# SG2M040075BJ

**TriQSiC™ 750V Silicon Carbide Power MOSFET G2** N Channel Enhancement

## Features

- High speed switchin

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# 1 Maximum ratings

**Table 2 Maximum rating** (Tc = 25°C unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|---|---|---|---|---|---|
| V | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $Q_{gs}$ | Gate source charge | - | 12 | - | nC | $V_{DS}$ = 500V, $V_{GS}$ = -4/+18V<br>$I_D$ = 22A | Fig.12 |
| $Q_{gd}$ | Gate drain charge | - | 12 | - | | | |
| $Q_g$ | Gate charge | - | 38 | - | | | |

## 2.3 Switching characteristics

**Table 6 Dynamic characteristics**(Tc = 25°C unless otherwise specified,the data comes from TO-247-4L)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| $E_{on}$ | Turn on switching energy | - | 85 | - | μJ | $V_{DS}$ = 500V, $V_{GS}$ = -4/+18V<br>$I_D$ = 22A, Rg = 2.5Ω<br>L = 120μH | |
| $E_{off}$ | Turn off switching energy | - | 31 | - | | | |
| $t_{d\ on}$ | Turn on delay time | - | 10.7 | - | ns | | |
| $t_r$ | Rise time | - | 11.6 | - | | | |
| $t_{d\ off}$ | Turn off delay time | - | 21 | - | | | |
| $t_f$ | Fall time | - | 9.5 | - | | | |

**Table 7 Body diode characteristics**(The data comes from TO-247-4L)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode forward voltage | - | 3.7 | - | V | $V_{GS}$ = -4V, $I_{SD}$ = 11A | Fig.8,9, 10 |
| | | - | 3.2 | - | V | $V_{GS}$ = -4V, $I_{SD}$ = 11A<br>$T_J$ = 175°C | |
| $I_S$ | Continuous diode forward current | - | 54 | - | A | $V_{GS}$ = -4V, Tc = 25°C | Note2 |
| $t_{rr}$ | Reverse recovery time | - | 25 | - | ns | $V_R$ = 500V, $V_{GS}$ = -4V<br>$I_{SD}$ = 22A<br>di/dt = 2111A/μs<br>$T_J$ = 175°C | |
| $Q_{rr}$ | Reverse recovery charge | - | 246 | - | nC | | |
| $I_{rrm}$ | Peak reverse recovery current | - | 17 | - | A | | |

Note 2: When using SiC Body Diode the maximum recommended $V_{GS}$ = -4 V

# 3 Electrical characteristic diagrams

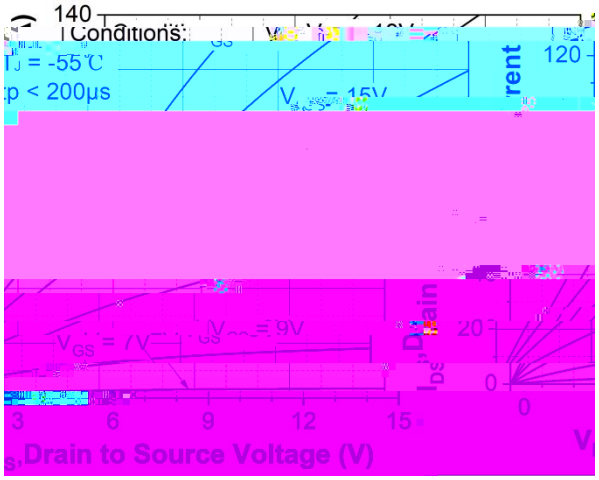



Figure 1. Output characteristics $T_J$ = -55 ºC

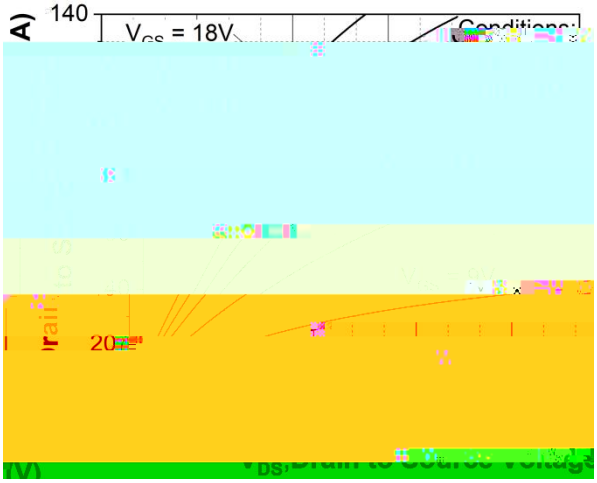



Figure 2. Output characteristics $T_J$ = 25 ºC

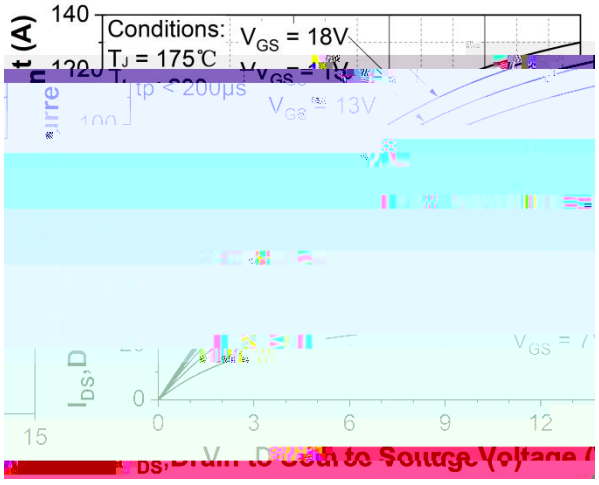



Figure 3. Output characteristics $T_J$ = 175 ºC

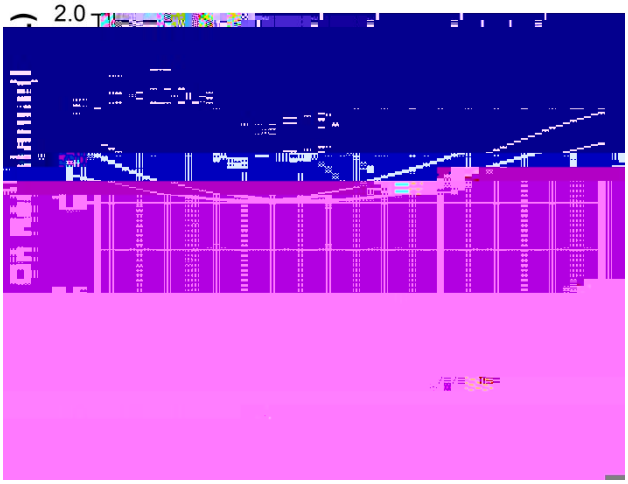



Figure 4. Normalized on-resistance vs. temperature

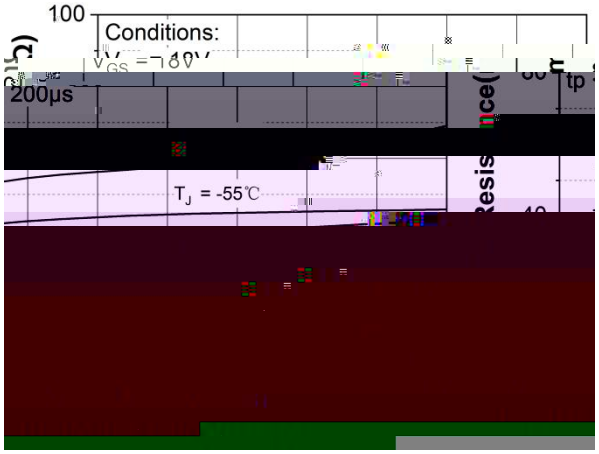



Figure 5. On-resistance vs. drain current for various temperatures

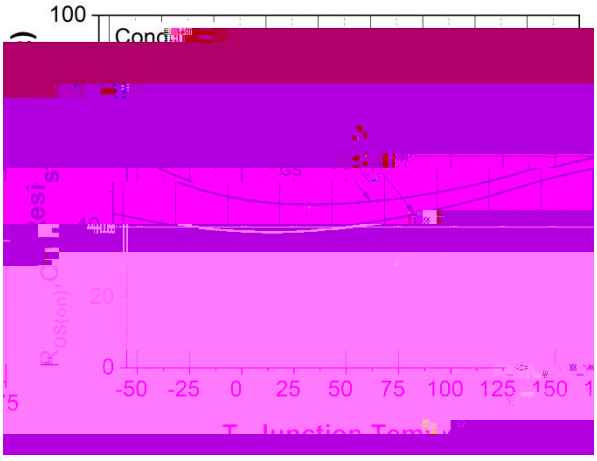



Figure 6. On-resistance vs. temperature for various gate voltages

Figure 7. Transfer characteristic for various junction temperatures

Figure 8. Body diode characteristic at $T_J$ = -55 ºC

Figure 9. Body diode characteristic at $T_J$ = 25 ºC

Figure 10.

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# 4 Mechanical parameters

## 4.1 Dimensions and metallization

| Parameter | Typical value | Unit | Metallization |
|---|---|---|---|
| Die size W x L | 2.800*3.400 | mm | |
| Gate pad size W x L | 0.800*0.800 | mm | |
| Die thickness | 175 | μm | |
| Top side | source gate | | |

# 5 Test conditions

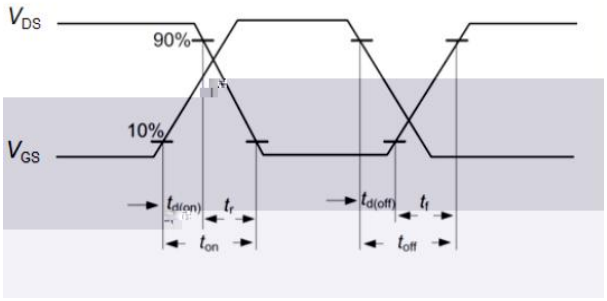



Figure A. Definition of switching times

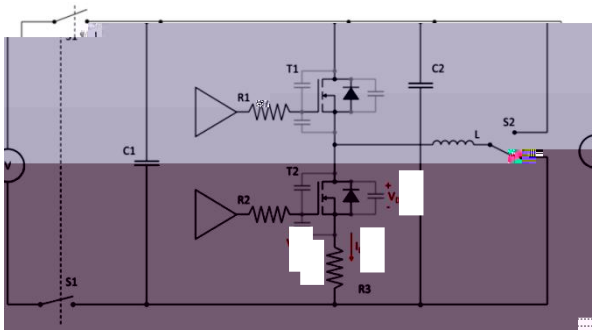



Figure B. Dynamic test circuit

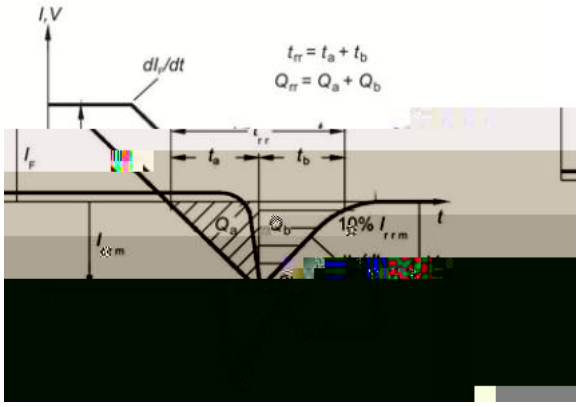



Figure C. Definition of body diode switching characteristics

# Revision history

| Document version | Date of release | Document stage | Description of changes |
|---|---|---|---|
| V01_00 | 2025-01-10 | —— | —— |
| V01_01 | 2025-01-13 | —— | —— |
| V01_02 | 2025-01-17 | —— | —— |
| V02_00 | 2025-05-23 | —— | —— |
| V02_01 | 2025-07-22 | —— | —— |
| V02_02 | 2025-08-14 | —— | —— |
| V03_00 | 2025-08-28 | —— | —— |
| V03_01 | 2025-12-05 | —— | —— |
| V03_02 | 2025-12-22 | Final | |

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