SPICE Device Model SiHF22N65E



Vishay Siliconix

E Series Power MOSFET

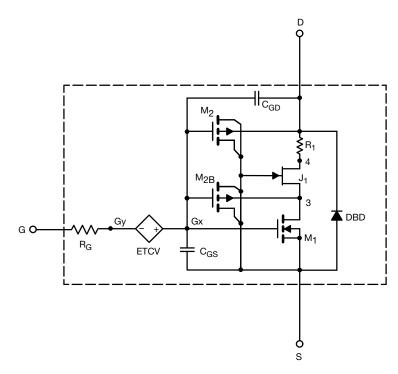
DESCRIPTION

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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| 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)} | $V_{DS} = V_{GS}$, $I_D = 250 \ \mu A$ | 3 | - | V |
| Drain-Source On-State Resistance | R _{DS(on)} | $V_{GS} = 10 \text{ V}, \text{ I}_{D} = 11 \text{ A}$ | 0.16 | 0.15 | Ω |
| Forward Transconductance | 9 _{fs} | $V_{DS} = 8 V, I_{D} = 5 A$ | 6.7 | 6.7 | S |
| Dynamic | | | | | |
| Input Capacitance | C _{iss} | V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz | 2570 | 2415 | pF |
| Output Capacitance | Coss | | 200 | 118 | |
| Reverse Transfer Capacitance | C _{rss} | | 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 _{gs} | | 15 | 15 | |
| Gate-Drain Charge | Q _{gd} | | 32 | 32 | |
| Drain-Source Body Diode Characteristics | | | | | |
| Diode Forward Voltage | V _{SD} | $T_{J} = 25 \ ^{\circ}C, I_{S} = 11 \ A, V_{GS} = 0 \ V$ | 0.91 | - | V |
| Reverse Recovery Time | t _{rr} | $T_J = 25 \text{ °C}, I_F = I_S = 11 \text{ A}, $ dI/dt = 100 A/µs, V _R = 400 V | 400 | 400 | ns |
| Reverse Recovery Charge | Q _{rr} | | 7.8 | 7.3 | μC |

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25

Ċ_{iss}

Goss C_{rss}

600

400

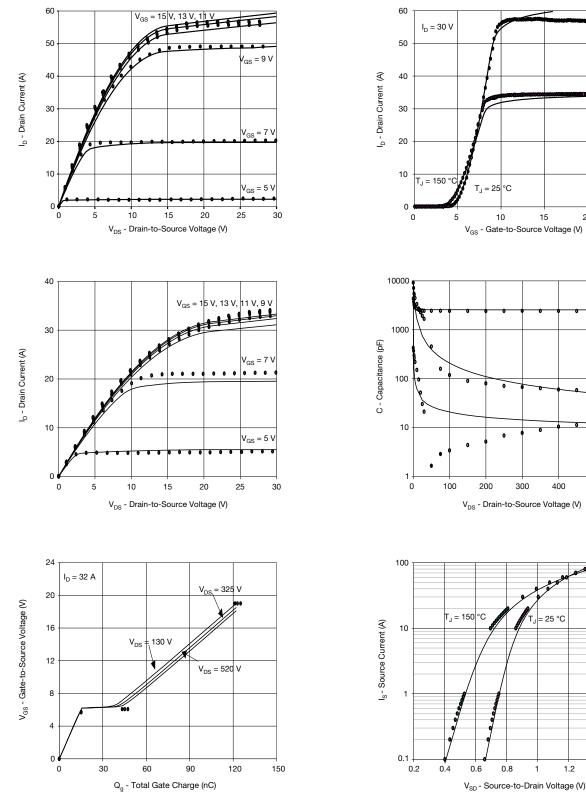
25 °C

1.2

500

20

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



Note

· Dots and squares represent measured data.

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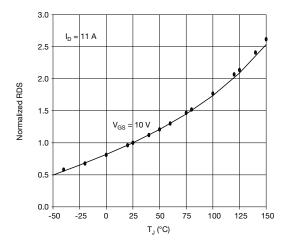
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COMPARISON OF MODEL WITH MEASURED DATA (T_J = 25 °C, unless otherwise noted)



Note

Dots and squares represent measured data.

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