

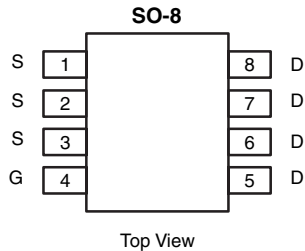
N-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
30	0.016 at V _{GS} = 10 V	9.5
	0.021 at V _{GS} = 4.5 V	7.7

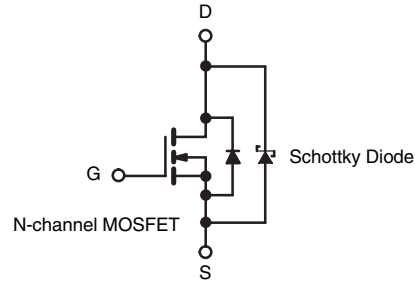
SCHOTTKY PRODUCT SUMMARY		
V _{DS} (V)	V _{SD} (V) Diode Forward Voltage	I _F (A)
30	0.50 V at 1.0 A	1.4

FEATURES

- LITTLE FOOT® Plus Power MOSFET
- 100 % R_g Tested



Ordering Information: Si4812BDY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted					
Parameter		Symbol	Limit		Unit
			10 sec	Steady State	
Drain-Source Voltage (MOSFET)		V_{DS}	30		V
Reverse Voltage (Schottky)			30		
Gate-Source Voltage (MOSFET)		V_{GS}	± 20		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) (MOSFET) ^{a, b}	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	9.5	7.3	A
	$T_A = 70\text{ }^{\circ}\text{C}$		7.7	5.9	
Pulsed Drain Current (MOSFET)		I_{DM}	50		
Continuous Source Current (MOSFET Diode Conduction) ^{a, b}		I_S	2.1	1.2	
Average Forward Current (Schottky)		I_F	1.4	0.8	
Pulsed Forward Current (Schottky)		I_{FM}	30		
Single Pulse Avalanche Current	$L = 0.1\text{ mH}$	I_{AS}	5		mJ
Avalanche Energy		E_{AS}	1.25		
Maximum Power Dissipation (MOSFET) ^{a, b}	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2.5	1.4	W
	$T_A = 70\text{ }^{\circ}\text{C}$		1.6	0.9	
Maximum Power Dissipation (Schottky) ^{a, b}	$T_A = 25\text{ }^{\circ}\text{C}$		2.0	1.2	
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3	0.8	
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 ≤ 10 sec) ^a	MOSFET	R _{thJA}	40	50	°C/W
	Schottky		50	60	
Maximum Junction-to-Ambient (t = Steady State) ^a	MOSFET		72	90	
	Schottky		85	100	

Notes:

a. Surface Mounted on FR4 Board.

b. t ≤ 10 sec.

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

MOSFET + SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	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 + Schottky)	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$		0.004	0.100	mA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 100\text{ }^{\circ}\text{C}$		0.7	10	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$		3.0	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	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 9.5\text{ A}$		0.013	0.016	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 7.7\text{ A}$		0.0165	0.021	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 9.5\text{ A}$		45		S
Schottky Diode Forward Voltage ^a	V_{SD}	$I_S = 1.0\text{ A}$, $V_{GS} = 0\text{ V}$		0.45	0.50	V
		$I_S = 1.0\text{ A}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$		0.33	0.42	
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 9.5\text{ A}$		8.5	13	nC
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			2.6		
Gate Resistance	R_g		0.3	0.7	1.1	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$		15	25	ns
Rise Time	t_r			13	20	
Turn-Off Delay Time	$t_{d(off)}$			20	30	
Fall Time	t_f			8	15	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.0\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		22	35	

Notes:

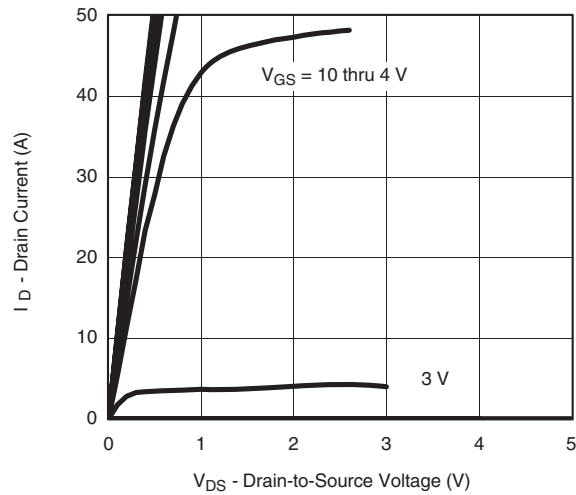
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

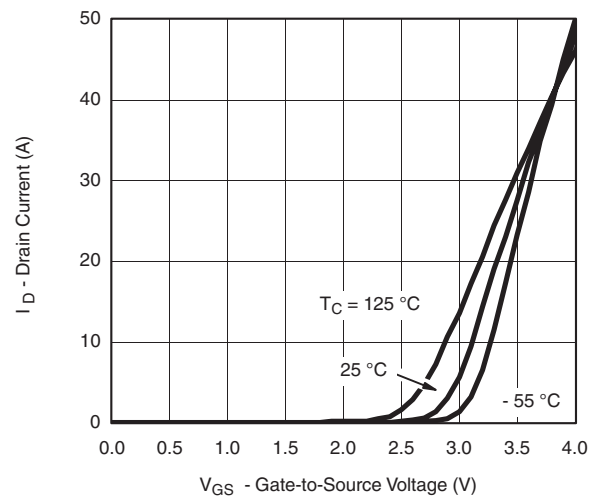
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



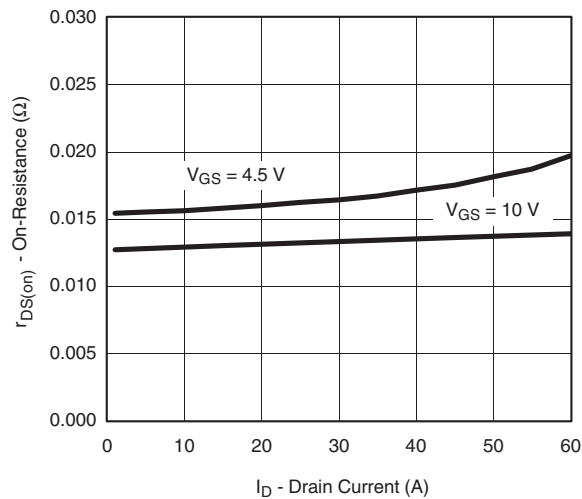
TYPICAL CHARACTERISTICS 25 °C unless noted



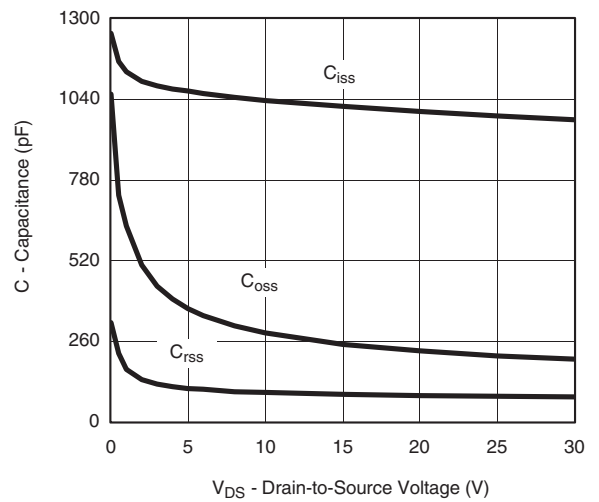
Output Characteristics



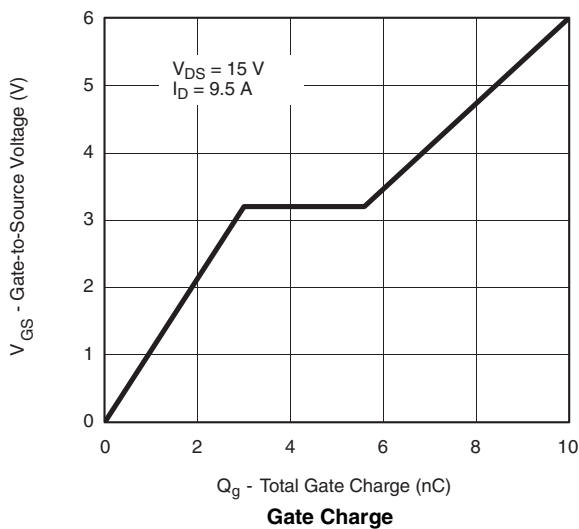
Transfer Characteristics



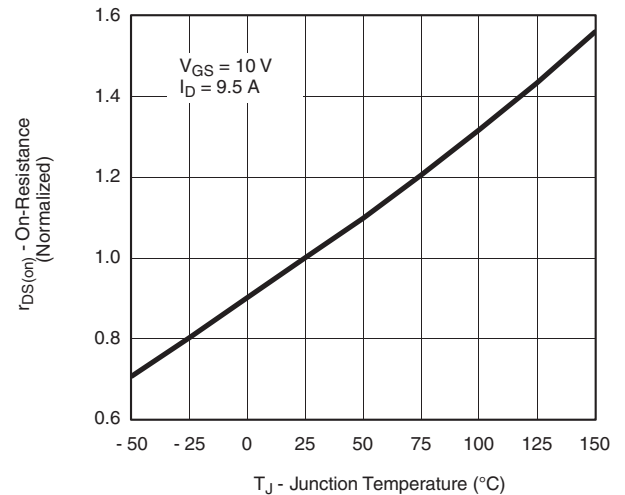
On-Resistance vs. Drain Current



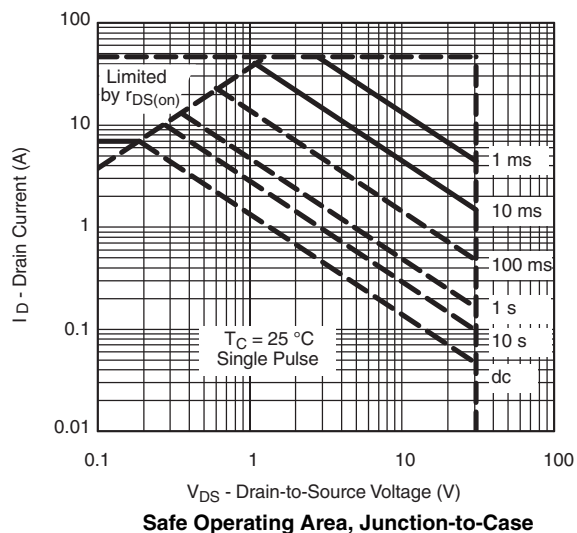
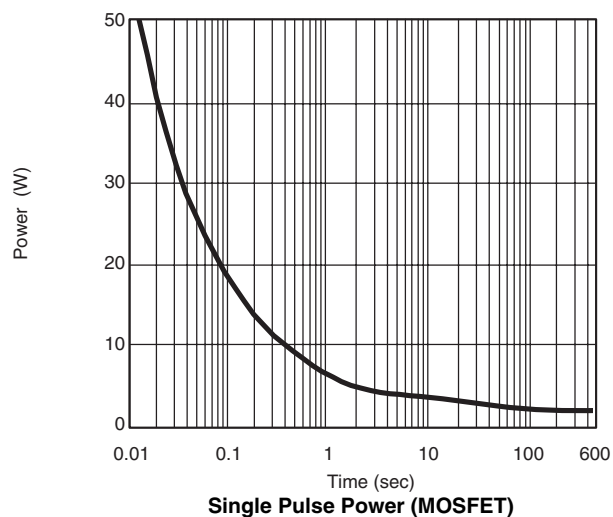
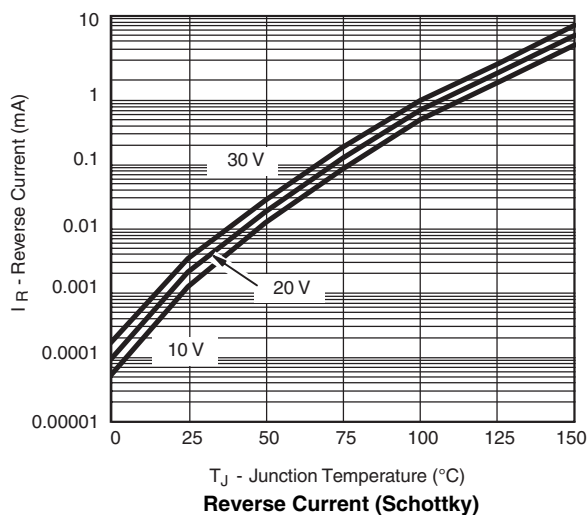
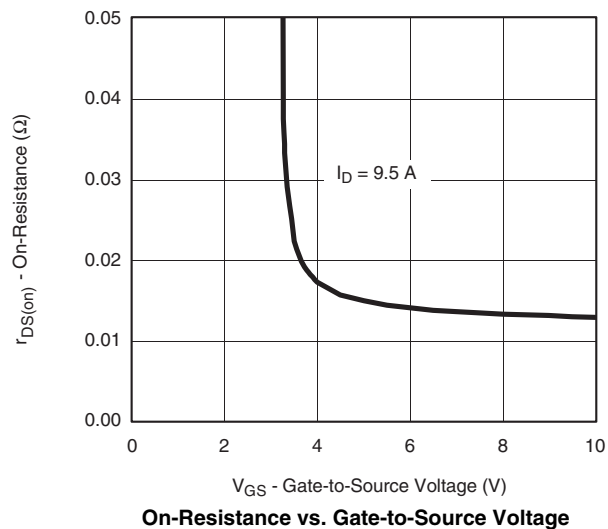
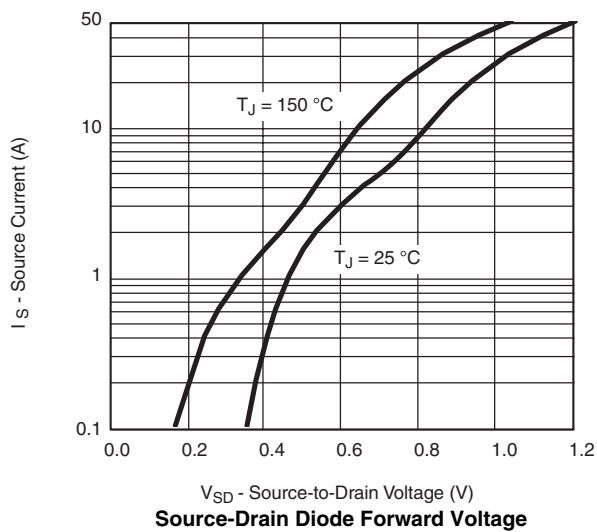
Capacitance



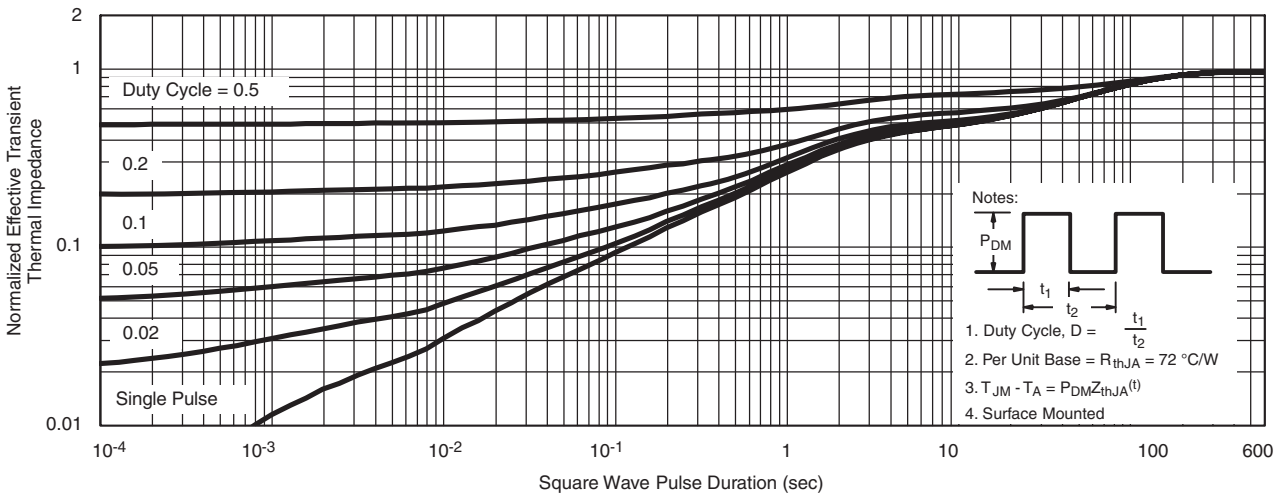
Gate Charge



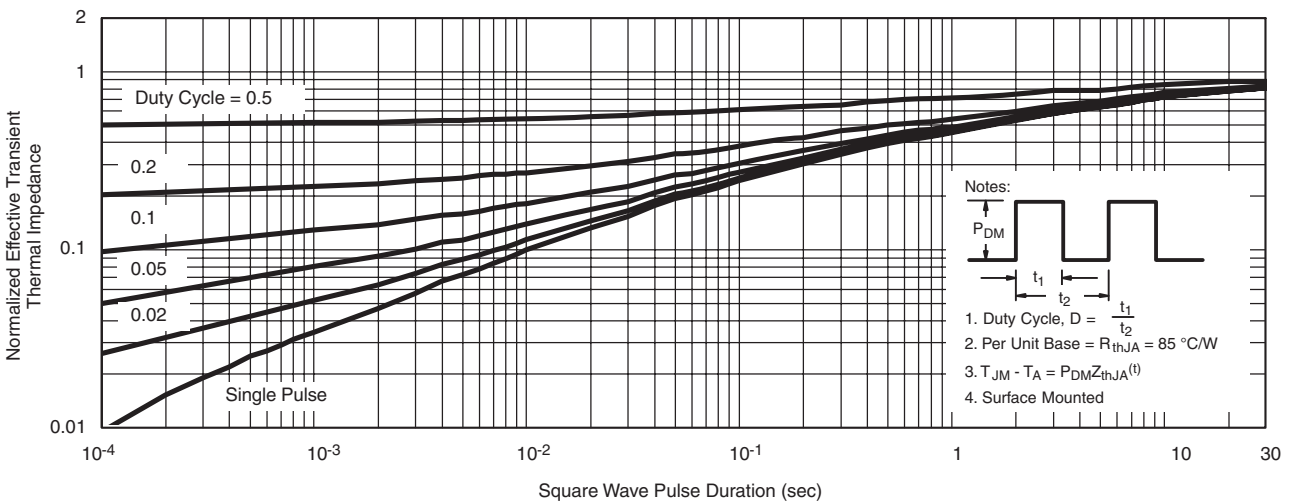
On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C unless noted

TYPICAL CHARACTERISTICS 25 °C unless noted



Normalized Thermal Transient Impedance, Junction-to-Ambient (MOSFET)



Normalized Thermal Transient Impedance, Junction-to-Ambient (Schottky)

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