SG2M040170BJ

TriQSiC™1700V 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

1 Maximum ratings

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DS,max}$	Drain source voltage	1700	V	V_{GS} = 0V, I_D = 100μA	
$V_{GS,max}$	Gate source voltage	-8 /+22	V	Absolute maximum values	Note1
$V_{GSpulse}$	Gate-source voltage,max. transient voltage	-10 /+25	V	$t_p \leq 0.5\mu s$, D 0.01	
V_{GSop}	Gate source voltage	-4 /+18	V	Recommended operational values	
I_D	Continuous drain current	66	A	V_{GS} = 18V, T_C = 25˚C	
		47		V_{GS} = 18V, T_C = 100˚C	
I_D(pulse)	Pulsed drain current	188	A	Pulse width t_P=100μs limited by $T_{J,max}$	
T_J ,T_{stg}	Operating Junction and storage v temperature	-55 to +175	˚C		

Note 1 wh

2 Electrical characteristics

2.1 Static characteristics

Table 4 Static characteristics (Tc = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-source breakdown voltage	1700	-	-	V	V_{GS} = 0V, I_D = 100μA	
$V_{GS(th)}$	Gate threshold voltage	2.5	3.1	4	V	V_{DS} = V_{GS}, I_D = 12mA	Fig.11
		-	2.4	-	V	V_{DS} = V_{GS}, I_D = 12mA T_J = 175°C	
I_{DSS}	Zero gate voltage drain current	-	-	10	μA	V_{DS} = 1700V, V_{GS} = 0V	
I_{GSS}	Gate source leakage current	-	-	100	nA	V_{GS} = 18V, V_{DS} = 0V	
$R_{DS(on)}$	Current drain-source on-state resistance	-	47	65	mΩ	V_{GS} = 15V, I_D = 38A	Fig.4,5,6
		-	91	-		V_{GS} = 15V, I_D = 38A, T_J = 175°C	
		-	40	52		V_{GS} = 18V, I_D = 38A	
		-	88	-		V_{GS} = 18V, I_D = 38A, T_J = 175°C	
g_{fs}	Transconductance	-	23	-	S	V_{DS} = 20V, I_D = 38A	Fig.7
		-	22	-		V_{DS} = 20V, I_D = 38A, T_J = 175°C	
$R_{g,int}$	Intenal gate resistance	-	1.4	-	Ω	V_{AC} = 25mV, f	

3 Electrical characteristic diagrams

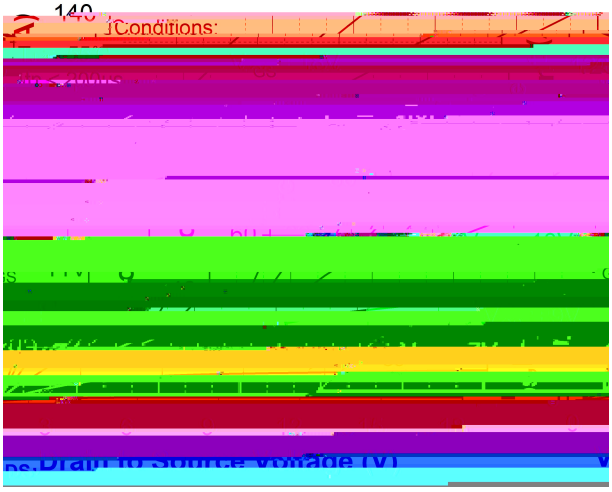


Figure 1. Output characteristics T_J = -55 ºC

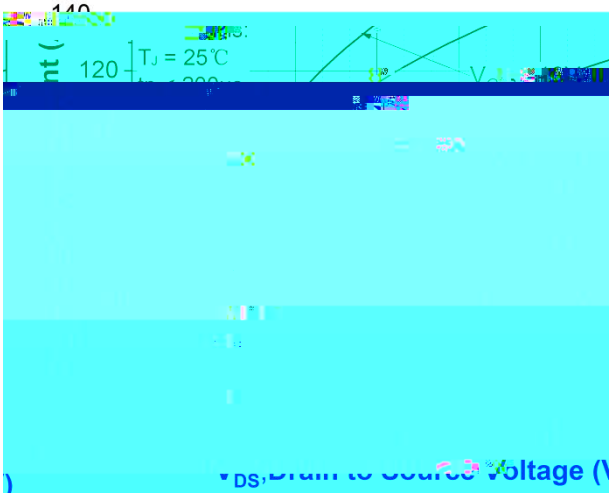


Figure 2. Output characteristics T_J = 25 ºC

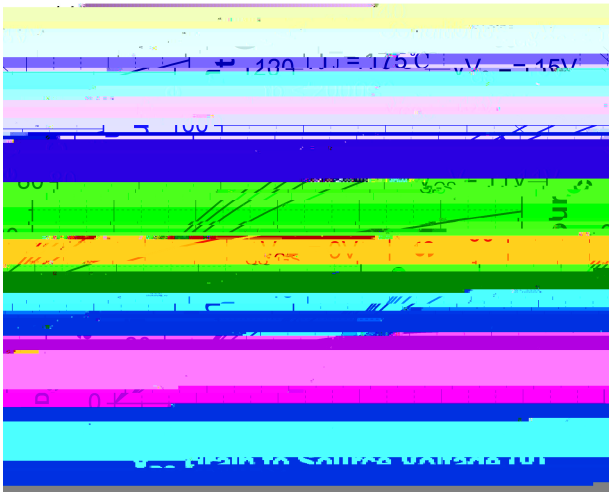


Figure 3. Output characteristics T_J = 175 ºC

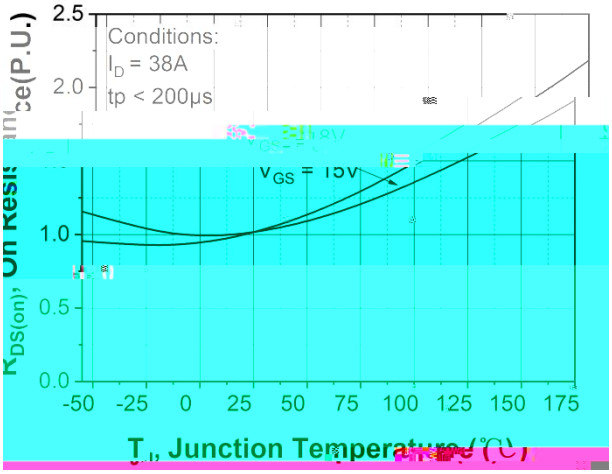


Figure 4. Normalized on-resistance vs. temperature

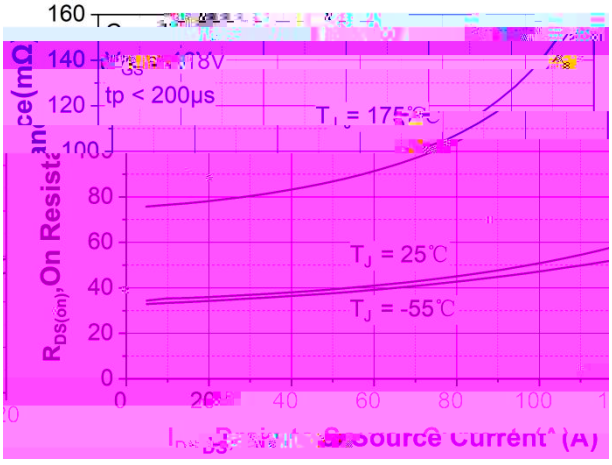


Figure 5. On-resistance vs. drain current for various temperatures

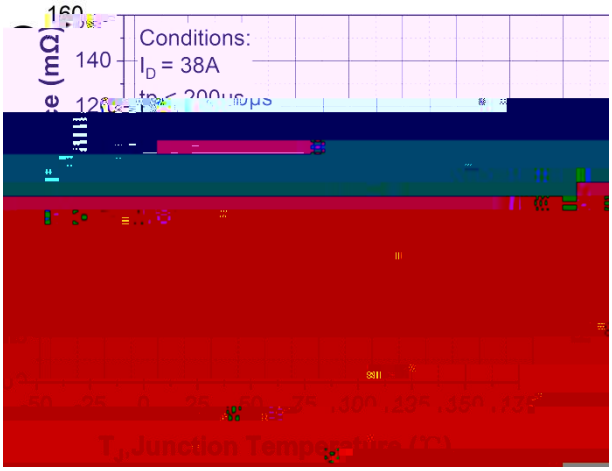


Figure 6. On-resistance vs. Temperature for various gate voltages

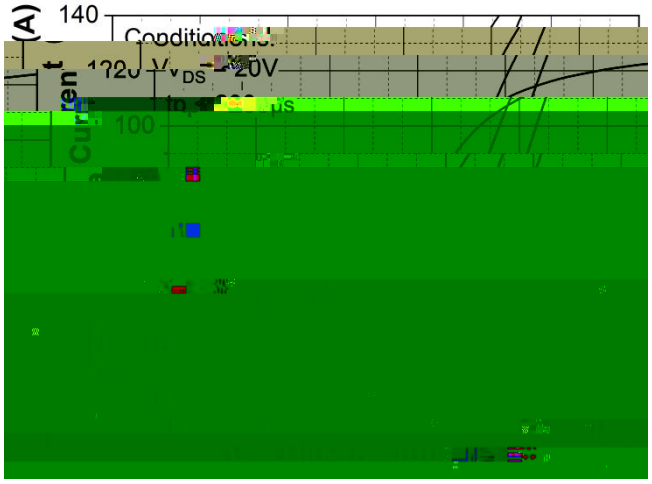


Figure 7. Transfer characteristic for various junction temperatures

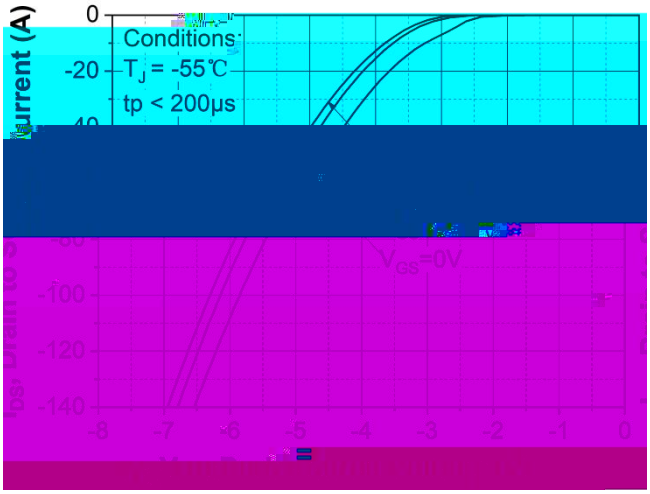


Figure 8. Body diode characteristic at T_J = -55 ºC

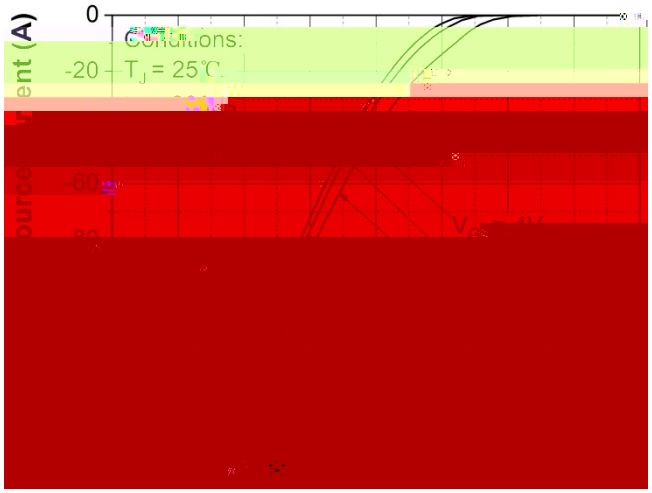


Figure 9. Body diode characteristic at T_J = 25 ºC

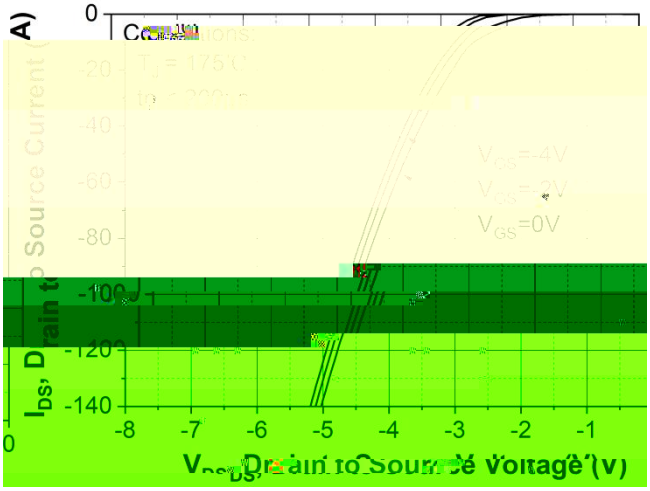


Figure 10. Body diode characteristic at T_J = 175ºC

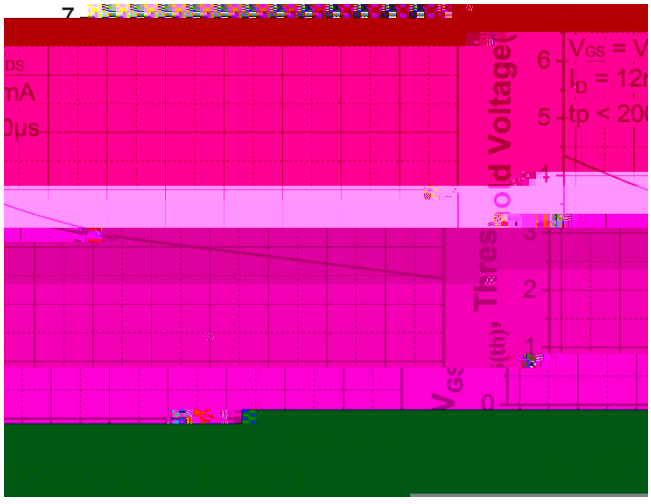


Figure 11. Threshold voltage vs. temperature

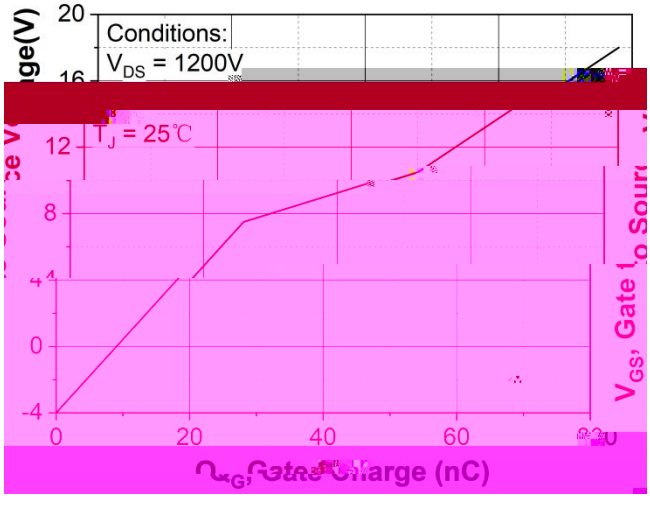


Figure 12. Gate charge characteristic

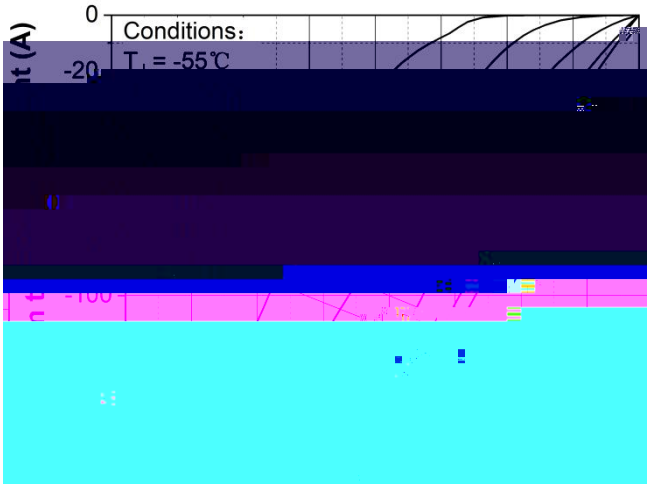


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

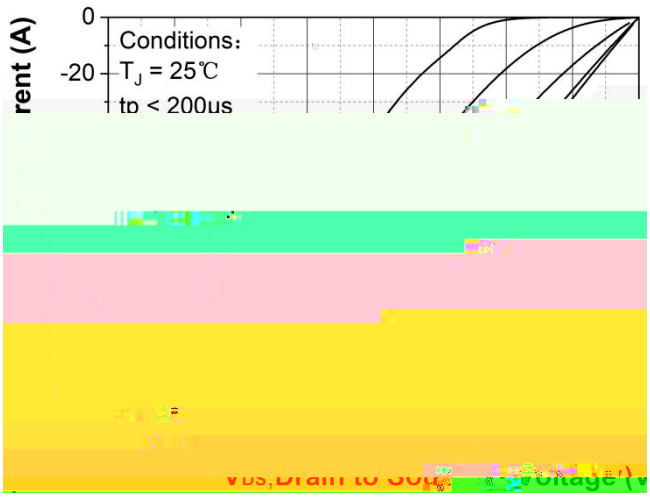


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

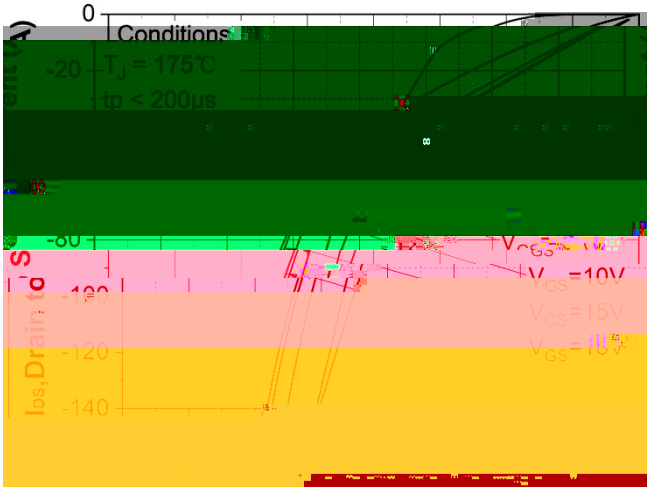


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

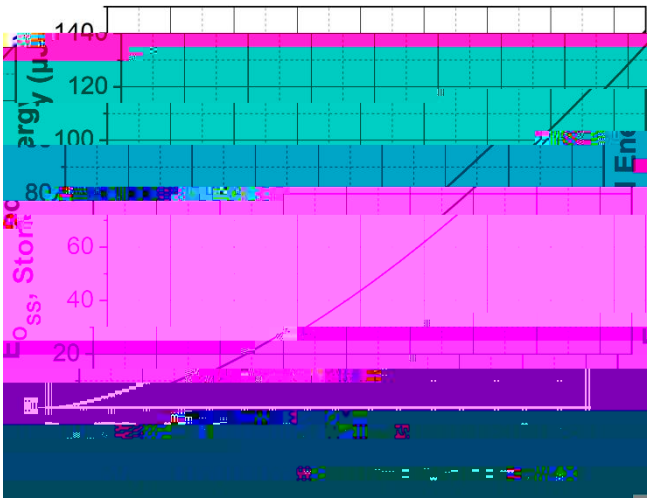


Figure 16. Output capacitor stored energy

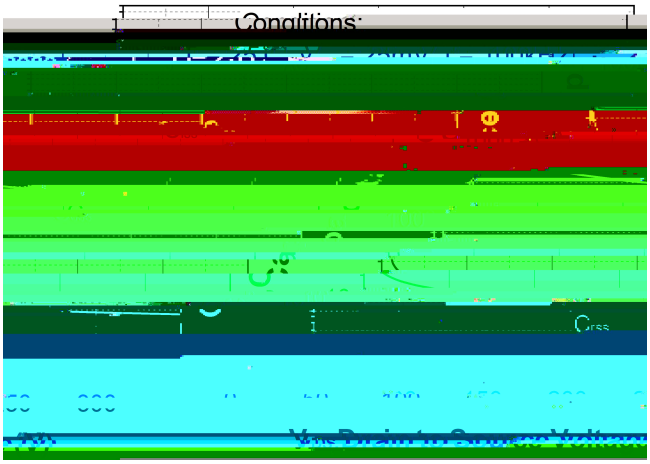


Figure 17. Capacitances vs. drain-source voltage (0 - 300V)

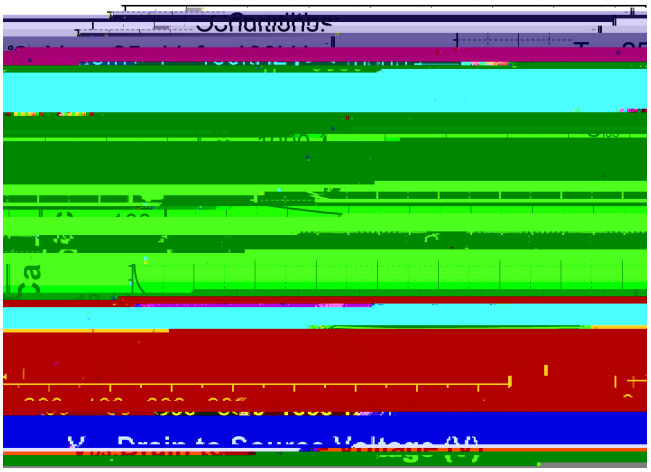


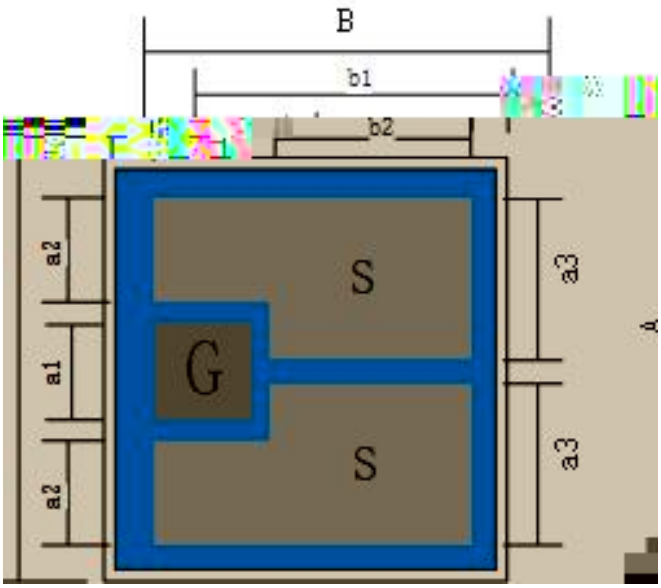
Figure 18. Capacitances vs. drain-source voltage (0 - 1700V)

4 Mechanical parameters

4.1 Dimensions and metallization

Parameter	Typical value	Unit	Metallization
Die size W x L	3.39 * 5.12	mm	
Gate pad size W x L	0.80 * 0.80	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	5.12
b1	4.38
b2	3.43
b3	0.80
A	3.39
a1	0.80
a2	0.80
a3	1.27

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2025-06-06	——	——
V01_01	2025-09-08	——	——
V01_02	2025-12-30	Final	——

Attention

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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.