1.Product overview:

SK6812 WWA is an intelligent external control LED light source that integrates a control circuit and a light-lighting circuit. Its appearance is the same as 5050 LED lamp beads, and each element is a pixel. Inside the pixel point contains an intelligent digital interface data locking signal shaping and amplification drive circuit, power supply regulator circuit, built-in constant current circuit, high precision RC oscillation, the output drive adapts the patented PWM technology, which effectively ensures the high color consistency of the light within the pixel.

The data protocol adopts the communication method of Unipolar zero code, and after the pixel point is reset on power, the DIN terminal accepts the data transmitted from the controller, the 24bit data firstly sent over is extracted by the first pixel, and sent to the data latch inside the pixel, and the remaining data is amplified by the internal shaping process circuit and then begins to forward the output to the next cascade pixel through the DO port, and each time a pixel is transmitted, the signal decreases 24bit. The pixel adopts automatic shaping forwarding technology, so that the number of cascades of the pixel is not limited by signal transmission, but only limited by the signal transmission speed requirements.

Large electronic displayIt has the advantages of low voltage drive, environmental protection and energy saving, high brightness, large scattering angle, good consistency, ultra-low power, ultra-long life, etc. By integrating the control circuit into the LED, the circuit becomes simpler, smaller in size, and easier to install.

2.Main applications:

● Full-color luminous word lamp string, LED Full-color module, LED light strips, LED guradrail tubes, LED mood lighting
● LED point light source, LED Pixel screen, Various electronic products, Electrical equipment color chasing lights.

3.Description of features:

● Top SMD Integrated high-quality external control single-line serial cascade constant current IC;

● The control circuit and chip are integrated in SMD 5050 components, it forms a complete external control pixel, the color temperature effect is uniform and consistent.

● Built-in data shaping circuit, any pixel receives the signal and then outputs after waveforming to ensure that the line waveform distortion will not accumulate.

● Built-in power-on reset and power-down reset circuits, no lights on;

● Grayscale adjustment circuit (256 levels of magnitude can be adjusted),

● Single-line data transmission, unlimited cascade.

● Plastic forwarding enhancement technology, the transmission distance between two points exceeds 10M.

● Data transmission frequency can reach 800Kbps, when the refresh rate 30Frames In seconds, the number of cades is not less than 1024 points.

4.Mechanical size:

BOTTOM VIEW
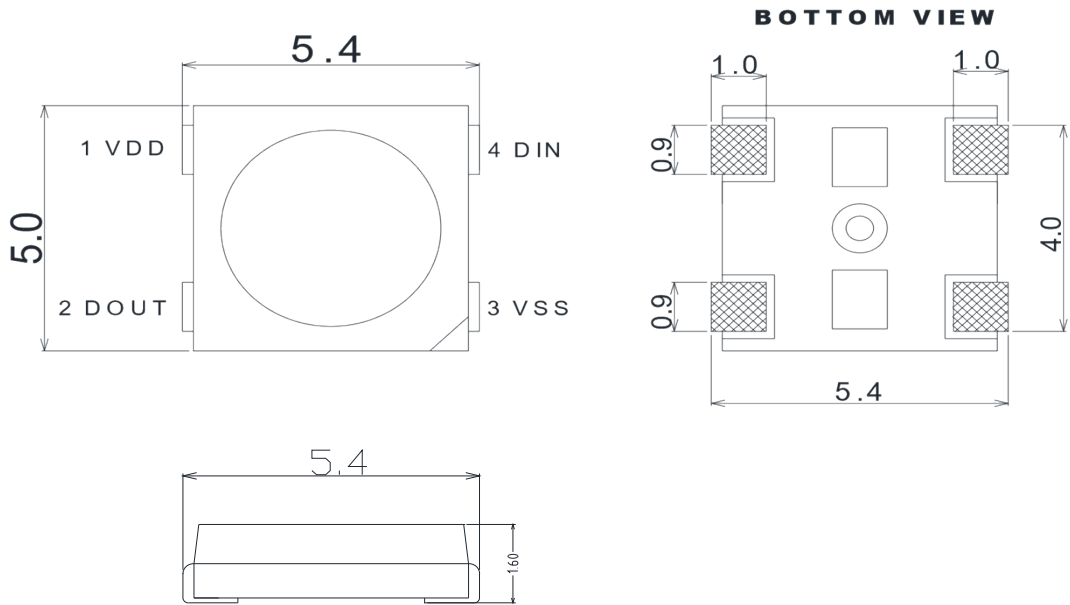
Remarks:

1. The unit marked above is mm.

2. Unless otherwise noted, the dimensional tolerance is±0.1Millimetre.

5.Pin function description

Serial number	Symbol	Pipe pin name	Function description
1	VDD	Power supply	Power supply pin
2	DOUT	Data output	Control data signal output
3	VSS	Earth	Power supply grounding
4	DIN	Data input	Control data signal input

6. PCBSuggested pad size

TOP VIEW

1 V D D

4 D I N

2 D O U T

3 V S S
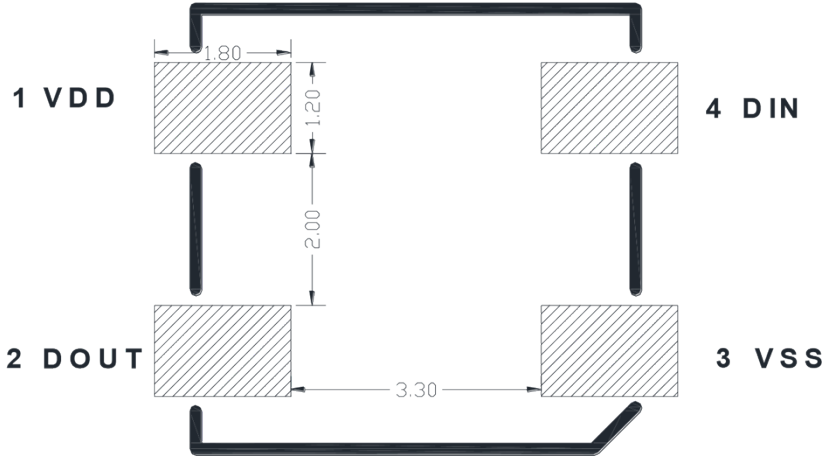
7.General description of product naming

SK 6812-WWA

1 2   3

1	2	3
Series	ICSeries and current code	Light-color integration code
Default is with ICIntegrated in 5.4x5.0x1.6Millimeter shape	Finger68SeriesIC XX:Include 5MA/12MACurrent version	W: BW·Blue and white 5800-8000K W: WS·Warm white 2800-3150K A: Amber 1500-% $$?··

8.Electrical parameters (limit parameters,Ta=25℃, VSS=0V):

Parameter	Symbol	Scope	Unit
Voltage	V_{DD}	+3.7~+5.5	V
Logic input voltage	V_I	-0.5~VDD+0.5	V
Operating temperature	Topt	-40~+85	℃
Storage temperature	Tstg	-40~+85	℃
ESDPressure resistance	V_{ESD}	2K	V

9. WWA LEDPhotoelectric parameters:

| Color	SK6812WWA-XX		
	Wavelength (Nm)	Color temperature (K)	Brightness (Mcd/lm)
White (BLUE WHITE)	/	5800-8000	1275-1800
Amber	585-595	1500-1800	240-450
Warm white	/	2800-3150	1275-1800

10. ICElectrical parameters (if no special instructions,TA=-20~+70℃,VDD=4.5~5.5V, VSS=0V):

Parameter	Symbol	The smallest	Example	The biggest	Unit	Test conditions
Power supply voltage inside the chip	V_{DD}	---	5.2	---	V	---
Signal input flip threshold	V_{IH}	0.7*VDD	---	---	V	VDD=5.0V
	V_{IL}	---	---	0.3*VDD	V	
PWMFrequency	Fahrenheit$_{PWM}$	---	1.0	---	Kilohertz	---
Static power consumption	I_{DD}	---	0.65	---	Master of Arts	---

11.Switch characteristics (Ta=25℃):

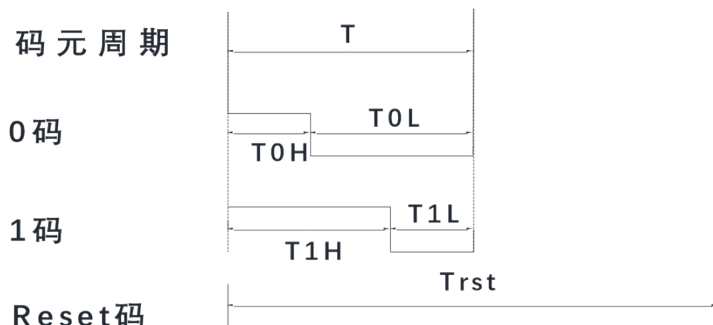| Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
Data transmission speed	fDIN	---	800	---	Kilohertz	Duty cycle ratio67%(Data1)
Signal transmission delay (Note4)	T_{PLH}	---	67	---	Ns	DOUTPort ground-to-ground load electricity Contain30pF,DINReachDOUT Signal transmission delay
	T_{PHL}	---	82	---	Ns	
DOUTConversion time (Note5)	T_{TLH}	---	9.6	---	Ns	DOUTPort ground-to-ground load capacitor30pF
	T_{THL}	---	11.6	---	Ns	
OUT R/B Conversion time (Note6)	Tr	---	22	---	Ns	IOUT=12mA,OUT R/B Port serial connection200ΩResistance toVDD, ground-to-ground load capacitor
	Tf	---	75	---	Ns	
OUT G Conversion time (Note6)	Tr	---	18	---	Ns	IOUT=12mA,OUT G Port serial connection200ΩResistance to VDD, ground-to-ground load capacitor 30pF
	Tf	---	110	---	Ns	

Pour 4, Note 5, Note 6: As shown in the figure below
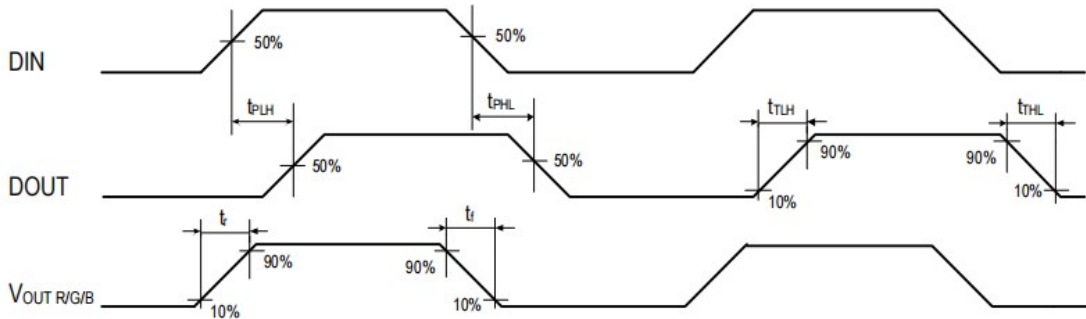
12.Data transmission time:

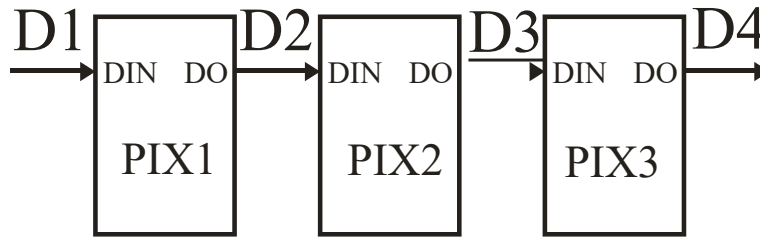|	Timing table name	Min.	Actual value	Max.	Unit
T	Code element cycle	1.20	- -	- -	Ms
T0H	0Code, High-level time	0.2	0.32	0.4	Ms
T0L	0Code, Low-level time	0.8	- -	- -	Ms
T1H	1Code, High-level time	0.6	0.67	1.0	Ms
T1L	1Code, low-level time	0.2	- -	- -	Ms
Reset	ResetCode, low-level time	>80	- -	- -	Ms

1. The protocol adopts unilateral zero code. Each code element must have a low level. Each code element in this agreement starts at a high level, and the time width of the high level determines"0"Code or "1".
2. When writing a program, the minimum requirement for the code element cycle is 1.2μs.
3. The high-level time of the "0" or "1" code shall be in accordance with the scope specified in the table above. The low-level time requirement of the "0" or "1" code is less than 20μs.
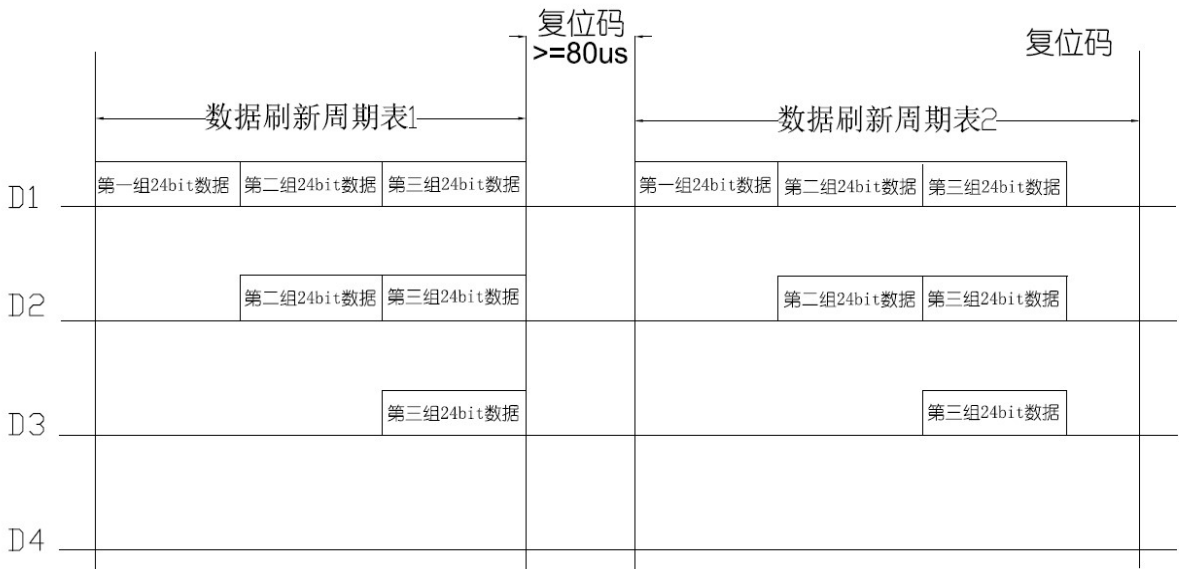
13.Timing waveform diagram (Ta=25℃):

Input code type:

Connection

D1 → DIN DO D2 → DIN DO D3 → DIN DO D4 →

PIX1   PIX2   PIX3

14.Data transmission method (Ta=25℃):

复位码
>=80us

复位码

数据刷新周期表1

数据刷新周期表2

D1 : 第一组24bit数据 | 第二组24bit数据 | 第三组24bit数据 ... 第一组24bit数据 | 第二组24bit数据 | 第三组24bit数据

D2 : 第二组24bit数据 | 第三组24bit数据 ... 第二组24bit数据 | 第三组24bit数据

D3 : 第三组24bit数据 ... 第三组24bit数据

D4 :

Note: Among them, D1 is the data sent from MCU side, D2, D3, D4 are the data automatically shaped and forwarded by the cascade circuit.

15. 24bitData structure (Ta=25℃):

W7	W6	W5	W4	W3	W2	W1	W0	A7	A6	A5	A4
A3	A2	A1	A0	W7	W6	W5	W4	W3	W2	W1	W0

Note: High-level first, according toWAWSend data in the order of(W7 → W6 →........ W0)

16. Typical application circuit:

5V

Data — R1 — DIN ... VDD | DIN ... VDD | DIN ... VDD
GND ... DOUT | GND ... DOUT | GND ... DOUT — R2

GND
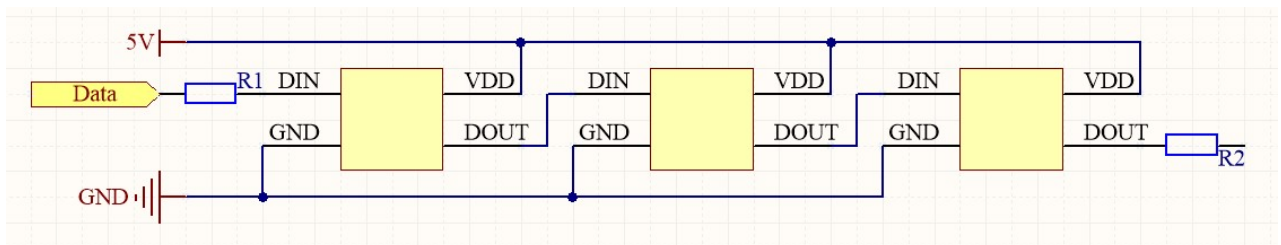
In practical application circuits, in order to prevent the product in the test charged with plugging and unplugging generated by the instantaneous high-voltage damage to the IC internal signal input and output pins, should be in the signal input and output terminals connected to protection resistors. In addition, in order to make IC chip more stably operation, the decoupling capacitance between the lamp beads is essential;

Application 1: For soft or hard light strips with short transmission distance between lamp beads, it is recommended to connect the protection resistors in series at the input and output ends of the signal and clock line, that is R1=R2 about 500 ohms;

Application 2: For modules or general special-shaped products, the transmission distance between lamp beads is long, and the protection resistors connected in series at both ends of the signal and clock line will be slightly different depending on the wire and transmission distance; it depends on the actual use;

17. White light color temperature level andCIEColor grading (referring to1931 CIEChroma)

CIEColor coordinate system(ANSIWhite light)

Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4
CA1	0.299	0.287	0.2867	0.2943	0.3006	0.3129	0.313	0.305
CA2	0.3127	0.305	0.3006	0.3129	0.3146	0.3314	0.326	0.323
CA3	0.3263	0.323	0.3146	0.3314	0.3285	0.35	0.34	0.341

ANSI White light

OPSCO Blue White Graph
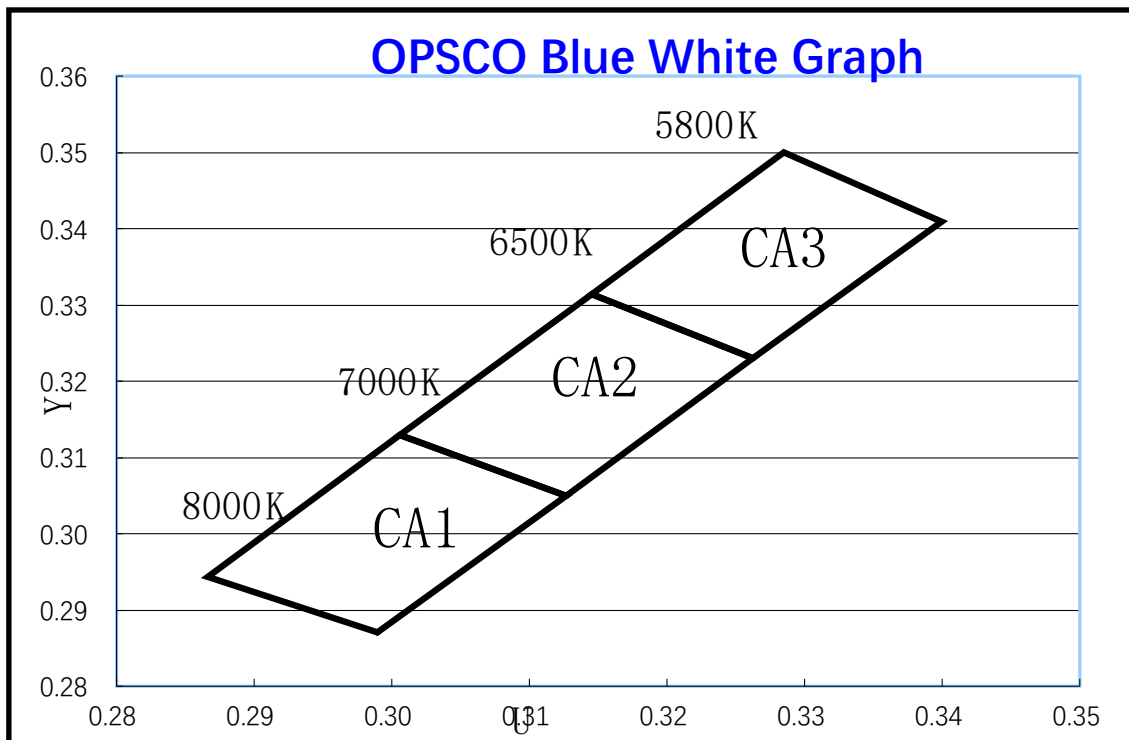
CIE Color Coordinate System (ANSI Warm)

Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4

K3A	0.4315	0.381	0.425	0.403	0.4358	0.4132	0.443	0.392
K3B	0.4433	0.392	0.4358	0.4132	0.4465	0.4233	0.455	0.404
K3C	0.4552	0.404	0.4465	0.4233	0.4573	0.4335	0.467	0.415

ANSI Warm color

OPSCO White Warm Graph
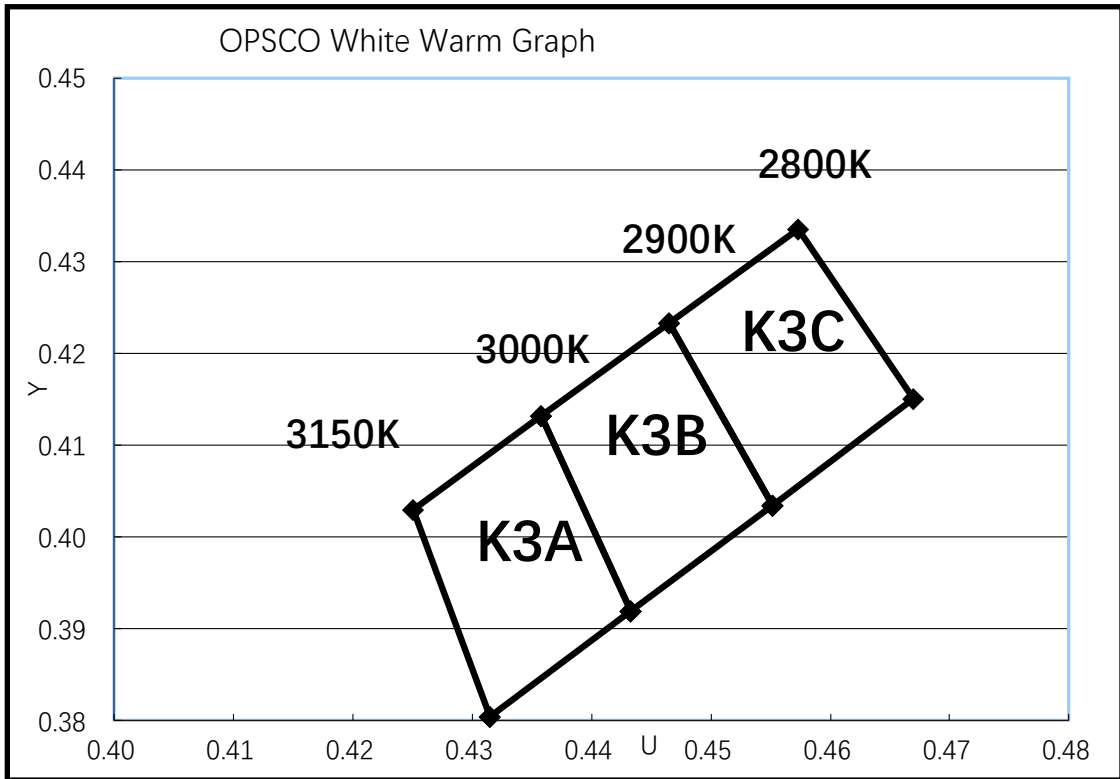
CIEColor coordinate system(Amber)

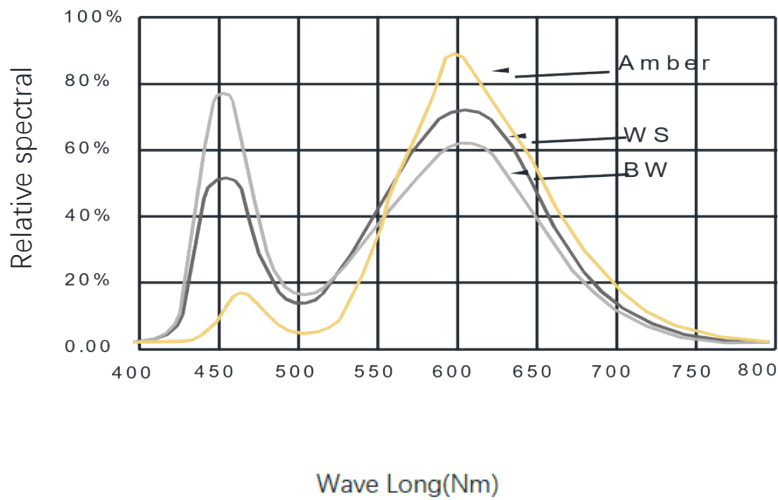| Name	X1	Y1	X2	Y2	X3	Y3	X4	Y4
Amber	0.5923	0.394	0.536	0.449	0.545	0.454	0.6021	0.3969

CIE AmberColor

OPSCO Amber Graph
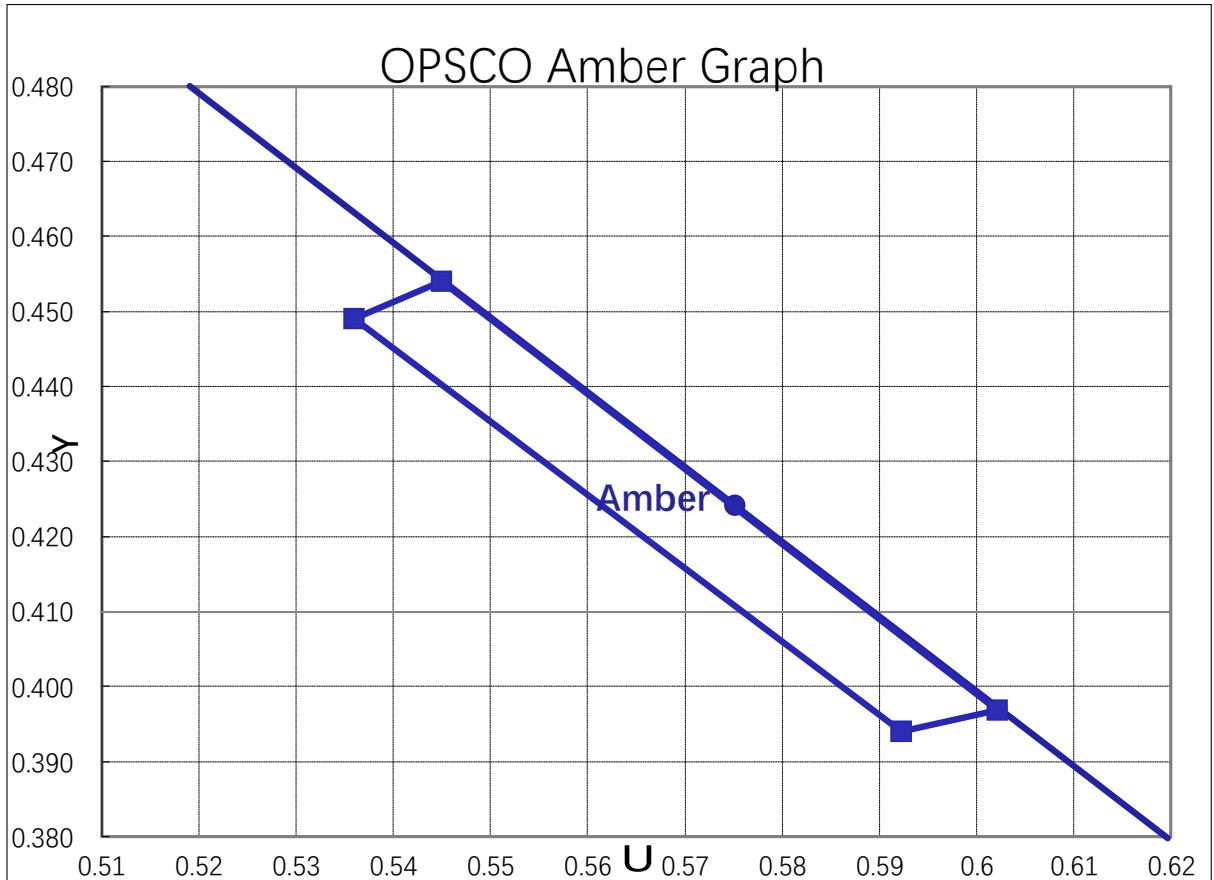
18.Photoelectric characteristics

Weld Plate Tepid Linear measure Give Light Lead to Measure Transport Go out Taxi
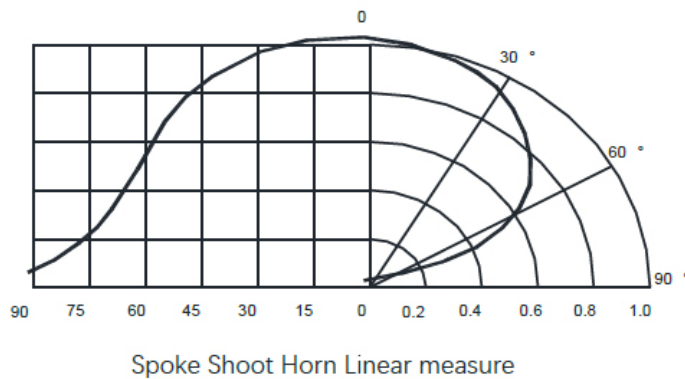Mutually Right Close Do up
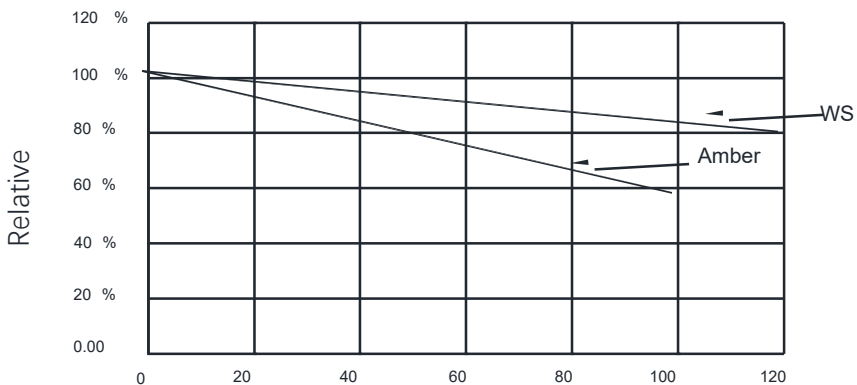
Weld Plate Tepid Linear measure(T=25°C)

Wave Long Special Nature

Relative spectral vs Wave Long(Nm)

- Amber
- W S
- B W

Standard work of scholarship Mould Taxi Spoke Shoot Square Face Picture120°

Spoke Shoot Horn Linear measure

20. Reliability test:

Serial number	Experimental project	Experimental conditions	Reference standards	Judgement
1	Hot and cold shock	100 ±5°C ~ -40°C ±5°C 30min~30min 100cycles	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 and 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	Welding heat resistance	Tsld = 260°C, 10sec. 2 times	JEITA ED-4701 300 301	0/22
7	Normal temperature life test	25°C, IF: Typical current , 1000hrs	JESD22-A108D	0/22

Failure judgment standard:

Project	Symbol	Test conditions	Judgment criteria	
			Minimum value	Maximum value
Luminous intensity	IV	DC=5V,Specifications typical current	Initial dataX0.7	---
Welding heat resistance	---	DC=5V,Specifications typical current	No dead lights or obvious damage	