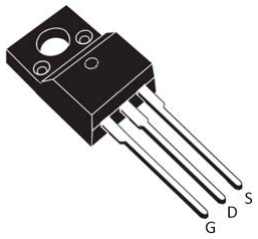
Silicon N-Channel Power MOSFET

V_{DSS}	1000	V
I_D	10	A
$P_D(T_C=25℃)$	60	W
$R_{DS(ON).TYP.}$	0.86	Ω

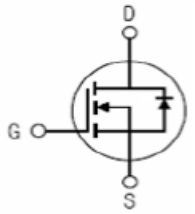
General Description :

HMF10N100, 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 TO-220F, which accords with the RoHS standard.

TO-220F



Inner Equivalent Principium Chart



Features :

- Fast Switching
- Low ON Resistance(R_{dson}≤1.1Ω)
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications:

- Power switch circuit of adaptor and charger

Absolute (Tc=25℃ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	1000	V
I_D	Continuous Drain Current	10	A
I_{DM}[a1]	Pulsed Drain Current	40	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{As}[a2]	Single Pulse Avalanche Energy	200	mJ
dv/dt[a3]	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	30	W
	Derating Factor above 25°C	0.48	W/℃
T_J , T_{stg}	Operating Junction and Storage Temperature Range	150 , −55 to 150	℃
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
$R_{θJC}$	Thermal Resistance, Junction-to-Case	2.1	℃/ W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	100	℃/ W

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

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	1000	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.55	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=1000V, V_{GS}=0V,T_a=25℃	--	--	1.0	μA
		V_{DS}=800V, V_{GS}=0V,T_a=125℃	--	--	50	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-30V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=5A	--	0.86	1.1	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
g_{fs}	Forward Trans conductance	V_{DS}=15V,I_D=5A	--	7	--	S
Pulse width≤380μs; duty cycle≤2%.						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS}=0V V_{DS}=25V f=1.0MHz	--	3538	--	pF
C_{oss}	Output Capacitance		--	240	--	
C_{rss}	Reverse Transfer Capacitance		--	30	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=10A,V_{DD}=500V V_{GS}=10V,R_g=9.1Ω	--	35	--	ns
t_r	Rise Time		--	36	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	44	--	
t_f	Fall Time		--	35	--	
Q_g	Total Gate Charge	I_D=10A,V_{DD}=500V V_{GS}=10V	--	73	--	nC
Q_{gs}	Gate to Source Charge		--	16	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	27	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	10	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	40	A
V_{SD}	Diode Forward Voltage	I_S=10A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=10A,T_j=25℃	--	--	850	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt=100A/μs,V_{GS}=0V	--	--	4.4	μC

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

a2 : L=10mH, I_D=10A, Start T_J=25℃

a3 : I_{SD}=10A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Fig. 1 Output Characteristics

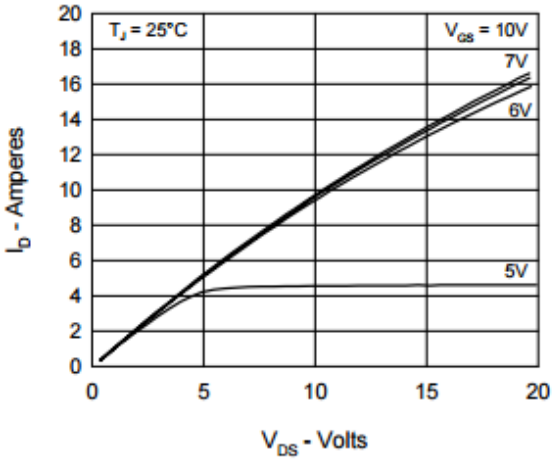


Fig. 2 Input Admittance

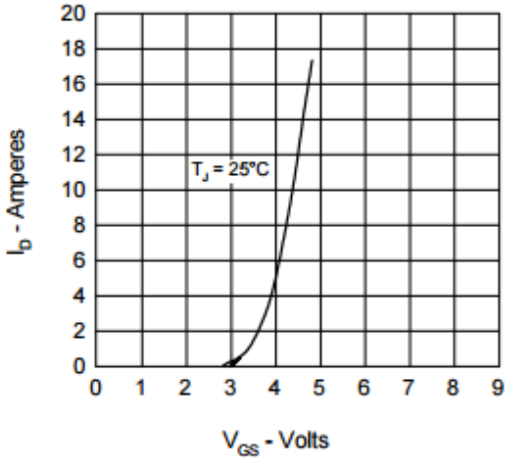


Fig. 3 $R_{DS(on)}$ vs. Drain Current

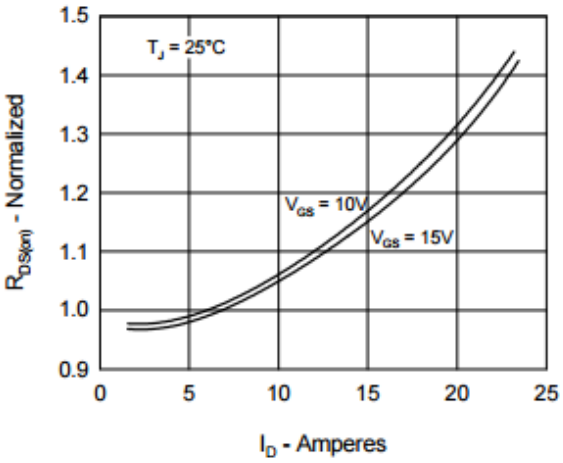


Fig. 4 Temperature Dependence of Drain to Source Resistance

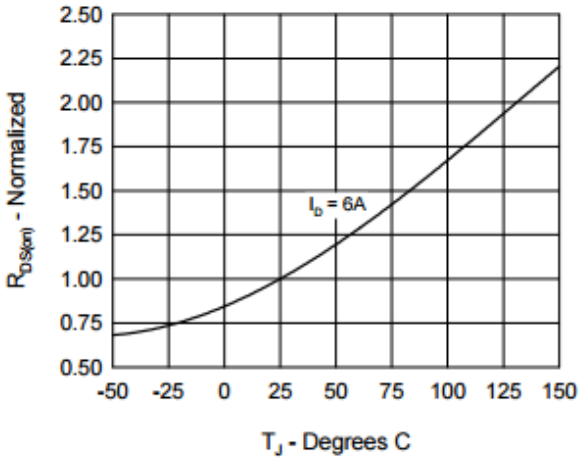


Fig. 5 Drain Current vs. Case Temperature

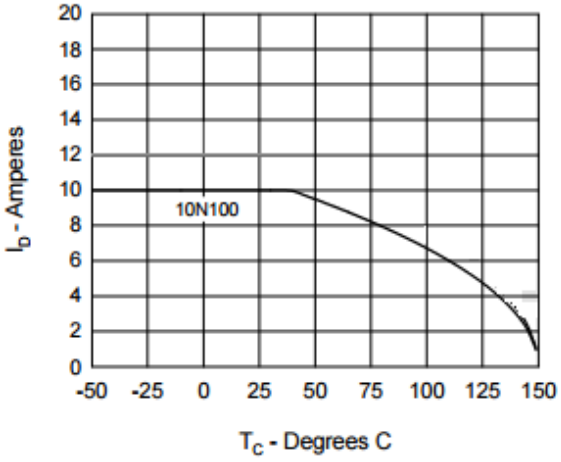


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

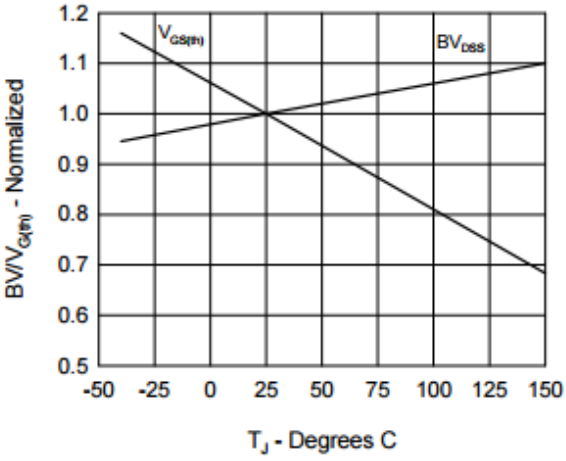


Fig.7 Gate Charge Characteristic Curve

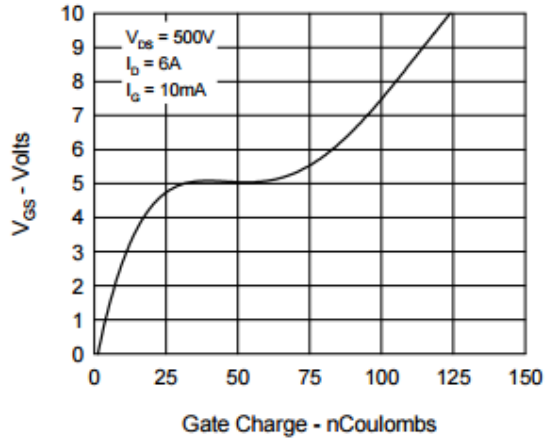


Fig.8 Forward Bias Safe Operating Area

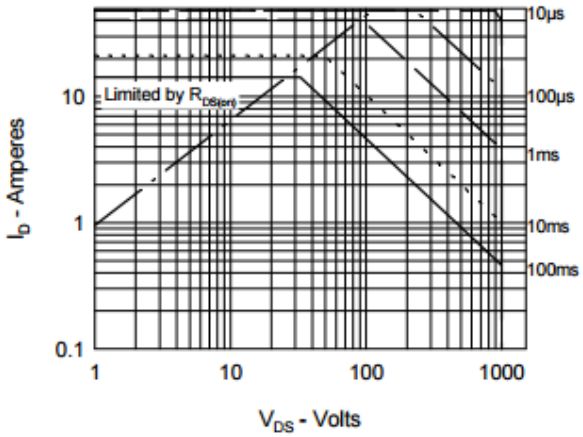


Fig.9 Capacitance Curves

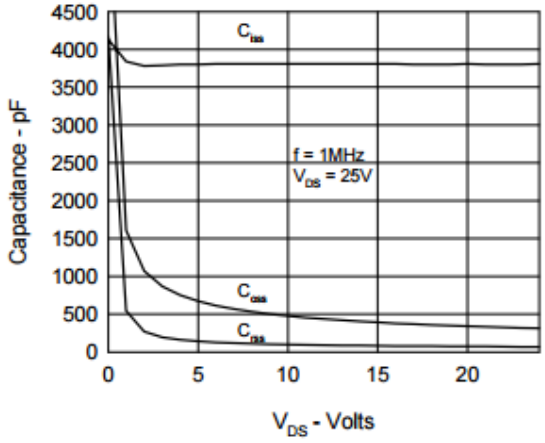


Fig.10 Source Current vs. Source to Drain Voltage

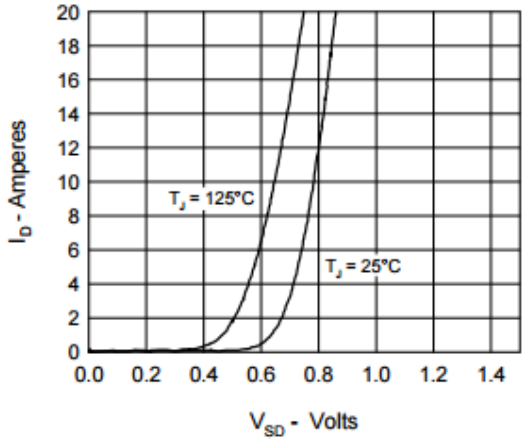


Fig.11 Transient Thermal Impedance