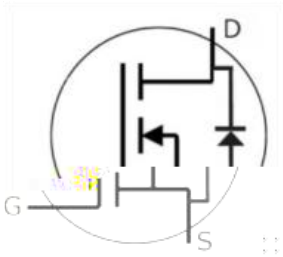
S3M013150BK-A

TriQSiC™1500V Silicon Carbide Power MOSFET G3 N Channel Enhancement

Features

- High speed switching
- Very low switching losses
- High blocking voltage with low on-resistance
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant



Part number	Die size W x L mm
S3M013150BK-A	4.8 * 6.3

Benefits

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

Applications

- EV motor drive
- PV string inverters
- Solar power optimizer
- Switch mode power supplies

Table 1 Key performance and package parameters

Type	V_{DS}	I_{DS} (T_C=25 , $R_{th\ (j\text{-}c),max}$ ≤ 0.26 °C/W)	$R_{DS(on),\ typ}$ (T_J=25 ,V_{GS} = 18V, I_D = 86A)	$T_{J,max}$
S3M013150BK-A	1500V	149A	13mΩ	175

1500V S0 Ű 0 Ű 0 Ű 0 t

2 Electrical characteristics

2.1 Static characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Unit

Q_{gs}	Gate source charge	-	57	-	nC	V_{DS} = 1000V, V_{GS} = -4/+18V I_D = 86A	Fig.12
Q_{gd}	Gate drain charge	-	47	-			
Q_g	Gate charge	-	179	-			

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	-	2407	-	μJ	V_{DS} = 1000V, V_{GS} = -4/+18V I_D = 86A, Rg = 2.5Ω, L = 16.7μH	
E_{off}	Turn off switching energy	-	1054	-			
$t_{d\ on}$	Turn on delay time	-	69	-	ns		
t_r	Rise time	-	21	-			
$t_{d\ off}$	Turn off delay time	-	93	-			
t_f	Fall time	-	20	-			

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	-	3.8	-	V	V_{GS} = -4V, I_{SD} = 43A	Fig.8,9, 10
		-	3.4	-	V	V_{GS} = -4V, I_{SD} = 43A T_J = 175°C	
I_S	Continuous diode forward current	-	132	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	69	-	ns	V_R = 1000V, V_{GS} = -4V I_D = 86A di/dt = 1683A/μs T_J = 175°C	
Q_{rr}	Reverse recovery charge	-	1028	-	nC		
I_{rrm}	Peak reverse recovery current	-	27	-	A		

Note2 : When using SiC Body Diode the maximum recommended V_{GS} = -4 V

3 Electrical characteristic diagrams

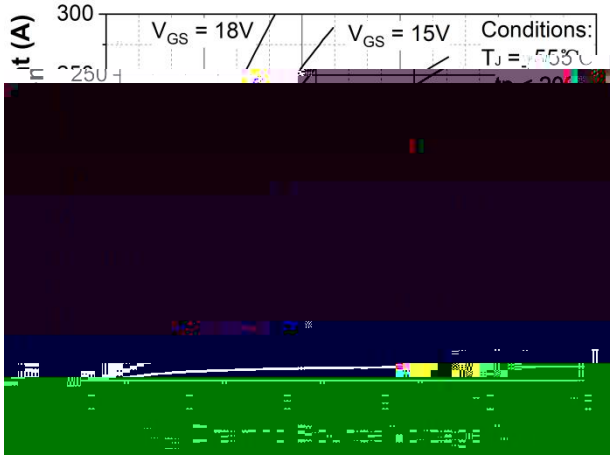


Figure 1. Output characteristics T_J = -55 ºC

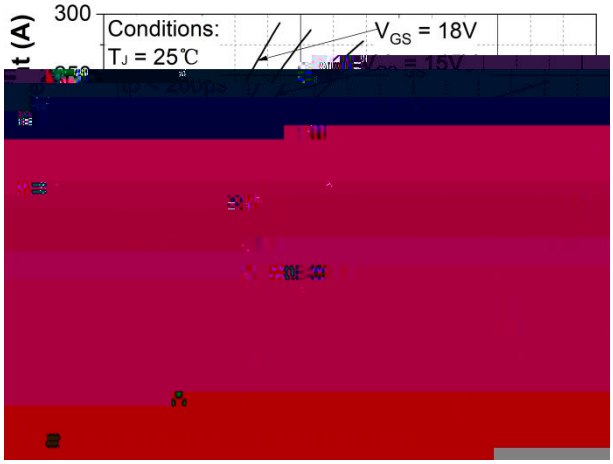


Figure 2. Output characteristics T_J = 25 ºC

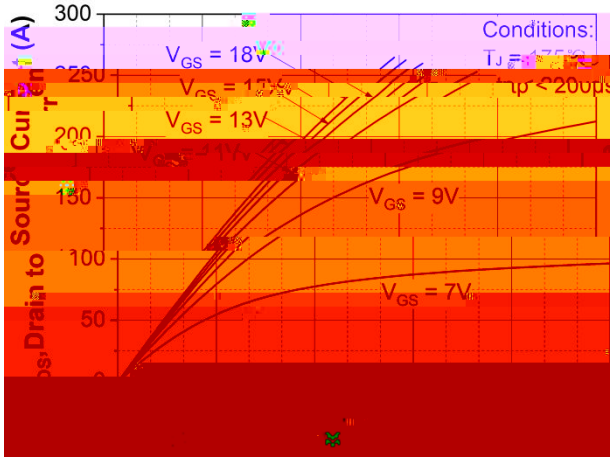


Figure 3. Output characteristics T_J = 175 ºC

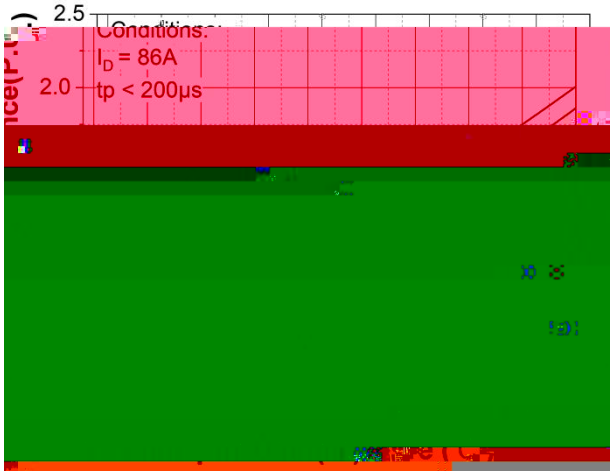


Figure 4. Normalized on-resistance vs. temperature

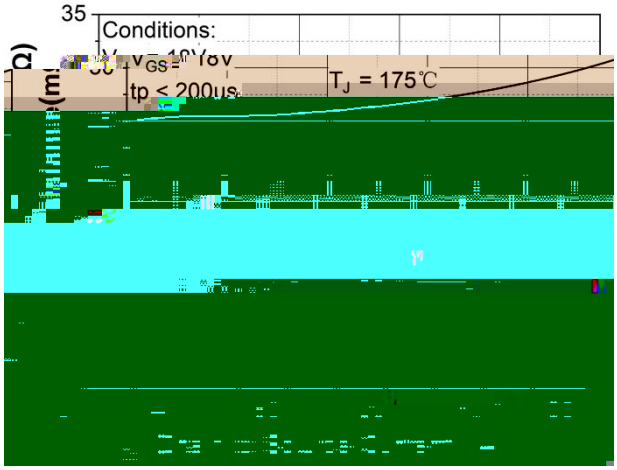


Figure 5. On-resistance vs. drain current for various temperatures

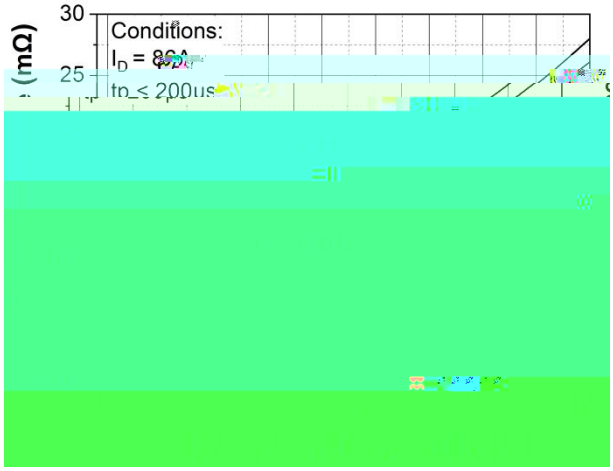


Figure 6. On-resistance vs. temperature for various gate voltages

Figure 7. Transfer characteristic for various junction temperatures

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

Figure 9. Body d

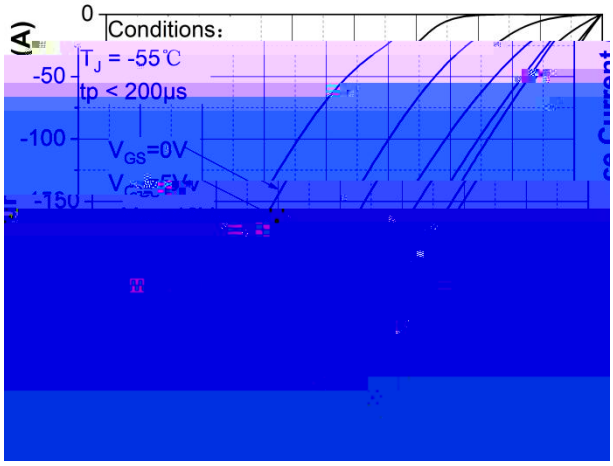


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

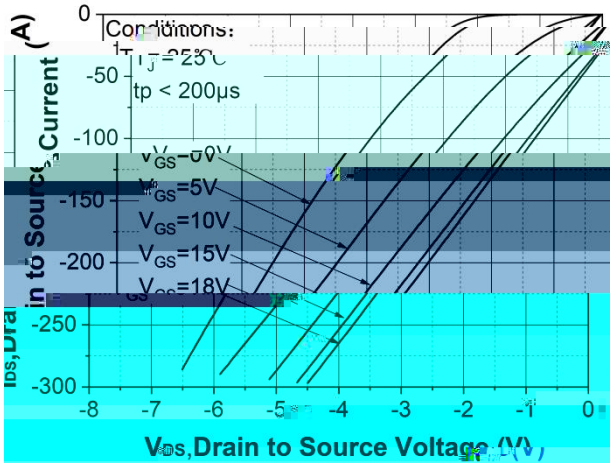


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

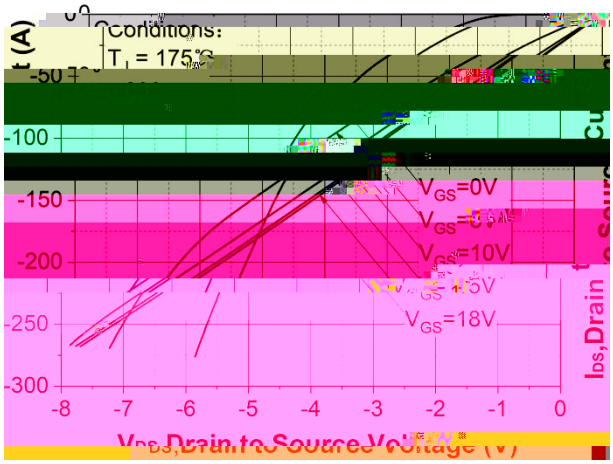


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

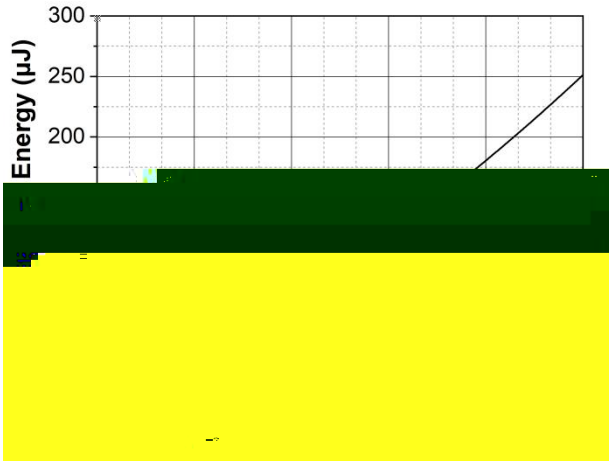


Figure 16. Output capacitor stored energy

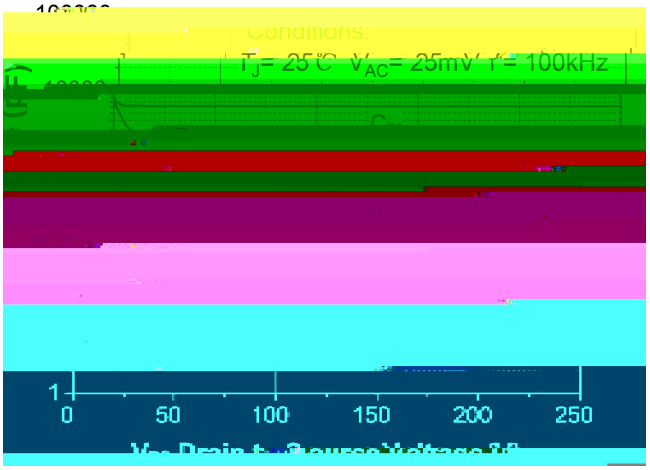


Figure 17. Capacitances vs. drain-source voltage (0 - 250V)

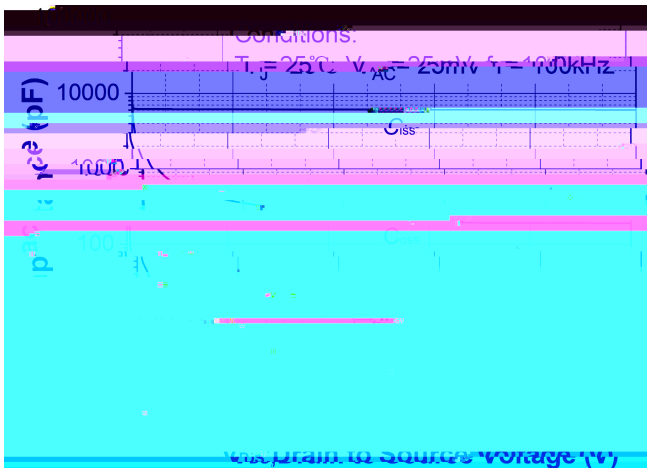


Figure 18. Capacitances vs. drain-source voltage (0 - 1500V)

S3MC 150BK-A

1500V Si ver MOSFET

4



5 Test conditions

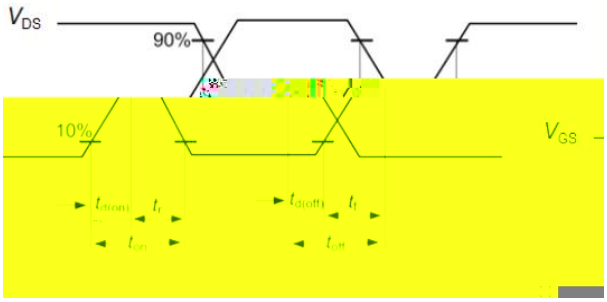


Figure A. Definition of switching times

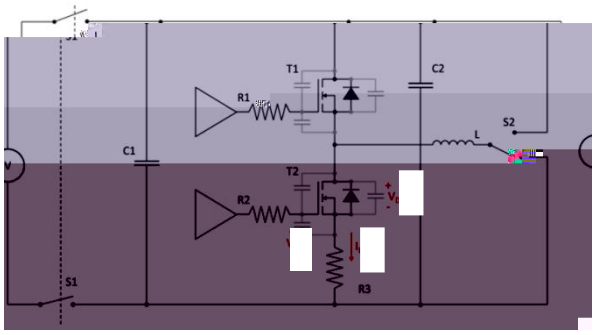


Figure B. Dynamic test circuit

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2026-06-29	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 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2. **REACH compliance**

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Sichain representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

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4. Any information given in this documents subject to customer's compliance with its obligations and any applicable legal requirements, norms and standards concerning any use of the product of Sichain in any customer's applications.

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6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sichain office.

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