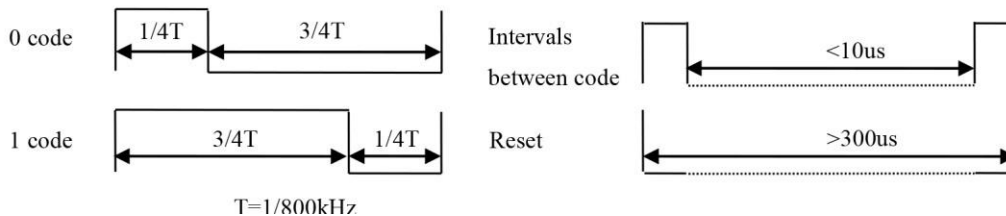
Parameter	Symbol	Conditions	Min	Typical	Max	Unit
Internal Oscillator Frequency	OSC			25		MHz
PWM refresh rate	tPLZ			8		kHz
Data refresh rate	tTHZ			30	1017	Hz
Data refresh delay time	CI	1024 points		700		us
Channel output delay time				80		ns
Current output rising time Current output falling time PWM pulse duration		18mA, VOUT=1V		40 40 240		ns
RZ data frequency			400k	800k	800k	800k

Data Format

GS8208 adopts the extended return to zero code (e-RZ) data transmission mode, 8bits data for single channel, each IC supports 3 channel for display. The transmission data is filtered internally to support the data anti-jitter function. The extension type is compatible with the traditional RZ code. So it is suitable for most of the RZ code controller in the market.

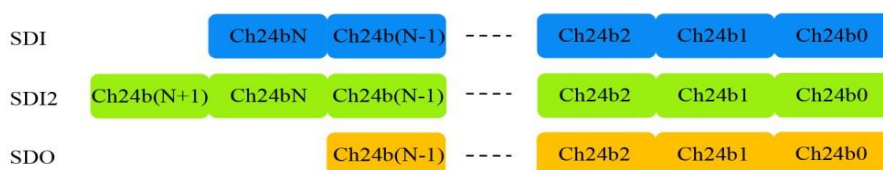


Single code with 1:3 duty cycle and a standard 800kHz transmission speed. The maximum frequency can reach 1MHz. GS8208 re-code the data before transmission. Data delay is less than 0.7us from chip to chip, meets the dynamic image needs.



Dual channel redundant control

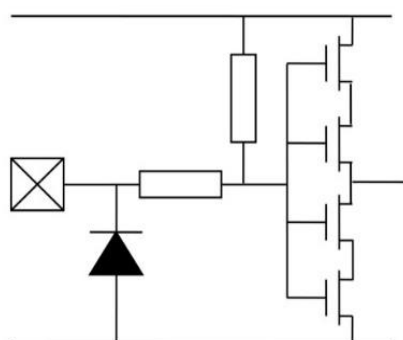
Dual channel redundant control can be used to effectively avoid the failure of any single device damage, and reduce the damage rate of the driving system to one millionth. The SDI signal is used as the default transmission channel while the system is power on. The transmission channel priority is switched between SDI and SDI2 when the transmission data is abnormal. The device will choose the clear transmission channel after data detection.



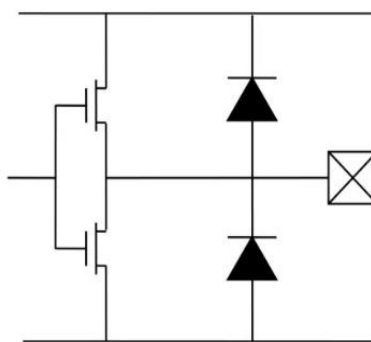
When the external control data is transmitted, SDI uses the 1-24bits received data as the display data, meanwhile, SDI2 will discard the 1-24bits data and use 25-48bits data as the display data.

Equivalent Circuits of Input and Output

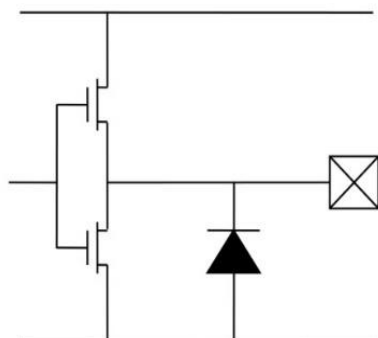
1 SDI/SDI2



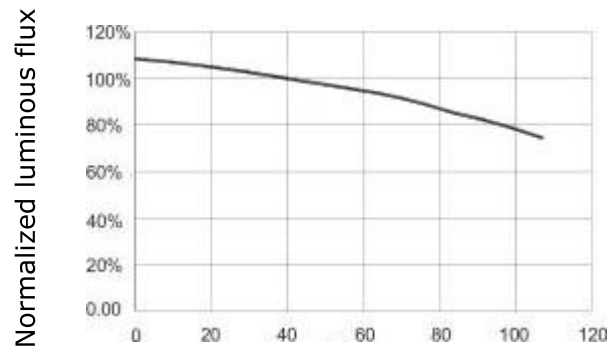
2 SDO



3 OUTR, OUTG, OUTB

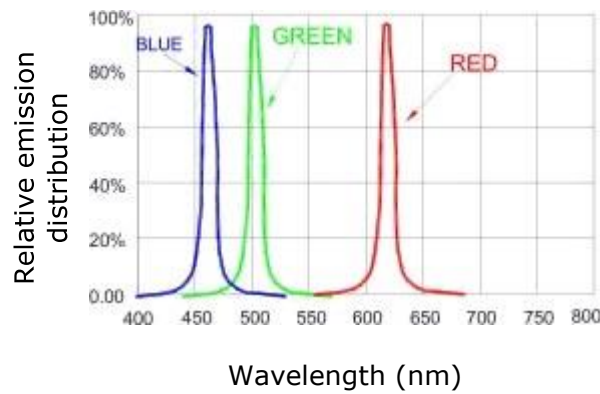


Thermal pad temperature vs. relative light output

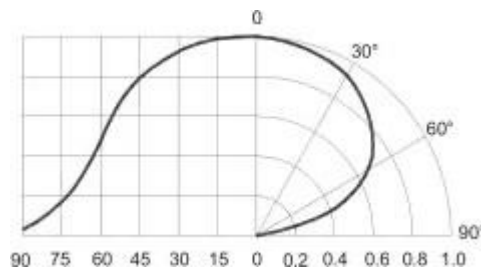


Thermal pad temperature ($T_j=25^\circ\text{C}$)

Wavelength characteristics



Typical radiation pattern 120°



Certificate of Conformity:

EC Council Directive 2004/108/EC
Electromagnetic Compatibility
Registration No.: ATE20120944

Complies to the Standards:

- EN 55015: 2006 + A1: 2007 + A2: 2009
- EN 61000-3-2: 2006 + A1: 2009 + A2: 2009
- EN 61000-3-3: 2008
- EN 61547: 2009

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