E Series Power MOSFET

DESCRIPTION

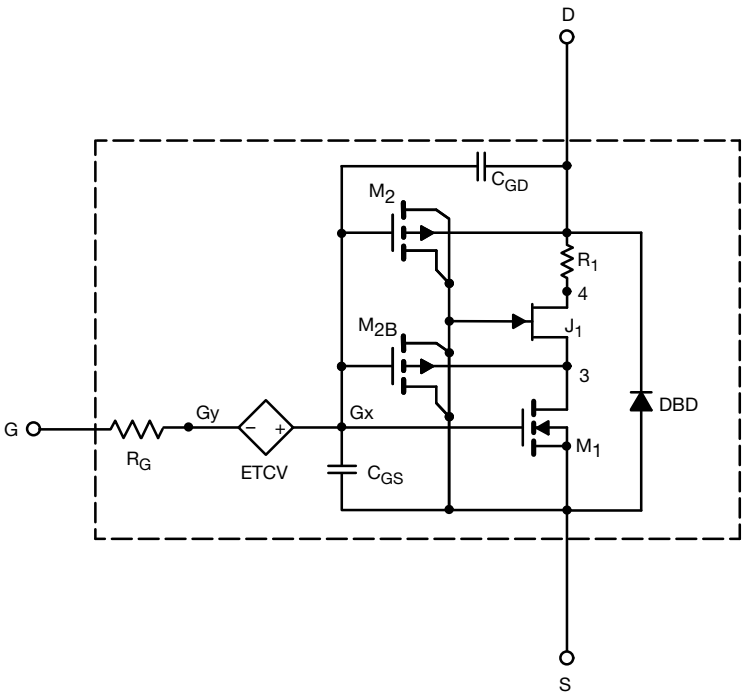
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over 25 °C to 150 °C temperature ranges under the pulsed 0 V to 15 V gate drive. The saturated output impedance is best fit at the gate bias near the 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

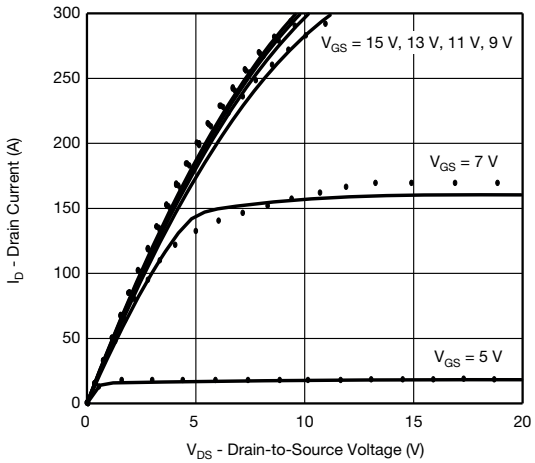


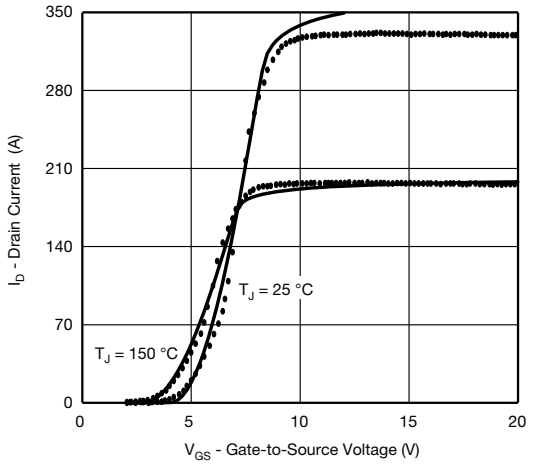
Note

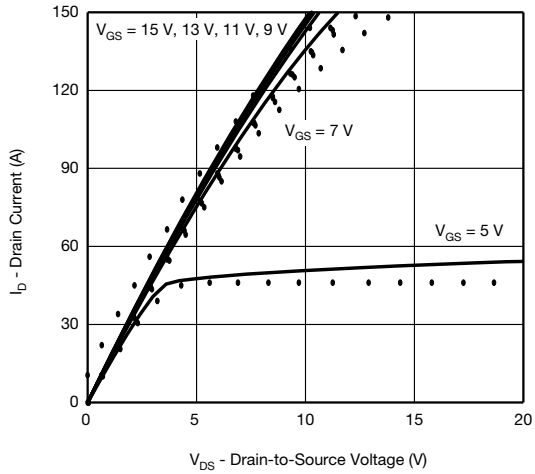
- This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits

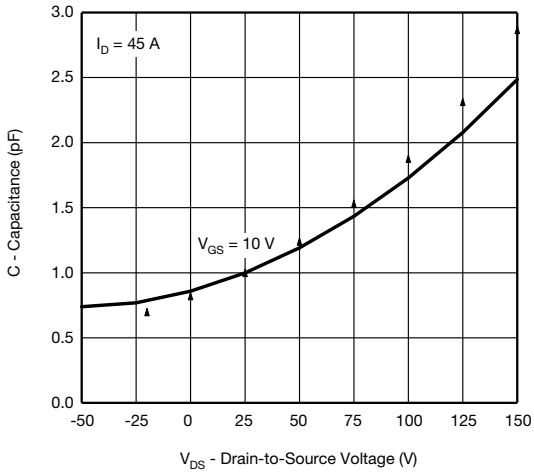
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**SIMULATED DATA**	**MEASURED DATA**	**UNIT**
Static					
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	3	-	V
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 45 A	0.025	0.025	Ω
Forward transconductance	g_{fs}	V_{DS} = 30 V, I_D = 45 A	50	32	S
Dynamic					
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	12 300	11 826	pF
Output capacitance	C_{oss}		884	528	
Reverse transfer capacitance	C_{rss}		9	9	
Total gate charge	Q_g	V_{DS} = 520 V, V_{GS} = 10 V, I_D = 45 A	389	394	nC
Gate-source charge	Q_{gs}		84	84	
Gate-drain charge	Q_{gd}		160	160	
Drain-Source Body Diode Characteristics					
Diode forward voltage	V_{SD}	T_J = 25 °C, I_S = 45 A, V_{GS} = 0 V	0.90	0.90	V
Reverse recovery time	t_{rr}	T_J = 25 °C, I_F = I_S = 45 A, di/dt = 100 A/µs, V_R = 25 V	960	971	ns
Reverse recovery charge	Q_{rr}		38	26	µC

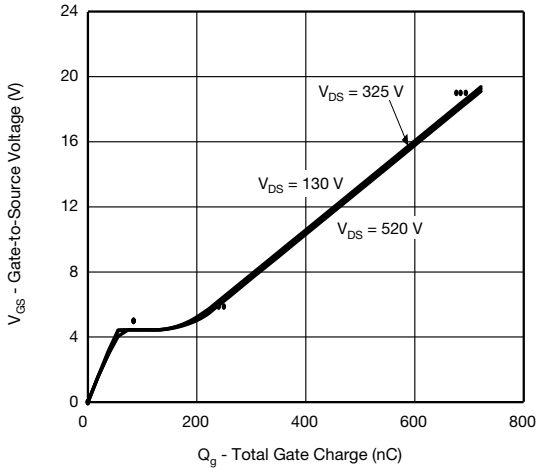
COMPARISON OF MODEL WITH MEASURED DATA (T_J = 25 °C, unless otherwise noted)

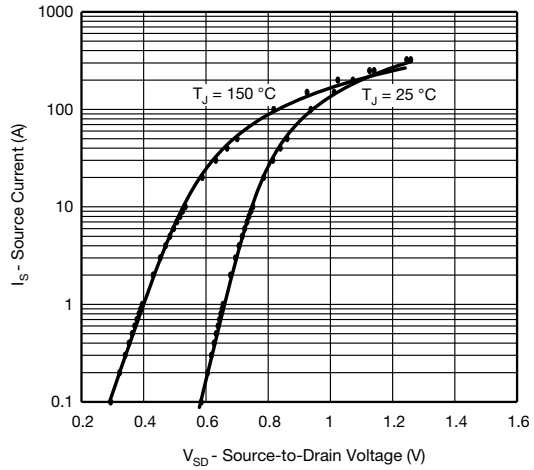












Note

- Dots and squares represent measured data.

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