



**NATIONSTAR**  
—SINCE 1969—



**NATIONSTAR**  
—SINCE 1969—

**LEDs**

**FOR DISPLAY APPLICATIONS**

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**2017**

**World-Class Advanced LED Packaging Manufacturer**

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## Company Profile



### NationStar Headquarters

Land Area: 60,600m<sup>2</sup>

Building Area: 139,000 m<sup>2</sup>

Foshan NationStar Optoelectronics Co.Ltd (subordinate to Guangdong Rising Investment Group) is a key hi-tech enterprise of the National Torch Plan and an excellent high-tech enterprise of Guangdong Province, specialized in manufacturing LED and LED application products. NationStar was founded in 1969, began its LED packaging business in 1976 and became one of the first LED manufacturers in China. With advantages on abundant capital, distribution channels, R&D, and management, it has been ranked in the list of the famous LED brands in China. Except the LED packaging business, NationStar also extends its business to the production of upstream chips and downstream lighting applications and establishes a whole LED industrial chain. On 16th July, 2010, it launched its initial public offering and was listed in ShenZhen Stock Exchange.

Innovation promotes development, and technology leads to the future. NationStar is equipped with the Post-Doctoral Science Workstation, the Enterprise Technology Center of Guangdong Province, the Optoelectronics Research Center of Guangdong Province, and the Research Office of Prof Su Qiang, Academician of China Academy of Science, and the Local and National United Engineering Laboratory of Semiconductor Lighting Materials and Devices. In recent years, we have undertaken various R&D projects supported by the national and local government. Besides, until December, 2016, NationStar has applied 394 patents, including 70 patents for invention. The main packaging product of NationStar is SMD LED, including RGB LED, White LED and Chip LED. The current production capacity of SMD LED has achieved 6000kk per month.

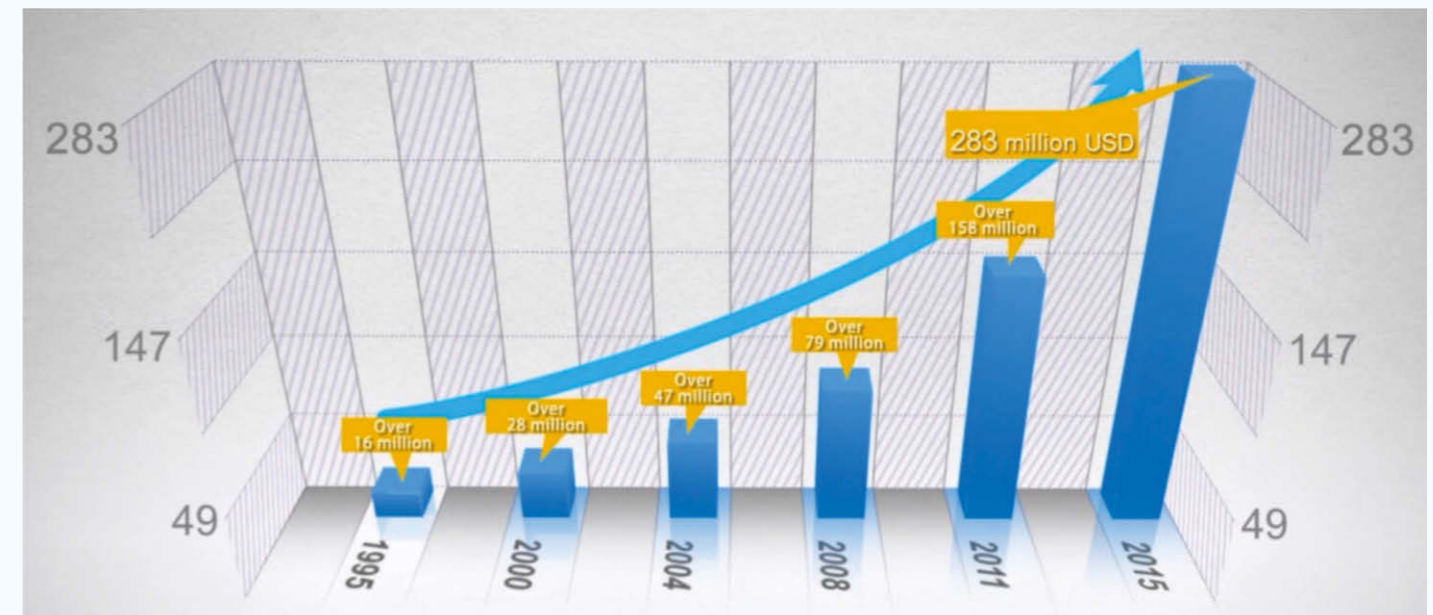
## Distribution Network

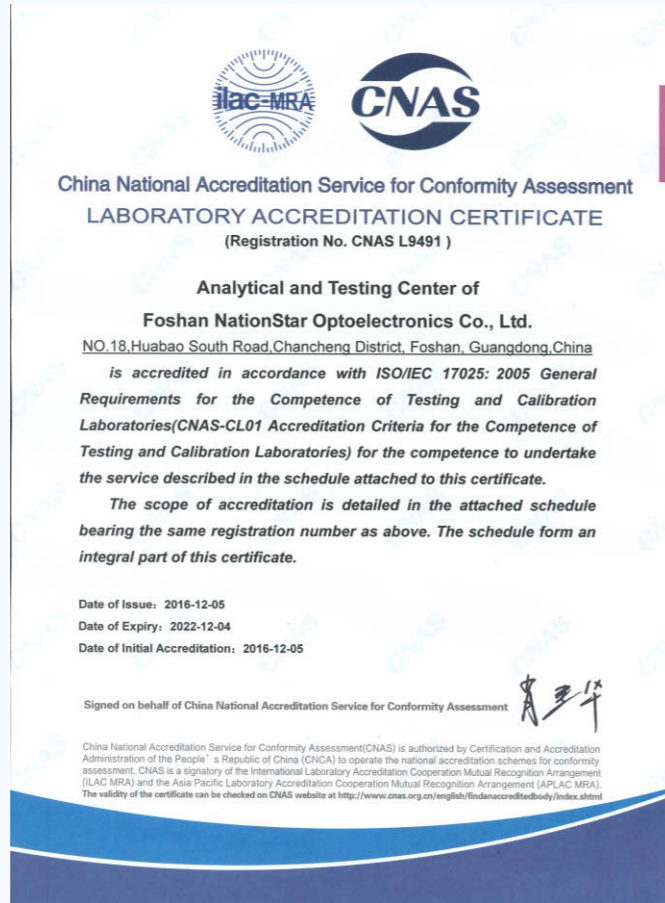
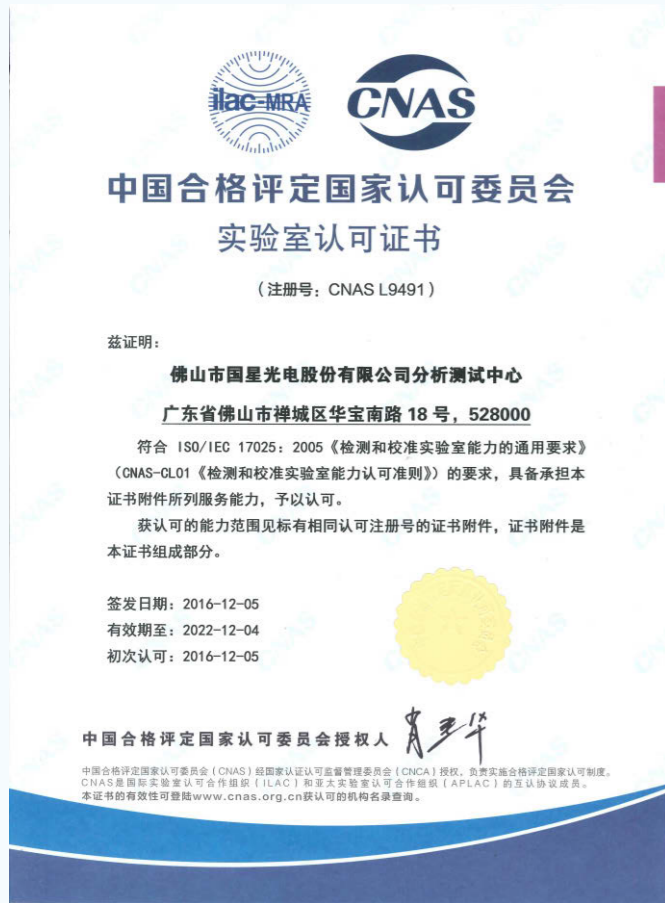
NationStar's main customers are located in many countries and areas. With sincere communication and cooperation, win-win partnership between NationStar and customers will push forward the LED industry and technology.



## Sales Volume

Its sales revenue increased **23%** annually on average in the last ten years. In 2015, NationStar's sales revenue reached **283 million** US dollars, with a year-on-year growth of **19%**.





NationStar LED Optical Component Testing Laboratory has gained the approval by CNAS.

### R&D Team

Doctor(Post-doctorate)

15P

Master

150P

Senior engineer

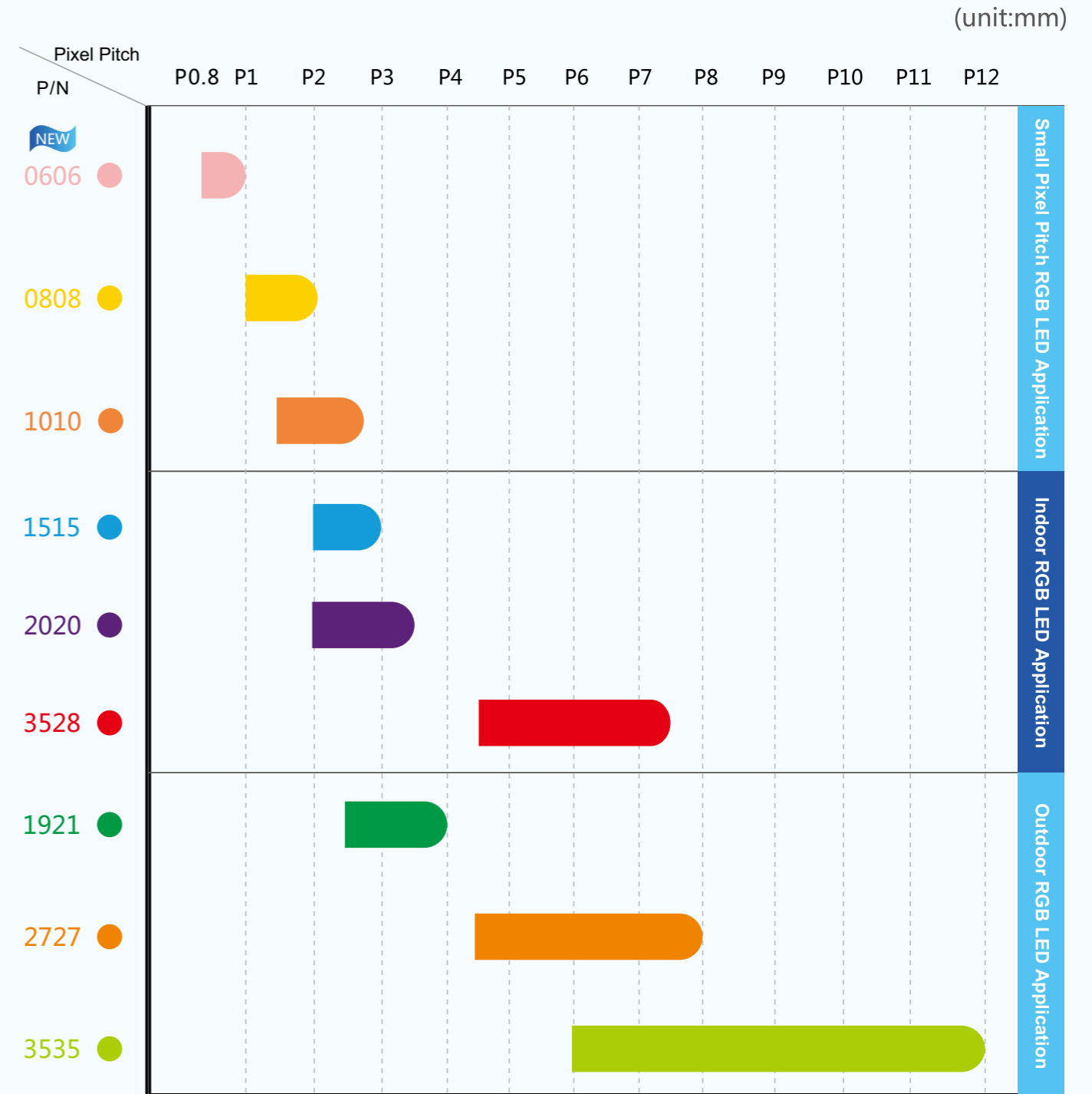
13P

R&D technician

>700P

### NationStar RGB LEDs Recommended Application

NationStar RGB LEDs include 9 packages, from 0606 to 3535, with different brightness and pixel pitch levels.



# REESTAR™ RGB LED Introduction



Qualified for Automotive Grade Discrete Semiconductors (AEC-Q101)

Failure rate < 10PPM

REESTAR™ ( hereinafter refer to “RS”), launched out in 2013, engineered for high-end display market, well accepted by high definition, great contrast, better waterproof level, absolute reliability and low luminous degradation.

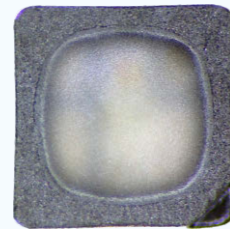
Patent No.:201410039006.X 201420207881.X

## RS 3 Structure Advantages

### 1. Matte Encapsulation Technology, High contrast

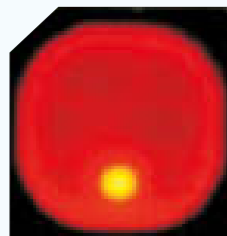


Common

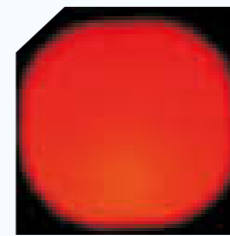


RS

### 2. Even Emitting Technique ----- No glaring



Common



RS

### 3. High Frame with Low Pins ----- Flexible for glue-filling and covering



Common



RS

## RS 7 Performance Advantages

### 1. Waterproof & Anti-Moisture:

Suitable for IPX8 application, LEDs reach MSL 2a.

### 2. Wide Working Temperature:

Pass thermal shock test with temperature from -60°C ~+150°C, no failed LED.

### 3. Anti-Reverse Bias:

Supports high refresh rate, pass harsh test with the condition 85°C, 85%RH, reverse voltage 8V, no failed LED.

### 4. Resist to Salt-Spray Corrosion:

Pass salt spray test.

### 5. Anti-UV:

Luminous degradation < 20% in the condition of ultraviolet test as a simulation status of 3-year outdoor LED use.

### 6. Long Lifespan:

MTBF: Luminous degradation < 20% in the condition of 3-year outdoor test under high temperature and damp environment.

### 7. High Brightness:

Advanced brightness level in this industry.

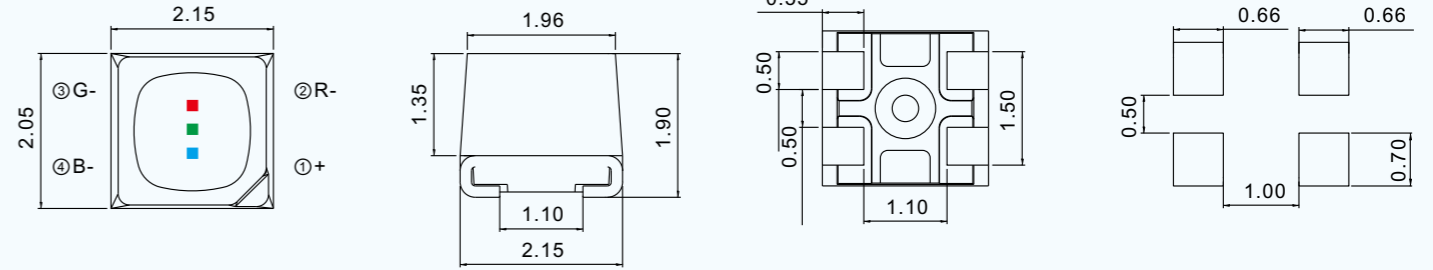
# REESTAR™ Outline

# REESTAR™ Outline

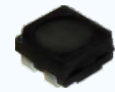
RS-1921MBAR  
2.15×2.05×1.9



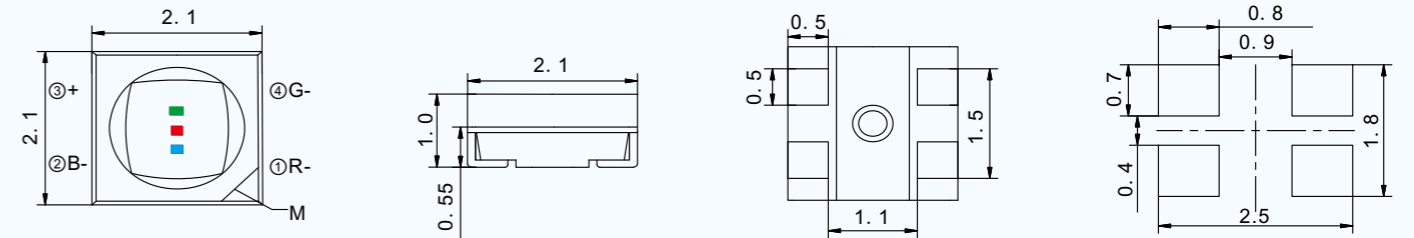
Color	IF(mA) TEST	λD(nm) Typ.	IV (mcd) Typ.	VF (V) Typ.	View angle de
	15	622	330	2.0	110
	8	525	480	3.0	
	5	471	50	3.0	



RS-2020MBAM  
2.1×2.1×1.0



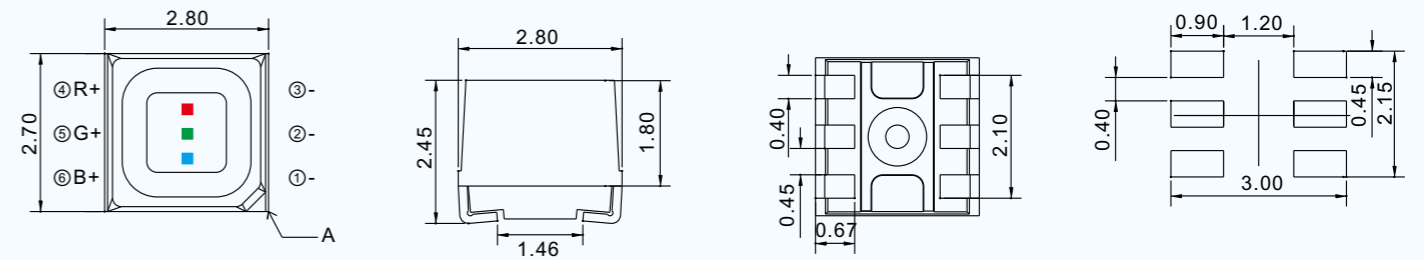
	8	620	80	2.0	110
	5	520	200	2.6	
	3	470	28	2.8	



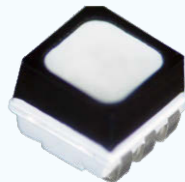
RS-2727MWAS  
2.8×2.7×2.45



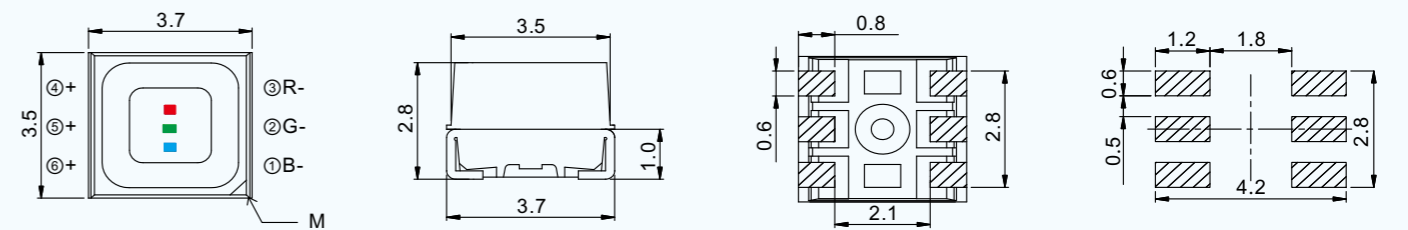
	20	620	820	2.0	110
	15	520	1750	3.0	
	10	470	270	3.0	



RS-3535MWAR  
3.7×3.5×2.8



	20	622	800	2.0	110
	20	527	2050	3.0	
	20	470	450	3.0	



Recommended soldering pad

Tolerance : ±0.1mm

# Small Pixel Pitch RGB LED Introduction

There are 2 dimensions of small pixel pitch RGB LED---0808 and 1010, with unique high contrast encapsulation technique. These products have advantages of good reliability, low luminous degradation, good consistency, high refresh rate, and high gray level, which can meet the demand of indoor full color UHD displays. The product of smaller size is in development.

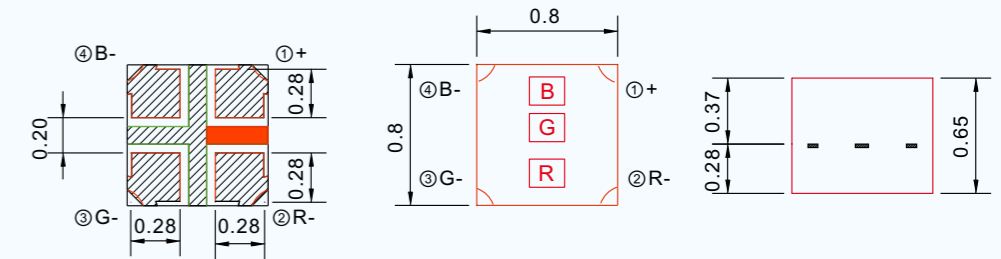
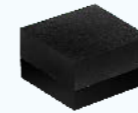
Patent No.: 201320212739.X 201420207881.X

## Characteristics

- 01 High contrast**
  - ♥ Black package, black matte encapsulation technique
- 02 Good reliability**
  - 🟩 Reverse voltage resistance, no IR, failure rate < 10ppm
- 03 Good consistency**
  - 🟠 Strict binning, uniform color
- 04 High refresh rate and high gray level**
  - 🟢 Deeper gray scale, natural picture quality
- 05 Wide view angle**
  - 👁️ More than 110°angle for luminous intensity distribution

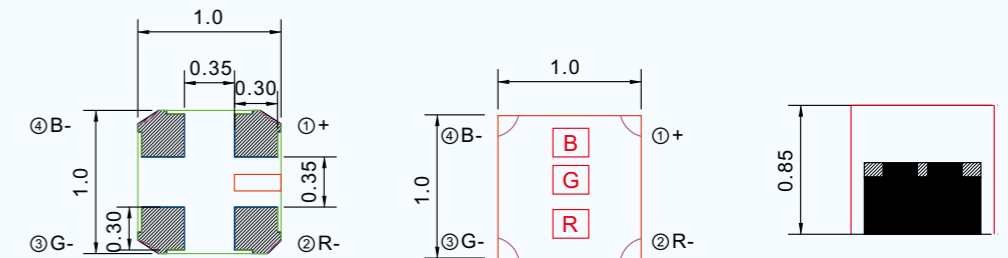
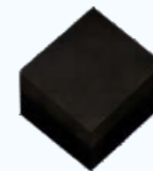
# Small Pixel Pitch RGB LED Introduction

FC-B0808RGBT-HF  
0.8×0.8×0.65



Color	IF(mA) TEST	λD(nm) Typ.	IV (mcd) Typ.	VF (V) Typ.	View angle (deg.)
	5	622	15	1.9	120
	2	530	20	2.5	
	2	472	4	2.6	

FC-B1010RGBT-HG  
1.0×1.0×0.9



Color	IF(mA) TEST	λD(nm) Typ.	IV (mcd) Typ.	VF (V) Typ.	View angle (deg.)
	5	622	20	2.0	120
	2	535	30	2.6	
	2	470	5	2.7	

Tolerance : ±0.1mm

# Indoor RGB LED Introduction

There are 3 dimensions of indoor application RGB LED---B1515, B2020 and 3528. These products have advantages of high reliability and contrast, wide view angle and good consistency which can meet the need of high refresh rate, high gray scale and keep natural color at one time.

Patent No.: 201410039006.X 201420207881.X

## Characteristics

**02** Good cost-effectiveness

Qualified material, copper substrate, and gold wire

**04** High reliability

Waterproof design and low failure rate

**High contrast 01**

- ♥ Matte encapsulation with non-mirror reflection

**Good consistency 03**

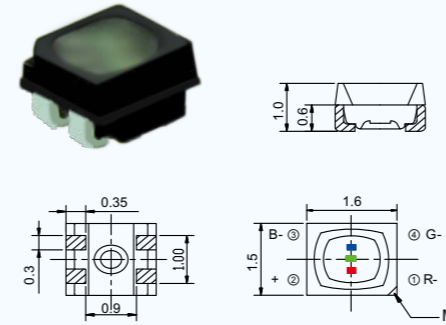
- Strict binning, no color difference and pitting

**Long lifespan 05**

- Good thermal dissipation, low luminous degradation and power consumption

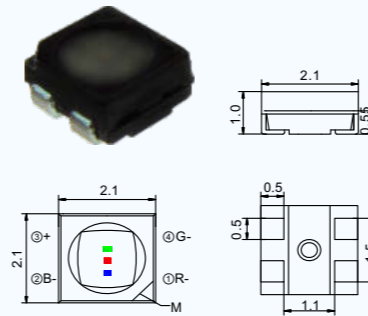
# Indoor RGB LED Introduction

FM-B1515RGBA-HG  
1.6×1.5×1.0



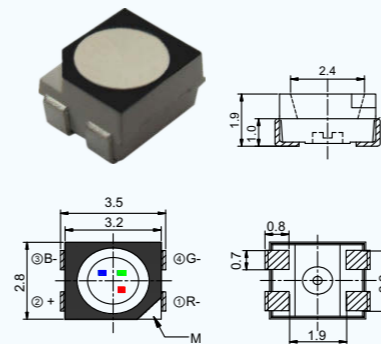
Color	IF(mA) TEST	λD(nm) Typ.	IV (mcd) Typ.	VF (V) Typ.	View angle (deg.)
Red	8	622	45	2.0	110
Green	5	523	160	3.0	
Blue	3	470	20	3.0	

FM-B2020RGBA-HG  
2.1×2.1×1.0



Red	8	622	55	2.0	110
Green	5	525	170	3.0	
Blue	3	470	25	3.0	

FM-3528RGBA-HF  
3.5×2.8×1.9



Red	20	622	300	2.0	110
Green	12	523	660	3.0	
Blue	12	470	140	3.0	

Tolerance : ±0.1mm



# Outdoor RGB LED Introduction

So far, there are 3 dimensions of outdoor application RGB LED---1921, 2727 and 3535. These products are with good quality, high reliability and good performance of waterproof , dust proof and UV-proof. Currently, the lowest production capacity among all outdoor RGB LEDs is high density 1921 series.

Patent No.: 201410039006.X 201310113388.1

## Characteristics

**02** High contrast

- Black coating, matte encapsulation with non-mirror reflection

**04** Good cost-effectiveness

- High frame with low pins, easy handling for glue-filling and covering

**06** Good quality

- Wide application, with more than 7 years' experience

**Brightness 01**

- White len, high luminous intensity

**High reliability 03**

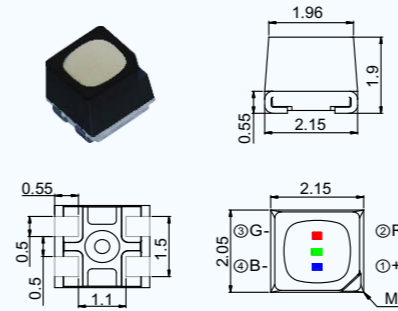
- Patented design of dust proof, waterproof and UV-proof

**Innovation 05**

- Advanced design and performance, meeting the demand of high density outdoor displays

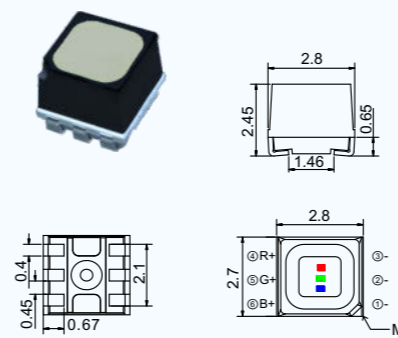
# Outdoor RGB LED Introduction

FM-Z1921RGBA-SH  
2.15×2.05×1.9



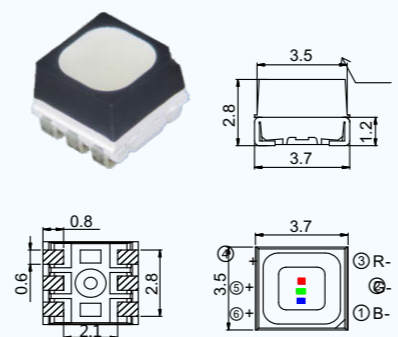
颜色	IF(mA) TEST	λD(nm) Typ.	IV (mcd) Typ.	VF (V) Typ.	View angle (deg.)
	15	622	450	2.0	110
	8	522	730	3.0	
	5	472	105	3.0	

FM-Z2727RGBA-SH  
2.8×2.7×2.45



	15	622	470	2.0	110
	8	525	750	3.0	
	5	470	120	3.0	

FM-Z3535RGBA-SH  
3.7×3.5×2.8



	15	622	480	2.0	110
	8	525	780	3.0	
	5	470	120	3.0	

Tolerance : ±0.1mm

# RS Display Applications



2016 Rio Olympic Games (RS3535)

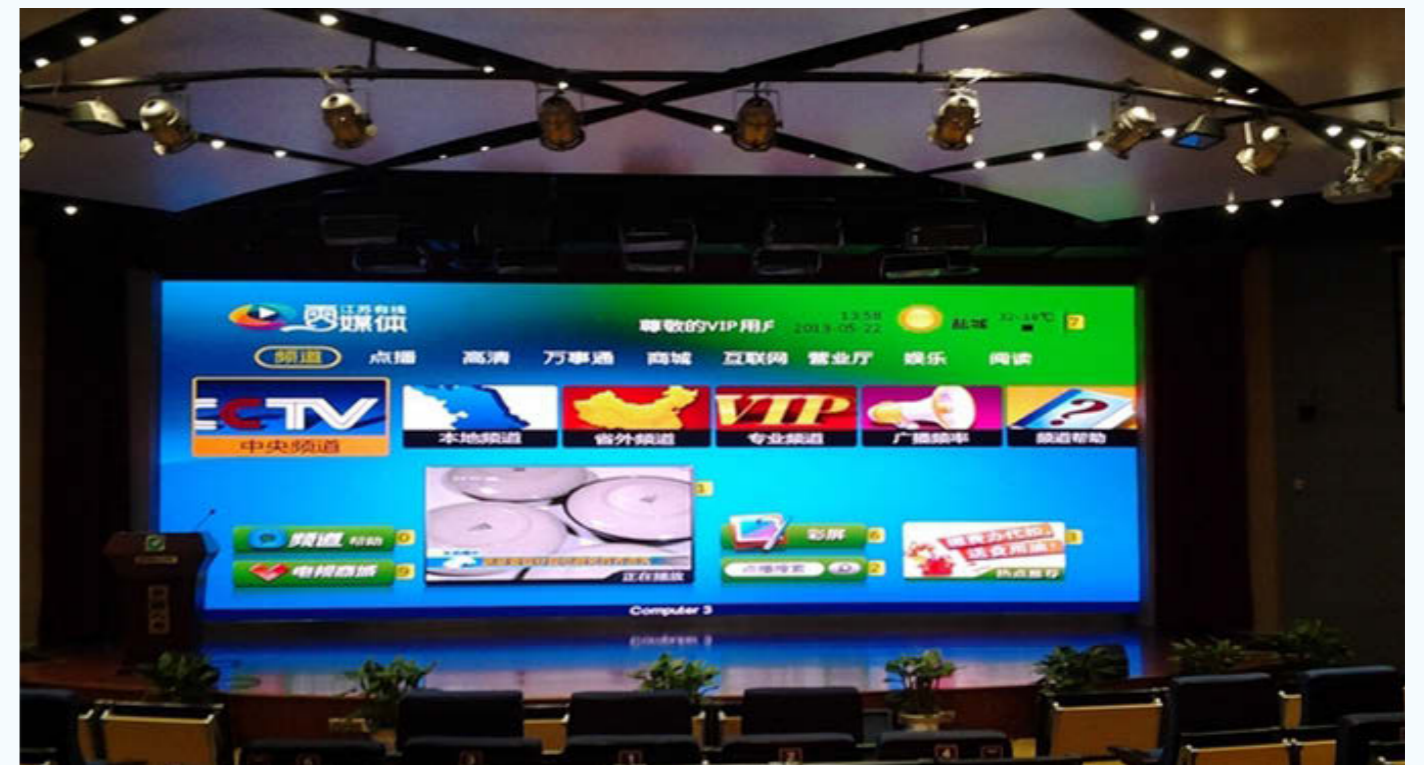
# Small Pixel Pitch LED Display Applications



Dangzai (Macao) Military Museum (1010)



2015 70th Anniversary of Anti-Japanese War in Tian'anmen Square (RS3535)



China Life Insurance's Meeting Room(1010)

## Small Pixel Pitch LED Display Applications



Guangzhou Auto Show 2016 (1010)

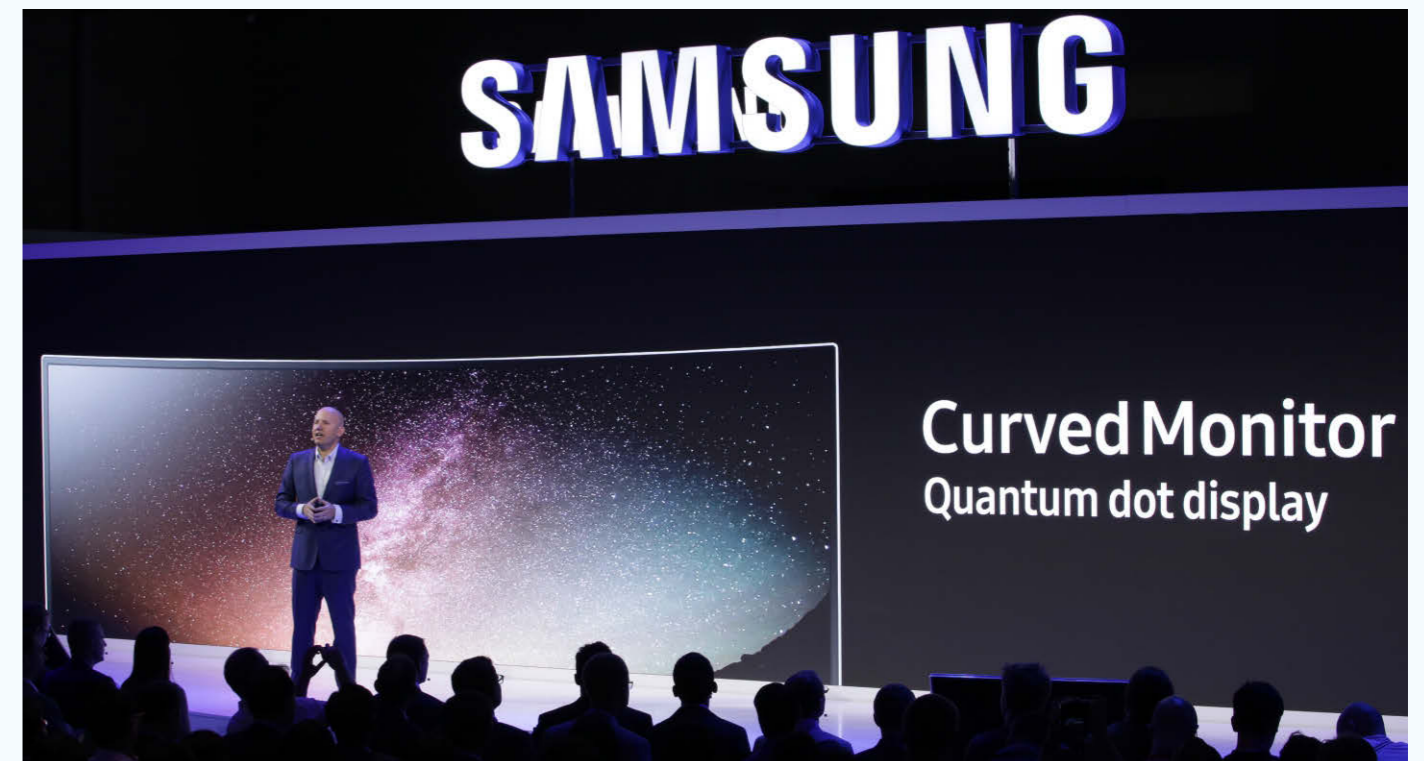


Hubei Expressway Emergency Command Center (2020)

## Indoor Display Applications



2014 Tianjing Davos World Economic Forum (1515)



Samsung New Products Conference in IFA Show 2016 (2020)

# Outdoor Display Applications



Toyota Center of Huston Rockets (3528)



2014 Brazil World Cup (3535)



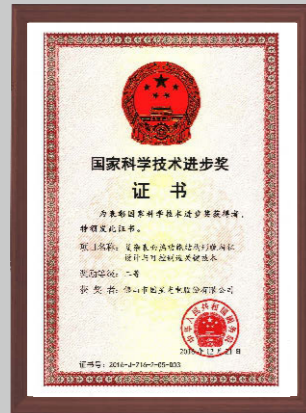
Largest Outdoor Display in Malaysia (3535)



Pope's Trip to Korea, August. 2014 (3535)

# Honors

# Patent of Invention



National Science and Technology Award



High-tech Enterprise in Guangdong Province



Major High-tech Enterprise of National Torch Program



National Integrity Outstanding Enterprise in Quality and Service



Famous Brand Products in Guangdong Province

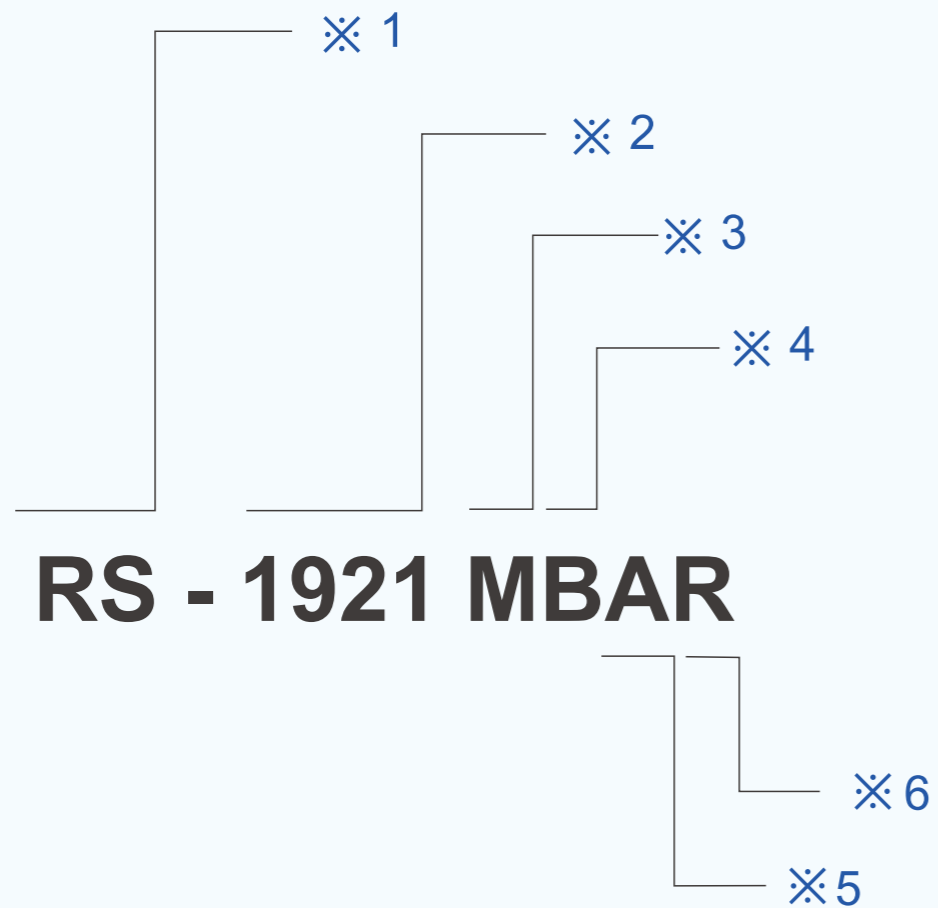


Innovative Enterprise in Guangdong Province



## Appendix:

### Naming rule



1. Product Code: Short for **REESTAR™**.
2. Dimensions.
3. Emitting Color: M-full color, R-red, G-green etc.
4. Frame color: W-white, B-black, Z- black frame with white len.
5. Encapsulation: W-diffusion, Y-diffusion and black, A-matte.
6. Brightness level: L/M/P etc stands for different brightness.