Specification

Document No.: OSK-SPC- SK6813E-A-003

Product No.: SK6813E-A-003

Sample No.: OP00121-002

Description: 5.4x5.0x1.6mm Top SMD Type 0.2Watt Power targeted light source Intelligent control LED(MSL:5a)

Rev. No.: A/0

Date: 2022-03-07

Customer approval			Opsco approval		
Approval	Review	Confirmation	Approval	Review	Confirmation
			朱更生	周凯	闫闪闪
☐Qualified ☐Disqualified Stamp			Stamp		

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*Official website: https://www.opscoled.com

Change History

Date	Rev. No.	Changes/Reason of changes	Signature
2022-03-07	A0	Provision specifications	KEVIN ZHU

CONTENTS

1. Product Overview :

SK6813E-A-003 is a smart LED control circuit and light emitting circuit in one controlled LED source, which has the shape of a 5050 LED chip. Each lighting element is a pixel, and the intensities of the pixels are contained within the intelligent digital interface input. The output is driven by patented PWM technology, which effectively guarantees high consistency of the color of the pixels. The control circuit consists of a signal shaping amplification circuit, a built-in constant current circuit, and a high precision RC oscillator.

The data protocol being used is unipolar RZ communication mode. The 24-bit data is transmitted from the controller to DIN of the first element, and if it is accepted it is extracted pixel to pixel. After an internal data latch, the remainingdata is passed through the internal amplification circuit and sent out on the DO port to the remaining pixels. The pixel is reset after the end of DIN. Using automatic shaping forwarding technology makes the number of cascaded pixels without signal transmission only limited by signal transmission speed.

The LED has a low driving voltage (which allows for environmental protection and energy saving), high brightness, scattering angle, good consistency, low power, and long life. The control circuit is integrated in the LED above.

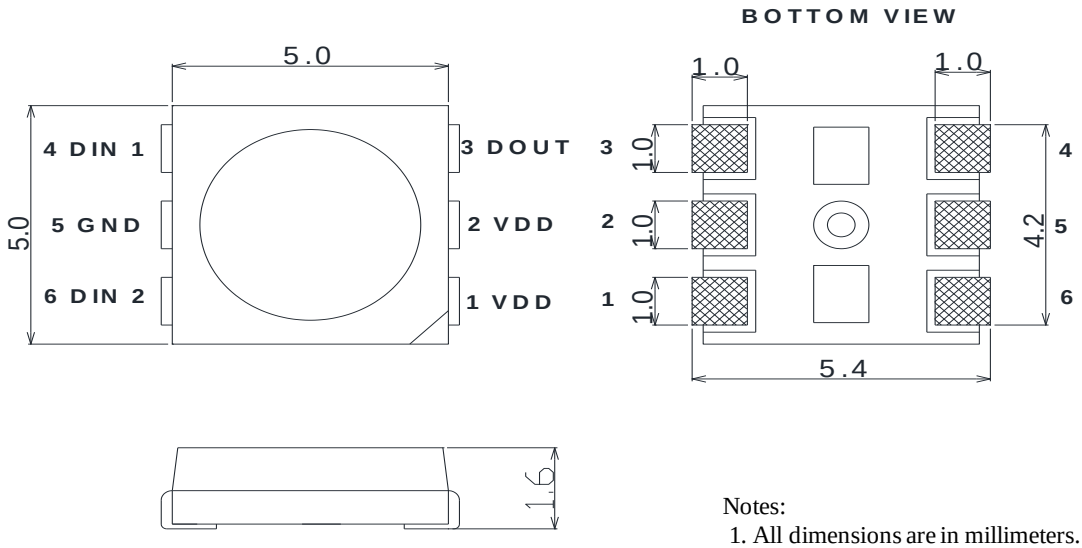
2. Main Application Field:

- Full color LED string light, LED full color module, LED super hard and soft lights, LED guardrail tube, LED appearance / scene lighting
- LED point light, LED pixel screen, LED shaped screen, a variety of electronic products, electrical equipment etc..

3. Description:

- Top SMD internal integrated high quality external control line serial cascade constant current IC;
- control circuit and the RGB chip in SMD 5050 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:

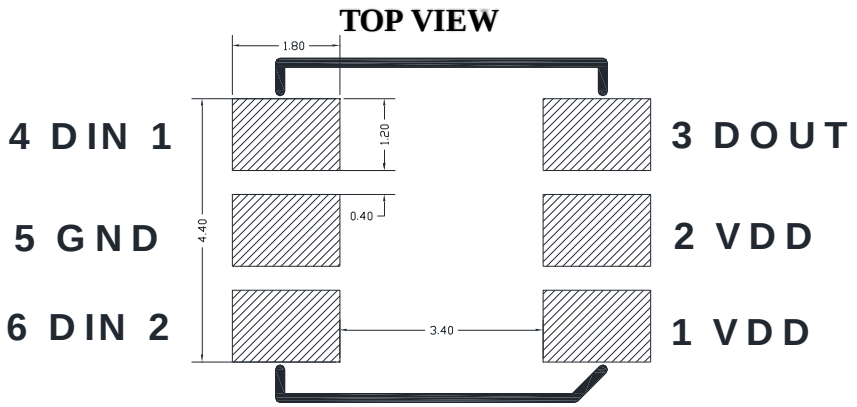


Notes:
1. All dimensions are in millimeters.
2. Tolerance is ±0.1mm unless otherwise noted

5. PIN configuration

Item	Symbol	Pin Name	Function description
1	VDD	Power	power supply pin
2	VDD	Power	power supply pin
3	DOUT	Data Output	control signal output data
4	DIN 1	Data Input	control signal input data
5	GND	Ground	power ground
6	DIN 2	Thermal data processing	Thermal data signal processing

6. Recommended dimensions for PCB products



7. General description of product naming.

SK 6813 E-A -003

① ② ③

①	②	③
Series	IC series and current code	Internal coding
The default is to integrate the RGB chip with the IC	Refers to the 6813 series IC 6813:12MA current version	E-A-003:Represents internal coding

8. Absolute Maximum Ratings（Ta=25℃,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	Topt	-40~+85	℃
Storage temperature	Tstg	-40~+85	℃
ESD withstand voltage (equipment mode)	VESD	200	V
ESD pressure(HBM)	V_{ESD}	2K	V

9. Electrical/Optical Characteristics:

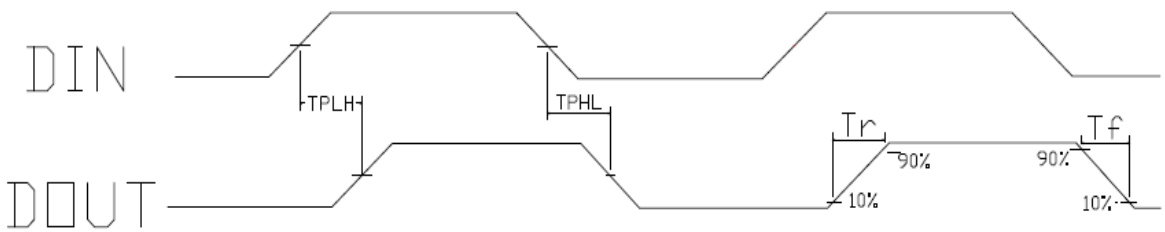
Color	SK6813E -A-003 12MA	
	Dominate avelength(nm)	Luminance(mcd)
Red	620-625	320-580
Green	520-525	815-1275
Blue	465-470	160-320

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

Parmeter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	---	5.2	---	V	---
The signal input flip threshold	VIH	0.7*+VDD	---	---	V	VDD=5.0V
	VIL	---	---	0.3*+VDD	V	
The frequency of PWM	FPWM	---	4.0	---	KHZ	---
Static power consumption	IDD	---	0.3	---	mA	---

11. Switching characteristics (Ta=25 ℃):

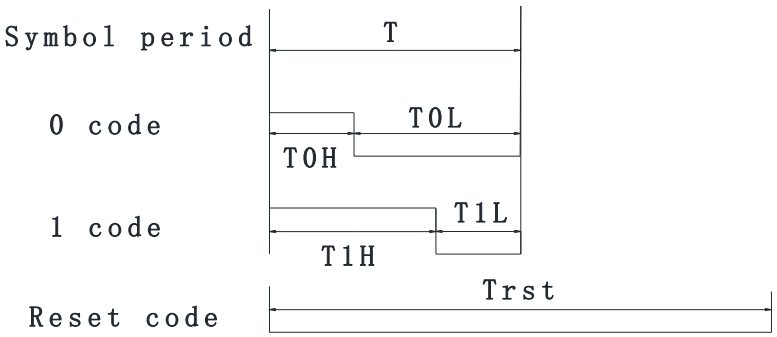
Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	fDIN	---	800	1100	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	TPLH	---	---	500	ns	DIN→DOUT
	TPHL	---	---	500	ns	
IOUT Rise/Drop Time	Tr	---	100	---	ns	VDS=1.5 IOUT=12mA
	Tf	---	100	---	ns	



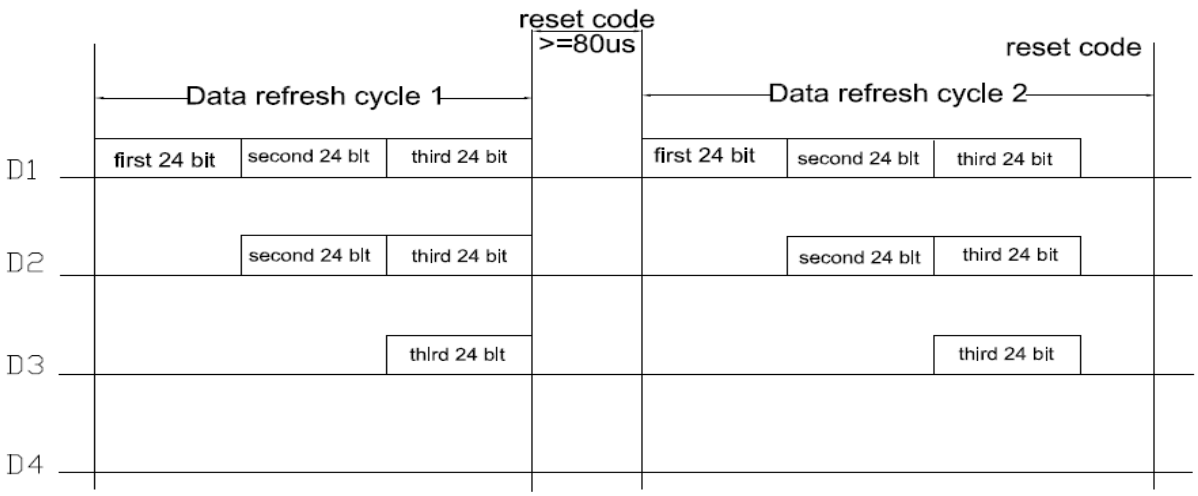
12. The data transmission time (TH+TL=1.25μs±600ns):

Name		Min.	Standard value	Max.	Unit
T	Code period	1.20	--	--	μs
T0H	0 code, high level time	0.2	0.3	0.4	μs
T0L	0 code, low level time	0.6	--	--	μs
T1H	1 code, high level time	0.58	0.65	1.0	μs
T1L	1 code, low level time	0.2	--	--	μs
Reset	Reset code，low level time	≥80	--	--	μs

13. Timing waveform:



14. The method of data transmission:



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

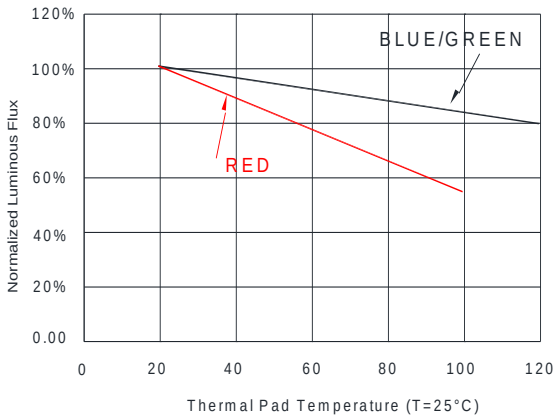
15. The data structure of 24bit:

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

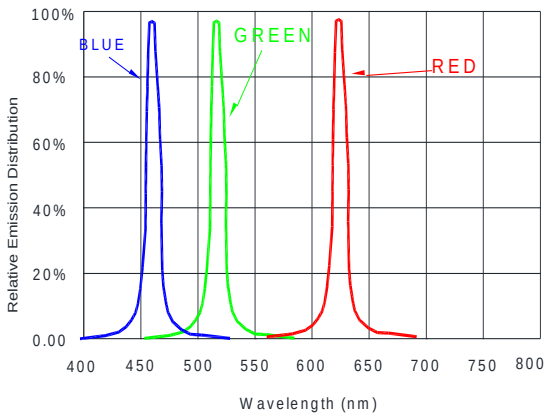
Note: high starting, in order to send data (G7 - G6 - ....B0)

16. Standard LED Performance Graph:

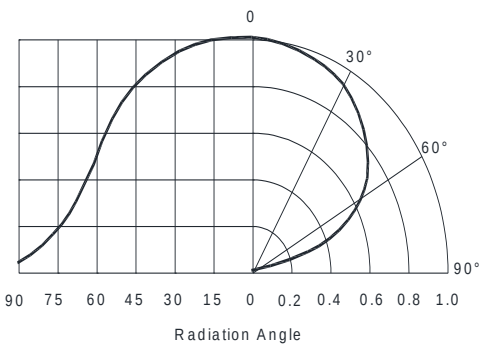
Thermal Pad Temperature vs. Relative Light Output



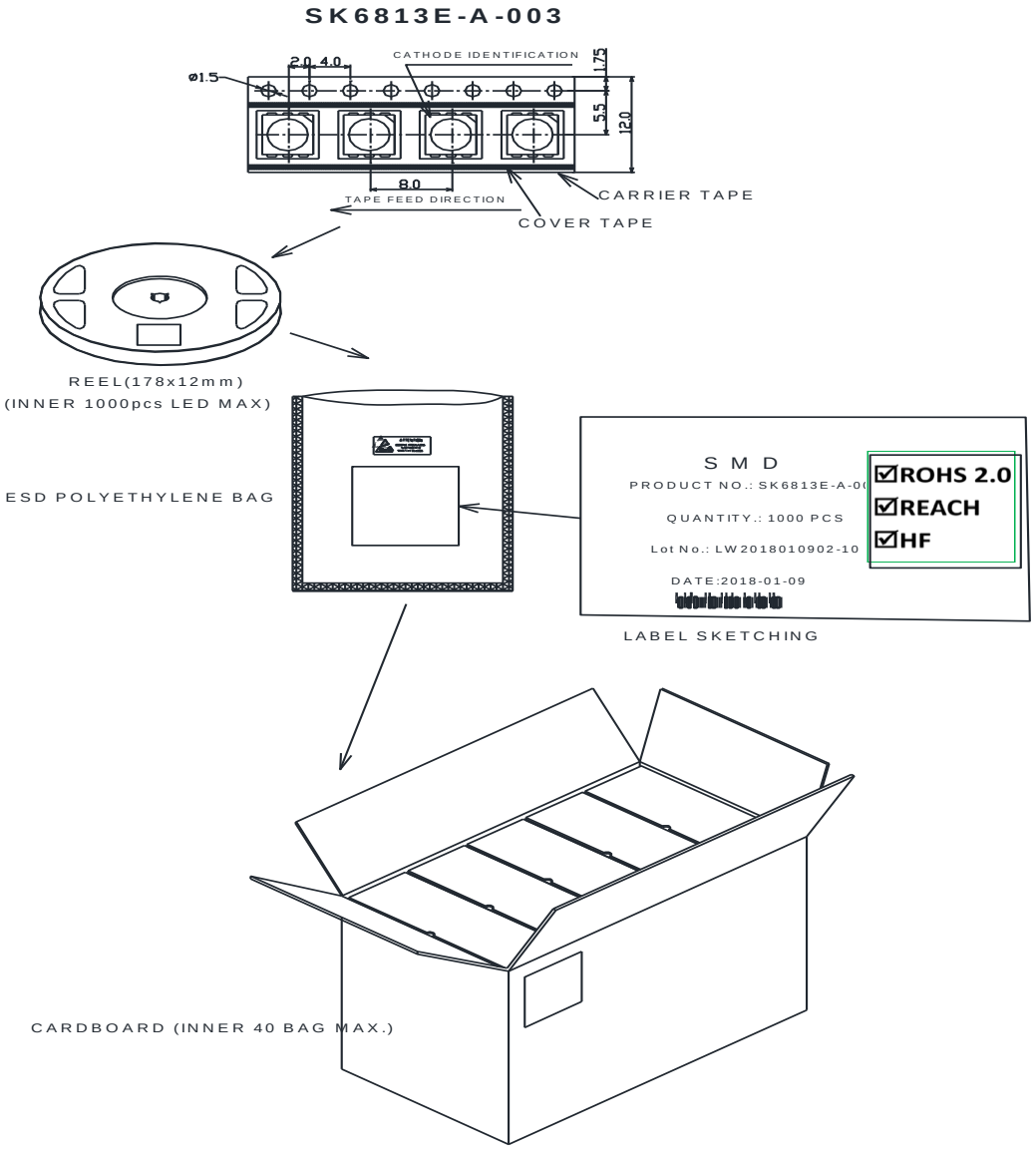
Wavelength Characteristics



Typical Radiation Pattern 120°



17. 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.

18. Reliability Test :

NO.	Test item	Test Conditions	Reference	Criterion
1	Thermal Shock	100 ± 5° C ~ -40° C ± 5° C 30min~30min 100 cycles	MIL-STD-202G	0/22
2	High Temperature Storage	Ta= +100ºC 1000hrs	JEITA ED-4701 200 201	0/22
3	Low Temperature Storage	Ta= -40ºC 1000hrs	JEITA ED-4701 200 202	0/22
4	High Temperature High Humidity Storage	Ta=60ºC RH=90% 1000hrs	JEITA ED-4701 100 103	0/22
5	Temperature Cycle	-40ºC~25ºC~100ºC~25ºC 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	