OptoSupply
Light It Up

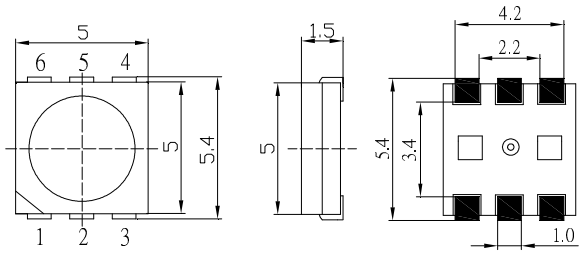
5x5x1.5mm Intelligent Control RGB LED

OSTS5050C1A

■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 5050 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.
- Each pixel of the three primary color can achieve 256 brightness display, completed 16777216 color full color display, and scan frequency 2KHz/s.
- Cascading port transmission signal by single line.
- Any two point the distance more than 5m transmission signal without any increase circuit.
- When the refresh rate is 30fps, cascade number are not less than1024 points.
- Send data at speeds of 800Kbps.
- The color of the light were highly consistent, cost-effective..

■Outline Dimension



Top View Side View Back View

NO.	Symbol	Function description
1	NC	Suspended in PCB layout,the circuit will be out of operation when it connects to other circuits.
2	VDD	Power Voltage,connect to"∠5V"
3	DO	Control data signal output
4	DIN	Control data signal input
5	GND	Data & Power Grounding
6	BIN	Backup Control data signal input

Unite:mm
Tolerance:±0.20mm
unless otherwise noted

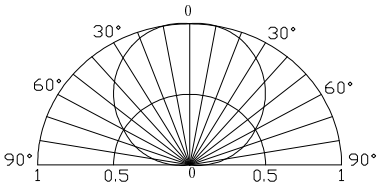
■Applications

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

■Absolute Maximum Rating (Ta=25℃)

Item	Symbol	Value	Unit
Power supply voltage	V_{DD}	+3.5~+5.3	V
Input voltage	V_I	-0.5~VDD+0.5	V
Operation junction temperature	Topt	-25~+60	℃
Storage Temperature	Tstg	-40 ~ +120	℃

■Directivity



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

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input current	I_I	V_I=VDD/VSS	-	-	±1	μA
Input voltage level	V_{IH}	D_{IN}，SET	0.7VDD	-	-	V
	V_{IL}	D_{IN}，SET	-	-	0.3 VDD	
Hysteresis voltage	V_H	D_{IN}，SET	-	0.35	-	V

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

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Transmission Delay Time	t_{PLZ}	CL=15pF,DIN→DOUT,RL=10KΩ	-	-	300	ns
Fall Time	t_{THZ}	CL=300pF,OUTR/OUTG/OUTB	-	-	120	us
Input-capacitance	C_I	-	-	-	15	pF

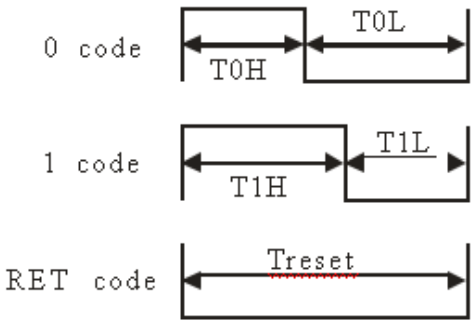
■LED characteristic parameter

Color		Quiescent Current(mA)	Constant Current(mA)	Iv(mcd)/typ.	λD(nm)
Red		>0.7	18	500	620-622
Pure Green		>0.7	18	1500	522-525
Blue		>0.7	18	300	467-470

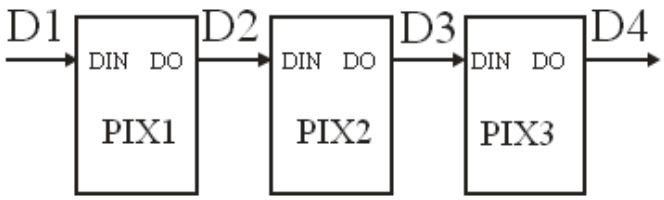
■Data transfer time(TH+TL=1.1μs±300ns)

T0H	0-code,High-level time	220ns~380ns
T1H	1-code,High-level time	580ns~1.6us
T0L	0-code,Low-level time	580ns~1.6us
T1L	1-code, Low-level time	220ns~420ns
RES	Frame unit,Low-level time	>280us

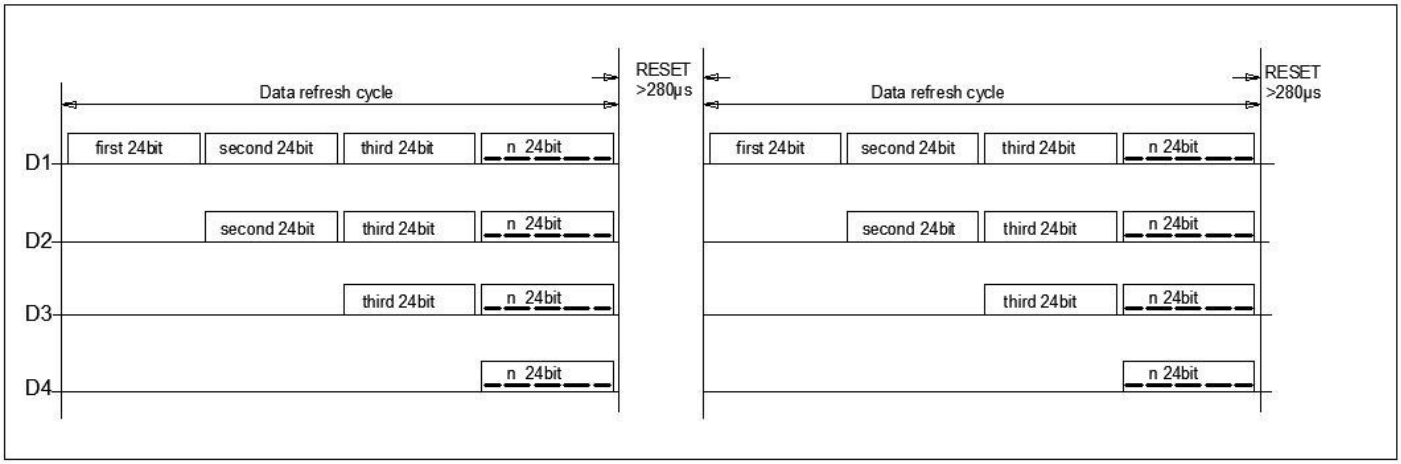
▪Sequence chart



▪Cascade method



■Data transmission method：



Note: D1 is the data from MCU, and D2, D3, D4 are from Cascade Circuits

■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: Data transmit in order of GRB, high bit data is first.

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OSTS5050C1A

■General description

OSTS5050C1A is an intelligent control LED light source that the control circuit and RGB chip are integrated in a package of 5050 components. Its internal include intelligent digital port data latch and signal reshaping amplification drive circuit. Also include a precision internal oscillator and a 12V voltage programmable constant current control part, which achieves highly consistent color effect.
The data transfer protocol use single NZR communication mode. After the pixel power-on reset, the DIN port receive data from controller, the first pixel collect initial 24bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DO port. After transmission for each pixel, the signal to reduce 24bit. Every pixel adopts auto-reshaping transmit technology, making the pixel cascade numbers are not limited to the signal transmission, only relate to the speed of signal transmission.
The BIN receives the data signal, and then compare the data with the DIN side after phagocytosis of 24bit data, if DIN do NOT receive the signal, then switching to BIN for receiving the input signal, which ensure that any the IC's damage does not affect the signal cascade transmission and make the BIN in state of receiving signal until restart after power-off.
Refresh Frequency updates to 2KHz, Low Frame Frequency and no Flicker appear in HD Video Camera.
250us or more of reset time, it won't cause wrong reset while interruption, it supports the lower frequency and inexpensive MCU.
There're in a choice of 16mA or 5mA current version, and also in a choice of high brightness or cost-effective version.
That is to say, OSTS5050C1A is provided with four versions

■Storage

· Storage Conditions
Before opening the package:
The LEDs should be kept at 30°C or less and 60%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material (silica gel) is recommended.
· After opening the package:
Soldering should be done right after opening the package (within 6hrs).
Keeping of a fraction, sealing and Temperature: 5~30℃ Humidity: Less than 30%.
If the package has been opened more than 1 week , components should be dried for 72hrs, at 70℃.
· Optosupply LED electrode sections are comprised of a silver plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid conditions which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration may cause difficulty during soldering operations. It is recommended that the User use the LEDs as soon as possible.
· Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

■Soldering Heat Reliability:

Reflow soldering Profile
· 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.
· 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.

Solder=Low Lead Free
Average ramp-up rate = 3ºC/sec. max.
Preheat temperature: 160º~200ºC
Preheat time = 120 sec. max.
Ramp-down rate = 6ºC/sec. max.
Peak temperature = 245ºC max.
Time within 3ºC of actual peak temperature = 25 sec. max.
Duration above 220ºC is 40 sec. max.