

Silicon N-Channel Power MOSFET

General Description:

The HMR80N07 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-252, which accords with the RoHS standard.

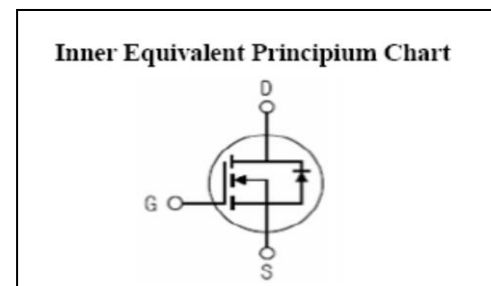
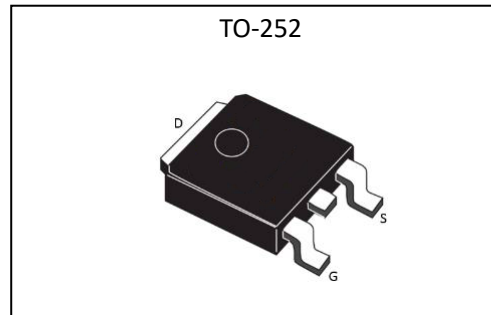
Features:

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications:

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

V _{DSS}	68	V
I _D	80	A
P _D	156	W
R _{DS(ON).TYP.}	6.5	mΩ



Absolute (T_c=25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-to-Source Voltage	70	V
I _D	Continuous Drain Current	80	A
	Continuous Drain Current T _c =100 °C	52	A
I _{DM}	Pulsed Drain Current	320	A
V _{GS}	Gate-to-Source Voltage	±20	V
E _{AS} ^{a2}	Single Pulse Avalanche Energy	600	mJ
E _{AR} ^{a1}	Avalanche Energy ,Repetitive	50	mJ
I _{AR} ^{a1}	Avalanche Current	33	A
dv/dt ^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P _D	Power Dissipation	156	W
T _J , T _{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	°C
T _L	Maximum Temperature for Soldering	300	°C

Electrical Characteristics (T_c=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	68	--	--	V
ΔBV _{DSS} /ΔT _J	Bvdss Temperature Coefficient	I _D =250uA, Reference 25°C	--	0.05	--	V/°C
I _{DSS}	Drain to Source Leakage Current	V _{DS} =65V, V _{GS} =0V, T _a =25°C	--	--	1	μA
		V _{DS} =56V, V _{GS} =0V, T _a =125°C	--	--	250	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} = 10V, I _D =40A	--	6.5	8.0	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						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =40A	15	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =60V f=1.0MHz	--	3396	--	pF
C _{oss}	Output Capacitance		--	435	--	
C _{rss}	Reverse Transfer Capacitance		--	151	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =40A, V _{DD} =35V V _{GS} =10V, R _G =3.0Ω	--	15	--	ns
t _r	Rise Time		--	44	--	
t _{d(OFF)}	Turn-Off Delay Time		--	31	--	
t _f	Fall Time		--	15	--	
Q _g	Total Gate Charge	I _D =40A, V _{DD} =35V V _{GS} =10V	--	58	--	nC
Q _{gs}	Gate to Source Charge		--	22	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	15	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	80	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	320	A
V_{SD}	Diode Forward Voltage	$I_S=80A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=40A, T_j = 25^\circ C$	--	33	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/us, V_{GS}=0V$	--	56	--	nC

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

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	0.8	$^\circ C/W$

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

a²: EAS condition : $T_j=25^\circ C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

a³: $I_{SD} = 80A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^\circ C$

Test Circuit and Waveform

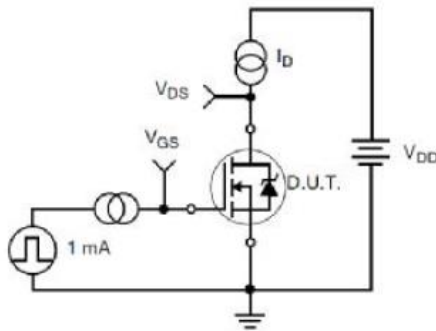


Figure 17. Gate Charge Test Circuit

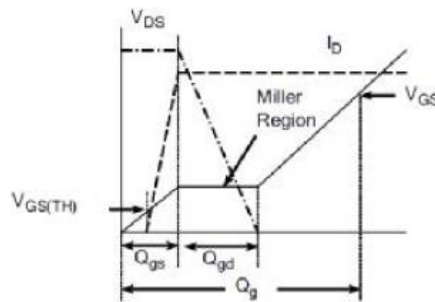


Figure 18. Gate Charge Waveform

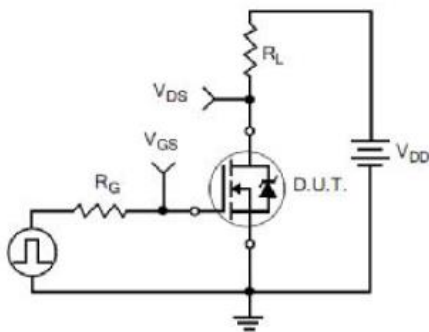


Figure 19. Resistive Switching Test Circuit

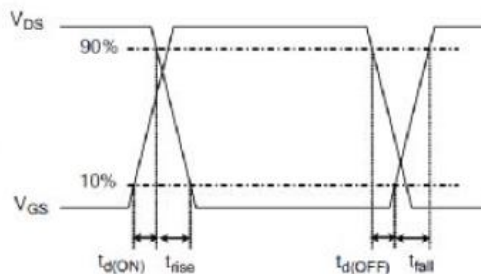


Figure 20. Resistive Switching Waveforms

Characteristics Curve:

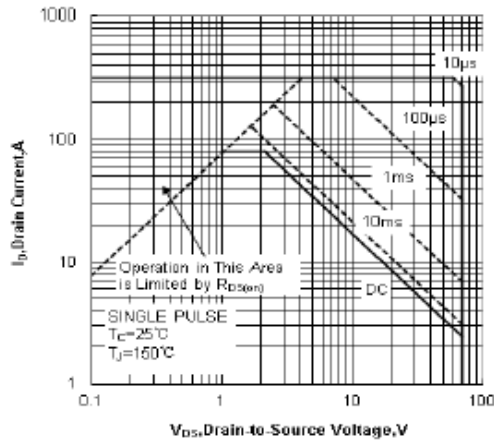


Figure 1 Maximum Forward Bias Safe Operating Area

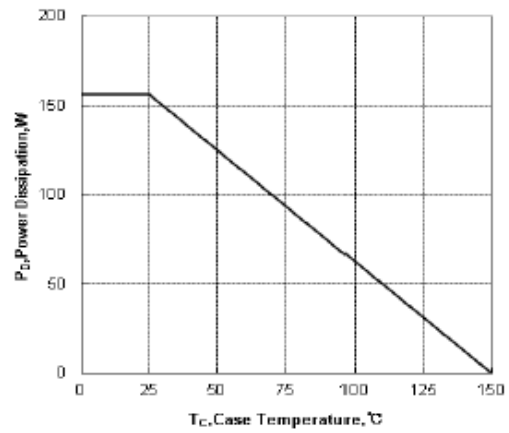


Figure 2 Maximum Power Dissipation vs Case Temperature

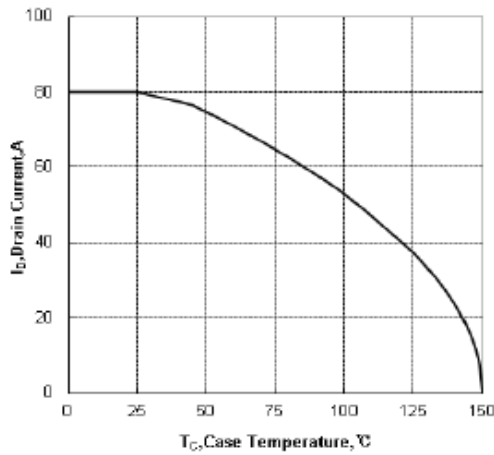


Figure 3 Maximum Continuous Drain Current vs Case Temperature

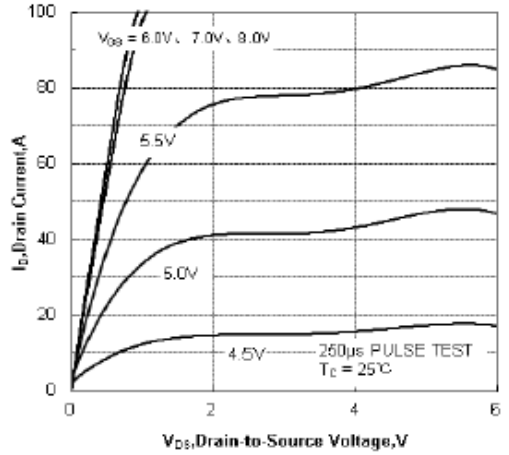


Figure 4 Typical Output Characteristics

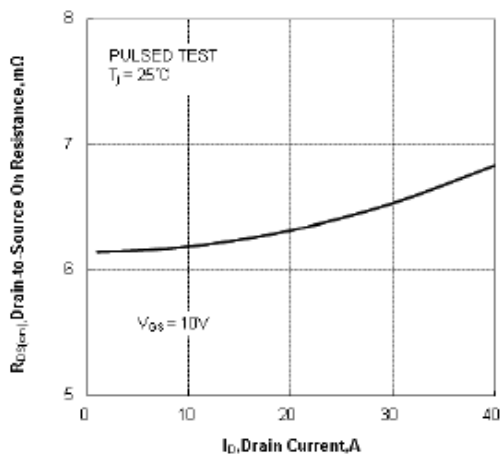


Figure 5 Drain-to-Source On Resistance vs Drain Current

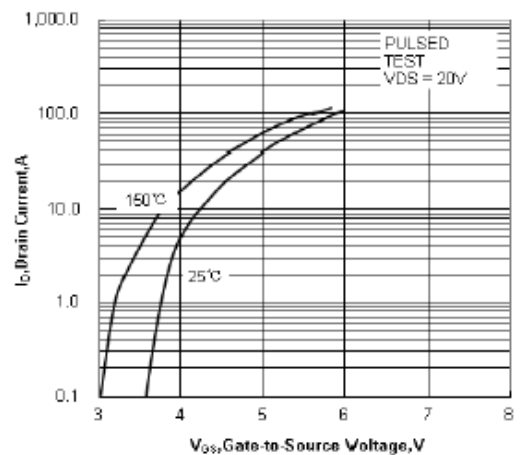


Figure 6 Typical Transfer Characteristics

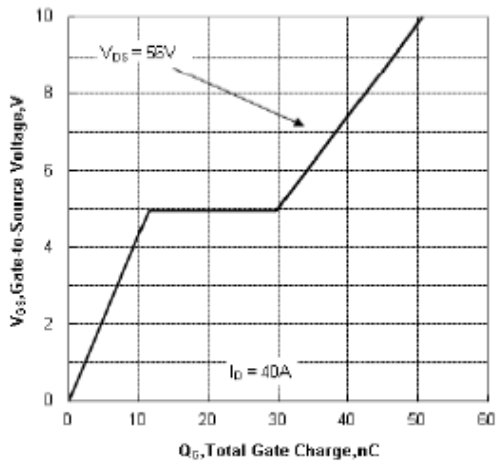


Figure 7 Typical Gate Charge vs Gate to Source Voltage

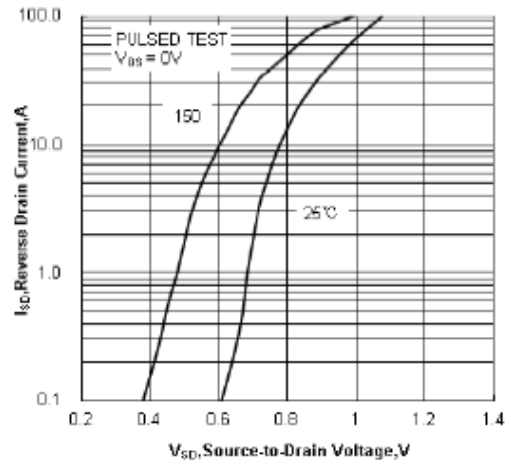


Figure 8 Typical Body Diode Transfer Characteristics

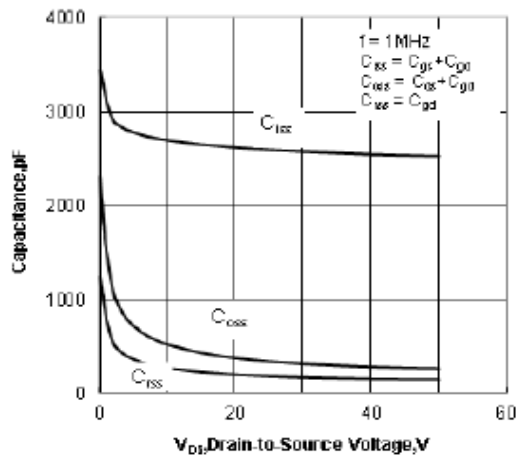


Figure 9 Typical Capacitance vs Drain to Source Voltage

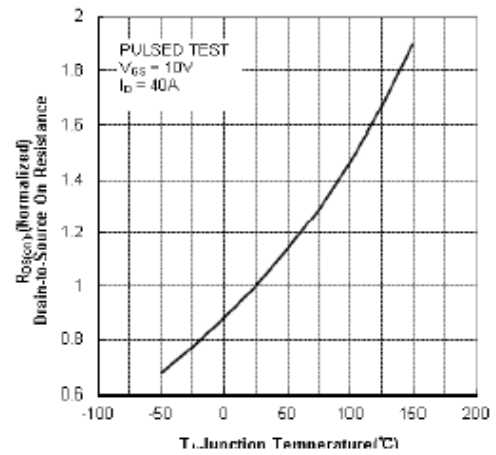


Figure 10 Typical Drain to Source on Resistance vs Junction Temperature

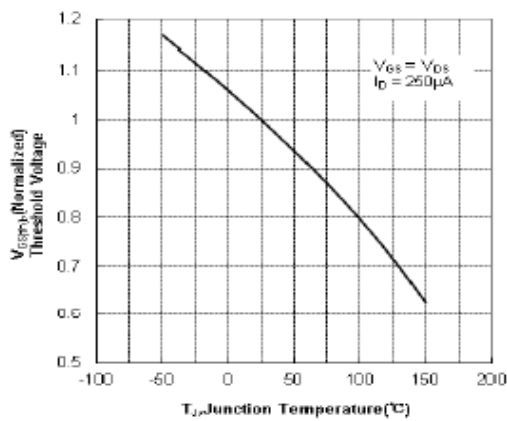


Figure 11 Typical Theshold Voltage vs Junction Temperature

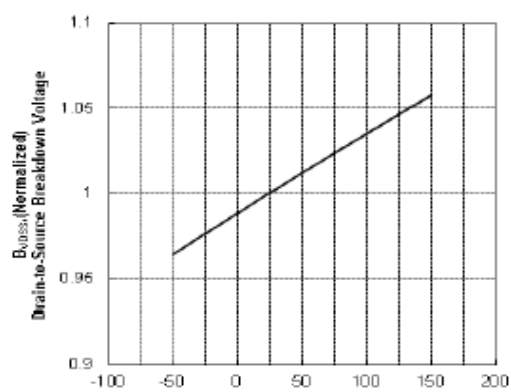


Figure 12 Typical Breakdown Voltage vs Junction Temperature