

N-Channel 20 V (D-S) MOSFET

DESCRIPTION

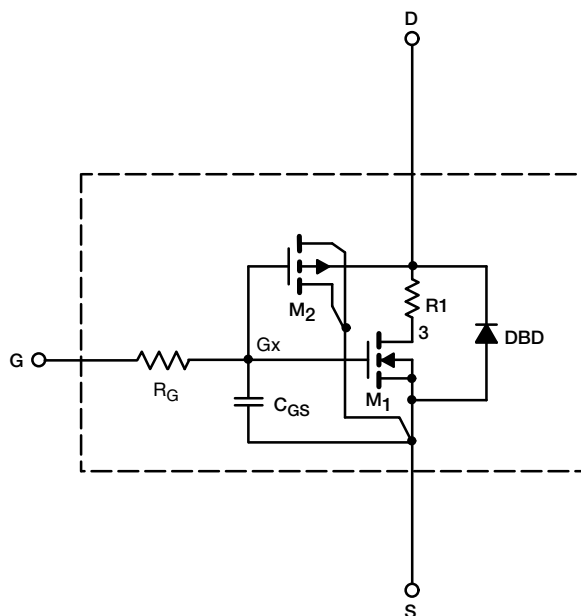
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The sub-circuit model is extracted and optimized over the -55 °C to +125 °C temperature ranges under the pulsed 0 V to 4.5 V gate drive. The saturated output impedance is best fit at the gate bias 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.

CHARACTERISTICS

- N-Channel Vertical DMOS
- Macro Model (Sub-circuit Model)
- Level 3 MOS
- Apply for both Linear and Switching Application
- Accurate over the -55 °C to +125 °C Temperature Range
- Model the Gate Charge

SUBCIRCUIT MODEL SCHEMATIC



Note

- This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.



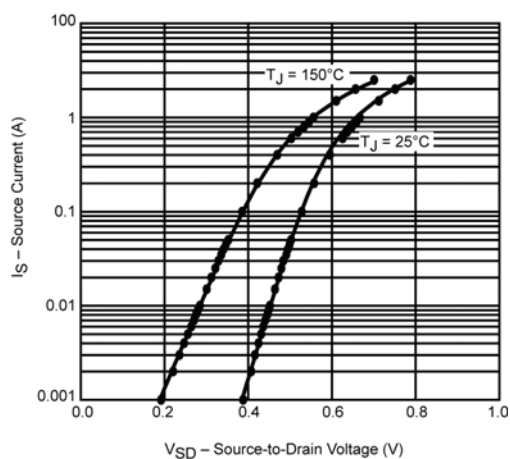
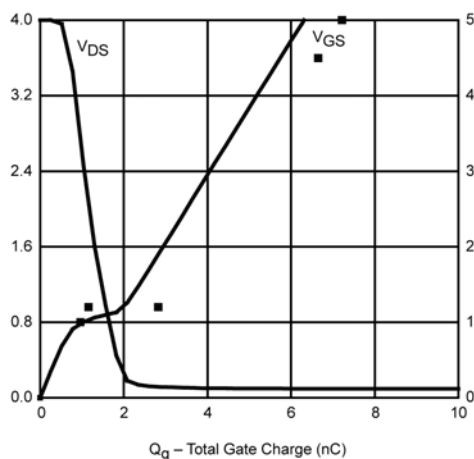
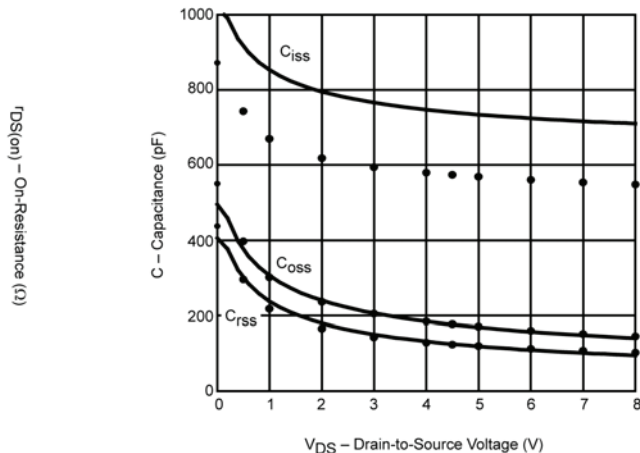
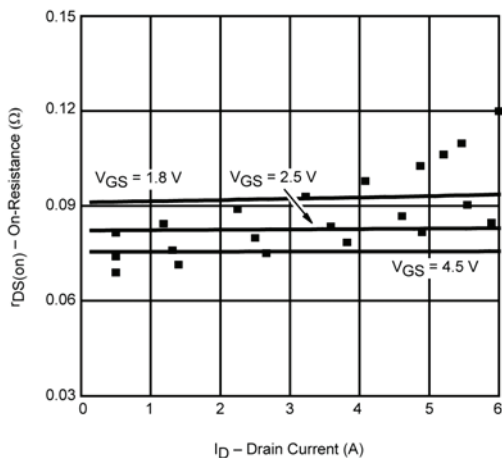
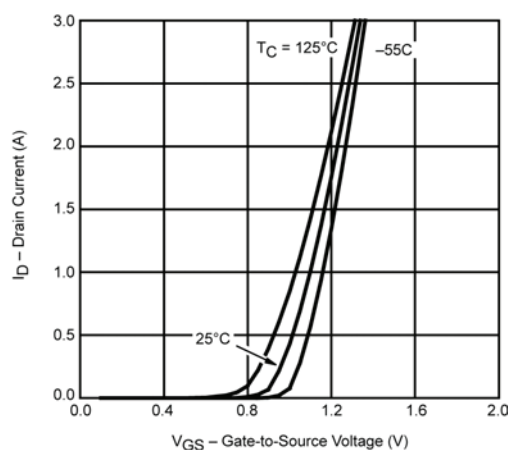
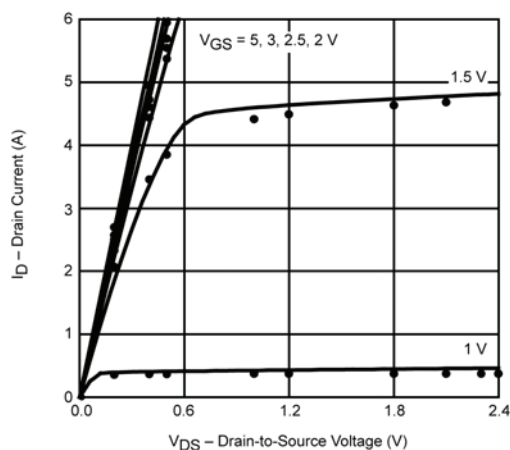
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.58	-	V
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq 5\text{ V}$, $V_{GS} = 4.5\text{ V}$	56	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 1.34\text{ A}$	0.076	0.071	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 1.29\text{ A}$	0.083	0.078	
		$V_{GS} = 1.8\text{ V}$, $I_D = 1.23\text{ A}$	0.093	0.085	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 4\text{ V}$, $I_D = 1.34\text{ A}$	8	4.12	S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1\text{ A}$	0.86	0.80	V
Dynamic ^b					
Input Capacitance	C_{iss}	$V_{DS} = 4\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	748	585	pF
Output Capacitance	C_{oss}		185	190	
Reverse Transfer Capacitance	C_{rss}		132	130	
Total Gate Charge	Q_g	$V_{DS} = 4\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 1.34\text{ A}$	6.4	7.7	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = 4\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 1.34\text{ A}$	5.7	7.1	
Gate-Drain Charge	Q_{gd}		1.14	1.14	
			1.69	1.69	

Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
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.

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