

General Description:

HMD05N250, the silicon N-channel Enhanced VDMOSFET, is obtained by the self-aligned very high Voltage 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-263, which accords with the RoHS standard.

Features:

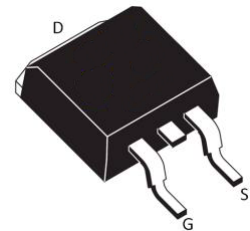
- Fast Switching
- High Blocking Voltage
- Low Gate Charge Minimize Switching loss
- Fast Recovery Body Diode
- 100% Single Pulse avalanche energy Test

Applications:

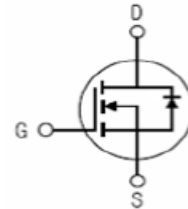
- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

V_{DSS}	2500	V
I_D	500	mA
$P_D(T_C=25^\circ\text{C})$	83	W
$R_{DS(ON)max}$	100	Ω

TO-263



Inner Equivalent Principium Chart



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	2500	V
I_D	Continuous Drain Current	500	mA
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$	2	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy	130	mJ
dv/dt	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	83	W
	Derating Factor above 25°C	0.67	W/°C
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	°C
T_L	Maximum Temperature for Soldering	300	°C
T_{PAK}	Leads at 0.63 in(1.6mm) from Case for 10 seconds, Package Body for 10 seconds	260	

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

Thermal Characteristics

Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.5	°C/ W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	°C/ W

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	$V_{GS}=0V, I_D=250\mu A$	2500	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=2500V, V_{GS}=0V, T_a=25^\circ C$	--	--	10	μA
		$V_{DS}=2000V, V_{GS}=0V, T_a=125^\circ C$	--	--	250	
$I_{GSS(F)}$	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	$V_{GS}=10V, I_D=0.25A$	--	--	100	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	--	4.5	V
g_{fs}	Forward Transconductance	$V_{DS}=60V, I_D=0.25A$	--	0.36	--	S

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ $f=1.0MHz$	--	500	--	pF
C_{oss}	Output Capacitance		--	33	--	
C_{rss}	Reverse Transfer Capacitance		--	6	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=0.5A, V_{DD}=100V$ $V_{GS}=10V, R_g=10\Omega$	--	15	--	ns
t_r	Rise Time		--	16	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	30	--	
t_f	Fall Time		--	28	--	
Q_g	Total Gate Charge	$I_D=0.25A, V_{DD}=1000V$ $V_{GS}=10V$	--	12	--	nC
Q_{gs}	Gate to Source Charge		--	5	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	8	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_{SD}	Continuous Source Current (Body Diode)		--	--	0.5	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	2	A
V_{SD}	Diode Forward Voltage	$I_S=0.5A, V_{GS}=0V$	--	--	5	V
t_{rr}	Reverse Recovery Time	$I_S=0.5A, T_j=25^{\circ}C$	--	800	--	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s, V_{GS}=0V$	--	5.1	--	uC
*Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Characteristics Curve:

Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

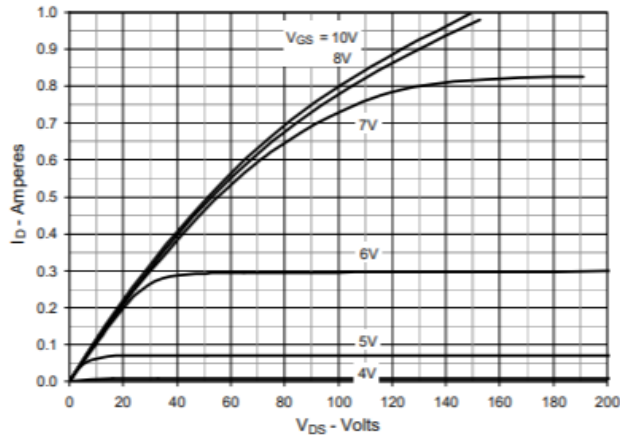


Fig. 2. Output Characteristics @ $T_J = 125^\circ\text{C}$

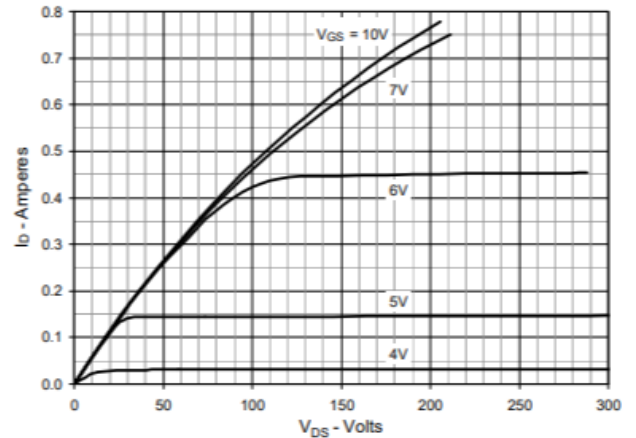


Fig. 3. $R_{DS(on)}$ Normalized to $I_D = 0.25A$ Value vs. Junction Temperature

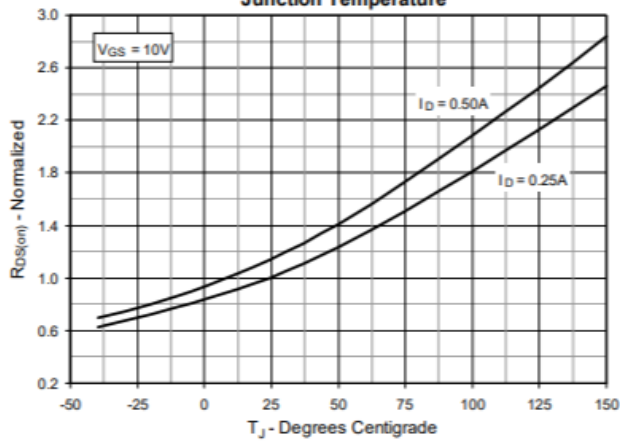


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 0.25A$ Value vs. Drain Current

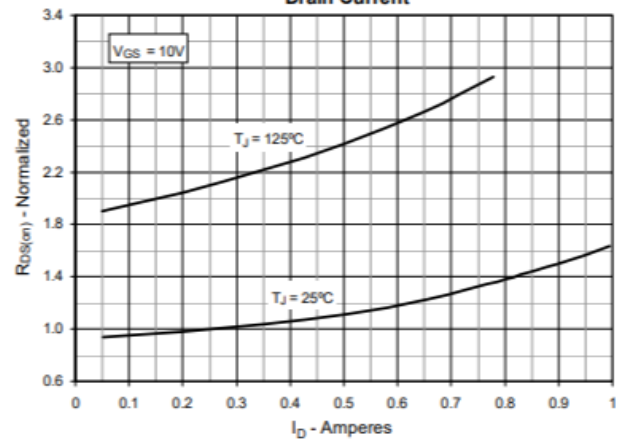


Fig. 5. Maximum Drain Current vs. Case Temperature

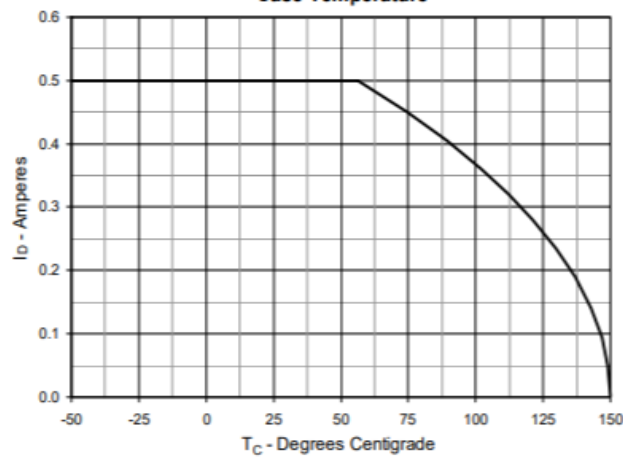


Fig. 6. Input Admittance

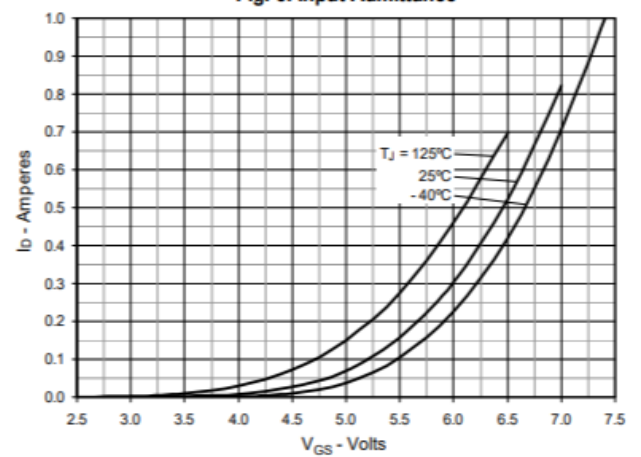


Fig. 7. Transconductance

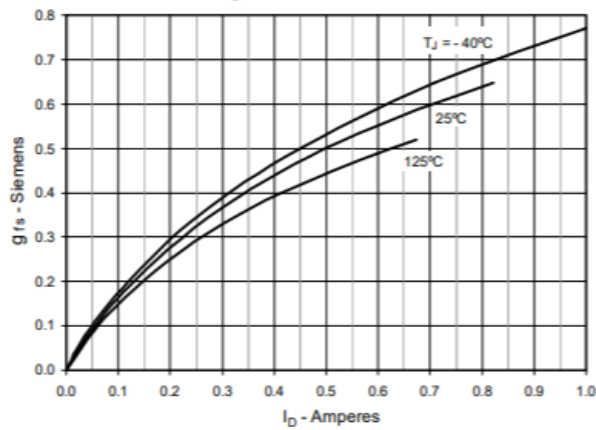


Fig. 8. Forward Voltage Drop of Intrinsic Diode

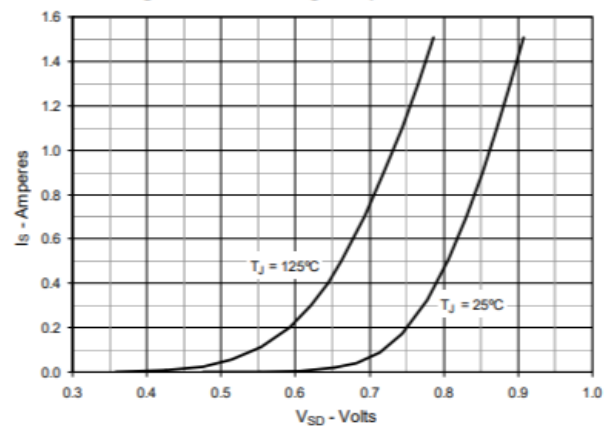


Fig. 9. Gate Charge

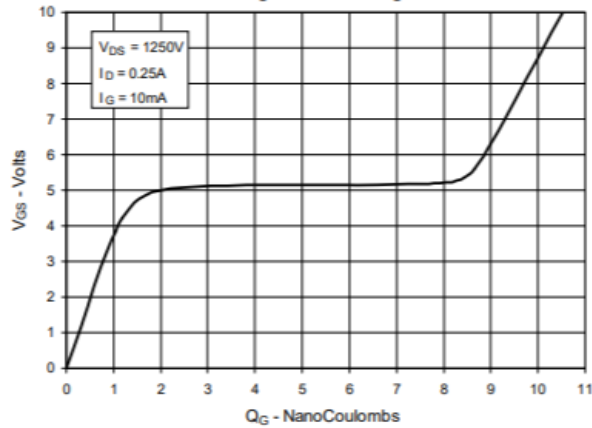


Fig. 10. Capacitance

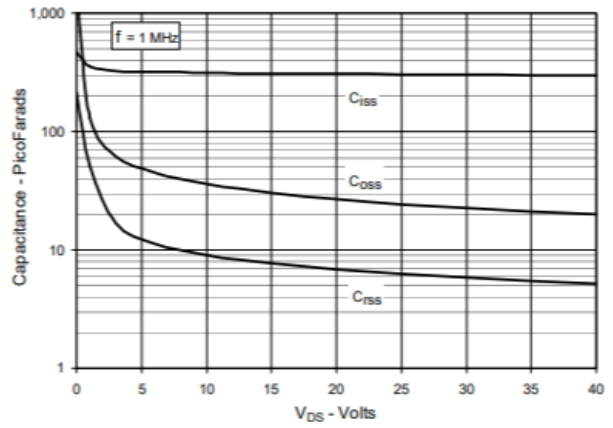


Fig. 11. Maximum Transient Thermal Impedance

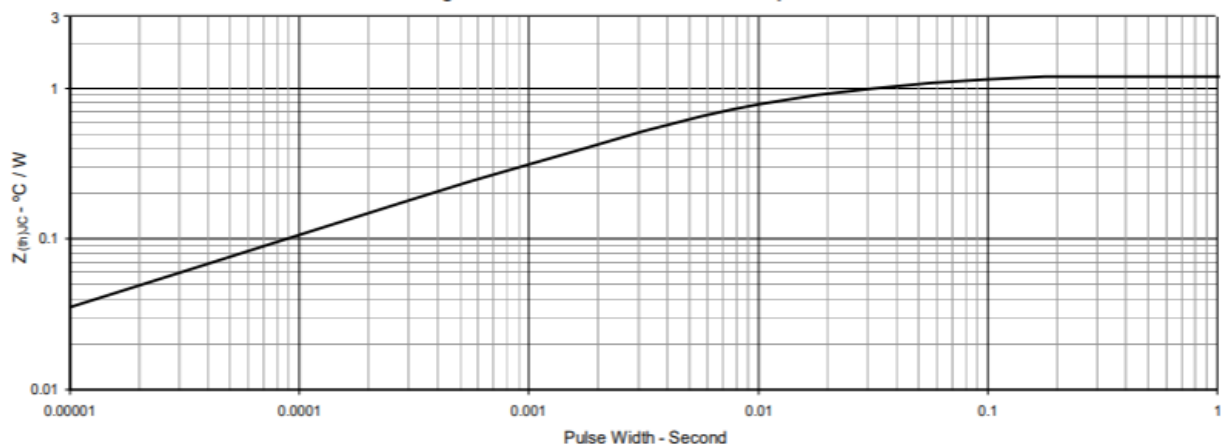


Fig. 13. Forward-Bias Safe Operating Area
@ $T_C = 25^\circ\text{C}$

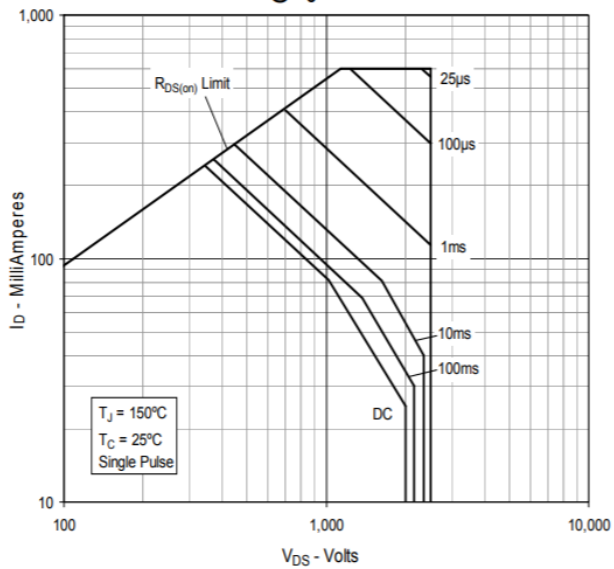


Fig. 14. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$

