

E Series Power MOSFET with Fast Body Diode

DESCRIPTION

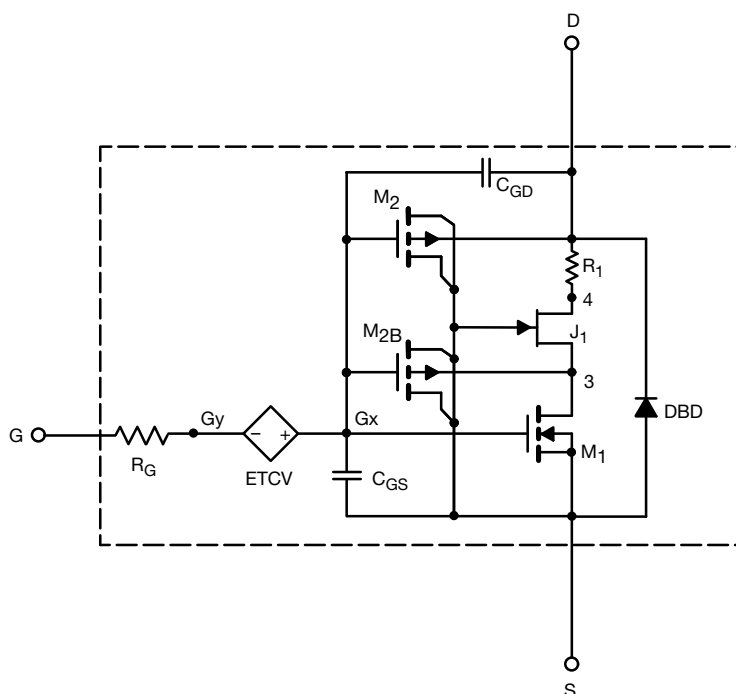
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over -55 °C to +150 °C temperature ranges under the pulsed 0 V to 15 V gate drive. The saturated output impedance is best fit at the gate bias near 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 -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



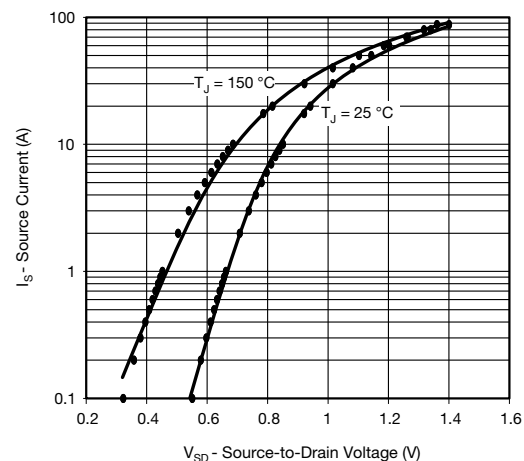
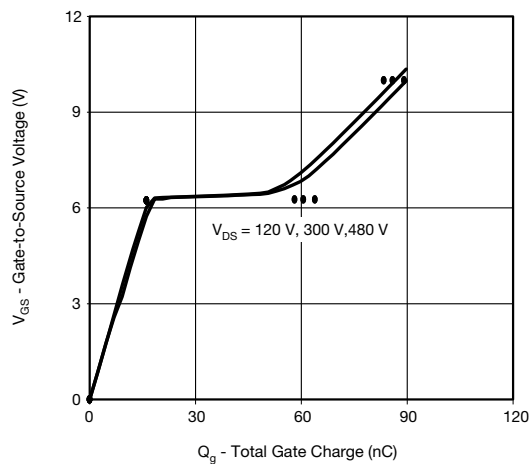
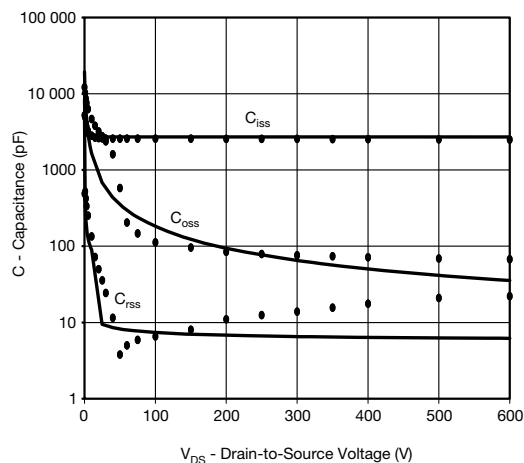
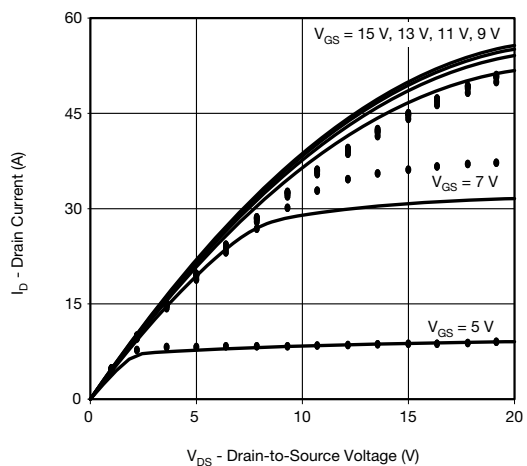
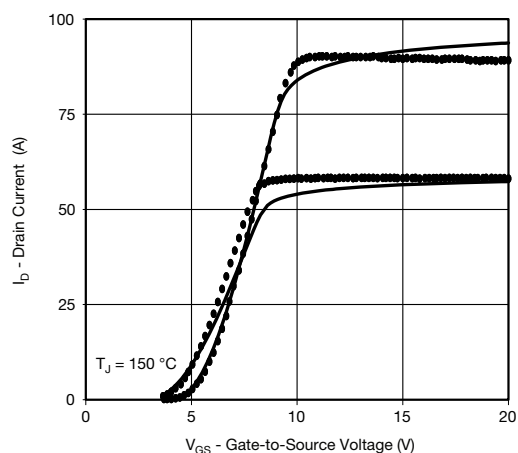
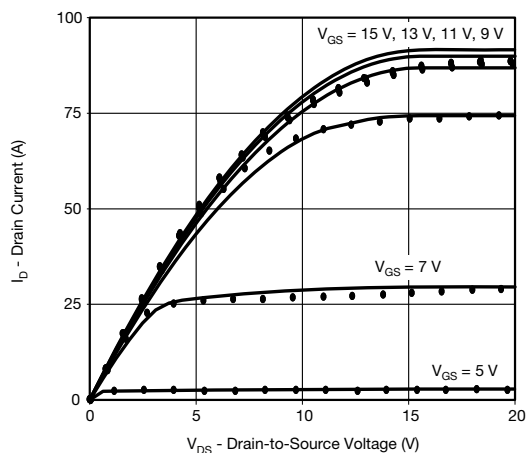
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	3	-	V
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 17 A	0.099	0.084	Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = 30 V, I _D = 17 A	14	8	S
Body Diode Voltage	V _{SD}	I _S = 17 A, V _{GS} = 0 V	0.9	-	V
Dynamic ^b					
Input Capacitance	C _{iss}	V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz	2720	2568	pF
Output Capacitance	C _{oss}		178	113	
Reverse Transfer Capacitance	C _{rss}		7.3	7	
Total Gate Charge	Q _g	V _{DS} = 480 V, V _{GS} = 10 V, I _D = 17 A	90	89	nC
Gate-Source Charge	Q _{gs}		16	16	
Gate-Drain Charge	Q _{gd}		39	48	
Drain-Source Body Diode Characteristics					
Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = I _S = 17 A, di/dt = 100 A/μs, V _R = 400 V	160	150	ns
Reverse Recovery Charge	Q _{rr}		1.2	1.1	μC

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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