# PRODUCT SPECIFICATION

## Model No: BOF-2016SR-DMC

For reference only.

Subject to change maybe necessary in a limited number of cases

| Descriptions: |
|---|
| • Ceramic Substrate Type<br>• SMD Chip Type<br>• Emitting Color : Super Red<br>• Viewing Angle : 130° |



LED 胶体为软硅胶封装，请避免外力碰撞。

| CUSTOMER APPROVED SIGNATURES | APPROVED BY | CHECKED BY | PREPARED BY |
|---|---|---|---|
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## ■ Applications

- Automotive light
- Day time running light
- Reversing light

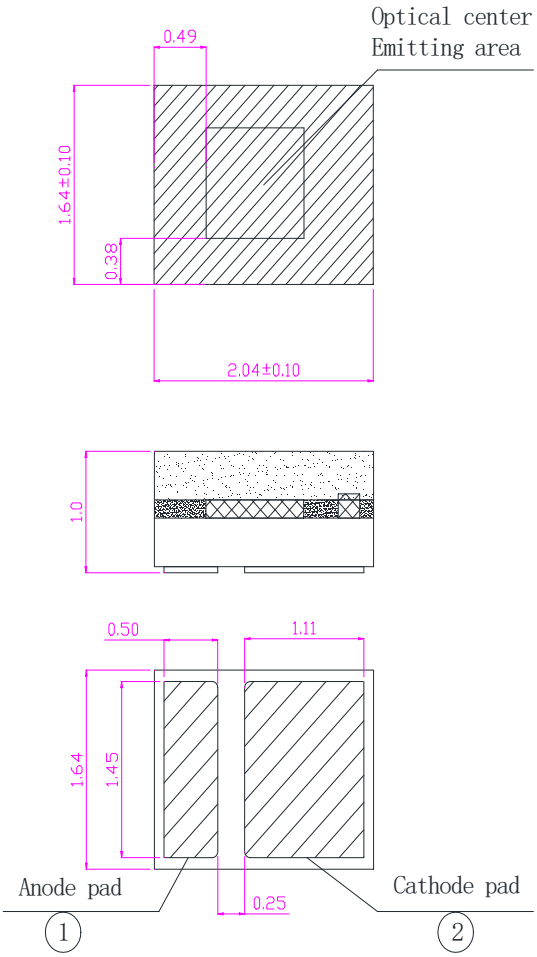
## ■ Device Selection Guide

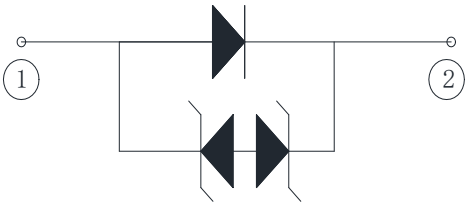
| Model No. | Chip | | Epoxy Color |
|---|---|---|---|
| | Material | Emitting Color | |
| BOF-2016SR-DMC | AlGaInP | Super Red | Water Clear |

LED 胶体为软硅胶封装，请避免外力碰撞。

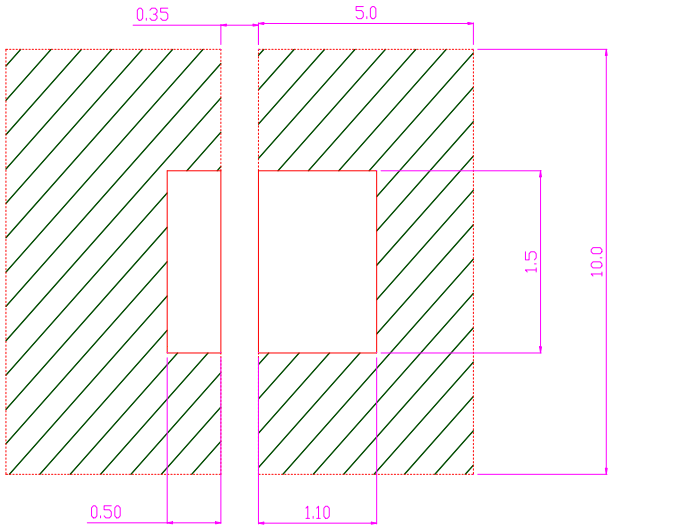
## ■ Package Outline Dimensions

Dimensions: 2.04(L)×1.64(W)×1.0(H)mm.




Recommended Solder pattern




Note:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are ± 0.2mm.

注:此款 LED 使用的红光芯片为反极性,对应 LED 小焊盘为正极,大焊盘为负极。

## ■ Absolute Maximum Ratings(Ta=25℃)

| Items | Symbol | Absolute Maximum Ratings | Unit |
|---|---|---|---|
| Power Dissipation | $P_d$ | 1.5 | W |
| Junction Temperature | $T_j$ | 150 | ℃ |
| Forward Current(DC) | $I_F$ | 500 | mA |
| Peak Forward Current*<br>（200ms：on，1800ms：off） | $I_{FP}$ | 1000 | mA |
| Operation Temperature | $T_{opr}$ | -40 ~ +125 | ° C |
| Storage Temperature | $T_{stg}$ | -40 ~ +125 | ° C |
| Wavelength | Wp | 630 ~ 650 | nm |
| Wavelength | Wd | 624 ~ 640 | nm |
| 50% Power Angle | $2\theta_{1/2}$ | 120 ~130 ~140 | deg |
| Thermal resistance junction/board | Rth | ≤20 | k/w |
| ESD（HBM） | ESD | ≥8 | Kv |
| Lead Soldering Temperature | $T_{sol}$ | 260° C for 5 Seconds | |

*Pulse Width ≦200ms and Duty ≦1/10;

*For 250 mA all reliability items are tested under good thermal management with 16x 16 mm2 FR4,Ts<125℃。

## ■ Typical Electrical & Optical Characteristics (Ta=25℃)

| Items | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$=150mA | 1.6 | 2.0 | 2.4 | V |
| | $V_F$ | $I_F$=350mA | 1.8 | 2.2 | 2.6 | V |
| | $V_F$ | $I_F$=500mA | 2.0 | 2.4 | 2.8 | V |
| Reverse Current | $I_R$ | Vr= -5v | --- | --- | 5 | μA |
| Dominant Wavelength | Wd | $I_F$=350mA | 624 | 631 | 640 | nm |
| Luminous Flux | $\Phi_V$ | $I_F$=150mA | 12 | 18 | --- | Lm |
| | $\Phi_V$ | $I_F$=350mA | 35 | 40 | --- | Lm |
| | $\Phi_V$ | $I_F$=500mA | 50 | 62 | --- | Lm |

## ■ Ranks Combination(IF =350mA)

| | | | | |
|---|---|---|---|---|
| ΦV /Lm | G: 35~40 | H: 40~50 | | |
| VF/v | B2：1.8-2.0 | C2：2.0-2.2 | D2：2.2-2.4 | |
| WD/nm | RG: 627-630 | RH: 630-633 | RI: 633-636 | |

Notes:

*Tolerance of measurement of Luminous Flux is ±15%;

*Tolerance of measurement of forward voltage is ± 0.15V;

*Tolerance of measurement of Ir is ± 3uA;

*Tolerance of measurement of If is ± 5%;

* Tolerance of measurement of If Wd ± 1nm.

## ■ Reliability

1) Test Items and Results:

| Classifi-cation | Test Item | Standard Test Method | Test Conditions | Duration | Units Tested | Number Of Damaged |
|---|---|---|---|---|---|---|
| Life Test | Operating Life Test * | JIS7021:B4<br>MIL-STD-202:107D<br>MIL-STD-750:1026 | Ta=85±5℃, IF=500mA * | 1000Hrs | 11 | 0/11 |
| | | JESD22-A101 | Ta=85±5℃<br>RH=85±5%RH<br>IF=500mA * | 1000 Hrs | 11 | 0/11 |
| Environment Test | High Temperature Storage | JIS7021:B10<br>MIL-STD-202:210A<br>MIL-STD-750:2031 | Ta=100±5℃ | 1000Hrs | 11 | 0/11 |
| | Low Temperature Storage | JIS7021:B12 | Ta= -40±5℃ | 1000Hrs | 11 | 0/11 |
| | Temp. & Humidity Test | JIS7021:B11<br>MIL-STD-202:103D | Ta=85±5℃<br>RH=85±5%RH | 1000Hrs | 11 | 0/11 |
| | Thermal Shock Test | JIS7021B4<br>MIL-STD-202:107D<br>MIL-STD-750:1026 | -40℃← - →125℃<br>15min 10sec 15min | 1000 Cycles | 11 | 0/11 |
| | ESD | JEDEC JS-001: HMB | 8KV | 10 Cycles | 11 | 0/11 |
| Soldering Test | Resistance to soldering | - | Tsol=260±5℃, 10sec | 3 time | 22 | 0/22 |

*Reliability items are tested under good thermal management 16x 16 mm2 FR4 PCB , Ts<125℃。

2) Criteria for Judge The Damage:

| Items | Symbol | Condition | Criteria for Judge | |
|---|---|---|---|---|
| | | | Min. | Max. |
| Forward Voltage | $V_F$ | $I_F$=350mA | --- | initial value x 1.2 |
| Reverse Current | $I_R$ | $V_R$=5V | --- | 10μA |
| Luminous Flux (Lm) | $\Phi_V$ | $I_F$=350mA | initial value x 0.85 | --- |

## ■ Typical Electrical / Optical Characteristics Curves

(Ta = 25℃ Unless Otherwise Noted)

Fig.1 Forward Current vs. Forward Voltage

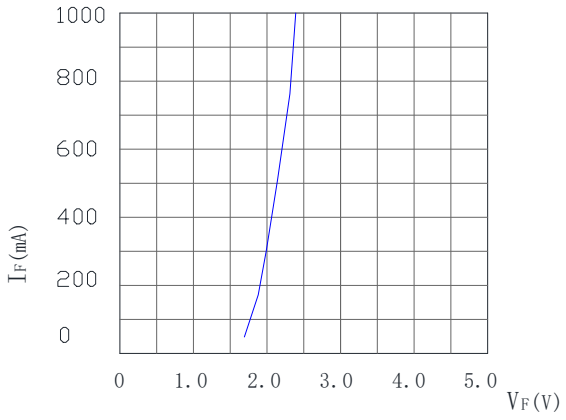



Fig.2 Luminous Flux vs. Forward Current

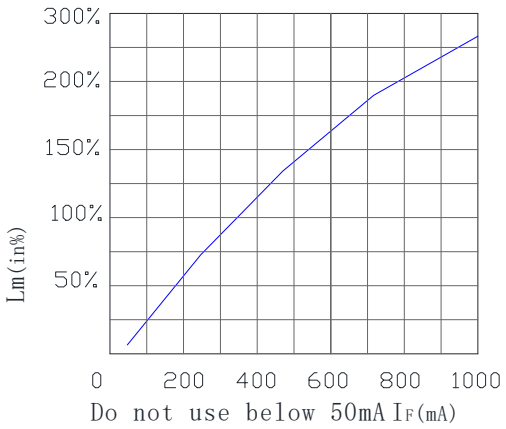



Fig.3 Luminous Flux vs.Ambient Temperature

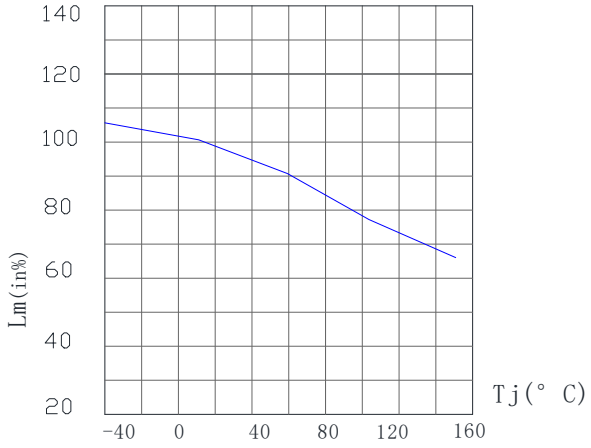



Fig.4 Relative Luminous Intensity vs.Wavelength

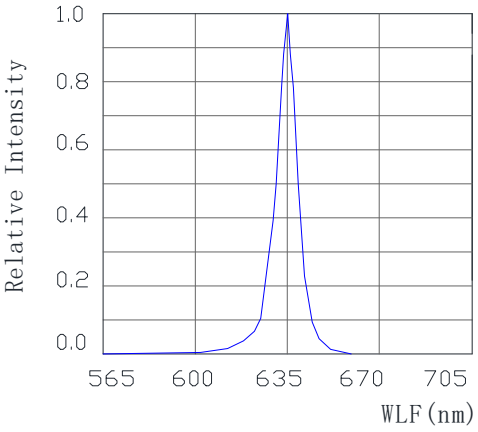



Fig.5 Maximum Forward Current vs. Ambient Temperture

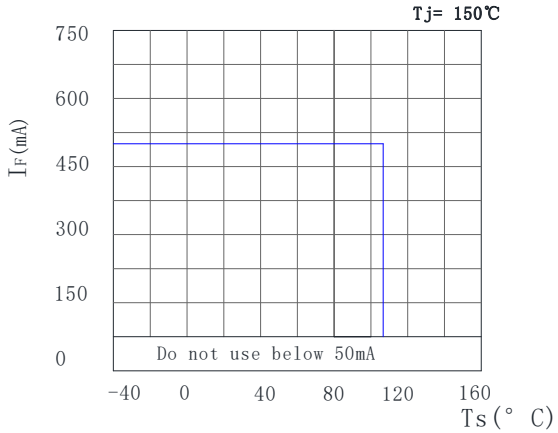
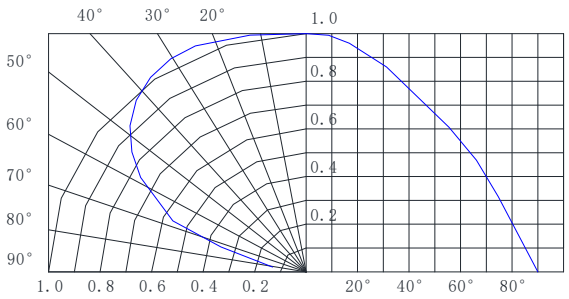
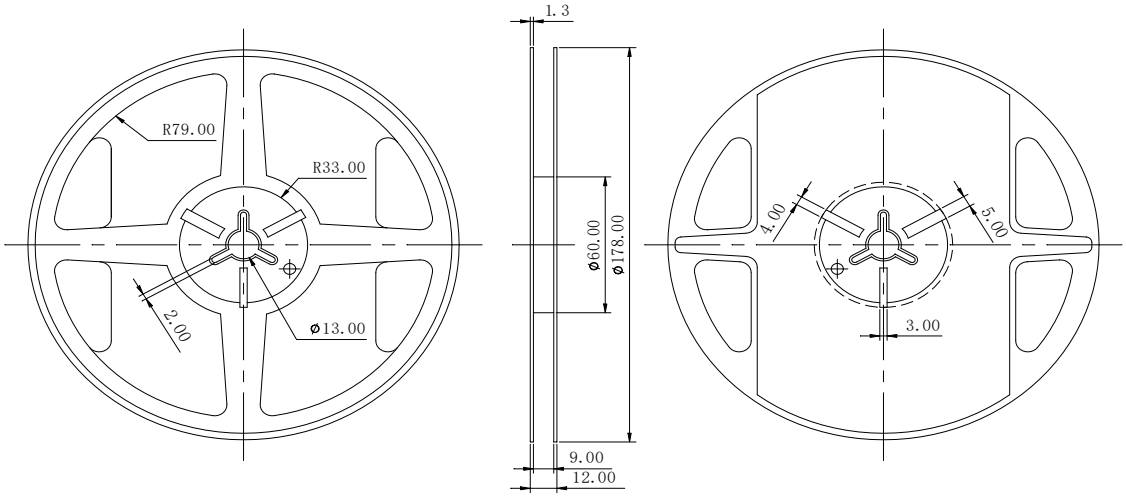


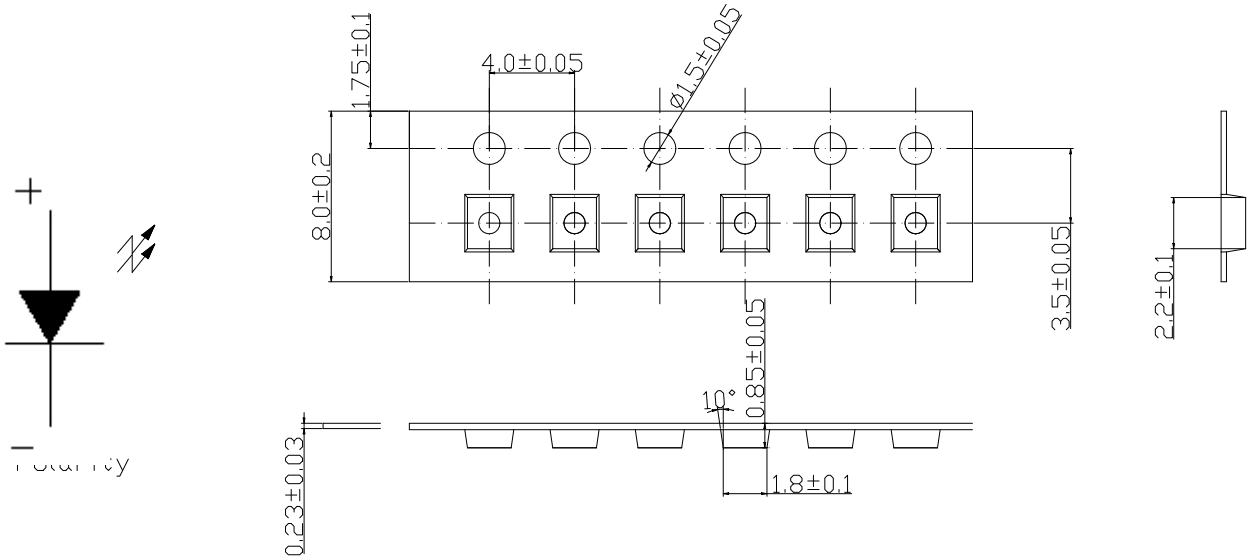

Fig.6 Relative Luminous Intensity vs.Radiation Angle



■ Reel Specification:

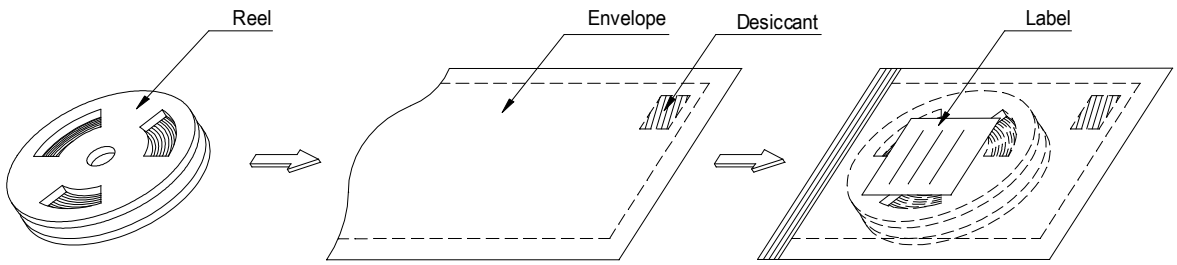



■ Taping Specification - ( 500 , or1000, or2000 or3000pcs / reel )




注:此款 LED 使用红光芯片为反极性,对应 LED 背部小焊盘为正极,大焊盘为负极,小焊盘朝载带圆孔方向。

■ Packing Type



## ■ Precautions For Use

1. Over -current -proof

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

2. Storage

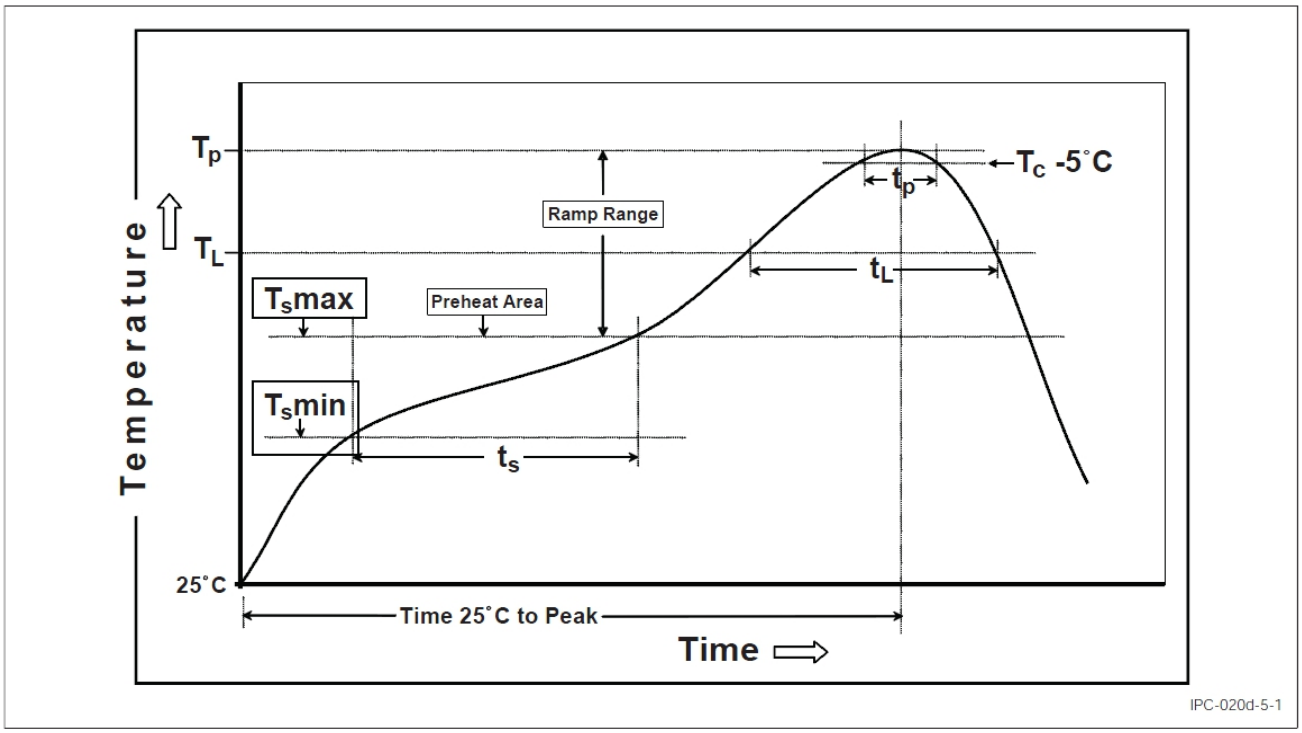
2.1 Do not open moisture proof bag before the products are ready to use;

2.2 The LEDS should be kept at 30℃ or less and 70%RH or less, and the storage life limits are 12 months;

2.3 Product complies to MSL Level 2 acc.to JEDEC J-STD-020E.

3. Soldering

3.1 Reflow Soldering / Time



| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Preheat & Soak | | |
| Temperature Min (Tsmin) | 100° C | 150° C |
| Temperature Max (Tsmax) | 150° C | 200° C |
| Time (Tsmin to Tsmax) (ts) | 60-120 seconds | 60-120 seconds |
| Average ramp-up rate (Tsmax to Tp) | 3° C/second max. | 3° C/second max. |
| Liquidous Temperature (TL) Time at Liquidous (tL) | 183° C/60-150 seconds | 217° C/60-150 seconds |
| Peak Package Body Temperature (Tp)* | 235° C max. | 260° C max. |
| Time (tp)** within 5° C of the specified classification Temperature (Tc) | 10 seconds max | 10 seconds max |
| Average ramp-down Rate (Tp to Tsmax) | 6° C/second max. | 6° C/second max. |
| Time 25° C to Peak Temperature | 6 minutes max. | 8 minutes max. |

3.2 Reflow soldering should not be done more than two times;
3.3 While soldering, do not put stress on the LEDs during heating;
3.4 After soldering, do not warp the circuit board.

## 4. Caution in ESD

4.1 Electrostatic discharge (ESD) and surge current (EOS) can damage LEDs;
4.2 An ESD wrist strap, ESD shoe strap or antistatic gloves must be worn whenever handling LEDs;
4.3 All devices equipment and machinery must be properly grounded.

## 5. Other

5.1 Above specification may be changed without notice. BYD will reserve authority on material change for above specification;
5.2 When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification. BYD assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification.

## RESTRICTIONS ON PRODUCT USE

- The information contained herein is subject to change without notice.

- **BYD Semiconductor Company Limited** exerts the greatest possible effort to ensure high quality and reliability. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing products, to comply with the standards of safety in making a safe design for the entire system, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue. In developing your designs, please ensure that products are used within specified operating ranges as set forth in the most recent products specifications.

- The products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of products listed in this document shall be made at the customer’s own risk.