S3M007075NK-A

TriQSiC™750V Silicon Carbide Power MOSFET G3 N Channel Enhancement

Features

- High speed switching
- Very l

Table of contents

Features **1**

Benefits **1**

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	750	V	V_{GS} = 0V, I_D = 100 μA	
$V_{GS,max}$	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	219	A	V_{GS} = 18V, T_C = 25˚C	
		155		V_{GS} = 18V, T_C = 100˚C	
$I_{D(pulse)}$	Pulsed drain current	656	A	Pulse width tp=100μs limited by $T_{J,max}$	
T_J , T_{stg}	Operating Junction and storage temperature	-55 to +175	˚C		

Note 1 when using MOSFET Body Diode $V_{GS,max}$ = -4 / +22V

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Datasheet

Q_{gs}	Gate source charge	-	80	-	nC	V_{DS} = 500V, V_{GS} = -4/+18V I_D = 96A	Fig.12
Q_{gd}	Gate drain charge	-	52	-			
Q_g	Gate charge	-	262	-			

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	-	1605	-	μJ	V_{DS} = 500V, V_{GS} = -4/+18V I_D = 96A, Rg = 2.5Ω, L = 16.7μH	
E_{off}	Turn off switching energy	-	1256	-			
$t_{d\ on}$	Turn on delay time	-	30	-	ns		
t_r	Rise time	-	61	-			
$t_{d\ off}$	Turn off delay time	-	140	-			
t_f	Fall time	-	28	-			

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	-	3.5	-	V	V_{GS} = -4V, I_{SD} = 48A	Fig.8,9, 10
		-	3.1	-	V	V_{GS} = -4V, I_{SD} = 48A T_J = 175°C	
I_S	Continuous diode forward current	-	152	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	60	-	ns	V_R = 500V, V_{GS} = -4V I_D = 96A di/dt = 2286A/μs T_J = 175°C	
Q_{rr}	Reverse recovery charge	-	873	-	nC		
I_{rrm}	Peak reverse recovery current	-	37	-	A		

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

3 Electrical characteristic diagrams

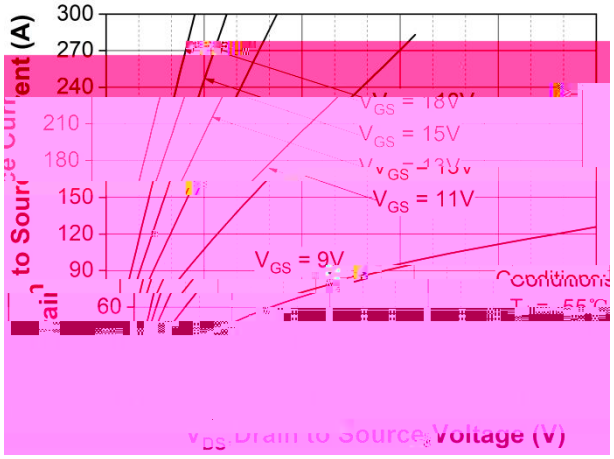


Figure 1. Output characteristics T_J = -55 ºC

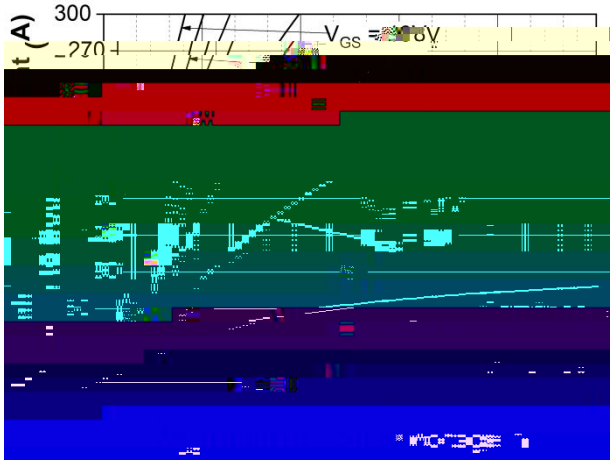


Figure 2. Output characteristics T_J = 25 ºC

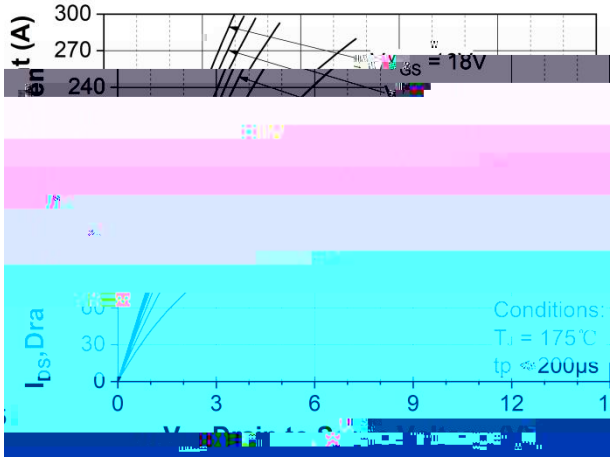


Figure 3. Output characteristics T_J = 175 ºC

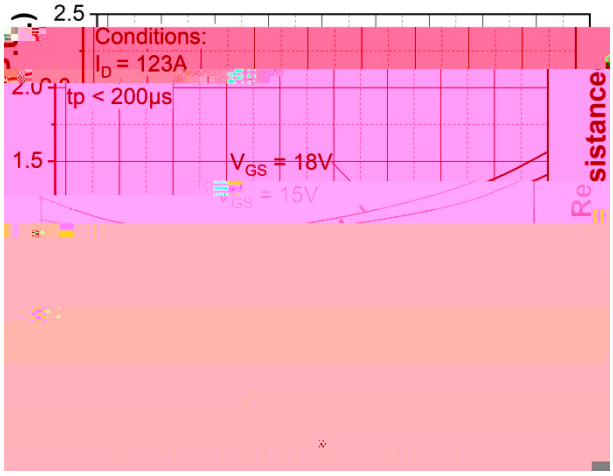


Figure 4. Normalized on-resistance vs. temperature

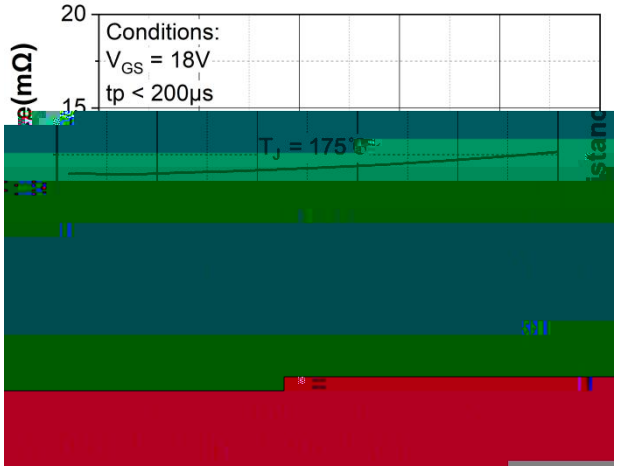


Figure 5. On-resistance vs. drain current for various temperatures

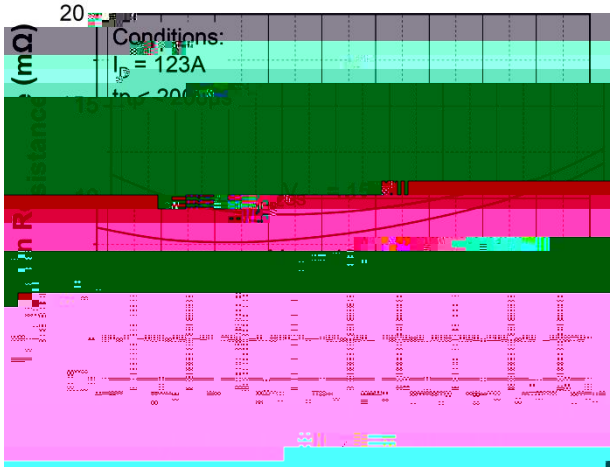


Figure 6. On-resistance vs. temperature for various gate voltages

Figure 7. Transfer characteristic for various junction temperatures

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

Figure 9. Body 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 c harge

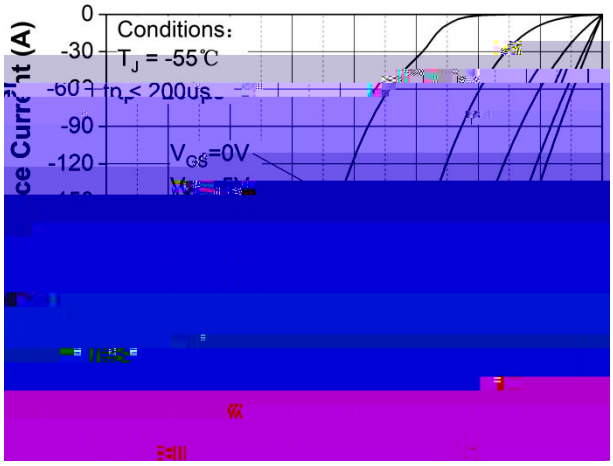


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

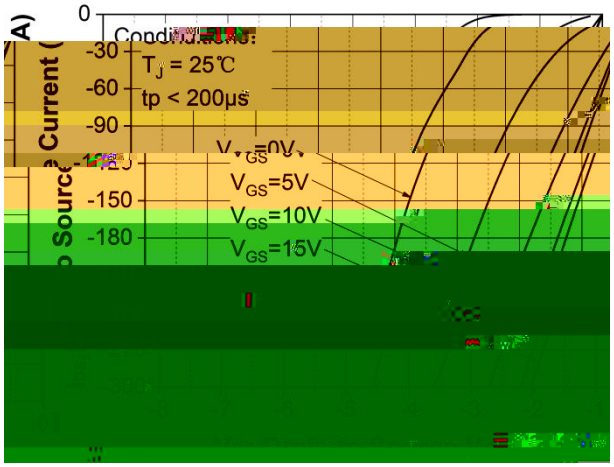


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

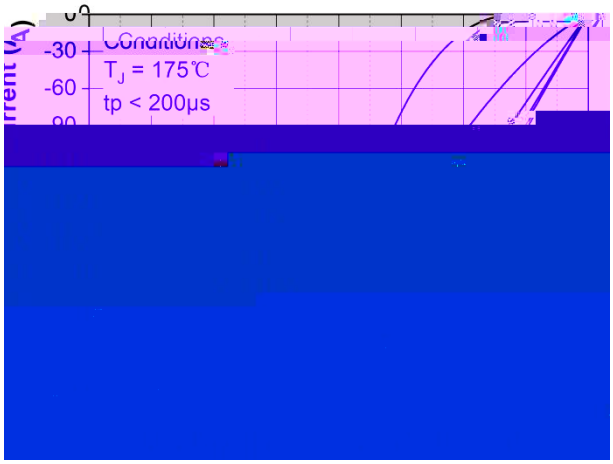


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

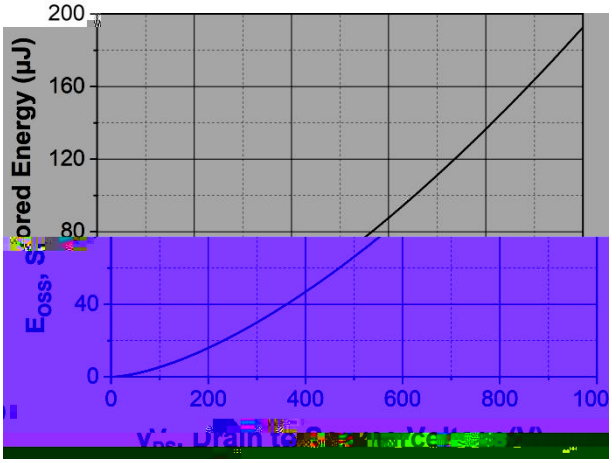


Figure 16. Output capacitor stored energy

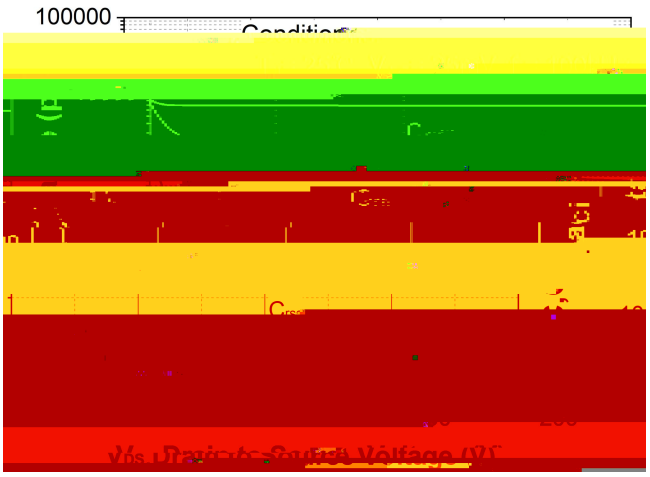


Figure 17. Capacitances vs. drain-source voltage (0 - 200V)

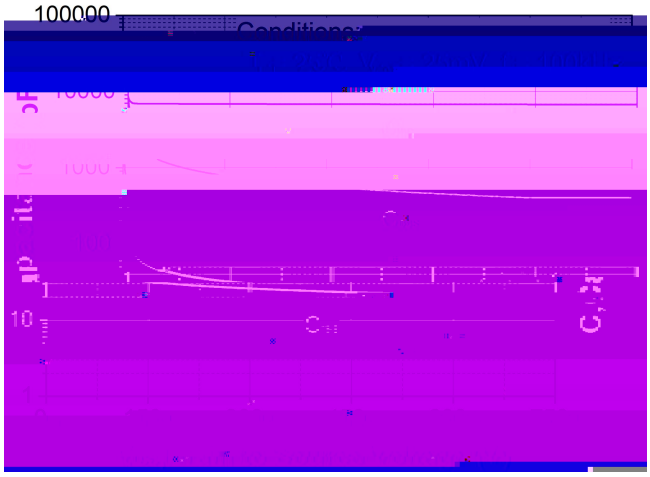


Figure 18. Capacitances vs. drain-source voltage (0 - 750V)

5 Test conditions

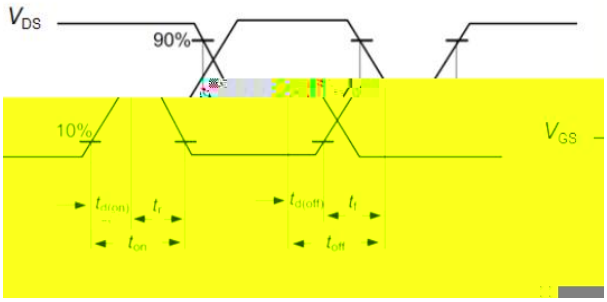


Figure A. Definition of switching times

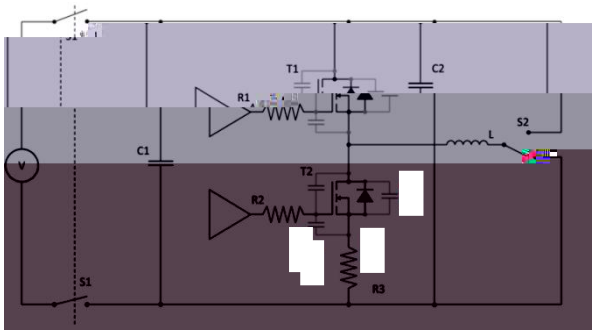


Figure B. Dynamic test circuit

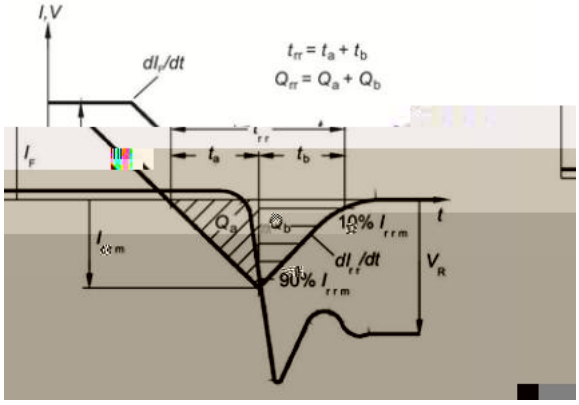


Figure C. Definition of body diode switching characteristics

Revision history

Document version	Date of release

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