

Silicon N-Channel Super-Junction Power MOSFET

General Description :

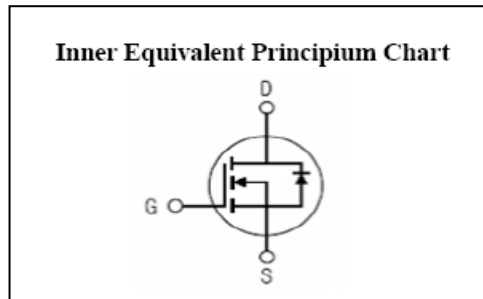
HMM100J60 the silicon N-channel Enhanced VDMOSFETS, is obtained by the self-aligned Superjunction Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is SOT-227B, which accords with the RoHS standard.

$V_{DSS}(T_J=150^{\circ}C)$	650	V
$V_{DSS}(T_C=150^{\circ}C)$	600	V
I_D	100	A
$P_D(T_C=25^{\circ}C)$	1560	W
$R_{DS(ON)}$	25	m Ω



Features :

- Proprietary New Super-Junction Technology
- $R_{DS(ON).typ.} = 18m\Omega$
- Low Gate Charge Minimize Switching Loss
- 100% Single Pulse avalanche energy Test



Applications :

- Adaptor
- Charger
- SMPS Standby Power
- Switching Voltage Regulators

Absolute ($T_c = 25^{\circ}C$ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	600	V
I_D	Continuous Drain Current	100	A
I_{DM}	Pulsed Drain Current	400	A
	Pulsed Drain Current (Pulse Width Limited by T_{JM})	240	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy	2	J
P_D	Power Dissipation	1560	W
	Derating Factor above $25^{\circ}C$	12.48	W/ $^{\circ}C$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150 , -55 to 150	$^{\circ}C$
T_L	Maximum Temperature for Soldering	300	$^{\circ}C$

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	600	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=600V, V_{GS}=0V, T_a=25^{\circ}\text{C}$	--	--	10	μA
		$V_{DS}=480V, V_{GS}=0V, T_a=125^{\circ}\text{C}$	--	--	1000	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+30V$	--	--	300	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-30V$	--	--	-300	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=50A$	--	18	25	$m\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	--	5.0	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=50A$	--	60	--	S
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=100V, f=1.0MHz$	--	16000	--	pF
C_{oss}	Output Capacitance		--	600	--	
C_{rss}	Reverse Transfer Capacitance		--	80	--	
Q_g	Total Gate Charge	$I_D=50A, V_{DD}=480V, V_{GS}=0 \text{ to } 10V$	--	320	--	nc
Q_{gs}	Gate to Source Charge		--	100	--	nc
Q_{gd}	Gate to Drain ("Miller") Charge		--	130	--	nc

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=300V, I_D=50A, V_{GS}=10V, R_g=25\Omega$	--	110	--	nS
t_r	Rise Time		--	90	--	

$t_{d(OFF)}$	Turn-Off Delay Time	--	600	--	
t_f	Fall Time	--	105	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	100	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	240	A
V_{SD}	Diode Forward Voltage	$I_S=100A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$V_R=480V, I_F=I_S,$ $diF/dt=100A/us,$ $V_{GS}=0V$	--	480	--	ns
Q_{rr}	Reverse Recovery Charge		--	2.9	--	μC

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Junction-to-Case	0.08	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-Ambient	55	$^{\circ}C/W$

$T_J = +25^{\circ}C$ to $+150^{\circ}C$

Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$.

Characteristics Curve:

Figure 1. Output Characteristics

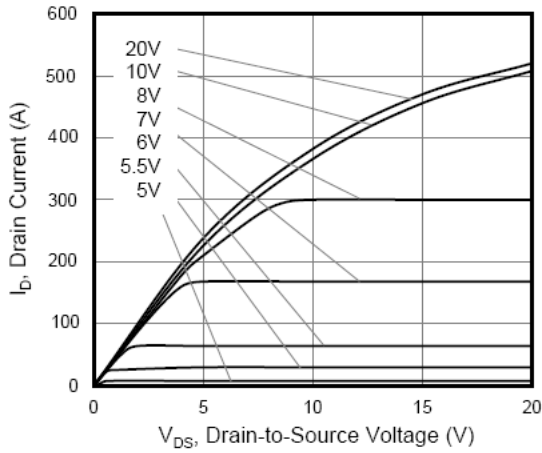


Figure 2. Transfer Characteristics

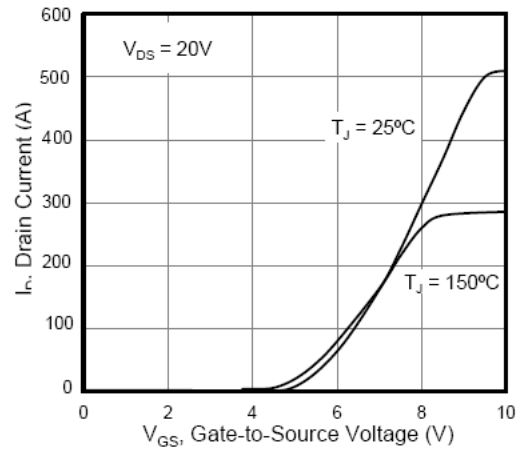


Figure 3. On-Resistance vs. Drain Current

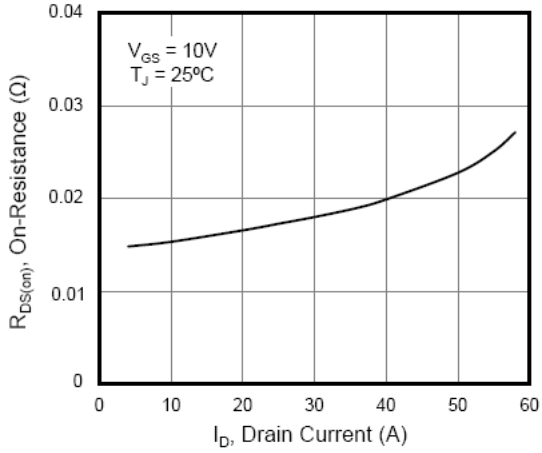


Figure 4. Capacitance

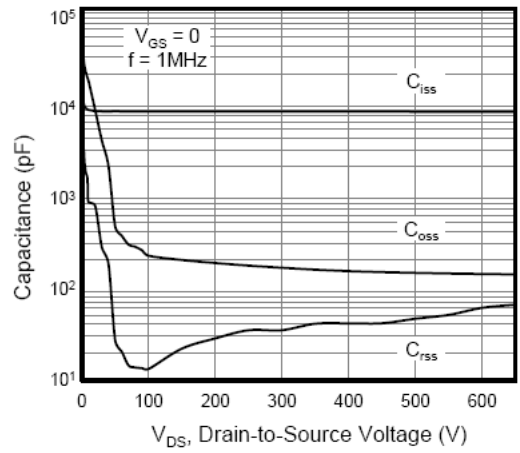


Figure 5. Gate Charge

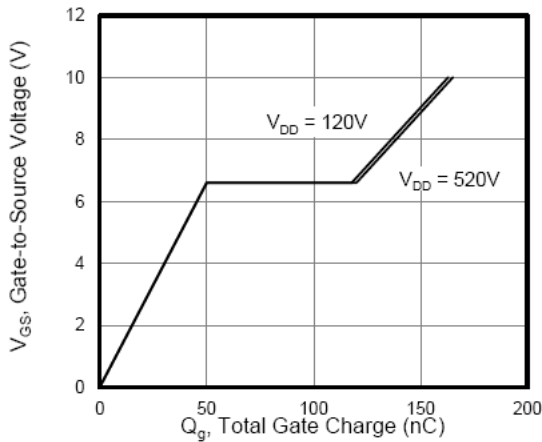
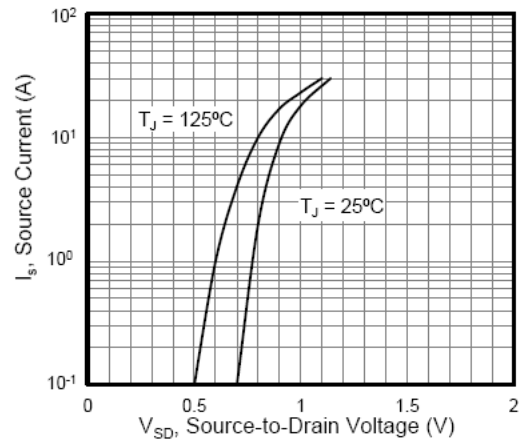


Figure 6. Body Diode Forward Voltage



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. On-Resistance vs. Junction Temperature

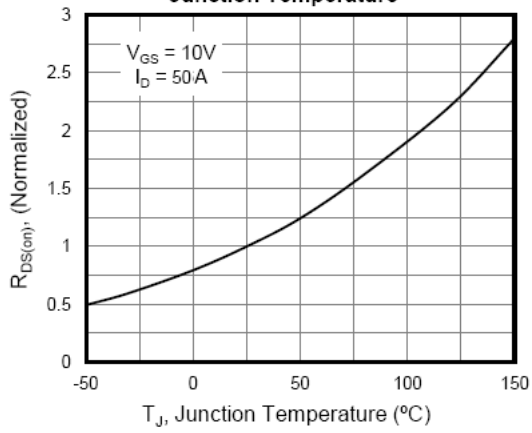


Figure 8. Breakdown voltage vs. Junction Temperature

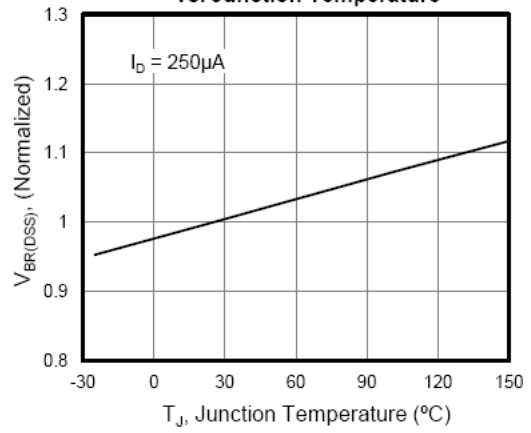


Figure9 . Forward-Bias Safe Operating Area

