SEMICONDUCTOR

SC400N90F

900V 11A N-Channel SIC Power MOSFET

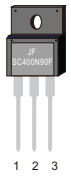
Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Wide Bandgap SiC MOSFET Technology
- Halogen free, RoHs compliant
- Easy to Parallel and Simple to Drive
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Typ)
900V	400@ 15V 5A	11	21nc

ITO-220

SC400N90F



Mechanical Data

- Case:ITO-220 Package

Application

- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Pulsed Power Applications
- Motor Drives

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

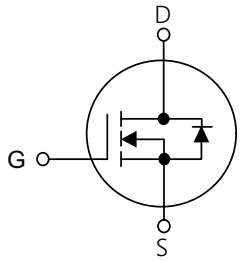


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	900	V
Gate-Source Voltage(Max)		$V_{GS(max)}$	-10/+22	V
Recommend Gate-Source Voltage		V_{GSop}	0/+18	V
Continuous Drain Current	T_C=25°C	I_D	11 ※	A
	T_C=100°C		9 ※	
Pulsed Drain Current (Note 1)		I_{DM}	22	A
Power Dissipation	T_C=25°C	P_D	50	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C

※limited by maximum junction temperature

Table 2.Thermal Characteristics

Parameter	Symbol	SC400N90F	Unit
Thermal resistance Junction to Case	$R_{\theta JC}$	3.02	°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=500μA	900	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=900V,V_{GS}=0V	-	-	10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=18V,V_{DS}=0V	-	-	250	nA
	Reverse		V_{GS}=-4V,V_{DS}=0V	-	-	-250	nA
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=1.8mA	2.7	-	4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=15V,I_D=5A,T_J=25°C	-	400	520	mΩ
			V_{GS}=15V,I_D=5A,T_J=175°C	-	340	-	
			V_{GS}=18V,I_D=5A,T_J=25°C	-	280	-	
			V_{GS}=18V,I_D=5A,T_J=175°C	-	290	-	
Gate Resisitance		R_G	f=1MHz	-	14	-	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=500V,V_{GS}=0V, f=1MHz	-	250	-	pF
Output Capacitance		C_{OSS}		-	18	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	2	-	pF
Turn-On Delay Time		td(on)	V_{DS}=500V,I_D=5A V_{GS}=0/18V,R_G=10Ω, T_J=25°C	-	14	-	ns
Turn-On Rise Time		t_R		-	43	-	
Turn-Off Delay Time		td(off)		-	17	-	
Turn-Off Fall Time		tf		-	52	-	
Turn-On Energy		Eon		-	140	-	μJ
Turn-Off Energy		Eoff		-	15	-	
Total Gate Charge		Q_G	V_{DD}=500V,I_D=5A, V_{GS}=0/15V	-	21	-	nC
Gate-Source Charge		Q_{GS}		-	10	-	nC
Gate-Drain Charge		Q_{GD}		-	8	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=3A	-	3.6	-	V
Continuous Diode Forward Current		I_S		-	11	-	A
Reverse Recovery Time		trr	V_R=500V,V_{GS}=18V I_{SD}=5A, di/dt=880A/us	-	11	-	ns
Recovered charge		Qrr		-	33	-	nC
Peak reverse recovery current		Irrm		-	5.2	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

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

Typical Characteristics Diagrams

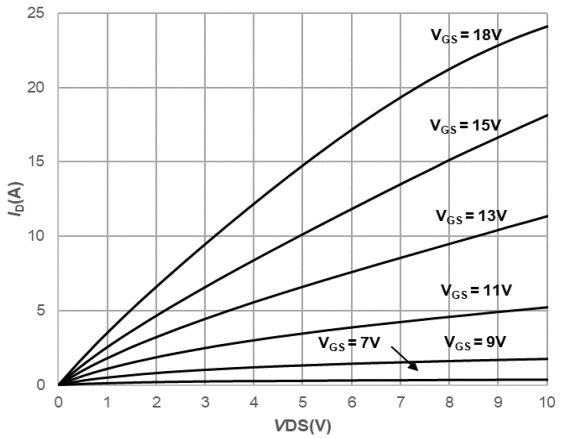


Fig1. Output Characteristics T_j=25℃

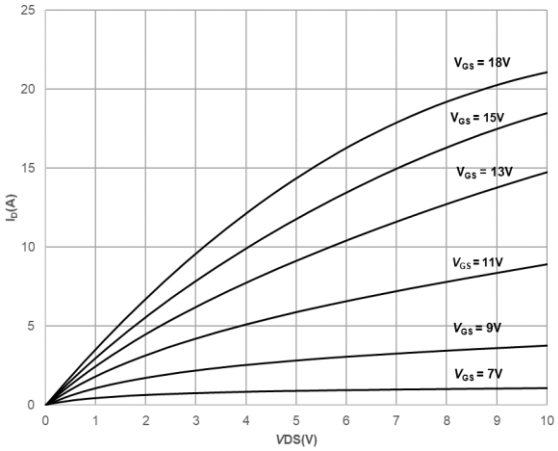


Fig2. Output Characteristics T_j=175℃

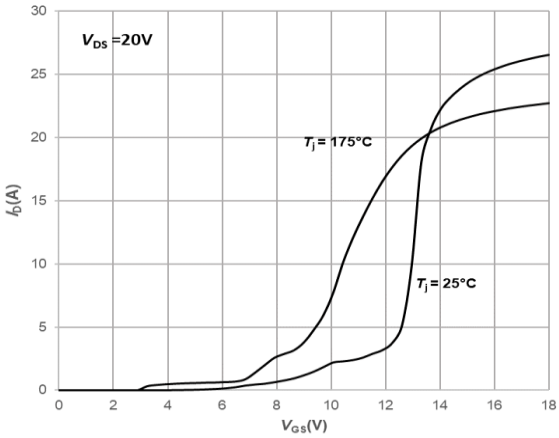


Fig3. Typical Transfer Characteristics

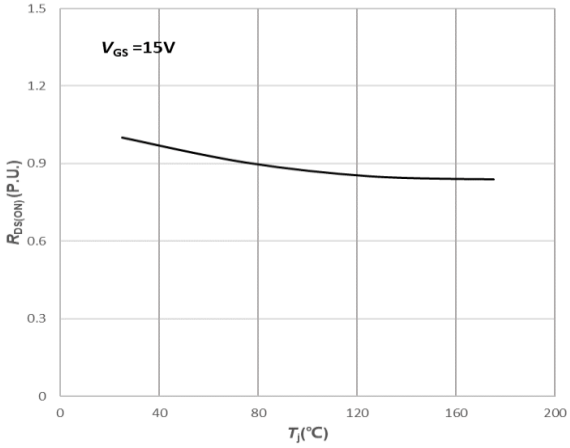


Fig4. Normalized On-Resistance vs. Temperature

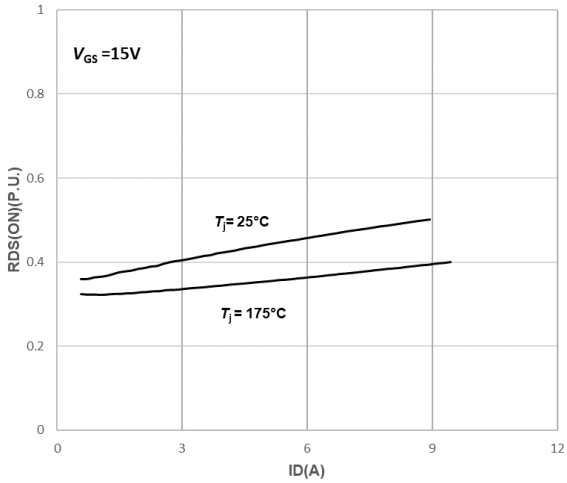


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

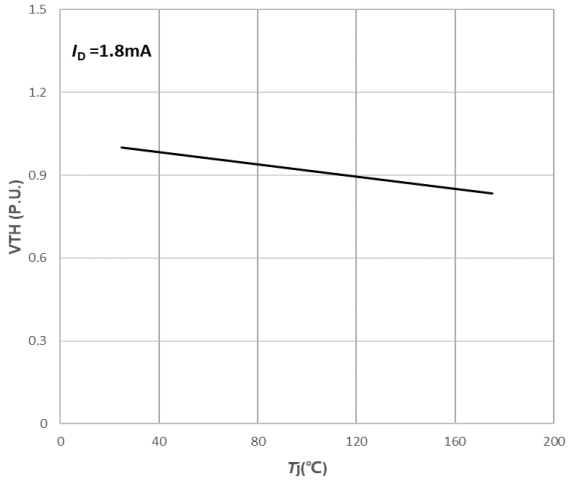


Fig6. Normalized Threshold Voltage vs. Temperature

Typical Characteristics Diagrams

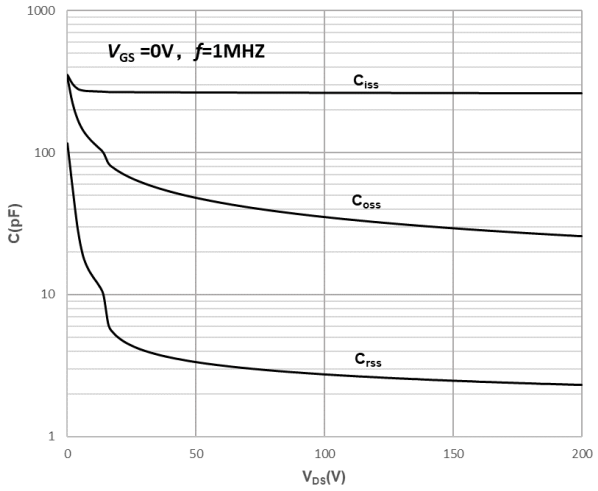


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

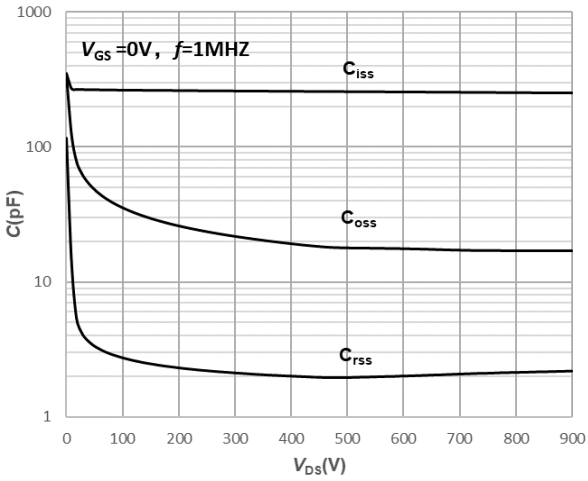


Fig8. Capacitances vs. Drain-Source Voltage (0-900V)

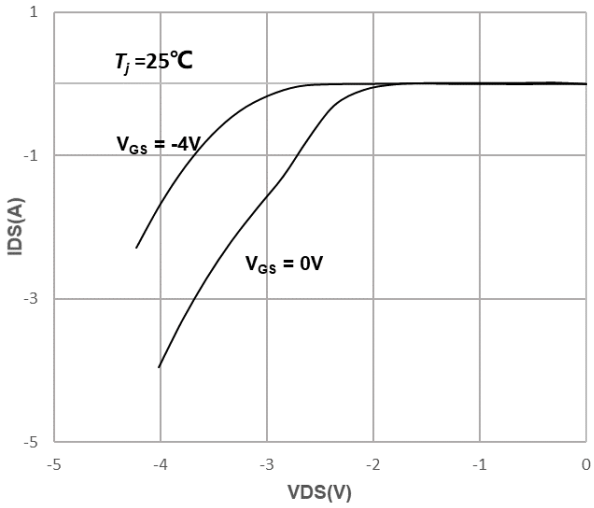
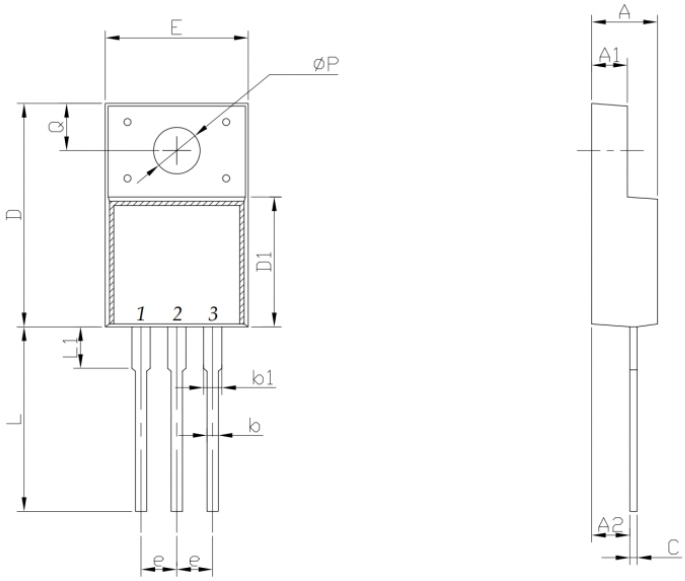


Fig9. Body Diode Characteristics

Dimensions

ITO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
L	12.6	14	0.496	0.551
L1	2.45	4.3	0.096	0.169
P	2.9	3.8	0.114	0.150
Q	2.5	3.55	0.098	0.140

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