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**REESTAR**

**FOSHAN NATIONSTAR OPTOELECTRONICS CO.,LTD**

Add: No.18 South Huabao Road, Chancheng District, Foshan,Guangdong,P.R.China

Tel 86-(0)757-82100238 ext. 8387, 83985605

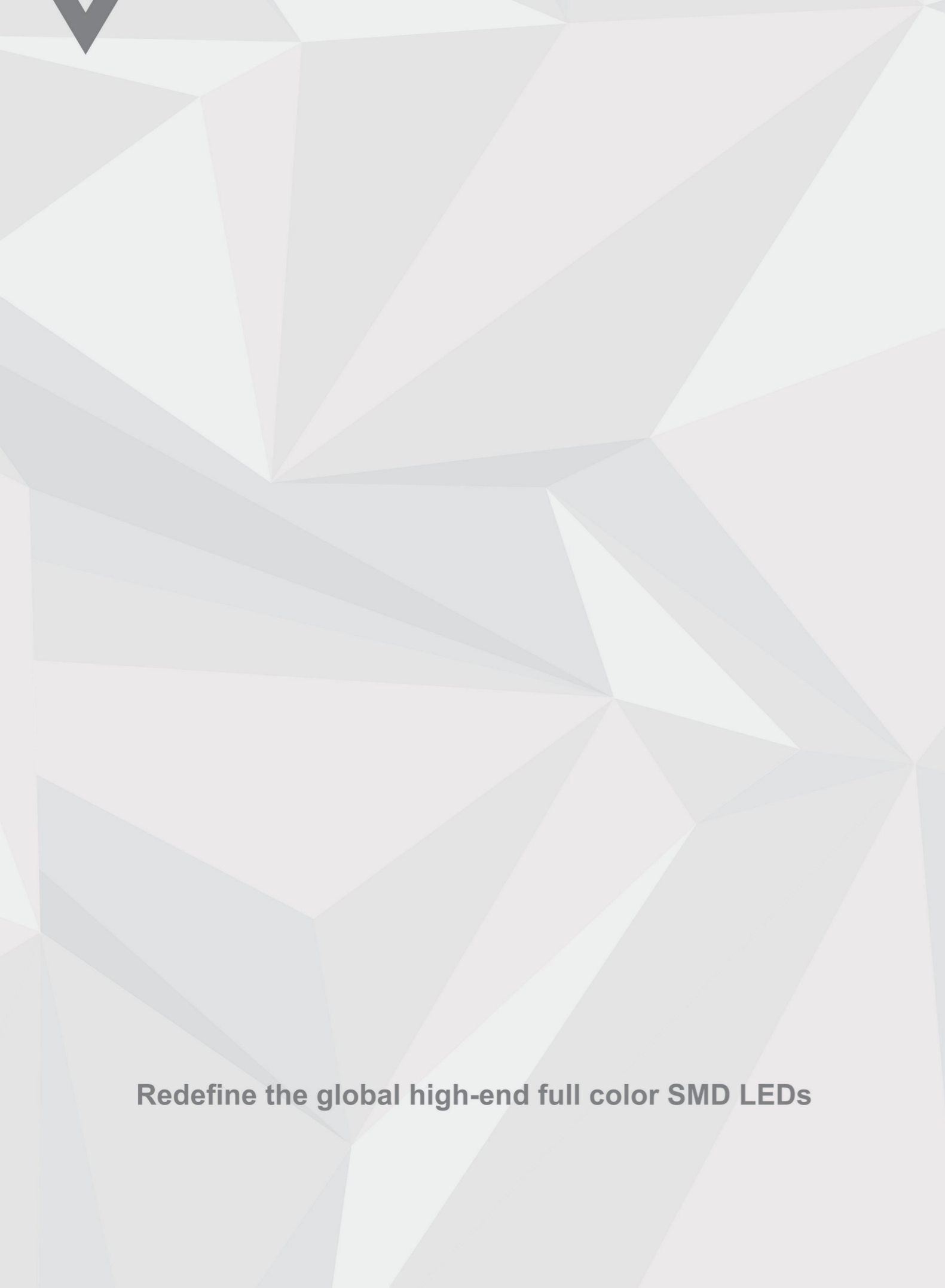
Fax 0086-757-82109319

P.C: 528000

Web [www.nationstar.com](http://www.nationstar.com)

E-Mail: [ledsales@nationstar.com](mailto:ledsales@nationstar.com)

**Redefine the global high-end full color SMD LEDs**



Redefine the global high-end full color SMD LEDs



REESTAR

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NATIONSTAR Sets up the Strategically-Controlled RGB Division which is commonly called as RGB Super Division.



On October 30, NATIONSTAR held the Inaugural Meeting of Strategically-Controlled RGB Division, with the attendance of all the directors, supervisors, top leaders and senior managers of the company which totaled up to over 80. At the meeting, it was announced that the Strategically-Controlled RGB Division was officially established.

## About NATIONSTAR and its RGB Division

According to the IHS Markit's market tracking reports on LEDs supply and demand in Q2, 2018, the operating revenue of NATIONSTAR for LED packages ranking the 8th globally in the list of operating revenue and market shares, two places surpassing that in the same period in 2017.

Looking back at the history, NATIONSTAR has been at the forefront of reform and opening up. Established in 1969, it has gone through such reforms as the "state-owned factories in the era of planned economy", "OEM enterprises in the era of reform and opening up", and "private enterprises based on independent innovation in the new century". With the investment and holding of Guangdong Rising Assets Management Co., Ltd. since 2014, NATIONSTAR has ushered in a new era of high-speed growth at a rate of over 20% per year.

RGB Division, the largest in NATIONSTAR, is mainly engaged in RGB display components. Its management team is dynamic, passionate, and rich in industry experience, with its members aged 32.4 on average, of whom, however, the average length of service is over 10 years. With the implementation of Division system in NATIONSTAR since October 2013, the RGB Division has realized rapid growth per year for five consecutive years, and has ranked the first globally in terms of sales revenue in SMD RGB LEDs and market share of Narrow Pixel Pitch LEDs. In addition, the RGB Division has undertaken several major international projects, such as supplying RGB LEDs to build "the displays for Tian'anmen military parade ceremony", "72 pcs large displays for Rio Olympics Arena", "displays for Boao Forum for Asia for three consecutive years" and "displays for Russian World Cup stadiums".

This upgrading will certainly vitalize the development of the Division to continue to hold on to a favorable position in the LED packages industry. What's more, it will mobilize the initiative of the Division's management team, releasing vitality and liberating productive forces, and it will bring a splendid future for LED display packages industry.

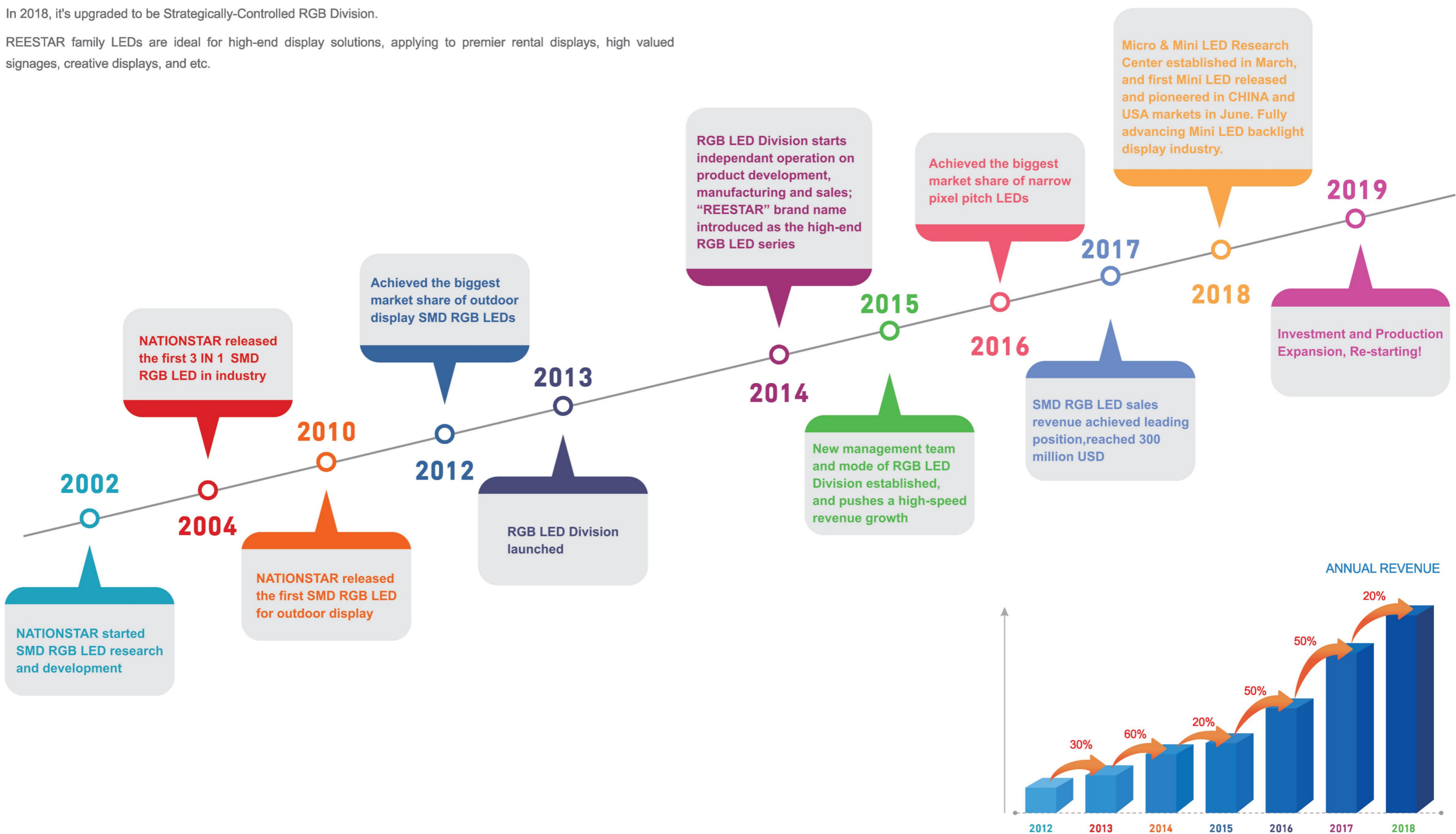
## RGB LED DIVISION INTRODUCTION

RGB LED Division is the biggest revenue Division in Foshan NATIONSTAR Optoelectronics Co., Ltd.

In 2018, it's upgraded to be Strategically-Controlled RGB Division.

REESTAR family LEDs are ideal for high-end display solutions, applying to premier rental displays, high valued signages, creative displays, and etc.

## RGB LED DIVISION HISTORY





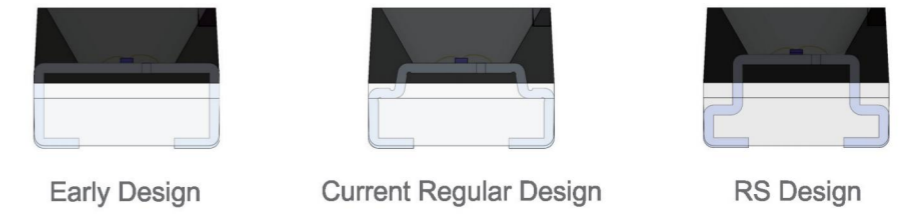


### Redefine the global high-end full color SMD LEDs

To provide high quality, high standard and customized products for high-end display application to global customers.

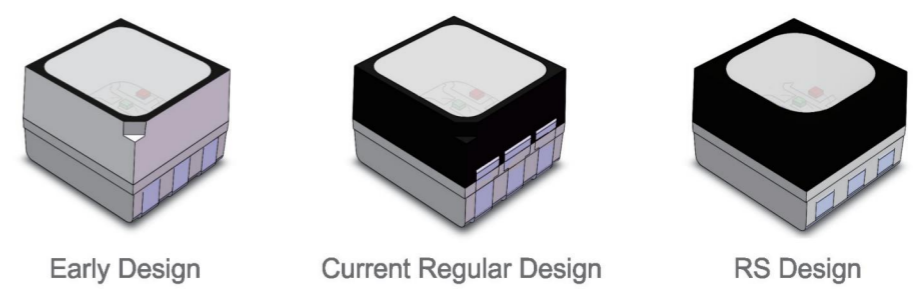
### PRODUCT ADVANTAGES

#### STRUCTURE Low pins high frame patent technique <sup>※1</sup>



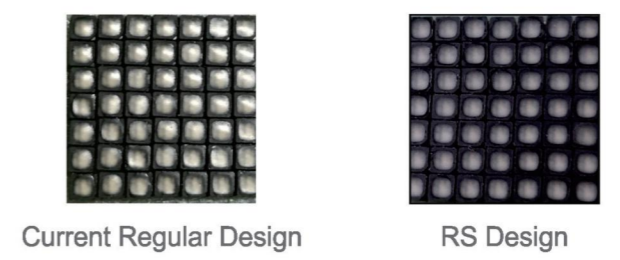
- Advantages:**
- High frame: 0.7mm (Leading in the industry)
  - Low pins: Easy for potting
  - Triple waterproof: Reliability improvement

#### CONTRAST Full black encapsulation patent technique <sup>※2</sup>



- Advantages:**
- Blackness on all sides: white PPA exposure solution
  - Blackness on surface: Contrast increase
  - Square frame with four corners in arc shape: Wider view angel and better consistency

#### MATTE



- Advantages:**
- It makes epoxy resin on LED surface become smoothness which solves display viewing in wide angle (>170°)
  - Matte encapsulation can solve picture distortion problem which is caused by light reflection

※1: Patent no.: ZL201110365452.6    ※2: Patent no.: ZL201220685543.8



## MANUFACTURE ADVANTAGES

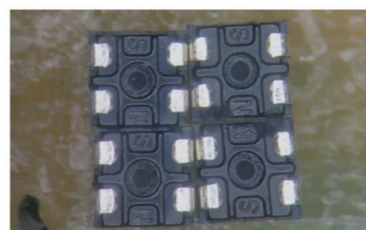
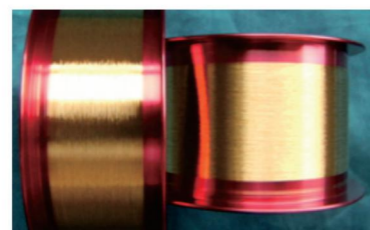
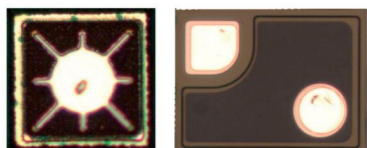
**R&D CENTER** > 800+ engineers, Nearly 500 authorized patents



**EQUIPMENT** First-class level in the world



**MATERIAL** Imported materials, Better quality



Famous die suppliers all over the world 99.99% pure gold wire

Pure copper leadframe

**QUALITY** Automotive quality management IATF16949  
Automotive grade discrete semiconductors (AEC-Q102)  
SMT failure rate<10PPM



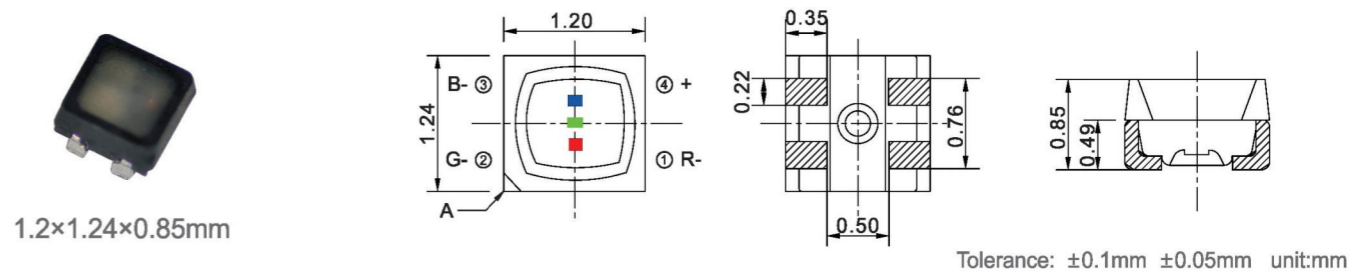
**WORKSHOP** Ten thousand level clean workshop

## RENTAL DISPLAY PRODUCTS

Front light, no light string, designed to create a more refined indoor p1.5-p2 display.

### RS-1212MBAM NEW

Type: Indoor  
Strength: Small and exquisite, Top lighting  
Application field: Radio and television, Stage, Large public rental screen (such as airport, subway, shopping mall), etc.



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
Red	8	622	42	2.0	110
Green	5	526	125	2.8	110
Blue	3	470	18	2.8	110



LED display for DOTA2 Ti9

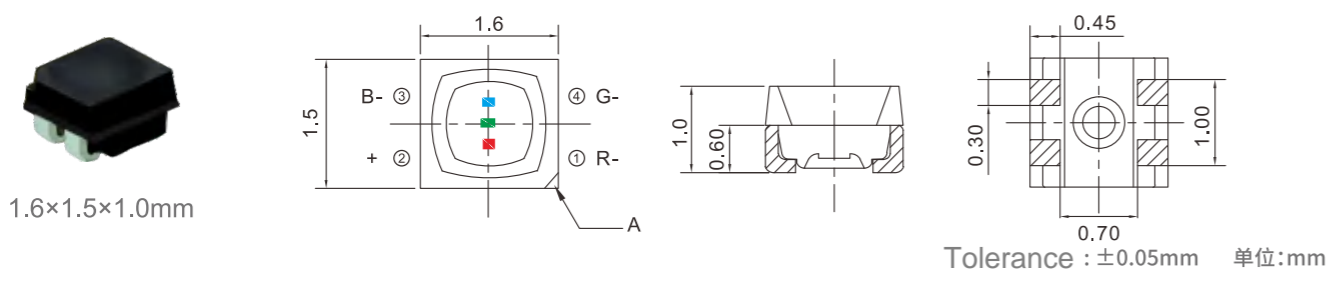


RENTAL DISPLAY PRODUCTS

Newly upgraded, high brightness, high contrast, perfect for XR applications

**RS-XR1515MBAN**

**Type:** Indoor  
**Advantage:** Suitable for XR scene, the bottom filling technology, extreme black glue to enhance the contrast of the product, surface leveling technology to achieve a more consistent appearance  
**Application filed:** High-end rental full-color display for XR virtual shooting, car show, product launch etc.



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle(deg)
Red	8	622	100	2.0	110
Green	5	530	150	2.6	110
Blue	3	468	16	2.6	110

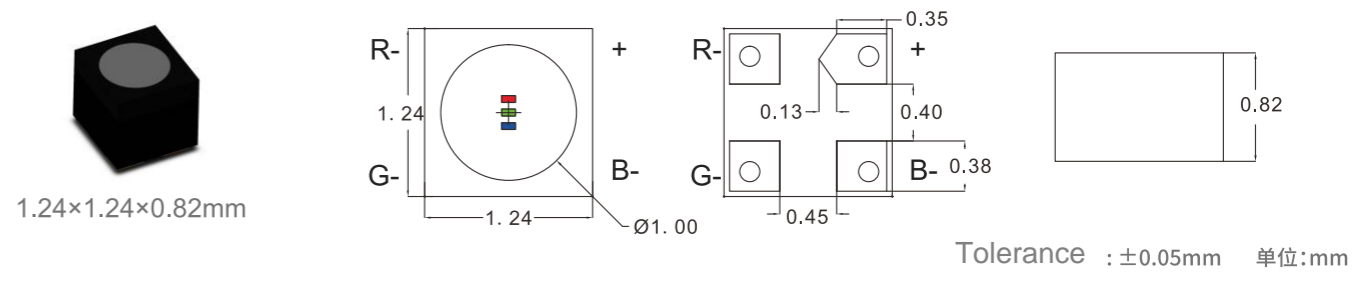


RENTAL DISPLAY PRODUCTS

High brightness, high contrast, extremely suitable for small pitch (P2 and below) high density displays

**RS-1111MBAR**

**Type:** Outdoor  
**Advantage:** Innovative design, high brightness and energy saving, strong reliability, outdoor smallest pitch LEDs  
**Application filed:** Advertising display, glass display, light pole display, station display and other outdoor small-pitch application situations.



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle(deg)
Red	15	622	250	2.1	110
Green	8	525	355	2.7	110
Blue	5	470	45	2.7	110

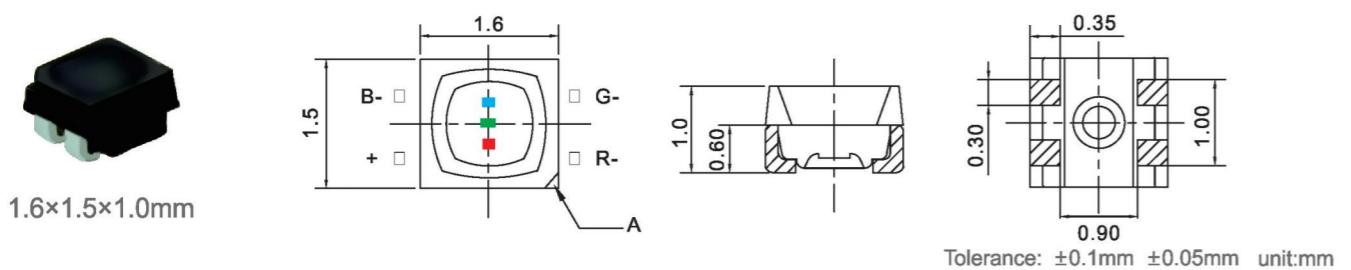


## RENTAL DISPLAY PRODUCTS

High brightness, High contrast, All black matte encapsulation, Good consistency in low grey scale, Effective view angle is up to 170°.

### RS-1515MBAM

Type: Indoor  
 Strength: Greatly improve color reduction by introducing wide color gamut standard products  
 Application field: High-end rental displays for auto show, product launch conference etc., broadcasting industry, cinema and other professional fields



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
Red	8	622	55	2.0	110
Green	5	528	170	2.6	110
Blue	3	468	17	2.6	110



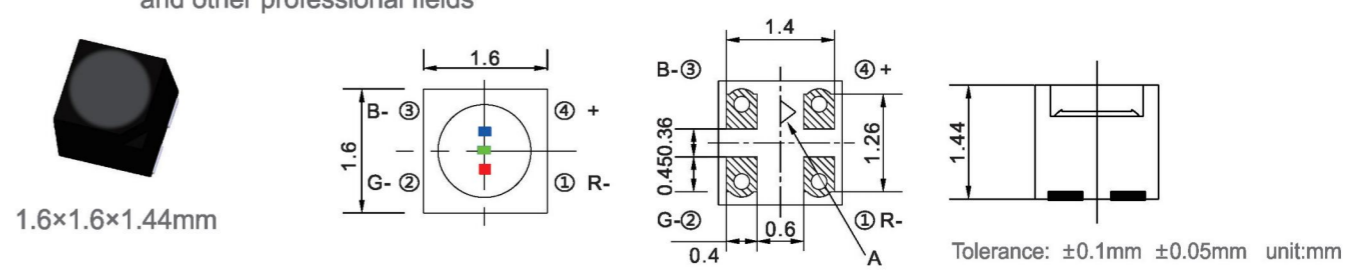
LED display for BRICS Business Forum

## RENTAL DISPLAY PRODUCTS

High definition, high brightness, high contrast and high reliability make the outdoor display screen landing beautiful.

### RS-1415MBAR NEW

Type: Outdoor  
 Strength: Innovative design, Excellent moisture resistance, High brightness and low power consumption, Small and exquisite, Create a new era of outdoor small space.  
 Application field: High-end rental displays for auto show, product launch conference etc., broadcasting industry, cinema and other professional fields



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
Red	15	622	360	2.1	110
Green	8	528	400	2.6	110
Blue	5	470	30	2.7	110



Application example

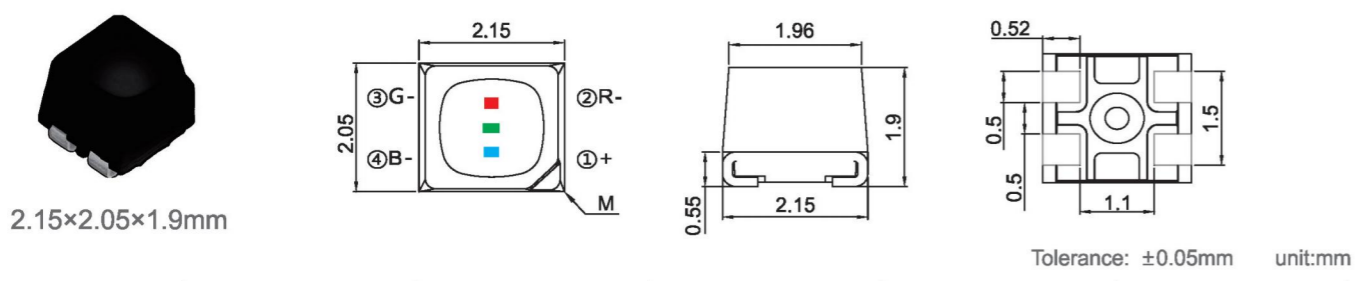


## RENTAL DISPLAY PRODUCTS

High brightness, High contrast, All black matte encapsulation, Good consistency in low grey scale, Effective view angle is up to 160°.

### RS-1921MBAR

Type: Outdoor  
 Strength: Whole display brightness ≥ 4500nit  
 Application field: High-end rental displays for outdoor stage, stadium and fine pixel pitch displays in airport, hotel, etc



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
●	15	622	350	2.0	110
●	8	527	500	2.7	110
●	5	472	52	2.7	110



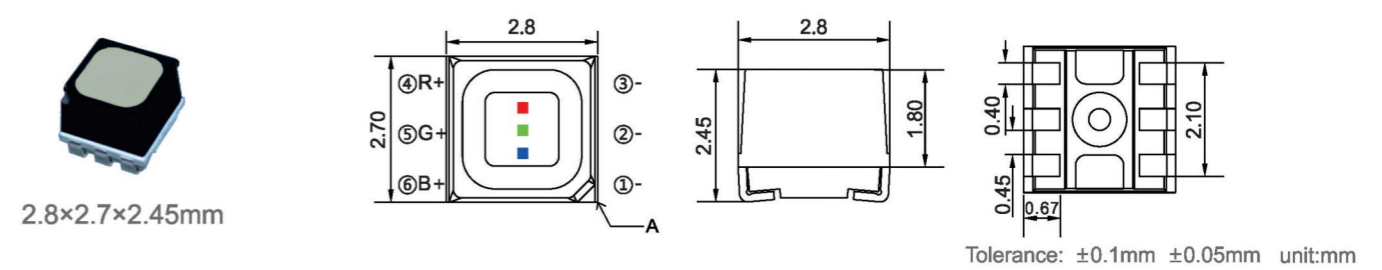
LED display for Asia Carnival

## FIXED DISPLAY PRODUCTS

High brightness, Long lifespan, Long warranty period.

### RS-2727MWAS

Flagship version, focuses outdoor display  
 Excellent reliability with 5 year limited warranty  
 High brightness, achieving 7000nit and up  
 Pixel Pitch: 4mm to 8mm  
 Target market: High-end rental and fixed  
 Application: Sports, landmark project, brand advertising signage, architectural exterior lighting decoration, and etc.



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
●	20	622	860	2.0	110
●	15	528	1810	2.8	110
●	10	474	300	2.8	110



LED display for 2018 Russia World Cup in five host cities



## FIXED DISPLAY PRODUCTS

High brightness, Long lifespan, Long warranty period.

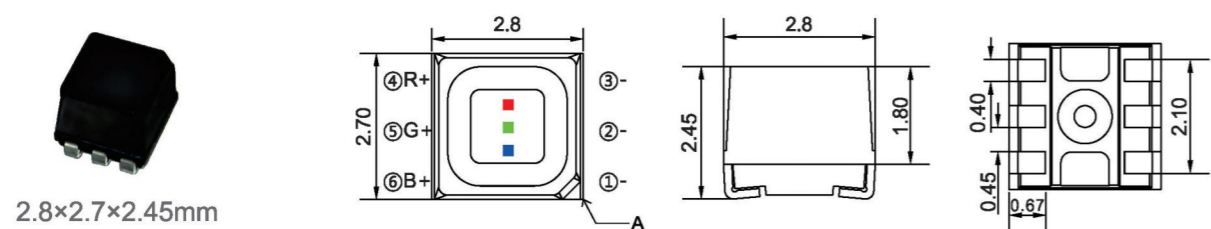
### RS-2727MBAR

Exclusively black LEDs for outdoor display, highest contrast.

Pixel Pitch: 4mm to 8mm

Target market: High-end rental and fixed

Application: Sports, broadcast, stage, brand advertising signage, and etc.



2.8x2.7x2.45mm

Tolerance: ±0.1mm ±0.05mm unit:mm

Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
●	20	622	480	2.0	110
●	15	530	810	2.8	110
●	10	474	115	2.8	110



LED display for OSCARS

## FIXED DISPLAY PRODUCTS

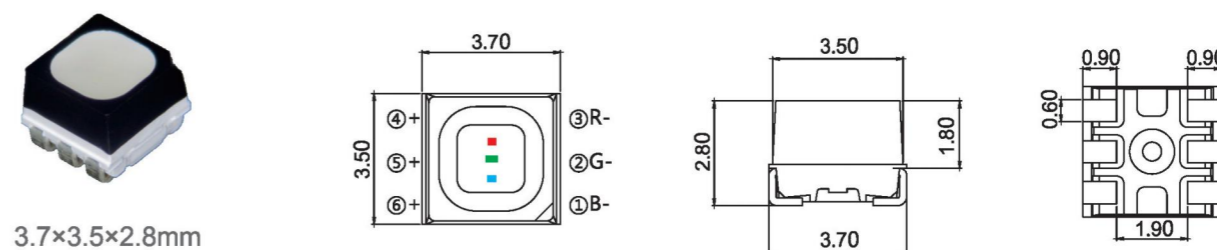
High brightness, Long lifespan, Long warranty period.

### RS-3535MWAM

Type: Outdoor

Strength: Whole display brightness > 5000nit

Application field: Stadium, airport, station, etc



3.7x3.5x2.8mm

Tolerance: ±0.1mm ±0.05mm

Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
●	15	622	520	2.0	110
●	8	525	850	2.7	110
●	5	470	115	2.7	110



Chongqing Guanyinqiao business district 3788 m² large screen

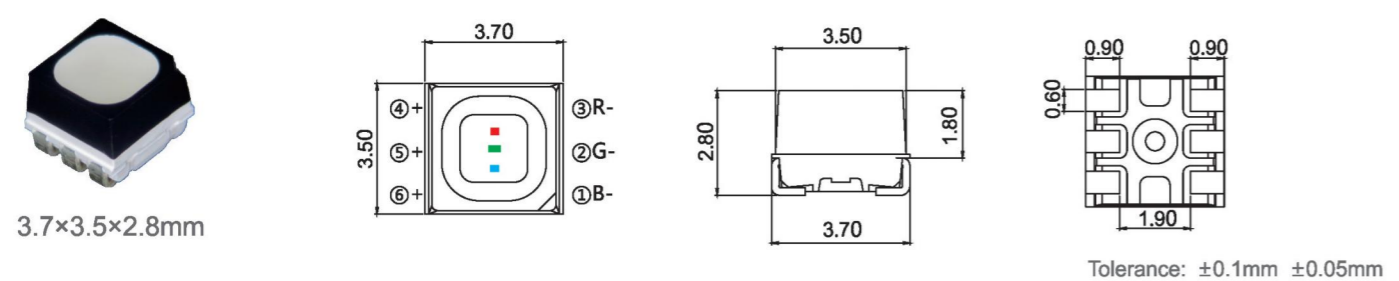


**FIXED DISPLAY PRODUCTS**

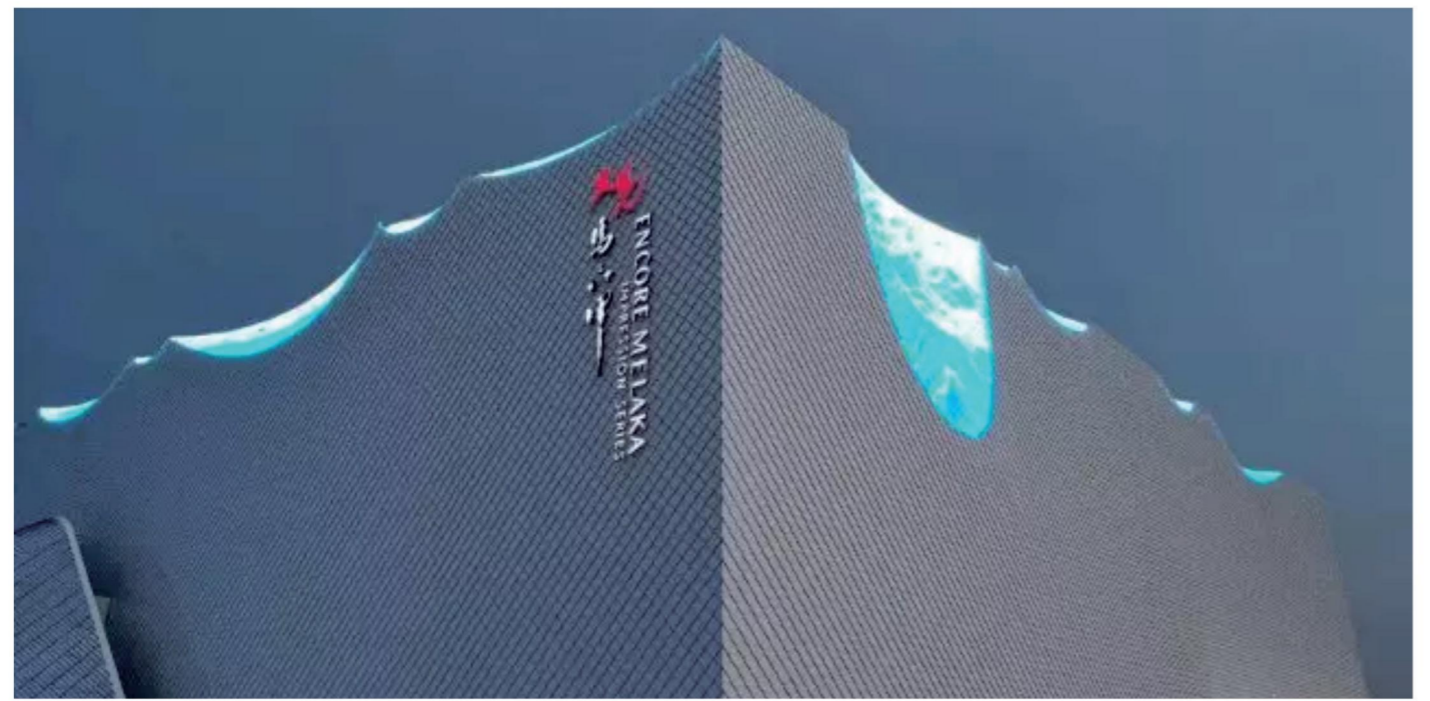
High brightness, Long lifespan, Long warranty period.

**RS-3535MWAP**

Type: Outdoor  
 Strength: Cree die, RS encapsulation, Whole display brightness > 5000nit  
 Application field: Landmarks project, government project, etc



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
Red	20	622	670	2.0	110
Green	20	532	1300	3.2	110
Blue	20	470	300	3.2	110



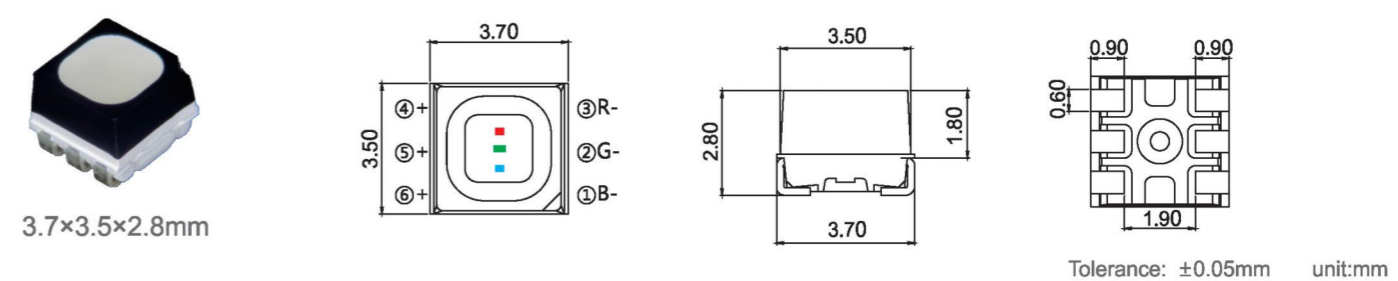
Malacca theatre 1800 m² large screen

**FIXED DISPLAY PRODUCTS**

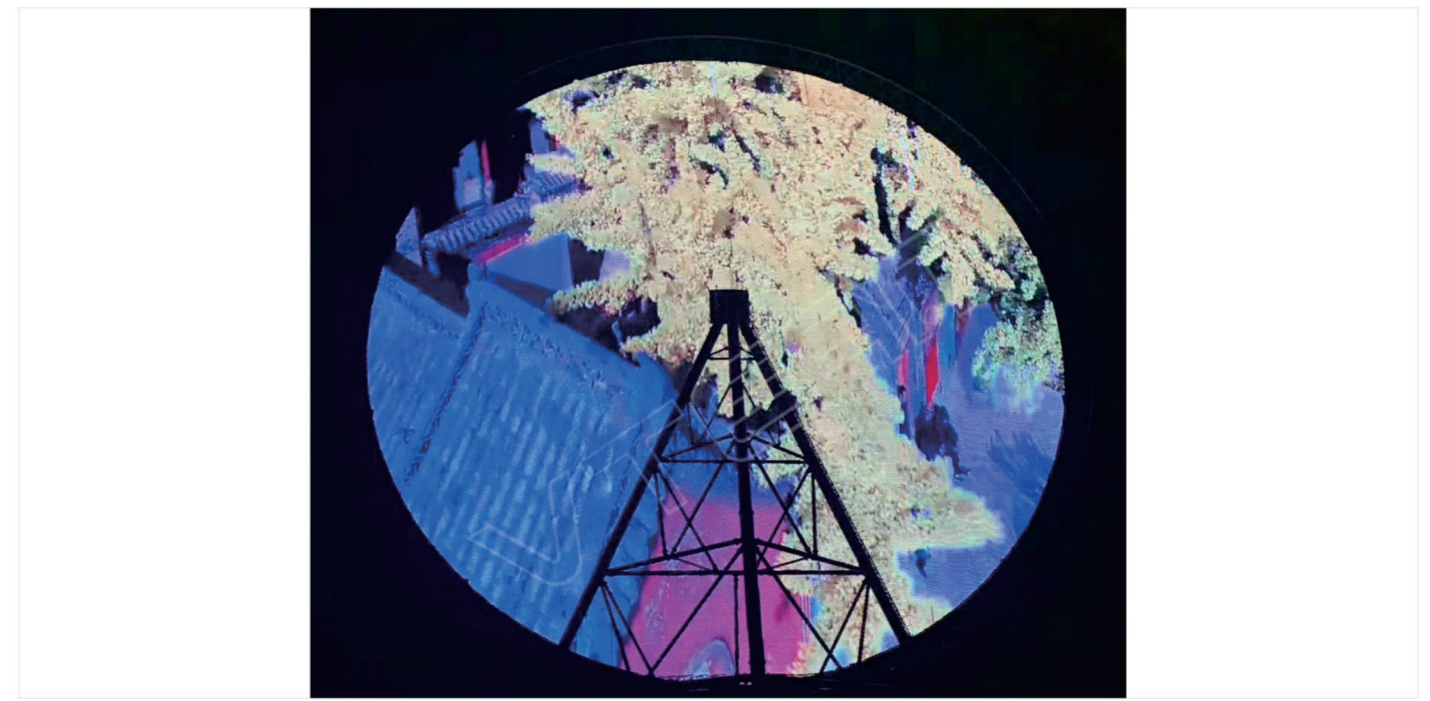
High brightness, Long lifespan, Long warranty period.

**RS-3535MWAR**

Type: Outdoor  
 Strength: Whole display brightness > 7000nit, Low power consumption  
 Application field: Long-distance areas such as outdoor advertisement, building lighting project, sky screen, etc



Color	IF(mA) TEST	λD(nm) Typ.	IV(mcd) Typ.	VF(V) Typ.	View angle de
Red	20	622	950	2.0	110
Green	20	527	2200	2.9	110
Blue	20	471	500	2.9	110

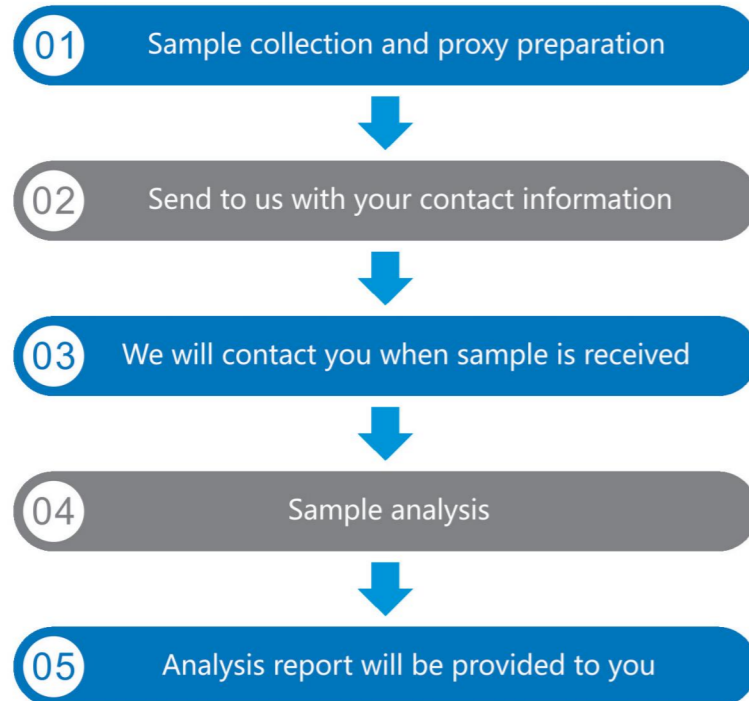


P80 Outdoor LED display decorating the Ferris wheel at Mohe city, north boarder of China

## PRODUCT IDENTIFICATION

We adhere to fight against counterfeit NATIONSTAR products in the market and ensure our customers have a pleasure experience by using our products.

NATIONSTAR RGB R&D center guarantees that sample verification is free of charge and the analysis report will be sent to you within 7 working days after receiving your sample.



Sample testing proxy

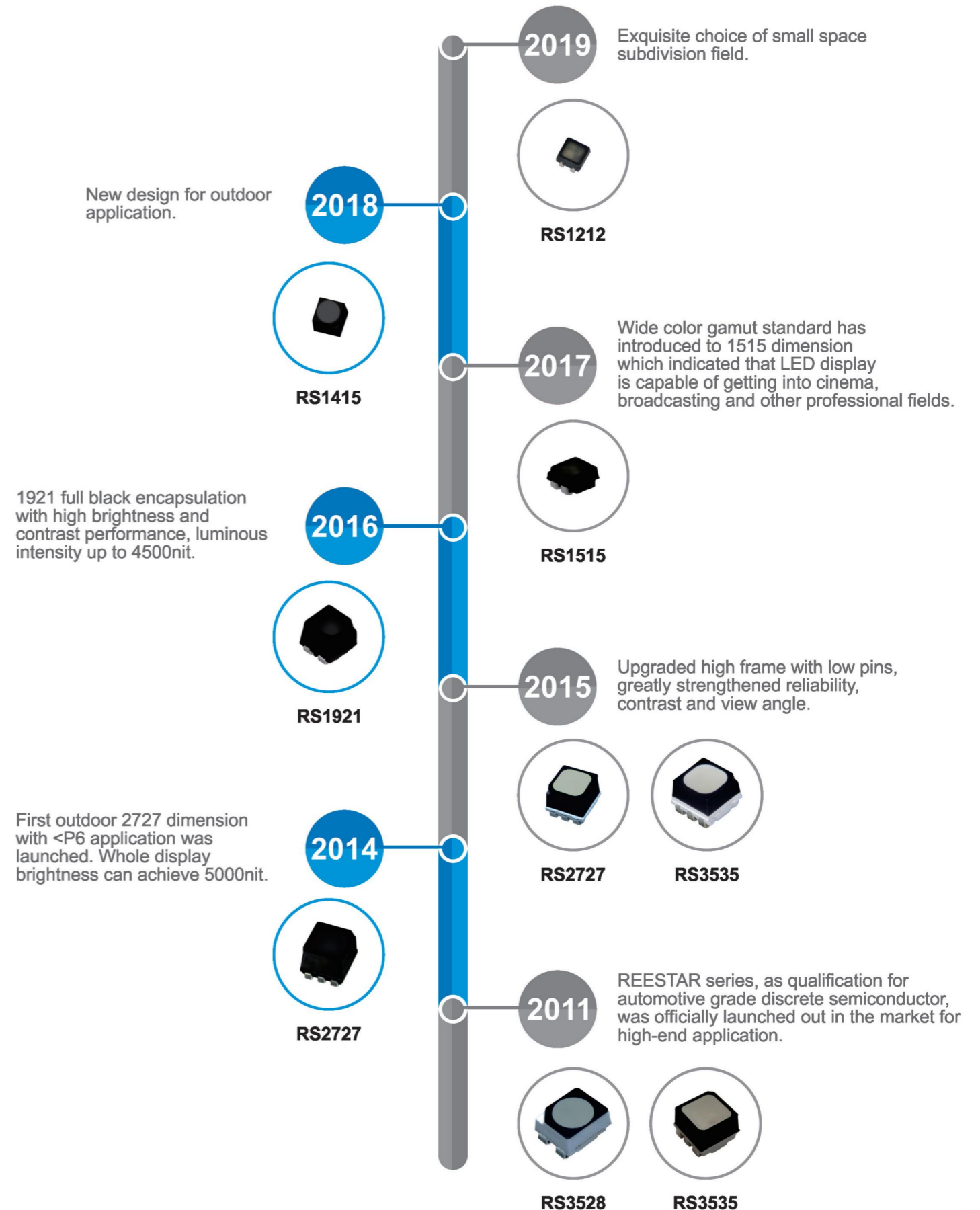
Sample Test Proxy			
Client		Date	
Contact Person		Method	
Address			
Item		Quantity	
Sample Supplier			
Test Content			
Test Intention			
Test Report			
Method: <input type="checkbox"/> Data Report <input type="checkbox"/> Written Report			
Delivery Method: <input type="checkbox"/> Self pick-up <input type="checkbox"/> Mail <input type="checkbox"/> E-mail			
Client Sign and Stamp			
YY/MM/DD			

Testing report

LED Sample Test Analysis																																																
Sample Situation	Client	Receiving Date	2018-6-5																																													
Requirement	To analyze if the LEDs in a module belongs to NationStar, to see if the bonding wire is golden wire.																																															
Item	1921	Manufacturer	Lin wan bar																																													
Inspection Item	Appearance	Parameter	Structure Structure																																													
		Temperature (°C)	Humidity (%)																																													
		22°C	55%RH																																													
<table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Test Value</th> <th>Standard</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Forward Current (I<sub>F</sub>)</td> <td>mA</td> <td>2.1</td> <td>2.7</td> <td>Pass</td> </tr> <tr> <td>Reverse Current (I<sub>R</sub>)</td> <td>μA</td> <td>0.1</td> <td>1.0</td> <td>Pass</td> </tr> <tr> <td>Forward Voltage (V<sub>F</sub>)</td> <td>V</td> <td>2.8</td> <td>3.4</td> <td>Pass</td> </tr> <tr> <td>Reverse Voltage (V<sub>R</sub>)</td> <td>V</td> <td>795.6</td> <td>104.5</td> <td>Pass</td> </tr> <tr> <td>Forward Power (P<sub>F</sub>)</td> <td>mW</td> <td>622.0</td> <td>120.9</td> <td>Pass</td> </tr> <tr> <td>Reverse Power (P<sub>R</sub>)</td> <td>mW</td> <td>0.36</td> <td>0.36</td> <td>Pass</td> </tr> <tr> <td>Forward Efficiency (η<sub>F</sub>)</td> <td>%</td> <td>47.3</td> <td>47.3</td> <td>Pass</td> </tr> <tr> <td>Reverse Efficiency (η<sub>R</sub>)</td> <td>%</td> <td>47.3</td> <td>47.3</td> <td>Pass</td> </tr> </tbody> </table>				Parameter	Unit	Test Value	Standard	Result	Forward Current (I <sub>F</sub> )	mA	2.1	2.7	Pass	Reverse Current (I <sub>R</sub> )	μA	0.1	1.0	Pass	Forward Voltage (V <sub>F</sub> )	V	2.8	3.4	Pass	Reverse Voltage (V <sub>R</sub> )	V	795.6	104.5	Pass	Forward Power (P <sub>F</sub> )	mW	622.0	120.9	Pass	Reverse Power (P <sub>R</sub> )	mW	0.36	0.36	Pass	Forward Efficiency (η <sub>F</sub> )	%	47.3	47.3	Pass	Reverse Efficiency (η <sub>R</sub> )	%	47.3	47.3	Pass
Parameter	Unit	Test Value	Standard	Result																																												
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Reverse Efficiency (η <sub>R</sub> )	%	47.3	47.3	Pass																																												
<p>LED samples were identified with FM-Z1921(RGBA-SH) of NationStar, bonding wire was golden wire.</p>																																																
<p>Conclusion: NationStar FM-Z1921(RGBA-SH) Wire: 15-6-Black, R: 300-488 mod, G:480-1100 mod, B: 70-160 mod</p>																																																
<p>Draw: 林文斌, Check: 陈海欣, Approve: 郑皇</p>																																																

Tel: 0086-757-82100238-8188 E-mail: RGByanfa@nationstar.com

## PRODUCT DEVELOPMENT



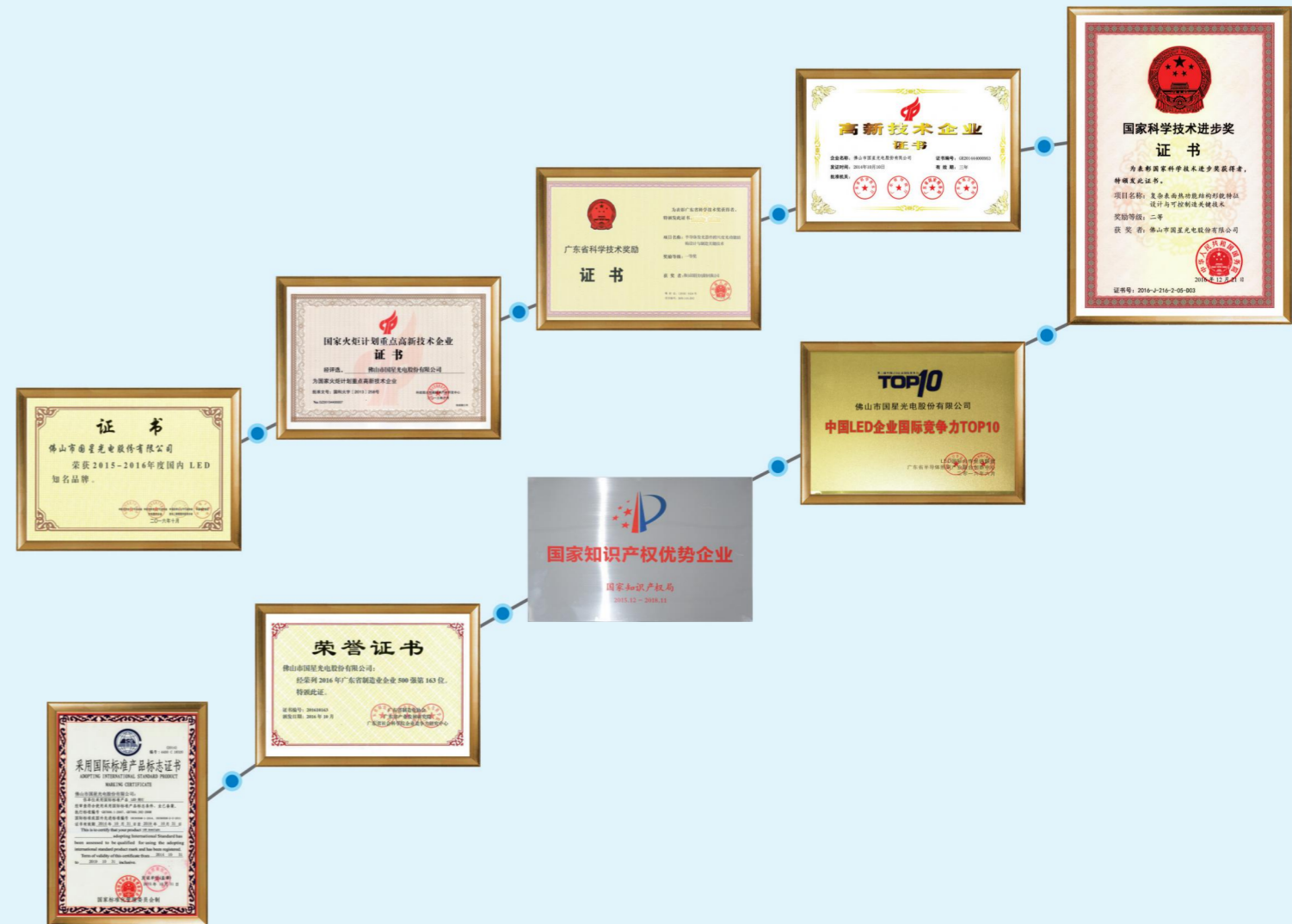


## Patents Achievements

By Oct 2019, NATIONSTAR had applied for 600 patents, including 168 patents for inventions, 52 overseas patents. There are 464 patents issued patents, including 68 patents for inventions.



## Company Honors



- Global TOP 8 LED Encapsulation Manufacture in Q2 2018(IHS Markit)
- National Science and Technology Progress Award
- Science and Technology Progress Award of Guangdong Province
- National high-tech enterprise
- Key high-tech enterprise of National Torch Plan
- LED famous brand in China
- National Intellectual Property Enterprise of Guangdong Province
- TOP 10 international competitiveness of Chinese LED enterprises
- One of 500 manufacture enterprises in Guangdong province
- International standard certification utilization