256 Gray Level

Constant Current RGB LED

Features

- **1616 package RGB LED**
- **Gray level 256 can be adjusted and scan frequency approaches 2KHz**
- **Built in signal reshaping circuit, after wave reshaping to the next driver, ensure wave- form distortion.**
- **Built-in electric reset circuit and power lost reset circuit.**
- **Cascading port transmission signal by single line.**
- **Any two point the distance more than 10m transmission signal without any increase circuit.**
- **When the refresh rate is 30fps, cascade numbers are not less than 1024 points.**
- **Send data at speeds of up to 800 Kbps.**
- **Support back-up mode function to avoid single failed pixel blocks following pixels.**

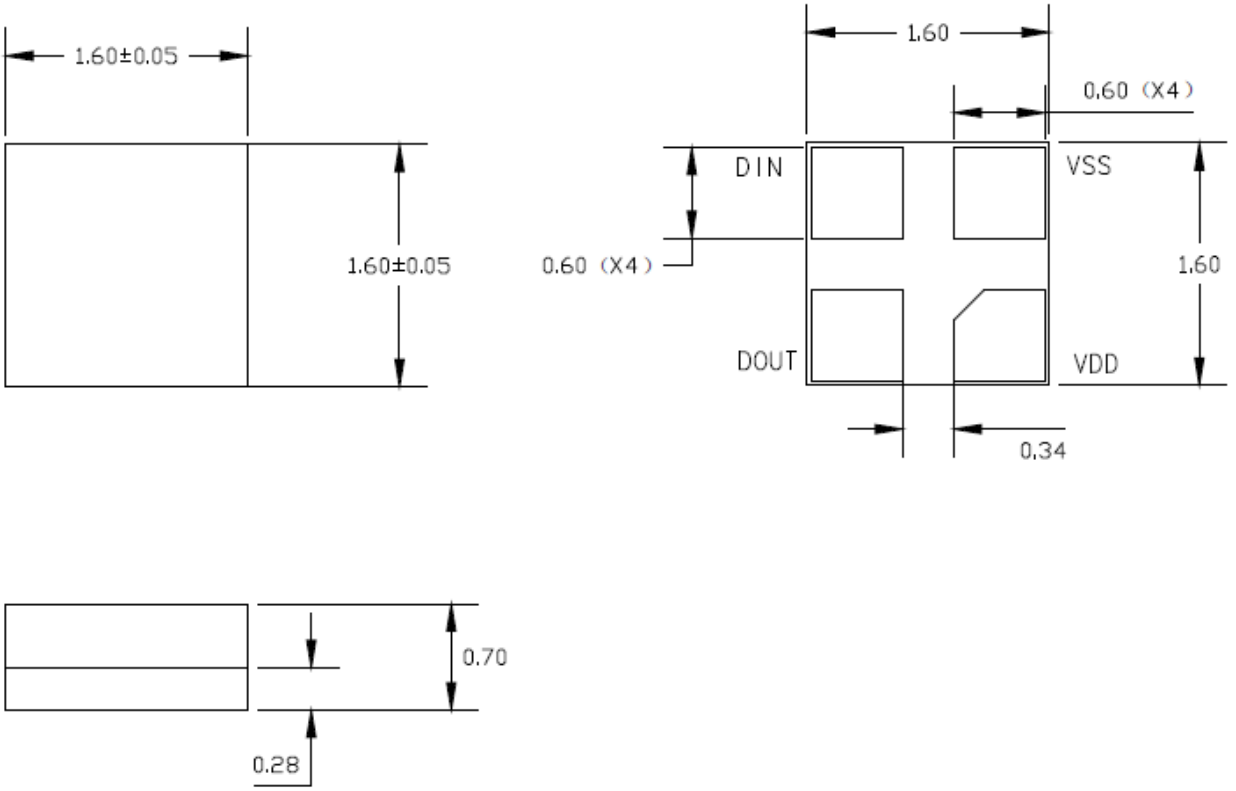
Description

The TF-S166 is 3 output channels special for RGB LED driver circuit. It also include internal intelligent digital port data latch and signal reshaping amplification drive circuit. TF-S166 use single NZR communication mode. After the chip power on reset, the DIN port receives data from controller, the first IC 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 IC through the DO port. After transmission for each chip, the signal to reduce
24bit. IC adopts auto reshaping transmit technology, making the chip cascade number is not limited the signal transmission, only depend on the speed of signal transmission. The data latch of IC depends on the received 24 bit data produce different duty ratio signal at IO_R, IO_G, IO_B port. All chip synchronously send the received data to each segment when the DIN port input a reset signal. It will receive new data again after the reset signal finished. Before a new reset signal received, the control signal of IO_R, IO_G, IO_B port unchanged. IC sends PWM data that received justly to IO_R, IO_G, IO_B port, after receiving a low voltage reset signal the time retains 24us at least.

Applications

- **LED decorative lighting**
- **Indoor/outdoor LED video or irregular screen.**
- **Full color LED light strip**

Mechanical Dimensions



TOP VIEW

Pad Description

Number	Name	Pin Description
1	VSS	Ground
2	VDD	Power supply voltage
3	DOUT	Data signal cascade output
4	DIN	Data signal cascade input

Absolute Maximum Ratings

Input Supply Voltage, VDD	+7 V
Output voltage	+12 V
Input voltage VI	-0.5 ~ VDD+0.5V
Operating Temperature	-25℃ to 85℃
Storage Temperature	-40℃ to 125℃
ESD, Human body mode	2KV

Recommended Operation Conditions

Input supply voltage VDD	5V
Junction temperature range	-40℃ to 125℃

Electrical Specifications

(V_{DD}=5V, TA=25℃, V_{SS}=0V, unless otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
LED output current	IO_R/G/B			12		mA
Input voltage level	VIH		0.7VDD			V
	VIL				0.3VDD	V
Hysteresis voltage	VH					V
Transmission delay time	t_{TD}	CL=15pF,DIN→ DOUT RL=10KΩ			300	ns
Fall time	t_{fall}	CL=300pF IO_*			TBD	us
Data transmission rate	F_{MAX}	Duty ratio 50%		800		Kbps
Input capacitance	C_I			15		pF

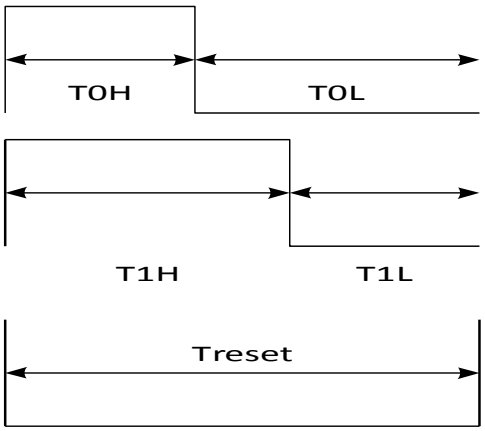
LED Characteristic Parameter

Emitting color	Wavelength(nm)	Luminous intensity(mcd) @12mA	Voltage(V) (Typ)
Red	610-630	462-510	2.1
Green	516-540	460-600	2.8
Blue	465-475	300-450	2.9

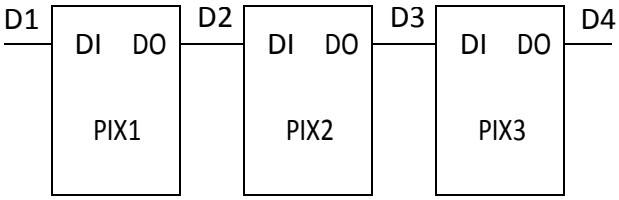
Data Transfer Timing

Timing Parameter	Group A	Group B
T0H	0.4us +/- 150ns	0.3us +/- 150ns
T0L	0.85us +/- 150ns	0.9us +/- 150ns
T1H	0.85us +/-150ns	0.6us +/- 150ns
T1L	0.4us +/-150ns	0.6us +/- 150ns
Reset Code	Treset > 24us	

Sequence chart:



Cascade method:



Composition of 24-Bit Data :

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

Figure 1. 24-Bit Data Format

Data Transmission Format：

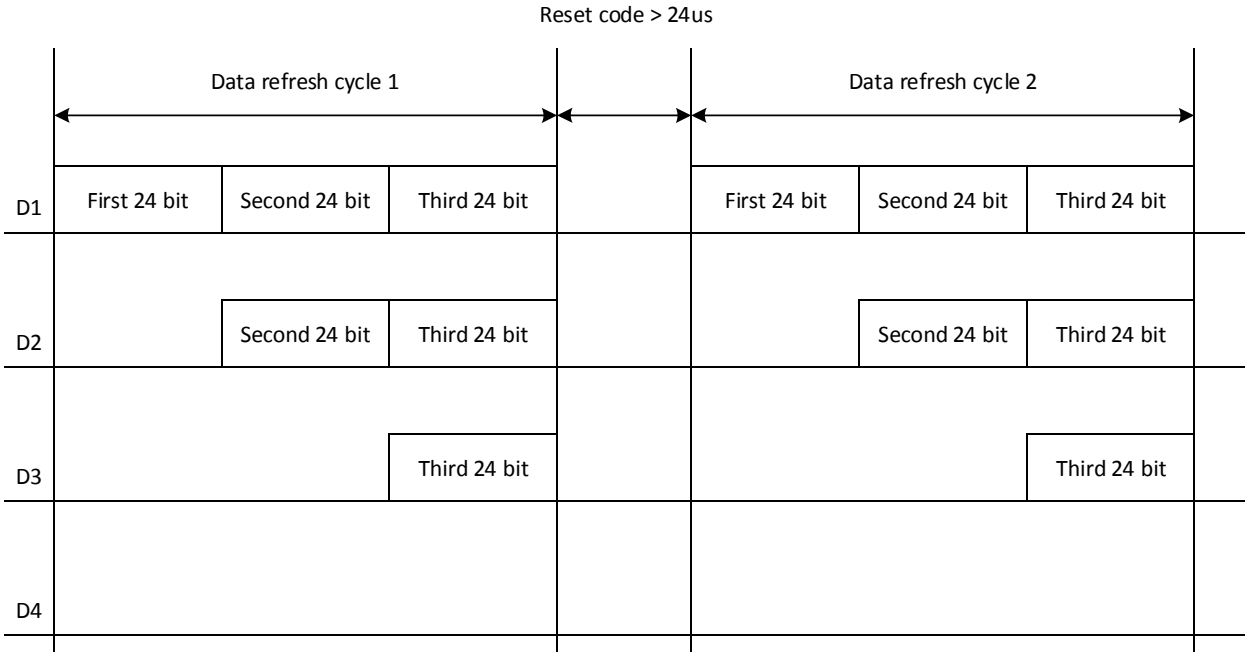


Figure 2. Data Transmission Format