D Series Power MOSFET

DESCRIPTION

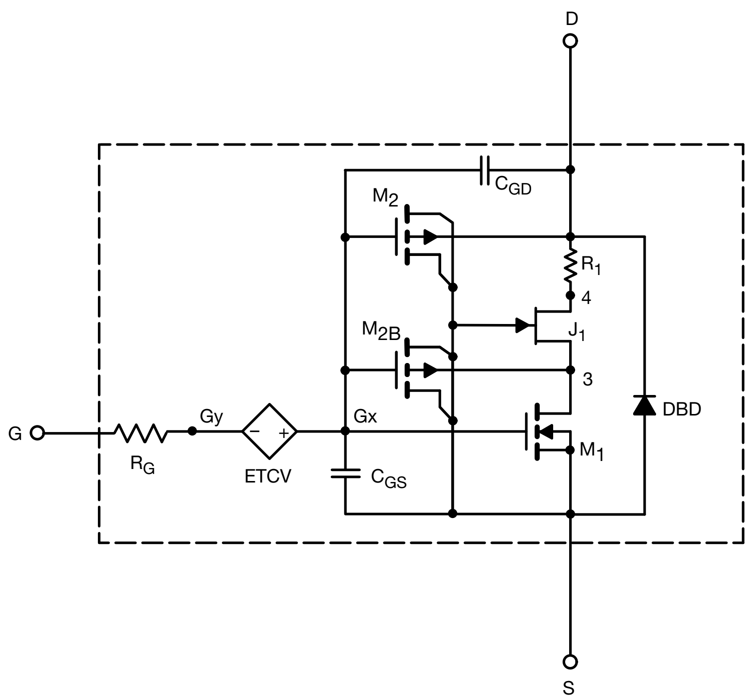
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over 25 °C to 150 °C temperature ranges under the pulsed 0 V to 15 V gate drive. The saturated output impedance is best fit at the gate bias near the 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 (subcircuit model)
- Level 3 MOS
- Apply for both linear and switching application
- Accurate over 25 °C to 150 °C temperature range
- Model the gate charge

SUBCIRCUIT MODEL SCHEMATIC

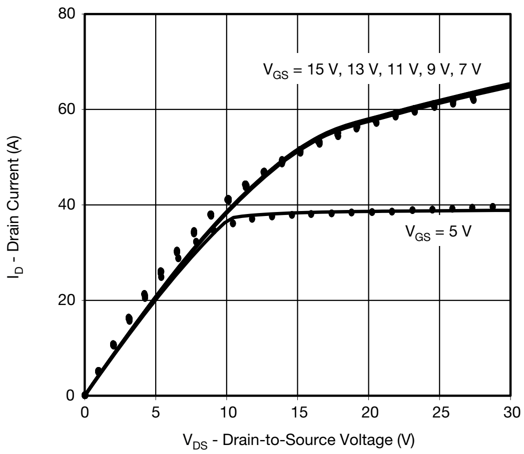


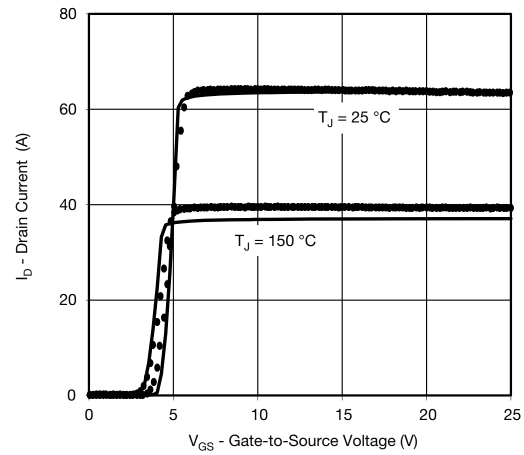
Note

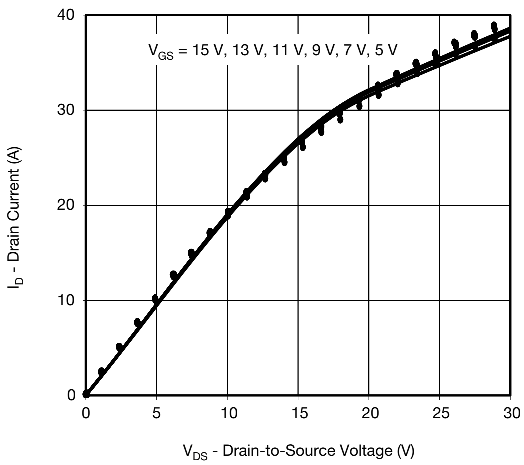
- This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

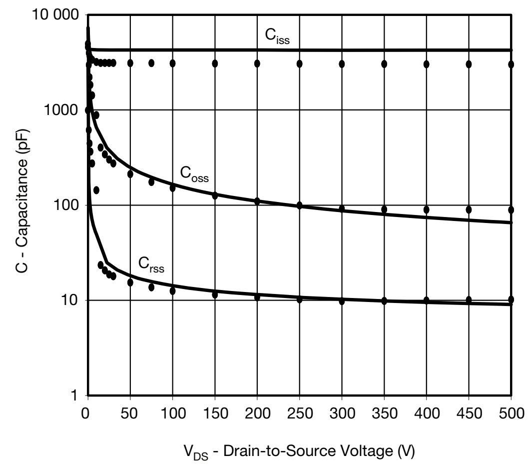
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**SIMULATED DATA**	**MEASURED DATA**	**UNIT**
Static					
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA	3	-	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A	0.23	0.20	Ω
Forward Transconductance	g_{fs}	V_{DS} = 50 V, I_D = 10 A	26	12	S
Dynamic					
Input Capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	4270	3094	pF
Output Capacitance	C_{oss}		161	152	
Reverse Transfer Capacitance	C_{rss}		14	13	
Total Gate Charge	Q_g	V_{DS} = 400 V, V_{GS} = 10 V, I_D = 10 A	80	85	nC
Gate-Source Charge	Q_{gs}		14	14	
Gate-Drain Charge	Q_{gd}		28	28	
Drain-Source Body Diode Characteristics					
Diode Forward Voltage	V_{SD}	T_J = 25 °C, I_S = 10 A, V_{GS} = 0 V	0.9	-	V
Reverse Recovery Time	t_{rr}	T_J = 25 °C, $I_F = I_S$ = 10 A, dI/dt = 100 A/µs, V_R = 20 V	430	437	ns
Reverse Recovery Charge	Q_{rr}		6.3	5.9	µC

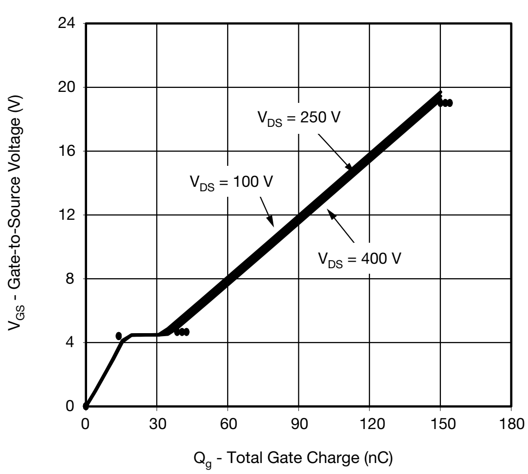
COMPARISON OF MODEL WITH MEASURED DATA (T_J = 25 °C, unless otherwise noted)

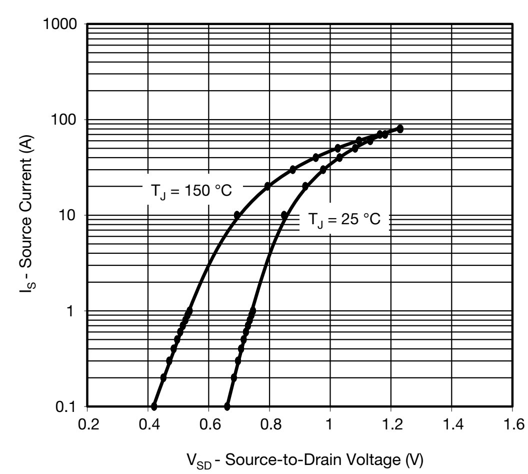












Note

- Dots and squares represent measured data.

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