

## Specification

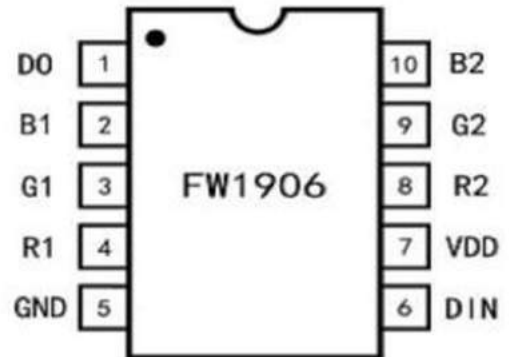
Model No.: FW1906

Product: SOP10,8bit/ch, 6ch output

Document No.: SPC-TOP-C/230421

Issue Date :25-04-2023

Version: A-23



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

## 1.Feature:

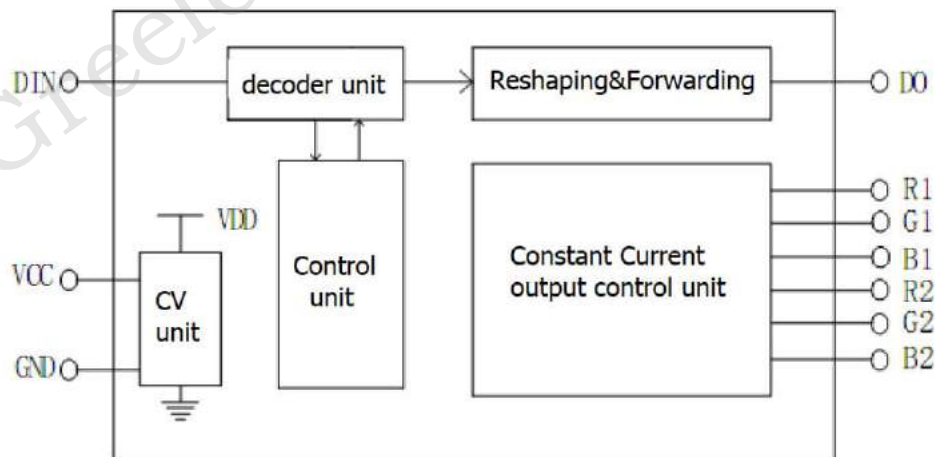
- SOP10 package,six channel constant current output,default current 18mA/CH
- Single data signal SPI Protocol.
- The data encoding adopt RZ code
- The PWM scanning frequency 2.6KHz
- It can support standard high speed data rate 800kbps
- 8bit/color,256 Grayscale
- The R/G/B output ports withstand value max 24V
- Self-inspection mode when power on,white light on.
- Suitable for 12V,24V circuits
- Don't need capacitor between VCC and GND

## 2.Application:

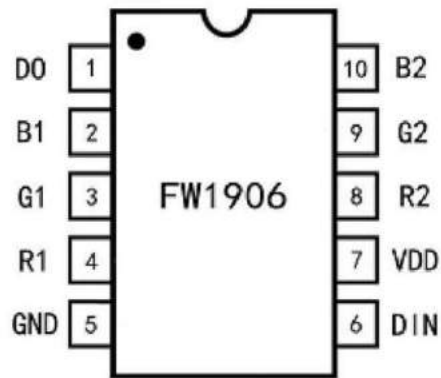
Device, Huge event lighting,TV studio lighting

Indoor&outdoor decoration lighting

## 3.Block diagram:



#### 4. Pin and define



No.	Symbol	Function description
1	DOUT	Forwarding redundant data flow output
2	OUTB1	Blue PWM control signal output
3	OUTG1	Green PWM control signal output
4	OUTR1	Red PWM control signal output
5	GND	Ground
6	DIN	Data flow signal input
7	VDD	Power supply
8	OUTR2	Red PWM control signal output
9	OUTG2	Green PWM control signal output
10	OUTB2	Blue PWM control signal output

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

Parameter	Symbol	Value	Unit
Logic power Voltage	VCC	+24	V
Data Port input Voltage	Vin	-0.5~+5.5	V
Logic input voltage	VI	-0.5~+24	V
Working temperature	Topt	-40~+85	°C
Storage temperature	Tstg	-50~+85	°C
ESD pressure ( body mode )	VESD	4000	V

### 5. Recommend operated range (if no special instructions, Ta=-40~+85℃):

Parameter	Symbol	Min	Typ	Max	Unit
Working Voltage	VCC	10	24	27	V
High voltage level	VIH	3	-	5.5	V
Low voltage level	VIL	0	-	1.5	V
R/G/B Port Voltage	Vout	-	-	24	V

### 6. Electronics Parameter (if no special instructions, Vcc=10-15V Ta=-40~+85℃):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
High level output current	Ioh	-	4.5	-	mA	VCC=24V, Vdo=3V
Low level output current	Ilo	-	11.6	-	mA	VCC=24V, Vdo=0.4V
R/G/B Port output current	Iout	-	18	-	mA	R,G,B=ON, Vout=3.0V
High level input voltage	Vih	3	-	-	V	VCC=24V
Low level input voltage	Vil	-	-	1.5	V	VCC=24V
PWM scanning frequency	Fpwm	-	2.6	-	KHz	R,G,B
Current offset(CH to CH)	dIout	-	±1.5	±3.0	%	Vdo=3V, Iout=18mA
Current offset(IC to IC)	dIout	-	±3.0	±5.0	%	Vdo=3V, Iout=18mA
Current offset(VS-Vds)	%dVds	-	±0.1	±0.5	%/V	
Current offset(VS-Vdd)	%dVds	-	±1.0	±2.0	%/V	
Static current	IDD	1.55	1.86	2.34	mA	VCC=24V, GND=0V
Dynamic Power	Pd	-	300	-	mW	Ta=25℃
Thermal resistance	Rth(J-a)	80	-	190	℃/W	

## 7.Switch Parameter(if no special instructions, VCC=10-15V Ta=-40~+85℃):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Oscillation frequency	Fosc	-	800	-	KHZ	
Transmission delay	Tpzl	-	-	600	ns	C1=15pF,DIN--DOUT
Data Rating	Fd	-	800	-	Kbps	
Input capacitor value	Ci	-	-	15	pF	

## 8.Data communication protocol description ( SPI Protocol):

(1) The data format as below

Data Frame	R2	G2	B2	R1	G1	B1
	8bit	8bit	8bit	8bit	8bit	8bit

(2) 8bit Per color, R/G/B / 256 Grayscale setting

R/G/B grayscale setting (8bit) MSB-----LSB	Duty Ratio Brightness level
0000 0000	0/255
0000 0001	1/255
-----	-----
0101 0000	80/255
0101 0001	81/255
-----	-----
1010 0000	160/255
-----	-----
1111 1111	255/255

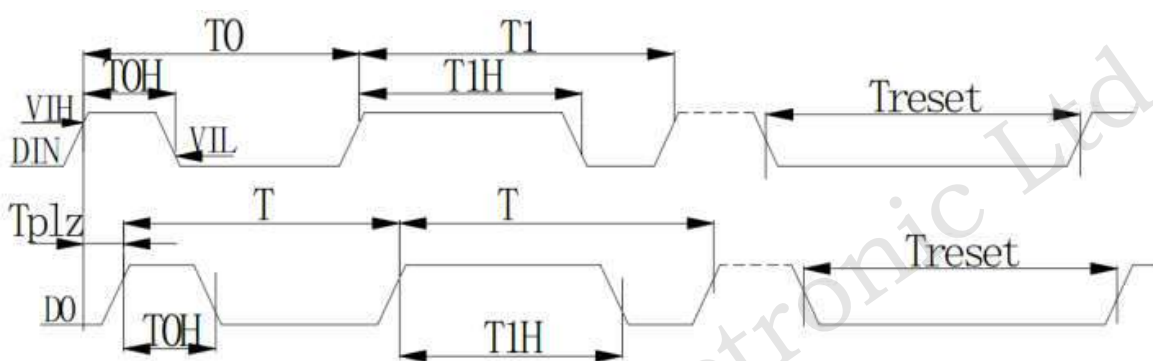
(3) Color bit sending sequence

R2-7	R2-6	R2-5	R2-4	R2-3	R2-2	R2-1	R2-0	G2-7	G2-6	G2-5	G2-4	G2-3	G2-2	G2-1	G2-0
B2-7	B2-6	B2-5	B2-4	B2-3	B2-2	B2-1	B2-0	R1-7	R1-6	R1-5	R1-4	R1-3	R1-2	R1-1	R1-0
G1-7	G1-6	G1-5	G1-4	G1-3	G1-2	G1-1	G1-0	B1-7	B1-6	B1-5	B1-4	B1-3	B1-2	B1-1	B1-0

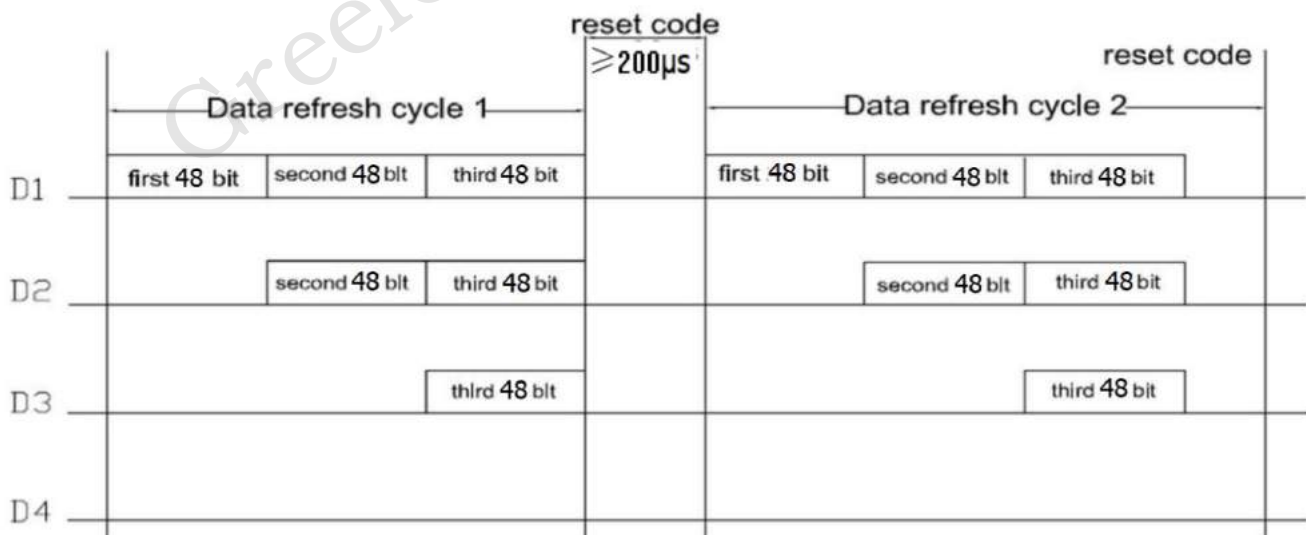
Note: The high bit is sent first, and the data is sent in the order of RGB(R2-7 → R2-6 →.....B1-0)

## 9.Data transmission time( $T_H+T_L\geq 1.25\mu s$ )

Name	Description	Min	Typical	Max	Allowable error	Unit
T0H	0 code, high level time	0.32	0.36	0.40	$\pm 0.05$	$\mu s$
T1H	1 code, high level time	0.64	0.72	0.80	$\pm 0.05$	$\mu s$
T0L	0 code, low level time	-	0.97	-	$\pm 0.05$	$\mu s$
T1L	1 code, low level time	-	0.61	-	$\pm 0.05$	$\mu s$
TRST	Reset code, low level time	200	-	-	-	$\mu s$

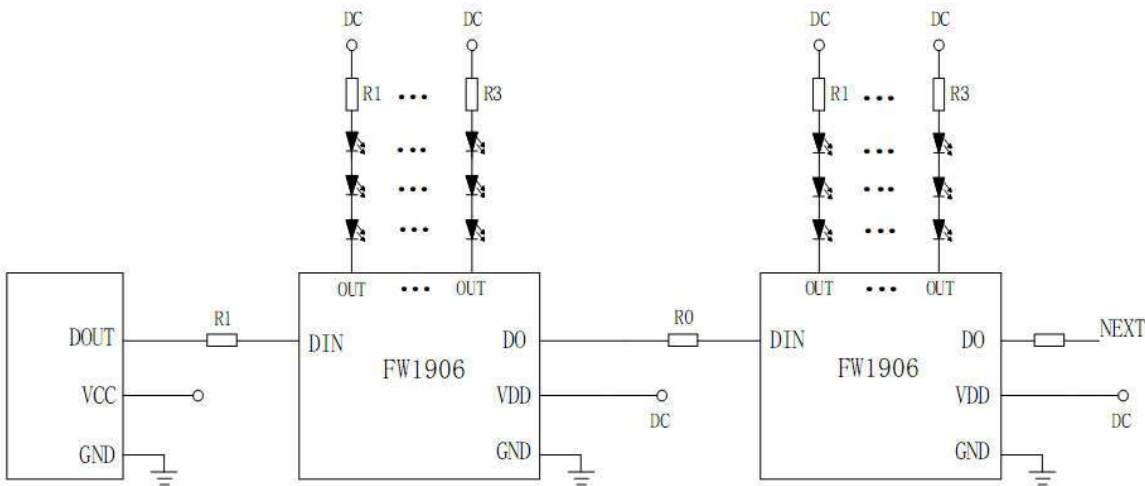


## 10.Data transmission method



Note: Low Level time among bytes don't exceed 50us , it is possible to reset. The data can't be transmitted under correct way. The data encoding adopt RZ code (Return to Zero)

## 11. Typical application circuit:



How to calculate the resistor value:

$$VCC - N * V_{led-min} - V_R < V_{ds}$$

$$V_R = I * R \text{ (R means the value of resistor divider)}$$

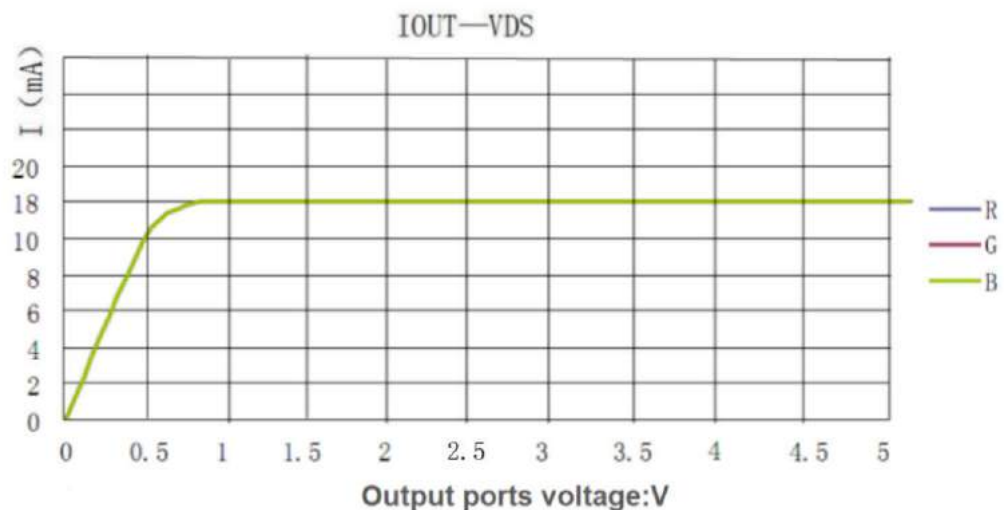
$$R > (VCC - N * V_{led-min}) / I$$

VCC means Power supply voltage,  $V_{led-min}$  (Min LED Forward voltage)

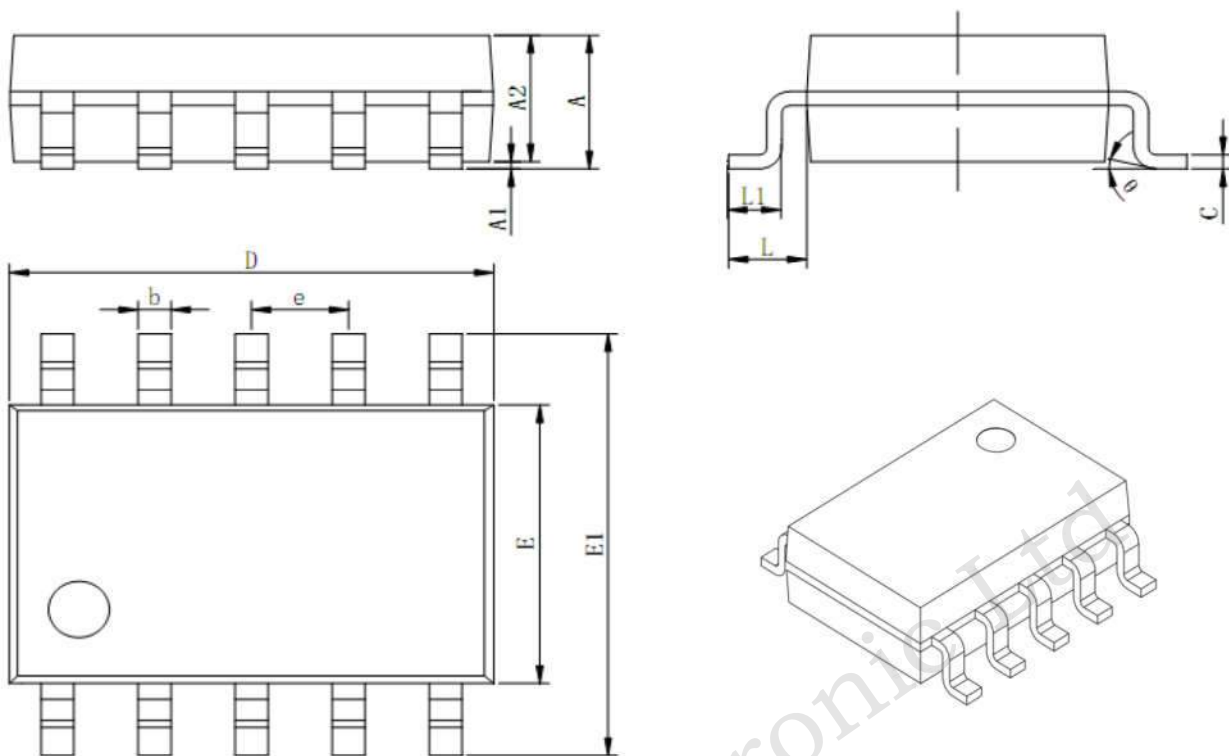
N: Quantity of led in series  $V_{ds}$  : Max voltage of output ports at constant current status

We can default  $V_{ds} = 1.5V$ ,  $I = 18mA$ : The constant current value of output ports

**Constant current curve as below:**



## 12.Packaging and dimension:



Symbol	SOP10			
	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	-	1.75	-	0.067
A1	0.10	0.225	0.004	0.009
A2	1.30	1.50	0.051	0.059
b	0.39	0.48	0.015	0.019
c	0.21	0.26	0.008	0.010
D	4.70	5.10	0.185	0.201
E	3.70	4.10	0.146	0.161
e	1.0 (BSC)		0.039 (BSC)	
E1	5.80	6.20	0.228	0.244
L1	0.50	0.80	0.197	0.032
L	1.05 (BSC)		0.041 (BSC)	
θ	0°	8°	0°	8°

Model No.	Description	Qty/bag	Bag/Ctn
FW1906	SOP10,8bit/color,6CH output	4000pcs	5bag

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