# SPICE Device Model SiHF22N65E



**Vishay Siliconix** 

# **E Series Power MOSFET**

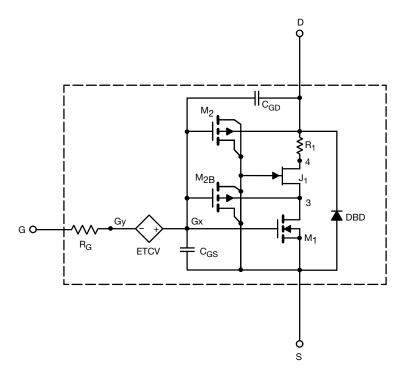
### DESCRIPTION

The attached SPICE model describes the typical electrical characteristics of the n-channel vertical DMOS. The subcircuit model is extracted and optimized over 25 °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  $C_{gd}\xspace$  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 25 °C to 150 °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.



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<b>SPECIFICATIONS</b> (T <sub>J</sub> = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_D = 250 \ \mu A$	3	-	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 11 \text{ A}$	0.16	0.15	Ω
Forward Transconductance	9 <sub>fs</sub>	$V_{DS} = 8 V, I_{D} = 5 A$	6.7	6.7	S
Dynamic					
Input Capacitance	C <sub>iss</sub>	$V_{DS}$ = 100 V, $V_{GS}$ = 0 V, f = 1 MHz	2570	2415	pF
Output Capacitance	Coss		200	118	
Reverse Transfer Capacitance	C <sub>rss</sub>		20	4	
Total Gate Charge	Qg	$V_{DS} = 520 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 11 \text{ A}$	69	73	nC
Gate-Source Charge	Q <sub>gs</sub>		15	15	
Gate-Drain Charge	Q <sub>gd</sub>		32	32	
Drain-Source Body Diode Characteristics					
Diode Forward Voltage	V <sub>SD</sub>	$T_{J} = 25 \ ^{\circ}C, I_{S} = 11 \ A, V_{GS} = 0 \ V$	0.91	-	V
Reverse Recovery Time	t <sub>rr</sub>	$T_J = 25 \text{ °C}, I_F = I_S = 11 \text{ A}, $ dI/dt = 100 A/µs, V <sub>R</sub> = 400 V	400	400	ns
Reverse Recovery Charge	Q <sub>rr</sub>		7.8	7.3	μC

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25

Ċ<sub>iss</sub>

Goss C<sub>rss</sub>

600

400

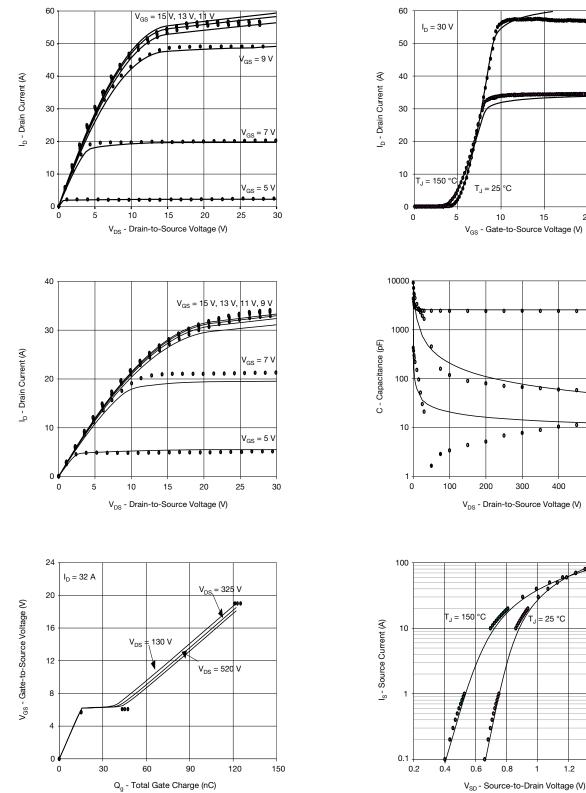
25 °C

1.2

500

20

## COMPARISON OF MODEL WITH MEASURED DATA (T<sub>J</sub> = 25 °C, unless otherwise noted)



#### Note

· Dots and squares represent measured data.

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1.4

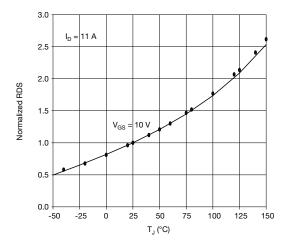
1.6

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## **COMPARISON OF MODEL WITH MEASURED DATA** ( $T_J$ = 25 °C, unless otherwise noted)



Note

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