

SPICE Device Model Si4418DY

Vishay Siliconix

N-Channel 200-V (D-S) MOSFET

CHARACTERISTICS

- N-Channel Vertical DMOS
- Macro Model (Subcircuit Model)
- Level 3 MOS

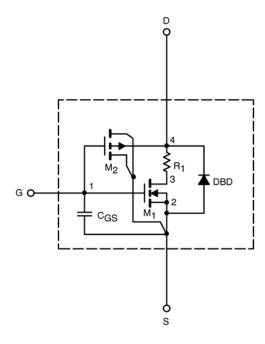
- · Apply for both Linear and Switching Application
- Accurate over the -55 to 125°C Temperature Range
- Model the Gate Charge, Transient, and Diode Reverse Recovery Characteristics

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 $C_{\rm gd}$ 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



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

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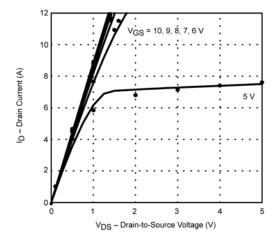
SPECIFICATIONS (T _J = 25°C UN	ILESS OTHER	WISE NOTED)			
Parameter	Symbol	Test Condition	Simulated Data	Measured Data	Unit
Static			-		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1.9		V
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	42		Α
Drain-Source On-State Resistance ^a	_	V _{GS} = 10 V, I _D = 3 A	0.111	0.110	Ω
	r _{DS(on)}	V_{GS} = 6 V, I_{D} = 2.8 A	0.125	0.120	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 3 A	11	13	S
Forward Voltage ^a	V_{SD}	$I_{S} = 2.1 \text{ A}, V_{GS} = 0 \text{ V}$	0.83	0.80	V
Dynamic ^b	-				
Total Gate Charge	Q_g	V _{DS} = 100 V, V _{GS} = 10 V, I _D = 3 A	21	20	nC
Gate-Source Charge	Q_{gs}		4.5	4.5	
Gate-Drain Charge	Q_{gd}		6.5	6.5	
Turn-On Delay Time	t _{d(on)}	$V_{DD} = 100 \text{ V}, \text{ R}_L = 100 \Omega$ $I_D \cong \text{ 1 A, V}_{GEN} = 10 \text{ V}, \text{ R}_G = 6 \Omega$	9	15	ns
Rise Time	t _r		16	15	
Turn-Off Delay Time	$t_{d(off)}$		22	40	
Fall Time	t _f		19	20	

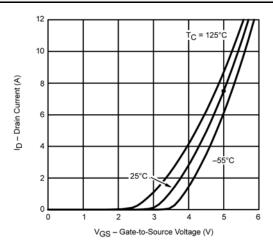
Notes a. Pulse test; pulse width $\leq 300~\mu\text{s},$ duty cycle $\leq 2\%.$ b. Guaranteed by design, not subject to production testing.

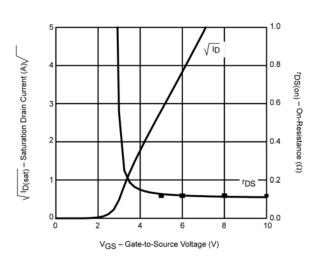


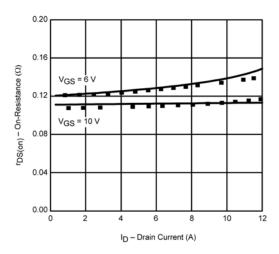
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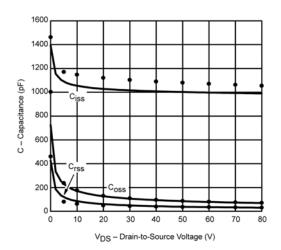
COMPARISON OF MODEL WITH MEASURED DATA (TJ=25°C UNLESS OTHERWISE NOTED)

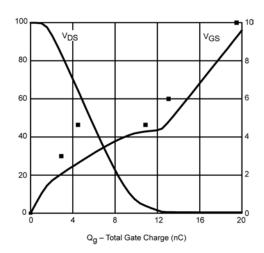












Note: Dots and squares represent measured data



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Document Number: 91000 Revision: 18-Jul-08

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