

1700V 5A N-Channel SIC Power MOSFET

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Ultra-Low Drain-Gate Capacitance
- Halogen free, RoHs compliant

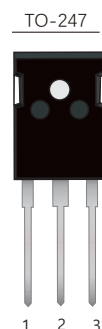
Mechanical Data

- Case:TO-247 Package

Application

- Switch mode power supplies
- Auxiliary Power Supplies
- Motor drives
- High voltage DC/DC converters

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
1700V	1000 @ 20V 2A	5	5.2nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

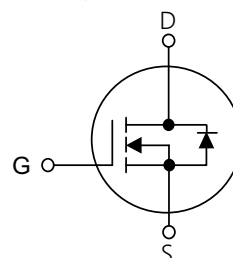


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	1700	V
Gate-Source Voltage(Max)	V _{GS(max)}	-10/+25	V
Recommend Gate-Source Voltage	V _{GSop}	-5/+20	V
Continuous Drain Current	I _D	T _C =25°C	5.0
		T _C =100°C	3.5
Pulsed Drain Current @tp=1ms (Note 1)	I _{DM}	6.0	A
Power Dissipation T _C =25°C	P _D	69	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +150	°C

Table 2.Thermal Characteristics

Parameter	Symbol	KWSC1000N170P	Unit
Thermal resistance Junction to Case,Max	R _{θJC}	2.0	°C/W
Thermal resistance Junction to Ambient,Max	R _{θJA}	40	°C/W

Table 3. Electrical Characteristics (T_J=25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =100μA	1700	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =1700V,V _{GS} =0V	-	1	100	μA
Gate- Source Leakage Current	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	250	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =1mA	2.5	3.0	4.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =20V,I _D =2A,T _J =25°C	-	1.0	1.3	Ω
		V _{GS} =20V,I _D =2A,T _J =150°C	-	1.5	-	
Gate Resisitance	R _G	f=1MHz	-	22	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} =1000V,V _{GS} =0V, f=1MHz,V _{AC} =25mV	-	186	-	pF
Output Capacitance	C _{OSS}		-	12	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	1.6	-	pF
COSS Stored Energy	E _{OSS}		-	6.2	-	μJ
Turn-on switching energy	E _{ON}	V _{DS} =1200V,I _D =2A,L=1500μH	-	48	-	μJ
Turn-off switching energy	E _{OFF}	V _{GS} = -4/+20V,R _G =2.5Ω,T _J =25°C	-	18	-	μJ
Turn-On Delay Time	td(on)	V _{DS} =1200V,I _D =2A V _{GS} = -4/+20V,R _G =2.5Ω, R _L =600Ω,T _J =25°C	-	5.2	-	ns
Turn-On Rise Time	t _R		-	9.4	-	ns
Turn-Off Delay Time	td(off)		-	13.2	-	ns
Turn-Off Fall Time	t _f		-	22.0	-	ns
Total Gate Charge	Q _G	V _{DD} =1200V,I _D =2A, V _{GS} = -5/20V	-	5.2	-	nC
Gate-Source Charge	Q _{GS}		-	7.3	-	nC
Gate-Drain Charge	Q _{GD}		-	21.8	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = -5V,I _S =1A	-	4.2	-	V
Continuous Diode Forward Current	I _S	T _C =25°C	-	-	4	A
Reverse Recovery Time	t _{rr}	V _{GS} = -5V, V _R =1200V, I _{SD} =2A	-	25	-	ns
Recovered charge	Q _{rr}		-	15	-	nC
Peak reverse recovery current	I _{rrm}		-	2.8	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width ≤300μS, Duty cycle ≤2%

Typical Characteristics Diagrams

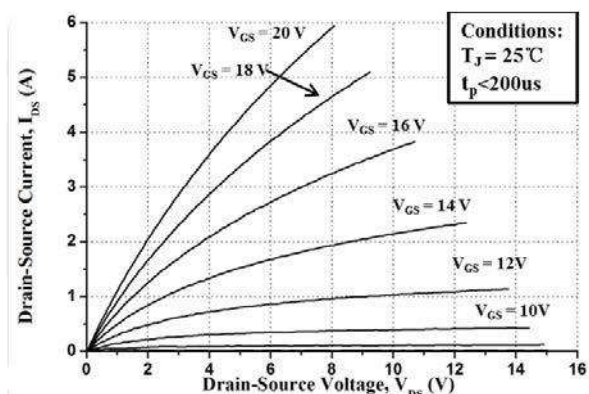


Figure 1. Output Characteristics $T_j = 25\text{ }^{\circ}\text{C}$

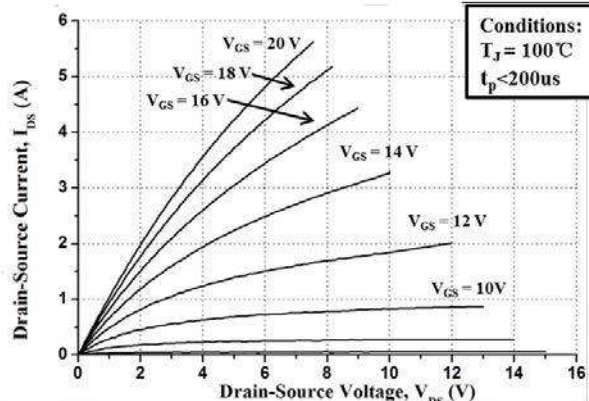


Figure 2. Output Characteristics $T_j = 100\text{ }^{\circ}\text{C}$

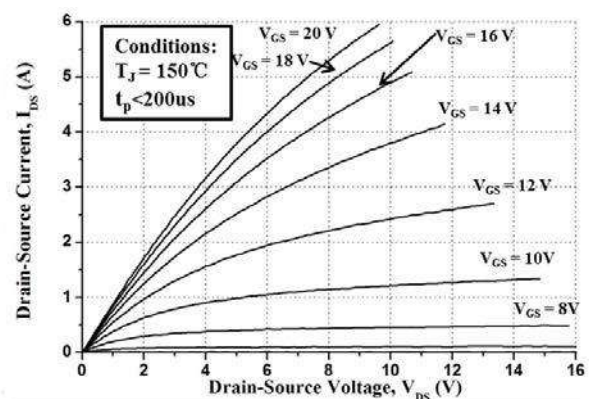


Figure 3. Output Characteristics $T_j = 150\text{ }^{\circ}\text{C}$

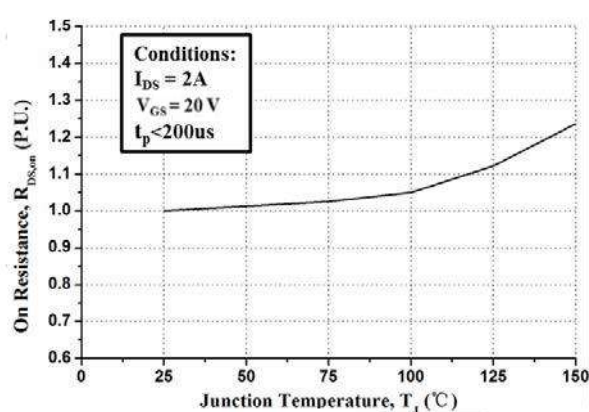


Figure 4. Normalized On-Resistance vs. Temperature

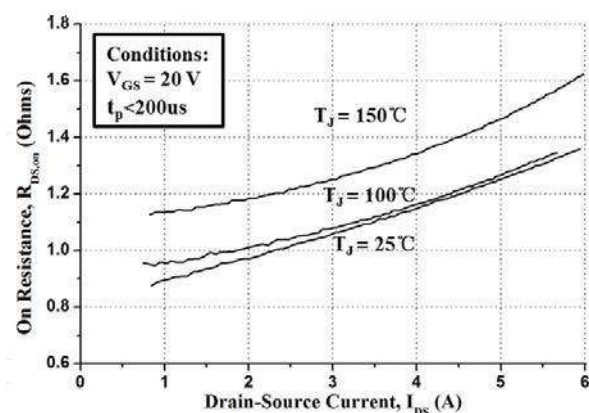


Figure 5. On-Resistance vs. Drain Current for Various Temperatures

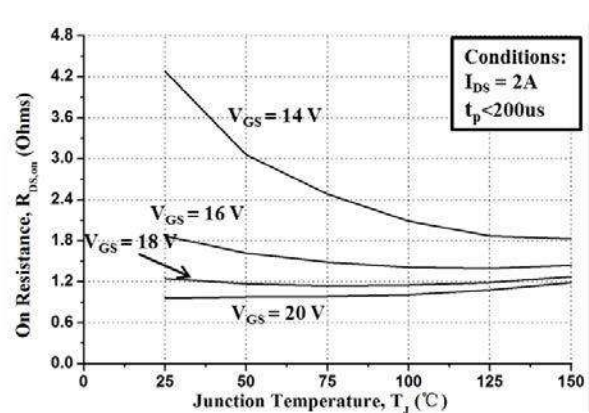


Figure 6. On-Resistance vs. Temperature for Various Gate Voltages

Typical Characteristics Diagrams

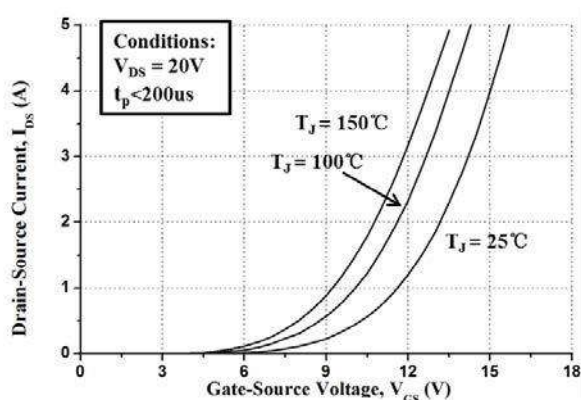


Figure 7. Transfer Characteristics for Various Junction Temperatures

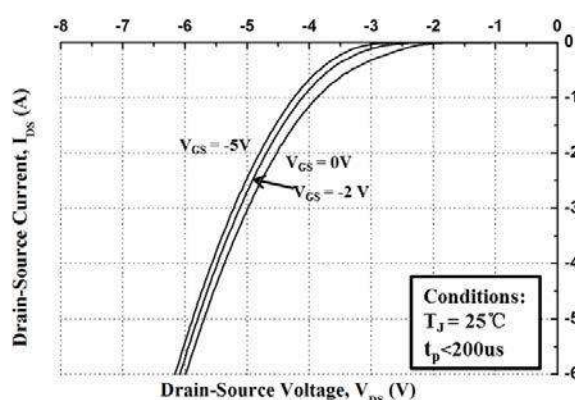


Figure 8. Body Diode Characteristics at 25 °C

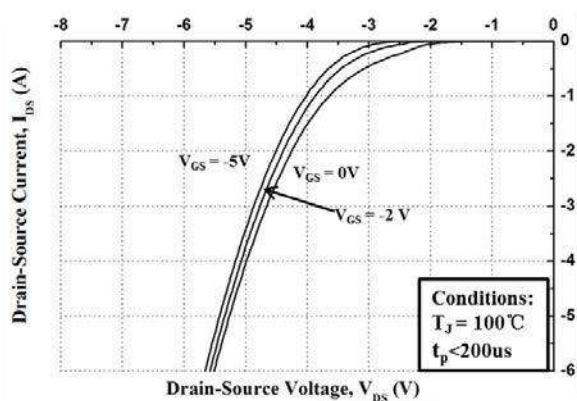


Figure 9. Body Diode Characteristics at 100 °C

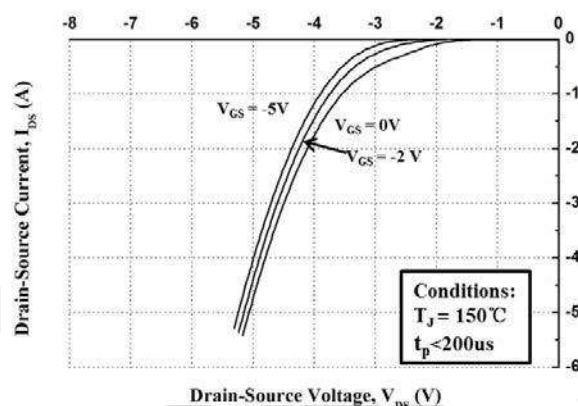


Figure 10. Body Diode Characteristics at 150 °C

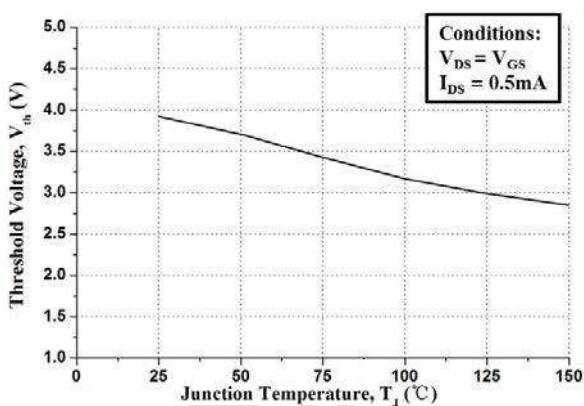


Figure 11. Threshold Voltage vs. Temperature

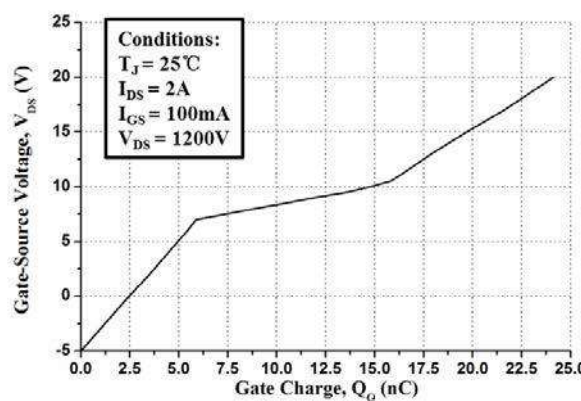


Figure 12. Gate Charge Characteristics

Typical Characteristics Diagrams

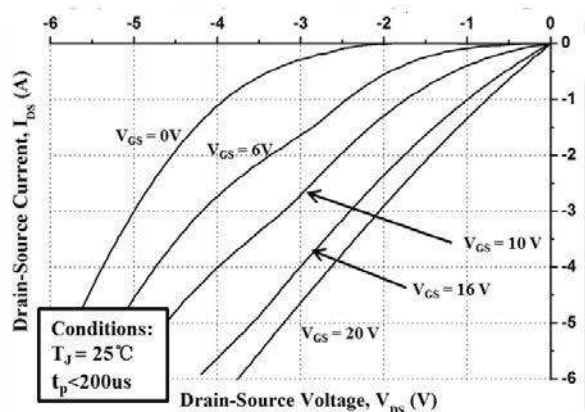


Figure 13. 3rd Quadrant Characteristics at 25 °C

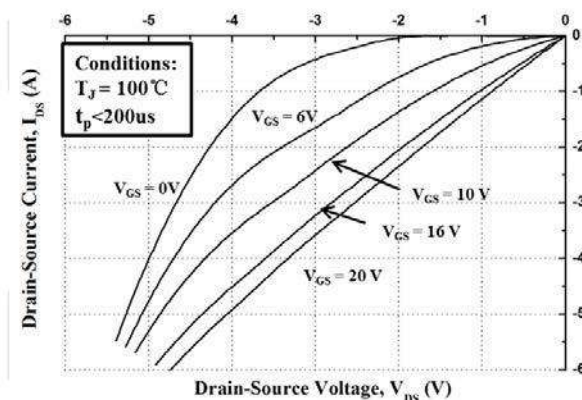


Figure 14. 3rd Quadrant Characteristics at 100 °C

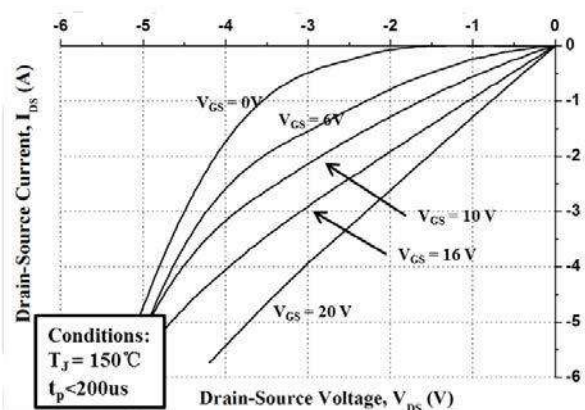


Figure 15. 3rd Quadrant Characteristics at 150 °C

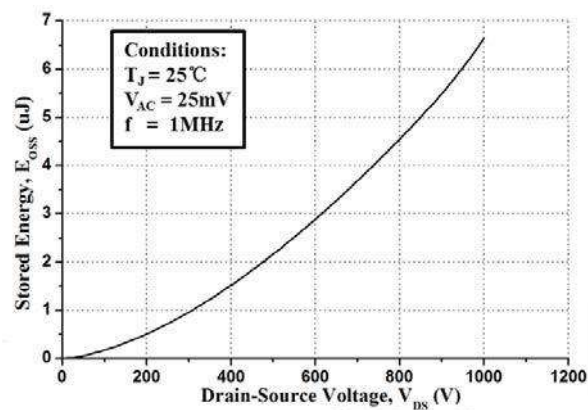


Figure 16. Output Capacitor Stored Energy

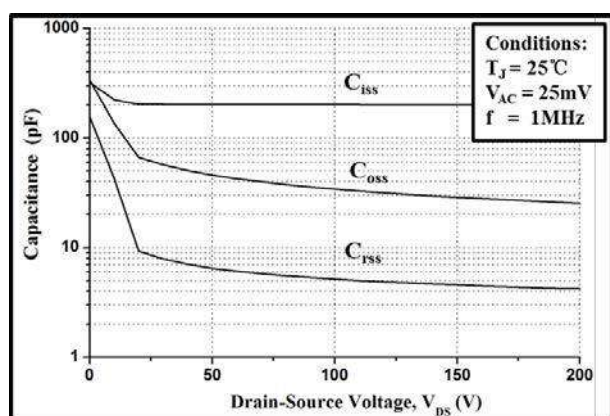


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

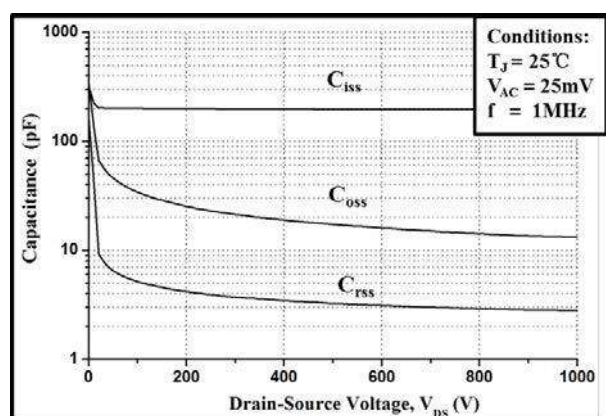


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

Dimensions

TO-247 package

