



N-Channel 25-V (D-S) MOSFET

CHARACTERISTICS

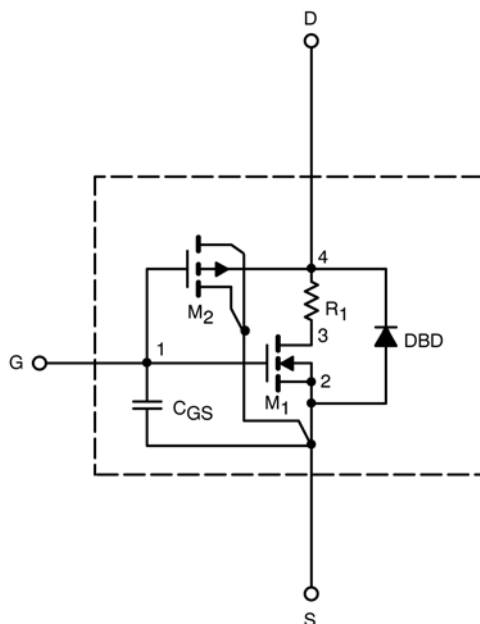
- N-Channel Vertical DMOS
- Macro Model (Model Subcircuit)
- Level 3 MOS
- Apply for both Linear and Switching Application
- Accurate over the -55 to 125°C Temperature Range
- Model the Gate Charge, Transient, and Diode Reverse Recovery Characteristics

DESCRIPTION

The attached spice model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over the -55 to 125°C temperature ranges under the pulsed 0-V to 10-V gate drive. The saturated output impedance is best fit at the gate bias near the threshold voltage.

A novel gate-to-drain feedback capacitance network is used to model the gate charge characteristics while avoiding convergence difficulties of the switched C_{gd} model. All model parameter values are optimized to provide a best fit to the measured electrical data and are not intended as an exact physical interpretation of the device.

SUBCIRCUIT MODEL SCHEMATIC

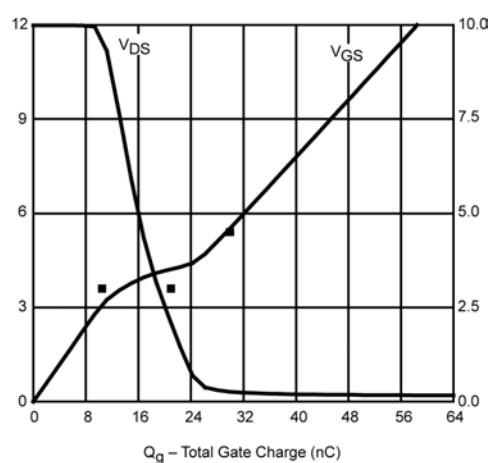
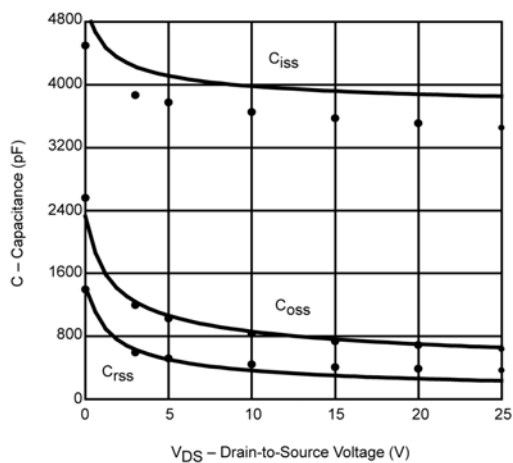
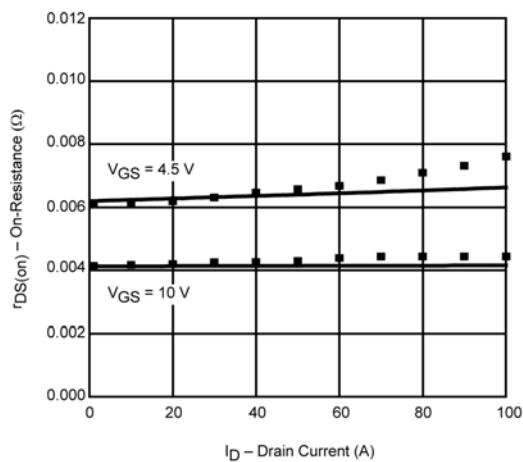
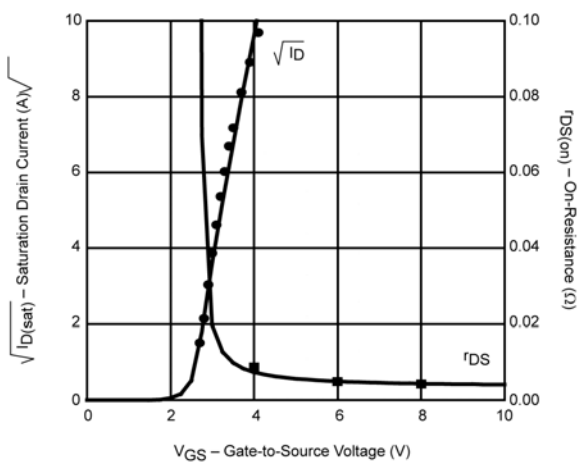
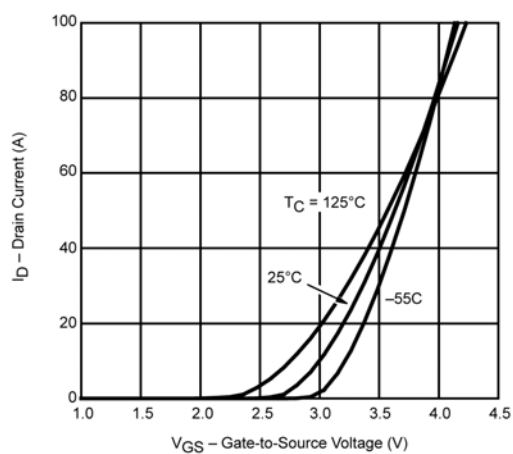
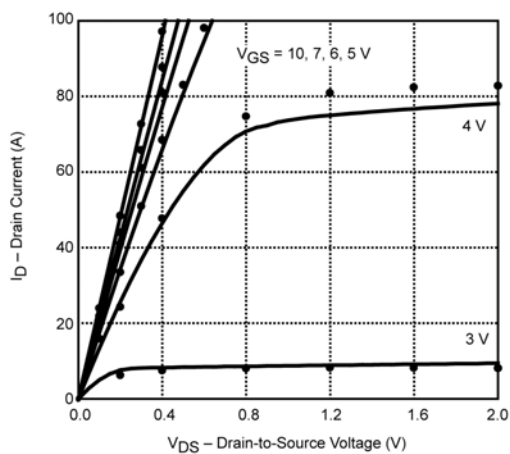


SPECIFICATIONS (T _J = 25°C UNLESS OTHERWISE NOTED)					
Parameter	Symbol	Test Condition	Simulated Data	Measured Data	Unit
Static					
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.8		V
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	1013		A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	0.0041	0.0042	Ω
		V _{GS} = 4.5 V, I _D = 15 A	0.0063	0.0062	
Forward Voltage ^a	V _{SD}	I _S = 30 A, V _{GS} = 0 V	0.90	0.90	V
Dynamic^b					
Input Capacitance	C _{iss}	V _{DS} = 12 V, V _{GS} = 0 V, f = 1 MHz	3956	3600	pF
Output Capacitance	C _{oss}		820	790	
Reverse Transfer Capacitance	C _{rss}		338	430	
Total Gate Charge	Q _g	V _{DS} = 12 V, V _{GS} = 4.5 V, I _D = 50 A	30	30	nC
Gate-Source Charge	Q _{gs}		10.5	10.5	
Gate-Drain Charge	Q _{gd}		10.5	10.5	

Notes

a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

b. Guaranteed by design, not subject to production testing.

COMPARISON OF MODEL WITH MEASURED DATA ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Note: Dots and squares represent measured data.