SEMICONDUCTOR

38N100S7P

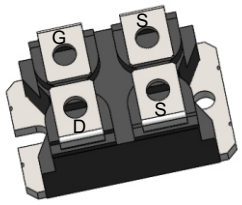
38A 1000V N-Channel Enhancement Mode Power MOSFET

Features

38N100S7P, the silicon N-channel Enhanced VDMOSFET,is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is SOT-227, which accords with the RoHS standard.

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Max)
1000V	196 @ 10V 18A	38	308nc

SOT-227



Features

- Fast switching
- ESD Improved Capability
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Mechanical Data

- Case:SOT-227 Package

Application

- Power switch circuit of POWER

Pin Definition:

G. Gate
D. Drain
S. Source

Block Diagram

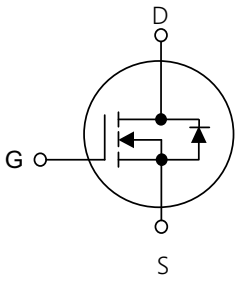


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	1000	V
Gate-Source Voltage		V_{GS}	±40	V
Continuous Drain Current	T_C=25°C	I_D	38	A
	T_C=100°C		30	
Pulsed Drain Current (Note 1)		I_{DM}	152	A
Power Dissipation T_C=25°C		P_D	890	W
Single Pulse Avalanche Energy(Note 2)		E_{AS}	5000	mJ
Avalanche Current(Note 1)		I_{AR}	38	A
Operating Junction and Storage Temperature		T_J/T_{STG}	-55~+150	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SOT-227	Unit
Thermal resistance Case to heatsink	$R_{\theta CS}$	0.05	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.14	°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=250μA	1000	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=1000V,V_{GS}=0V	-	-	1.0	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V	-	-	100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V	-	-	-100	nA
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	3.0	-	5.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=18A	-	196	280	mΩ
Forward Trans conductance		g_{fs}	V_{DS}=15V,I_D=40A	-	50	-	S
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	-	19	-	nF
Output Capacitance		C_{OSS}		-	1012	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	520	-	pF
Switching Characteristics							
Turn-On Delay Time		td(on)	V_{DD}=500V,I_D=19A V_{GS}=10V,R_G=25Ω,	-	30	-	ns
Turn-On Rise Time		t_R		-	30	-	ns
Turn-Off Delay Time		td(off)		-	60	-	ns
Turn-Off Fall Time		tf		-	35	-	ns
Total Gate Charge		Q_G	V_{DD}=500V,I_D=18A, V_{GS}=10V	-	308	-	nC
Gate-Source Charge		Q_{GS}		-	107	-	nC
Gate-Drain Charge		Q_{GD}		-	64	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 3)							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=38A	-	-	1.5	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	38	A
Reverse Recovery Time		trr	V_{GS}=0V,I_S=38A dI$_F$/dt=100A/μs		500		ns
Reverse Recovery Charge		Q_{RR}			3.8		μC

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 I_{SD}=38A,V_{DD}≤BV_{DS},di/dt≤100A/μS,Starting TJ=25°C

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

Typical Characteristics Diagrams

Figure 1.Output Characteristics

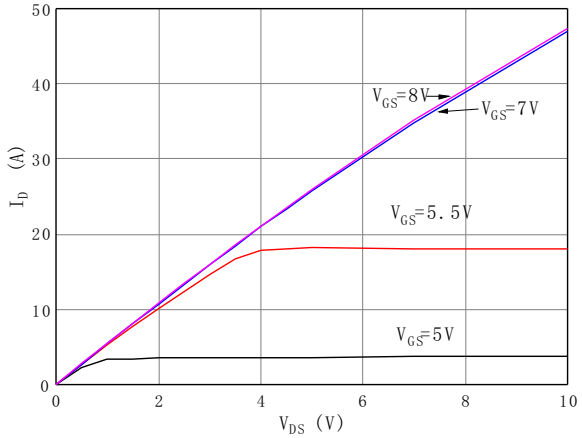


Figure2.Normalized $R_{DS(ON)}$ vs Temperature

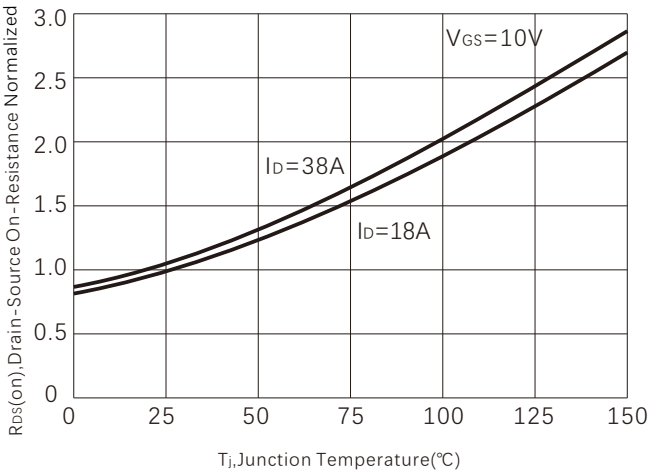


Figure 3.On-Resistance to ID=18A vs.Drain Current

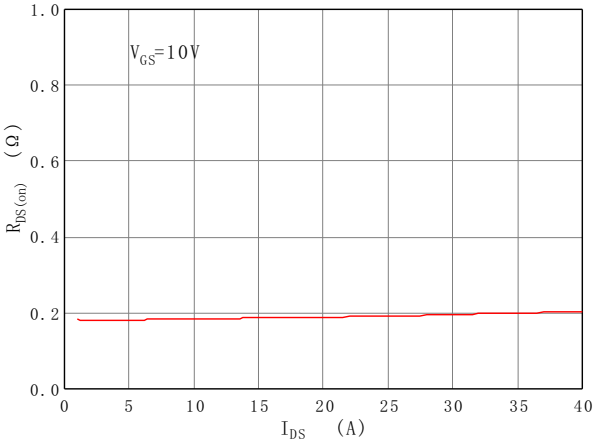


Figure 4. Capacitance

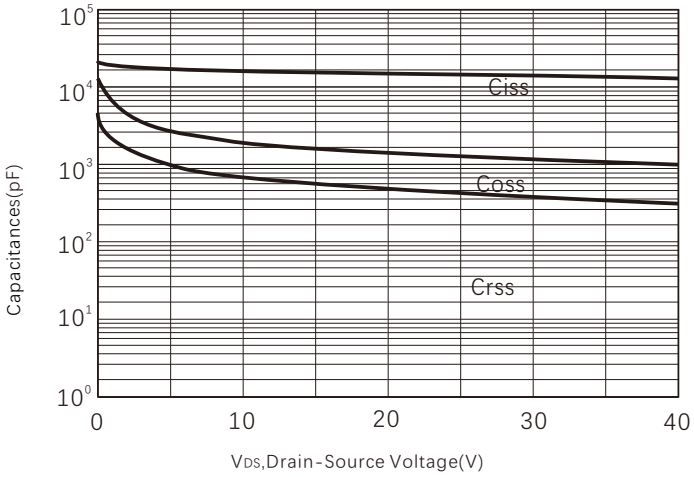


Figure 5.Gate charge

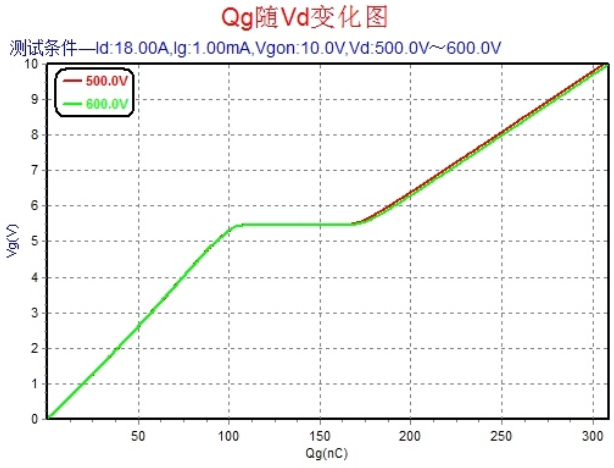


Figure 6.Source-Drain Diode Forward Voltage

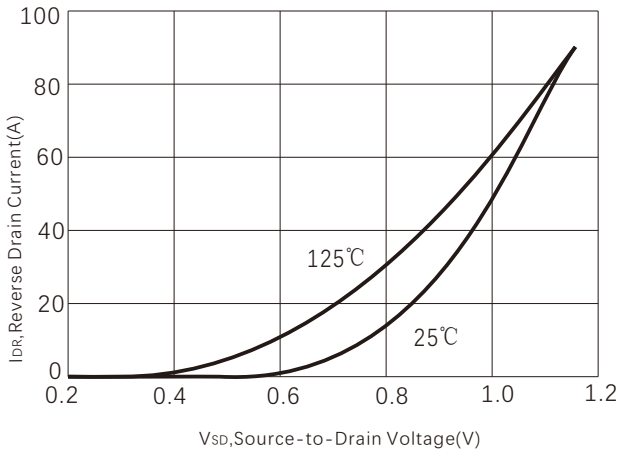


Figure7.Maximum Drain Current vs Temperature

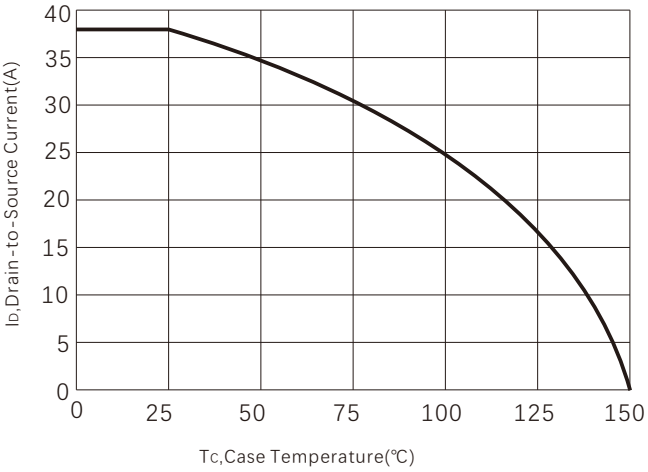


Figure 8. Transfer Characteristics

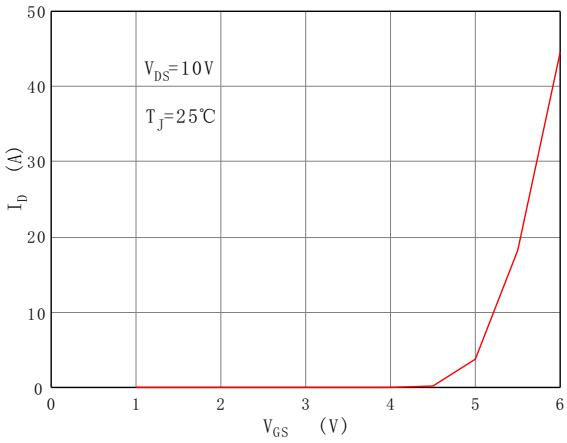


Figure 9. Safe operating area

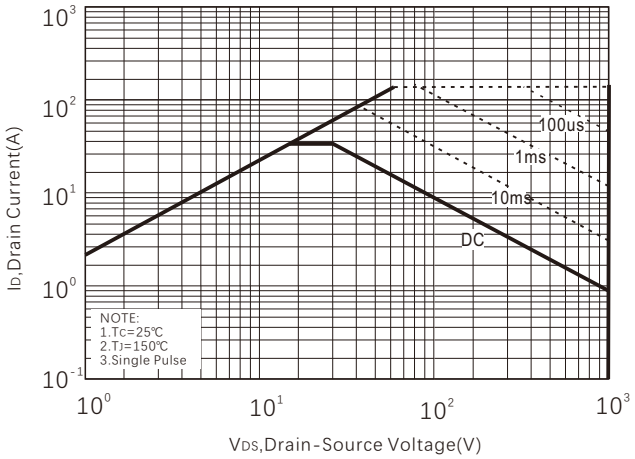
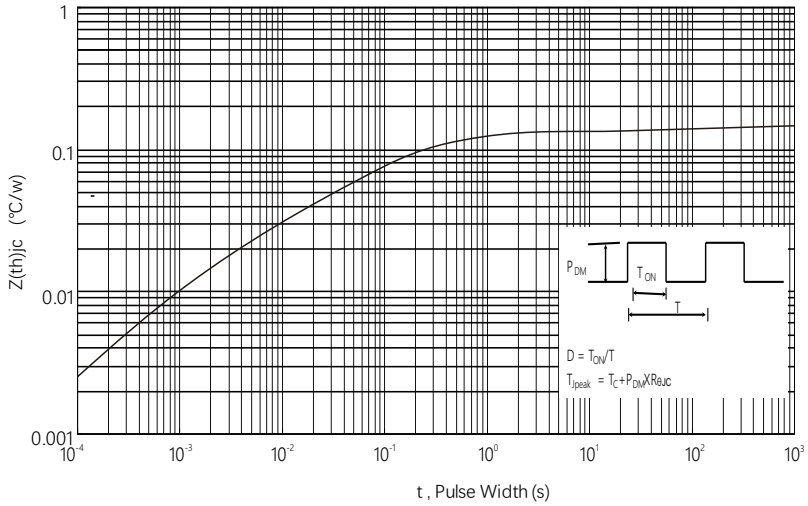
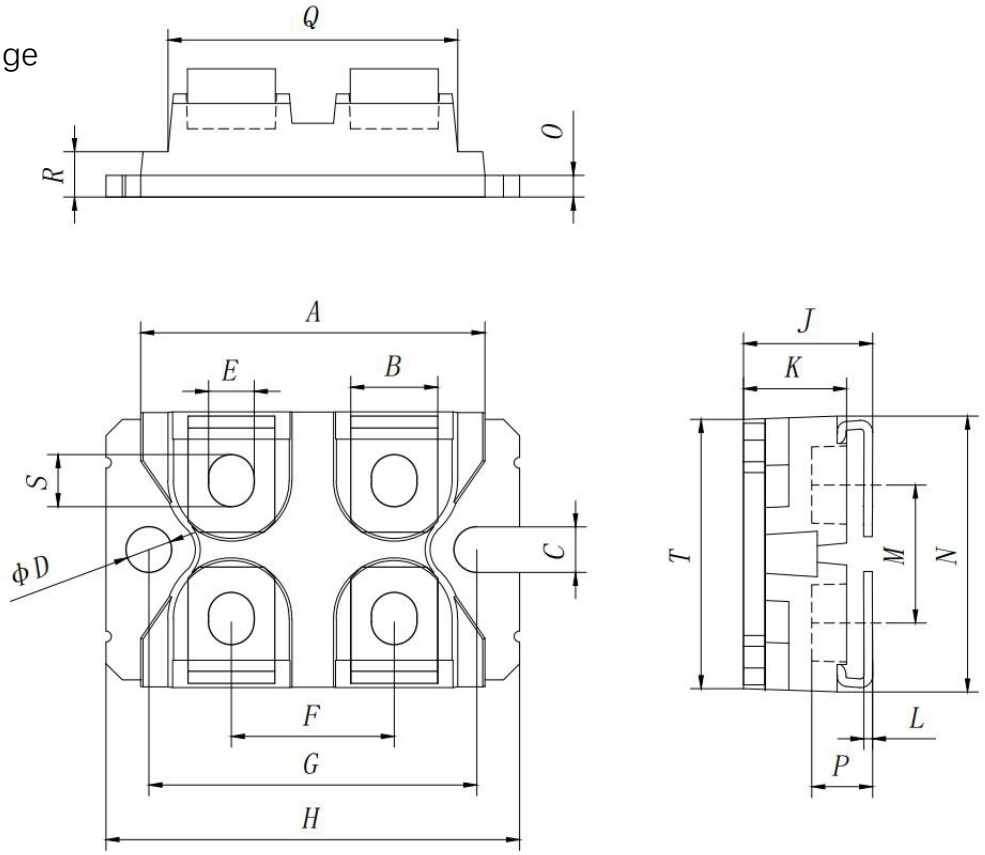


Figure 10. Maximum Transient Thermal Impedance



Dimensions

SOT-227package



SYMBOLS	DIMENSION IN MM		
	MIN	NOM	MAX
A	31.20	31.70	32.20
B	7.50	8.00	8.50
C	3.80	4.20	4.60
D	3.80	4.20	4.60
E	3.80	4.20	4.60
F	14.50	15.00	15.50
G	29.80	30.20	30.60
H	37.70	38.10	38.50
J	11.50	11.90	12.30
K	8.90	9.50	10.00
L	0.75	0.80	0.85
M	12.40	12.70	13.00
N	25.00	25.40	25.80
O	1.70	2.00	2.30
P	4.95	5.60	6.10
Q	26.40	26.70	27.00
R	3.90	4.18	4.45
S	4.20	4.80	5.40
T	23.80	24.80	25.80

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