

Automotive Dual N-Channel 30 V (D-S) 175 °C MOSFET

DESCRIPTION

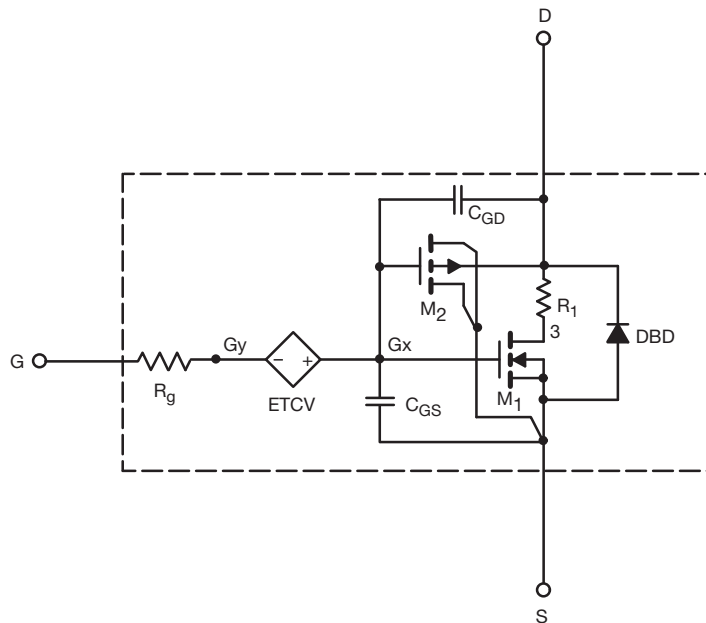
The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over the -55 °C to 125 °C temperature ranges under the pulsed 0 V to 10 V gate drive. The saturated output impedance is best fit at the gate bias near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



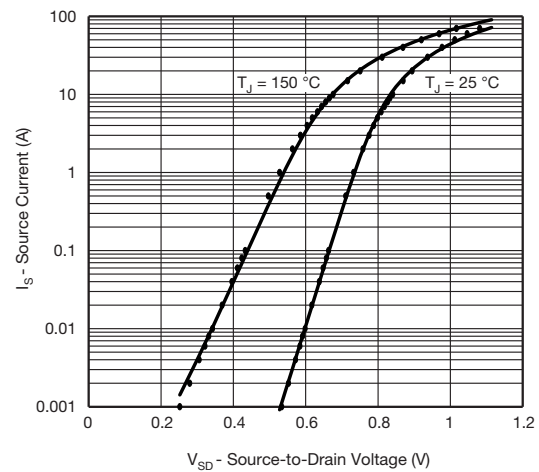
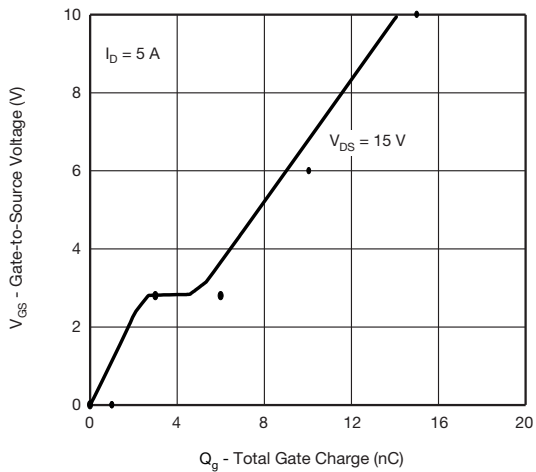
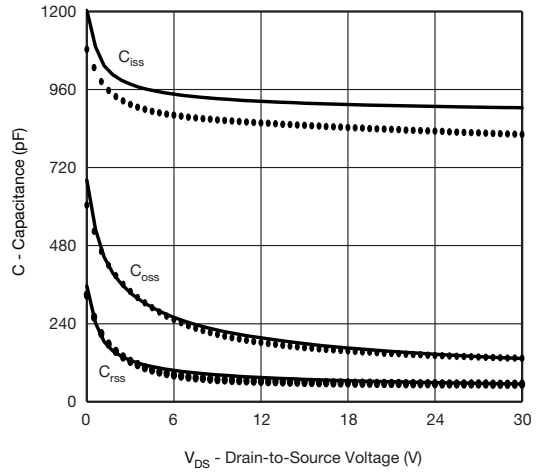
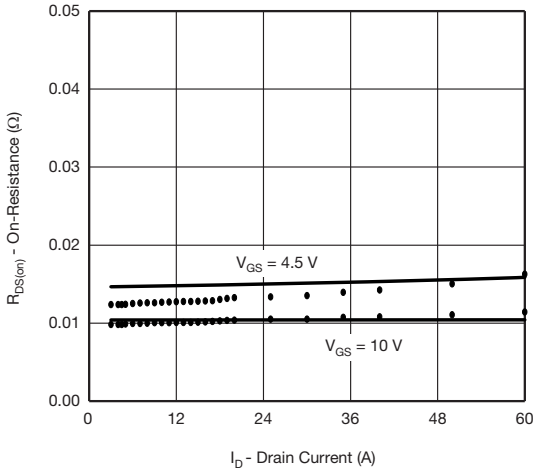
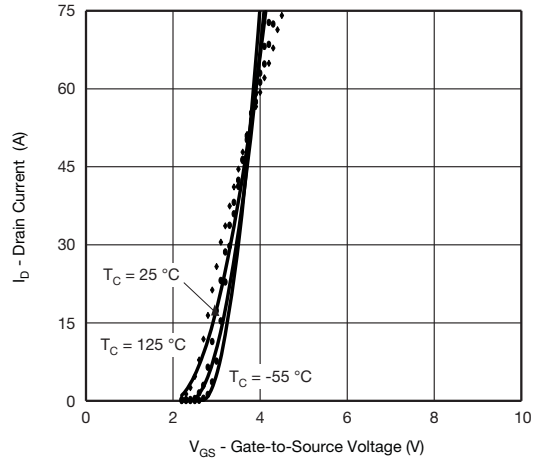
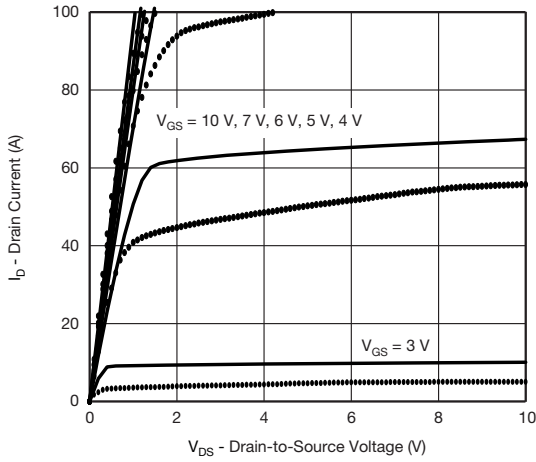
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	2	V
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 4.5 A	0.0104	0.0098	Ω
		V _{GS} = 4.5 V, I _D = 3 A	0.0140	0.0139	
Forward transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 4 A	20	25	S
Diode forward voltage	V _{SD}	I _S = 4 A	0.79	0.79	V
Dynamic ^b					
Input capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz	918	850	pF
Output capacitance	C _{oss}		178	167	
Reverse transfer capacitance	C _{rss}		68	60	
Total gate charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 5 A	14.3	15	nC
Gate-source charge	Q _{gs}		3	3	
Gate-drain charge	Q _{gd}		2.4	3	

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 ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Note

- Dots and squares represent measured data

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