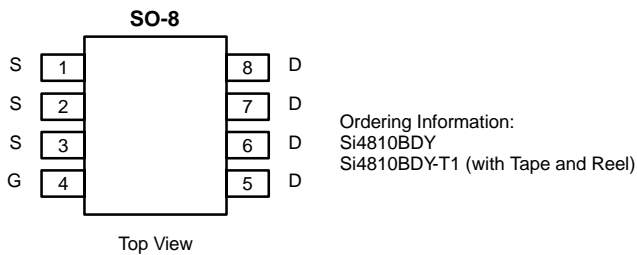


## N-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (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

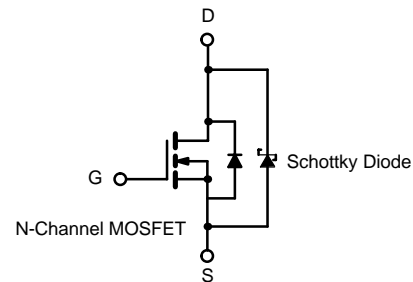


### FEATURES

- 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)	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) (MOSFET) <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$	10	7.5	A
		$T_A = 70^\circ\text{C}$	8	6	
Pulsed Drain Current (MOSFET)	$I_{DM}$	50		A	
Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>	$I_S$	2.3	1.25		
Average Forward Current (Schottky)	$I_F$	3.8	2.4		
Pulsed Forward Current (Schottky)	$I_{FM}$	40			
Maximum Power Dissipation (MOSFET) <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	2.5	1.38	W
		$T_A = 70^\circ\text{C}$	1.6	0.88	
Maximum Power Dissipation (Schottky) <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	2.0	1.31	W
		$T_A = 70^\circ\text{C}$	1.3	0.84	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	

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

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

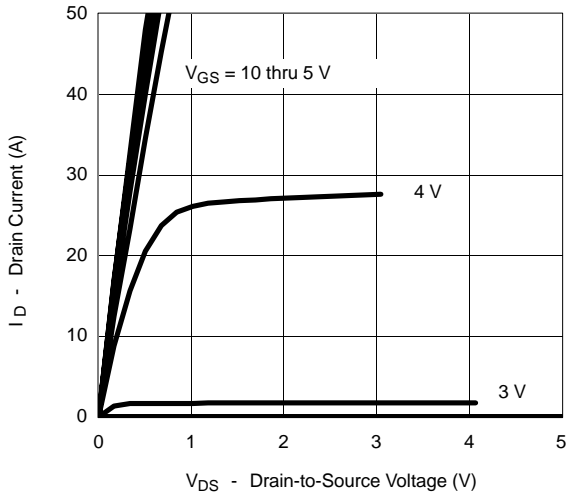
## Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

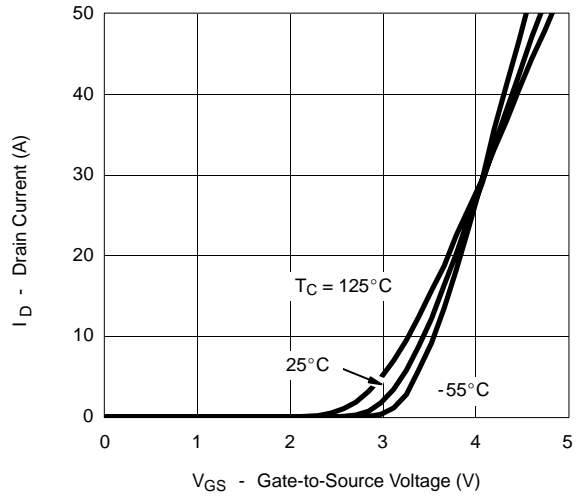


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

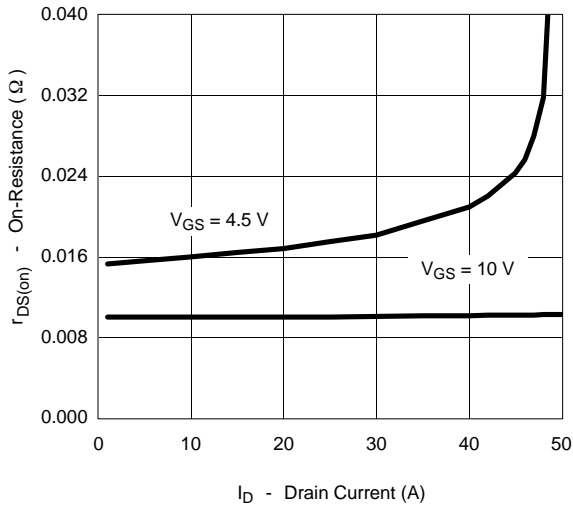
Output Characteristics



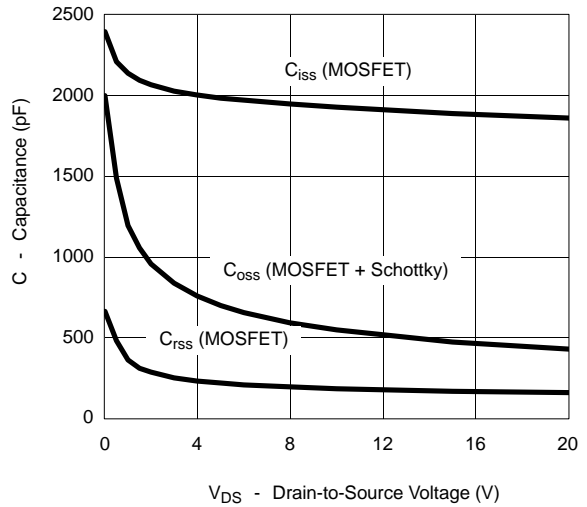
Transfer Characteristics



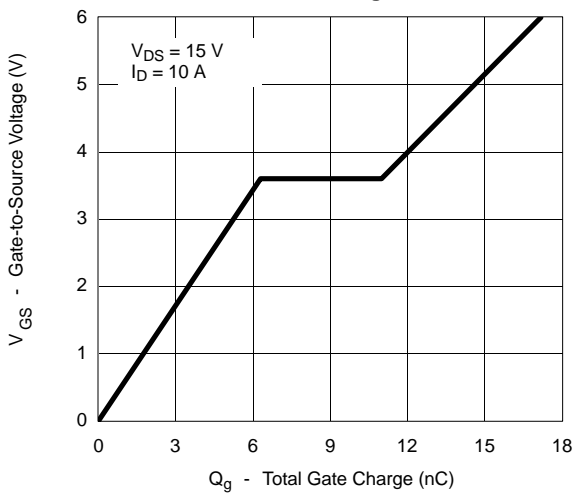
On-Resistance vs. Drain Current



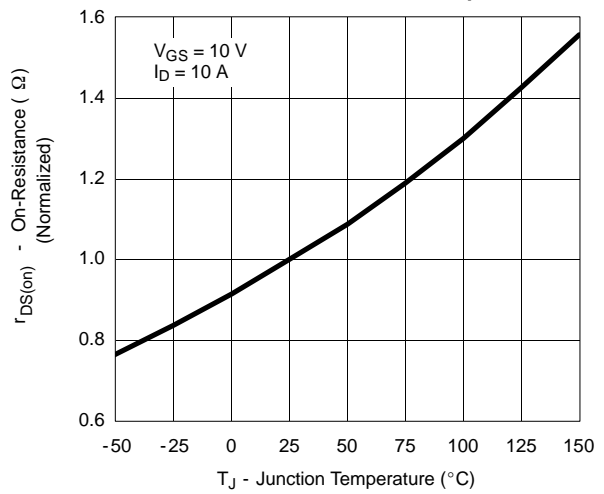
Capacitance



Gate Charge



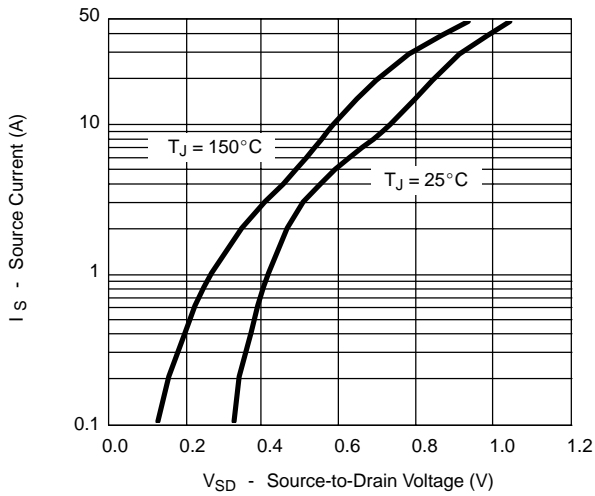
On-Resistance vs. Junction Temperature



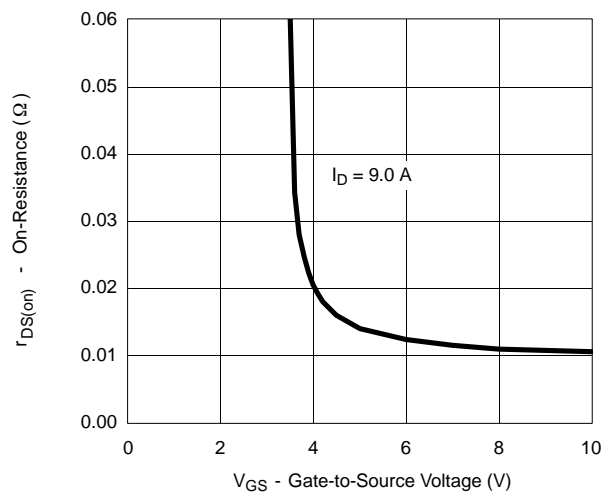


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

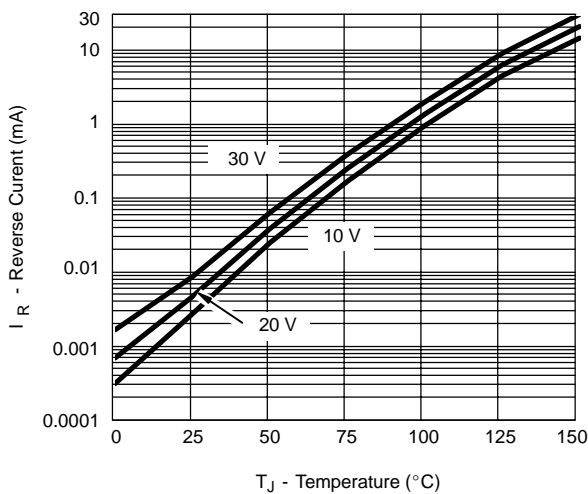
Source-Drain Diode Forward Voltage



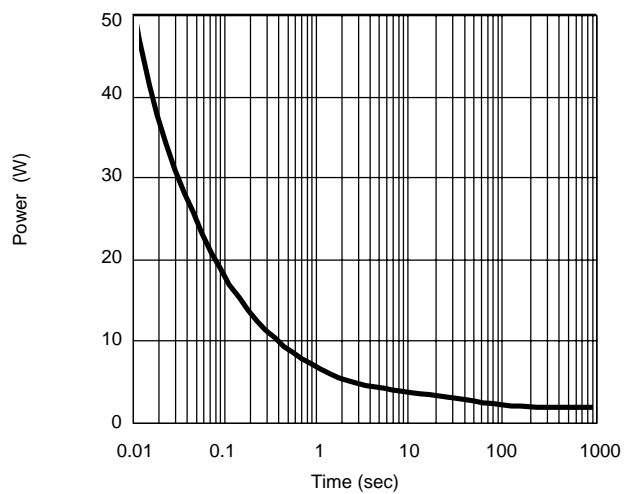
On-Resistance vs. Gate-to-Source Voltage



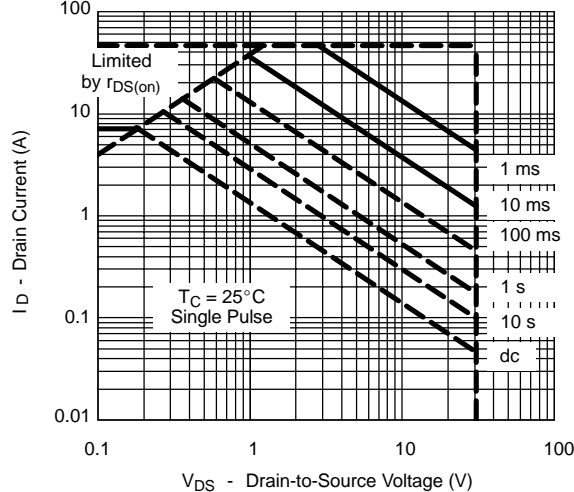
Reverse Current (Schottky)



Single Pulse Power



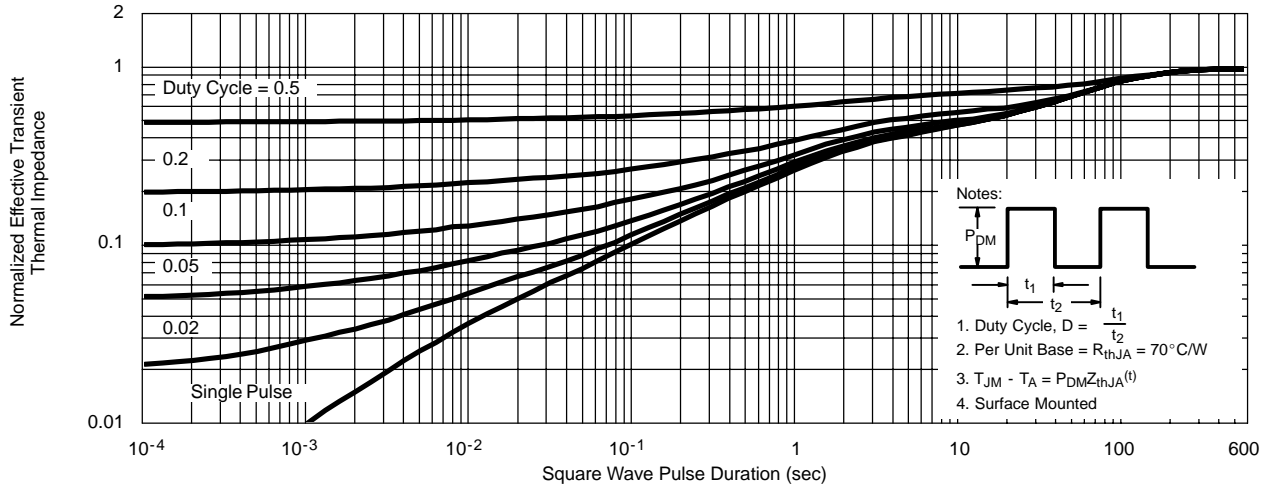
Safe Operating Area, Junction-to-Case





**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

