

Product specification

Document number: NMD-SPC- SK6803/05-EC15
 Product model: SK6803/05-EC15
 Product description: 1.5x1.5x0.65mm Type 0.05/00.1Watt Power Embedded
 Version number: A/0
 Time: 2021-03-29

Customer approval			NMD approval		
Approval	Audit	Confirmation	Approval	Audit	Confirmation
			KEVIN ZHU	TONI WU	ZHENLEIWU
<input type="checkbox"/> Qualified <input type="checkbox"/> Disqualified Stamp			 Stamp		



*Before using our products, please search our official website to check the version of the specification. The version of the product specification will be updated in time. Please refer to the latest information on the official website ;

*The copyright and the final interpretation right of the product belong to Shenzhen Normand Electronic Co., Ltd. if you have special specifications, please contact our engineers ;

*Website : <http://www.normandle.com>

Shenzhen Normand Electronic Co.,Ltd

Change History

Date	Rev. No.	Changes/Reason of changes	Signature
2018-07-13	01	Initial Document	KEVIN ZHU
2018-10-31	02	Correction of bead parameters	KEVIN ZHU
2018-12-19	03	Revise the format of specification book	KEVIN ZHU
2019-05-05	05	Update the instructions	KAEN ZHOU
2019-10-21	06	Increase photoelectric parameters of different current	KAEN ZHOU
2021-03-29	A/0	Change icon and specification book version	ZHENLEIWU

CONTENTS

1、 Product overview.....	4
2、 Main Application Field.....	4
3、 Description.....	4
4、 Mechanical Dimensions.....	5
5、 PIN configuration.....	5
6、 Recommended dimensions for PCB products.....	5
7、 General description of product naming.....	6
8、 Electrical parameters.....	6
9、 Electrical/Optical Characteristics.....	6
10、 IC The electrical parameters.....	7
11、 Switching characteristics.....	7
12、 The data transmission time	8
13、 Timing waveform.....	8
14、 The method of data transmission.....	9
15、 The data structure of 24bit.....	10
16、 The typica I application circuit.....	10
17、 Standard LED Performance Graph.....	11
18、 Packaging Standard.....	12
19、 Reliability Test.....	13

1. Product Overview :

SK6803-EC15/SK6805-EC20 is an embedded control LED light source, which includes intelligent digital, digital interface, data latching, signal shaping and amplifying driver, power supply voltage stabilizing circuit, built-in constant current circuit, high precision RC oscillator, the output drive uses the patent PWM technology, effectively guarantees the pixel point inside the light color high consistency. The data protocol adopts the communication method of Unipolar Return Code. After the Pixel is reset on the power, the DIN terminal receives the data transmitted from the controller. The first 24 bit data sent is extracted by the first pixel and sent to the Pixel, the rest of the data is amplified by the internal shaping, then the data is rotated through the DO port, and the output is sent to the next cascaded pixels, and the signal is reduced by 24bit for each pixel. Pixel, the use of automatic shaping forwarding technology, so that the number of the Pixel cascade is limited by the signal transmission, only limited by the signal, the transmission speed requirements.

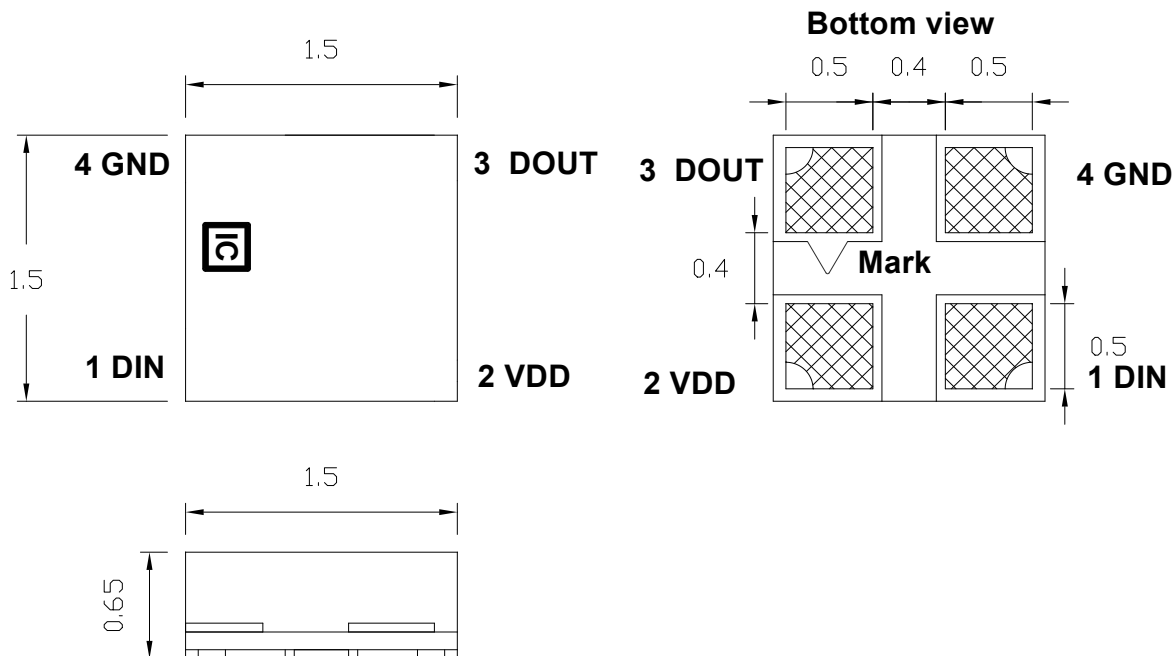
2. Main features

- Easy To Design
- Easy To Build
- Easy To Program

3. Description:

- Top SMD internal integrated high quality external control line serial cascade constant current IC;
- control circuit and the RGB chip in EC2020 components, to form a complete control of pixel, color mixing uniformity and consistency;
- built-in data shaping circuit, a pixel signal is received after wave shaping and output waveform distortion will not guarantee a line;
- The built-in power on reset and reset circuit, the power does not work;
- gray level adjusting circuit (256 level gray scale adjustable);
- red drive special treatment, color balance;
- line data transmission;
- plastic forward strengthening technology, the transmission distance between two points over 10M;
- Using a typical data transmission frequency of 800 Kbps, when the refresh rate of 30 frames per sec

4. Mechanical Dimensions:



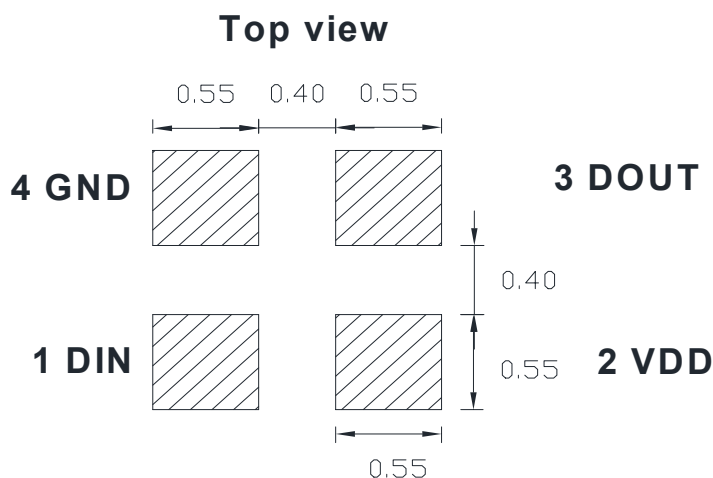
Notes:

1. All dimensions are in millimeters.
2. Tolerance is ± 0.1 mm unless otherwise noted

5. PIN configuration

NO.	Symbol	Pin Name	function description
1	DIN	Data input	Control data input
2	VDD	Power supply	Power Supply Pin
3	DOUT	Data output	Control data signal output
4	GND	Ground	Signal grounding and power grounding

6. Recommended dimensions for PCB



7. General description of product naming

SK 6803-EC15

① ② ③

①	②	③
Series	IC series and current code	Package outline
The default is to integrate the RGB chip with the IC	Refers to the 68 series IC 03:3MA current version 05:5MA current version	1.5x1.5x0.65mm PCB package outline

8. Electrical parameters (Ta=25°C,VSS=0V) :

Parameter	Symbol	Range	Unit
Power supply voltage	VDD	+3.7~+5.5	V
Logic input voltage	V _{IN}	-0.5~VDD+0.5	V
Working temperature	T _{opt}	-40~+80	°C
Storage temperature	T _{stg}	-40~+80	°C
ESD pressure(HBM)	V _{ESD}	2K	V
ESD pressure(DM)	V _{ESD}	200	V

9. Electrical/Optical Characteristics:

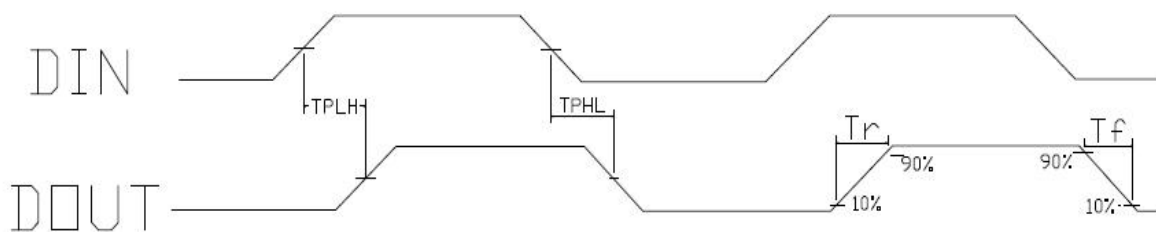
Color	SK6803-EC15 3mA			SK6805-EC15 5mA		
	Dominate Wavelength(nm)	Luminance (mcd)	luminous flux(lm)	Dominate Wavelength(nm)	Luminance (mcd)	luminous flux(lm)
Red	620-625	20-80	0.13-0.5	620-625	40-160	0.13-0.5
Green	520-530	80-320	0.5-1.0	520-530	80-320	0.5-1.0
Blue	460-470	20-80	0.06-0.25	460-470	20-80	0.06-0.25

10. IC The electrical parameters (unless otherwise specified, TA=-20 ~ +70 °C, VDD=4.5 ~ 5.5V, VSS=0V):

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	---	5.2	---	V	---
The signal input flip threshold	V _{IH}	0.7*V _{DD}	---	---	V	VDD=5.0V
	V _{IL}	---	---	0.3*V _{DD}	V	
The frequency of PWM	FPWM	---	1.2	---	KHZ	---
Static power consumption	I _{DD}	---	1	---	mA	---

11. Switching characteristics (VCC=5V Ta=25 °C):

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	f _{DIN}	---	800	---	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	T _{PLH}	---	---	500	ns	DIN→DOUT
	T _{PHL}	---	---	500	ns	
IOUT Rise/Drop Time	T _r	---	100	---	ns	V _{DS} =1.5V I _{OUT} =3mA I _{OUT} =5mA
	T _f	---	100	---	ns	



12. The data transmission time :

Name		Min.	Standard value	Max.	Unit
T	Code period	1.20	--	--	μs
T0H	0 code, high level time	0.2	0.32	0.4	μs
T0L	0 code, low level time	0.8	--	--	μs
T1H	1 code, high level time	0.58	0.64	1.0	μs
T1L	1 code, low level time	0.2	--	--	μs
Trst	Reset code, low level time	>80	--	--	μs

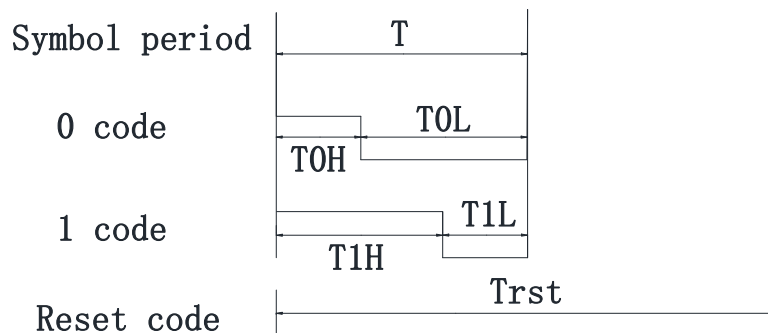
1. The protocol uses a unipolar zeroing code. Each symbol must have a low level. Each symbol in this protocol starts with a high level. The high time width determines the "0" or "1" code. .

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

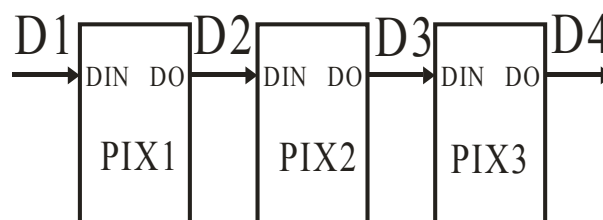
3. The high time of "0" code and "1" code should be in accordance with the stipulated range in the above table. The low time requirement of "0" code and "1" code is less than 20μs.

13. Timing waveform:

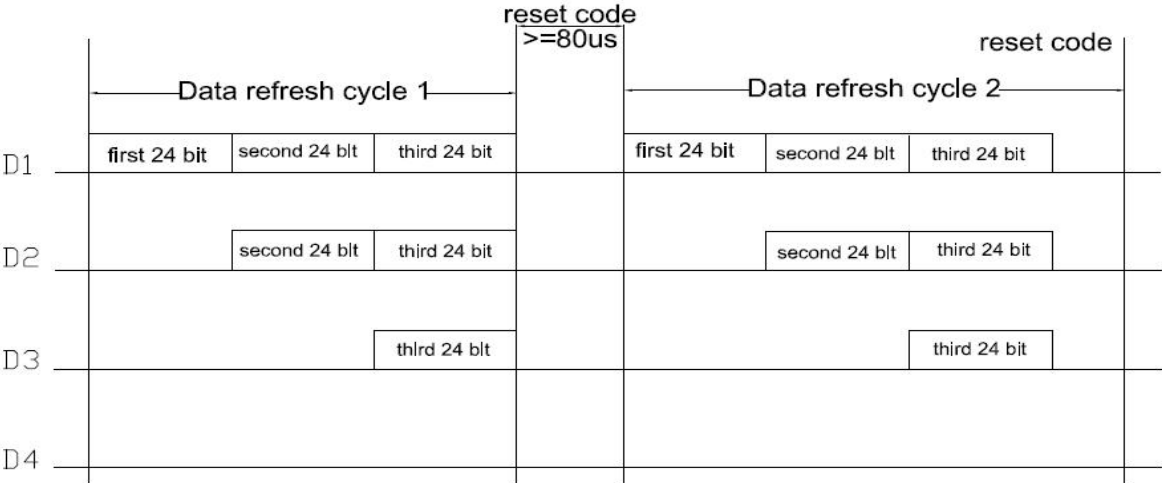
Input code:



Connection mode:



14. The method of data transmission:



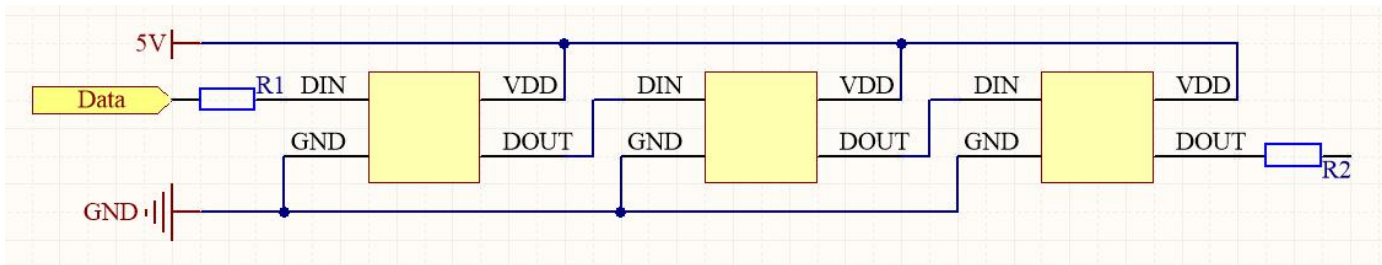
Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

15. The data structure of 24bit:

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

Note: high starting, in order to send data (G7 - G6 -B0)

16. The typical application circuit:



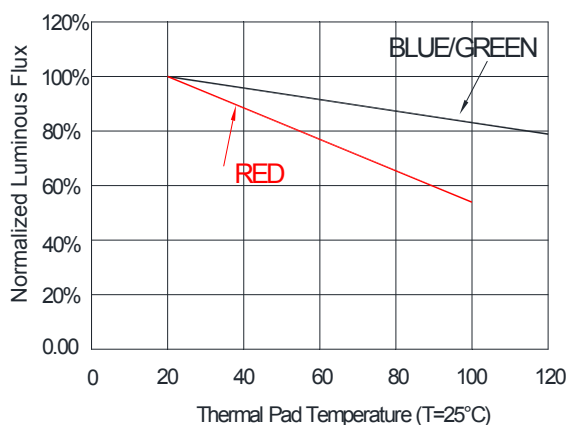
In the practical application circuit, the signal input and output pins of the IC signal input and output pins should be connected to the signal input and output terminals. In addition, in order to make the IC chip is more stable, even the capacitance between beads is essential back;

Application: used for soft lamp strip or hard light, lamp beads transmission distance is short, suggested in signal in time the clock line input and output end of each connected in series protection resistors, R1=R2 of about 500 ohms.

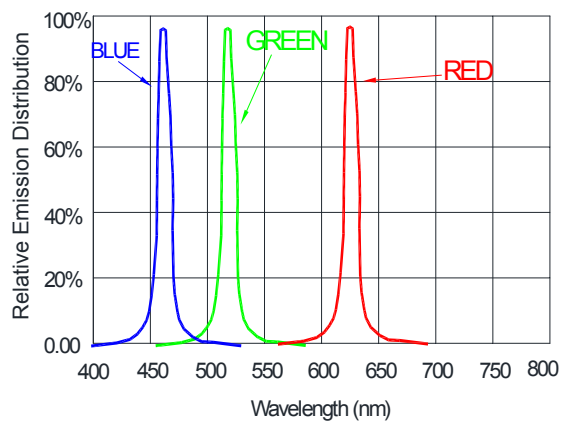
Application: for module or general special-shaped products, lamp beads transmission distance is long, because of different wire and transmission distance, in the signal in time clock at both ends of the line on grounding protection resistance will be slightly different; to the actual use of fixed;

17. Standard LED Performance Graph:

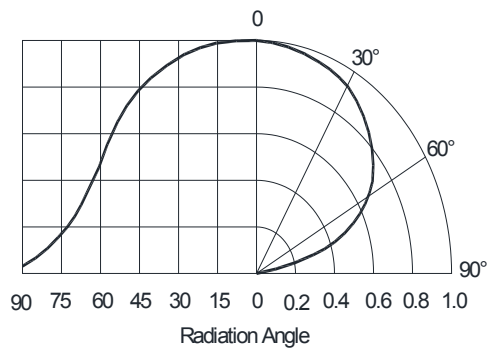
Thermal Pad Temperature vs. Relative Light Output



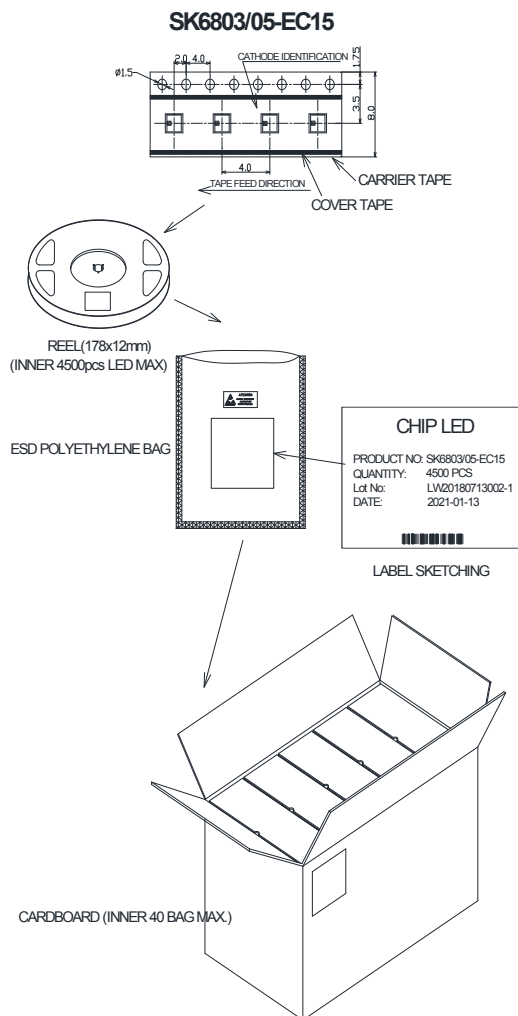
Wavelength Characteristics



Typical Radiation Pattern 120°



18. Packaging Standard:



The reel pack is applied in SMD LED. The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags. cardboard boxes will be used to protect the LEDs from mechanical shocks during transportation. The boxes are not water resistant and therefore must be kept away from water and moisture.

19. Reliability Test :

NO.	Test item	Test Conditions	Reference	Criterion
1	Thermal Shock	100 ± 5° C ~ -40° C ± 5° C 15min~15min 100 cycles	MIL-STD-202G	0/22
2	High Temperature Storage	Ta= +100°C 1000hrs	JEITA ED-4701 200 201	0/22
3	Low Temperature Storage	Ta= -40°C 1000hrs	JEITA ED-4701 200 202	0/22
4	High Temperature High Humidity Storage	Ta=60°C RH=90% 1000hrs	JEITA ED-4701 100 103	0/22
5	Temperature Cycle	-40°C~25°C~100°C~25°C 30min~5min~30min~5min 100 cycles	JEITA ED-4701 100 105	0/22
6	Resistance to Soldering Heat	Tsld = 260° C, 10sec. 2 times	JEITA ED-4701 300 301	0/22
7	Room temp Life Test	25° C, IF: Typical current , 1000hrs	JESD22-A 108D	0/22

Criteria for Judging the Damage:

Item	Symbol	Test Condition	Limit	
			Min	Max
Luminous Intensity	IV	DC=5V, Typical current	Init. Value*0.7	---
Resistance to Soldering Heat	---	DC=5V, Typical current	No dead lights or obvious damage	