S3M0

TriQSiC

Features

- High speed sw
- Very low swit
- High blocking vol w on-re
- Temperature independ osses
- Halogen free, RoHS compliant

Benefits

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

Applications

- EV motr e D D "

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1 Maximum r

3 Electrical characteristics

3.1 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	650	-	-	V	V_{GS} = 0V, I_D = 100μA	
$V_{GS(th)}$	Gate threshold voltage	2.7	3.5	4.2	V	V_{DS} = V_{GS}, I_D =	

Q_{gs}	Gate source charge	-	10	-	nC	V_{DS} = 400V, V_{GS} = -4/+15V I_D = 12A	Fig.12
Q_{gd}	Gate drain charge	-	7	-			
Q_g	Gate charge	-	21	-			

3.3 Switching characteristics

Table 6 Dynamic characteristics(Tc = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
E_{on}	Turn on switching energy	-	48	-	μJ	V_{DS} = 400V, V_{GS} = -4/+15V I_D = 12A, Rg = 2.5Ω, L = 120μH	Fig.26
E_{off}	Turn off switching energy	-	12	-			
$t_{d\ on}$	Turn on delay time	-	10	-	ns		Fig.27
t_r	Rise time	-	11	-			
$t_{d\ off}$	Turn off delay time	-	14	-			
t_f	Fall time	-	8	-			

Table 7 Body diode characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode forward voltage	-	3.6	-	V	V_{GS} = -4V, I_{SD} = 6A	Fig.8,9, 10
		-	3.2	-	V	V_{GS} = -4V, I_{SD} = 6A T_J = 175°C	
I_S	Continuous diode forward current	-	29	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	26	-	ns	V_R = 400V, V_{GS} = -4V I_D = 12A di/dt = 1453A/μs T_J = 175°C	
Q_{rr}	Reverse recovery charge	-	117	-	nC		
I_{rrm}	Peak reverse recovery current	-	10	-	A		

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

4 Electrical characteristic diagrams

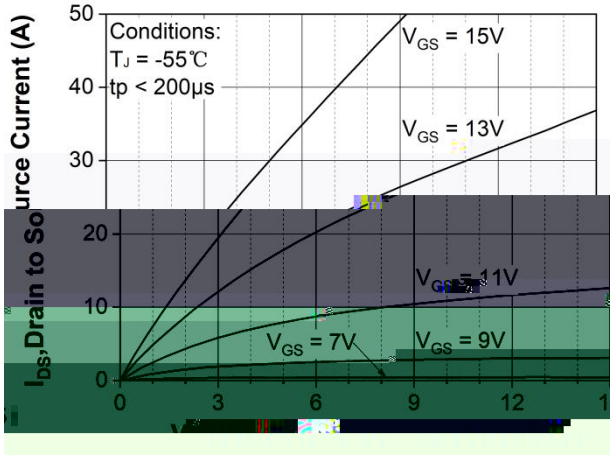


Figure 1. Output characteristics T_J = -55 ºC

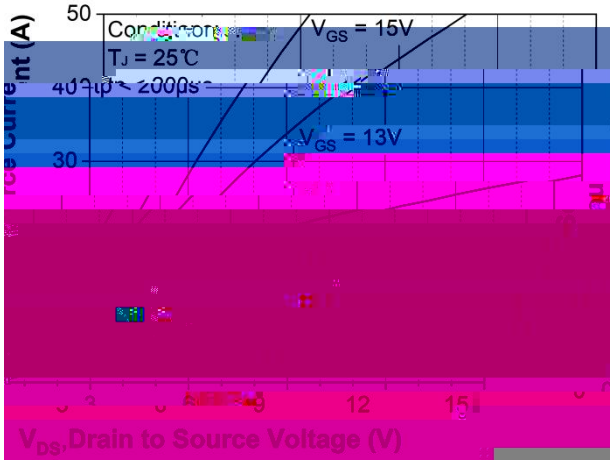


Figure 2. Output characteristics T_J = 25 ºC

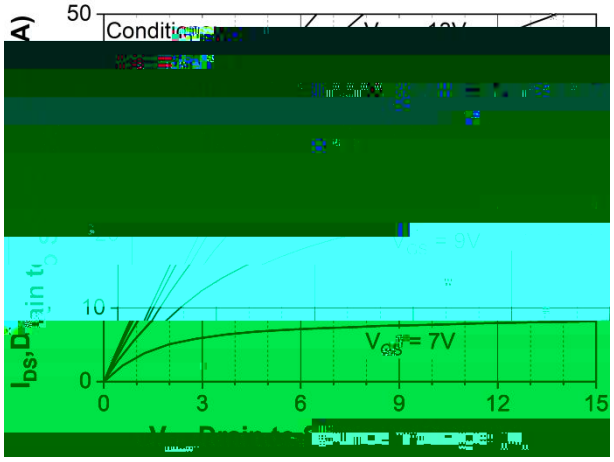


Figure 3. Output characteristics T_J = 175 ºC

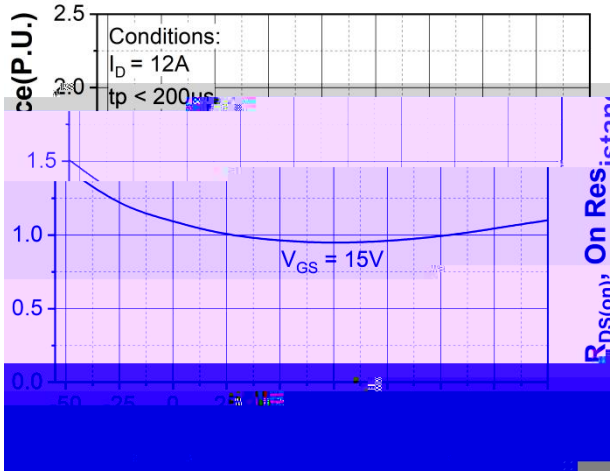


Figure 4. Normalized on-resistance vs. temperature

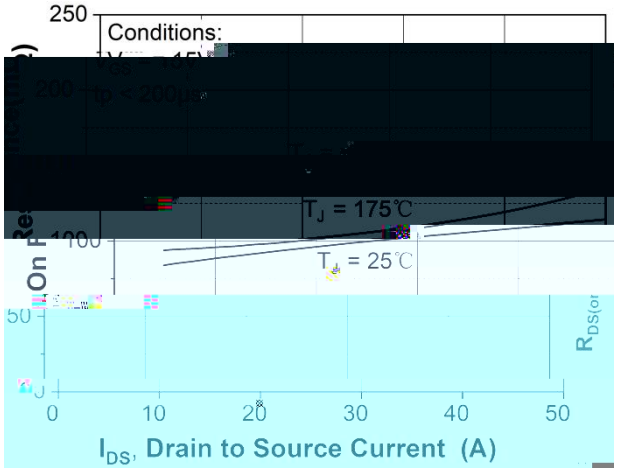


Figure 5. On-resistance vs. drain current for various temperatures

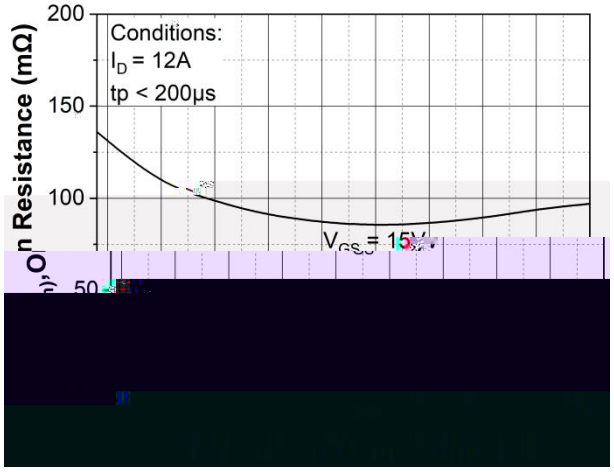


Figure 6. On-resistance vs. temperature for various gate voltages

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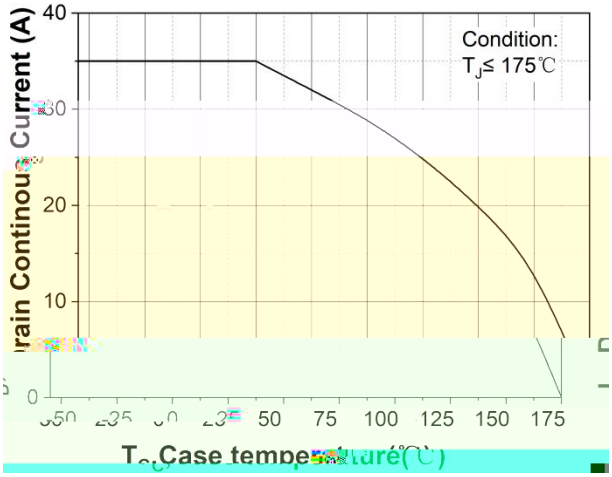


Figure 19. Continuous drain current derating vs. case temperature

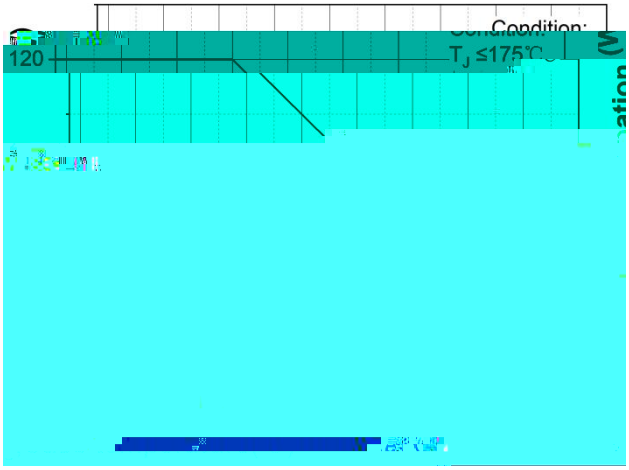


Figure 20. Maximum power dissipation derating vs. case temperature

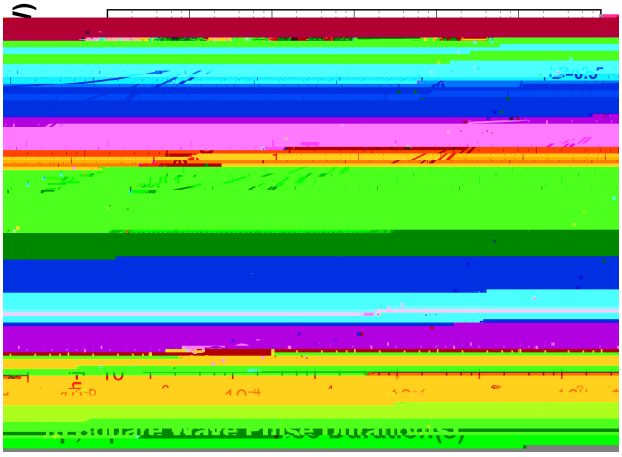


Figure 21. Transient thermal impedance (junction - case)

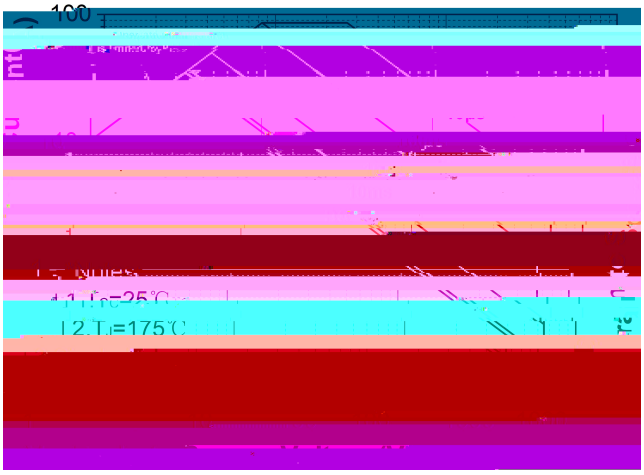


Figure 22. Safe operating area

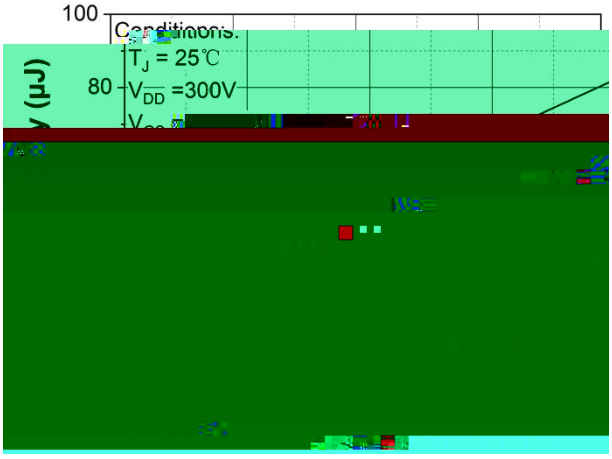


Figure 23. Clamped Inductive switching energy vs. drain current (V_{DD} = 300V)

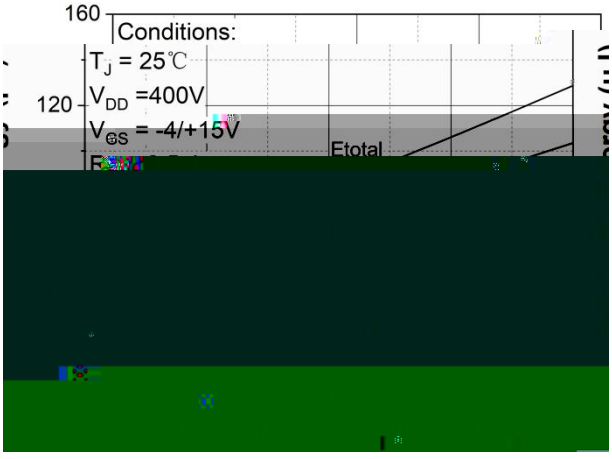


Figure 24. Clamped inductive switching energy vs. drain current (V_{DD} = 400V)

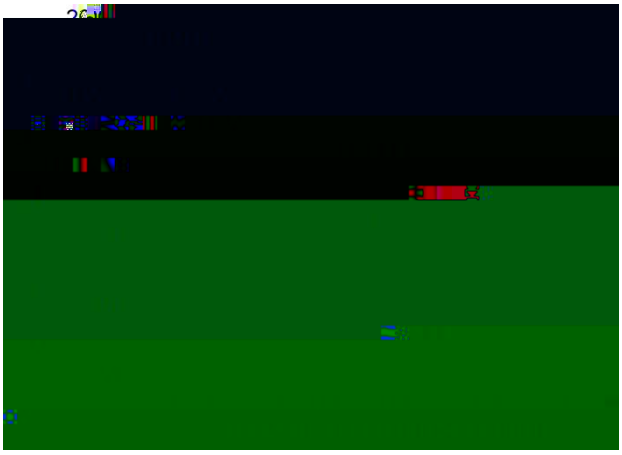


Figure 25. Clamped inductive switching energy vs. R_G (ext)

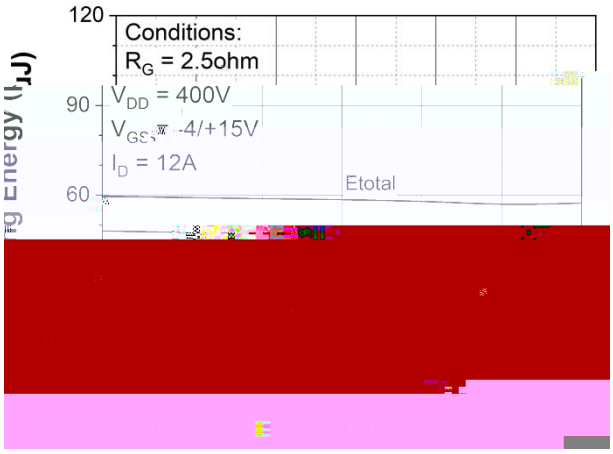


Figure 26. Clamped inductive switching energy vs. temperature

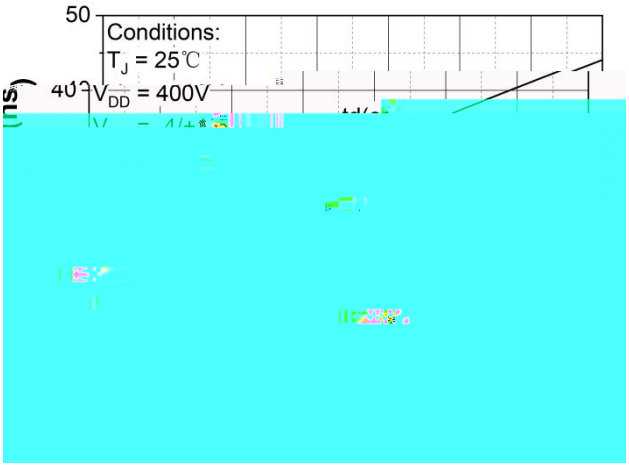
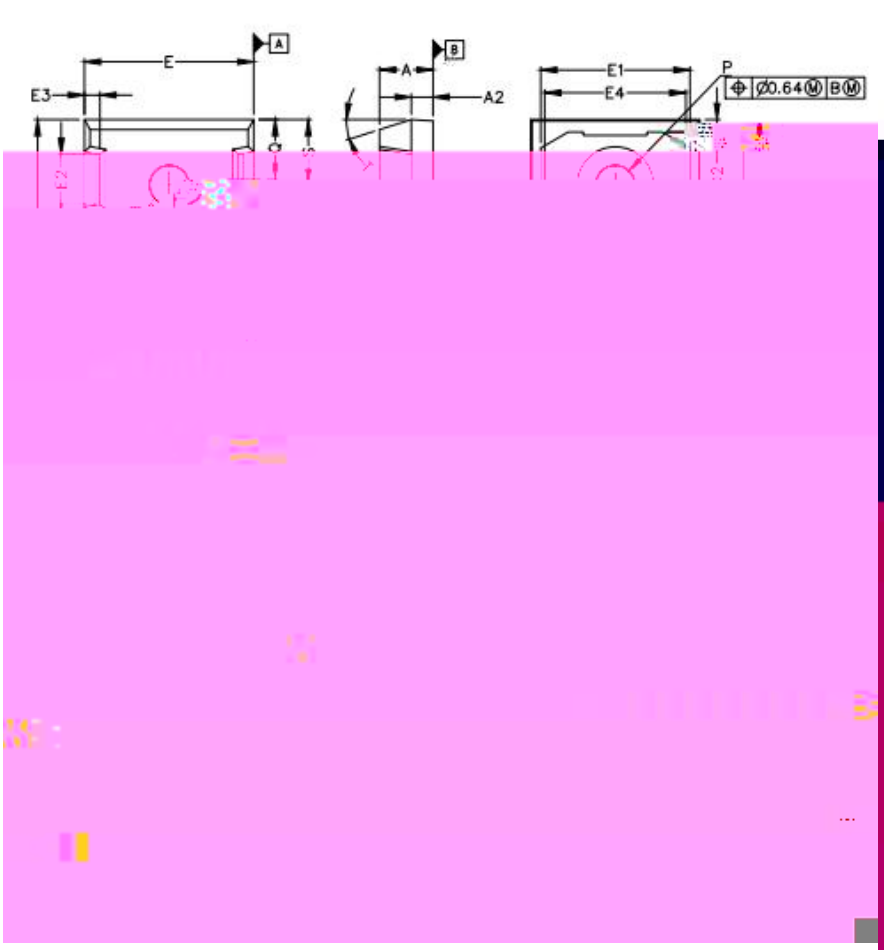


Figure 27. Switching times vs. R_G (ext)

5 Package drawing (TO-247-4L-C)



NOTE ;
1. ALL METAL SURFACES: TIN PLATED,EXCEPT AREA OF CUT
2. DIMENSIONING & TOLERANCEING CONFIRM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE IN MILLIMETER ANGLES ARE IN DEGREE

S3M009075LK

Datasheet

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2026-01-27	——	——
V01_01	2026-02-02	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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