



N-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0135 @ $V_{GS} = 10$ V	10
	0.020 @ $V_{GS} = 4.5$ V	8

SCHOTTKY PRODUCT SUMMARY

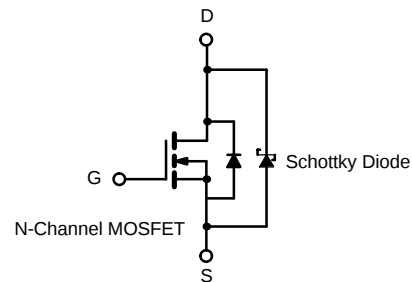
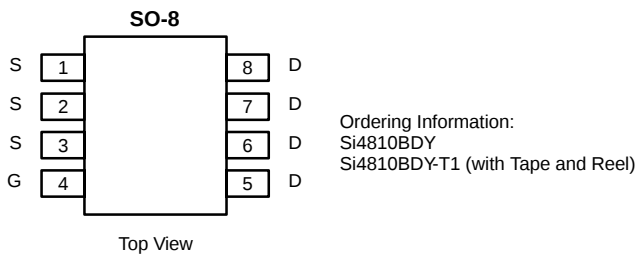
V_{DS} (V)	Diode Forward Voltage V_{SD} (V)	I_F (A)
30	0.53 V @ 3.0 A	3.8

FEATURES

- TrenchFET® Power MOSFETS
- Fast Switching Speed
- Low Gate Charge

APPLICATIONS

- DC-DC Logic Level
- Low Voltage and Battery Powered Applications

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	10 sec	Steady State	Unit
Drain-Source Voltage (MOSFET)		V _{DS}	30		V
Reverse Voltage (Schottky)			30		
Gate-Source Voltage (MOSFET)		V _{GS}	± 20		
Continuous Drain Current (T _J = 150°C) (MOSFET) ^a	T _A = 25°C	I _D	10	7.5	A
	T _A = 70°C		8	6	
Pulsed Drain Current (MOSFET)		I _{DM}	50		
Continuous Source Current (MOSFET Diode Conduction) ^a		I _S	2.3	1.25	
Average Foward Current (Schottky)		I _F	3.8	2.4	
Pulsed Foward Current (Schottky)		I _{FM}	40		
Maximum Power Dissipation (MOSFET) ^a	T _A = 25°C	P _D	2.5	1.38	W
	T _A = 70°C		1.6	0.88	
Maximum Power Dissipation (Schottky) ^a	T _A = 25°C		2.0	1.31	
	T _A = 70°C		1.3	0.84	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Device	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ($t \leq 10$ sec) ^a	MOSFET	R_{thJA}	36	50	$^\circ\text{C/W}$
	Schottky		44	60	
Maximum Junction-to-Ambient ($t = \text{steady state}$) ^a	MOSFET		73	90	
	Schottky		77	95	
Maximum Junction-to-Foot ($t = \text{steady state}$) ^a	MOSFET	R_{thJF}	17	21	
	Schottky		24	30	

Notes

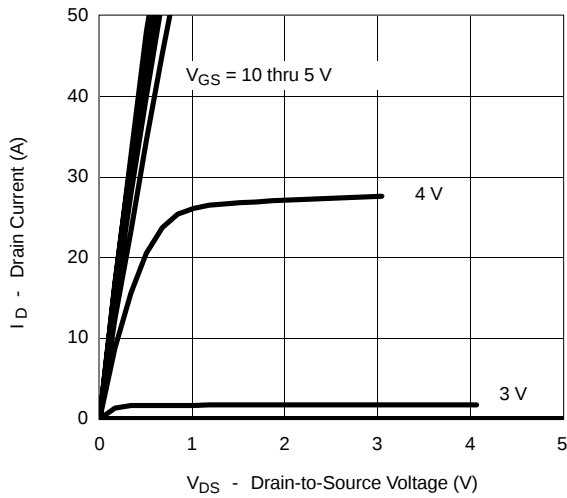
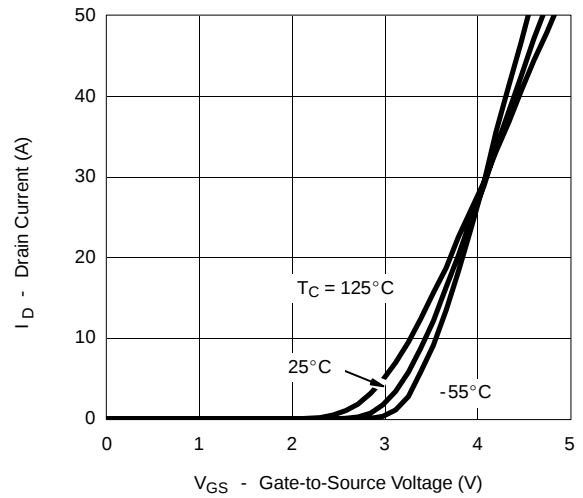
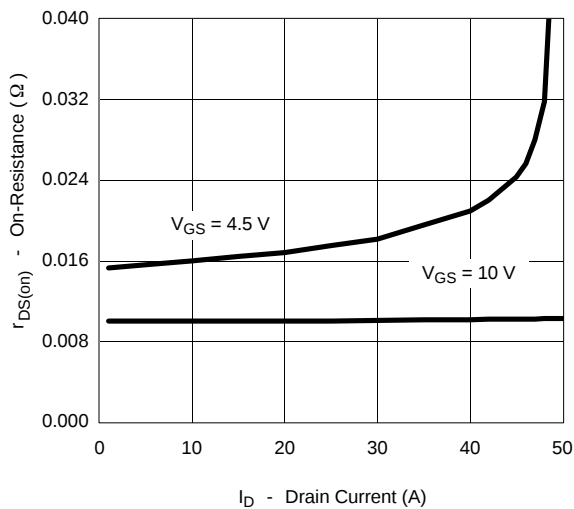
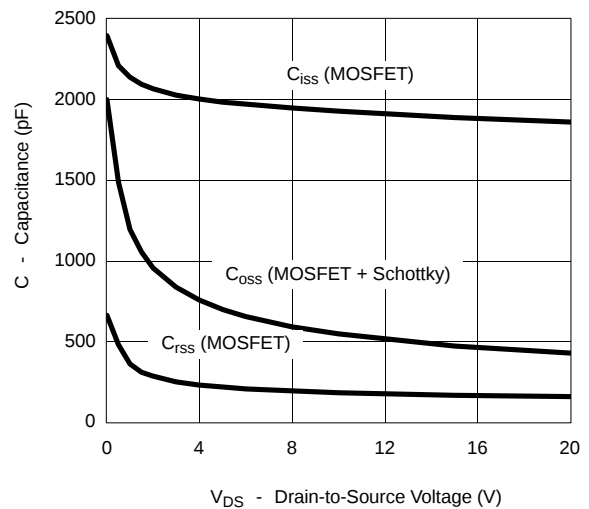
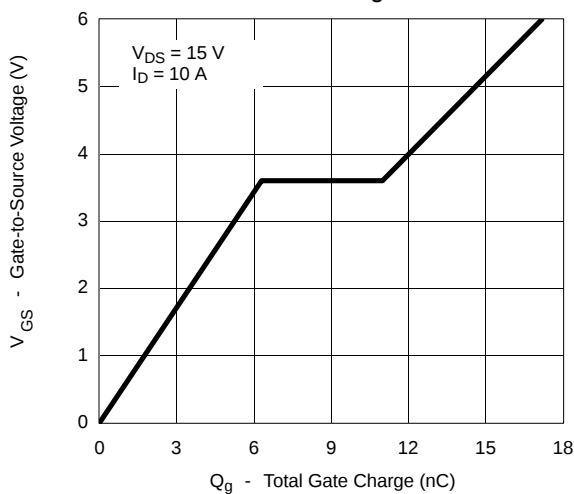
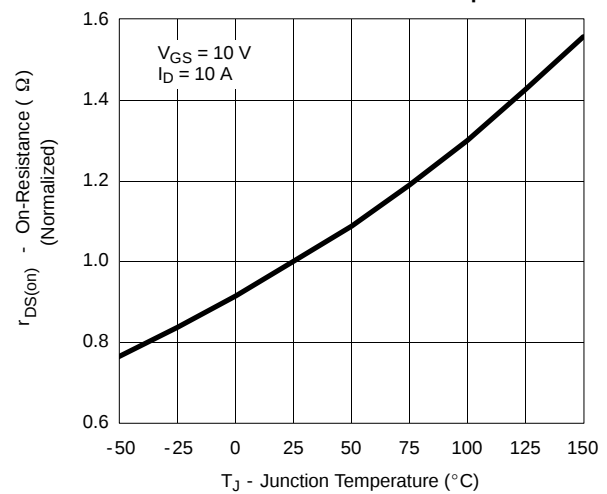
a. Surface Mounted on FR4 Board.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>

MOSFET + SCHOTTKY SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current (MOSFET + Schottky)	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V		0.007	0.100	mA
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 100 °C		1.5	10	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 125 °C		6.5	20	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	20			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 10 A		0.0105	0.0135	Ω
		V _{GS} = 4.5 V, I _D = 5 A		0.016	0.020	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 10 A		25		S
Schottky Diode Forward Voltage ^a	V _{SD}	I _S = 3.0 A, V _{GS} = 0 V		0.485	0.53	V
		I _S = 3.0 A, V _{GS} = 0 V, T _J = 125 °C		0.420	0.47	
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 5 V, I _D = 10 A		14.5	22	nC
Gate-Source Charge	Q _{gs}			6.3		
Gate-Drain Charge	Q _{gd}			4.7		
Gate Resistnce	R _G			0.55		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω		17	30	ns
Rise Time	t _r			13	20	
Turn-Off Delay Time	t _{d(off)}			45	90	
Fall Time	t _f			15	25	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 3.0 A, di/dt = 100 A/μs		36	70	

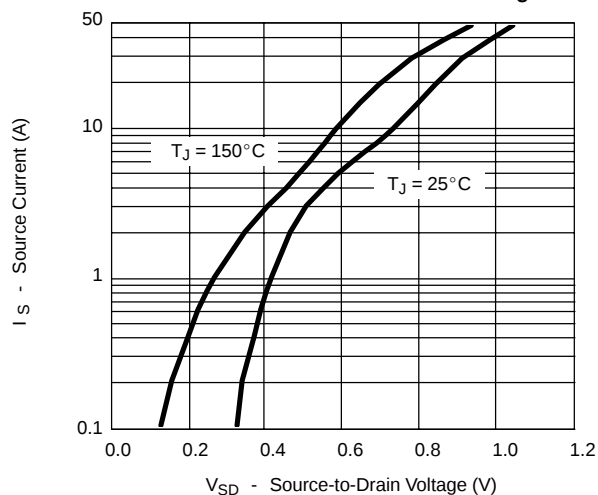
Notes

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

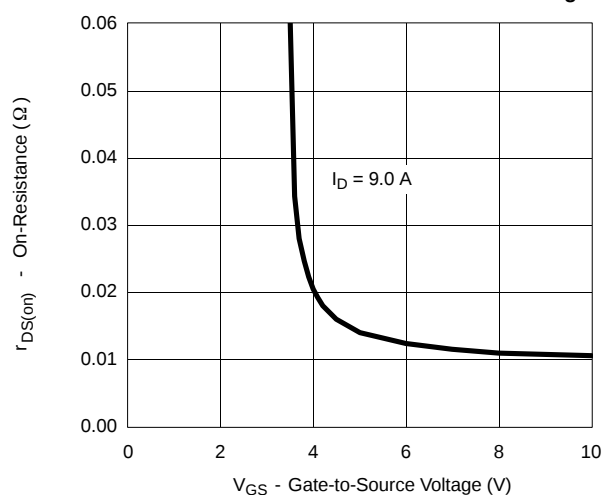
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature**

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

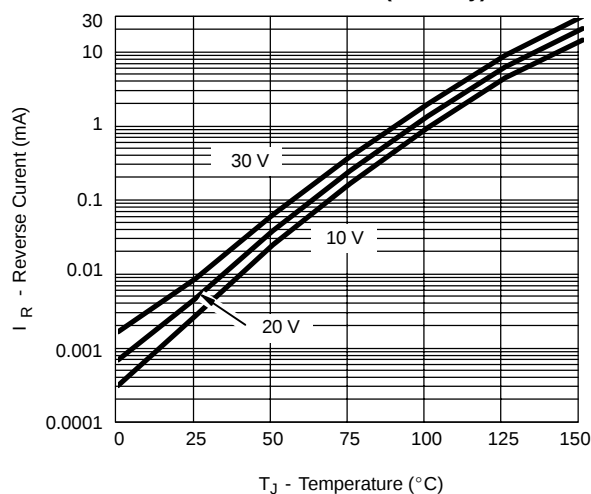
Source-Drain Diode Forward Voltage



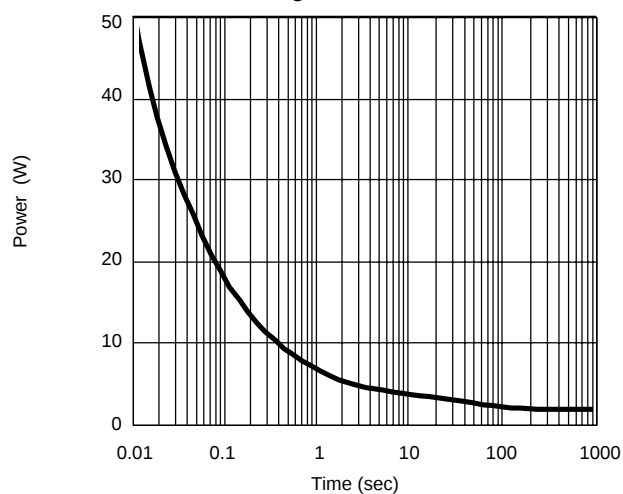
On-Resistance vs. Gate-to-Source Voltage



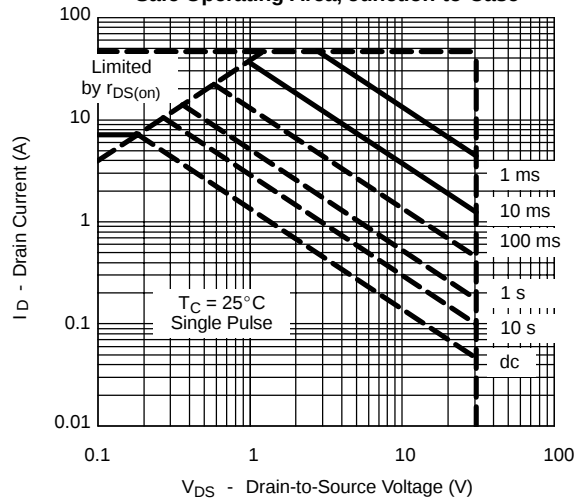
Reverse Current (Schottky)



Single Pulse Power



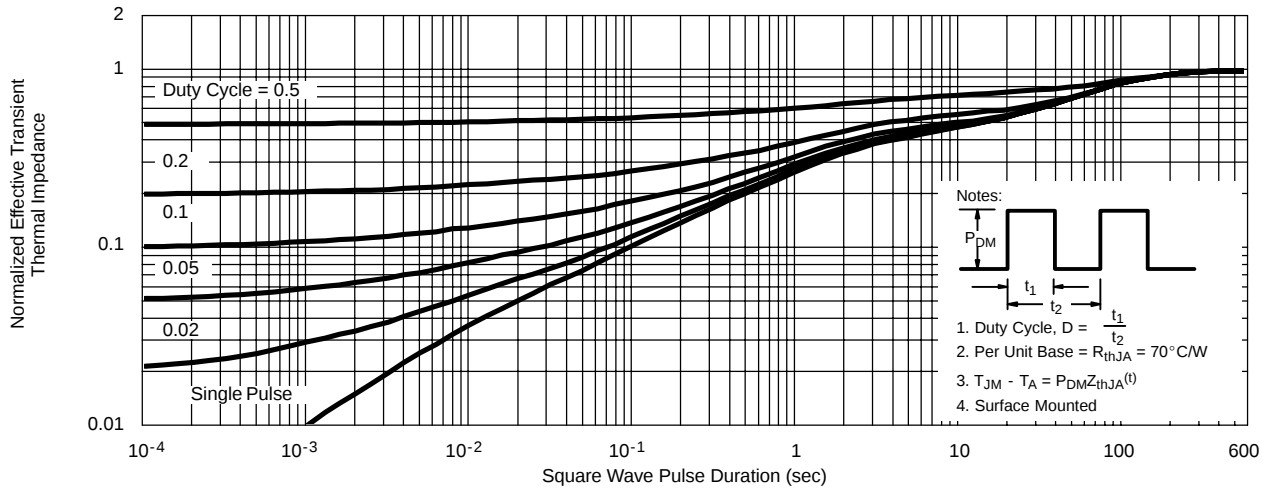
Safe Operating Area, Junction-to-Case





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

