



Dual N-Channel 30V (D-S) MOSFET

CHARACTERISTICS

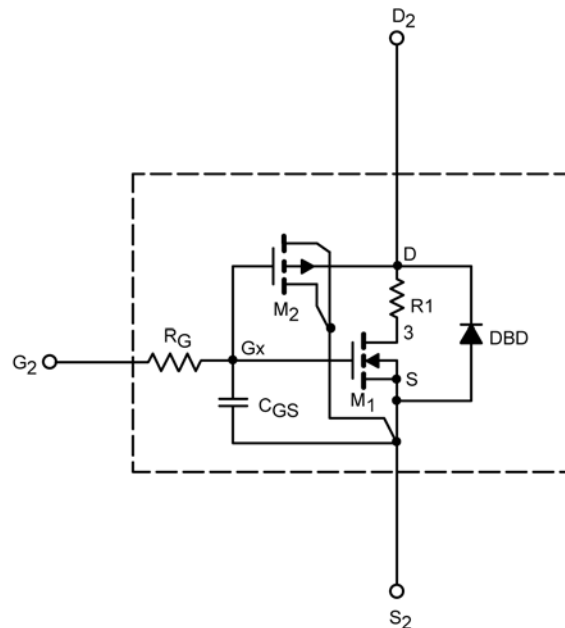
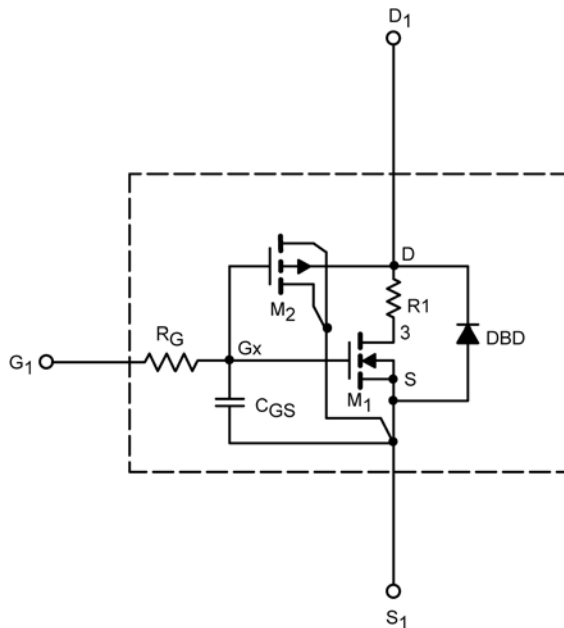
- N-Channel Vertical DMOS
- Macro Model (Subcircuit Model)
- Level 3 MOS
- Apply for both Linear and Switching Application
- Accurate over the -55 to 125°C Temperature Range
- Model the Gate Charge, Transient, and Diode Reverse Recovery Characteristics

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 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.

SUBCIRCUIT MODEL SCHEMATIC



SPICE Device Model Si4922BDY

Vishay Siliconix



SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	Test Condition	Simulated Data	Measured Data	Unit
Static					
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.90		V
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}$, $V_{GS} = 10\ \text{V}$	354		A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 5\ \text{A}$	0.0137	0.0135	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 5\ \text{A}$	0.0150	0.0145	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}$, $I_D = 5\ \text{A}$	30	30	S
Forward Voltage ^a	V_{SD}	$I_F = 1.7\ \text{A}$	0.74	0.77	V
Dynamic^b					
Input Capacitance	C_{iss}	$V_{DS} = 15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	2459	2070	pF
Output Capacitance	C_{oss}		254	255	
Reverse Transfer Capacitance	C_{rss}		107	135	
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 5\ \text{A}$	36	41	nC
			18	19	
Gate-Source Charge	Q_{gs}	$V_{DS} = 15\ \text{V}$, $V_{GS} = 4.5\ \text{V}$, $I_D = 5\ \text{A}$	3.5	3.5	
Gate-Drain Charge	Q_{gd}		3.7	3.7	

Notes

a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

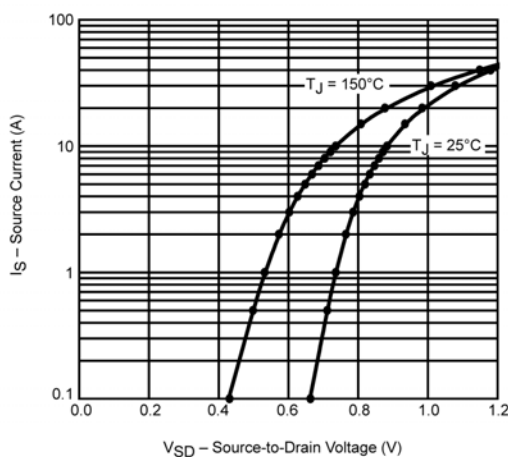
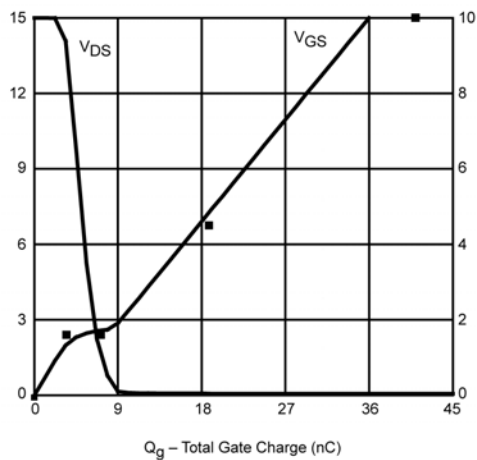
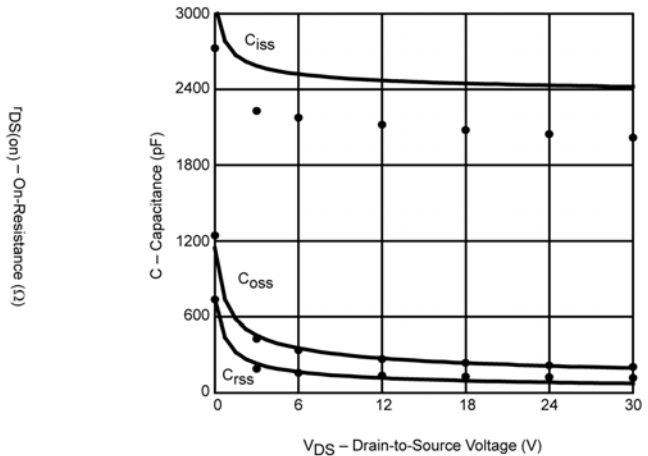
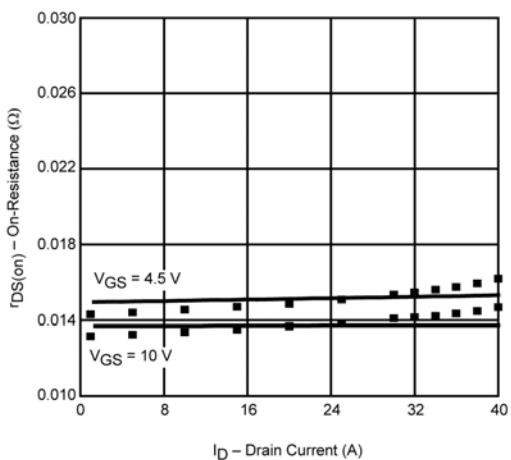
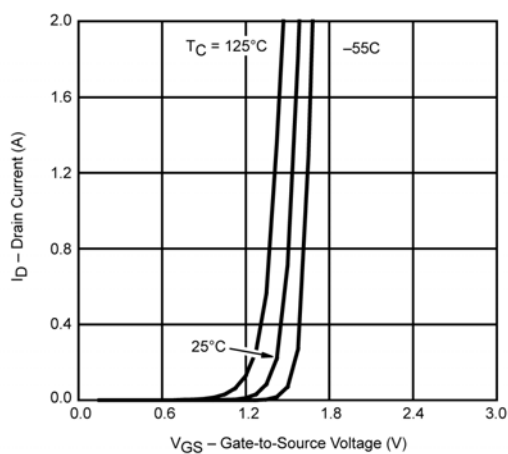
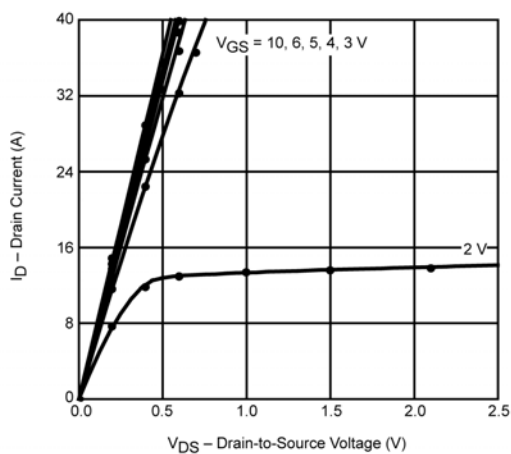
b. Guaranteed by design, not subject to production testing.



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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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