



UCS2904B Product overview

UCS 2904B is a 4 channel LED driving and controlling constant current IC, with a built-in MCU digital interface, data latches and LED high voltage driving circuit. It features superior and reliable functions. Under the control of the external MCU, it performs independent grayscale control through data-cascading transfer for driving large outdoor color dot-matrix led panels.

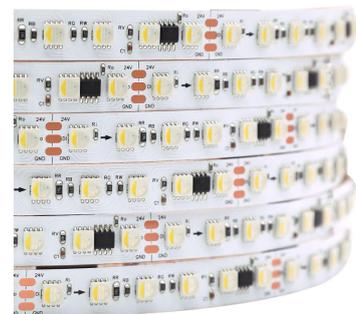
Adopt S-drive technology and enhanced receiving technology. Extending the pull wire distance between two Points more than 10m under 800K transmission sequence. Excellent product performance, reliable quality.

Function Characteristic

1. Single line data transmission (Return to Zero Code);
2. Shaping transmit specific technology, Cascade number of lamps and lanterns is not restricted;
3. Cascading ability enhancement technology, Any 2 lanterns spacing can be up to 10 meters;
4. Data transfer rate of 800 k/s, images of not less than 512 points can be realized when the refresh rate of 25 frames per second.
5. RGBW output port PWM can be achieved 256 gray level each port adjustment. Port scanning frequency of 1.8 KHZ/S.
6. Built in 5V stabilvoltage, Port max withstand voltage up to 26V
7. 17mA constant current per channel. High precision of constant current, differences of current between channel is less than $\pm 1.5\%$. the differences of current between chip is less than $\pm 3\%$.
8. When power on, IC self-inspection then LED light connection on the pin B port. Lighting Blue color.
9. S-AI anti-interference patent technology for single line data transmission.
10. Industries standard design, stable and reliable.

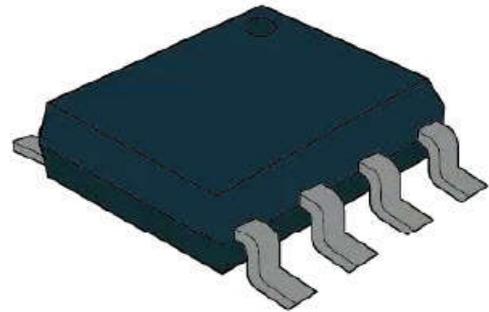
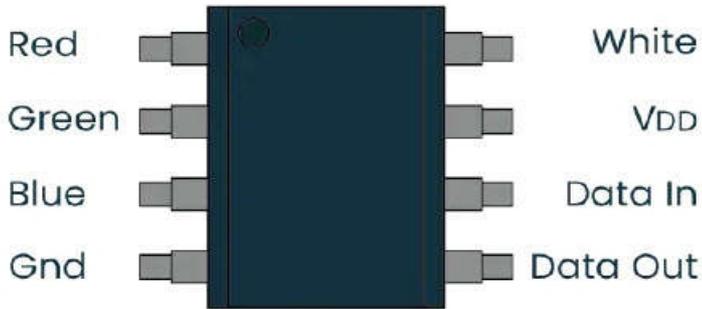
Application

1. Pixel lighting
2. LED flexible strip
2. Display





PIN define



UCS2904B		
NO.	Symbol	Description
1	OUTR	Red PWM Output
2	OUTG	Green PWM Output
3	OUTB	Blue PWM Output
4	GND	Ground
5	DOUT	Data Input (800K)
6	DIN	Data Output (800K)
7	VDD	Power
8	OUTW	White PWM Output

Absolute Maximum Ratings (Ta = 25 °C , Vss = 0 V)

Parameter	Symbol	Value	Unit
Logic supply voltage	V _{DD}	+ 7.0	V
Output port limitation voltage	V _{OUT}	28	V
Logic input voltage	V _I	- 0.5 to V _{DD} + 0.5	V
Operating temperature	T _{OPT}	- 40 to + 85	°C
Storage temperature	T _{STG}	- 55 to + 150	°C
antistatic	ESD	6 0 0 0	V
output rating	Pd	4 0 0	mW



Recommend operation Ratings ($T_a = -40 \sim +85 \text{ }^\circ\text{C}$, $V_{ss} = 0 \text{ V}$)

Parameter	Symbol	MIN	TYP	MAX	UNIT	Condition
Logical Volt	V_{dd}	2.6	5.5	6	V	-
Input voltage level	V_{ih}	$0.7V_{dd}$	-	V_{dd}	V	-
	V_{il}	0	-	$0.3V_{dd}$	V	-
Withstand Volt	V_{out}	26			V	

Electrical Characteristics ($T_a = -40 \sim +85 \text{ }^\circ\text{C}$, $V_{ss} = 0 \text{ V}$, $V_{dd} = 4.5 \sim 5.5 \text{ V}$)

Symbol	MIN	TYP	MAX	UNIT	Condition
I_{out}		17		mA	R, G, B, W
I_{do}	20	-	-	mA	$V_o = 0.4\text{V}$, D_{out}
I_i	-	-	± 1	μA	
I_{sink}		17		mA	
V_{ih}	$0.7V_{dd}$	-		V	D_{in} , SET
V_{il}	-	-	$0.3V_{dd}$	V	D_{in} , SET
V_h	-	0.35	-	V	D_{in} , SET
dI_{out}		± 1.5	± 3.0	%	$V_{ds}=1\text{V}$, $I_{out}=17\text{mA}$
dI_{out}		± 3.0	± 5.0	%	$V_{ds}=1\text{V}$, $I_{out}=17\text{mA}$
$\%dV_{ds}$		± 0.1	± 0.5	%/V	$1\text{V} < V_{ds} < 3\text{V}$
$\%dV_{ds}$		± 1.0	± 2.0	%/V	$4.5\text{V} < V_{dd} < 5.5\text{V}$
I_{DDdyn}	无负载			1	mA
PD	($T_a=25^\circ\text{C}$)			250	mW
$R_{th(j-a)}$		80		190	$^\circ\text{C/W}$



Switch Characteristics ($T_a = -40 \sim +85 \text{ }^\circ\text{C}$, $V_{ss} = 0 \text{ V}$, $V_{dd} = 4.5 \sim 5.5 \text{ V}$)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
Propagation delay time	t_{PLZ}	-	-	300	ns	$C_L = 15 \text{ pF}$, $DIN \rightarrow DOUT$, $R_L = 10 \text{ k}\Omega$
Fall time	t_{THZ}	-	-	120	μs	$C_L = 300 \text{ pF}$, OUTR/OUTG/OUTB
Data transfer rate	F_{MAX}	800	-	-	kbps	50 % duty cycle
Input capacitance	C_i	-	-	15	pF	-

Constant current characteristic

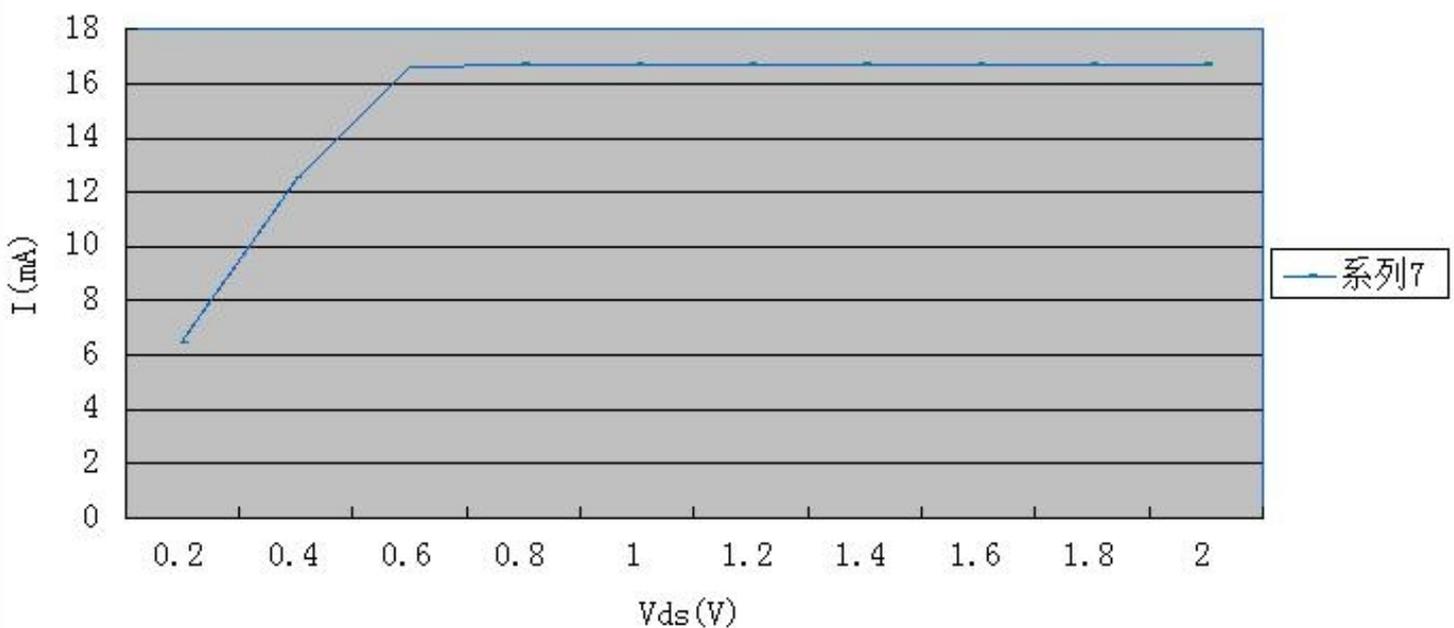
UCS2904B constant current characteristic is excellent. Between channel, even between chip, the difference of current is tiny.

(1): the differences of current : Between channel is less than $\pm 1.5\%$; the difference of current between chip is less than $\pm 3\%$.

(2): When the voltage of load change, UCS2904B output current is not affected, as shown in the figure1

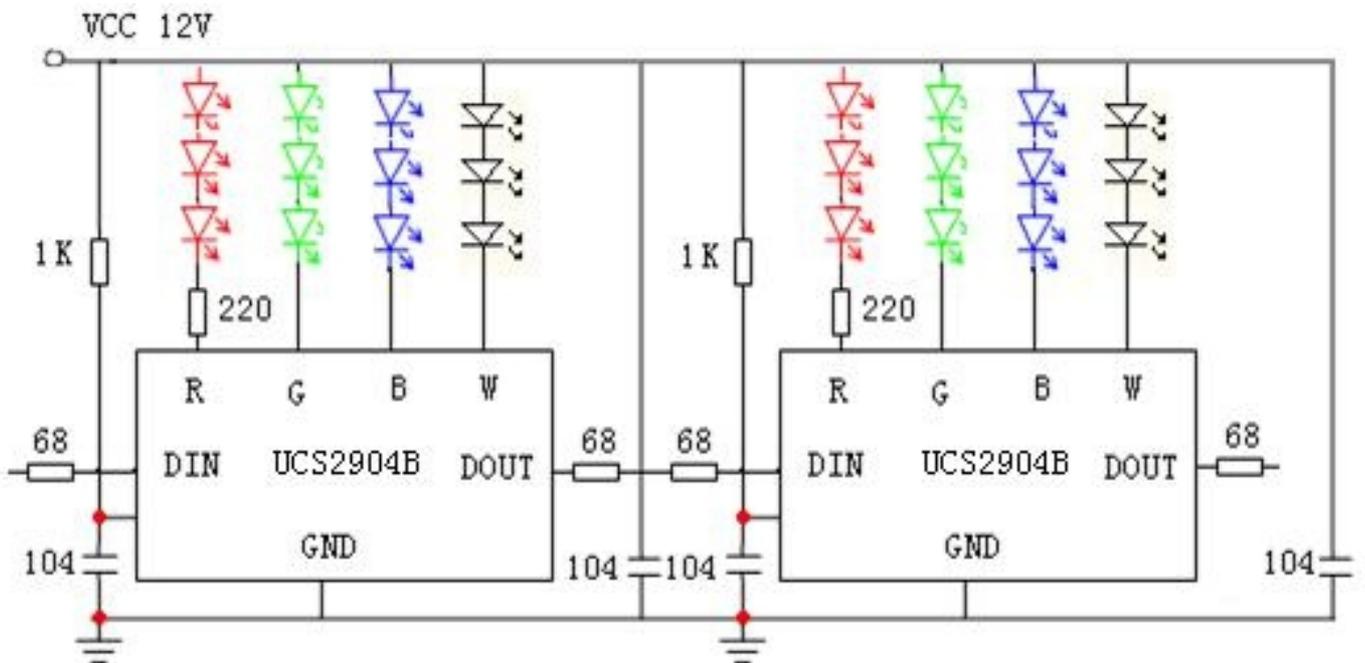
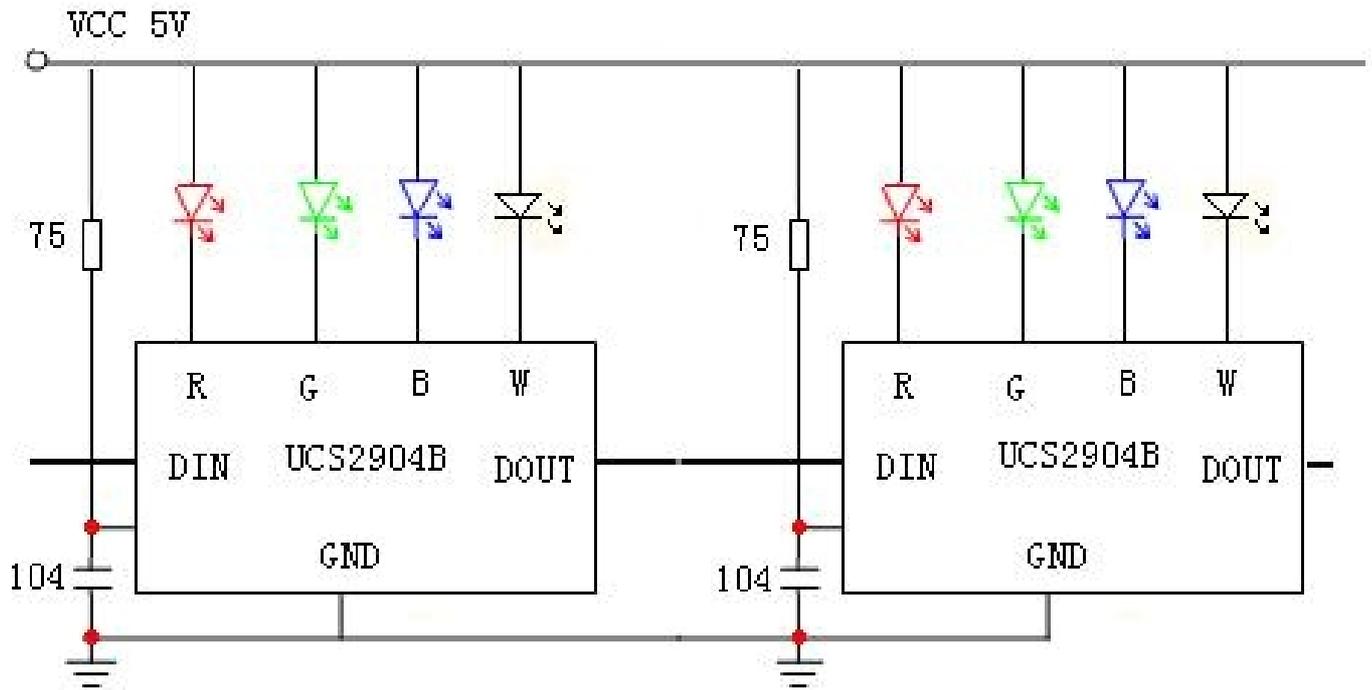
(3): Below UCS2904B output port of the current Iout and add on the port voltage Vds curve relationship, the smaller the Iout current, the smaller in the condition of constant current need of Vds.

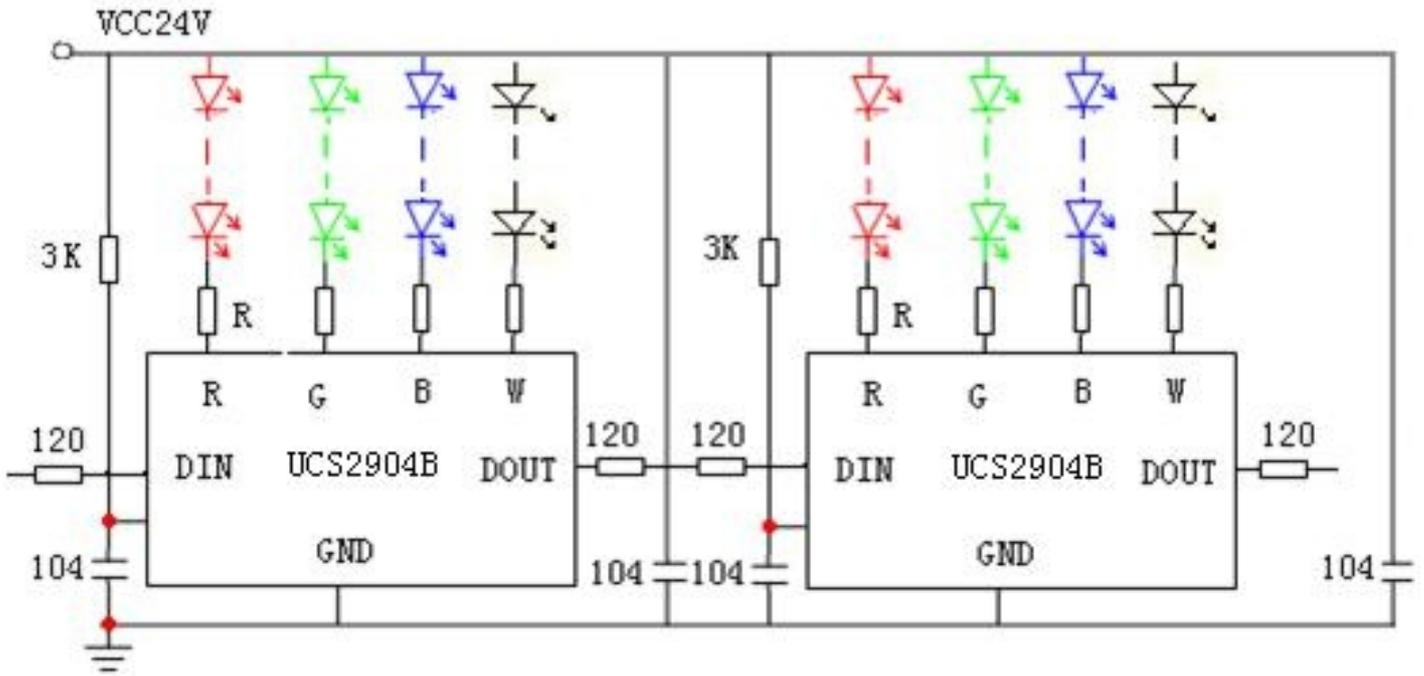
UCS2904B Iout与Vds的关系





Application Circuit





Footprint (SOP 8)

