P-Channel 8 V (D-S) MOSFET

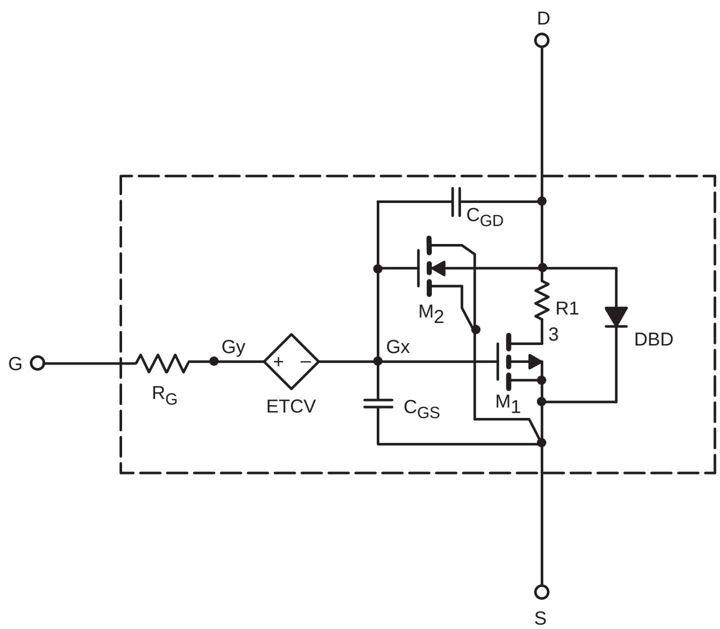
DESCRIPTION

The attached SPICE model describes the typical electrical characteristics of the p-channel vertical DMOS. The subcircuit model is extracted and optimized over the -55 °C to +125 °C temperature ranges under the pulsed 0 V to 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

- P-Channel Vertical DMOS
- Macro Model (Subcircuit 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.

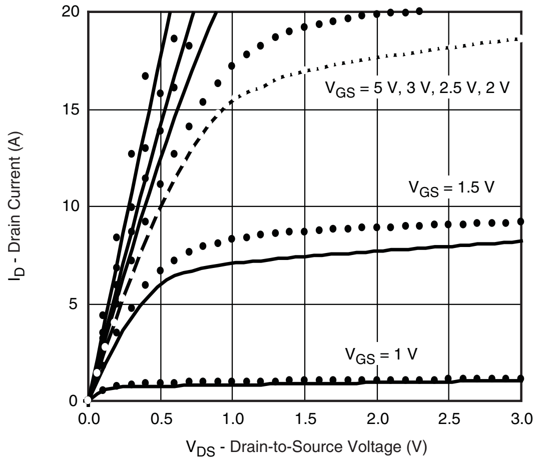
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**SIMULATED DATA**	**MEASURED DATA**	**UNIT**
Static					
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = - 250 µA	0.5	-	V
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 4.4 A	0.028	0.028	Ω
		V_{GS} = - 2.5 V, I_D = - 3.8 A	0.037	0.039	
Forward Transconductance [a]	g_{fs}	V_{DS} = - 4 V, I_D = - 4.4 A	16	17	S
Diode Forward Voltage [a]	V_{SD}	I_S = - 3.5 A	- 0.74	- 0.80	V
Dynamic b					
Input Capacitance	C_{iss}	V_{DS} = - 4 V, V_{GS} = 0 V, f = 1 MHz	961	960	pF
Output Capacitance	C_{oss}		333	330	
Reverse Transfer Capacitance	C_{rss}		296	300	
Total Gate Charge	Q_g	V_{DS} = - 4 V, V_{GS} = - 8 V, I_D = - 4.4 A	15	20	nC
		V_{DS} = - 4 V, V_{GS} = - 4.5 V, I_D = - 4.4 A	9.3	12	
Gate-Source Charge	Q_{gs}		1.5	1.5	
Gate-Drain Charge	Q_{gd}		3.1	3.1	

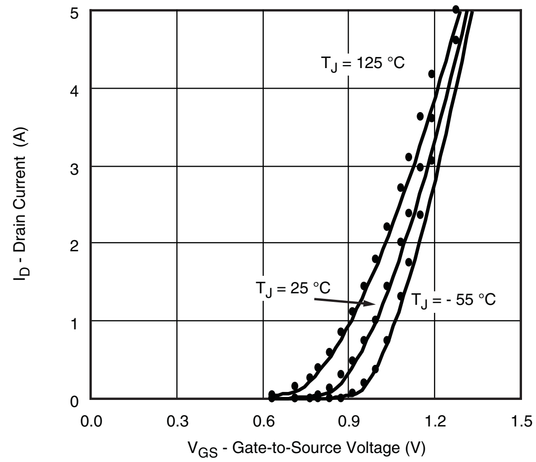
Notes

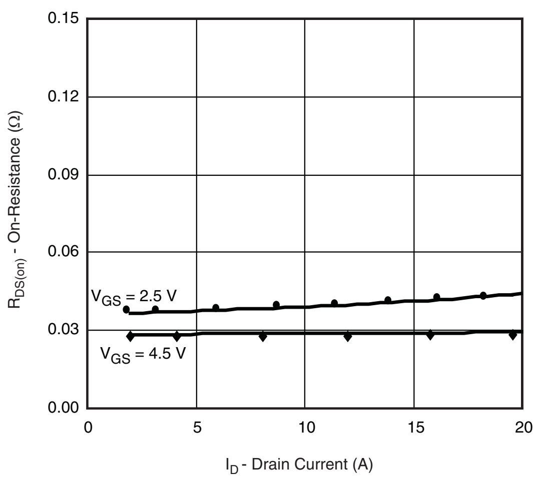
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

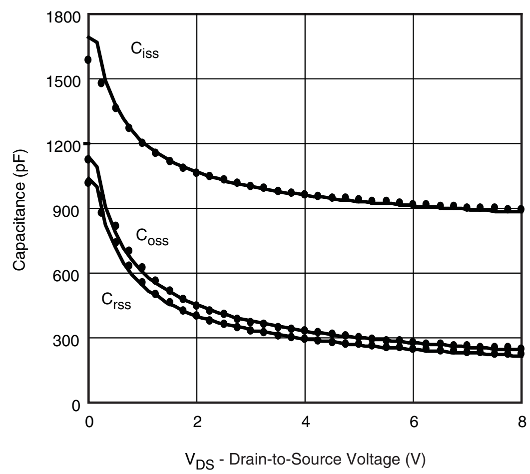
b. Guaranteed by design, not subject to production testing.

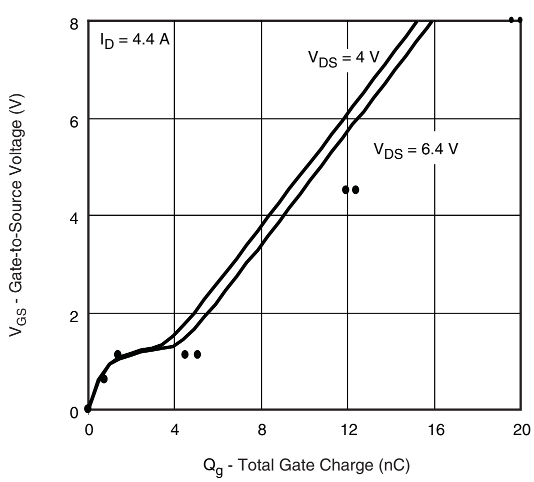
COMPARISON OF MODEL WITH MEASURED DATA (T_J = 25 °C, unless otherwise noted)

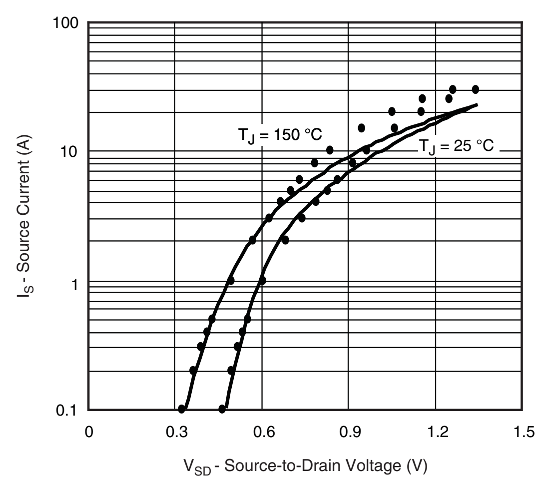








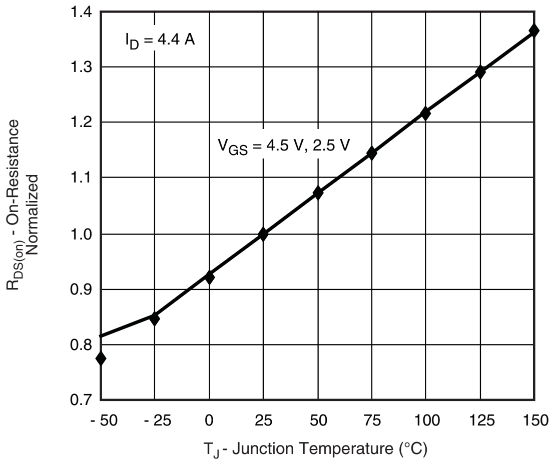


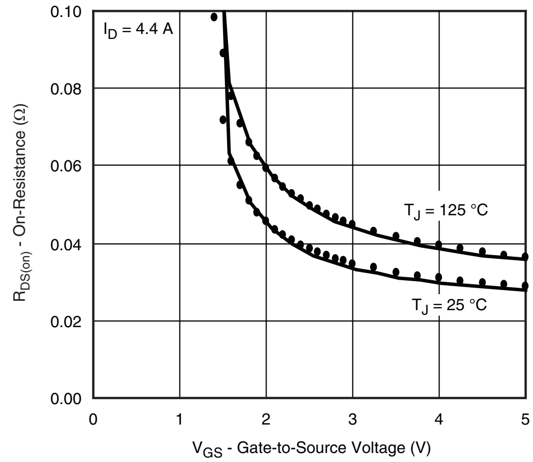


Note

- Dots and squares represent measured data.

COMPARISON OF MODEL WITH MEASURED DATA (T_J = 25 °C, unless otherwise noted)





Note

- Dots and squares represent measured data.

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