SEMICONDUCTOR

SC160N120P

1200V 19A N-Channel SIC Power MOSFET

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- High operating junction temperature capability
- Very fast and robust intrinsic body diode
- Kelvin gate input easing driver circuit design

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Typ)
1200V	160 @ 20V 20A	19	9.9nc

TO-247



Mechanical Data

- Case:TO-247 Package

Application

- Switch mode power supplies
- Renewable energy
- Motor drives
- High voltage DC/DC converters

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

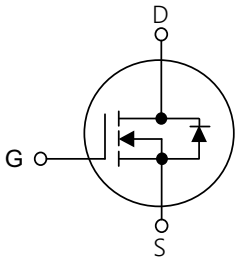


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage(Max)		$V_{GS(max)}$	-10/+25	V
Recommend Gate-Source Voltage		V_{GSop}	-4/+18	V
Continuous Drain Current	T_C=25°C	I_D	19	A
	T_C=100°C		14	
Pulsed Drain Current (Note 1)		I_{DM}	31	A
Power Dissipation	T_C=25°C	P_D	134	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC160N120P	Unit
Thermal resistance Junction to Case	$R_{\theta JC}$	1.12	°C/W
Thermal resistance Junction to Ambient	$R_{\theta JA}$	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	1200	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=1200V,V_{GS}=0V	-	1	50	μA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=18V,V_{DS}=0V	-	-	250	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=2.5mA	-	3.0	-	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=20V,I_D=10A,T_J=25°C	-	160	195	mΩ
		V_{GS}=20V,I_D=10A,T_J=175°C	-	320	-	
Gate Resisitance	R_G	f=1MHz	-	3.0	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=1000V,V_{GS}=0V, f=1MHz,V_{AC}=25mV	-	730	-	pF
Output Capacitance	C_{OSS}		-	24	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	1	-	pF
Total Gate Charge	Q_G	V_{DD}=800V,I_D=10A, V_{GS}=-4to18V	-	9.9	-	nC
Gate-Source Charge	Q_{GS}		-	8.2	-	nC
Gate-Drain Charge	Q_{GD}		-	4.7	-	nC
Drain-Source Diode Characteristics and Maximum Ratings (Note 2)						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=-4V,I_S=3A	-	2.8	-	V
Continuous Diode Forward Current	I_S	V_{GS}=-4V	-	20	-	A
Diode pulse Current	$I_{S,\ pulse}$	V_{GS}=-4V,pulse width tp limited by T_{jmax}	-	31	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

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

Typical Characteristics Diagrams

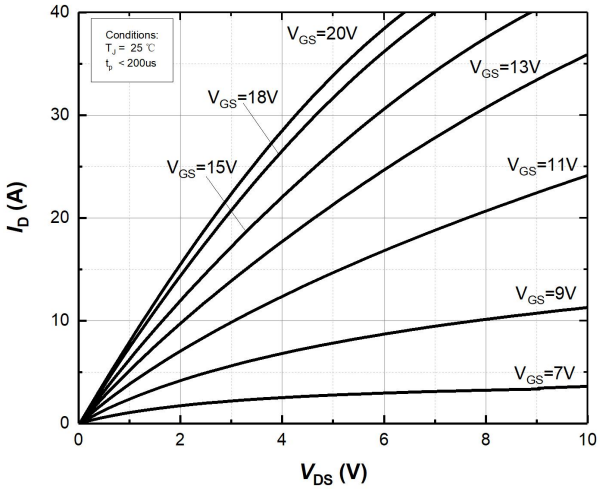


Figure 1. Output characteristics at Tj=25°C

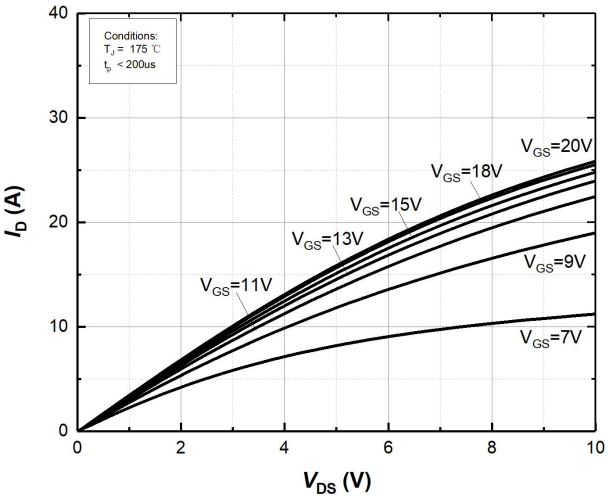


Figure 2. Output characteristics at Tj=175°C

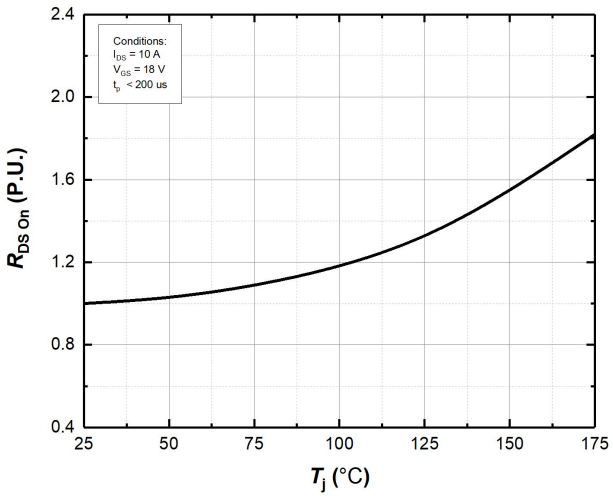


Figure 3. Normalized On-Resistance vs. Temperature

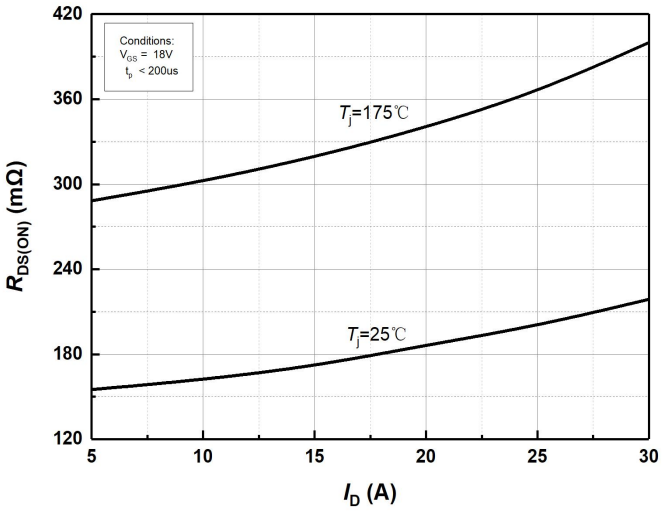


Figure 4. On-Resistance vs. Drain current for Various Temperature

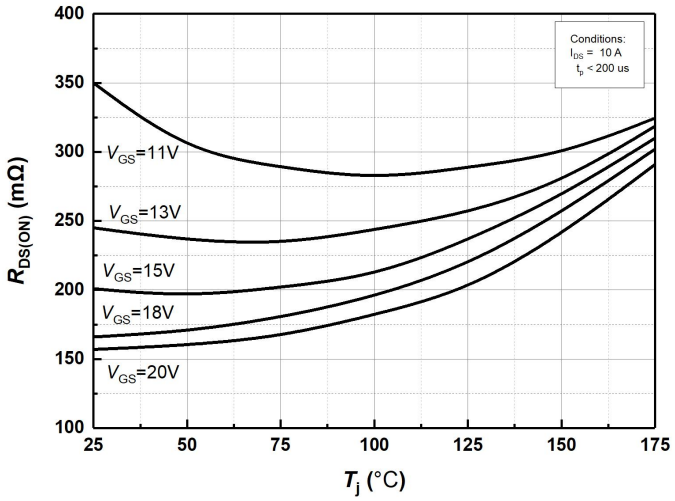


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

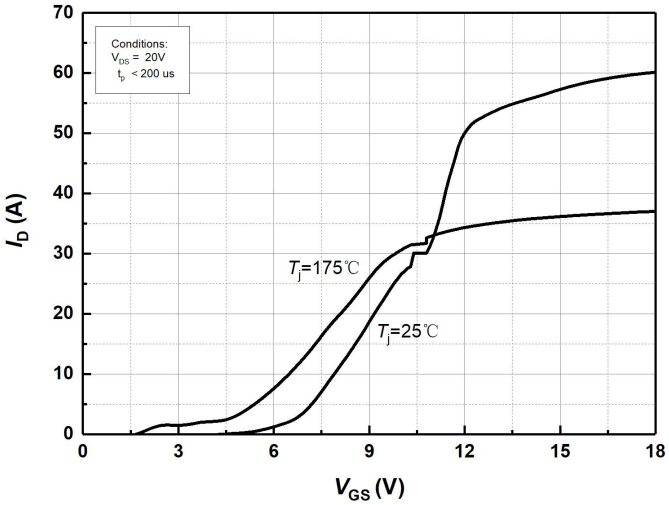


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics Diagrams

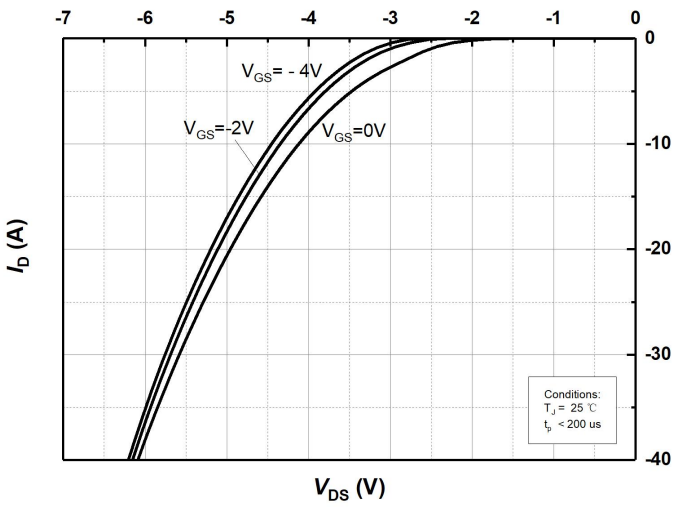


Figure 7. Body Diode Characteristics at Tj=25°C

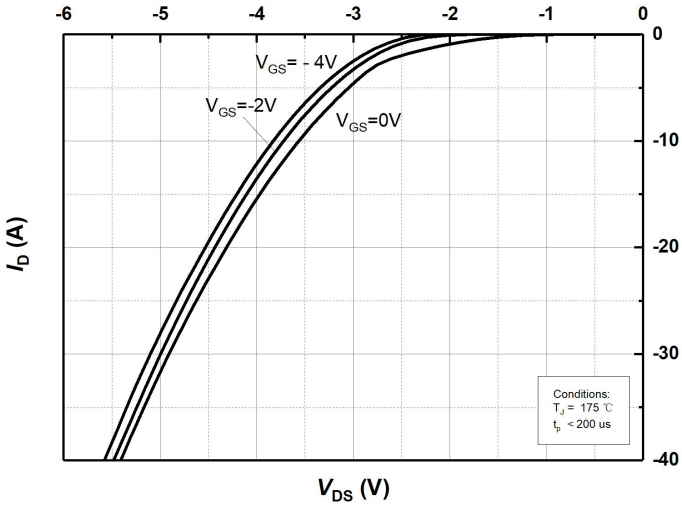


Figure 8. Body Diode Characteristics at Tj=175°C

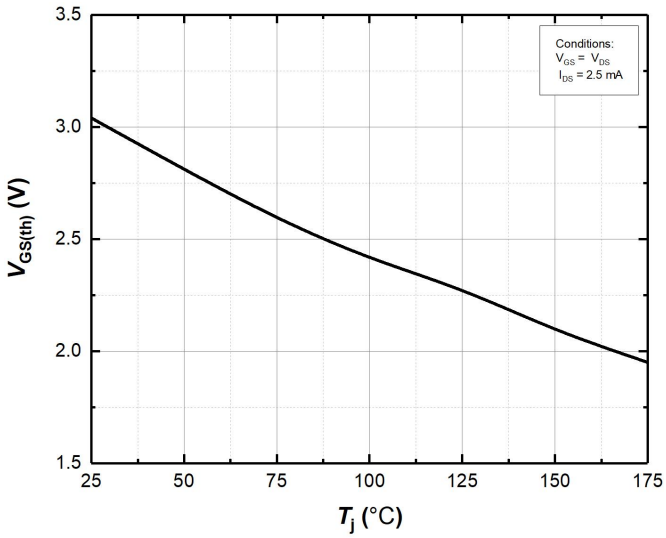


Figure 9. Threshold Voltage vs. Temperature

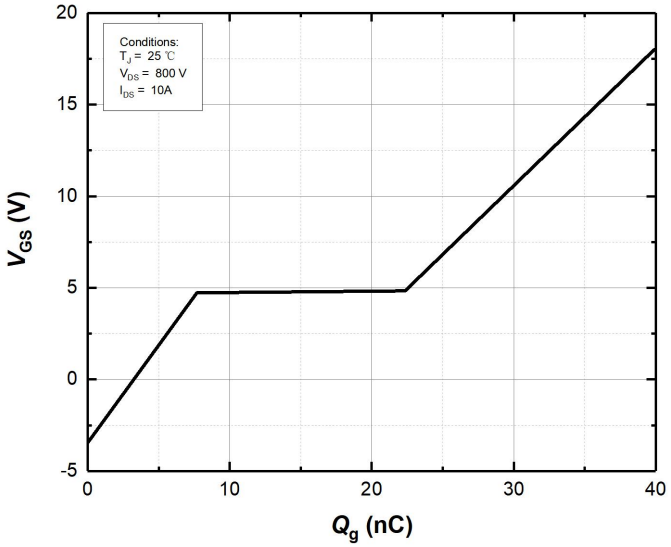


Figure 10 Gate Charge Characteristics

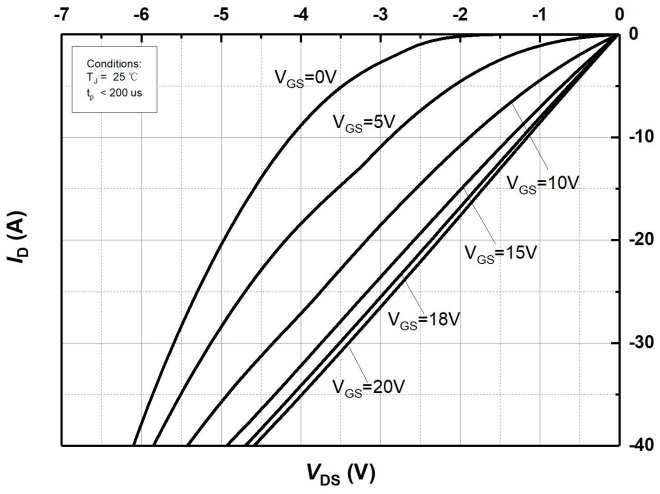


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

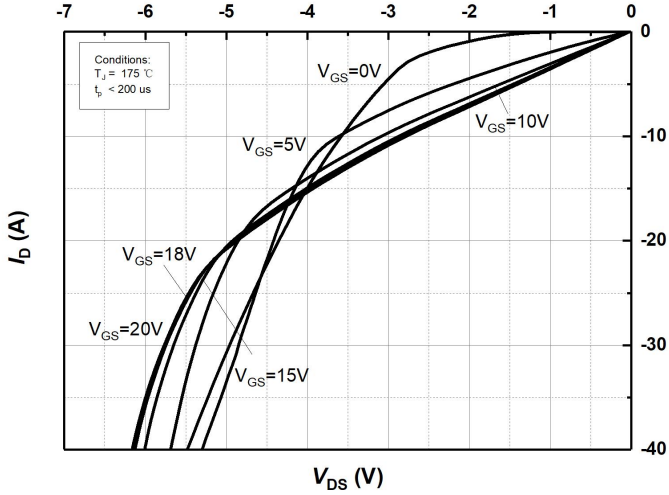


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Characteristics Diagrams

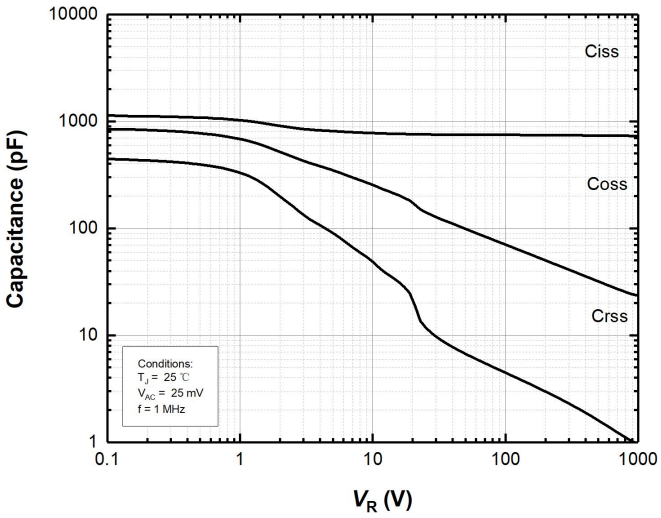


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

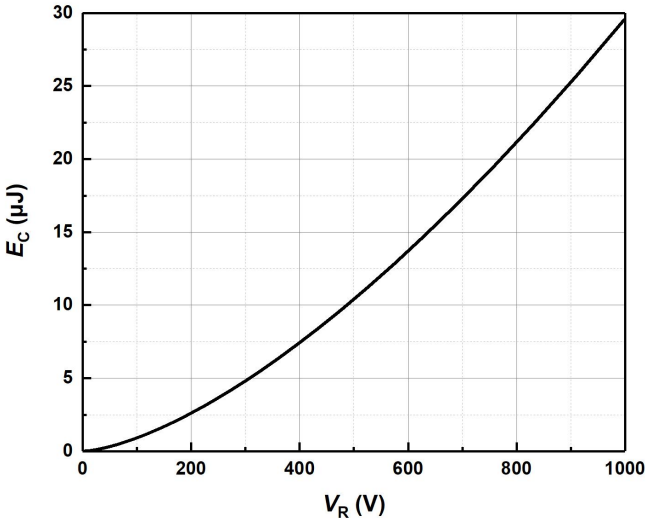
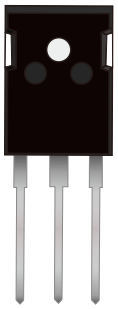
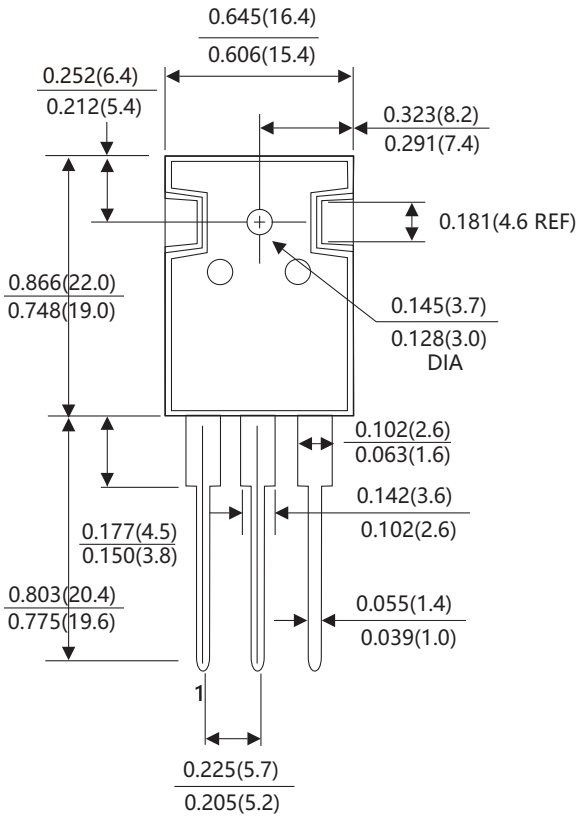


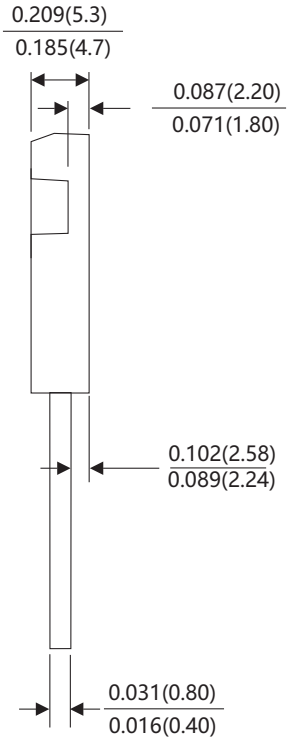
Figure 14. Output Capacitor Stored Energy

Dimensions

TO-247 PACKAGE OUTLINE DIMENSIONS







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