APA-104-4RGB260

SPECIFICATION

INTEGRATED LIGHT SOURCE INTELLIGENT CONTROL OF CHIP-ON-TOP SMD TYPE LED

Model No.: APA-104-4RGB260

Description: 5.5x5.0x1.6mm Top SMD Type 0.25 Watt Power

Tegrated light source Intelligent control LED

1. **Product Overview :**

APA-104-4RGB260 is a smart LED control circuit and light emitting circuit in one controlled LED source, which has the shape of a 5050 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 NRZ communication mode. The 32-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.

2. Main Application Field:

● Full color LED string light, LED full color module, LED super hard and soft lights, LED guardrail tube, LED appearance / scene lighting

● LED point light, LED pixel screen, LED shaped screen, a variety of electronic products, electrical equipment etc..

3. Description:

● Top SMD internal integrated high quality external control line serial cascade constant current IC;

● control circuit and the chip in SMD 5050 components, to form a complete control of pixel, color mixing uniformity and consistency;

●built-in data shaping circuit, a pixel signal is received after wave shaping and output waveform distortion will not guarantee a line;

●The built-in power on reset and reset circuit, the power does not work;

●gray level adjusting circuit (256 level gray scale adjustable);

● red drive special treatment, color balance;

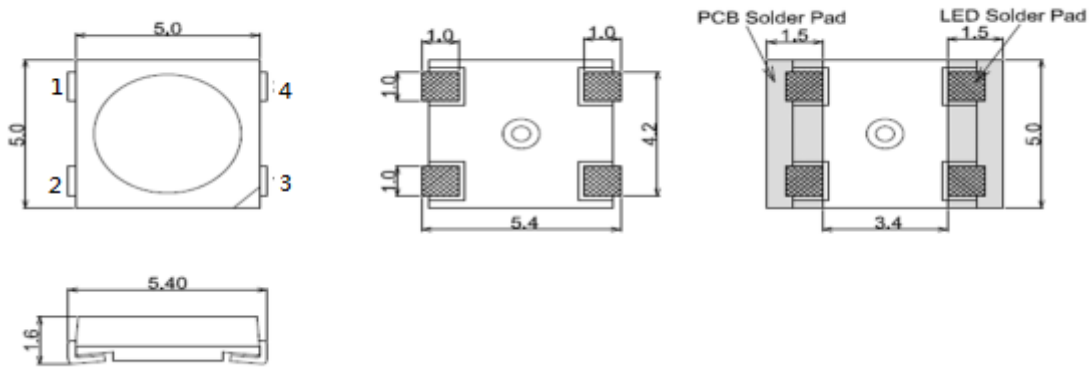
● line data transmission;

● plastic forward strengthening technology, the transmission distance between two points over 10M;

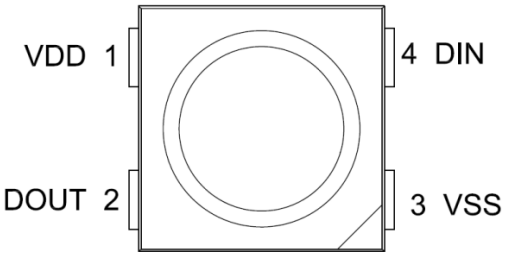
●Using a typical data transmission frequency of 800 Kbps, when the refresh rate of 30 frames per sec

●Built-in reverse power protection module, power supply reverse polarity will not damage the IC.

4. . Mechanical Dimensions:



5. **PIN configuration**



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

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

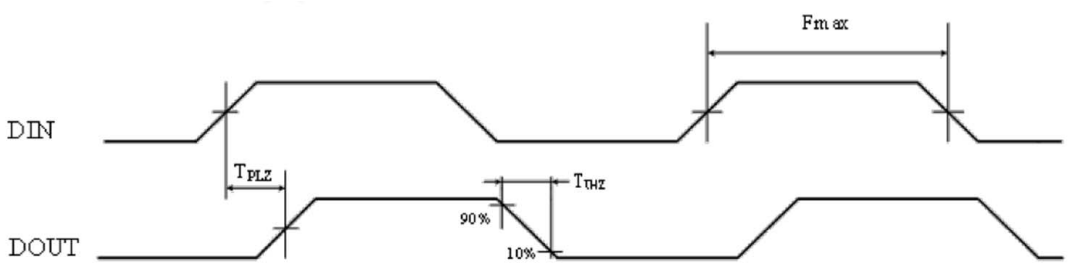
Parameter	Symbol	Range	Unit
Logic input voltage	V_{IN}	+5～+24	V
Logic input voltage	V_I	-0.5～VDD+0.5	V
Working temperature	Topt	-40~+85	℃
Storage temperature	Tstg	-50~+150	℃
ESD pressure	V_{ESD}	4K	V

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

Parmeter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	---	5.2	---	V	---
R/G/B port pressure	VDS,MAX	---	---	26	V	---
DOUT drive capability	IDOH	---	49	---	mA	DOUT conect ground, the maximum drive current
	IDOL	---	-50	---	mA	DOUT conect +, the largest current
The signal input flip threshold	VIH	---	3.4	---	V	VDD=5.0V
	VIL	---	1.6	---	V	
The frequency of PWM	FPWM	---	1.2	---	KHZ	---
Static power consumption	IDD	---	1	---	mA	---

9. The dynamic parameters (Ta=25 ℃):

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	TPLH	---	---	500	ns	DIN→DOUT
	TPHL	---	---	500	ns	



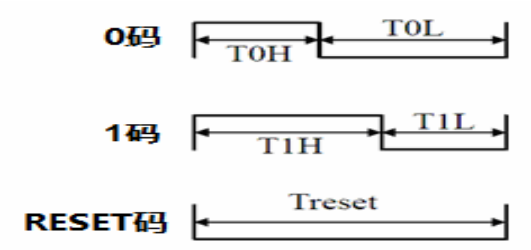
COLOR	(nm)	(mcd)	(v)
（Red)	621.2-625	chip:370-497 LED:400-750	2.0-2.3
（Green)	522-524	chip:320-340 LED:1100~1800	2.6-2.8
（Blue)	469-470	chip:90-100 LED:200~800	2.7-3.0

10. The data transmission time (TH+TL=1.25μs±600ns):

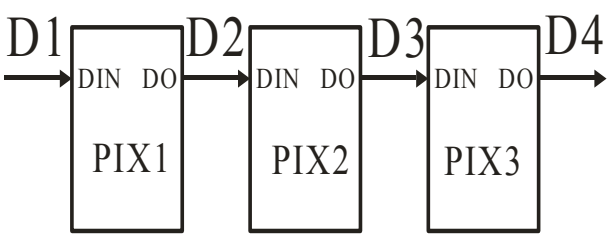
T0H	0 code, high level time	0.3μs	±0.15μs
T1H	1 code, high level time	0.6μs	±0.15μs
T0L	0 code, low level time	0.9μs	±0.15μs
T1L	1 code, low level time	0.6μs	±0.15μs
Trst	Reset code，low level time	200μs	

11. Timing waveform

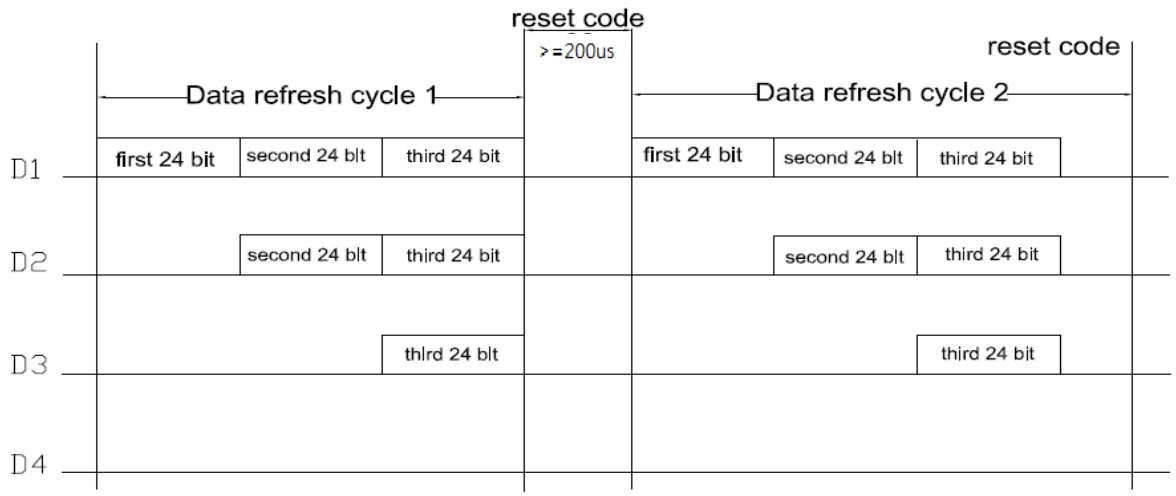
Input code:



Connection mode:



12. The method of data transmission:

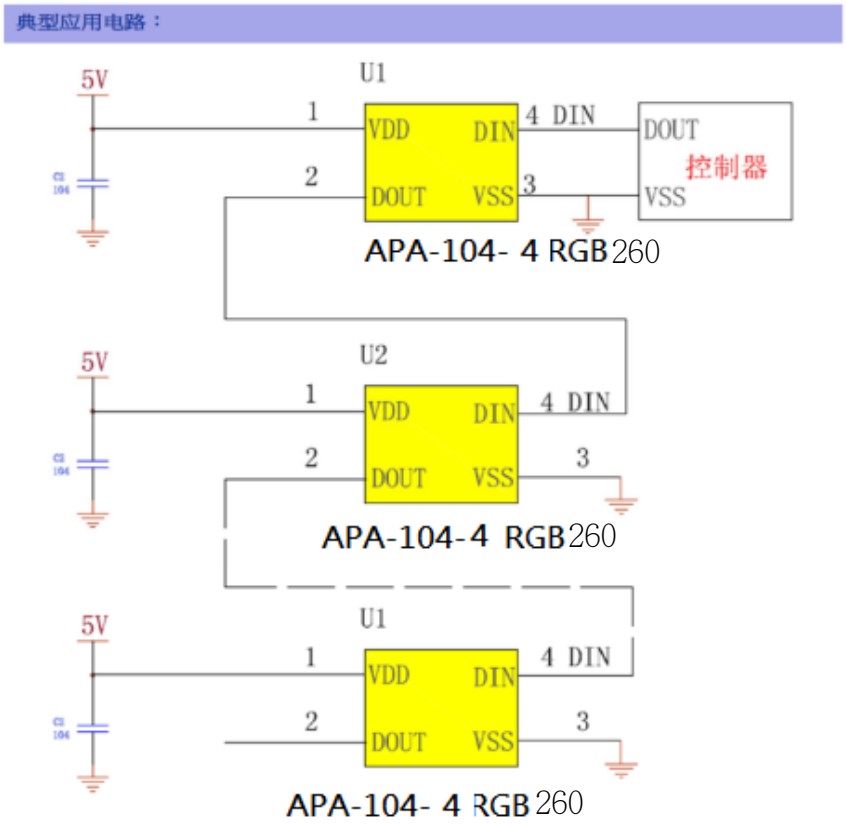


Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

13. The data structure of 24bit:

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)



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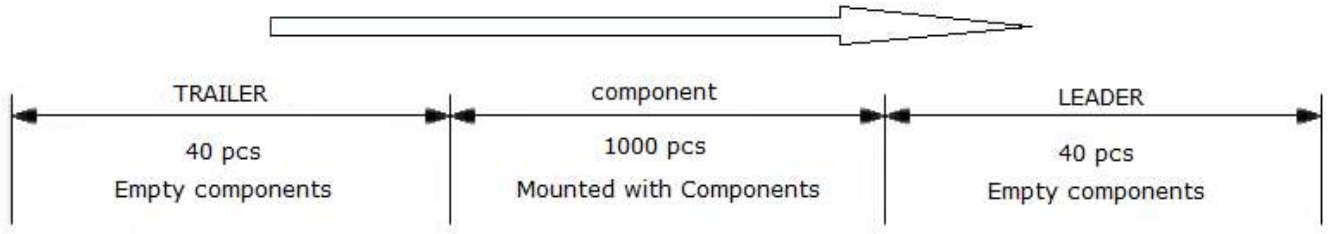
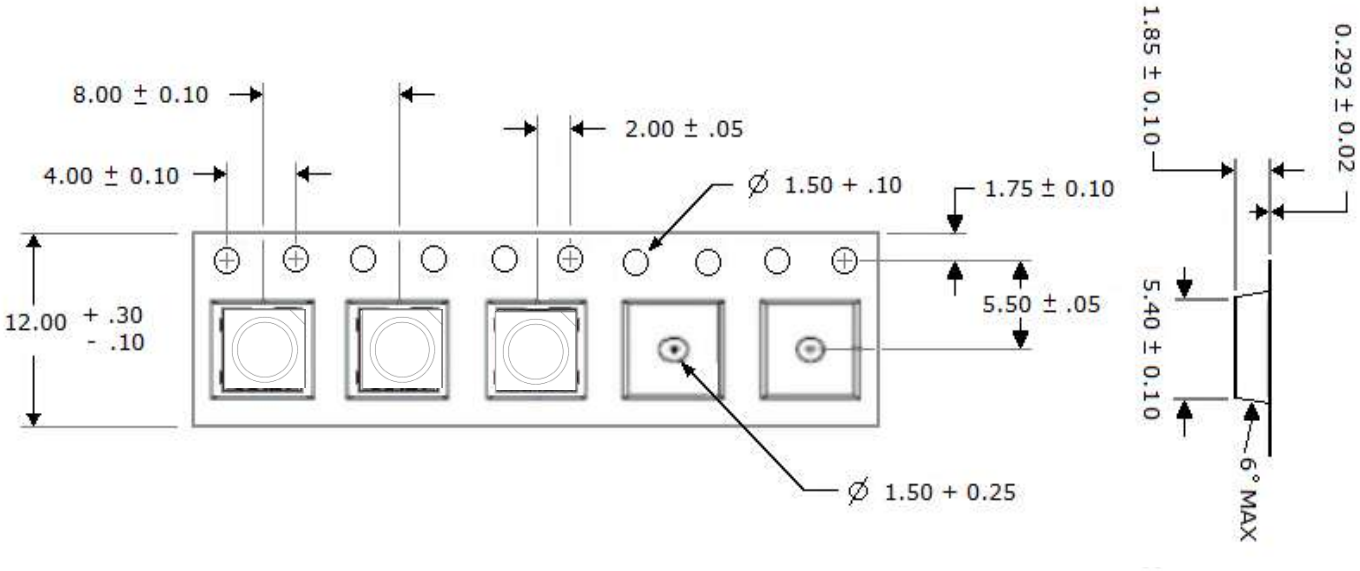
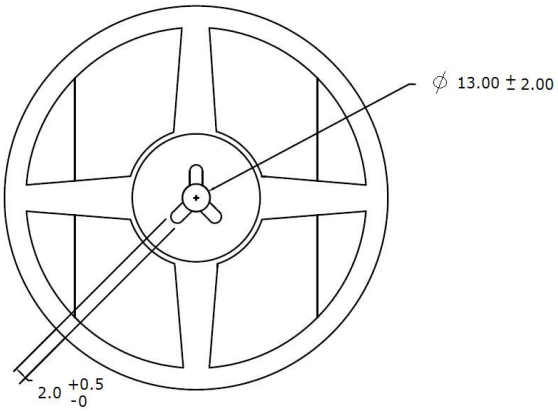
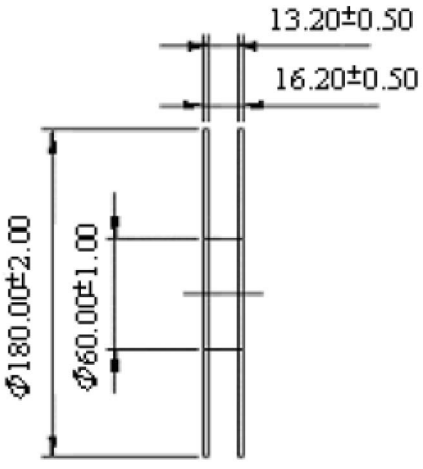
REEL PACKAGE:

Pull Direction:









Note:
1. Unit: mm
2. 1,000 pcs / reel

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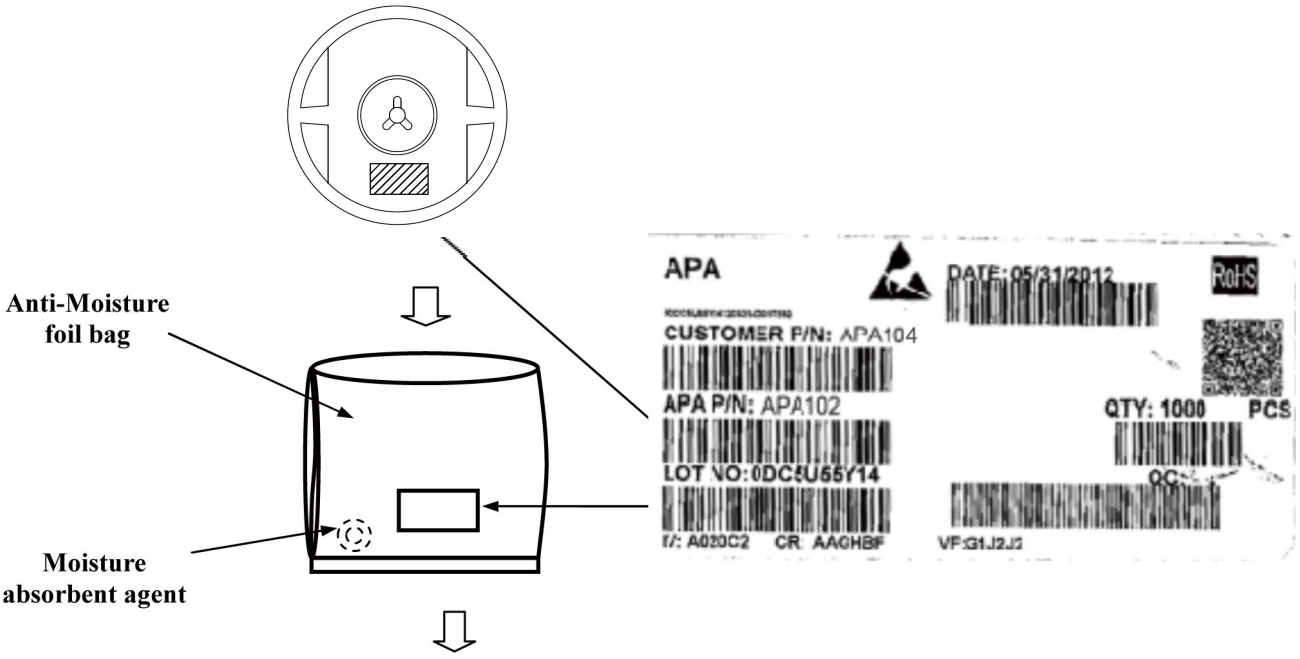
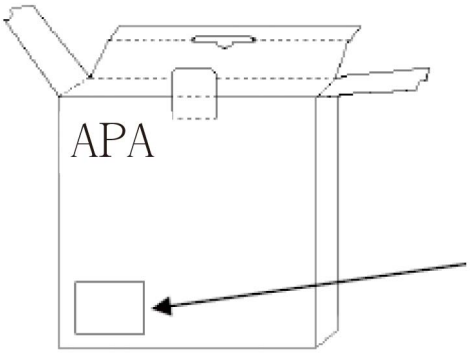
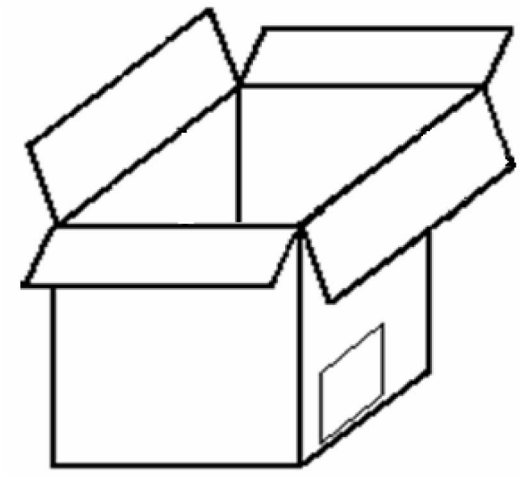




APA

QTY:5000PCS

DATE:2012/06/01



APA
QTY:50000PCS
DATE:2012/06/01

APA ELECTRONIC CO., LTD.
TEL:886-2-2240-9871
FAX:886-2-2240-9870

Note:
1. 1000 pcs (max.) / reel
2. 5 reels / box
3. 10 box / carton

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(1) Recommended Re-flow profile

We would inform you the following points when you use our SUPER LED to avoid any defective of those Led in the production line.

1) Before you start to work on it, you have to put them (super leds) into the oven and let them be roasted under the temperature on 70-80C degree for 7-8 hrs. ,then you can start to use them after.

2) When you want to use the SMT to assembly the super leds for the strips. panels or other design products,first please use a low temperature TIN Paste and keep the TIN STOVE temperature within 220-230C degree which is the best circumstance for Smart leds.