

N-Channel 60 V (D-S) MOSFET

DESCRIPTION

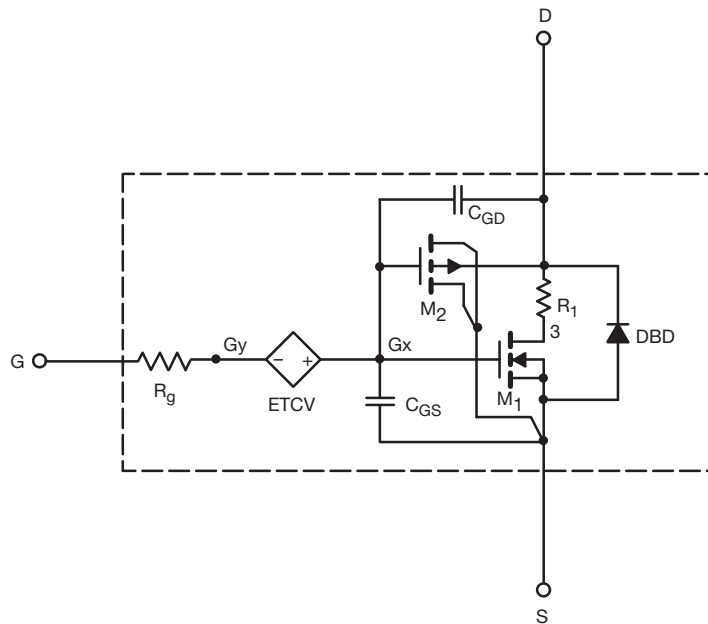
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over -55 °C to +125 °C temperature ranges under the pulsed 0 V to 10 V gate drive. The saturated output impedance is best fit at the gate bias near 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.



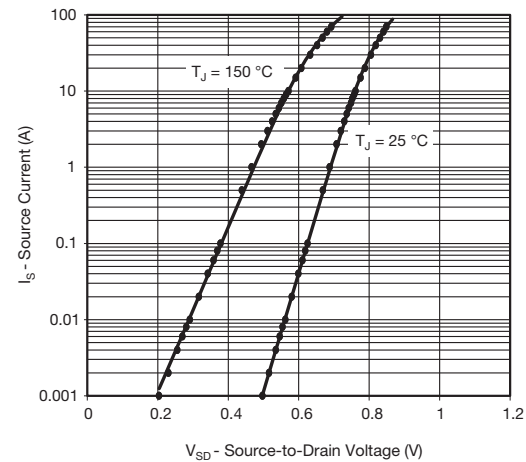
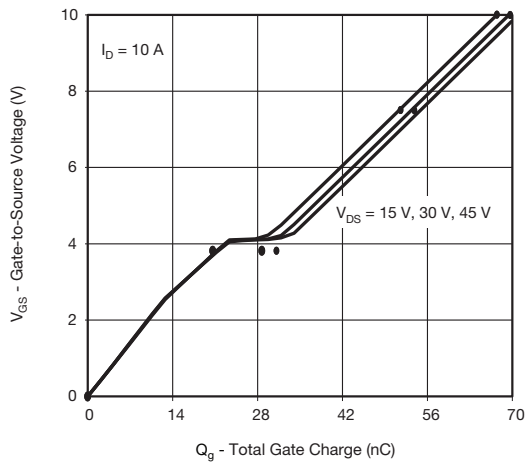
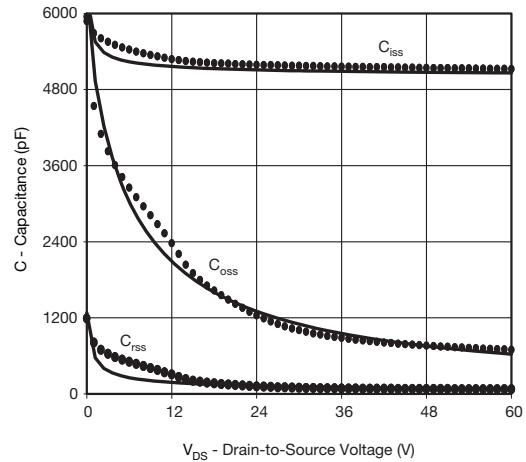
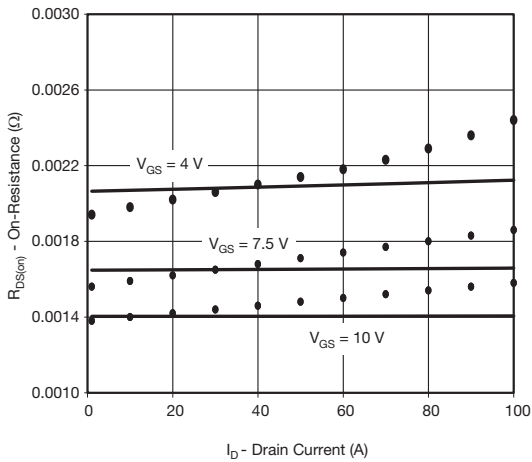
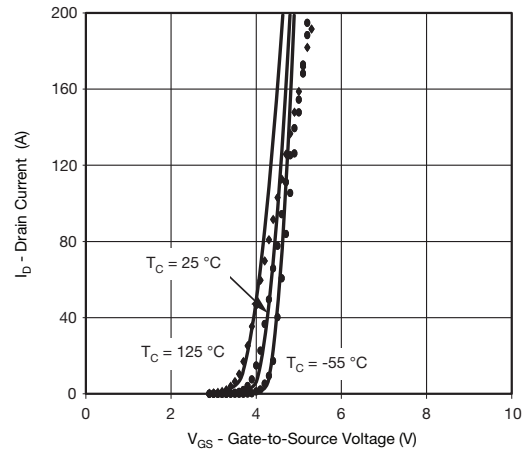
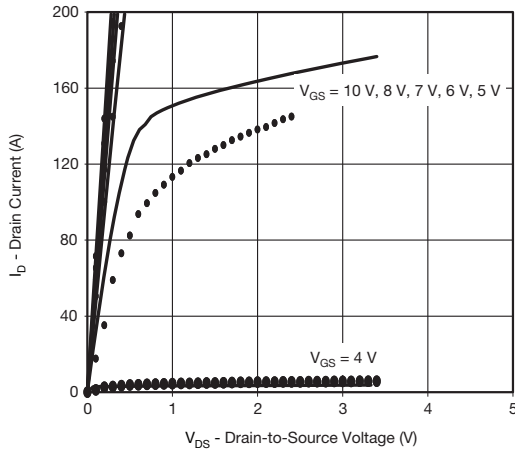
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.8	-	V
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 20\ \text{A}$	0.0014	0.0014	Ω
		$V_{GS} = 7.5\ \text{V}, I_D = 20\ \text{A}$	0.0016	0.0016	
		$V_{GS} = 6\ \text{V}, I_D = 10\ \text{A}$	0.0020	0.0020	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 20\ \text{A}$	35	78	S
Diode Forward Voltage	V_{SD}	$I_S = 5\ \text{A}$	0.76	0.72	V
Dynamic ^b					
Input Capacitance	C_{iss}	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, f = 1\ \text{MHz}$	5100	5130	pF
Output Capacitance	C_{oss}		1100	992	
Reverse Transfer Capacitance	C_{rss}		110	94	
Total Gate Charge	Q_g	$V_{DS} = 30\ \text{V}, V_{GS} = 10\ \text{V}, I_D = 10\ \text{A}$	70	68	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = 30\ \text{V}, V_{GS} = 7.5\ \text{V}, I_D = 10\ \text{A}$	53	52	
Gate-Drain Charge	Q_{gd}		23	21	
			8.7	8.2	

Notes

- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\ \%$.
- b. Guaranteed by design, not subject to production testing.



COMPARISON OF MODEL WITH MEASURED DATA ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Note

- Dots and squares represent measured data.

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