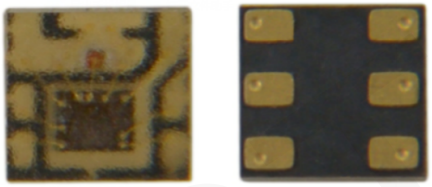
NEWSTAR LED CO., LIMITED

Address : 7/F, Block A YuShan Industrial Park,Songbai Road,ShiYan Town,Bao'An | CN-51810 8 Shenzhen
Tel: 0755-29405686 www.newstar-ledstrip.com info@newstarleds.com

NS107S-2020

SPECIFICATION

EMBEDDED CONTROLLER TYPE LED



Document No.: SPC/ NS107S-2020

Model No.: NS107S-2020

Description: 2.0X2.0X0.75mm Type 0.2Watt Power Embedded Controller LED
LED

Rev. No.: 02

Date: 2019-07-15

正式规格书

ELECTROSTATIC SENSITIVE DEVICES

RoHS

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Model: NS107S-2020

1. Product Overview:

NS107S-2020 is an embedded control type LED light source integrating control circuit and light-emitting circuit. Products containing a signal decoding module, data buffer, a built-in constant current circuit and RC oscillator; CMOS, low voltage, low power consumption; 256 level grayscale PWM adjustment and 32 brightness adjustment; use the double output, Data and synchronization of the CLK signal, connected in series each wafer output action synchronization.

2. Main Application Field:

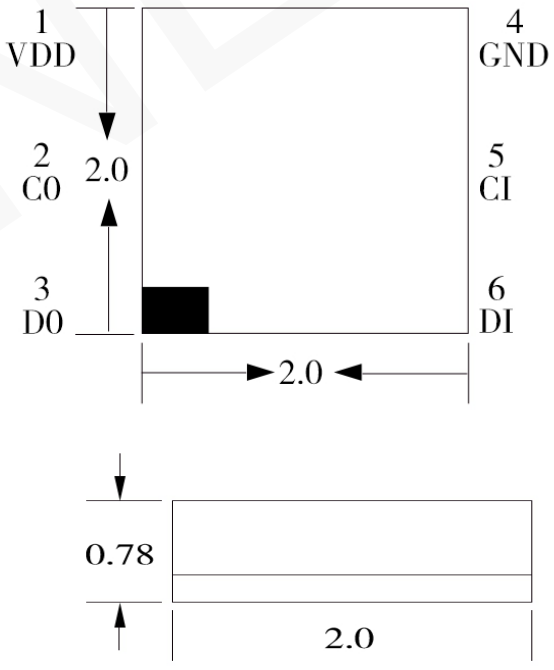
- **Easy To Design**
- **Easy To Build**
- **Easy To Program**

3. Description:

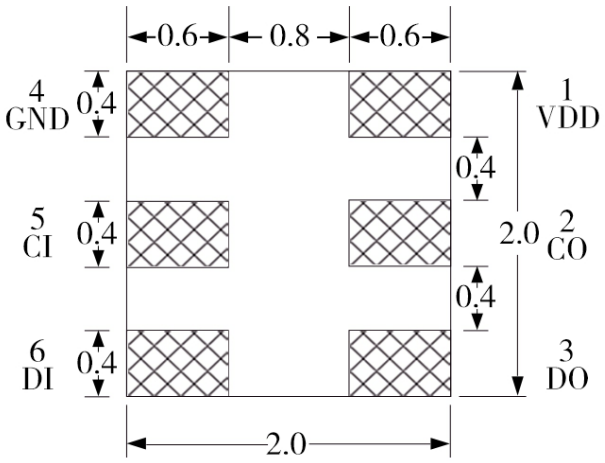
- **LED internal integrated high quality external control line serial cascade constant current IC; 5V application; default on electric lights;**
- **The two-wire synchronous control.**
- **The three RGB output control, 8Bit (256) color; 5Bit (32) to adjust the brightness;**
- **The three constant current drive, self detection function specific signal**
- **The maximum frequency of 40MHZ serial data input**
- **The double data transmission, built-in support uninterrupted oscillation PWM (28Khz) output, can maintain a static image.**

4. Mechanical Dimensions:

Front View



Buttom View



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

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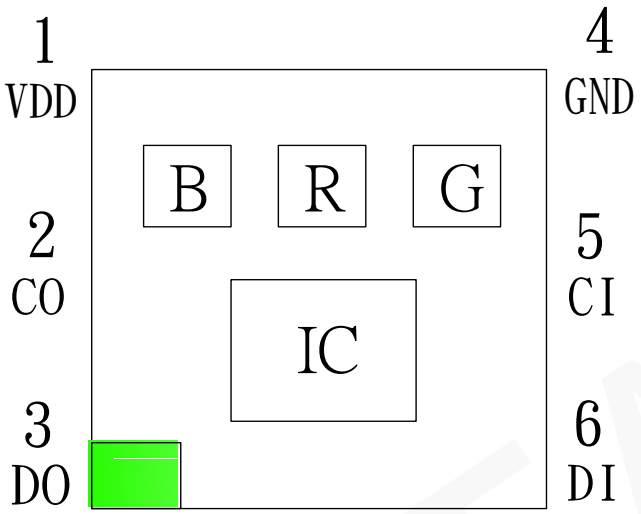
■ PIN configuration



No.	Symbol	Function description
1	VDD	Supply Voltage
2	CO	Clock output
3	DO	Data output
4	GND	Ground
5	CI	Clock input
6	DI	Data input

■ Typical Porduct Characteristics (Ta = 25℃)

Characteristics	Symbol		Min.	Typ.	Max.	Unit	Test condition
Forward Voltage	V_F		4.5		5.5	V	I_F=18mA
Luminous Intensity	Iv	R	-	230	-	mcd	I_F=18mA
		G	-	320	-		
		B	-	80	-		
		W	270	530	-		
Dominant Wavelength	λd	R	615	-	630	nm	I_F=18mA
		G	520	-	530		
		B	460	-	475		
Color Coordinate	x			0.2257			I_F=18mA
	y			0.2234			
View Angle	$2\theta_{1/2}$		-	120	-	deg	I_F=18mA

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■ Absolute Maximum Ratings（Ta=25℃,VSS=0V）：

Parameter	Symbol	Rating	Unit
IC Power Supply Voltage	VCC	+4.5~+5.5	V
LED voltage	Vled	3-7.5	V
Rate of data signal	F_{CLK}	30	MHZ
The max led output Current	I_{OMAX}	18	mA
Channel current deviation	D_{IO}	Channel<3%,chip<5%	%
Power dissipation;	P_D	<350	mW
Soldering Temperature*1	T_{SD}	260	°C
Operating Temperature Range	-40℃to+85℃		
Storage Temperature Range	-40℃to+105℃		

Notes 1: The maximum of soldering time is 5 seconds in T_{SD}

■ Electrical/Optical Characteristics:

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V_{cc}			5.0	5.5	V
Input voltage	V_{IN}		-0.4		5	V
Rate of data signal	F_{CLK}		0	20	-	MHZ
Input voltage level	V_{IH}	D_{IN}, SET	0.7 V_{cc}	-	-	V
	V_{IL}	D_{IN}, SET	-	-	0.3 V_{cc}	V
The clock high level widch	T_{CLKH}		30	-	-	ns
The clock low level widch	T_{CLKL}		30	-	-	ns
Data set up time	T_{SETUP}		10	-	-	ns
Data hold time	T_{HOLD}		5	-	-	ns

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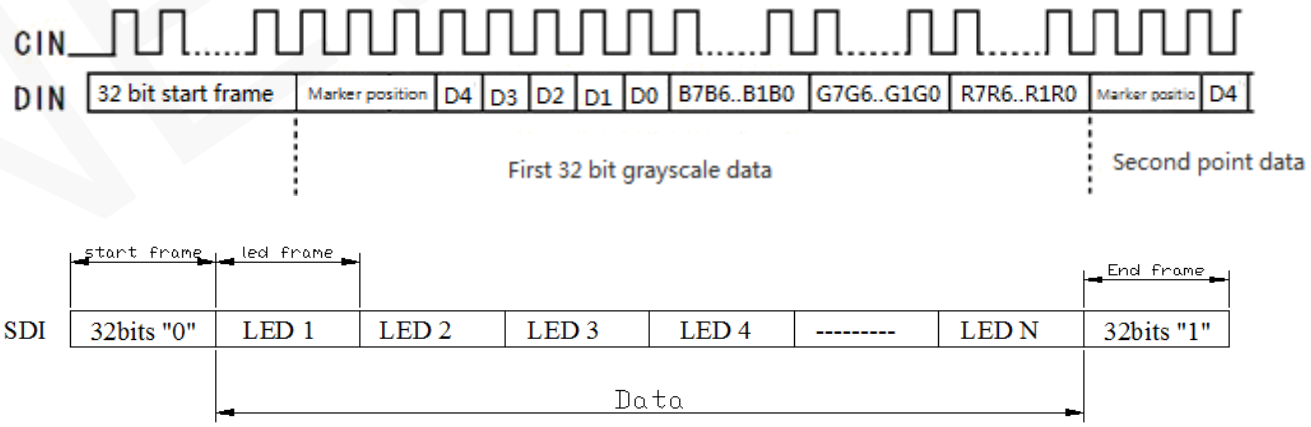
■ The electrical parameters (unless otherwise specified, TA=-20 ~ +70 ℃, VDD=4.5 ~ 5.5V, VSS=0V):

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit
Transfer time	T_{THH}	CL=30pF,RL=1K Ω	-	-	15	ns
	T_{THL}		-	-	15	ns
Signal delay time	Tpd	CL=30pF,RL=1K Ω	-	-	12	ns
	Tco		-	-	12	ns
Signal rise and fall time	T_R	Vcc=5V	-	-	500	ns
	T_F				400	ns
The output minimum PWM opening width	T_{ONMIN}	$I_{OUT=}$ 18mA	200	-	-	ns
The output signal maximum opening and closing time	T_{ON}	$I_{OUT=}$ 18mA	-	--	80	ns
	T_{Off}		-	-	80	ns

■ Feature Descriptions:



1. The first 32 bit "0" is the starting frame, and the CIN is on the rise time, and the timing DIN is preceded by CIN

2. It is marked as "1"

3. D4 D3 D2 D1 and D0 are 32 level brightness adjustment, D4 is the highest

4. The gray level data to high, the sequence is B/G/R

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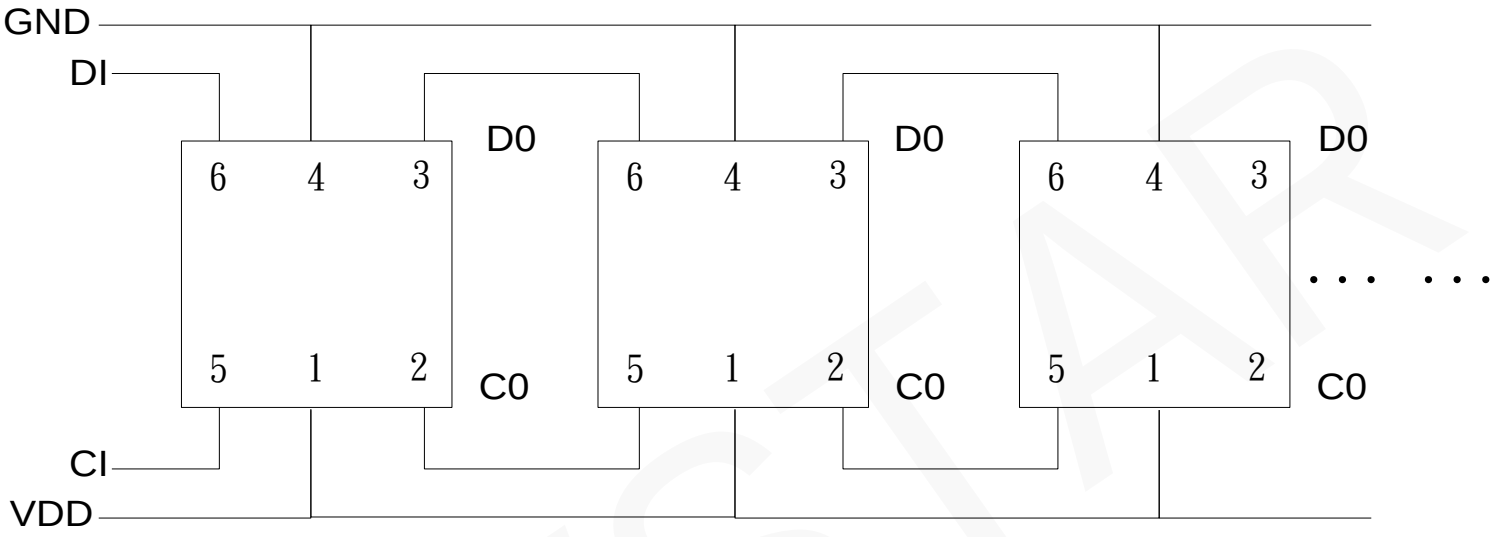
■ Test Circuit and Precautions for Use

1. Typical application circuit



2. Precautions for Use

2.1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn-out will happen).

2.2. Storage

1). To store the products is recommended with following conditions:

Humidity: 60% R.H. Max.

Temperature: 5℃~30℃(41℉~86℉)

2). Shelf life in sealed bag: 12 month at ＜5℃~30℃ and ＜60% R.H.

2.3. Baking

No Matter the Package bag is open or not ,the LED must do dehumidification in the oven for 24-48 hours at 70℃ before use and used within 2 hours, otherwise it need to be dehumidified again

1). 70±5℃ X 24hrs and ＜5%RH, for reel

2). 150±3℃ X 2hrs, for single LED

It shall be normal to see slight color fading of carrier (light yellow) after baking in process

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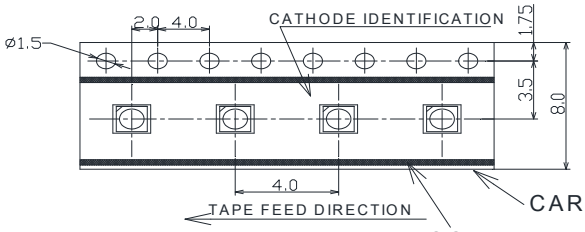
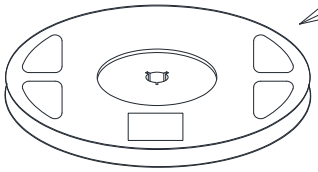
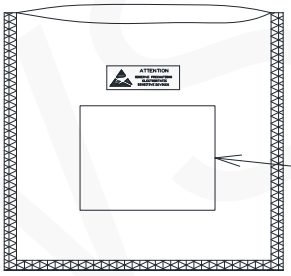
■ Packaging Standard:

NS107S-2020

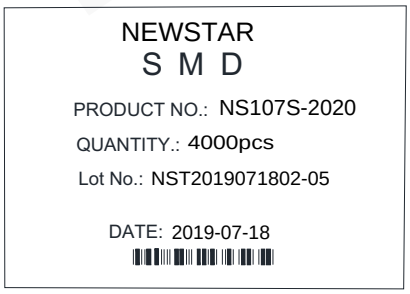




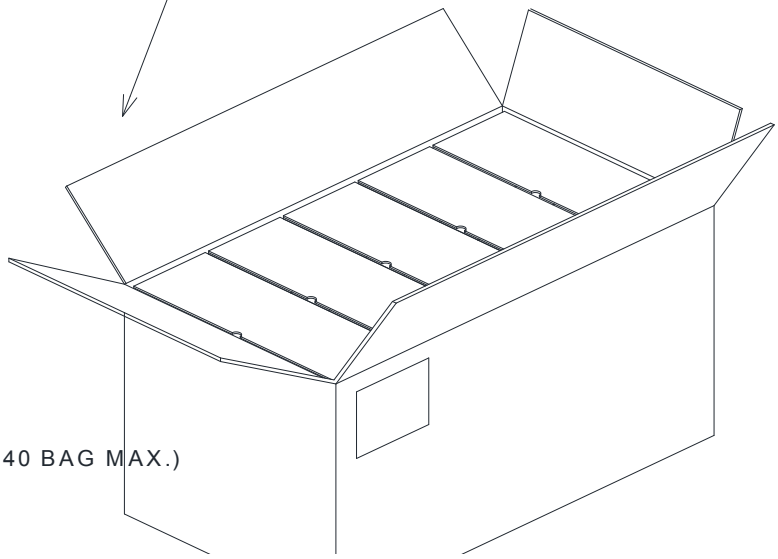
REEL(178x12mm)
(INNER 5000pcs LED MAX)



ESD POLYETHYLENE BAG



LABEL SKETCHING



CARDBOARD (INNER 40 BAG MAX.)

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.

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■ Reliability Test :

NO.	Test item	Test Conditions	Reference	Criterion
1	Thermal Shock	100 ± 5° C ~ -40° C ± 5° C 30min~30min 300 cycles	MIL-STD-202G	0/22
2	High Temperature Storage	Ta= +100°C 1000hrs	JEITA ED-4701 200 201	0/22
3	Low Temperature Storage	Ta= -40°C 1000hrs	JEITA ED-4701 200 202	0/22
4	High Temperature High Humidity Storage	Ta=60°C RH=90% 1000hrs	JEITA ED-4701 100 103	0/22
5	Temperature Cycle	-55°C~25°C~100°C~25°C 30min~5min~30min~5min 100 cycles	JEITA ED-4701 100 105	0/22
6	Resistance to Soldering Heat	Tsld = 260° C, 10sec. 3 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	

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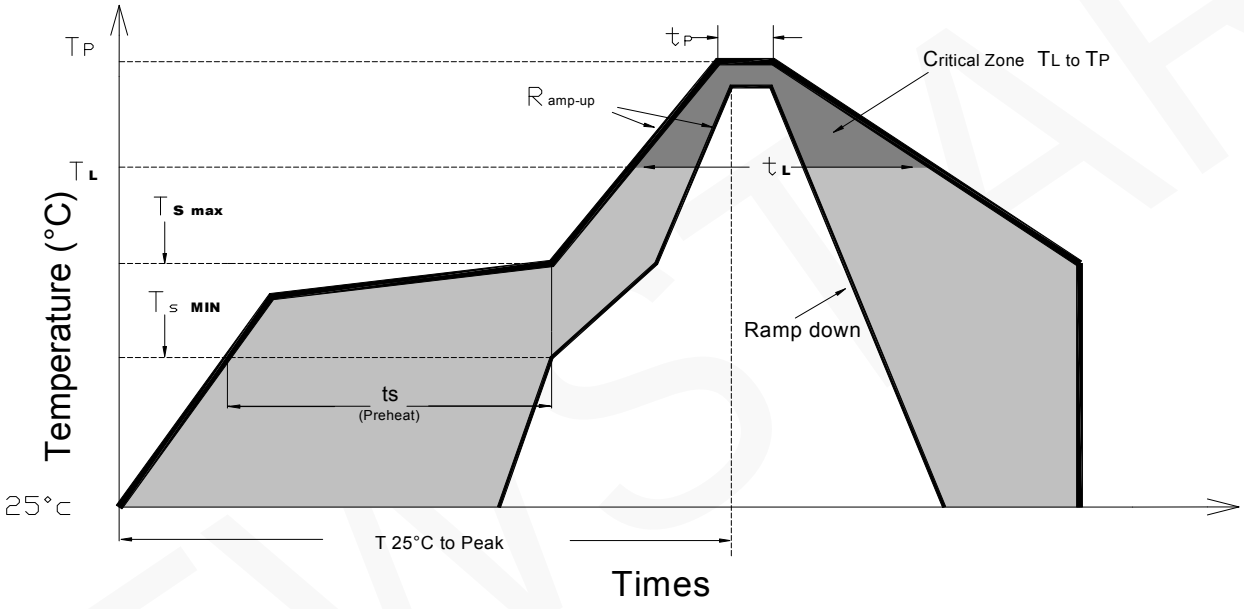
■ Reflow Soldering Characteristics

In testing,Newstar has found NS107S to be compatible with JEDEC J-STD-020C,using the parameters listed below. As a general guideline Newstar recommends that users follow the recommended soldering profile provided by the manufacturer of solder paste used.

Note that this general guideline is offered as a starting point and may require adjustment for certain PCB designs and Configurations of reflow soldering equipment.



Profile Feature	Lead-Based Solder	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	3℃/second max.	3℃/second max.
Preheat: Temperature Min (Ts_{min})	100℃	150℃
Preheat: Temperature Min (Ts_{max})	150℃	200℃
Preheat: Time (ts_{min} to ts_{max})	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (T_L)	183 ℃	217 ℃
Time Maintained Above: Time (t_L)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (T_P)	215 ℃	240 ℃
Time Within 5℃ of Actual Peak Temperature (tp)	<10 seconds	<10 seconds
Ramp-Down Rate	6℃/second max.	6℃/second max.
Time 25 ℃ to Peak Temperature	<6 minutes max.	<6 minutes max.

Note: All temperatures refer to topside of the package, measured on the package body surface.

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■ Heat Generation:

Thermal design of the end product is of paramount importance. Please consider the heat generation of the LED when making the system design. The coefficient of temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as components. It is necessary to avoid in tense heat generation and operate within the maximum rating given in this specification. The operating current should be decided after considering the ambient maximum temperature of LEDs

The maximum working humidity of the product is not easy to exceed 40 ˚ C (≤ 40 ˚ C, refers to the product pin at the operating temperature)

■ Electrostatic Discharge & Surge Current :

Electrostatic discharge (ESD) or surge current (EOS) may damage LED.

Precautions such as ESD wrist strap, ESD shoe strap or antistatic gloves must be worn whenever handling of LED.

IC device signal input and output ports must be connected in series protection resistor to prevent surge or static shock port caused by product failure;

All devices, equipment and machinery must be properly grounded.

It is recommended to perform electrical test to screen out ESD failures at final inspection.

It is important to eliminate the possibility of surge current during circuitry design.

■ Moisture Proof Package

Cannot take any responsibility for any trouble that are caused by using the LEDs at conditions exceeding our specifications.

The LED light output is strong enough to injure human eyes. Precautions must be taken to prevent looking directly at the LEDs with unaided eyes for more than a few seconds.

The formal specification must be exchanged and signed by both parties before large volume purchase begins.

The appearance and specifications of the product may be modified for improvement without notice.

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Change History

FCN No.	Date	Rev. No.	Changes/Reason of changes
	2019-06-15	01	Initial Document
	2019-07-15	02	Amendment of packaging data

Items	Signatures	Date	Note
Prepared by	Jorge Zhong	2019-07-16	02Amendment of packaging data
Checked by			
Approved by			
FCN#			