OptoSupply
Light It Up

3.2*1.0*1.48mm Intelligent Control RGB Side View Chip LED

OSSK5CS31

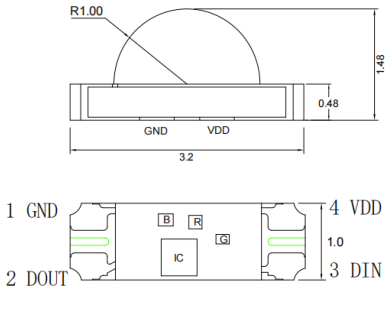
▪Features

- Intelligent reverse connect protection, the power supply reverse connection does not damage the IC.
- The control circuit and the LED share the only power source.
- Control circuit and RGB chip are integrated in a package of 3210 components, form a complete control of pixel point.
- Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate.
- Built-in electric reset circuit and power lost reset circuit.
- gray level adjusting circuit (256 level gray scale adjustable)
- Cascading port transmission signal by single line.
- Any two point the distance more than 5m transmission signal without any increase circuit.
- Using a typical data transmission frequency of 800 Kbps, when the refresh rate of 30 frames per sec

▪Applications

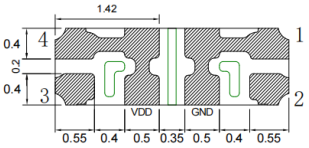
- LED decorative lighting, Indoor/outdoor LED video irregular screen
- Full-color module, Full color soft lights a lamp strip.

▪Outline Dimension



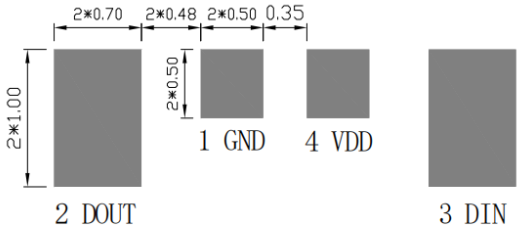
Notes:

1. All dimensions are in millimeters.
2. Tolerance is ±0.2mm unless otherwise noted



NO.	Symbol	Function description
1	GND	Ground
2	DOUT	Control data signal output
3	DIN	Control data signal input
4	VDD	Power supply LED

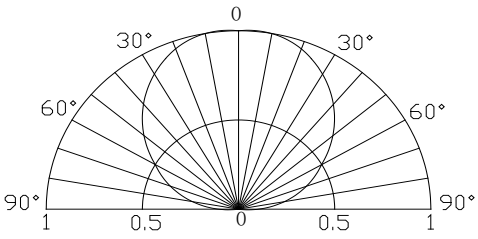
Recommended dimensions for PCB



▪Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value	Unit
Power supply voltage	V_{DD}	+3.7~+5.5	V
Input voltage	V_I	-0.5~VDD+0.5	V
Operation junction temperature	Topt	-40~+85	℃
Storage Temperature	Tstg	-40 ~ +85	℃

▪Directivity

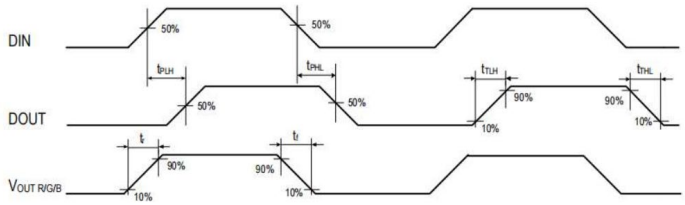


▪Electrical Characteristics (Ta-20~+70℃, VDD=4.5~5.5V, Vss=0V unless otherwise specified）

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	---	0.25	---	mA	---

■ Switching Characteristics:

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	fDIN	---	800	---	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	T_{PLH}	---	100	---	ns	The load capacitance of dout port to ground is 30pf,Signal transmission delay from DIN to dout
	T_{PHL}	---	100	---	ns	
DOUT Conversion time	T_{TLH}	---	15	---	ns	The load capacitance of dout port to ground is 30pf
	T_{THL}	---	24	---	ns	
IOUT Rise/Drop Tim	Tr	---	200	---	ns	I_{OUT} = 5mA, out R / g / B port series connection 200 Ω electricResistance to VDD, load capacitance to ground 30pF
	Tf	---	280	---	ns	



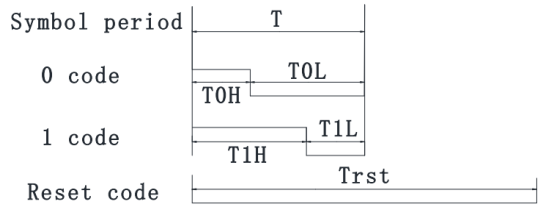
■ LED Characteristic Parameter

Emitting color	Wavelength (nm)	Luminous intensity (mcd)
	IF=5mA	
Red	620-630nm	80-160
Green	520-530nm	250-450
Blue	460-470nm	60-120

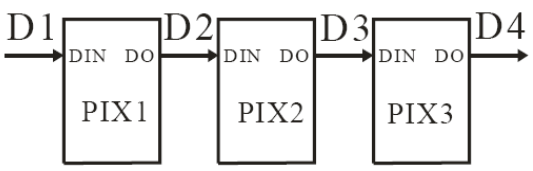
■ The Data Transfer Time:

Name		Typical value	Tolerance range	Unit
T	Code period	1.2	--	μs
T0H	0 code, high level time	0.3	±0.05	μs
T0L	0 code, low level time	0.9	±0.05	μs
T1H	1 code, high level time	0.9	±0.05	μs
T1L	1 code, low level time	0.3	±0.05	μs
Trst	Reset code, low level time	>200	--	μs

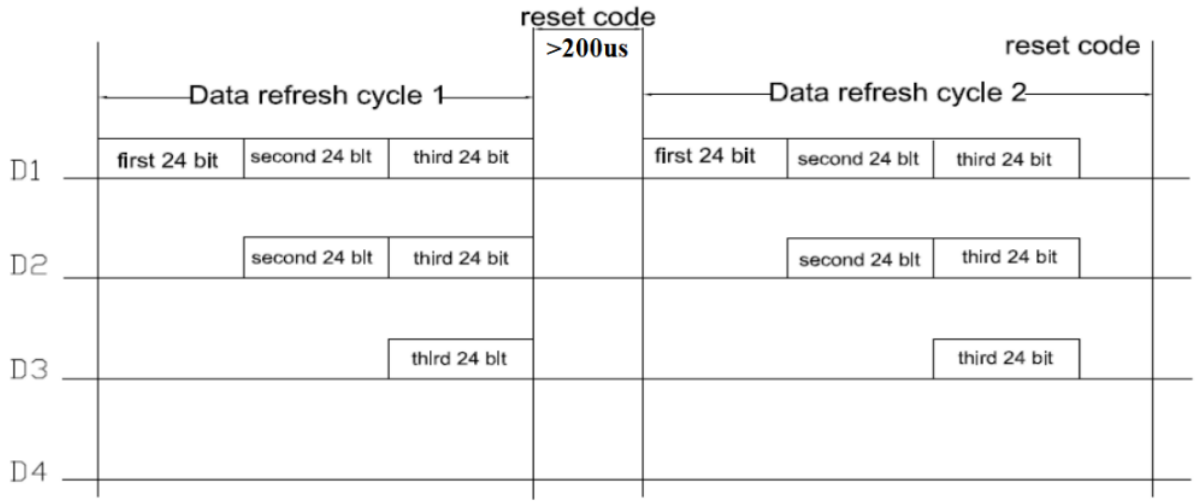
■ Sequence Chart:



■ Cascade Method:



▪Data Transmission Method:

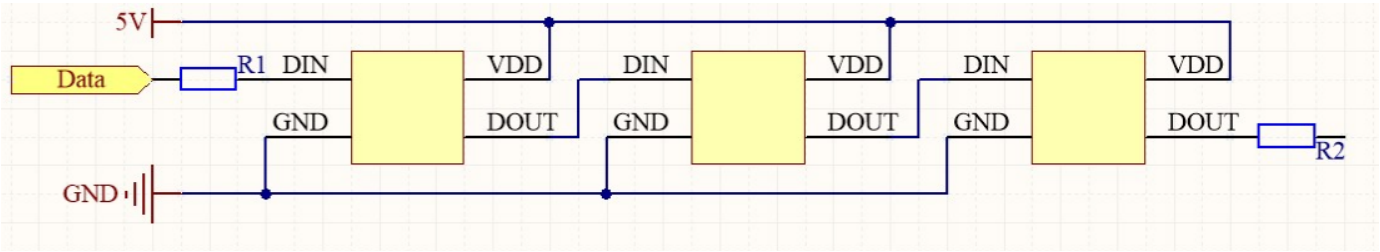


▪Composition of 24bit data:

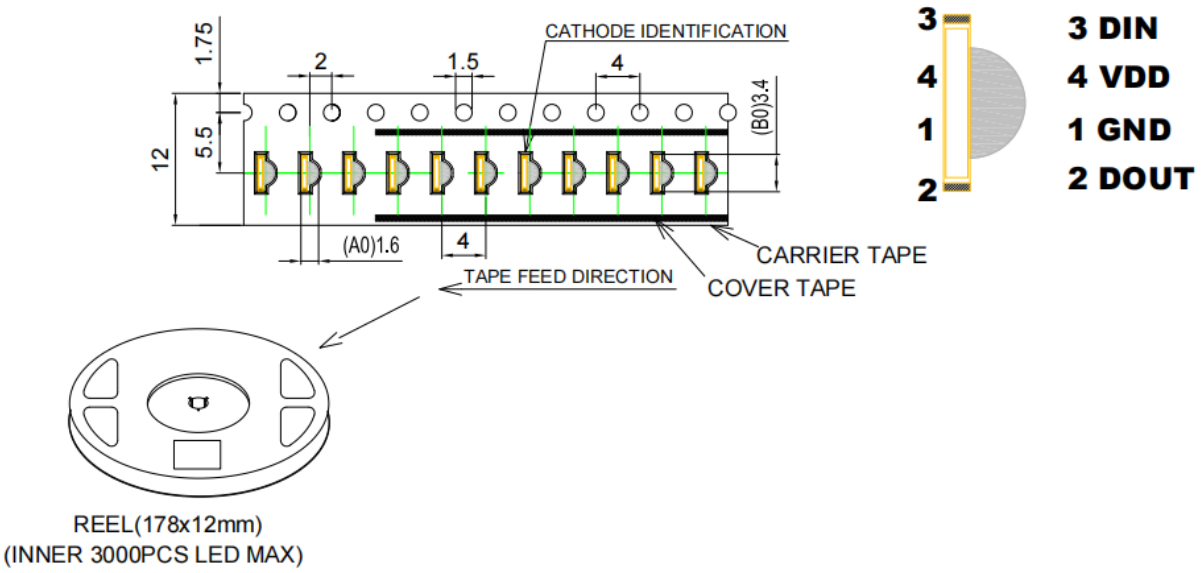
G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4
R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

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

▪Typical application circuit:



Carrier Tape (Unit: mm)



▪ Cautions:

1. After open the package, the LED´s floor life is 4 Weeks under 30℃ or less and 60%RH or less(MSL:2a).
2. Heat generation must be taken into design consideration when using the LED.
3. Power must be applied resistors for protection, over current would be caused the optic damage to the devices and wavelength shift.
4. Manual tip solder may cause the damage to Chip devices, so advised that heat of iron should be lower than 15W with temperature control under 5 seconds at 230-260 deg. C. (The device would be got damage in re working process, recommended under 5 seconds at 230-260 deg. C)
5. All equipment and machinery must be properly grounded. It is recommended to use a wristband or anti-electrostatic glove when handing the LED.
6. Use IPA as a solvent for cleaning the LED. The other solvent may dissolve the LED package and the epoxy, Ultrasonic cleaning should not be done.
7. Damaged LED will show unusual characteristics such as leak current remarkably increase, turn-on voltage becomes lower and the LED get unlight at low current.

■ General Description

OSSK5CS31 is a smart LED control circuit and light emitting circuit in one controlled LED source, which has the shape of a 3210 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 remaining data 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.

■ Soldering Conditions

Reflow Soldering		Hand Soldering	
Pre-Heat	180 ~ 200°C	Temperature Soldering time	350°C Max. 3 sec. Max. (one time only)
Pre-Heat Time	120 sec. Max.		
Peak Temperature	260°C Max.		
Dipping Time	**10 sec. Max.**		
Condition	Refer to Temperature-profile		

• Reflow Soldering Condition(Lead-free Solder)

*Recommended soldering conditions vary according to the type of LED

*Although the recommended soldering conditions are specified in the above table, reflow, or hand soldering at the lowest possible temperature is desirable for the LEDs.

*A rapid-rate process is not recommended for cooling the LEDs down from the peak temperature.

•All SMD LED products are pb-free soldering available.

• Occasionally there is a brightness decrease caused by the influence of heat or ambient atmosphere during air reflow. It is recommended that the User use the nitrogen reflow method.

• Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

• Reflow soldering should not be done more than two times.

• When soldering, do not put stress on the LEDs during heating.

• After soldering, do not warp the circuit board.