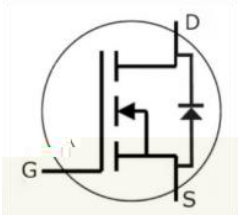
SG2M120120BJ

TriQSiC™ 1200V Silicon Carbide Power MOSFET G2 N Channel Enhancement

Features

- High speed switching
- Very low switching losses
- Fully controllable dv/dt
- High blocking voltage with low on-resistance
- Fast intrinsic diode with low reverse recovery (Qrr)
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant



Benefits

- Cooling effort reduction
- Efficiency improvement
- Reduced cooling requirements
- Increased power density
- Increased system switching frequency

Part number	Die size W x L mm
SG2M120120BJ	2.645 * 1.850

Applications

- On-board charger/PFC
- EV battery chargers
- Booster/DC-DC converter
- Switch mode power supplies

Table 1 Key performance and package parameters

Type	V_{DS}	I_{DS} (T_C=25 , $R_{th\ (j\text{-}c),max}$ ≤ 1.38°C/W)	$R_{DS(on),\ typ}$ (V_{GS} = 18V, I_D = 9A, T_J = 25)	$T_{J,max}$
SG2M120120BJ	1200V	23A	115mΩ	175

Table of contents

Features **1**

Benefits .....

SG2M120120BJ

Q_{gs}	Gate source charge	-	5.5	-	nC	V_{DS} = 800V, V_{GS} = -4/+18V I_D = 9A	Fig.12
Q_{gd}	Gate drain charge	-	5.3	-			
Q_g	Gate charge	-	16.6	-			

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	-	79	-	μJ	V_{DS} = 800V, V_{GS} = -4/+18V I_D = 9A, Rg = 2.5Ω L = 120μH	
E_{off}	Turn off switching energy	-	22	-			
$t_{d\ on}$	Turn on delay time	-	7.9	-	ns		
t_r	Rise time	-	6.9	-			
$t_{d\ off}$	Turn off delay time	-	12.2	-			
t_f	Fall time	-	12.4	-			

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} = 4.5A	Fig.8,9, 10
		-	3.3	-	V	V_{GS} = -4V, I_{SD} = 4.5A T_J = 175°C	
I_S	Continuous diode forward current	-	23	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	25	-	ns	V_R = 800V, V_{GS} = -4V I_{SD} = 9A di/dt = 2331A/μs T_J = 175°C	
Q_{rr}	Reverse recovery charge	-	180	-	nC		
I_{rrm}	Peak reverse recovery current	-	14	-	A		

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

3 Electrical characteristic diagrams

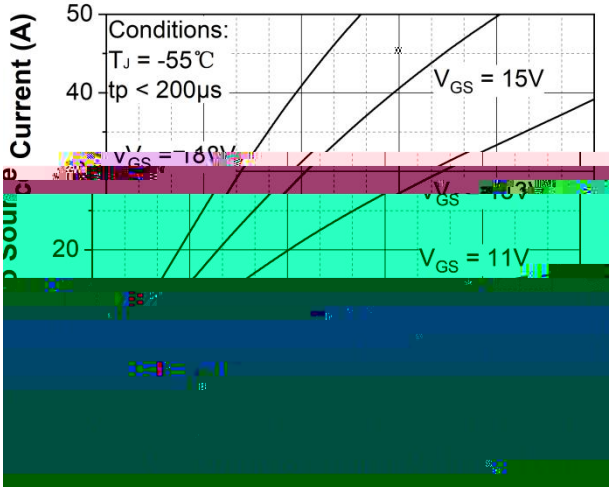


Figure 1. Output characteristics T_J = -55 ºC

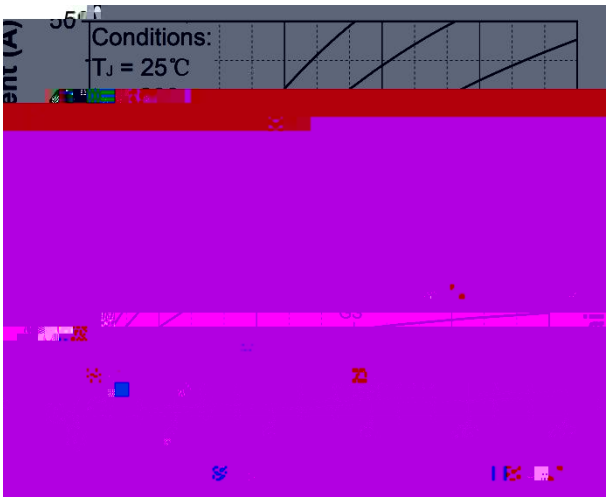


Figure 2. Output characteristics T_J = 25 ºC

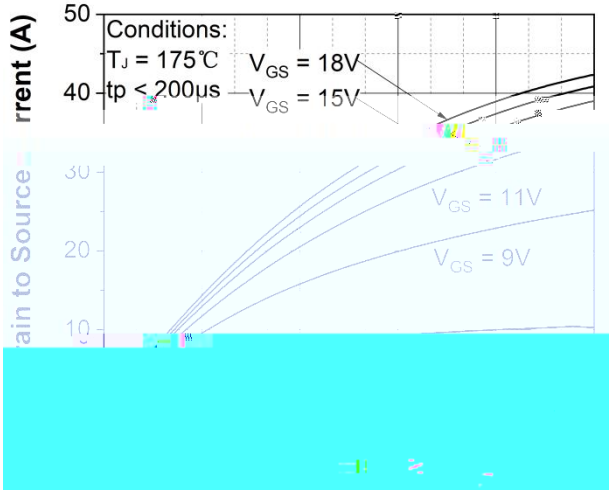


Figure 3. Output characteristics T_J = 175 ºC

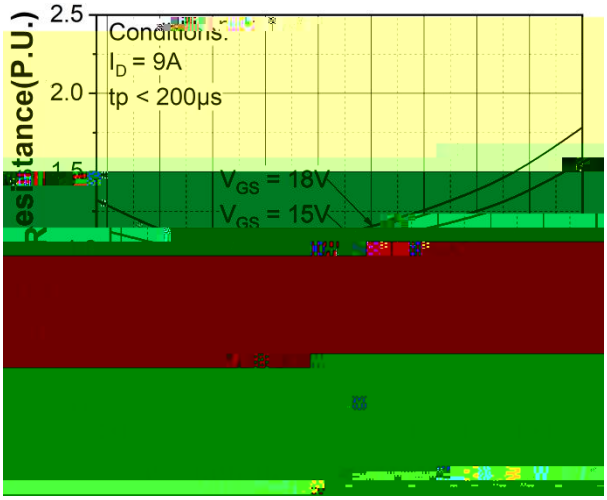


Figure 4. Normalized on-resistance vs. temperature

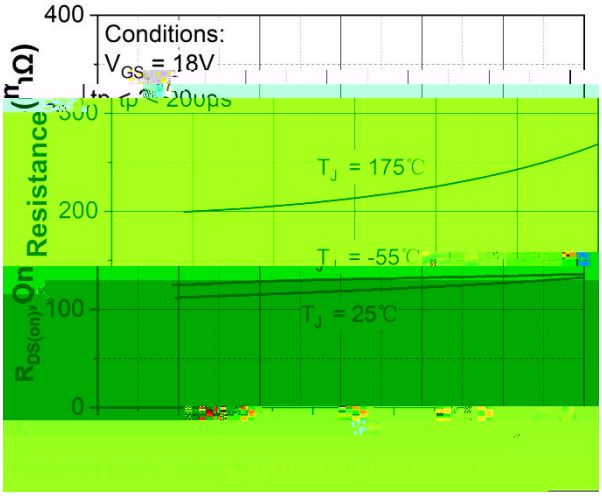


Figure 5. On-resistance vs. drain current for various temperatures

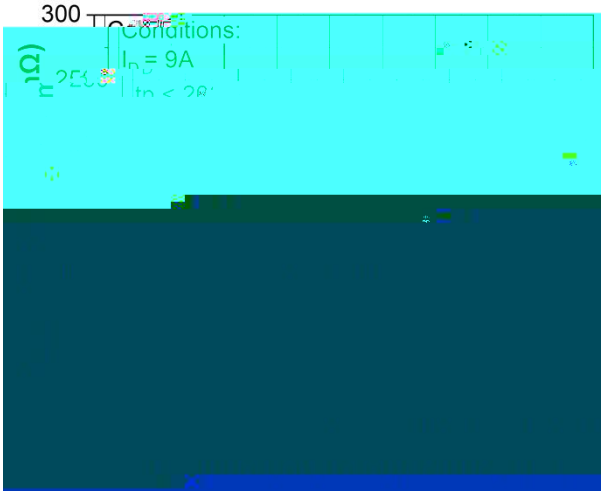


Figure 6. On-resistance vs. temperature for various gate voltages

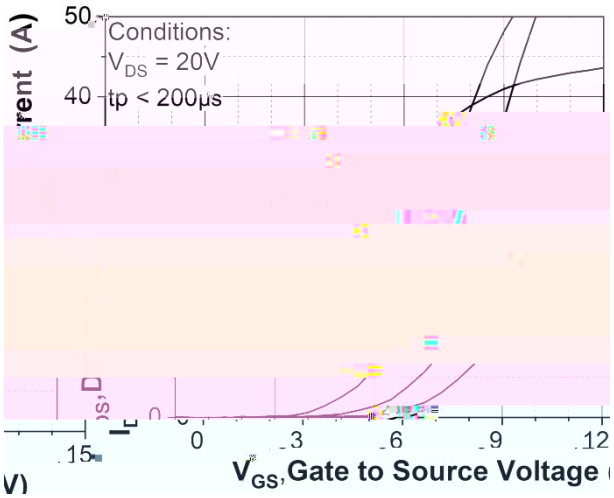


Figure 7. Transfer characteristic for various junction temperatures

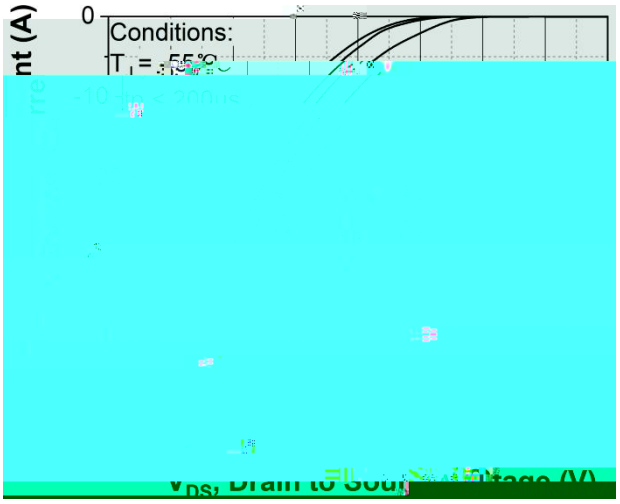


Figure 8. Body diode characteristic at T_J = -55 ºC

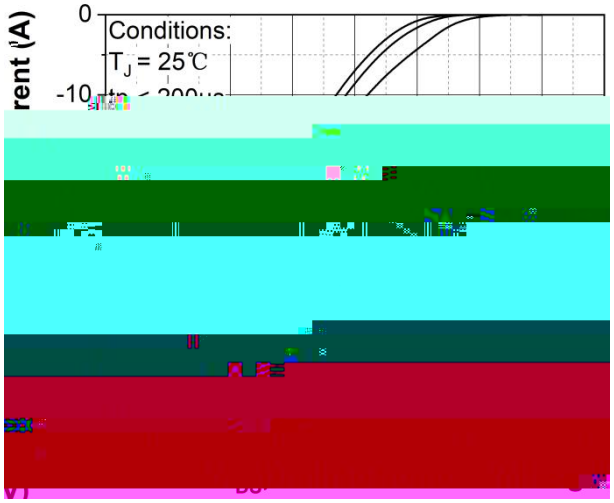


Figure 9. Body diode characteristic at T_J = 25 ºC

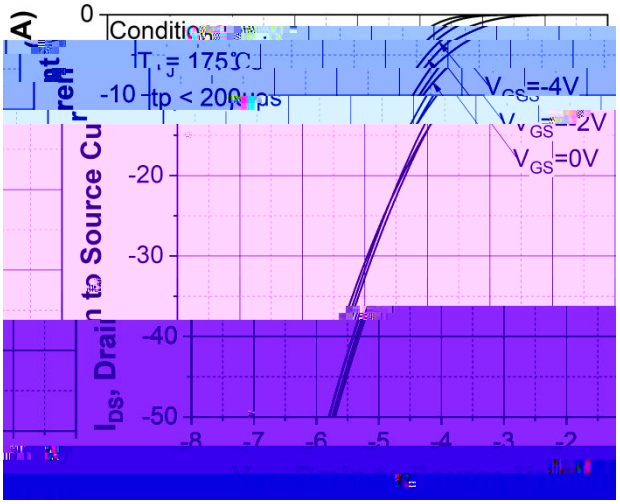


Figure 10. Body diode characteristic at T_J = 175ºC

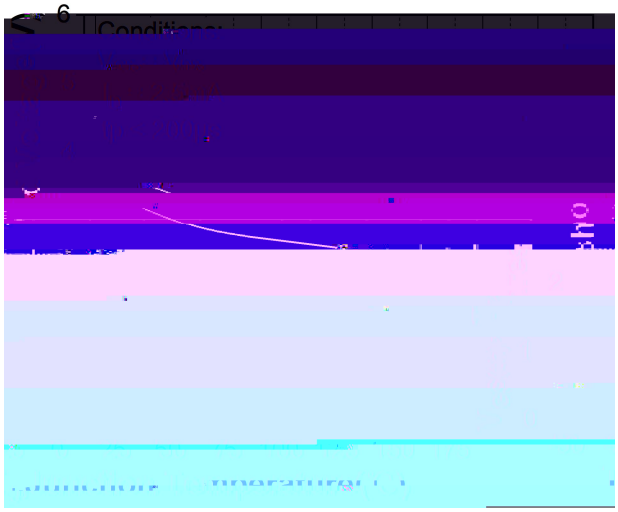


Figure 11. Threshold voltage vs. temperature

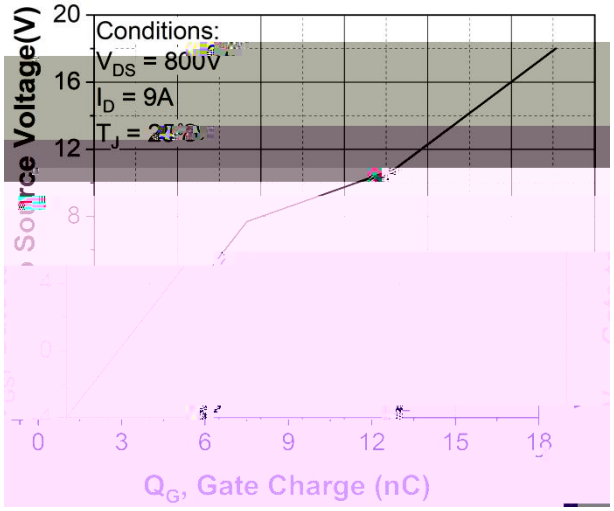


Figure 12. Gate charge characteristic

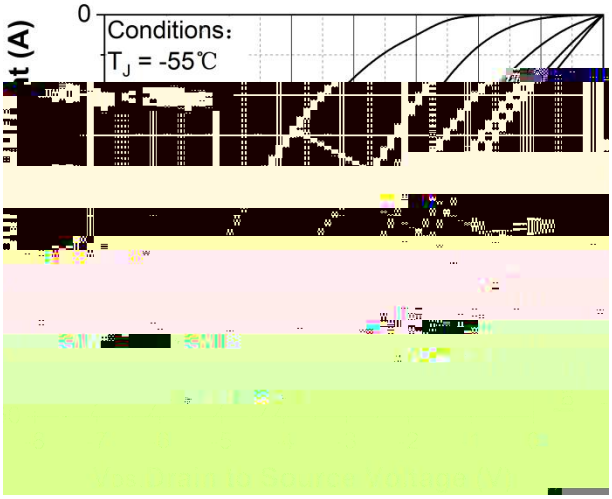


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

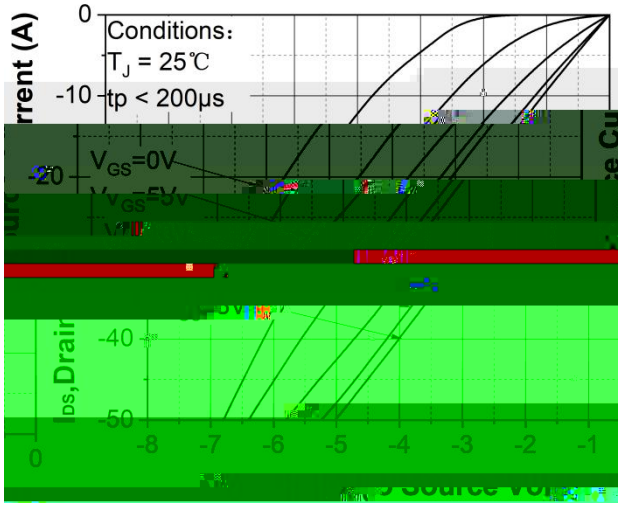


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

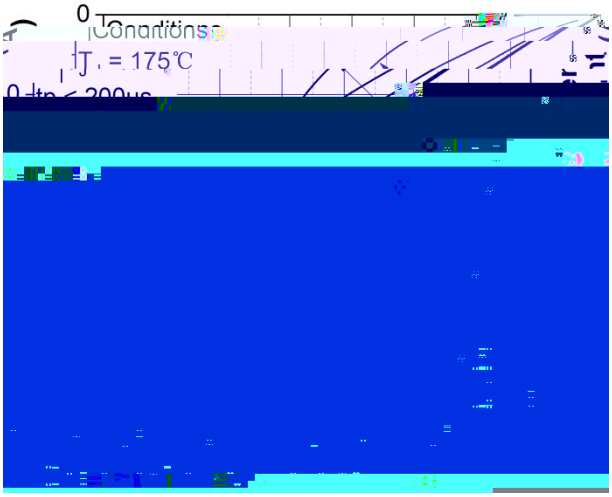


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

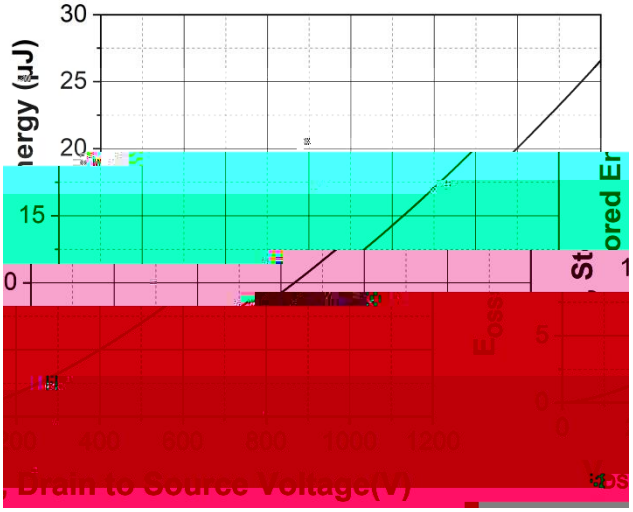


Figure 16. Output capacitor stored energy

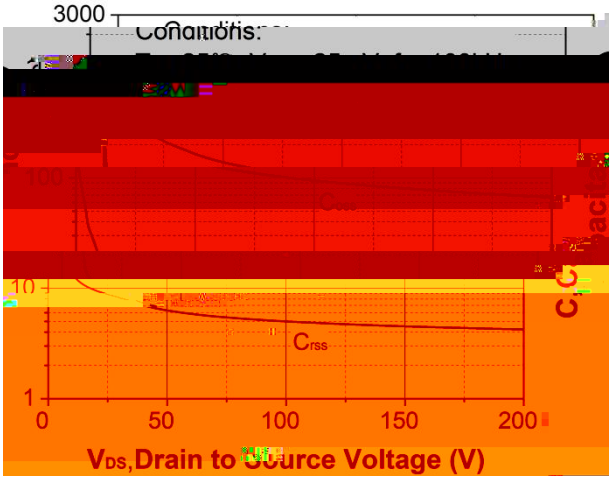


Figure 17. Capacitances vs. drain-source voltage (0 - 200V)

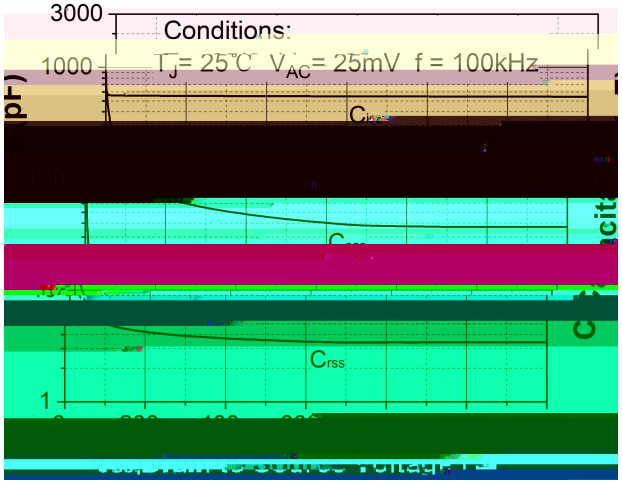


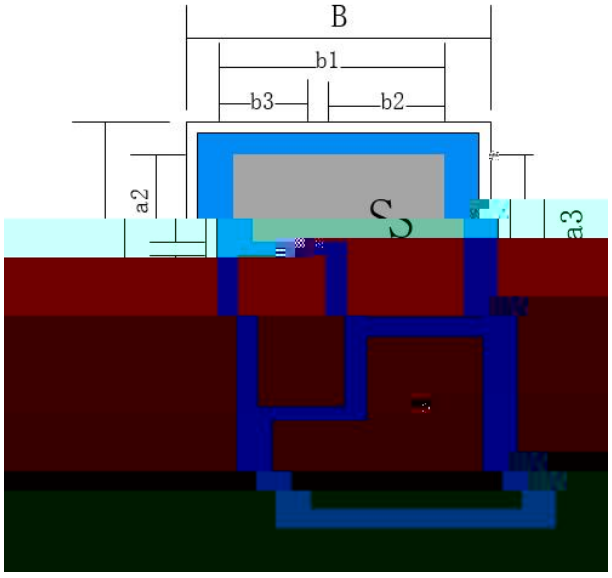
Figure 18. Capacitances vs. drain-source voltage (0 - 1200V)

4 Mechanical parameters

4.1 Dimensions and metallization

Parameter	Typical value	Unit	Metallization
Die size W x L	2.645 * 1.850	mm	
Gate pad size W x L	0.749 * 0.449	mm	
Die thickness	175	μm	
Top side source gate metallization	4	μm	Al
Back side drain metallization	1	μm	Ag

4.2 Layout



Symbol	Dimension / mm
B	1.850
b1	1.249
b2	0.750
b3	0.449
A	2.645
a1	0.749
a2	0.478
a3	0.900

5 Test con

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2026-05-11	Final	——

Attention

1. **RoHS compliance**

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/61كِ

7. Except as otherwise explicitly approved by Sichain in a written document signed by authorized representatives of Sichain, Sichain' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment,primary communication equipment,traffic lights,fire/crime prevention, safety equipment, medical systems, and power transmission systems.