

Silicon N-Channel Power MOSFET

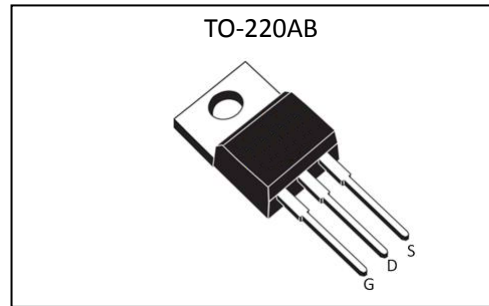
General Description :

The HMR90N07 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the RoHS standard.

V_{DSS}	70	V
I_D	90	A
P_D	160	W
$R_{DS(ON)type}$	6.8	m Ω

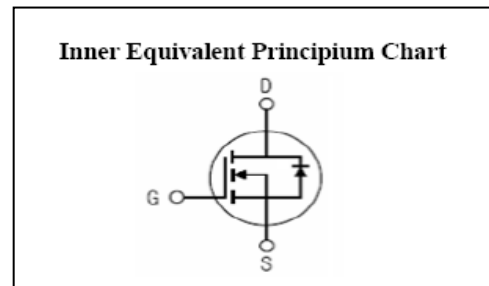
Features :

- $R_{DS(ON)} < 8m\Omega$ @ $V_{GS}=10V$ (Typ6.8m Ω)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications :

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	70	V
I_D	Continuous Drain Current	90	A
I_{DM}	Pulsed Drain Current	310	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	160	W
E_{AS}	Single pulse avalanche energy ^{a5}	450	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175 , -55 to 175	$^\circ C$

Electrical Characteristics (Tc= 25°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 =250μA	70	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =70V, V _{GS} = 0V, T _a = 25°C	--	--	1.0	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	0.1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-0.1	μA

ON Characteristics^{a3}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =30A	--	6.8	8	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	2.9	4.0	V
Pulse width tp ≤ 380μs, δ ≤ 2%						

Dynamic Characteristics^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =45A	25	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1.0MHz	--	3400	--	pF
C _{oss}	Output Capacitance		--	310	--	
C _{rss}	Reverse Transfer Capacitance		--	221	--	

Resistive Switching Characteristics^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, I _D =2A V _{GS} =10V, R _G =2.5Ω	--	15	--	ns
t _r	Rise Time		--	11	--	
t _{d(OFF)}	Turn-Off Delay Time		--	52	--	
t _f	Fall Time		--	13	--	
Q _g	Total Gate Charge	V _{DD} =30V, I _D =30A V _{GS} =10V	--	94	--	nC
Q _{gs}	Gate to Source Charge		--	16	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	24	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current ^{a2} (Body Diode)		--	--	90	A
V_{SD}	Diode Forward Voltage ^{a3}	$I_S=90A, V_{GS}=0V$	--	--	1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case ^{a2}	0.9	°C/W

^{a1} : Repetitive Rating: Pulse width limited by maximum junction temperature.

^{a2} : Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.

^{a3} : Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

^{a4} : Guaranteed by design, not subject to production

^{a5} : EAS condition : $T_j=25^\circ\text{C}, V_{DD}=35\text{V}, V_G=10\text{V}, L=0.5\text{mH}, R_g=25\Omega$

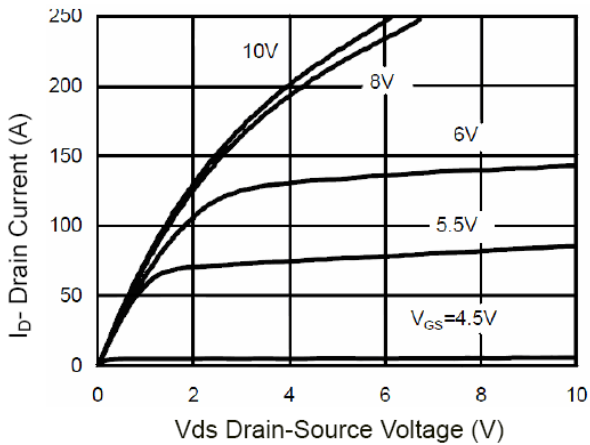


Figure 1 Output Characteristics

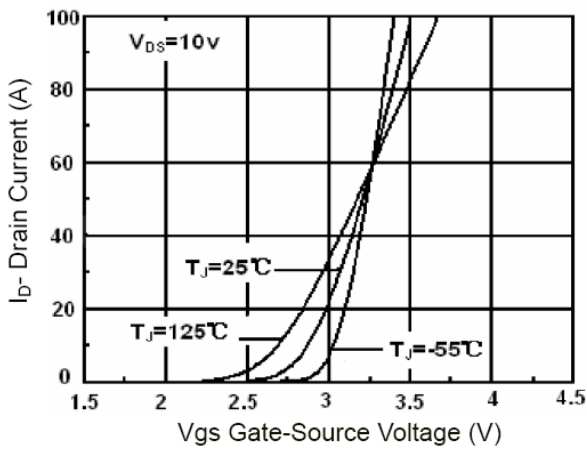


Figure 2 Transfer Characteristics

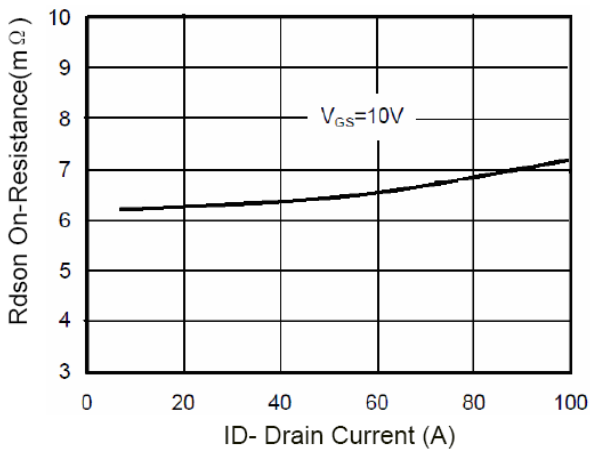


Figure 3 Rdson- Drain Current

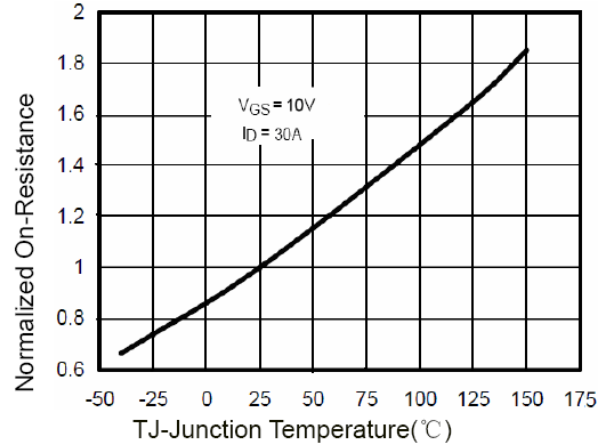


Figure 4 Rdson-Junction Temperature

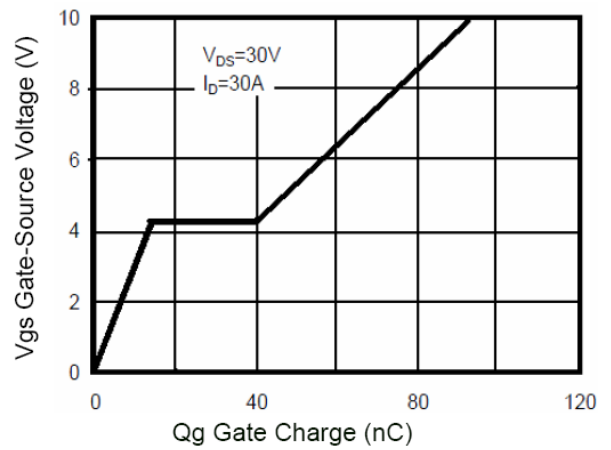


Figure 5 Gate Charge

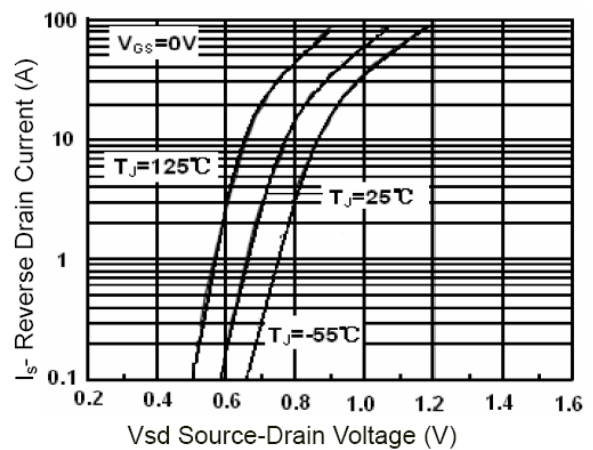


Figure 6 Source- Drain Diode Forward

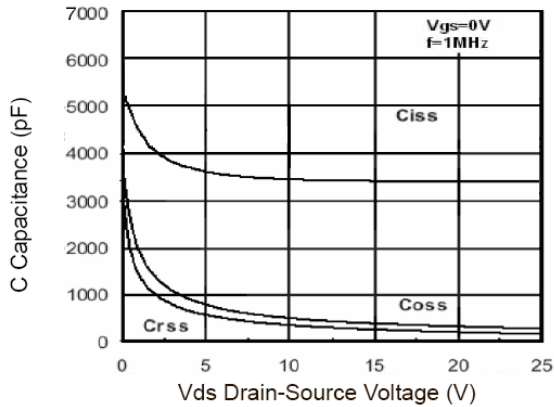


Figure 7 Capacitance vs Vds

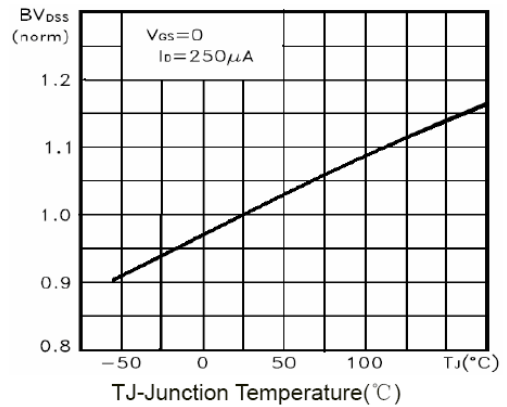


Figure 9 BV_{DSS} vs Junction Temperature

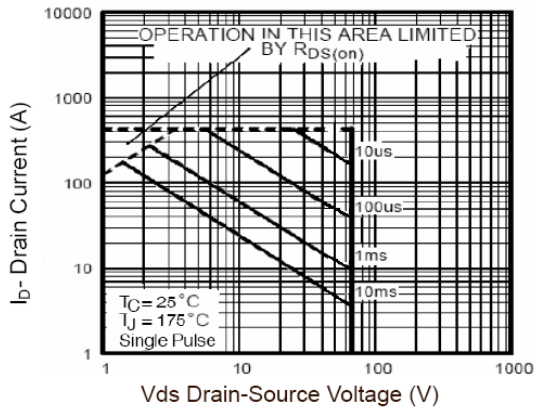


Figure 8 Safe Operation Area

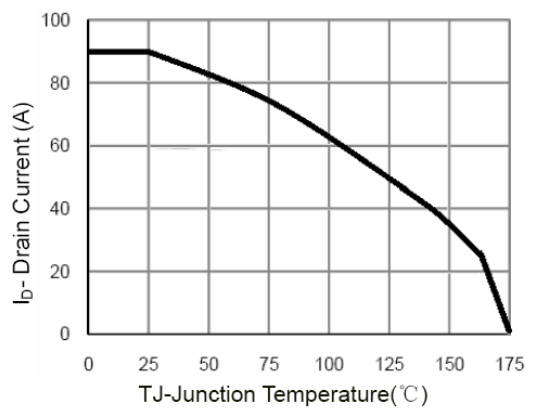


Figure 10 Current vs Junction Temperature

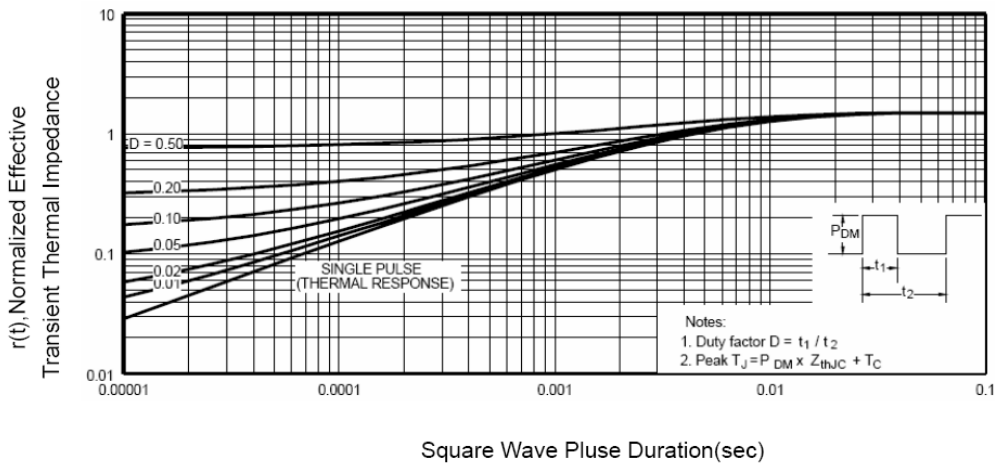


Figure 11 Normalized Maximum Transient Thermal Impedance