

## 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 at $V_{GS} = 10$ V	10
	0.020 at $V_{GS} = 4.5$ V	8

SCHOTTKY PRODUCT SUMMARY		
$V_{DS}$ (V)	Diode Forward Voltage $V_{SD}$ (V)	$I_F$ (A)
30	0.53 at 3.0 A	3.8

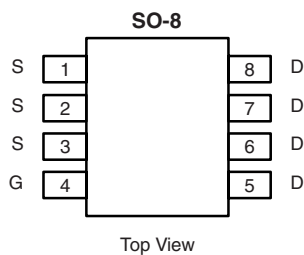
### FEATURES

- TrenchFET<sup>®</sup> Power MOSFETS
- Fast Switching Speed
- Low Gate Charge
- 100 % UIS and  $R_g$  Tested

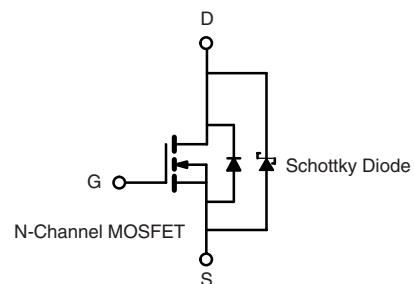


### APPLICATIONS

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



Ordering Information:  
Si4810BDY-T1  
Si4810BDY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °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 ( $T_J = 150$ °C) (MOSFET) <sup>a</sup>	$I_D$	$T_A = 25$ °C	10	7.5	A
		$T_A = 70$ °C	8	6	
Pulsed Drain Current (MOSFET)	$I_{DM}$	50			
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			
Avalanche Current	$I_{AS}$	20		mJ	
Single-Pulse Avalanche Energy		$E_{AS}$			
Maximum Power Dissipation (MOSFET) <sup>a</sup>	$P_D$	$T_A = 25$ °C	2.5	1.38	W
		$T_A = 70$ °C	1.6	0.88	
Maximum Power Dissipation (Schottky) <sup>a</sup>	$P_D$	$T_A = 25$ °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) <sup>a</sup>	MOSFET	$R_{thJA}$	36	50	°C/W
	Schottky		44	60	
Maximum Junction-to-Ambient ( $t =$ Steady State) <sup>a</sup>	MOSFET		73	90	
	Schottky		77	95	
Maximum Junction-to-Foot ( $t =$ Steady State) <sup>a</sup>	MOSFET	$R_{thJF}$	17	21	
	Schottky		24	30	

Notes:

a. Surface Mounted on FR4 Board.

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

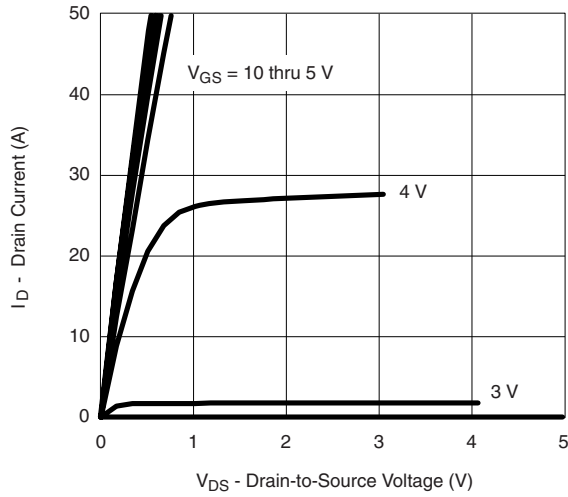
<b>MOSFET AND SCHOTTKY SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1		3	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current (MOSFET and Schottky)	$I_{DSS}$	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$		0.007	0.100	mA
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 100\text{ }^\circ\text{C}$		1.5	10	
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 125\text{ }^\circ\text{C}$		6.5	20	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 10\ \text{A}$		0.0105	0.0135	$\Omega$
		$V_{GS} = 4.5\ \text{V}, I_D = 5\ \text{A}$		0.016	0.020	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 10\ \text{A}$		25		S
Schottky Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 3.0\ \text{A}, V_{GS} = 0\ \text{V}$		0.485	0.53	V
		$I_S = 3.0\ \text{A}, V_{GS} = 0\ \text{V}, T_J = 125\text{ }^\circ\text{C}$		0.420	0.47	
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15\ \text{V}, V_{GS} = 5.0\ \text{V}, I_D = 10\ \text{A}$		14.5	22	nC
Gate-Source Charge	$Q_{gs}$			6.3		
Gate-Drain Charge	$Q_{gd}$			4.7		
Gate Resistance	$R_g$		0.2	0.55	0.9	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		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	$t_{rr}$		$I_F = 3.0\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		36	

## Notes:

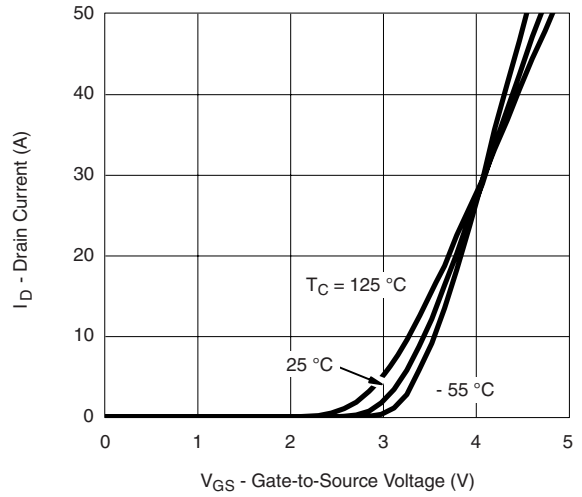
- a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

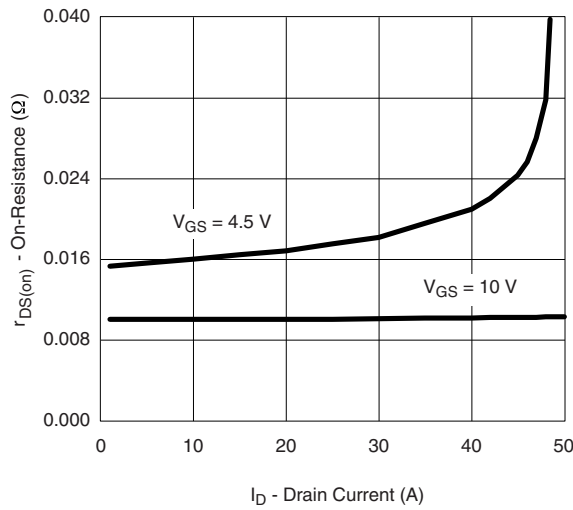
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



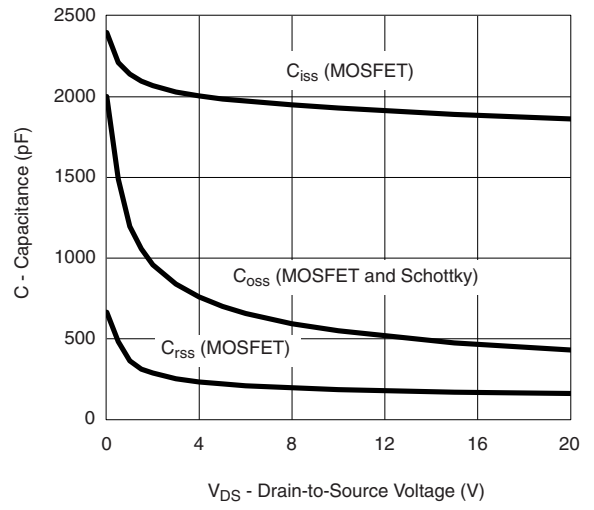
**Output Characteristics**



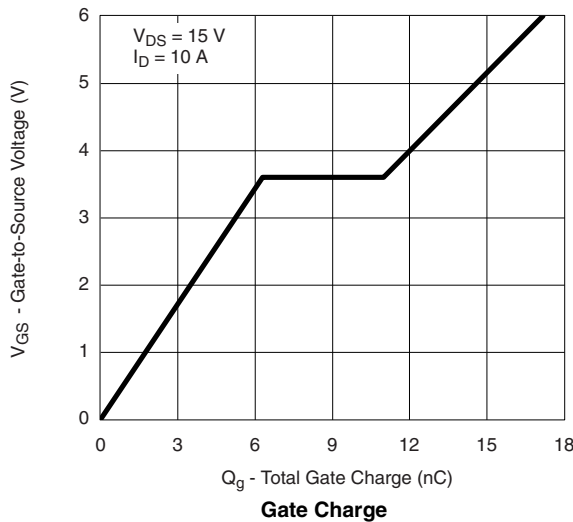
**Transfer Characteristics**



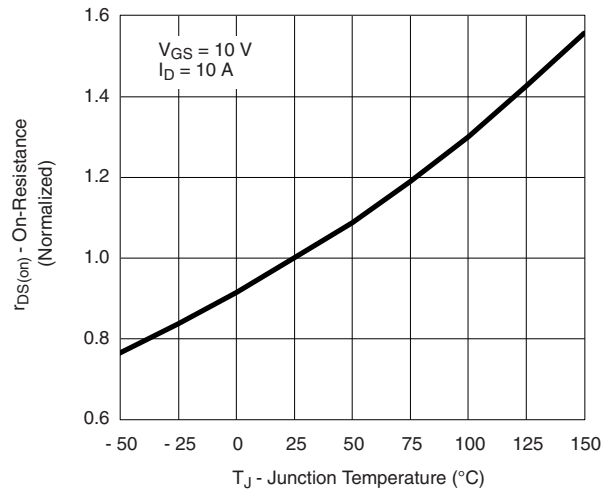
**On-Resistance vs. Drain Current**



**Capacitance**

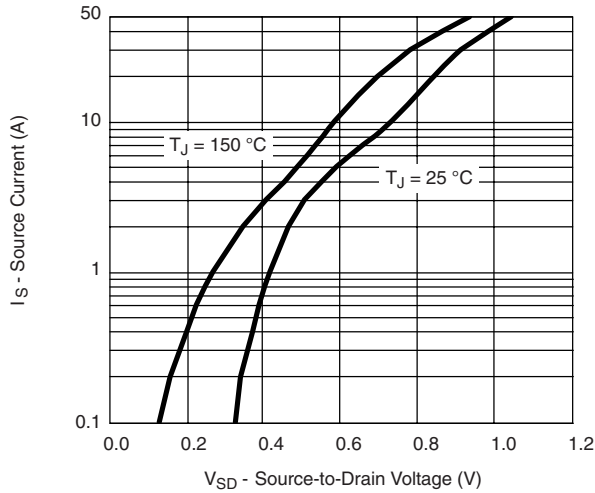


**Gate Charge**

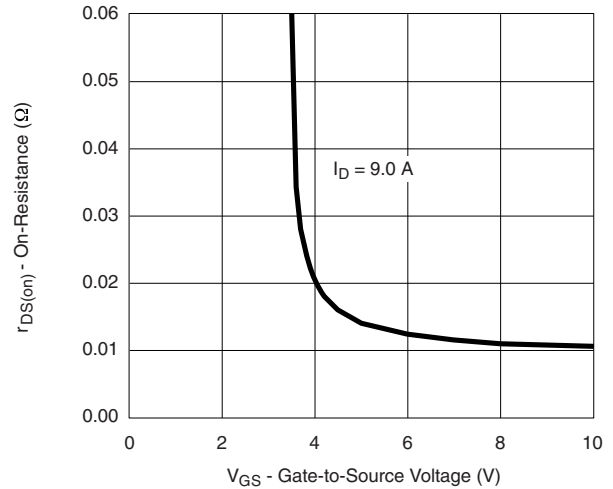


**On-Resistance vs. Junction Temperature**

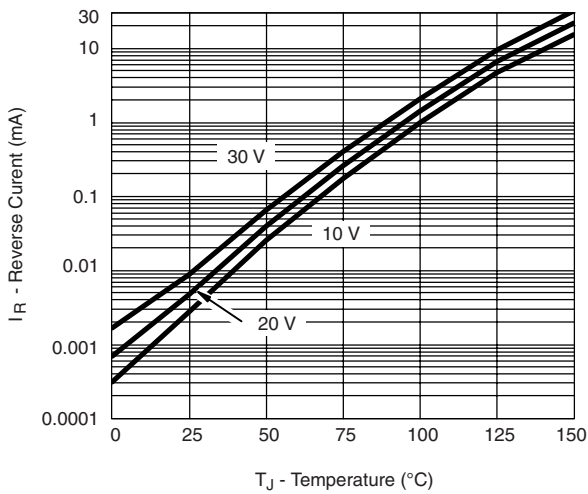
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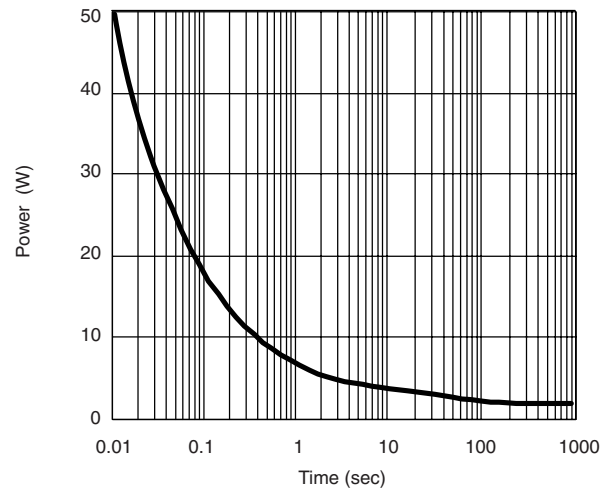
**Source-Drain Diode Forward Voltage**



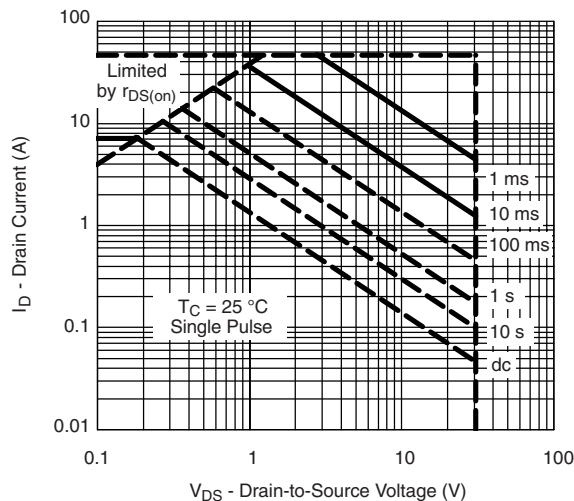
**On-Resistance vs. Gate-to-Source Voltage**



**Reverse Current (Schottky)**

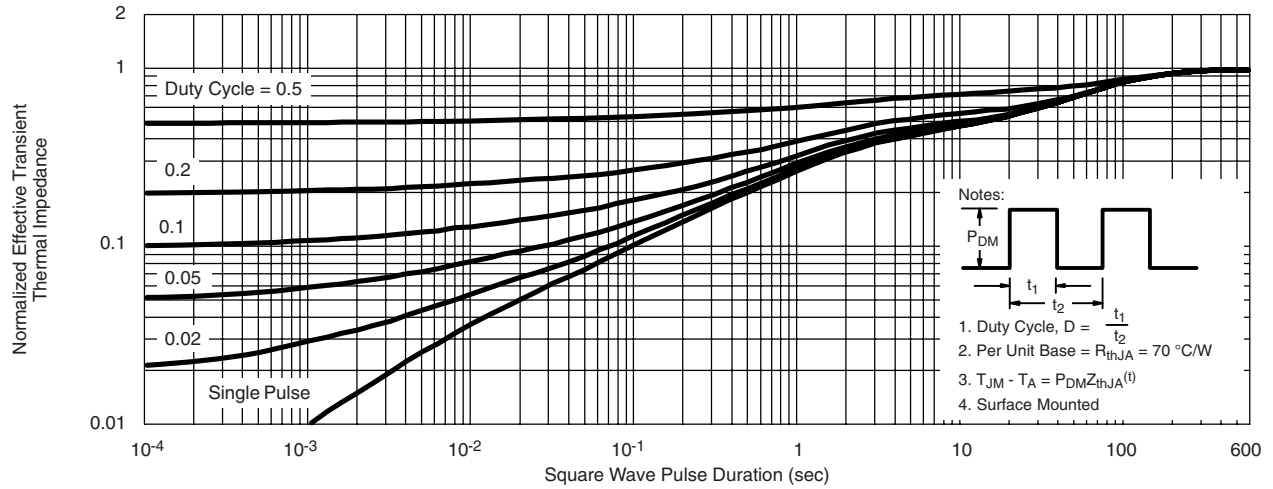


**Single Pulse Power**

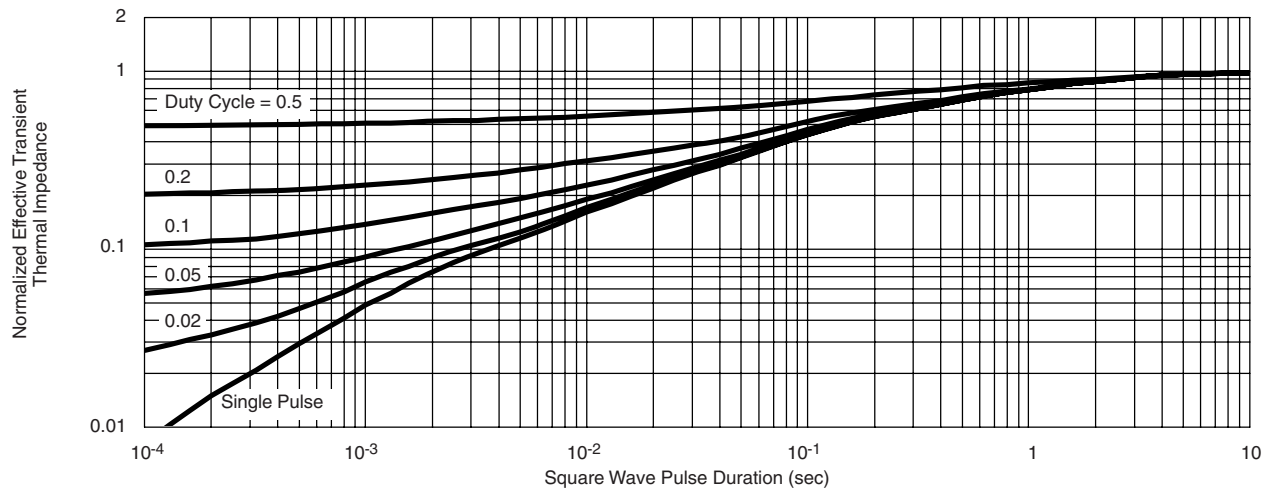


**Safe Operating Area, Junction-to-Case**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**

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