

**BRCS250C03MFQ**

**绝对最大额定值(Absolute Maximum Ratings)(Ta=25℃)**

| Parameter                              | Symbol                       | Rating      |           | Unit |
|----------------------------------------|------------------------------|-------------|-----------|------|
|                                        |                              | N-channel   | P-channel |      |
| Drain-Source Voltage                   | $V_{DS}$                     | 30          | -30       | V    |
| Gate-Source Voltage                    | $V_{GS}$                     | $\pm 12$    |           | V    |
| Continuous Drain Current               | $I_D (T_C=25^\circ\text{C})$ | 5.5         | -4.0      | A    |
| Pulsed Drain Current                   | $I_{DM}$                     | 35          | -25       | A    |
| Power Dissipation                      | $P_D (T_C=25^\circ\text{C})$ | 1.3         | 1.3       | W    |
| Junction and Storage Temperature Range | $T_J, T_{STG}$               | -55 to +150 |           |      |
| Maximum Junction-to-Ambient            | $R_{\theta JA}$              | 140         |           | /W   |
| Maximum Junction-to-Lead               | $R_{\theta JL}$              | 75          |           | /W   |

**2N-CHANNEL Electrical Characteristics(Ta=25℃)**

| Parameter                         | Symbol        | Test Conditions                                    | Min | Typ  | Max       | Unit     |
|-----------------------------------|---------------|----------------------------------------------------|-----|------|-----------|----------|
| Drain-Source Breakdown Voltage    | $BV_{DS}$     | $V_{GS}=0V$ $I_D=250\mu A$                         | 30  | 32.6 |           | V        |
| Zero Gate Voltage Drain Current   | $I_{DSS}$     | $V_{DS}=30V$ $V_{GS}=0V$                           |     |      | 1.0       | A        |
| Gate-Body leakage current         | $I_{GSS}$     | $V_{GS}=\pm 12V$ $V_{DS}=0V$                       |     |      | $\pm 100$ | nA       |
| Gate Threshold Voltage            | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=250\mu A$                     | 0.5 | 0.9  | 1.5       | V        |
| Static Drain-Source On-Resistance | $R_{DS(on)}$  | $V_{GS}=10V$ $I_D=4A$                              |     | 21.5 | 25        | m        |
|                                   |               | $V_{GS}=4.5V$ $I_D=4A$                             |     | 23   | 35        | m        |
|                                   |               | $V_{GS}=2.5V$ $I_D=1A$                             |     | 30   | 50        | m        |
| Diode Forward Voltage             | $V_{SD}$      | $V_{GS}=0V$ $I_S=1A$                               |     | 0.74 | 1.2       | V        |
| Input Capacitance                 | $C_{iss}$     | $V_{DS}=25V$ $V_{GS}=0V$<br>$f=1.0MHz$             |     | 690  |           | pF       |
| Output Capacitance                | $C_{oss}$     |                                                    |     | 200  |           | pF       |
| Reverse Transfer Capacitance      | $C_{rss}$     |                                                    |     | 130  |           | pF       |
| Gate resistance                   | $R_g$         | $V_{DS}=0V$ $V_{GS}=0V$<br>$f=1.0MHz$              |     | 3.5  |           | $\Omega$ |
| Total Gate Charge                 | $Q_{g(10V)}$  | $V_{GS}=10V$ $V_{DS}=15V$<br>$I_D=3.5A$            |     | 4.1  |           | nC       |
| Total Gate Charge                 | $Q_{g(4.5V)}$ |                                                    |     | 2.2  |           | nC       |
| Gate-Source Charge                | $Q_{gs}$      |                                                    |     | 0.6  |           | nC       |
| Gate-Drain Charge                 | $Q_{gd}$      |                                                    |     | 1.1  |           | nC       |
| Turn-On Delay Time                | $t_{d(on)}$   | $V_{DS}=15V$ $V_{GS}=10V$<br>$R_L=4.2$ $R_{GEN}=3$ |     | 4.6  |           | ns       |
| Turn-On Rise Time                 | $t_r$         |                                                    |     | 1.4  |           | ns       |
| Turn-Off Delay Time               | $t_{d(off)}$  |                                                    |     | 18.7 |           | ns       |
| Turn-Off Fall Time                | $t_f$         |                                                    |     | 15.8 |           | ns       |

## N-CHANNEL Electrical Characteristic Curve

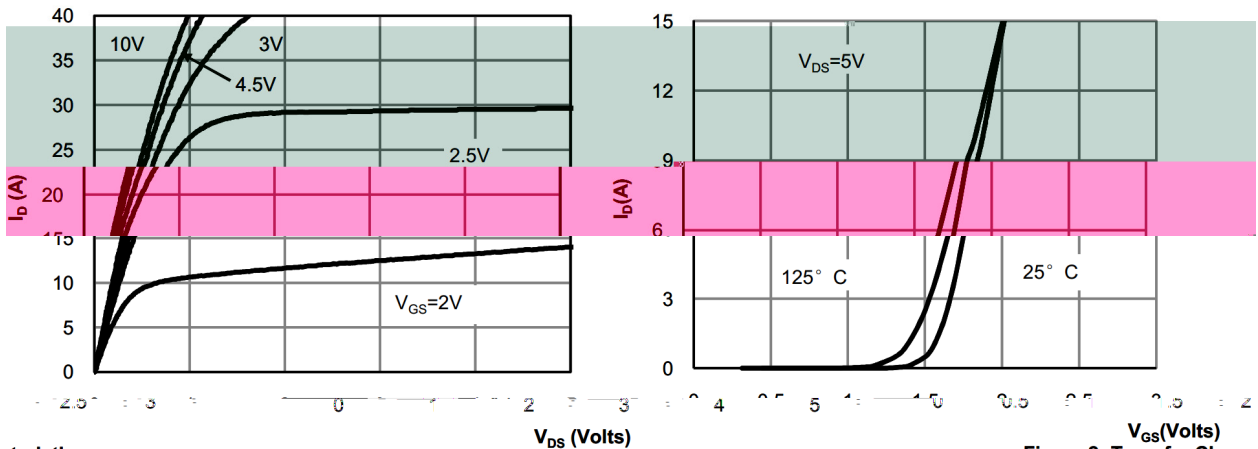


Fig 1: On-Region Characteristics

Figure 2: Transfer Characteristics

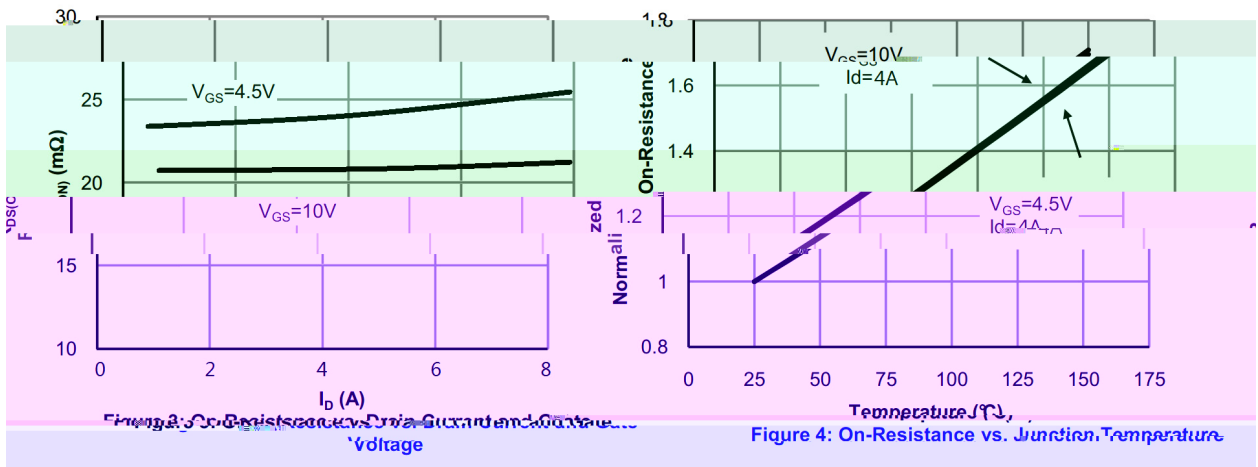


Figure 3: On-Resistance vs. Drain Current and Gate-Source Voltage

Figure 4: On-Resistance vs. Junction Temperature

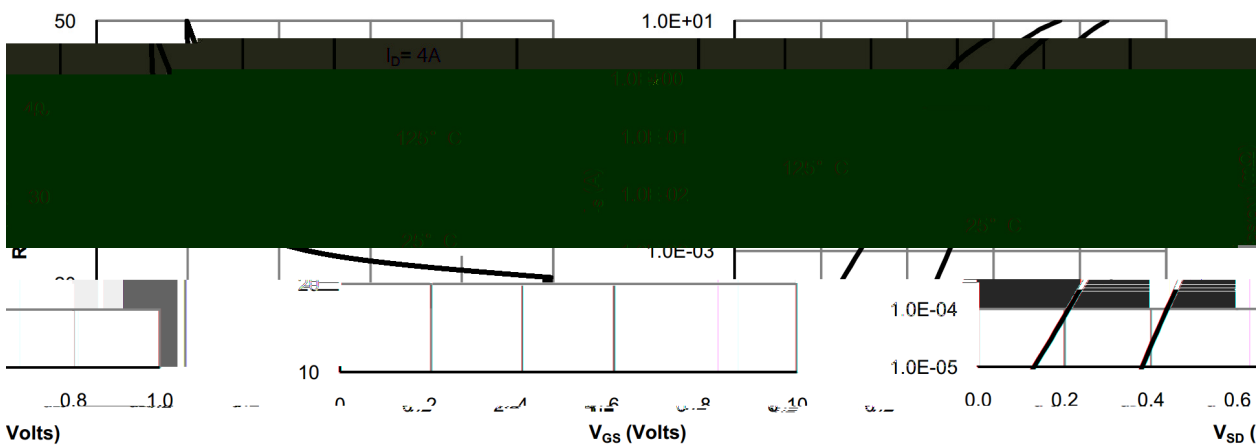


Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Body-Diode Characteristics

N-CHANNEL Electrical Characteristic Curve

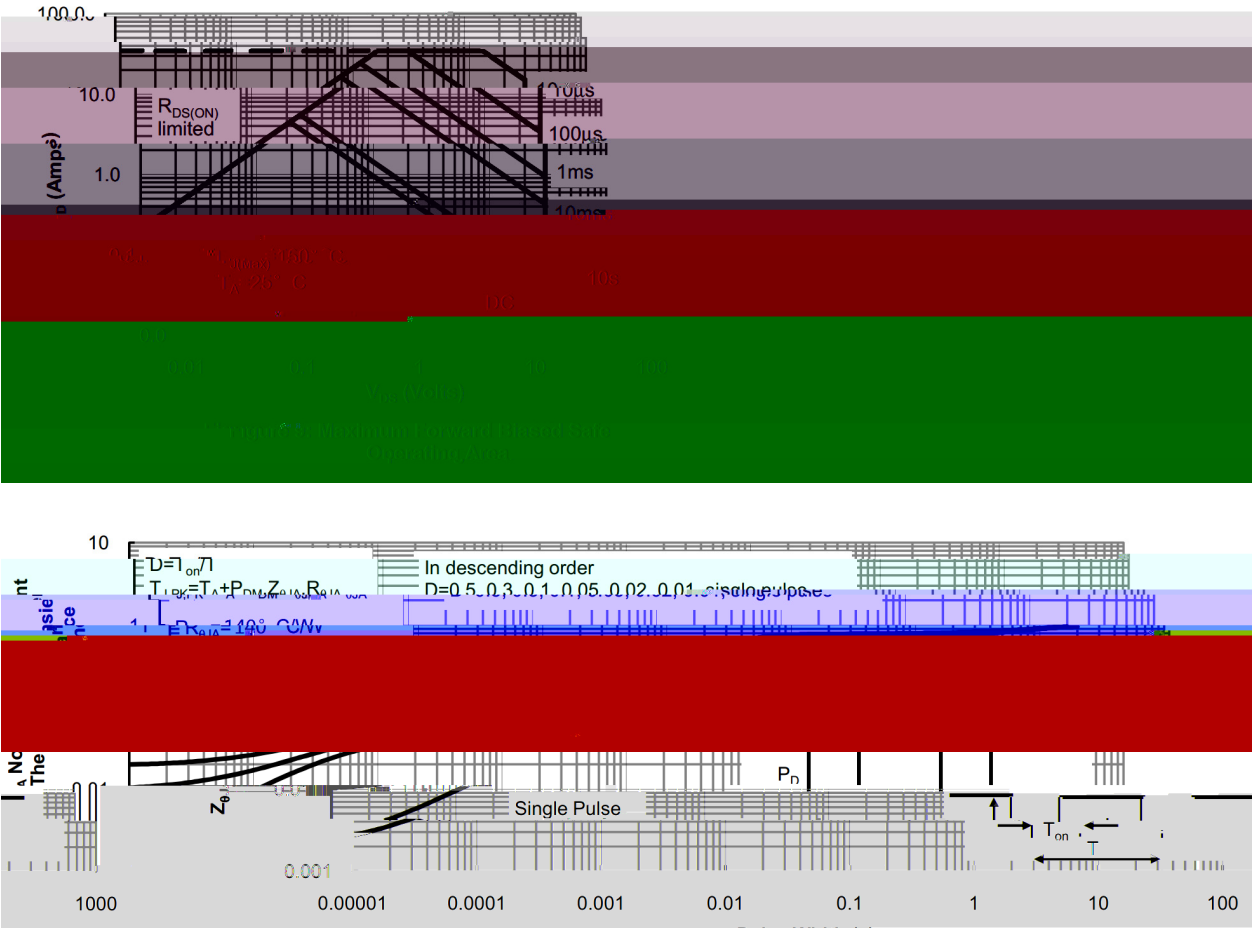
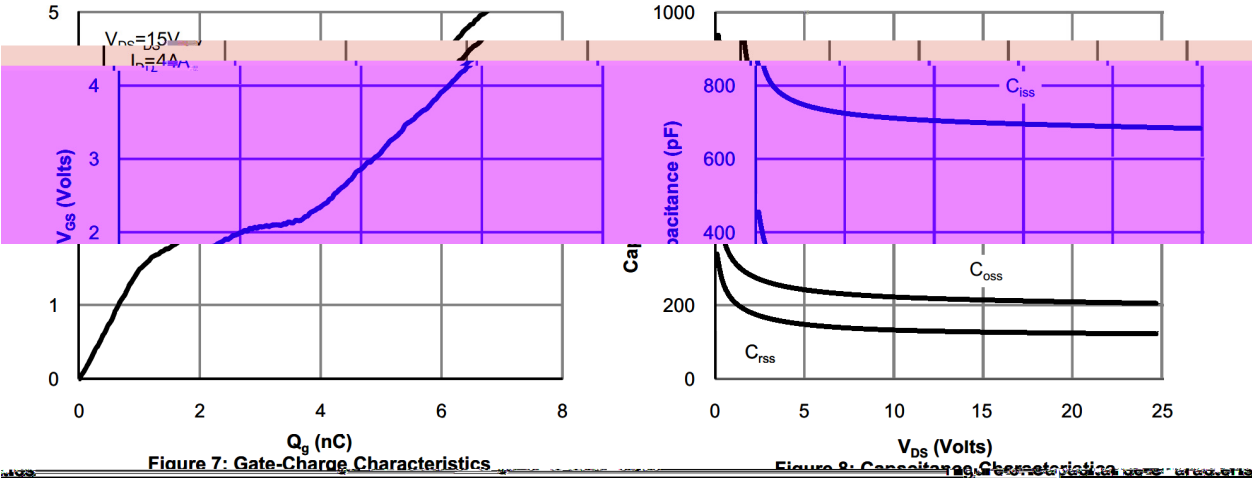


Figure 10: Normalized Maximum Transient Thermal Impedance

# BRCS250C03MFQ

Rev.A Oct.-2024

| Parameter                         | Symbol        | Test Conditions                            | Min  | Typ   | Max       | Unit     |
|-----------------------------------|---------------|--------------------------------------------|------|-------|-----------|----------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$    | $V_{GS}=0V$ $I_D=-250 A$                   | -30  | -32   |           | V        |
| Zero Gate Voltage Drain Current   | $I_{DSS}$     | $V_{DS}=-30V$ $V_{GS}=0V$                  |      |       | -1.0      | A        |
| Gate-Body leakage current         | $I_{GSS}$     | $V_{GS}=\pm 12V$ $V_{DS}=0V$               |      |       | $\pm 100$ | nA       |
| Gate Threshold Voltage            | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=-250 A$               | -0.5 | -0.9  | -1.5      | V        |
| Static Drain-Source On-Resistance | $R_{DS(on)}$  | $V_{GS}=-10V$ $I_D=-4A$                    |      | 46    | 55        | m        |
|                                   |               | $V_{GS}=-4.5V$ $I_D=-4A$                   |      | 53    | 65        | m        |
|                                   |               | $V_{GS}=-2.5V$ $I_D=-1A$                   |      | 70    | 120       | m        |
| Diode Forward Voltage             | $V_{SD}$      | $V_{GS}=0V$ $I_S=-1A$                      |      | -0.76 | -1.2      | V        |
| Input Capacitance                 | $C_{iss}$     | $V_{DS}=-25V$ $V_{GS}=0V$<br>$f=1.0MHz$    |      | 900   |           | pF       |
| Output Capacitance                | $C_{oss}$     |                                            |      | 240   |           | pF       |
| Reverse Transfer Capacitance      | $C_{rss}$     |                                            |      | 190   |           | pF       |
| Gate resistance                   | $R_g$         | $V_{DS}=0V$ $V_{GS}=0V$<br>$f=1.0MHz$      |      | 4.5   |           | $\Omega$ |
| Total Gate Charge                 | $Q_{g(10V)}$  | $V_{GS}=-10V$ $V_{DS}=-15V$<br>$I_D=-2.7A$ |      | 4.4   |           | nC       |
| Total Gate Charge                 | $Q_{g(4.5V)}$ |                                            |      | 2.3   |           | nC       |
| Gate-Source Charge                | $Q_{gs}$      |                                            |      | 0.75  |           | nC       |
| Gate-Drain Charge                 | $Q_{gd}$      |                                            |      | 1.2   |           | nC       |
| Turn-On Delay Time                | $t_{d(on)}$   |                                            |      | 7.8   |           | ns       |

$V_{DS}=-15 V$   $V_{GS}=-10V$   
 $R_L=5.55$   $R_{GEN}=3$

P- 静态特性 / P-CHANNEL Electrical Characteristic Curve

P-?è Ô ? d • Ž ¢ / P-CHANNEL Electrical Characteristic Curve

Ø □ = ) ¢ / Package Dimensions



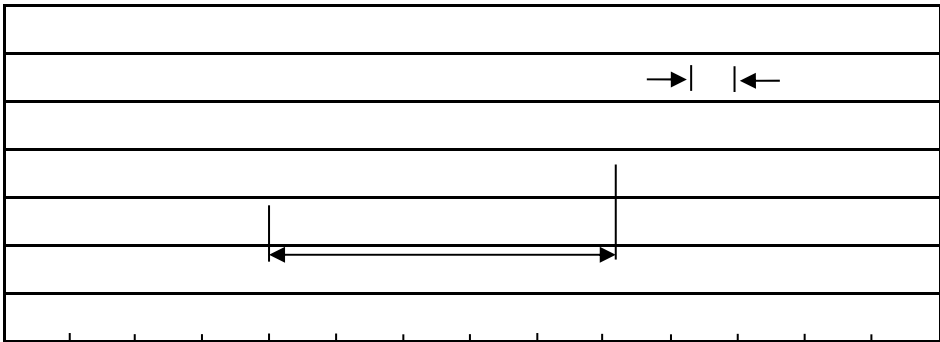
, M y f / Marking Instructions

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ÂD /Cã p ¯ »] / Resistance to Soldering Heat Test Conditions

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G P á / Packaging SPEC.

2 & x / REEL

| Package Type<br>7>û ~ E | Units ;>û H      |                          |                       |                                |                        | Dimension ;>û p . (unit Åmm³) |             |             |
|-------------------------|------------------|--------------------------|-----------------------|--------------------------------|------------------------|-------------------------------|-------------|-------------|
|                         | Units/Reel<br>/- | Reels/Inner Box<br>-- /- | Units/Inner Box<br>/- | Inner Boxes/Outer Box<br>- /1ç | Units/Outer Box<br>/1ç | Reel                          | Inner Box   | Outer Boxç  |
| SOT23-5/6               | 3,000            | 10                       | 30,000                | 4                              | 120,000                | 7 s ×8                        | 210×205×205 | 445×435×230 |

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