

Specification

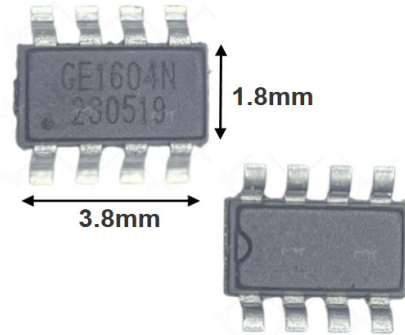
Model No.: GE1604N

Product: SOP8, Mini, 4CH output

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

1.Feature:

- Mini SOP8 package,Four channel constant current output,default current 16.5mA/CH
- Single data signal SPI Protocol
- 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/W output ports withstand value max 28V
- No light without signal Input

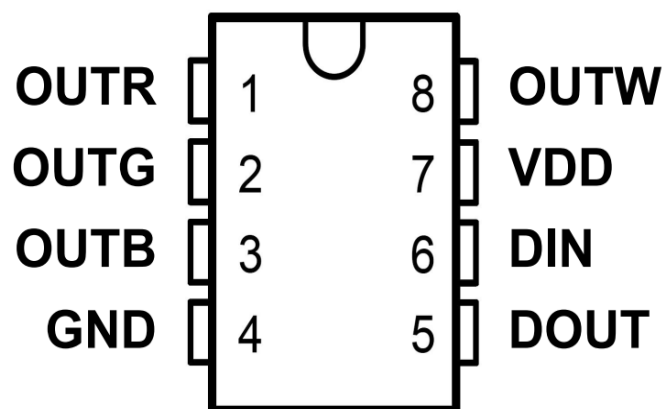
2.Application:

LED Control circuit

The Toys circuit

Display

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℃):

Parameter	Symbol	Value	Unit
Logic power Voltage	VDD	-0.5~7.5	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	300	mW
ESD pressure (body mode)	VESD	3000	V

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

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, Vss=0V, Vdd=4.5-5.5V Ta=-40~+85°C):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Low level output current	Iout	16	16.5	17	mA	R/G/B/W Port
Low level output current	I _{do}	8	-	-	mA	V _o =0.4V, D _{out}
Sinking Current	I _i	-	-	1	μA	-
High level input voltage	V _{ih}	0.7VDD	-	-	V	Din, SET
Data creation time	V _{il}	-	-	0.3VDD	V	Din, 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-Vds)	%dV _{ds}	-	±0.1	±0.5	%/V	1V < V _{ds} < 3V
Current offset(VS-Vdd)	%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, Vss=0V, Vdd=4.5-5.5V Ta=-40~+85°C):

Parameter	Symbol	Min	Typical	Max	Unit	Test Conditions
Oscillation frequency	F _{osc1}	-	800	-	kHZ	VDD=5V
Transmission delay	T _{flz}	-	-	200	ns	C1=15pF, DIN--DOUT
Dropping time	T _{thz}	-	-	120	μs	C1=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
	8bit	8bit	8bit	8bit

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

R/G/B/W 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
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(R7 → R0 →.....W0)

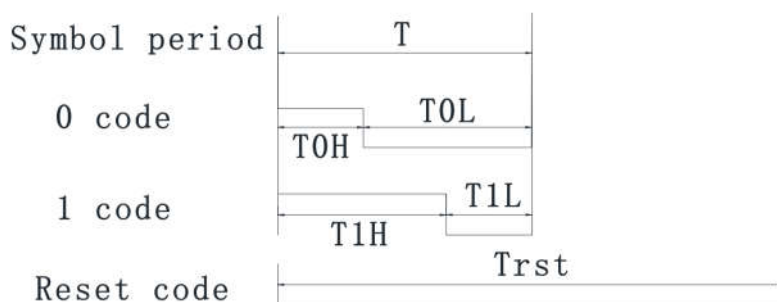
(4) The data timing

Name	Min	Standard Value	Max	Unit
T	Code Period	1.20	-	μs
T0H	0 code,High level time	0.25	0.3	μs
T0L	0 code,low level time	0.85	-	μs
T1H	1 code,high level time	0.85	0.9	μs
T1L	1 code,low level time	0.25	-	μs
Trst	Reset,low level time	300	-	μs

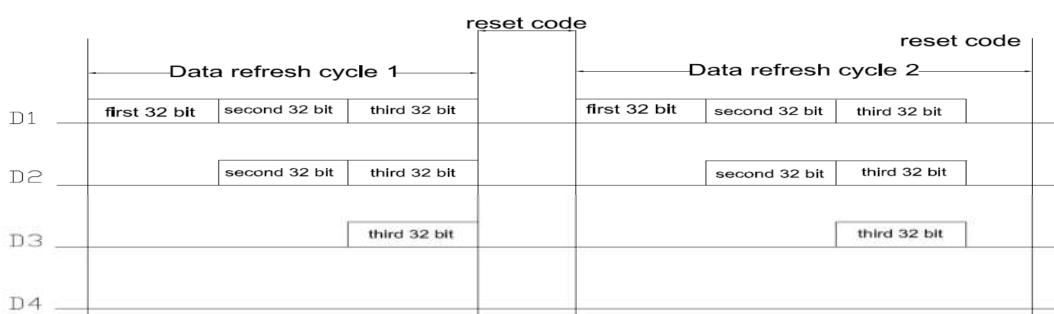
1. The protocol uses a unipolar zeroing code. Each symbol must have a low level. Each symbol in this protocol starts with a high level. The high time width determines the "0" or "1" code. .
2. When writing programs, the minimum symbol period is 1.2 μs .
3. The high time of "0" code and "1" code should be in accordance with the stipulated range in the above table. The low time requirement of "0" code and "1" code is less than 20 μs

(5) Code waveform:

Input code:



(6) The data transmission method



Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

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