

BRCS070N03DP

Rev.A Mar.-2023

描述 / Descriptions

TO-252 塑封封装 N 沟道场效应管。

N-CHANNEL MOSFET in a TO-252 Plastic Package.

特征 / Features

$R_{DS(on)}$ 小, 门电荷低, C_{rss} 小, 开关速度快, 无卤产品。

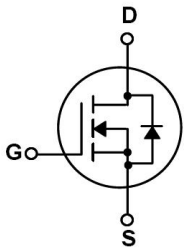
Low $R_{DS(on)}$, low gate charge, low C_{rss} , fast switching, HF Product.

用途 / Applications

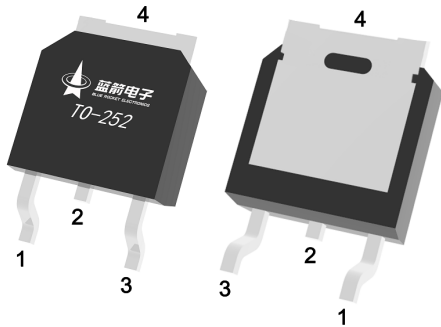
用于低压电路如: 汽车电路、DC/DC 转换、便携式产品的电源高效转换, 满足汽车应用的严格要求。

Suited for low voltage applications such as automotive, DC/DC Converters, and high efficiency switching for power management in portable and battery operated products, Meet the stringent requirements of automotive applications.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN 1 : G

PIN 2 : D

PIN 3 : S

PIN 4 : D

印章代码 / Marking

见印章说明。

See Marking Instructions.

极限参数 / Absolute Maximum Ratings(Ta=25°C)

| 参数 Parameter | 符号 Symbol | 数值 Rating | 单位 Unit |
|---|-----------------------------------|--------------|------------|
| Drain-Source Voltage | V _{DSS} | 30 | V |
| Drain Current | I _D (Tc=25°C) | 77 | A |
| Drain Current - Pulsed | I _{DM} | 165 | A |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Avalanche Current | I _{AS} | 18.5 | A |
| Single Pulsed Avalanche Energy(L=0.5mH) | E _{AS} | 136.9 | mJ |
| Power Dissipation | P _D (Tc=25°C) | 70 | W |
| Junction and Storage Temperature Range | T _J , T _{STG} | -55 to 150 | °C |
| Thermal Resistance-Junction to Ambient | t ≤ 10s | 20 | °C/W |
| | Steady-State | 50 | |
| Thermal Resistance-Junction to Case | Steady-State | 1.79 | |

电性能参数 / Electrical Characteristics(Ta=25°C)

| 参数 Parameter | 符号 Symbol | 测试条件 Test Conditions | 最小值 Min | 典型值 Typ | 最大值 Max | 单位 Unit |
|------------------------------------|----------------------|---|------------|------------|------------|------------|
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 30 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =30V V _{GS} =0V | | | 1.0 | μA |
| Gate-Body Leakage Current Forward | I _{GSS} | V _{GS} =±20V V _{DS} =0V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} I _D =250μA | 1.0 | 1.7 | 2.5 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =10V I _D =20A | | 6.3 | 7 | mΩ |
| | | V _{GS} =4.5V I _D =10A | | 9.5 | 12 | |
| Drain-Source Diode Forward Voltage | V _{SD} | V _{GS} =0V I _S =1A | | 0.72 | 1.4 | V |
| Gate resistance | R _g | V _{GS} =0V V _{DS} =0V, f=1MHz | | 3.7 | | Ω |
| Input Capacitance | C _{iss} | V _{DS} =25V V _{GS} =0V f=1.0MHz | | 1170 | | pF |
| Output Capacitance | C _{oss} | | | 110 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 100 | | |
| Total Gate Charge | Q _{g(10V)} | V _{GS} =10V, I _D =20A V _{DS} =15V, | | 40 | | nC |
| Total Gate Charge | Q _{g(4.5V)} | | | 22 | | |
| Gate Source Charge | Q _{gs} | | | 11 | | |
| Gate Drain Charge | Q _{gd} | | | 5 | | |

电性能参数 / Electrical Characteristics(Ta=25°C)

| 参数 Parameter | 符号 Symbol | 测试条件 Test Conditions | 最小值 Min | 典型值 Typ | 最大值 Max | 单位 Unit |
|---------------------|--------------|---|------------|------------|------------|------------|
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}=10V$ $V_{DS}=15V$ $R_L=0.75\ \Omega$ $R_{GEN}=3\ \Omega$ | | 11 | | ns |
| Turn-On Rise Time | t_r | | | 14 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 38 | | |
| Turn-Off Fall Time | t_f | | | 10 | | |

电参数曲线图 / Electrical Characteristic Curve

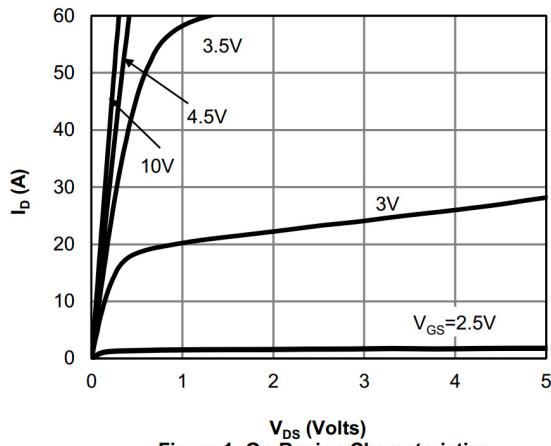


Figure 1: On-Region Characteristics

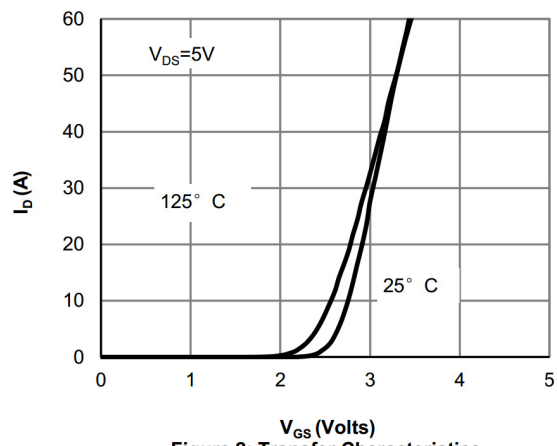


Figure 2: Transfer Characteristics

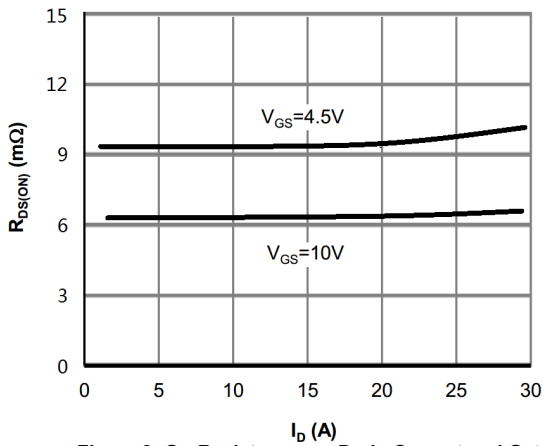


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

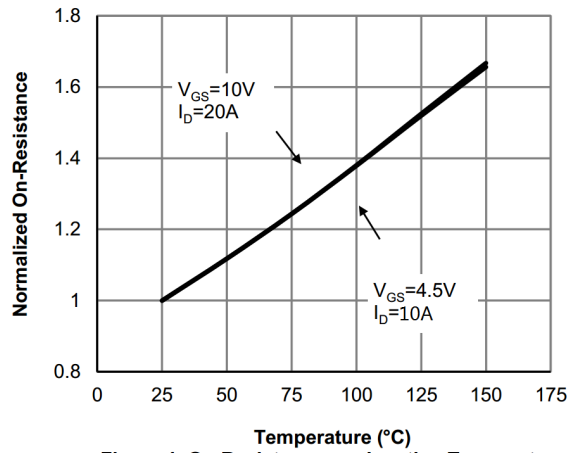


Figure 4: On-Resistance vs. Junction Temperature

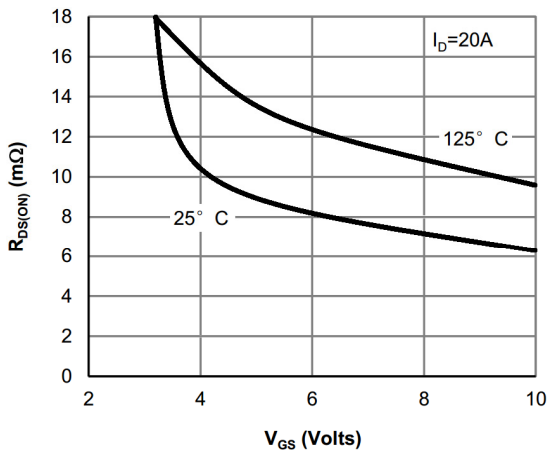


Figure 5: On-Resistance vs. Gate-Source Voltage

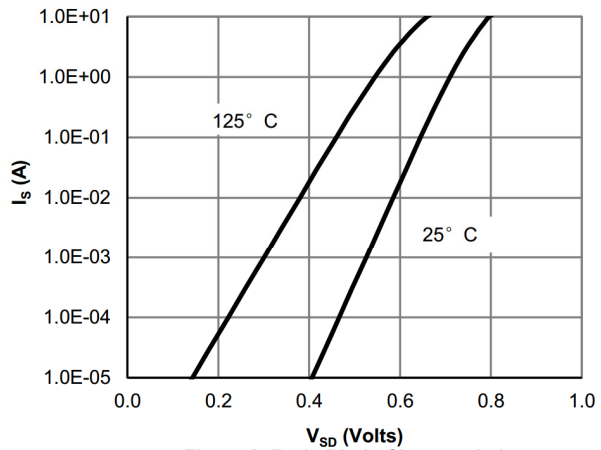


Figure 6: Body-Diode Characteristics

电参数曲线图 / Electrical Characteristic Curve

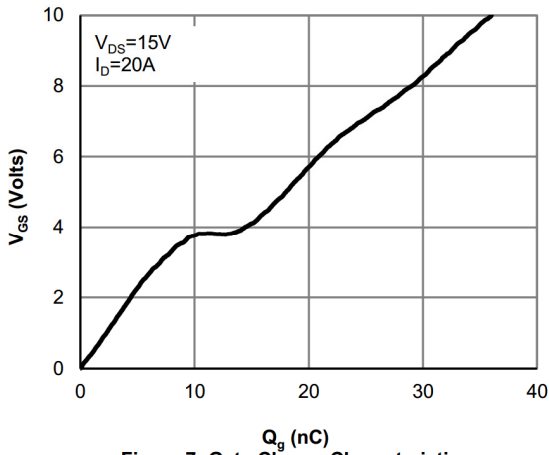


Figure 7: Gate-Charge Characteristics

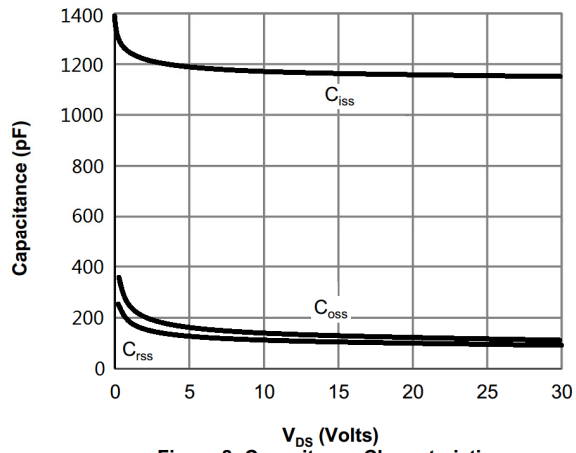


Figure 8: Capacitance Characteristics

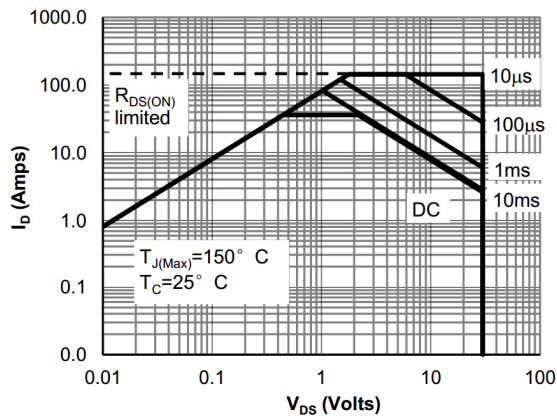


Figure 9: Maximum Forward Biased Safe Operating Area

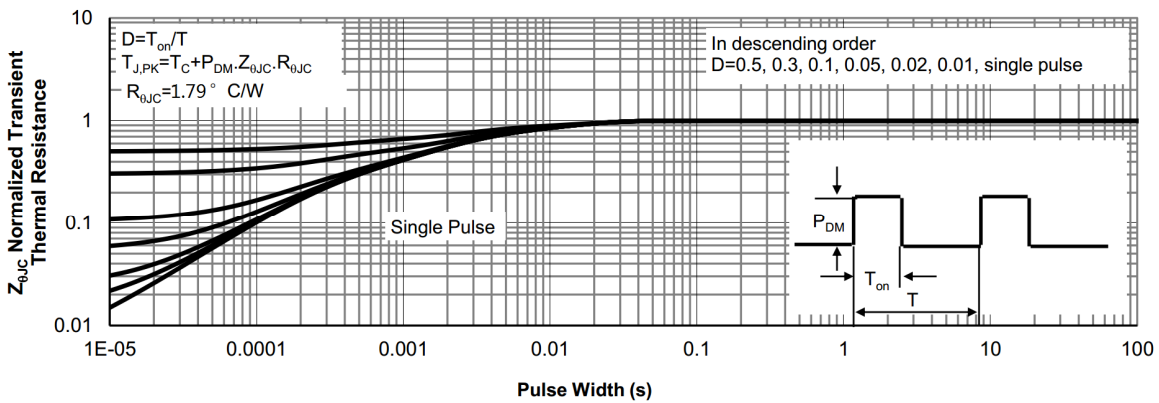
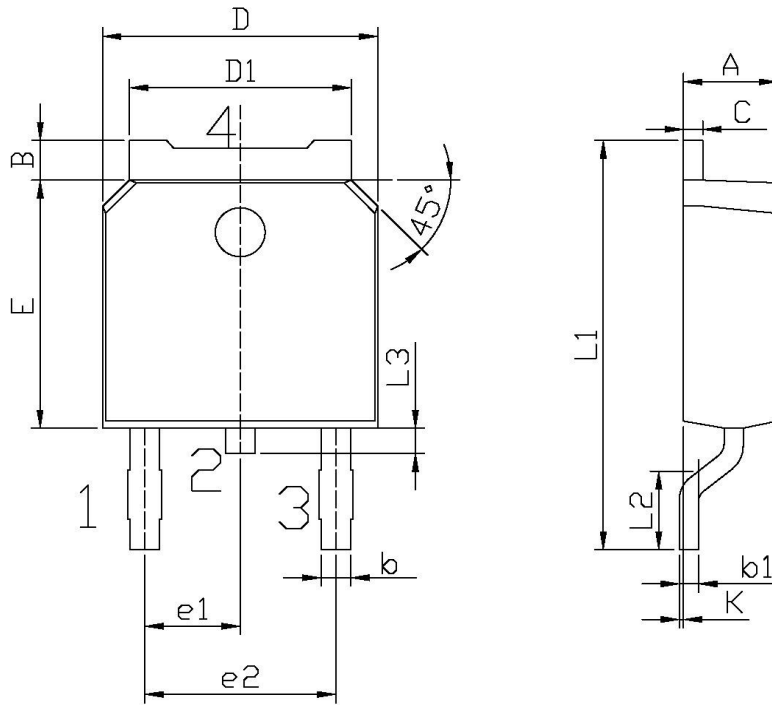


Figure 10: Normalized Maximum Transient Thermal Impedance

外形尺寸图 / Package Dimensions

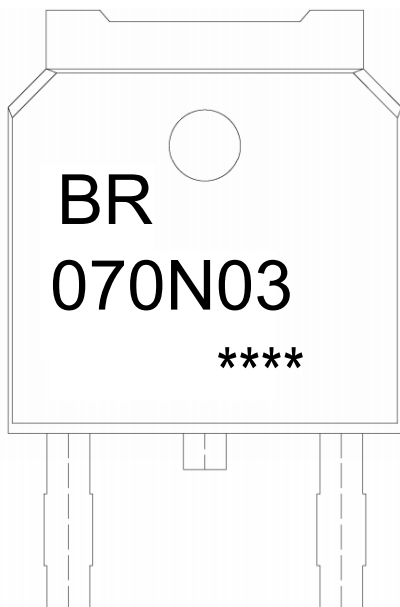


单位: mm

| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|--------|---------------------------|------|--------|---------------------------|-------|
| | Min | Max | | Min | Max |
| A | 2.20 | 2.40 | E | 5.95 | 6.25 |
| B | 0.95 | 1.25 | e1 | 2.24 | 2.34 |
| b | 0.70 | 0.90 | e2 | 4.43 | 4.73 |
| b1 | 0.45 | 0.55 | L1 | 9.85 | 10.35 |
| C | 0.45 | 0.55 | L2 | 1.70 | 2.00 |
| D | 6.45 | 6.75 | L3 | 0.60 | 0.90 |
| D1 | 5.10 | 5.50 | K | 0.00 | 0.10 |

TO-252

印章说明 / Marking Instructions



说明：

BR： 为公司代码

070N03： 为型号代码

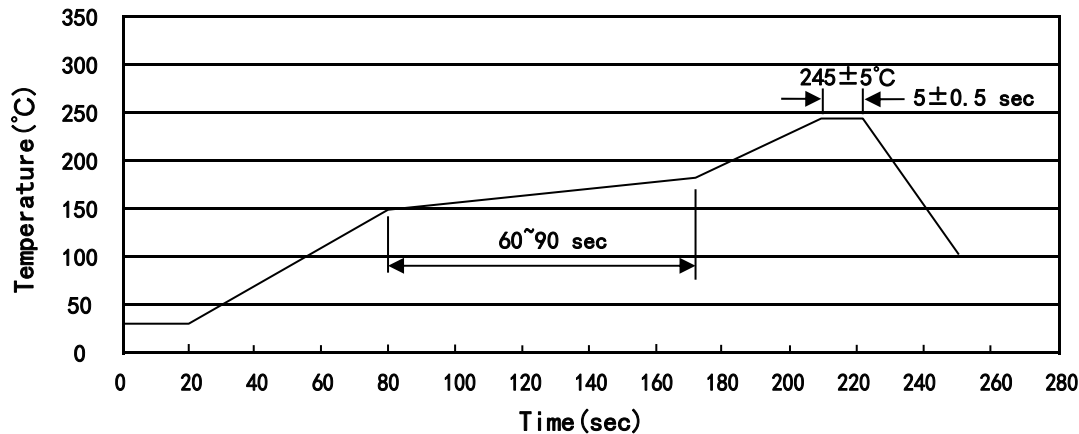
****： 为生产批号代码，随生产批号变化

Note:

BR: Company Code

070N03: Product Type Code

****: Lot No. Code, code change with Lot No

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)


说明：

- 1、预热温度 150~180°C，时间 60~90sec;
- 2、峰值温度 245±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2~10°C/sec.

Note:

- 1.Preheating:150~180°C, Time:60~90sec.
- 2.Peak Temp.:245±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度：260±5°C

时间：10±1 sec.

Temp.:260±5°C

Time:10±1 sec

包装规格 / Packaging SPEC.

卷盘包装 / REEL

| Package Type 封装形式 | Units 包装数量 | | | | | Dimension 包装尺寸 (unit: mm ³) | | |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|---|-------------|-------------|
| | Units/Reel 只/卷盘 | Reels/Inner Box 卷盘/盒 | Units/Inner Box 只/盒 | Inner Boxes/Outer Box 盒/箱 | Units/Outer Box 只/箱 | Reel | Inner Box 盒 | Outer Box 箱 |
| TO-252 | 2,500 | 2 | 5,000 | 6 | 30,000 | 13" ×16 | 360×360×50 | 380×335×366 |

套管包装 / TUBE

| Package Type 封装形式 | Units 包装数量 | | | | | Dimension 包装尺寸 (unit: mm ³) | | |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|---|-------------|-------------|
| | Units/Tube 只/套管 | Tubes/Inner Box 套管/盒 | Units/Inner Box 只/盒 | Inner Boxes/Outer Box 盒/箱 | Units/Outer Box 只/箱 | Tube 套管 | Inner Box 盒 | Outer Box 箱 |
| TO-251/252 | 75 | 48 | 3,600 | 5 | 18,000 | 526×20.5×5.25 | 555×164×50 | 575×290×180 |

使用说明 / Notices

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