HMM**520N075**

Silicon N-Channel Power MOSFET

General Description :

HMM520N075, 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-227B, which accords with the RoHS standard.

Features :

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

Applications:

- Power switch circuit of POWER

$V_{DSS}(T_C=175℃)$	75	V
I_D	480	A
$P_D(T_C=25℃)$	940	W
$R_{DS(ON)MAX}$	2.0	mΩ

SOT-227B

Inner Equivalent Principium Chart

Absolute (Tc=25℃ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	75	V
I_D	Continuous Drain Current	480	A
	Continuous Drain Current $T_C=100$ °C	200	A
I_{DM}[a1]	Pulsed Drain Current(pulse width limited by T_{JM})	1500	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy	4	mJ
I_{AR} [a1]	Avalanche Current	250	A
dv/dt[a2]	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	940	W
	Derating Factor above 25°C	6.27	W/℃
T_J , T_{stg}	Operating Junction and Storage Temperature Range	150 , −55 to 175	℃
T_L	Maximum Temperature for Soldering	300	℃

Caution Stresses greater than those in the "Absolute Maximum Ratings" may cause permanent damage to the device
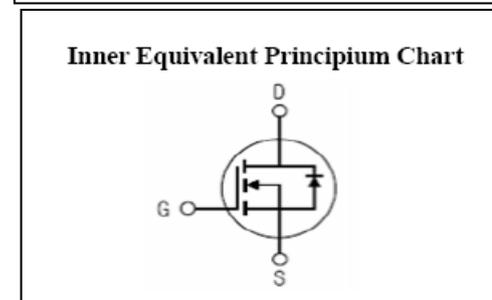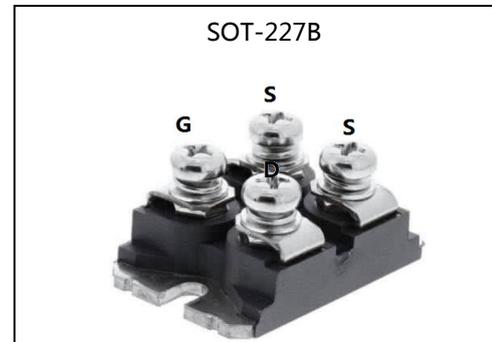
Thermal Characteristics

Symbol	Parameter	Rating	Units
R_{thJC}	Thermal Resistance, Junction-to-Case	0.16	℃/ W
R_{thcs}	Thermal Resistance, Case to heatsink	0.1	℃/ W

Electrical Characteristics (Tc= 25℃ unless otherwise specified) :

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V,I_D=250\mu A$	75	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=75V, V_{GS}=0V,T_a=25℃$	--	--	10	μA
		$V_{DS}=60V, V_{GS}=0V,T_a=125℃$	--	--	1000	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	200	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-200	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V,I_D=200A$	--	1.5	2.0	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS},I_D=250\mu A$	2.0	--	4.0	V
g_{fs}	Forward Trans conductance	$V_{DS}=25V,I_D=40A$	200	330	--	S

Pulse width＜380μs; duty cycle＜2%.

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
C_{iss}	Input Capacitance	$V_{GS}=0V \; V_{DS}=25V$ $f=1.0MHz$	--	28	--	nF
C_{oss}	Output Capacitance		--	2500	--	pF
C_{rss}	Reverse Transfer Capacitance		--	780	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
$t_{d(ON)}$	Turn-on Delay Time	$I_D=200A,V_{DD}=30V$ $V_{GS}=10V,R_g=25\Omega$	--	46	--	ns
t_r	Rise Time		--	38	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	80	--	
t_f	Fall Time		--	55	--	
Q_g	Total Gate Charge	$I_D=200A,V_{DD}=50V$ $V_{GS}=10V$	--	500	--	nC
Q_{gs}	Gate to Source Charge		--	96	--	
Q_{gd}	Gate to Drain ("Miller")Charge		--	196	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	480	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	1500	A
V_{SD}	Diode Forward Voltage	$I_S=200A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=80A, T_j=25℃$	--	96	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/μs$, $V_{GS}=0V$	--	160	--	nC

a1 : Repetitive rating; pulse width limited by maximum junction temperature

a2 : $I_{SD}=200A, di/dt≤100A/us, V_{DD}≤BV_{DS}$, Start $T_J=25℃$

Characteristics Curve :

Fig. 1. Output Characteristics @ T$_J$ = 25ºC
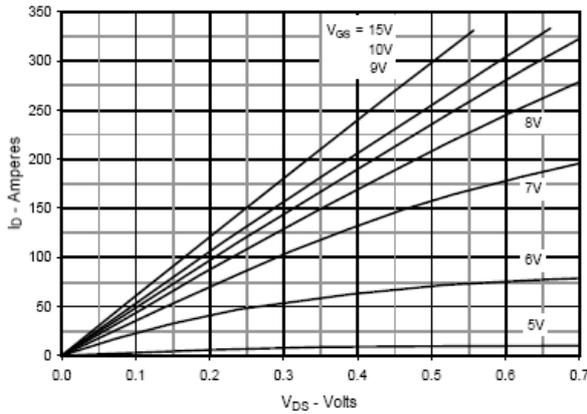
Fig. 2. Extended Output Characteristics @ T$_J$ = 25ºC
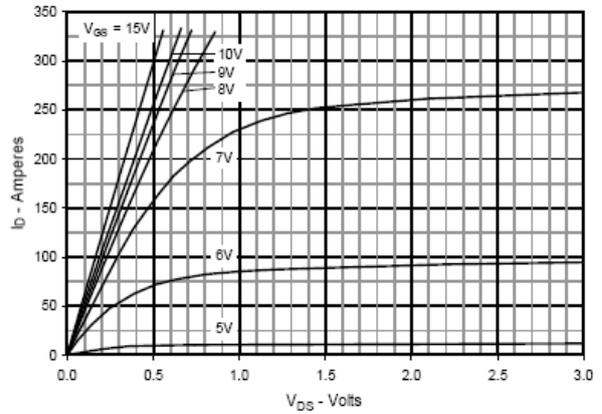
Fig. 3. Output Characteristics @ T$_J$ = 150ºC
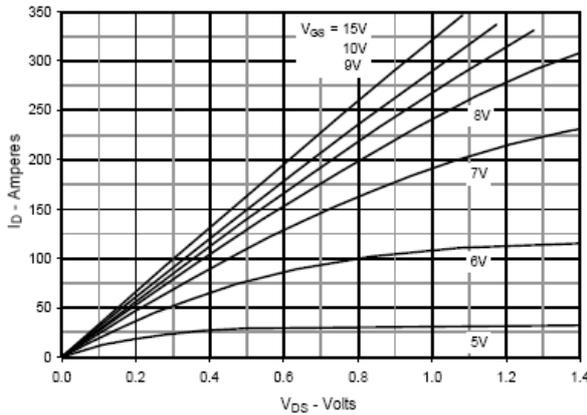
Fig. 4. R$_{DS(on)}$ Normalized to I$_D$ = 150A Value vs. Junction Temperature
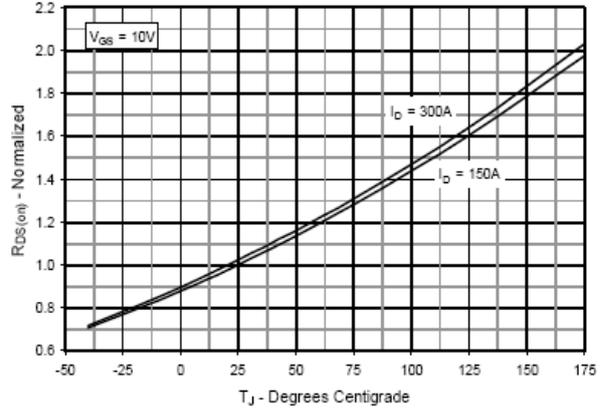
Fig. 5. R$_{DS(on)}$ Normalized to I$_D$ = 150A Value vs. Drain Current
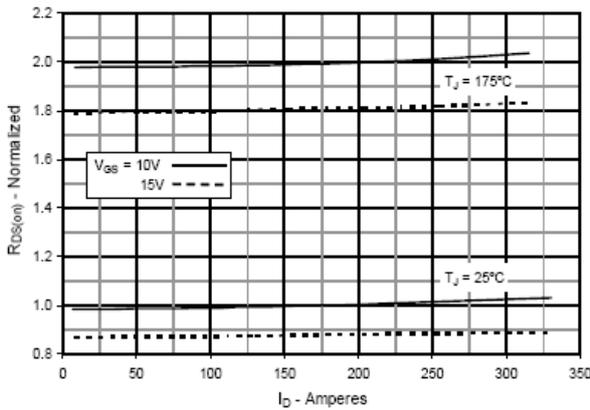
Fig. 6. Drain Current vs. Case Temperature
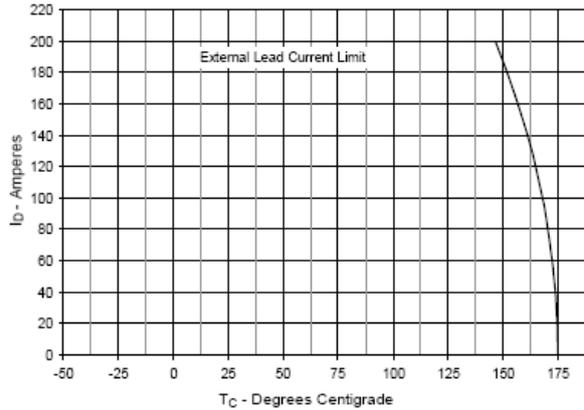
Fig. 7. Input Admittance
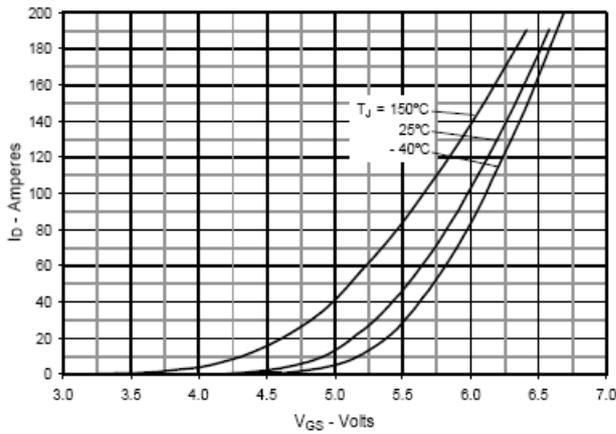
Fig. 8. Transconductance
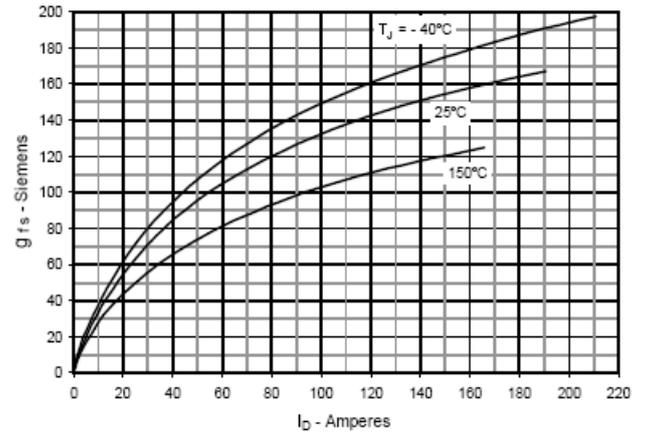
Fig. 9. Forward Voltage Drop of
Intrinsic Diode
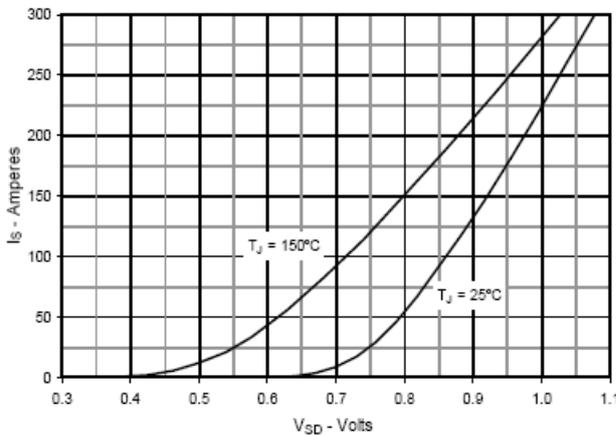
Fig. 10. Gate Charge
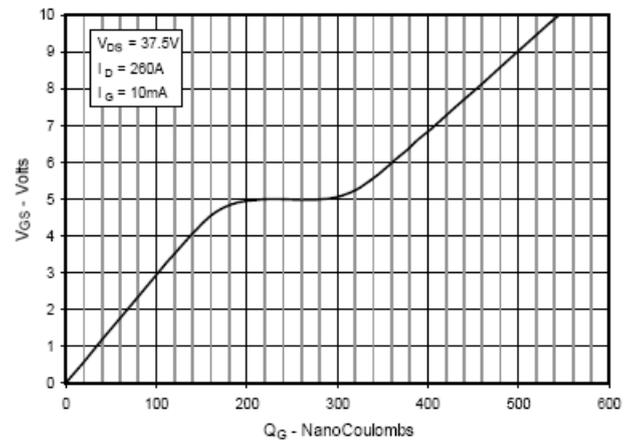
Fig. 11. Capacitance
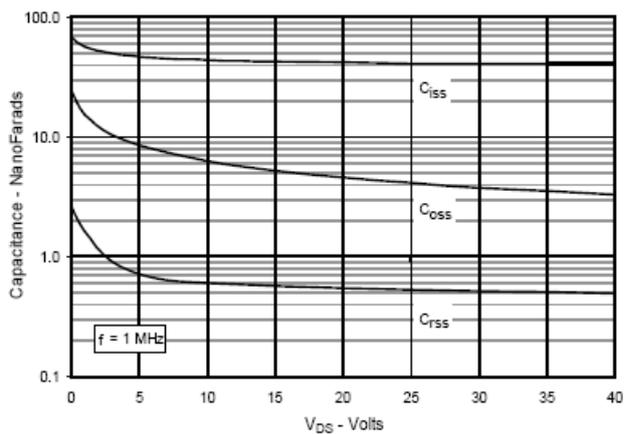
Fig. 12. Forward-Bias Safe Operating Area
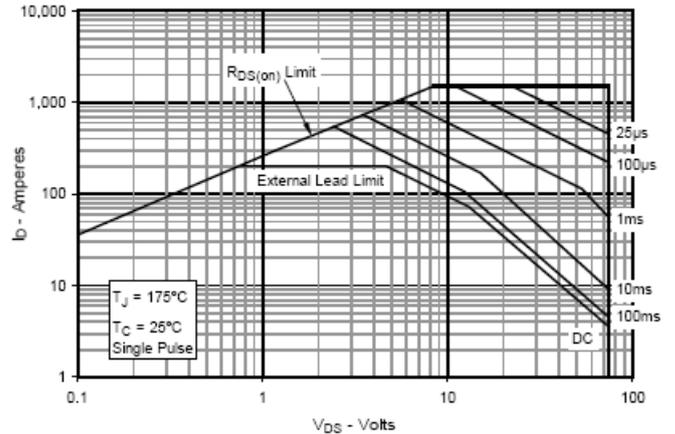
Fig. 13. Resistive Turn-on Rise Time
vs. Junction Temperature
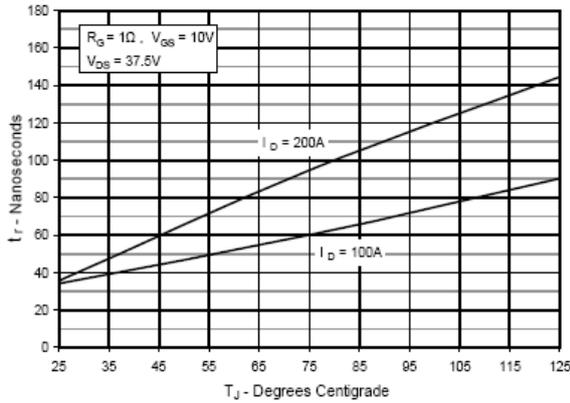

Fig. 14. Resistive Turn-on Rise Time
vs. Drain Current
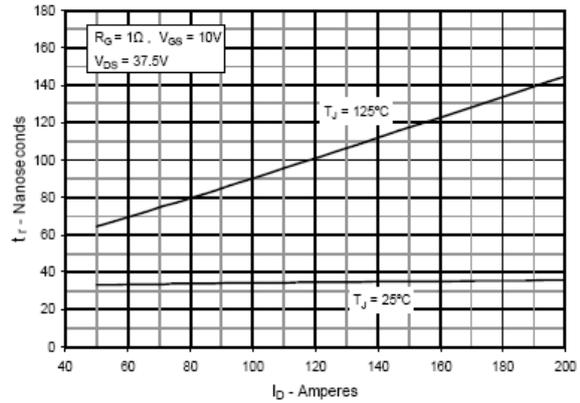
Fig. 15. Resistive Turn-on Switching Times
vs. Gate Resistance
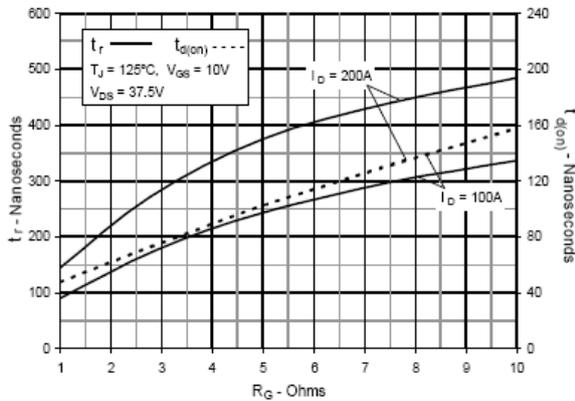
Fig. 16. Resistive Turn-off Switching Times
vs. Junction Temperature
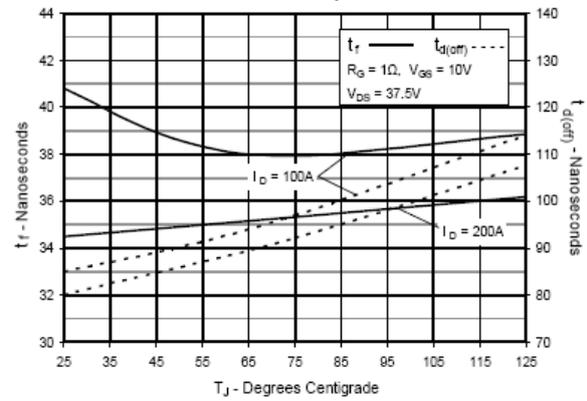
Fig. 17. Resistive Turn-off Switching Times
vs. Drain Current
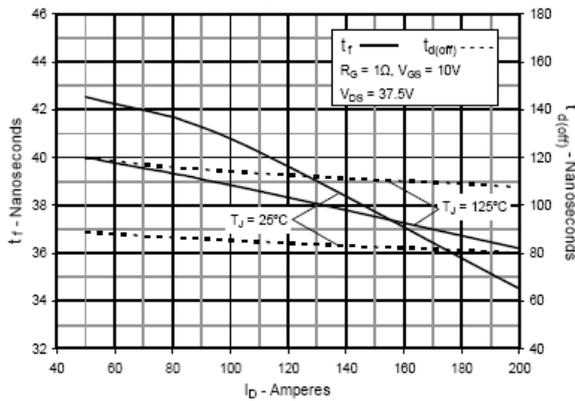

Fig. 18. Resistive Turn-off Switching Times
vs. Gate Resistance
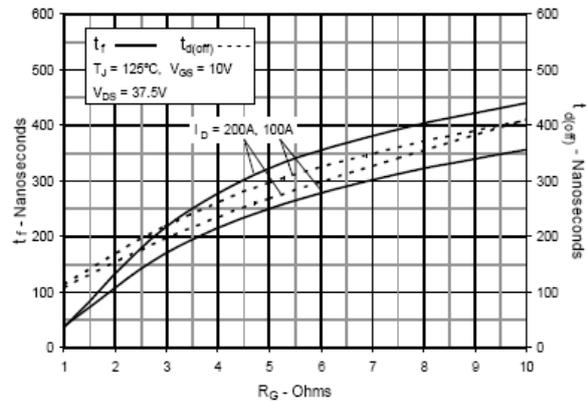
Fig. 19. Maximum Transient Thermal Impedance