



WS2814A

Signal line 256 Gray level 4 channel Constant current LED driver IC

Feature

- R, G, B, W output port withstand voltage 20V, DIN port withstand voltage 9V.
- Built-in voltage-regulator tube, only a resistance needed to add to IC VDD feet when under 24V power supply.
- The PWM control terminal can realize 256 Gray-scale adjustable and scan frequency is 2KHz.
- Built in signal reshaping circuit, to ensure waveform distortion do not accumulate after wave reshaping to the next driver.
- Built-in electrify reset circuit and power-down reset circuit.
- Cascading port transmission signal by single line.
- Any two point the distance less than 5 Meters' transmission signal without any increase circuit.
- When the refresh rate is 30fps, the cascade number is at least 1024 pixels.
- Send data at speed of 800Kbps.

Applications

- LED full color decorative lighting, such as LED string, LED strip, LED module etc.
- Indoor/outdoor LED video or irregular screen.

General description

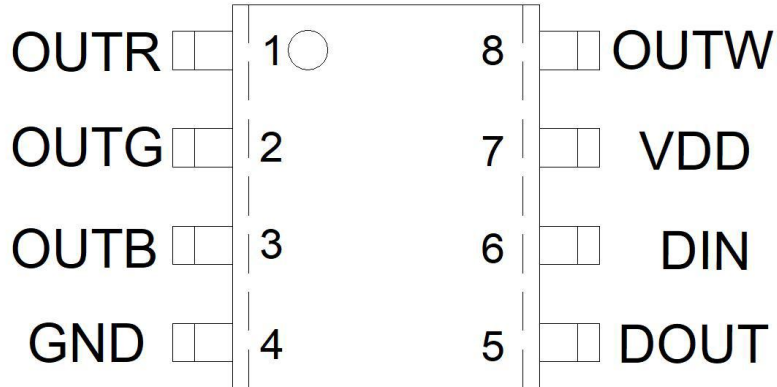
WS2814A is 4 channels special for LED driver circuit. Its internal includes intelligent digital port data latch and signal reshaping amplification drive circuit. Also include a precision internal oscillator and a 20V voltage programmable constant current output drive. It effectively ensures that the color of pixel light on the driving circuit is highly consistent.

IC use single NZR communication mode. After the chip power-on reset, the DIN port receive data from controller, the first IC collect initial 32bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade IC through the DO port. After transmission for each chip, the signal to reduce 32bit. IC adopt auto reshaping transmit technology, making the chip cascade number is not limited the signal transmission, only depend on the speed of signal transmission.

The data latch of IC depend on the received 32bit data produce different duty ratio signal at OUTR, OUTG, OUTB, OUTW port. All chip synchronous send the received data to each segment when the DIN port input a reset signal. It will receive new data again After the reset signal finished. Before a new reset signal received, the control signal of OUTR, OUTG, OUTB, OUTW port unchanged. IC sent 32bit PWM data that received justly to OUTR, OUTG, OUTB, OUTW pin, after receive a low voltage reset signal the time retain over 280 μ s.

We offer SOP8 package.

PIN configuration



PIN function

NO.	Symbol	PIN	Function description
1	OUTR	LED Driver Output	Output of RED PWM control
2	OUTG	LED Driver Output	Output of GREEN PWM control
3	OUTB	LED Driver Output	Output of BLUE PWM control
4	GND	Ground	Data & Power Grounding
5	DOUT	Data Output	Display data cascade output
6	DIN	Data input	Display data input
7	VDD	Logic Power Supply	IC power supply
8	OUTW	LED Driver Output	Output of WHITE PWM control

Absolute Maximum Ratings (T_A=25°C, V_{SS}=0V, unless otherwise noted.)

Parameter	Symbol	Ratings	Unit
Power Supply Voltage	V _{DD}	+3.7~+5.3	V
Logical Input Voltage	V _I	VDD-0.7~VDD+0.7	V
R/G/B/W Channel Output Port Withstand Voltage	V _{out}	20	V
Operation Temperature	T _{opt}	-25~+85	°C
Storage Temperature Range	T _{stg}	-40~+150	°C

Note: If the voltage on the pins exceeds the maximum ratings may cause permanent damage to the device.

Electrical Characteristics ($T_A = -20 \sim +70^\circ\text{C}$, $V_{DD} = 4.5 \sim 5.5\text{V}$, $V_{SS} = 0\text{V}$, unless otherwise specified)

Parameter	Symbol	Min	Tpy	Max	Unit	Conditions
R/G/B/W Low voltage output current	I_{OL}	15.5	16.5	17.5	mA	
Low voltage output current	I_{dout}	10	—	—	mA	$V_O = 0.4\text{V}$, D_{OUT}
Input current	I_I	—	—	± 1	μA	$V_I = V_{DD}/V_{SS}$
High level Input	V_{IH}	$0.7V_{DD}$	—	—	V	D_{IN}
Low level Input	V_{IL}	—	—	$0.3 V_{DD}$	V	D_{IN}
Hysteresis voltage	V_H	—	0.35	—	V	D_{IN}

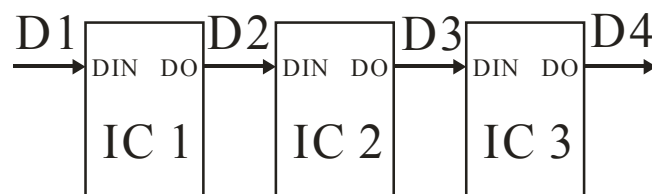
Switching characteristics ($T_A = -20 \sim +70^\circ\text{C}$, $V_{DD} = 4.5 \sim 5.5\text{V}$, $V_{SS} = 0\text{V}$, unless otherwise specified)

Parameter	Symbol	Min	Tpy	Max	Unit	Condition
Transmission delay time	T_{PLZ}	—	—	300	ns	$CL = 15\text{pF}$, $D_{IN} \rightarrow D_{OUT}$, $RL = 10\text{K}\Omega$
Fall time	T_{THZ}	—	—	120	μs	$CL = 300\text{pF}$, $OUTR/OUTG/OUTB/OUTW$
Data transmission rate	F_{MAX}	600	—	—	Kbps	Duty ratio 50%
Input capacity	C_I	—	—	15	pF	—

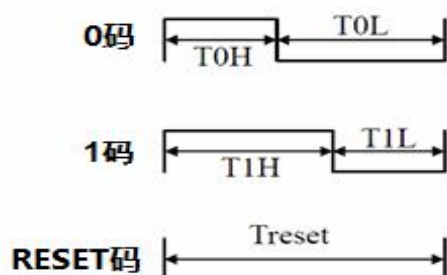
Data Transfer Time

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

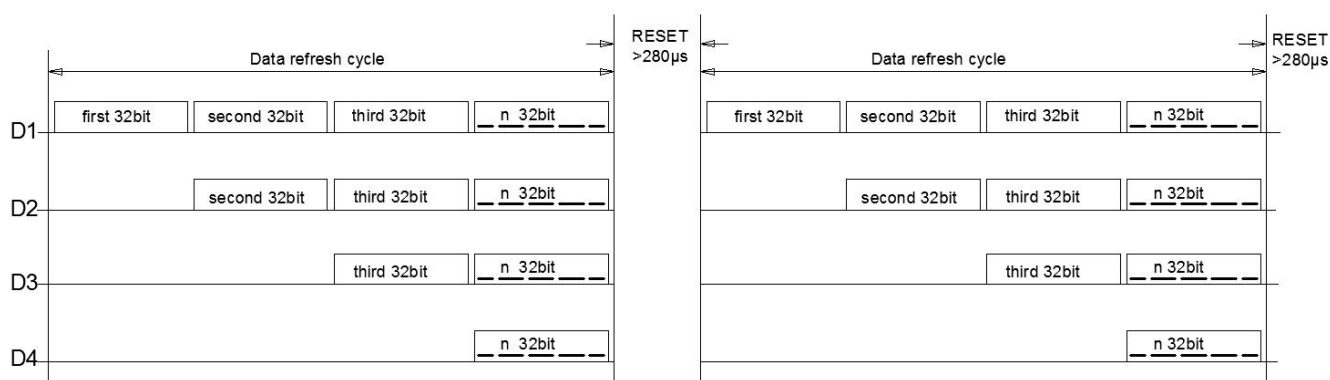
Cascade Method



Sequence Chart



Data Transmission Method



Note: The data of D1 is send by MCU, and D2, D3, D4 through IC internal reshaping amplification to transmit.

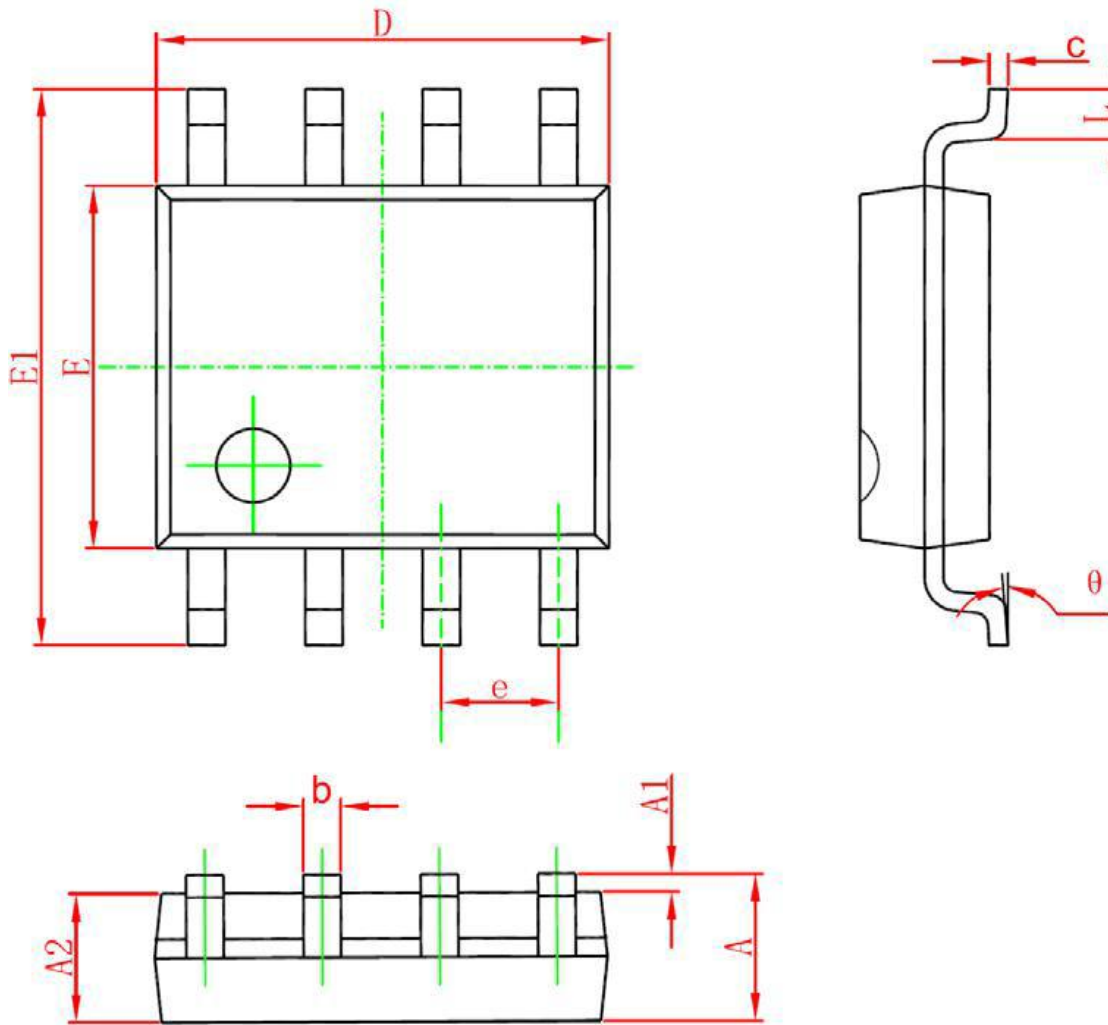
Composition of 32bit Data

Note: Data transmit in order of WRGB, high bit data at first.

W	W	W	W	W	W	W	W	R	R	R	R	R	R	R	R	G	G	G	G	G	G	G	B	B	B	B	B	B	B	B	
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Package information

- SOP8 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270		0.050	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Modify Records

Version №	Status Bar	Modify Content Summary	Date	Reviser	Approved
V1.0	N	New	20190410	Dong Le	Shen JinGuo
V1.1	M	Modify	20210118	Dong Le	Shen JinGuo

Remarks: Initial version: V1.0; Version number plus "0.1" after each revision;

Status bar: N--New, A--Add, M--Modify, D--Delete.