

FEATURES:

- 2-wire Control Mode, No address needed.
- RGB 3 Channel 8 bit PWM Dimming.
- Few external components.
- 2048 chips cascade capability.
- 768Kbps~4Mbps transmission speed.
- LED pin are open-drain output pads with 24mA drive capabilities.
- Work voltage 4.5~5.5V
- SOP10 package

GENERAL DESCRIPTION:

The SD600 is a highly integrated low power single-chip solution for LED light control. It just uses 2 wires to realize data communication, one line for data transmission, one line for clock synchronization. This character makes the cascade chain more flexible and the chip more easy to use. The SD600 integrates data sample and align mechanism, phase adapter, shifter, and PWM modules. Transmission space is 5 meters in 768kbps on CAT-5 Line.

APPLICATIONS:

- LED Strip
- LED Tube
- LED String
- LED Pixel Lamp
- LED Control Module

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Introduction

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The operation frequency of SD600 can up to 4.096MHZ. And the data transfer rate can be 4.096Mbit/s.

Internal frequency relationship:

Input clock frequency	PWM clock
F_{in}	$F_{in} / 2$

Example:

Input clock frequency	PWM clock
F_{in}	$F_{in} / 2$
4.096MHZ	2.048MHZ

Table 1: Frequency relationship

Pin description



Figure 1 : SD600 pin distribution platform

Pin names	Pin location	Direction	Description	Comments
SDI	1	INPUT	Serial data input	
CLKI	2	INPUT	Clock, used to synchronize input serial data	
Ctrl_Polarity	3	INPUT	LED Polarity choose 0: connect to LED directly 1: with external driving transistor	
SDO	9	OUTPUT	Serial data output	Buffered
CLKO	8	OUTPUT	Clock, used to synchronize output serial data	Buffered
RED	7	OUTPUT	RED LED PWM control signal	Buffered
GREEN	4	OUTPUT	GREEN LED PWM control signal	Buffered
BLUE	6	OUTPUT	BLUE LED PWM control signal	Buffered
VCC	10	-	+5V power supply	
GND	5	-	Ground	

Table 2: Pin description

ELECTRONIC SPECIFICATION

Recommended Operating Conditions

Symbol	Parameter	Minimum	Maximum	Condition
V _{DD}	Power Supply	4.5v	5.5v	
V _{IL}	Low level input voltage CMOS input CMOS_SCHMITT	-0.5v -0.5v	0.2 x VDD 1.25v	Guaranteed input Low Voltage
V _{IH}	High level input voltage CMOS input CMOS_SCHMITT	0.7 x VDD 2.05v	VDD + 0.5v VDD + 0.5v	Guaranteed input High Voltage
V _{OL}	Low level output voltage CMOS output		1.5v	Guaranteed input Low Voltage
V _{OH}	High level output voltage CMOS output	3.5v		Guaranteed input High Voltage
T _{OP}	Operation Temperature	0° C	85° C	

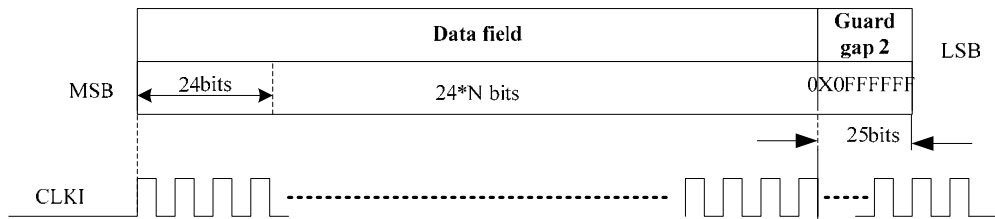
Absolute Maximum Ratings

Symbol	Parameter	Minimum	Maximum	Condition
T _J	Junction Temperature	0° C	125° C	
TSTG	Storage Temperature	-65° C	150° C	
I/O	I/O latching performance	-	500 mA	
VESD	I/O ESD protection. Electrostatic Discharge Voltage	-	2.5 kV HBM	
I _{ccq}	Quiescent VCC supply current	-	200uA	TA of 25°C at VCCINT = 1.2 V, VCCO = 3.3V,

Function Description:

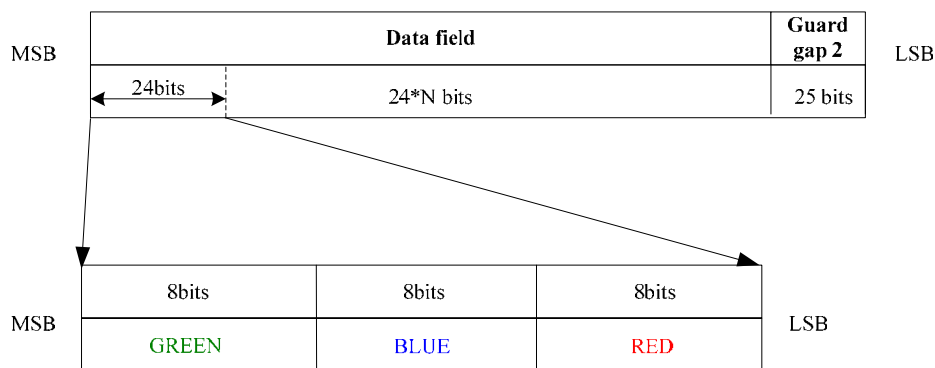
1. Data frame structure

Frame structure:



*Note: N is number of pixel

If CLKI=4.096MHZ, a SD600 cascade chain can control $(4096000-25)/24= 170665$ pixels according to the frame structure in one second. Or drive 512 pixels $4096000/ (25+24*512) =332$ times/s.



*Note: N is number of pixel

Input signals relationship:

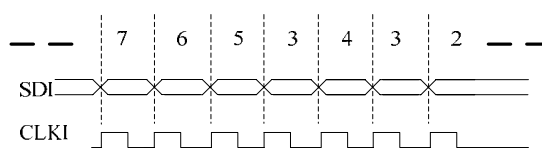
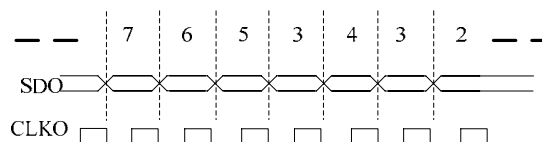


Figure 2: Timing of input signals

*Note: the CLKI signal should always keep oscillating.

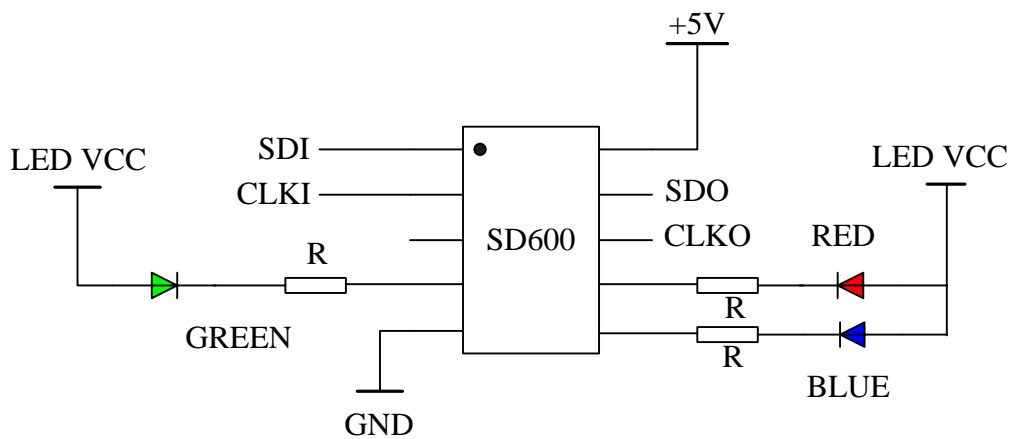


There are there 8-bit registers control the LED flash duty cycle. The relationship between LED light and LED control register value see below:

LED value 8 bits	Description		
	Number of '1'	Number of '0'	Duty cycle
0	0	255	0
1	1	254	1/255
2	2	253	2/254
3	3	252	3/253
4	4	251	4/252
5	5	250	5/251
6	6	249	6/250
.....
248	248	7	248/7
249	249	6	249/6
250	250	5	250/5
251	251	4	251/4
252	252	3	252/3
253	253	2	253/2
254	254	1	254/1

Cascade chain description

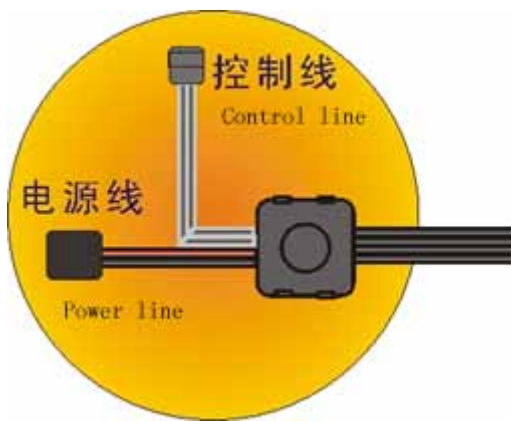
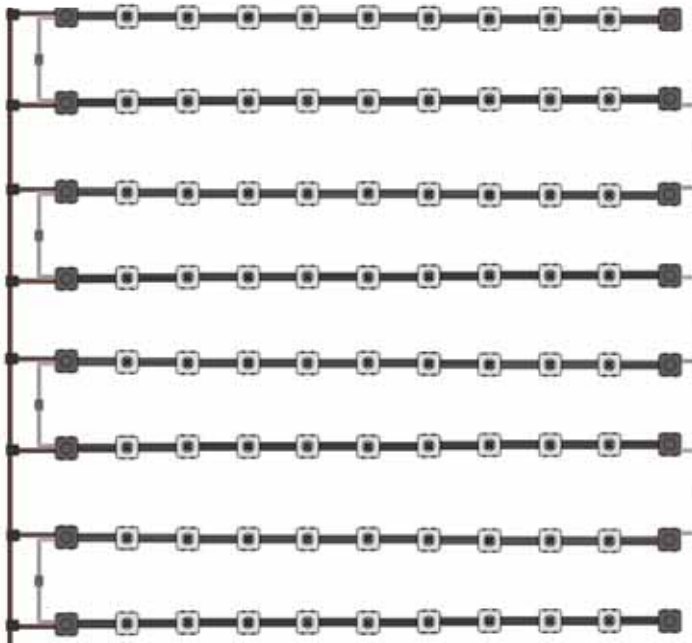
One chip configuration:



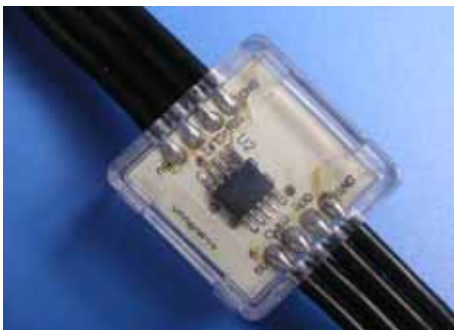
The serial resistors are current limit function.

Cascade chain description:

5DC

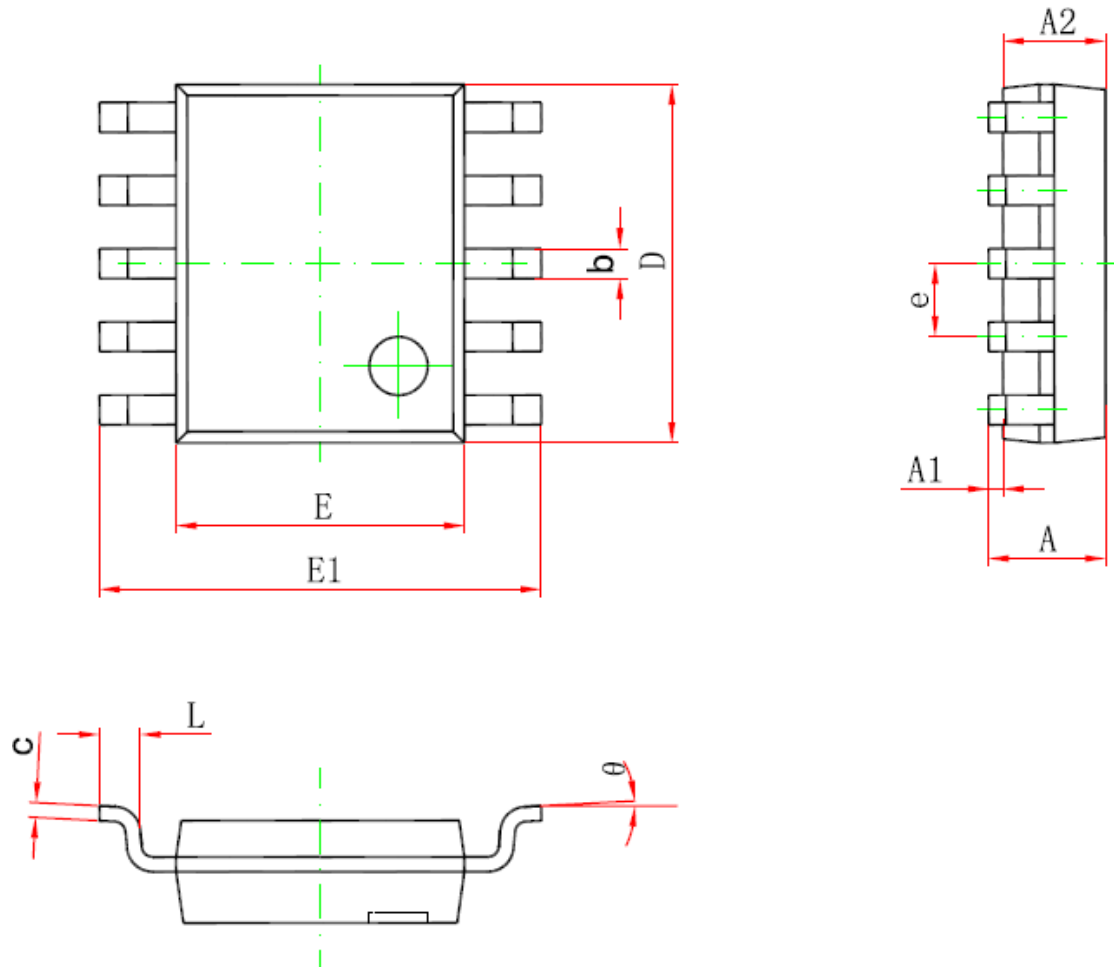


Chip Application:



Package Information

Figure 3: SSOP10 package



Symbol	Dimensions In Millimeters		Dimensions In 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	0.300	0.450	0.012	0.018
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.000 (BSC)		0.039 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	1°	8°