

Specification

Model No.: UCS8904B

Product: SOP8,16bit/ch, 4ch output

Document No.: SPC-TOP-C/230420

Issue Date :25-04-2023

Version: A-23



Greeled Approval		Customer Approval	
Aduit	Confirmation	Approval	Audit
Mr Chiang	Ms Lee		
Date:		<input type="checkbox"/> Qualified	<input type="checkbox"/> Disqualified
Reason:			

1.Feature:

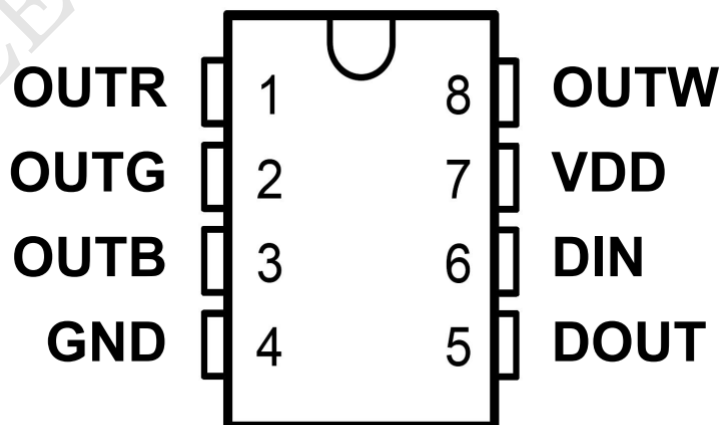
- SOP8 package,Four channel constant current output,default current 17mA/CH
- Single data signal SPI Protocol,The upgraded version of UCS2904B
- The data encoding adopt RZ code
- The PWM scanning frequency 4KHz
- It can support standard high speed data rate 800kbps
- 16bit/color,65536 Grayscale
- The R/G/B/W output ports withstand value max 30V
- Self-inspection mode when power on,Blue light on.
- Suitable for 5V,12V,24V circuits

2.Application:

Device, Huge event,TV studio

Indoor&outdoor decoration

3.Pin diagram and define:



No.	Symbol	Function description
1	OUTR	Red PWM control signal output
2	OUTG	Green PWM control signal output
3	OUTB	Blue PWM control signal output
4	GND	Ground
5	DOUT	Forwarding redundant data flow output
6	DIN	Data flow signal input
7	VDD	Power supply
8	OUTW	White PWM control signal output

4. Absolute max parameter (unless otherwise specified, Ta=25 °C Vss=0V):

Parameter	Symbol	Value	Unit
Logic power Voltage	VDD	+6.5	V
Output port withstand Voltage	VOUT	+30	V
Logic input voltage	VI	-0.5 ~ VDD+0.5	V
Working temperature	Topt	-40 ~ +85	°C
Storage temperature	Tstg	-50 ~ +85	°C
Static power consumption	Pd	400	mW
ESD pressure (body mode)	VESD	6000	V

5. Recommend operated range (if no special instructions, Vss=0V, Ta=-40 ~ +85 °C):

Parameter	Symbol	Min	Typ	Max	Unit
Working Voltage	VDD	-	5	-	V
High voltage level	VIH	0.7VDD	-	VDD	V
Low voltage level	VIL	0	-	0.3VDD	V
Withstand voltage	Vout		28		V

6. Electronics Parameter (if no special instructions, V_{ss}=0V, V_{dd}=4.5-5.5V Ta=-40~+85 °C):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Low level output current	I _{out}	16	17	18	mA	R/G/B/W Port
Low level output current	I _{do}	10	-	-	mA	V _o =0.4V, D _{out}
Sinking Current	I _i	-	-	1	μA	-
High level input voltage	V _{ih}	0.7V _{DD}	-	-	V	D _{in} , SET
Data creation time	V _{il}	-	-	0.3V _{DD}	V	D _{in} , SET
PWM scanning frequency	F _{pwm}	-	4	-	KHz	-
Static current	I _{DD}	-	1	-	uA	-
Current offset(CH to CH)	dI _{out}	-	±1.5	±3.0	%	V _{ds} =1V, I _{out} =17mA
Current offset(IC to IC)	dI _{out}	-	±3.0	±5.0	%	V _{ds} =1V, I _{out} =17mA
Current offset(VS-V _{ds})	%dV _{ds}	-	±0.1	±0.5	%/V	1V < V _{ds} < 3V
Current offset(VS-V _{dd})	%dV _{ds}	-	±1.0	±2.0	%/V	4.5V < V _{ds} < 5.5V
Dynamic Current loss	I _{DDdyn}	2	-	3	mA	DO off
Dynamic Power	P _d	-	300	-	mW	T _a =25 °C
Thermal resistance	R _{th(J-a)}	80	-	190	°C/W	-

7. Switch Parameter (if no special instructions, V_{ss}=0V, V_{dd}=4.5-5.5V Ta=-40~+85 °C):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Oscillation frequency	F _{osc1}	-	800	-	kHZ	V _{DD} =5V
	F _{osc2}	-	100	-	MHZ	V _{DD} =5V
Transmission delay	T _{flz}	-	-	300	ns	C ₁ =15pF, D _{IN} --D _{OUT}
Dropping time	T _{thz}	-	-	120	μs	C ₁ =300pF, R/G/B Ports
Data Rating	F _d	-	800	-	Kbps	50% Duty Ratio
Input capacitor value	C _i	-	-	15	pF	-

8.Data communication protocol description (SPI Protocol):

(1) The data format as below

Data Frame	Red	Green	Blue	White
	16bit	16bit	16bit	16bit

(2) 16bit Per color, R/G/B /W 65536 Grayscale setting

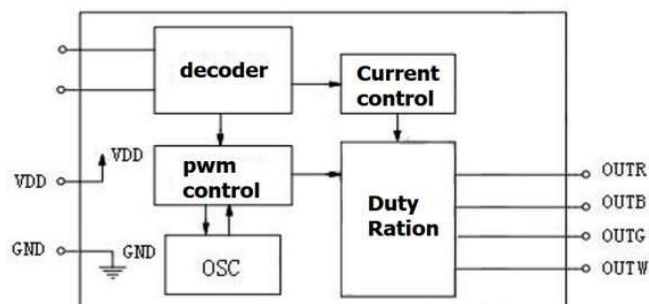
R/G/B grayscale setting (8bit) MSB-----LSB	Duty Ratio Brightness level
0000 0000 0000 0000	0/65535
0000 0000 0000 0001	1/65535
-----	-----
0000 0000 0101 0000	80/65535
0000 0000 0101 0001	81/65535
-----	-----
0000 0000 1010 0000	160/65535
-----	-----
1111 1111 1111 1111	65535/65535

(3) Color bit sending sequence

R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0
G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0
B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
W15	W14	W13	W12	W11	W10	W9	W8	W7	W6	W5	W4	W3	W2	W1	W0

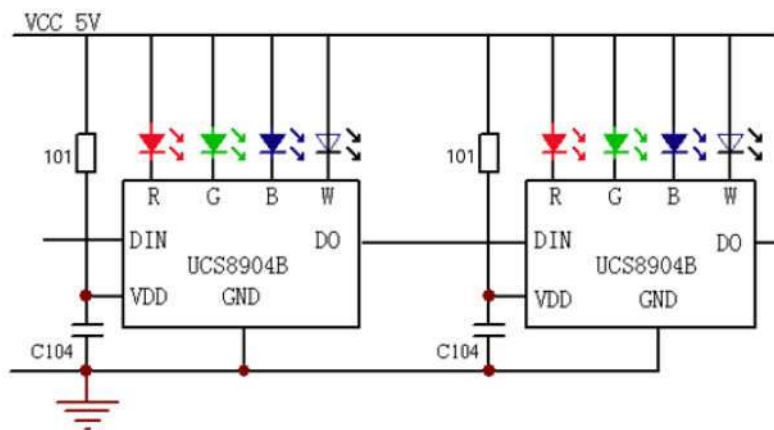
Note: The high bit is sent first, and the data is sent in the order of RGBW(R15 → R14 →.....W0)

(4) Block diagram

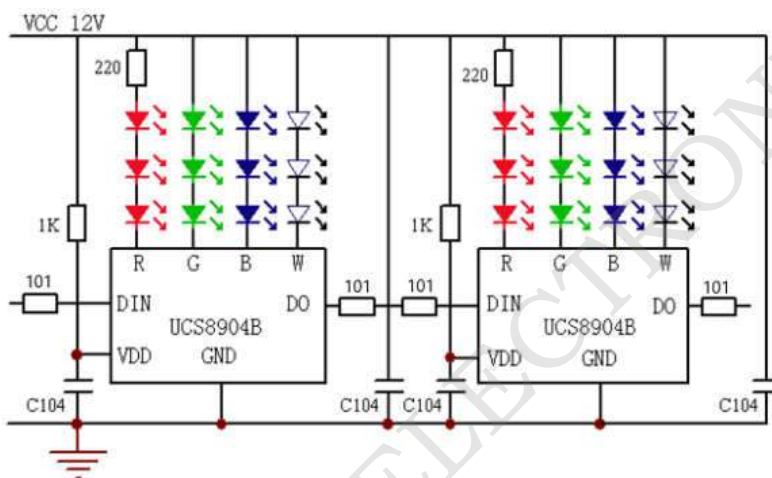


9. Typical application circuit:

1. DC5V 1Led/CH

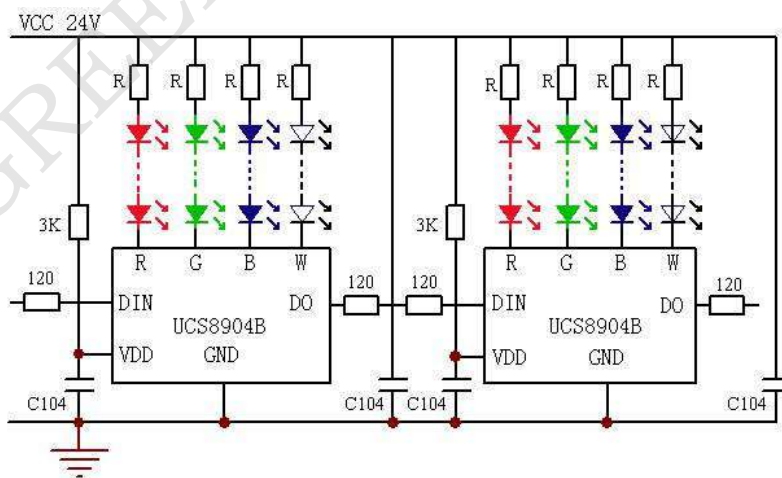


2. DC12V 3Leds/CH



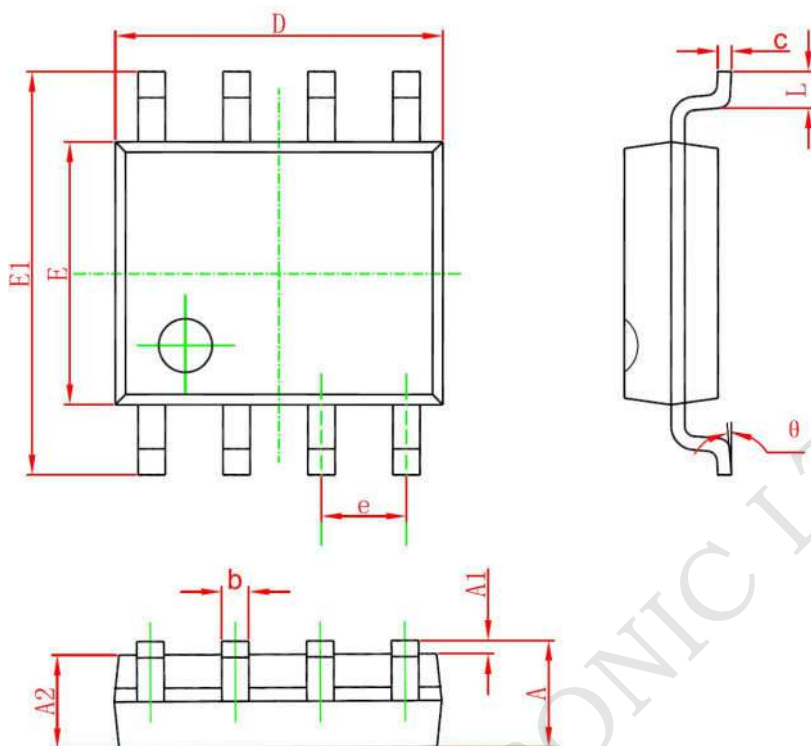
Input and signal output series with one 68-100ohm resistor, it will protect IC under special condition
104 capacitor between 12v and GND to prevent interference under current switch.

3. DC24V 4-6leds Per channel



Input and signal output series with one 12-33ohm resistor, it will protect IC under special condition
104 capacitor between 24v and GND to prevent interference under current switch.

10.Packaging and dimension:



Symbol	mm		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(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Model No.	Description	Qty/bag	Bag/Ctn
UCS8904B	SOP8,16bit/color,4CH output	4000pcs	5bag

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