GREELED
格瑞电子

Specification
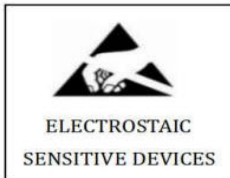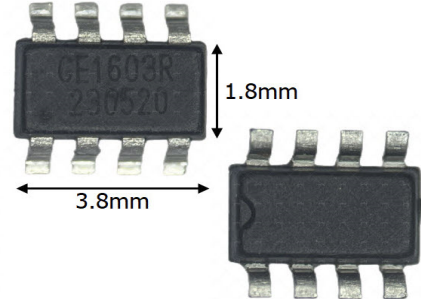
Model No.: GE1603R

Product: SOP8,Mini,3CH output

Document No.: SPC-TOP-C/2306002

Issue Date :01-06-2023

Version: A-23

GE1603R
230520

1.8mm

3.8mm

ELECTROSTAIC
SENSITIVE DEVICES

RoHS

CE

Greeled Approval		Customer Approval	
Aduit	Confirmation	Aprroval	Audit
Mr Chiang	Ms Lee		
Date:		□ Qualified	□ Disqualified
Reason:			

1.Feature:

■ Mini SOP8 package,Three channel constant current output,default current 16.5mA/CH

■ Single data signal SPI Protocol

■ it have redundant data to prevent signal interrupt (Break point signal transmission continuously)

■ The data encoding adopt RZ code

■ The PWM scanning frequency 4KHz

■ It can support standard high speed data rate 800kbps

■ 8bit/color,256 Grayscale

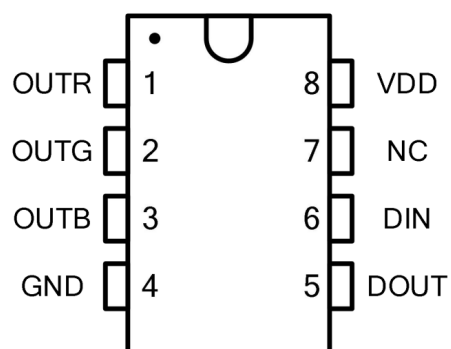■ The R/G/B output ports withstand value max 28V

2.Application:

LED Control circuit

The Toys circuit

Display

3.Pin diagram and define:

OUTR	1	8	VDD
OUTG	2	7	NC
OUTB	3	6	DIN
GND	4	5	DOUT

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	NC	Redundant Data
8	VDD	Power supply

4.Absolute max parameter (unless otherwise specified, Ta=25℃):

Parameter	Symbol	Value	Unit
Logic power Voltage	VDD	3～12	V
Output port withstand Voltage	VOUT	+28	V
Logic input voltage	VI	-0.5～VDD+0.5	V
Working temperature	Topt	-40～+85	℃
Storage temperature	Tstg	-50～+85	℃
Static power consumption	Pd	200	mW
ESD pressure（body mode）	VESD	3000	V

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

Parameter	Symbol	Min	Typ	Max	Unit
Working Voltage	VDD	-	5	7	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, Vss=0V, Vdd=4.5-5.5V Ta=-40～+85℃):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Low level output current	Iout	16	16.5	17	mA	R/G/B Port
Low level output current	Ido	10	-	-	mA	
Sinking Current	Ii	-	-	1	μA	-
High level input voltage	Vih	0.7VDD	-	-	V	Din,SET
Data creation time	Vil	-	-	0.3VDD	V	Din,SET
PWM scanning frequency	Fpwm	-	4	-	KHz	-
Static current	IDD	-	1	-	uA	
Current offset(CH to CH)	dIout	-	±1.5	±3.0	％	Vds=1V,Iout=16.5mA
Current offset(IC to IC)	dIout	-	±3.0	±5.0	％	Vds=1V,Iout=16.5mA
Current offset(VS-Vds)	％dVds	-	±0.1	±0.5	％/V	1V＜Vds＜3V
Current offset(VS-Vdd)	％dVds		±1.0	±2.0	％/V	4.5V＜Vds＜5.5V
Dynamic Current loss	IDDdyn	1	-	2	mA	DO off
Dynamic Power	Pd	-	200	-	mW	Ta=25℃
Thermal resistance	Rth(J-a)	80	-	190	℃/W	

7.Switch Parameter(if no special instructions, Vss=0V, Vdd=4.5-5.5V Ta=-40～+85℃):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Oscillation frequency	Fosc1	-	800	-	kHZ	VDD=5V
Transmission delay	Tflz	-	-	200	ns	DIN--DOUT
Dropping time	Tthz	-	-	300	μs	
Data Rating	Fd	-	800	-	Kbps	
Input capacitor value	Ci	-	-	15	pF	

8.Data communication protocol description (SPI Protocol):

⑴ The data format as below

Data Frame	Red	Green	Blue
	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

R7	R6	R5	R4	R3	R2	R1	R0
G7	G6	G5	G4	G3	G2	G1	G0
B7	B6	B5	B4	B3	B2	B1	B0

Note: The high bit is sent first, and the data is sent in the order of RGB(R7 → R0 →……B0)

(4) The data timing

| Name		Min	Standard Value	Max	Unit
T	Code Period	1.20	-	-	μs
T0H	0 code,High level time	0.20	-	0.35	μs
T0L	0 code,low level time	0.6	-	1.5	μs
T1H	1 code,high level time	0.55	-	1.0	μs
T1L	1 code,low level time	0.3	-	1.5	μs
Trst	Reset,low level time	350	-	-	μs

1. The protocol uses a unipolar zeroing code. Each symbol must have a low level. Each symbol in this protocol starts with a high level. The high time width determines the "0" or "1" code. .

2. When writing programs, the minimum symbol period is 1.2μs.

3. The high time of "0" code and "1" code should be in accordance with the stipulated range in the above table. The low time requirement of "0" code and "1" code is less than 20μs

(5) Code waveform:
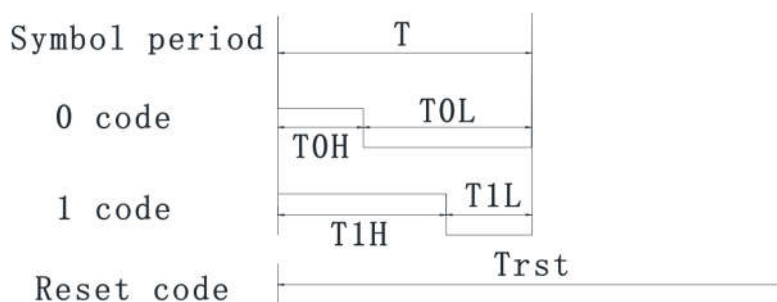
(6) The data transmission method
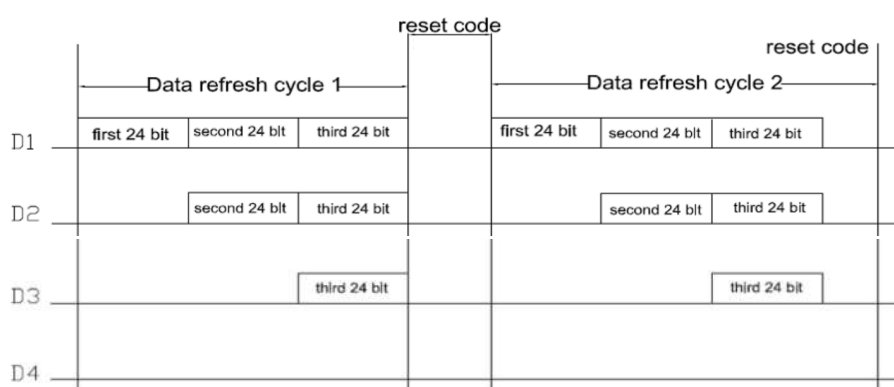
Note: D1 is the data sent by the MCU, and D2, D3, and D4 are the data that the cascade circuit
automatically reshapes and forwards.

GREELED ELECTRONIC LTD

Add: 2F,1st Building logistic park,shiyan town,shenzhen city
E-mail:sales@gree-leds.com   Skype:greeledelectronic