

Vishay Siliconix

Automotive P-Channel 60 V (D-S) 175 °C MOSFET

DESCRIPTION

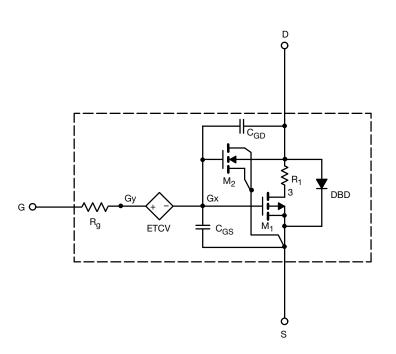
The attached SPICE model describes the typical electrical characteristics of the p-channel vertical DMOS. The sub-circuit model is extracted and optimized over the -55 °C to +125 °C temperature ranges under the pulsed 0 V to 10 V gate drive. The saturated output impedance is best fit at the gate bias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

- P-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



SPICE Device Model SQJ457EP

Vishay Siliconix

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	TEST CONDITIONS	SIMULATED DATA	MEASURED DATA	UNIT
Static					
Gate threshold voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = -250 \ \mu A$	2	-	V
Drain-source on-state resistance ^a	R _{DS(on)}	$V_{GS} = -10 \text{ V}, \text{ I}_{D} = -10 \text{ A}$	0.0213	0.0210	Ω
		$V_{GS} = -4.5 \text{ V}, \text{ I}_{D} = -5 \text{ A}$	0.0291	0.0288	
Forward transconductance ^a	9 _{fs}	$V_{DS} = -15 \text{ V}, \text{ I}_{D} = -10 \text{ A}$	26	26	S
Diode forward voltage	V _{SD}	I _S = -10 A	-0.8	-0.8	V
Dynamic ^b					
Input capacitance	C _{iss}	V _{DS} = -25 V, V _{GS} = 0 V, f = 1 MHz	2980	2600	pF
Output capacitance	Coss		308	310	
Reverse transfer capacitance	C _{rss}		202	200	
Total gate charge	Qg	V _{DS} = -30 V, V _{GS} = -10 V, I _D = -5 A	59	65	nC
Gate-source charge	Q _{gs}		9	9.5	
Gate-drain charge	Q _{gd}		16	19	

Notes

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

b. Guaranteed by design, not subject to production testing

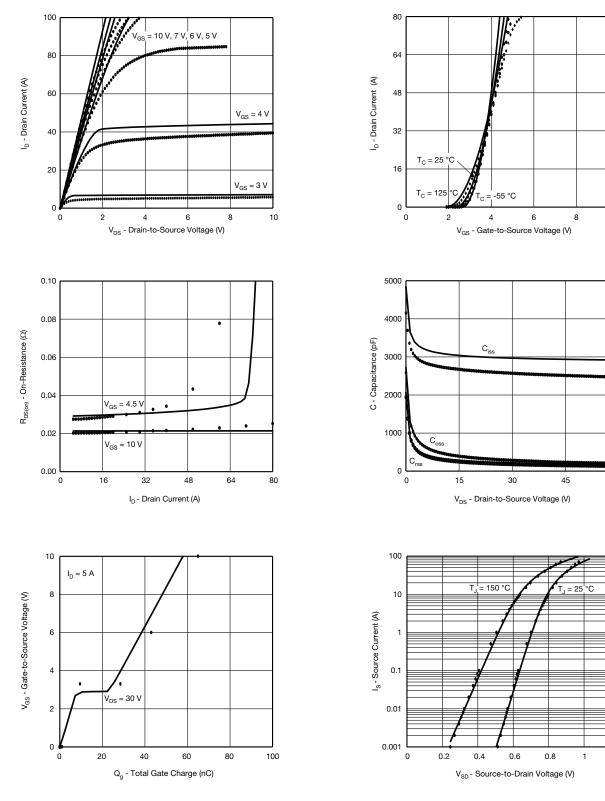


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60

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



Note

Dots and squares represent measured data
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