

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 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

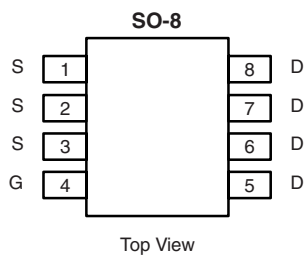
FEATURES

- TrenchFET[®] Power MOSFETS
- Fast Switching Speed
- Low Gate Charge
- 100 % UIS and R_g Tested

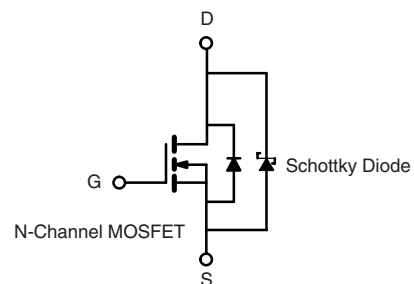


APPLICATIONS

- 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}	± 20			
Continuous Drain Current (T _J = 150 °C) (MOSFET) ^a	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) ^a	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}	20		
Maximum Power Dissipation (MOSFET) ^a	P _D	T _A = 25 °C	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 ≤ 10 sec) ^a	MOSFET	R _{thJA}	36	50	°C/W
	Schottky		44	60	
Maximum Junction-to-Ambient (t = Steady State) ^a	MOSFET		73	90	
	Schottky		77	95	
Maximum Junction-to-Foot (t = Steady State) ^a	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>

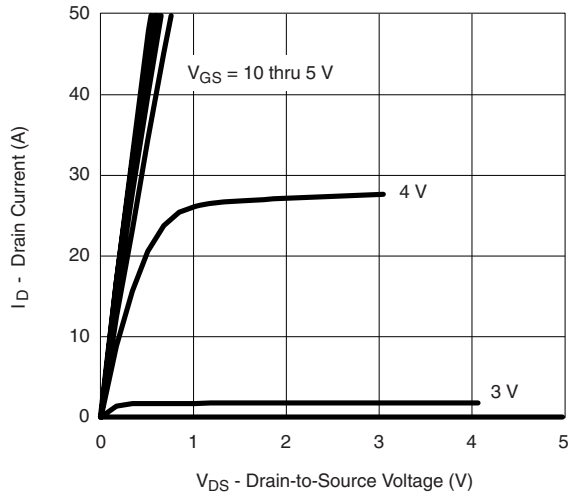
MOSFET AND SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1		3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 20\ \text{V}$			± 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 ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}$, $V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 10\ \text{A}$		0.0105	0.0135	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 5\ \text{A}$		0.016	0.020	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}$, $I_D = 10\ \text{A}$		25		S
Schottky Diode Forward Voltage ^a	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	
Dynamic^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	Ω
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:

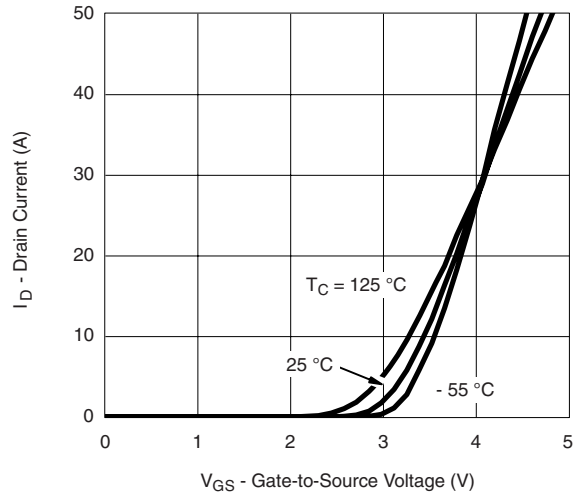
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

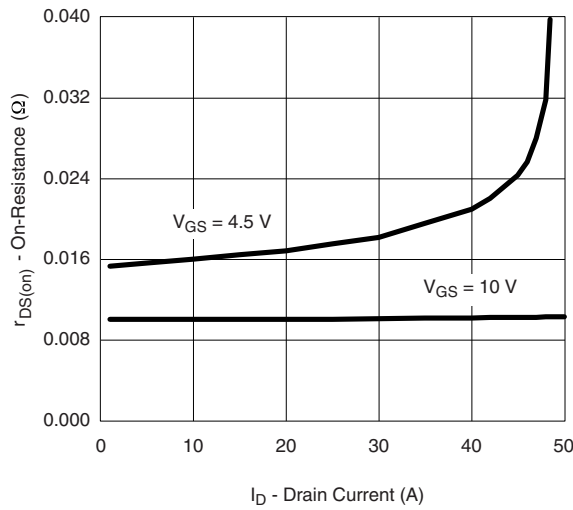
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



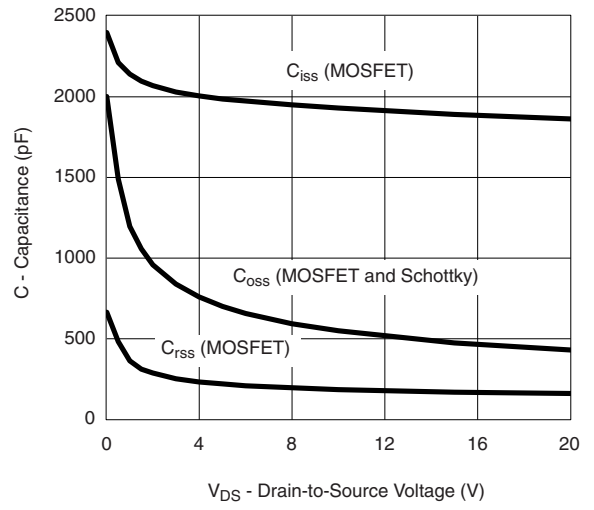
Output Characteristics



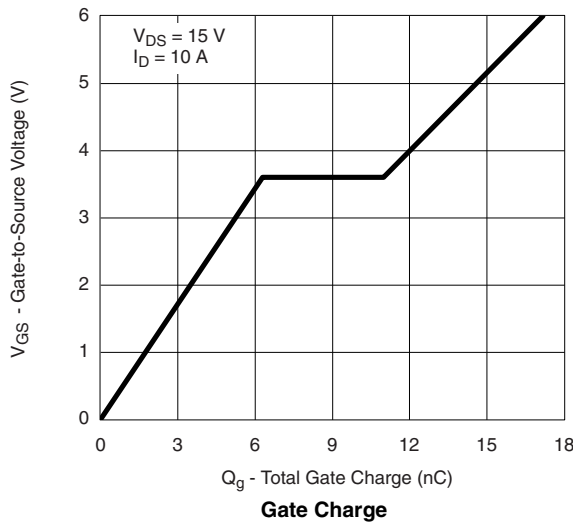
Transfer Characteristics



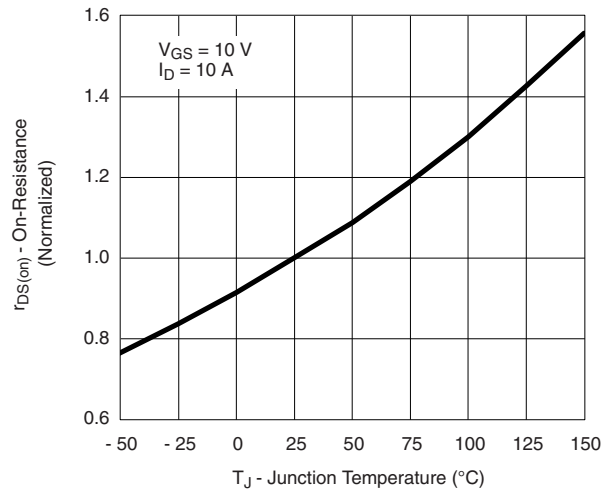
On-Resistance vs. Drain Current



Capacitance

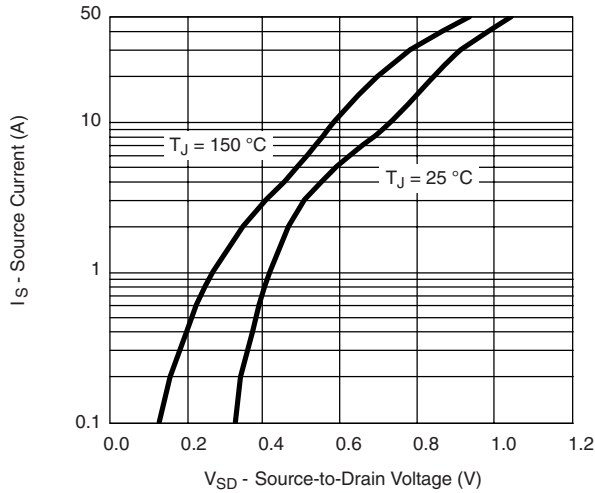


Gate Charge

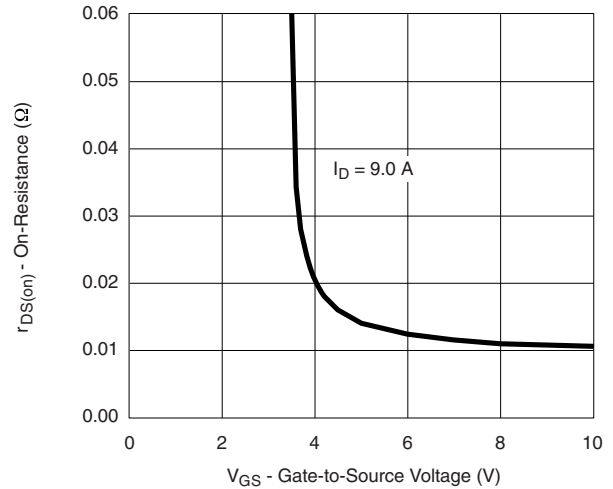


On-Resistance vs. Junction Temperature

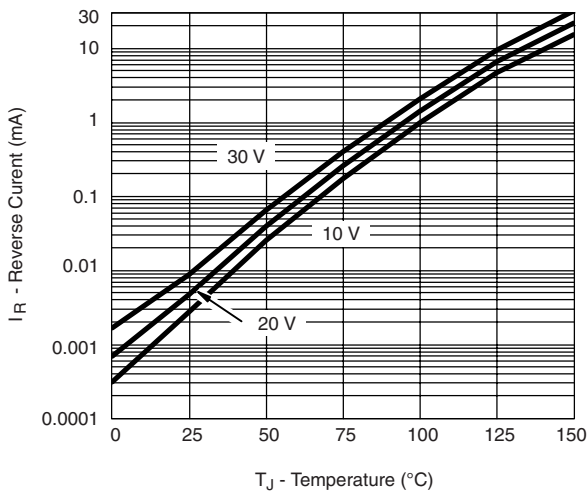
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



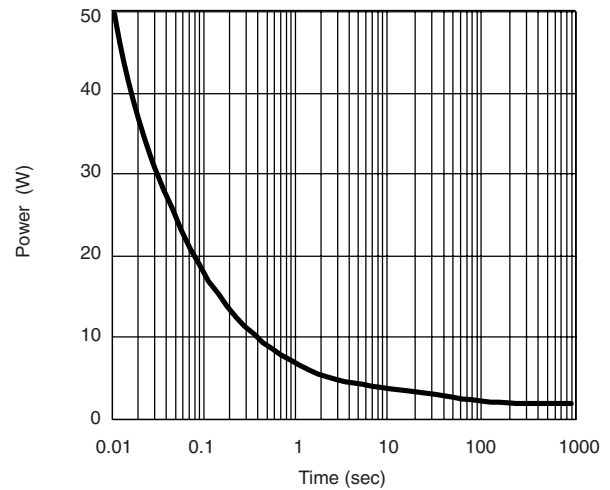
Source-Drain Diode Forward Voltage



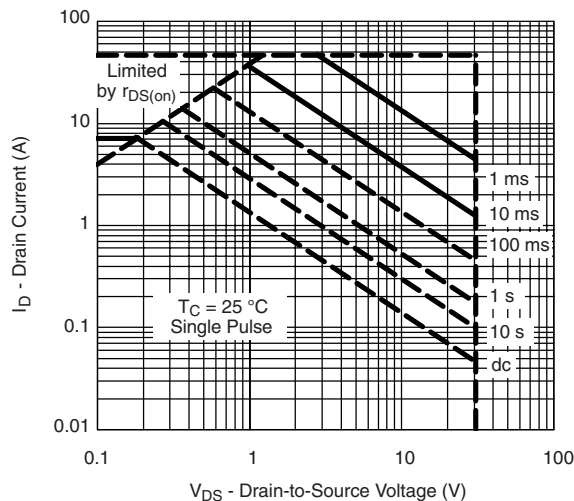
On-Resistance vs. Gate-to-Source Voltage



Reverse Current (Schottky)

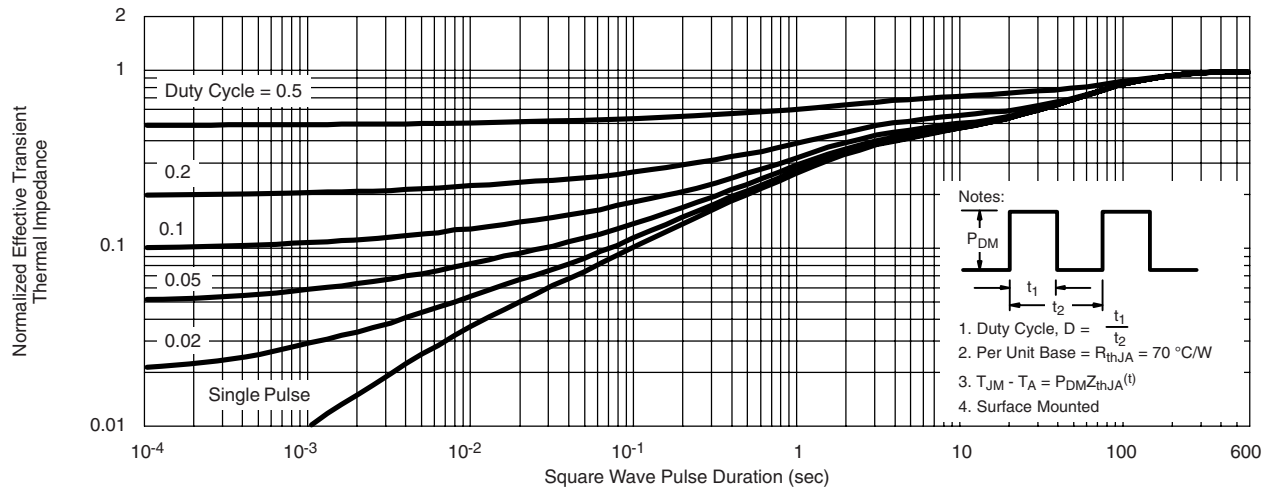


Single Pulse Power

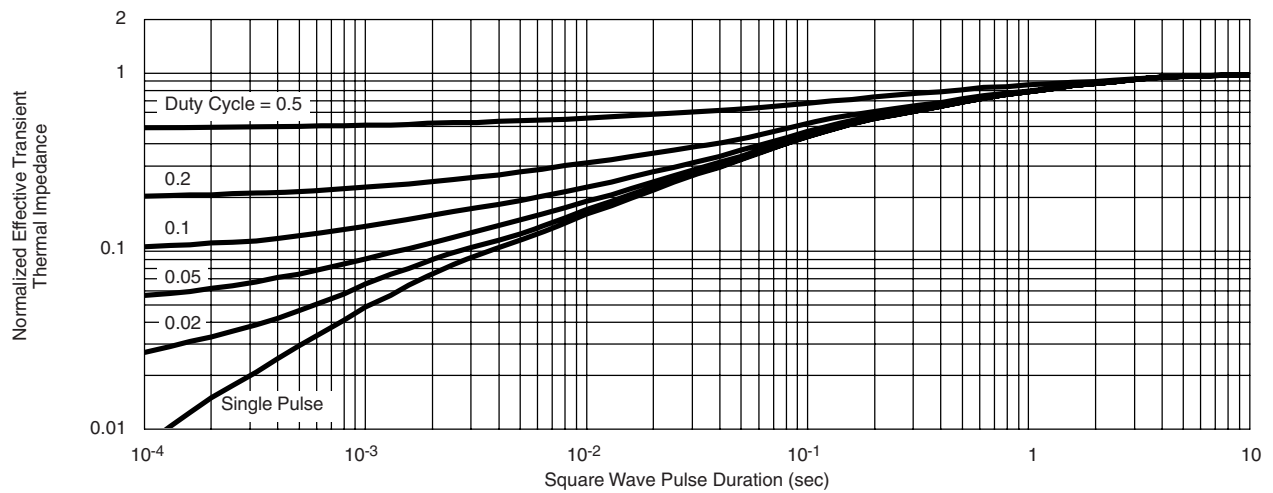


Safe Operating Area, Junction-to-Case

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?72229>



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.