

客户 (Customer) : _____

承认书

Approval Sheet

谨致执事者：兹提供敝公司之有关详细规格及图面数据，敬请给予办理试认定手续。
同时敬请送返一份附有贵公司签认之测试认定后之样品承认书。

We are pleased in sending you herewith on specification and drawings for your approval.
Please return to us one copy "Approval sheet" with your approved signature.

型号 (Model No.) : A-SC5050ARGBC-B02-03-1T

发文日期 (Issue Date) : 2023/02/01 承认日期 (Approved Date) : _____

Checking signature of Amicc

Designer	Checker	Approver
Allen		Darren

Approval signature of customer

Designer	Checker	Approver

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5050RGB+IC ■ Top View 5050 Package

A-SC5050ARGBC-B02-03-1T



■ Description

A-SC5050ARGBC is an intelligent externally controlled LED light source that integrates control circuit and lighting circuit. Its appearance is the same as a SMD5050 LED, and each component is a pixel. The pixel contains intelligent digital interface, data latch signal, shaping and amplification drive circuit, power supply voltage regulator circuit, built-in constant current circuit, high-precision RC oscillator, and output drive circuit, which effectively ensures that the color of the light in the pixel is highly consistent.

The data protocol adopts the communication method of unipolar return-to-zero code. After the pixel is powered on and reset, the DIN port receives the data transmitted from the controller. The 24bit data sent first is extracted by the first pixel and sent to the inner data latches, the remaining data is shaped and amplified by the internal shaping processing circuit and then transmit to the next cascaded pixel point through the DO port. The signal will reduce 24 bits after through one pixel point. The pixel adopts automatic shaping and forwarding technology, so the cascade number of the pixel is not limited by the signal transmission, but only limited by the signal transmission speed requirement.

LED 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 and so on. By integrating the control circuit in LED package, the whole circuit becomes simpler、smaller and easier.

■ Features

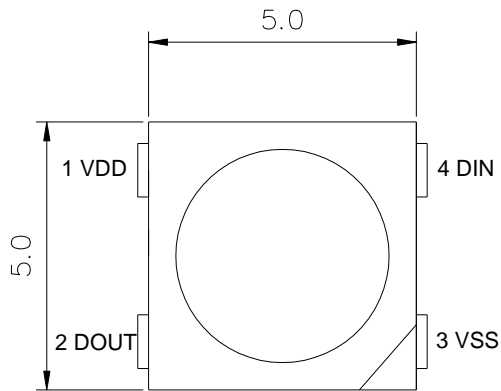
- Integrated R G B light emitting chip
- Integrated intelligent control chip
- Support single line communication and unlimited cascade
- Constant current output: 12mA (maximum)
- RGB three constant current output
- Each channel 256-level PWM gray modulation
- Built-in high-precision vibrator
- Built-in high precision waveform shaping output circuit
- Data transmission frequency up to 800Kbps
- Display refresh rate up to 20khz
- Built-in power-on reset circuit, power-off reset circuit, power-on does not light LED
- Input voltage VDD range 3V~7.5V

■ Applications

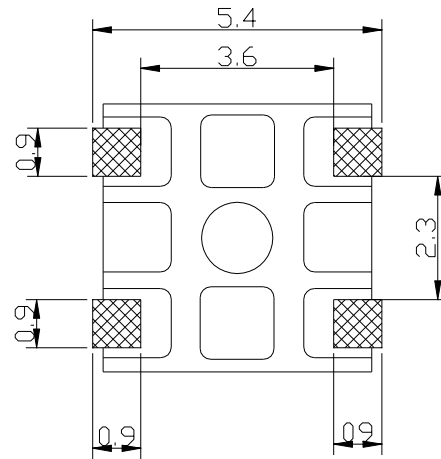
- LED full color point light source, running light, pixel screen, profiled screen
- LED full color module, luminous light string, magic color soft and hard light strip, situational lighting
- Decorative lights for electronic products, running lights for electrical equipment

■ **Package Dimensions**

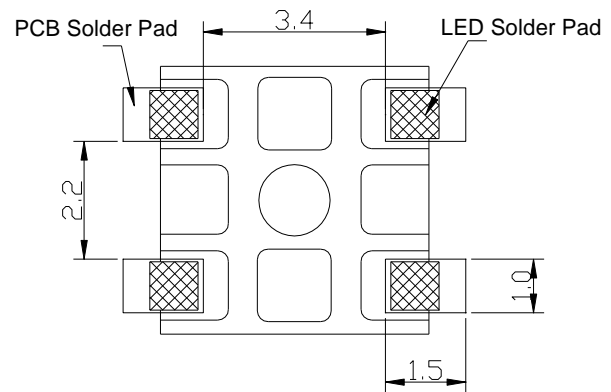
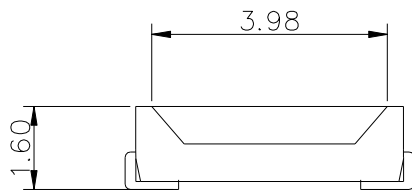
Top View



Bottom View



Side View



Notes:

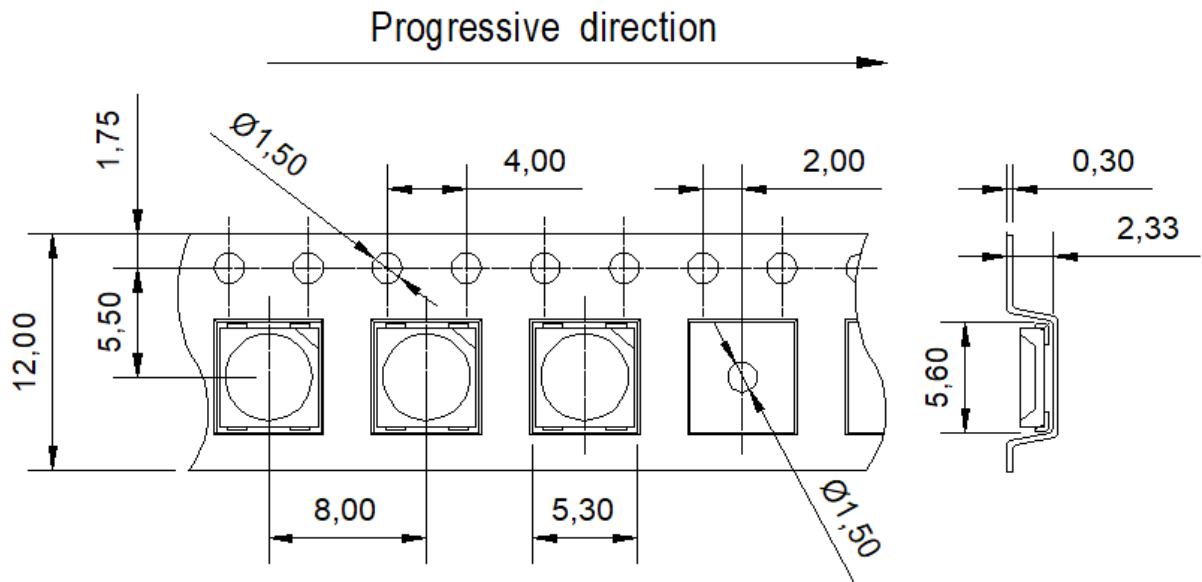
1. Dimensions are in millimeters
2. Tolerance is unless mentioned ± 0.1 mm.

■ **Function Instructions of Pin**

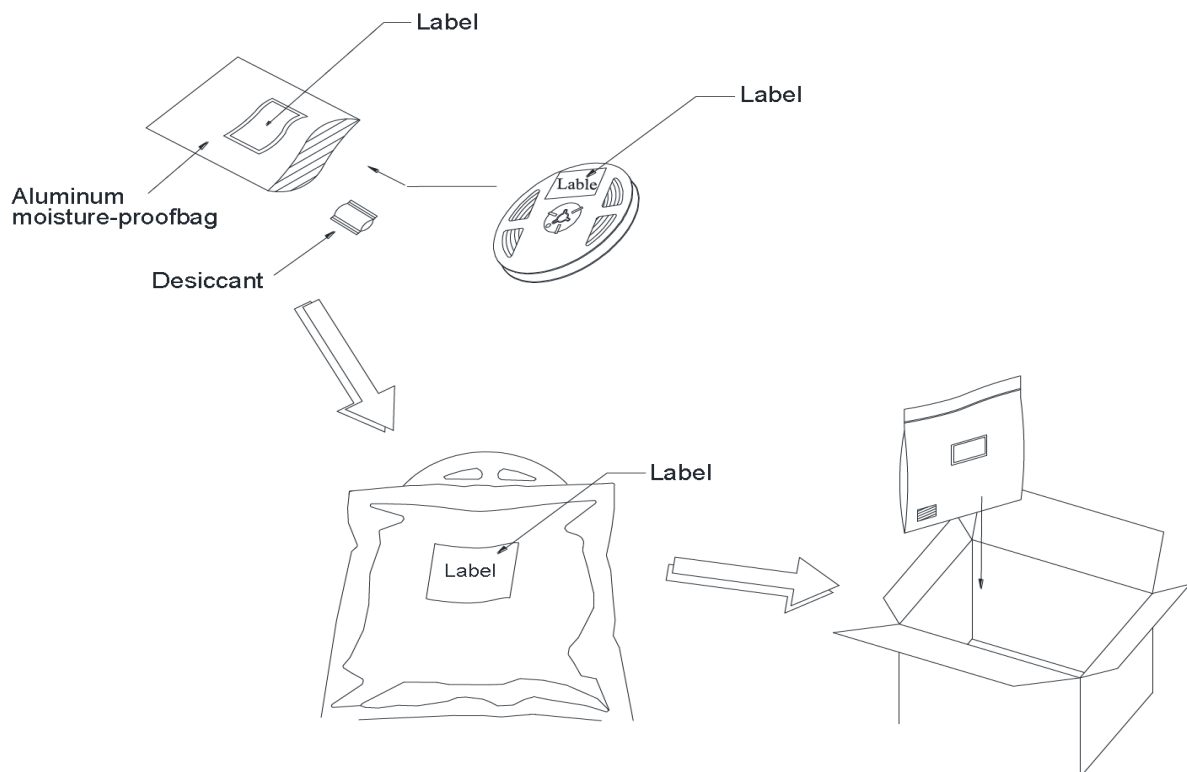
No.	Pad Name	Function	Note
1	VDD	Chip supply voltage	
2	DOUT	Data output	
3	VSS	Ground	
4	DIN	Data input	

■ **Product Packing**

1. Carrier Tape Schematic Picture



2. Packing Schematic Picture

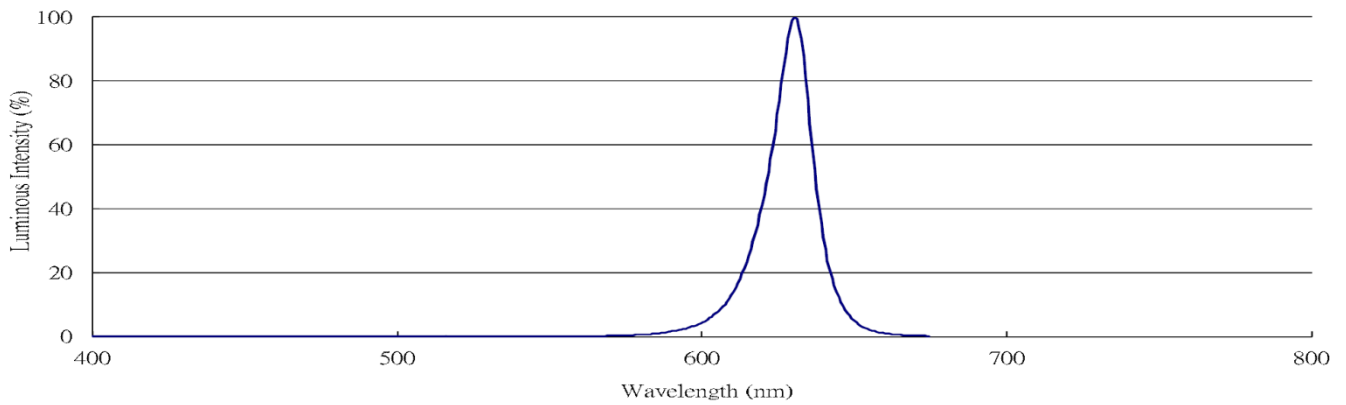


■ **Chip Optical Properties**

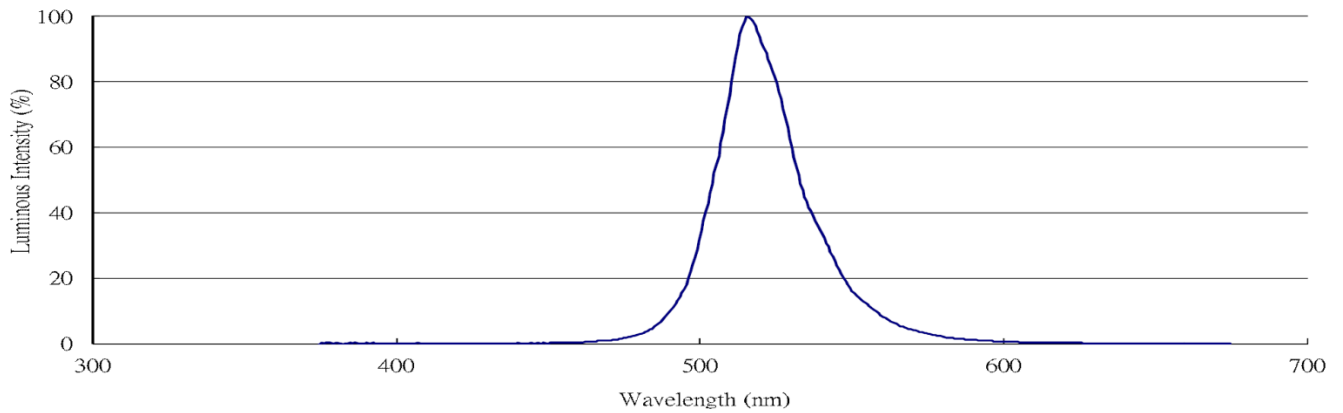
Color	Dominant wavelength(nm)	Flux (lm)	Current (mA)	Voltage (V)
RED	620-625	0.5-1.8	12	5
Green	525-535	1.8-3.5	12	5
Blue	465-475	0.5-1.2	12	5

■ **Chip Spectral Distribution**

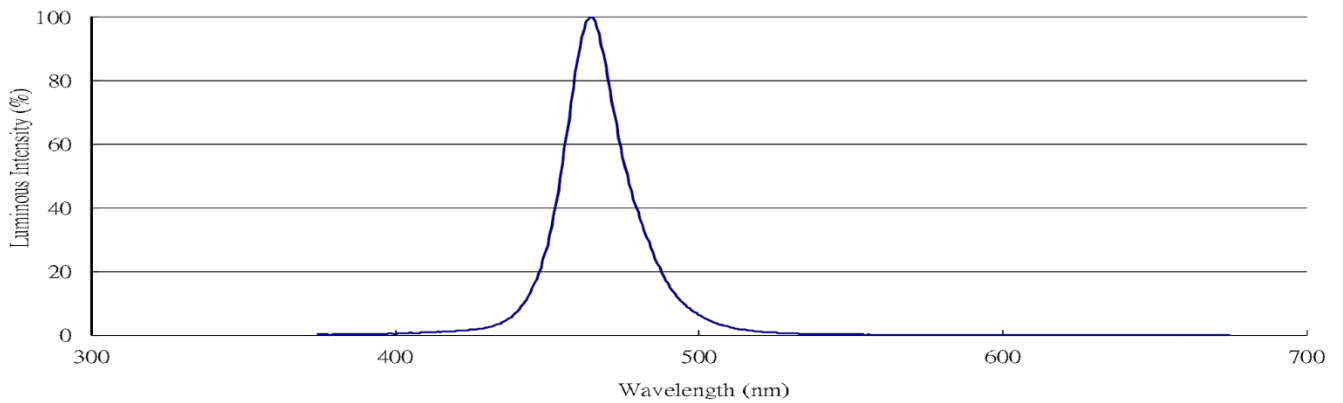
Red:



Green:



Blue:



■ **Parameter Limitation** (Unless otherwise specified: $T_a=25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}$, $V_{SS}=0\text{V}$)

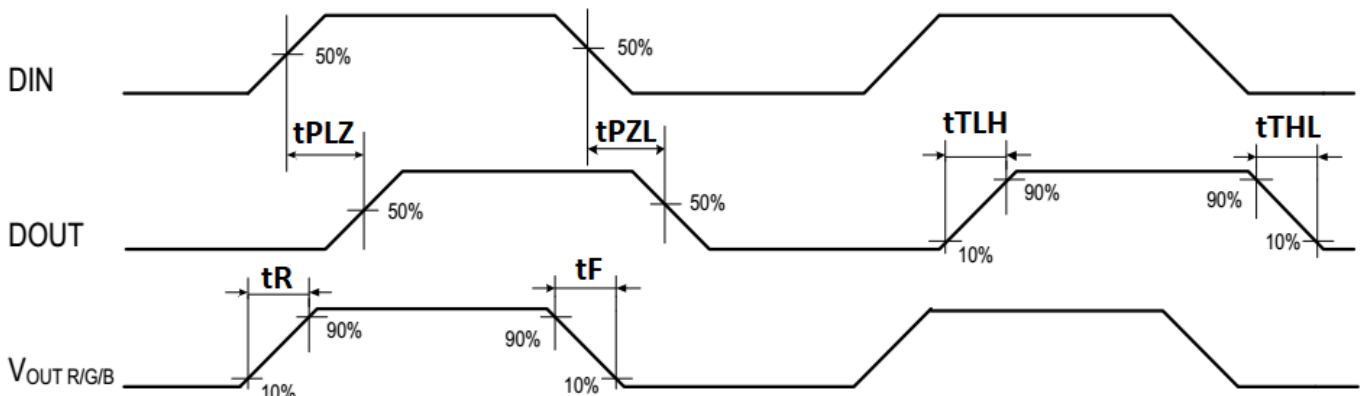
Parameter	Symbol	Range	Units	Note
Chip Supply Voltage	VDD	+3.0~+7.5	V	
Input Voltage	Vin	-0.5~+5.5	V	
GRB Output Driving Current	Io	15	mA	
Power	PD	400	mW	
PWM	F _{PWM}	3-5	kHz	
Work Temp.	Topt	-40~+85	°C	
Storage Temp.	Tstg	-40~+85	°C	

■ **Electrical Characteristics** ($T_a=-40\sim+85^{\circ}\text{C}$, $V_{DD}=3.0\text{V}\sim7.5\text{V}$, $V_{SS}=0\text{V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Chip Supply Voltage	VDD	3	5	7.5	V	
Sleep Current	I _{SLEEP}	0.6	0.8	1	mA	
High-level Input	V _{IH}	VDD*0.7		VDD	V	Din
Low-level Input	V _{IL}	0		VDD*0.3	V	Din
G、R、B Maximum Sink current	I _{sink}		12	15	mA	$V_{DD}-V_{fLED} \geq 1.2\text{V}$

■ **Dynamic Parameter** ($T_a = 25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}$, $V_{SS} = 0\text{V}$)

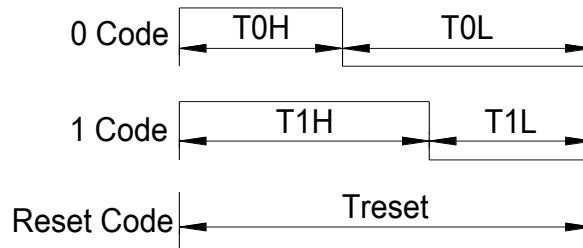
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmission delay time	t _{PLZ}			200	ns	Din → Dout, CL=30pF
	t _{PZL}			200	ns	
Rise time	t _{TLH}			400	ns	
Fall time	t _{THL}			400	ns	
Rise time	t _R			400	ns	G、R、B=12mA, CL=30pF
Fall time	t _F			400	ns	
Data transmission speed	F _{data}		800	1100	KHz	



■ Function and Sequential Description

1. Coding Sequence

MCU data is communicated with chip through single wire bus interface. The communication protocol adopts polarity return to zero code mode, and each codes must have low level. The starting level of each codes in this communication protocol is high level, and the time width of high level distinguish "0" code or "1" code.



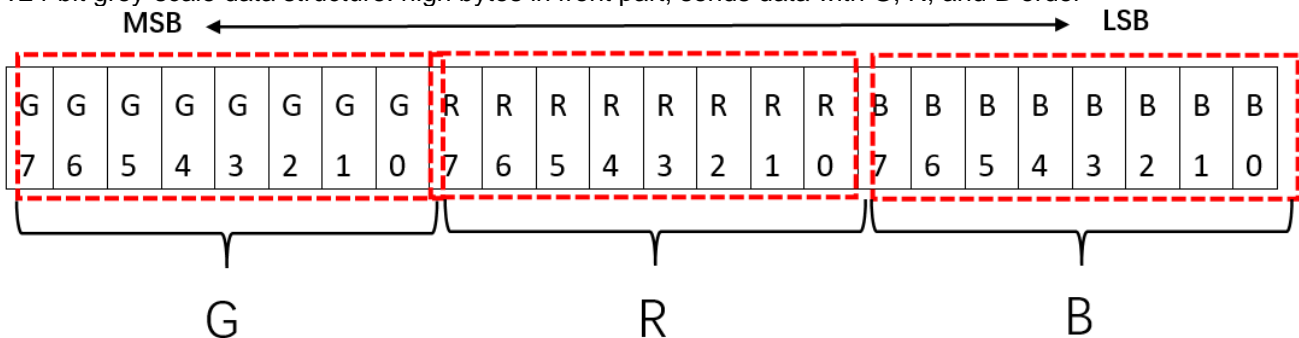
(VDD=5.0V)

Name	Description	Min.	Typ.	Max.	Tolerance	Unit
T0H	0 Code, high level time		0.295		0.05	us
T1H	1 Code, high level time		0.595		0.05	us
T0L	0 Code, Low level time		0.595		0.05	us
T1L	1 Code, low level time		0.295		0.05	us
Trst	Reset code, low level time	80				us

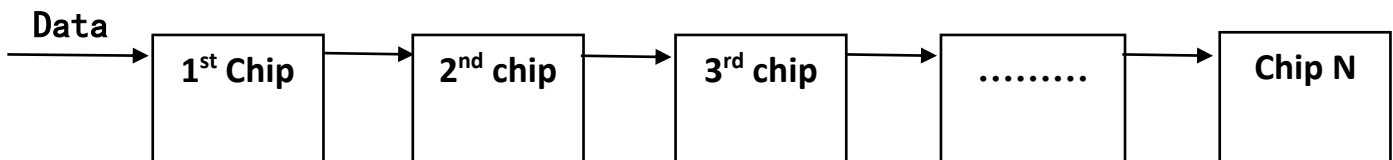
2. Protocol Data Format

According to the Principle, Trst + 24-bit data for first chip + 24-bit data for second chip +... + Nth chip 24-bit data +Trst

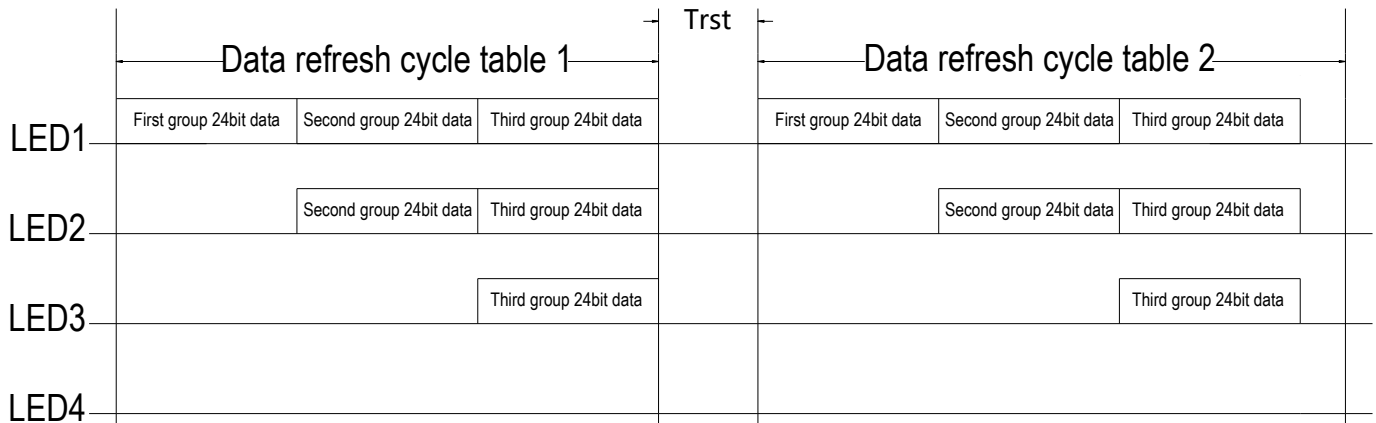
A 24-bit grey-scale data structure: high bytes in front part, sends data with G, R, and B order



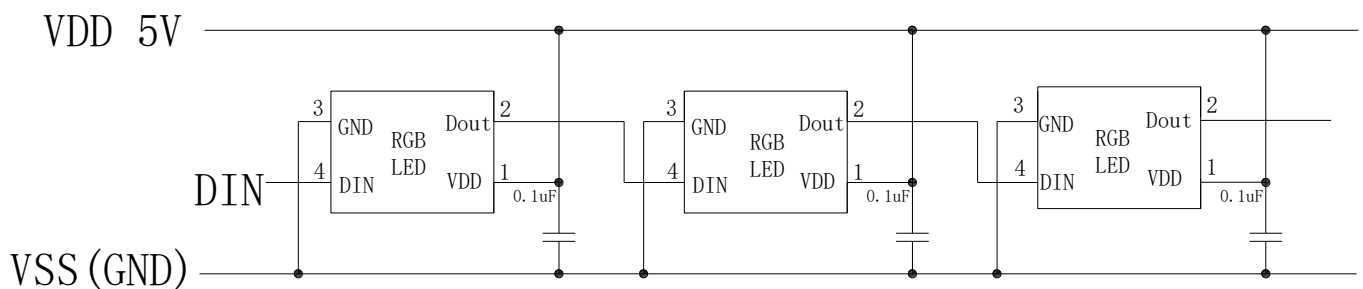
2.1 System Topology View



2.2 Data Transmission Mode (Take 4LEDs for example)

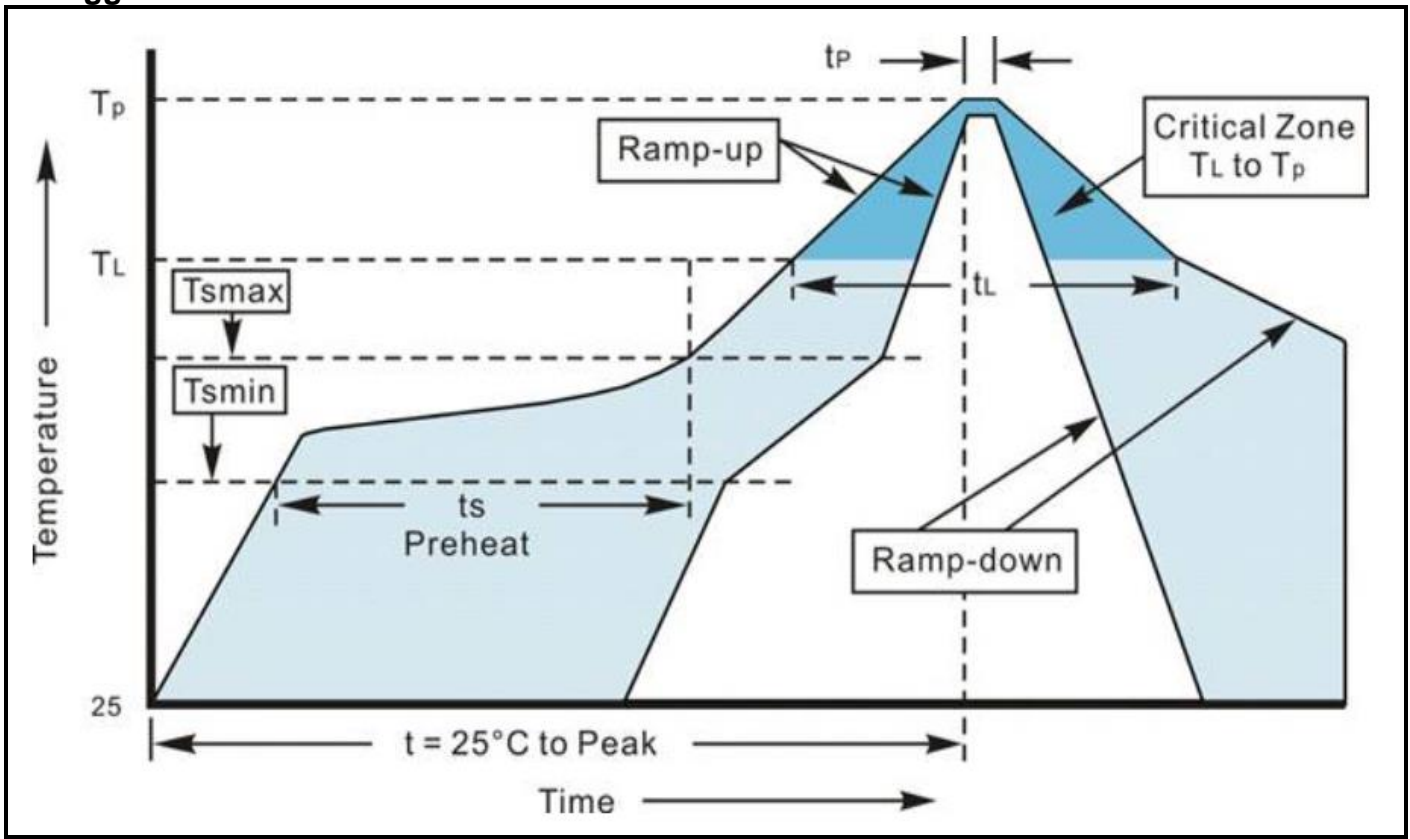


■ Suggested Application Current:



(Remarks: According to the standard design principle, the power input pin of each package needs to add a 0.1uF bypass capacitor. You can decide whether to exempt the 0.1uF capacitor according to the test results. Besides, it is should to connect a 33R damping resistor in series to the input terminal)

■ Suggested Reflow Profile



Temperature curve features	lead solder	Lead-free solder
Average heating rate (T _{Smax} to T _P)	Max 3°C/second	Max 3°C/second
Preheating: minimum temperature (T _{Smin})	100°C	150°C
Preheating: maximum temperature (T _{Smax})	150°C	200°C
Warm-up: time (T _{Smin} to T _{Smax})	60-120 seconds	60-120 seconds
Time to maintain high temperature: Temperature (T _L)	183°C	217°C
Time to maintain high temperature: Time (t _L)	60-150 seconds	60-150 seconds
Peak/Classification temperature (T _P)	215°C	245°C
Time at actual peak temperature (T _P) 5°C	<10 seconds	<10seconds
Cooling speed	Max 6°C/Second	Max 6°C/Second
Time required to reach peak temperature from 25°C	Max 6min.	Max 6min.

Note: All temperatures are measured on the surface of the package body