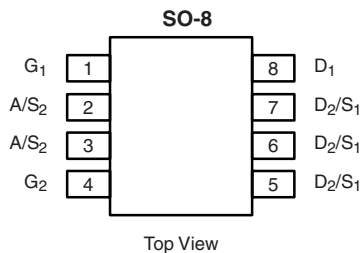


## Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY				
	V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ)
Channel-1	30	0.0185 at V <sub>GS</sub> = 10 V	6.8	7.8
		0.0225 at V <sub>GS</sub> = 4.5 V	6.0	
Channel-2		0.0115 at V <sub>GS</sub> = 10 V	11.4	11.6
		0.016 at V <sub>GS</sub> = 4.5 V	9.5	

SCHOTTKY PRODUCT SUMMARY		
V <sub>DS</sub> (V)	V <sub>SD</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
30	0.50 V at 1.0 A	2.0



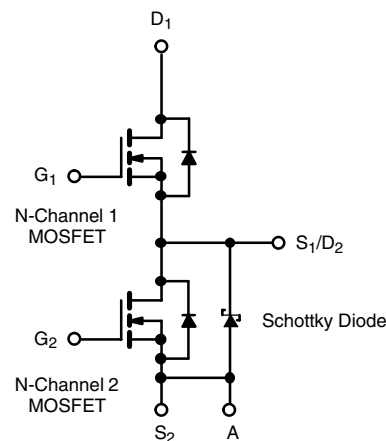
Ordering Information: Si4816BDY-T1-E3 (Lead (Pb)-free)

### FEATURES

- LITTLE FOOT<sup>®</sup> Plus Power MOSFET
- 100 % R<sub>g</sub> Tested



RoHS  
COMPLIANT



ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 sec	Steady State	10 sec	Steady State		
Drain-Source Voltage	V <sub>DS</sub>	30				V	
Gate-Source Voltage	V <sub>GS</sub>	20					
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	6.8	5.8	11.4	8.2	A
		T <sub>A</sub> = 70 °C	5.5	4.6	9.0	6.5	
Pulsed Drain Current	I <sub>DM</sub>	30		40			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1	0.9	2.2	1.15		
Single Pulse Avalanche Current	I <sub>AS</sub>	L = 0.1 mH	10		20		
Avalanche Energy			E <sub>AS</sub>	5		20	
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	1.4	1.0	2.4	1.25	W
		T <sub>A</sub> = 70 °C	0.9	0.64	1.5	0.8	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150				°C	

THERMAL RESISTANCE RATINGS									
Parameter	Symbol	Channel-1		Channel-2		Schottky		Unit	
		Typ	Max	Typ	Max	Typ	Max		
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 sec	72	90	43	53	48	60	°C/W
		Steady State	100	125	82	100	80	100	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	Steady State	51	63	25	30	28	35	

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted							
Parameter	Symbol	Test Conditions		Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	Ch-1	1.0		3.0	V
			Ch-2	1.0		3.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = 20\ \text{V}$	Ch-1			100	nA
			Ch-2			100	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$	Ch-1			1	$\mu\text{A}$
			Ch-2			100	
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 85\text{ }^\circ\text{C}$	Ch-1			15	
			Ch-2			2000	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\ \text{V}, V_{GS} = 10\ \text{V}$	Ch-1	20			A
			Ch-2	30			
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 6.8\ \text{A}$	Ch-1		0.0155	0.0185	$\Omega$
		$V_{GS} = 10\ \text{V}, I_D = 11.4\ \text{A}$	Ch-2		0.0093	0.0115	
		$V_{GS} = 4.5\ \text{V}, I_D = 6.0\ \text{A}$	Ch-1		0.0185	0.0225	
		$V_{GS} = 4.5\ \text{V}, I_D = 9.5\ \text{A}$	Ch-2		0.013	0.016	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 6.8\ \text{A}$	Ch-1		30		S
		$V_{DS} = 15\ \text{V}, I_D = 11.4\ \text{A}$	Ch-2		31		
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 1\ \text{A}, V_{GS} = 0\ \text{V}$	Ch-1		0.73	1.1	V
		$I_S = 1\ \text{A}, V_{GS} = 0\ \text{V}$	Ch-2		0.47	0.5	
<b>Dynamic<sup>a</sup></b>							
Total Gate Charge	$Q_g$	Channel-1 $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = 6.8\ \text{A}$	Ch-1		7.8	10	nC
			Ch-2		11.6	18	
Gate-Source Charge	$Q_{gs}$	Channel-2 $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = -11.4\ \text{A}$	Ch-1		2.9		
			Ch-2		4.8		
Gate-Drain Charge	$Q_{gd}$		Ch-1		2.3		
			Ch-2		3.7		
Gate Resistance	$R_g$		Ch-1	1.5	3.0	4.5	$\Omega$
			Ch-2	0.9	1.8	2.7	
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$  Channel-2 $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$	Ch-1		11	17	ns
Rise Time	$t_r$		Ch-2		13	20	
			Ch-1		9	15	
Turn-Off Delay Time	$t_{d(off)}$		Ch-2		9	15	
			Ch-1		24	40	
Fall Time	$t_f$		Ch-2		31	50	
			Ch-1		9	15	
Source-Drain Reverse Recovery Time	$t_{rr}$		$I_F = 1.3\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$	Ch-1		20	
		$I_F = 2.2\ \text{A}, di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2		25	40	

## Notes:

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

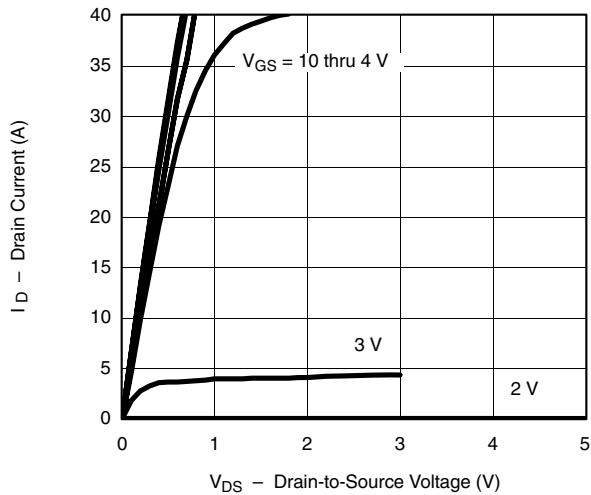
b. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .



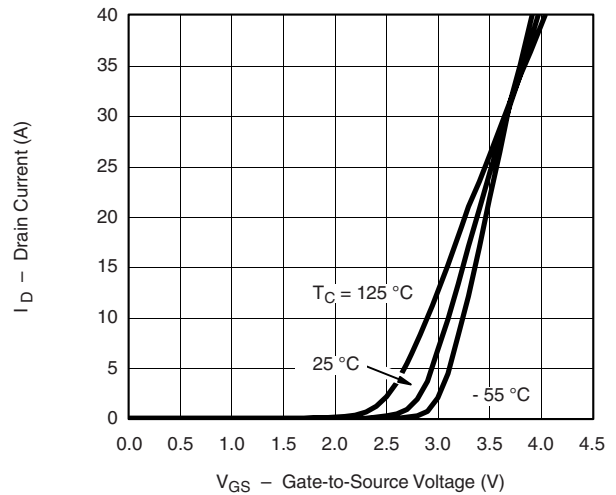
<b>SCHOTTKY SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	$I_{rm}$	$V_r = 30\text{ V}$		0.004	0.100	mA
		$V_r = 30\text{ V}, T_J = 100\text{ }^\circ\text{C}$		0.7	10	
		$V_r = -30\text{ V}, T_J = 125\text{ }^\circ\text{C}$		3.0	20	
Junction Capacitance	$C_T$	$V_r = 10\text{ V}$		50		pF

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.

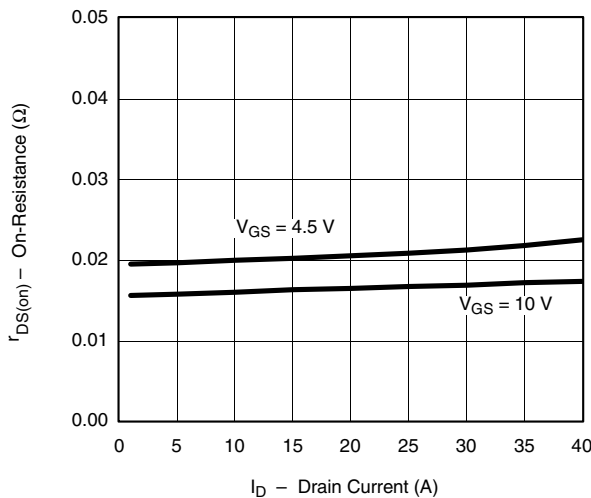
**CHANNEL-1 TYPICAL CHARACTERISTICS**  $25\text{ }^\circ\text{C}$ , unless noted



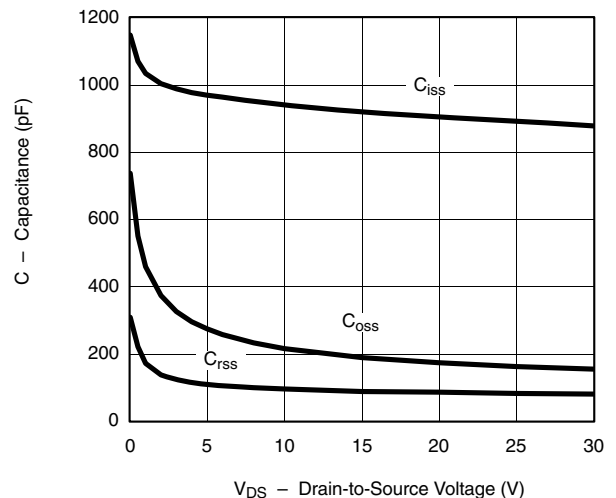
**Output Characteristics**



**Transfer Characteristics**

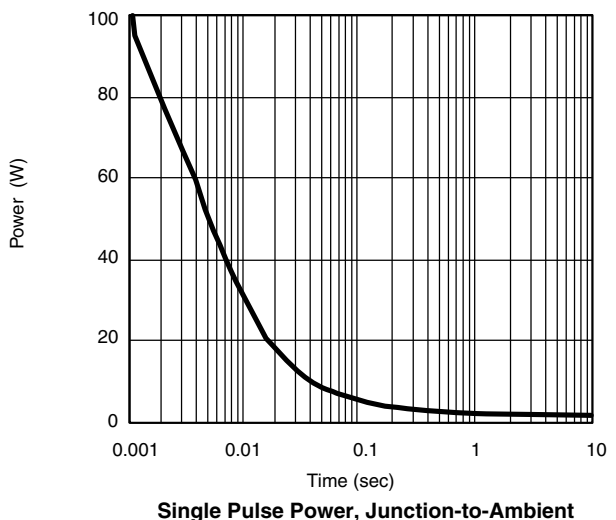
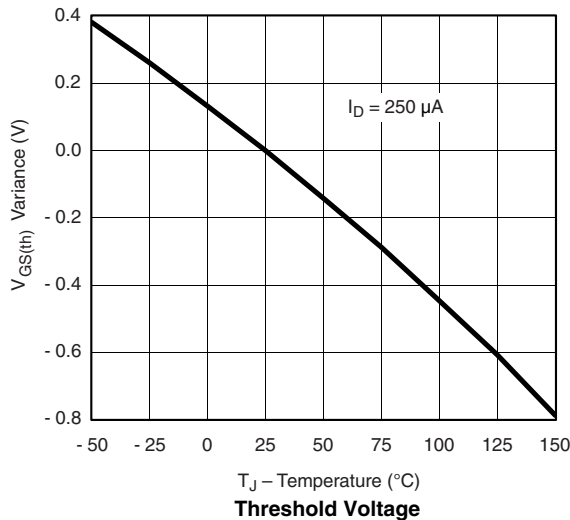
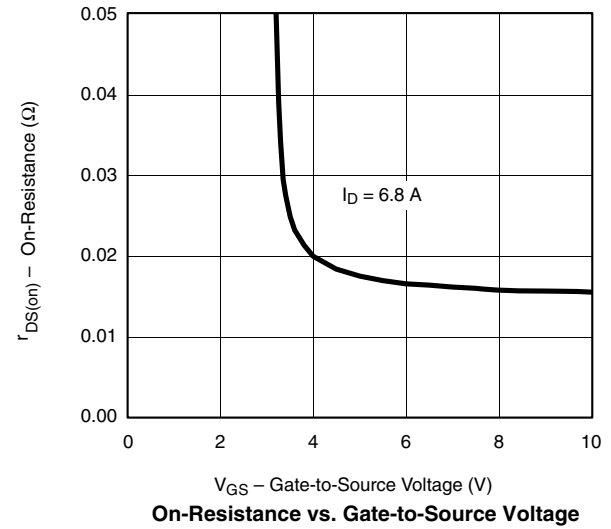
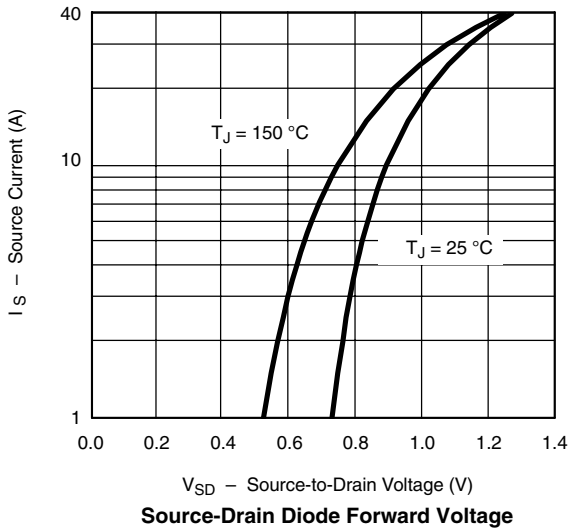
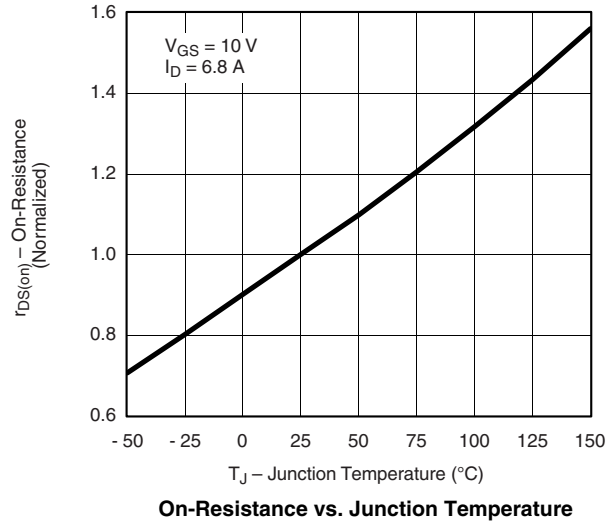
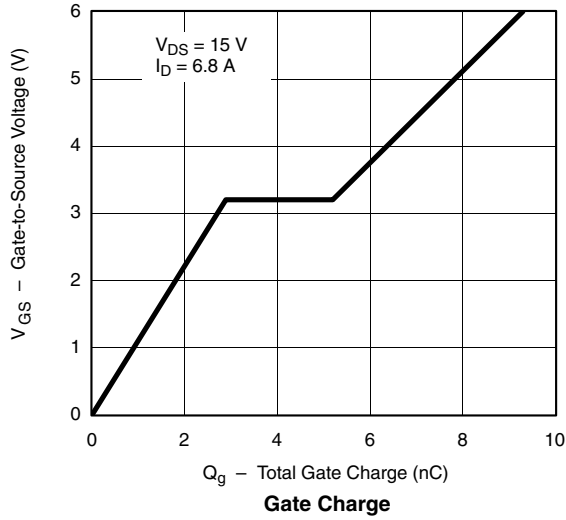


**On-Resistance vs. Drain Current**

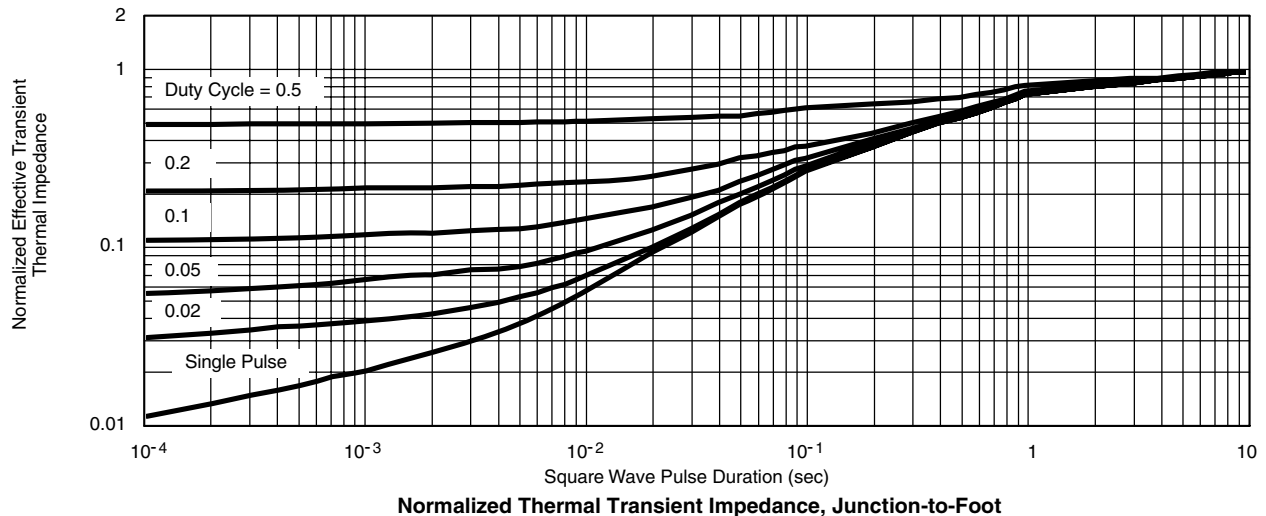
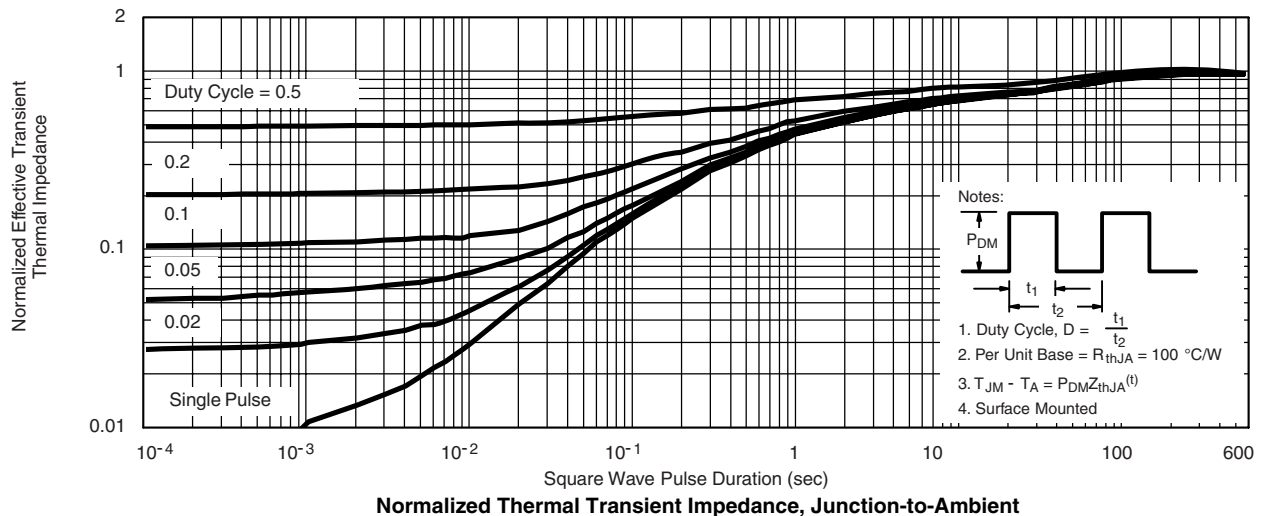
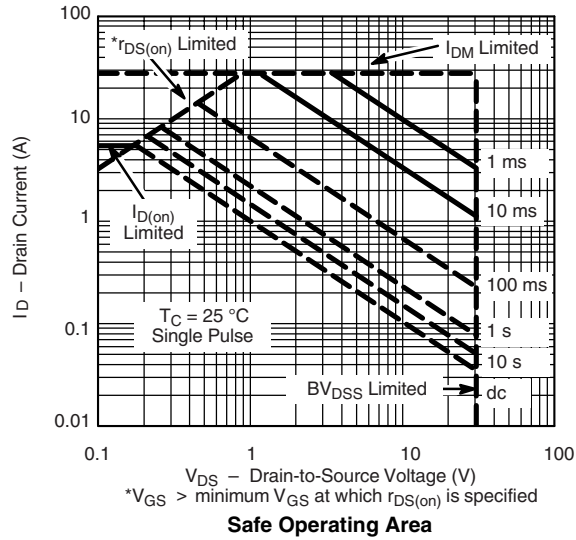


**Capacitance**

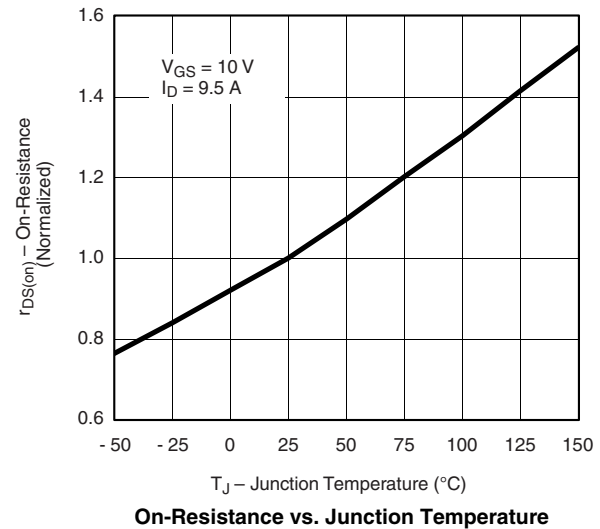
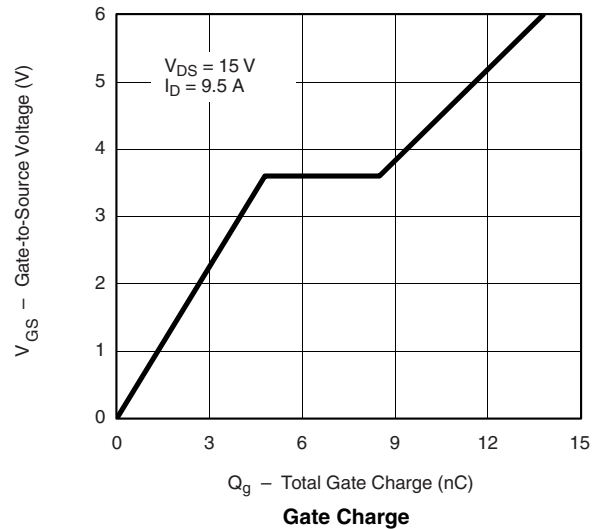
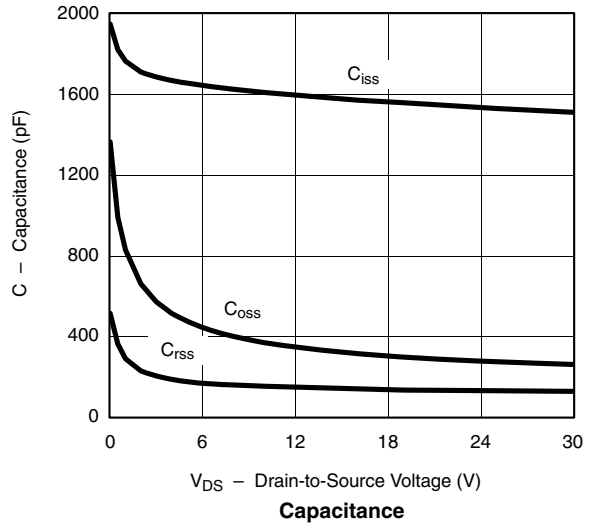
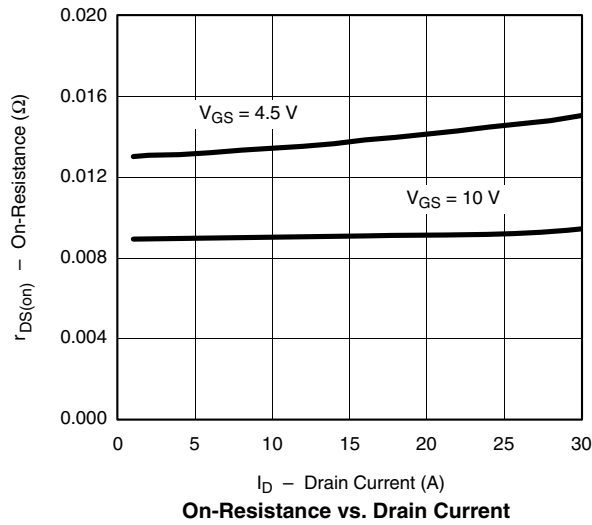
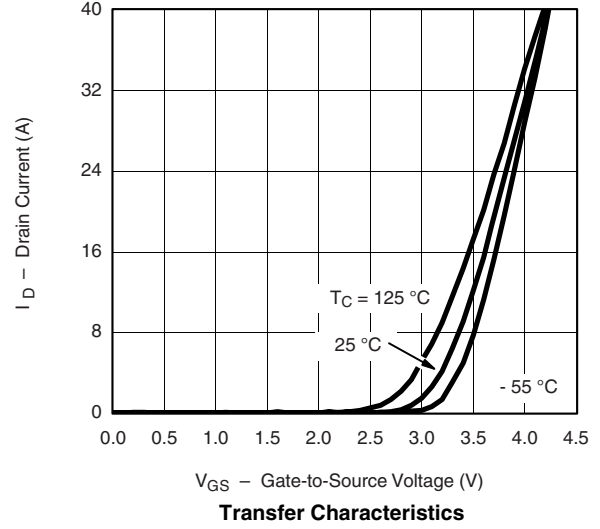
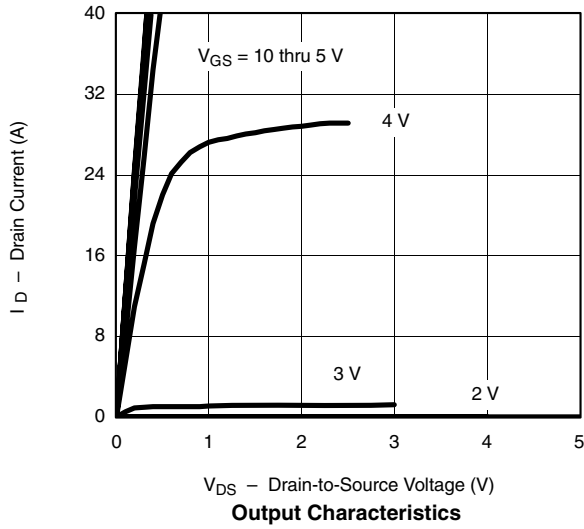
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless noted



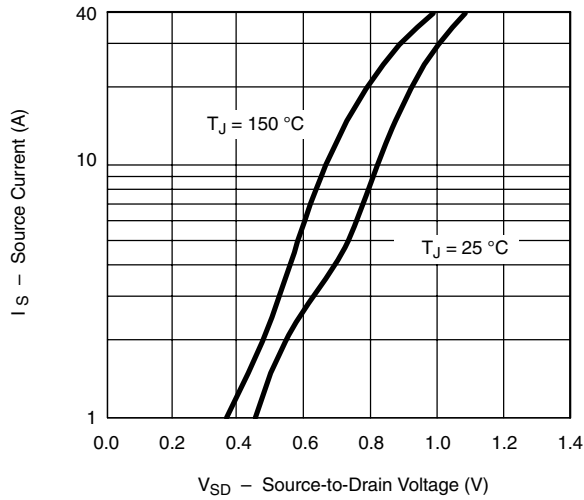
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless noted



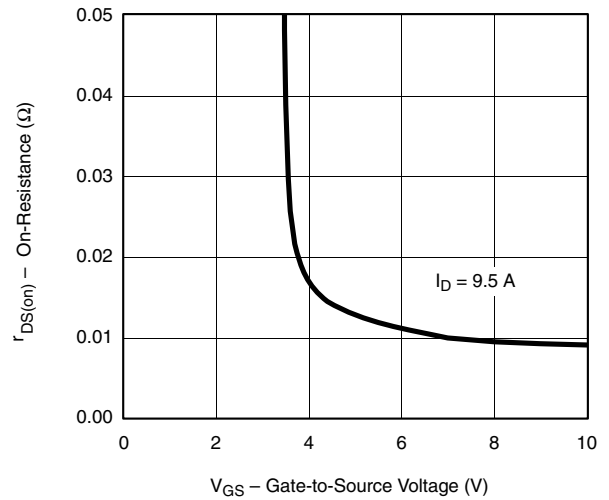
## CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless noted



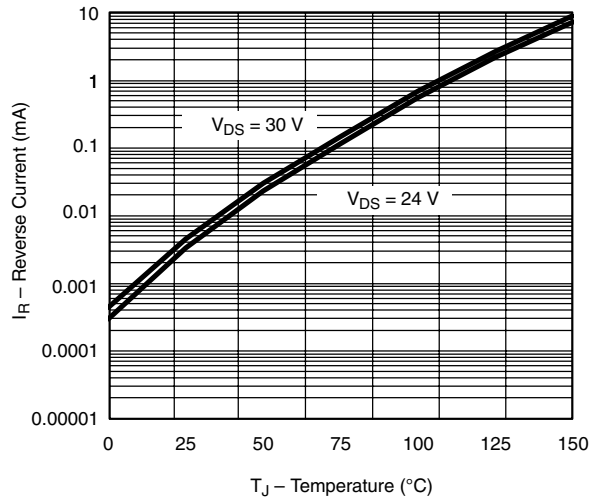
**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless noted



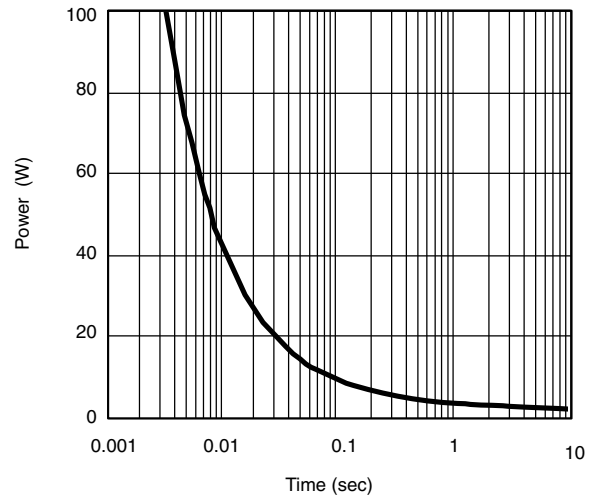
Source-Drain Diode Forward Voltage



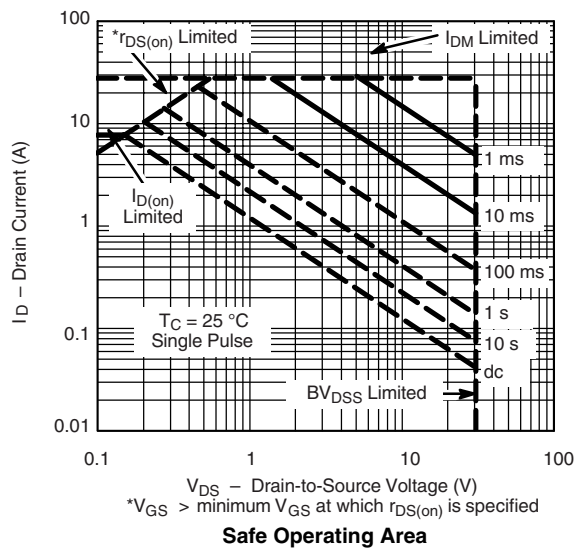
On-Resistance vs. Gate-to-Source Voltage



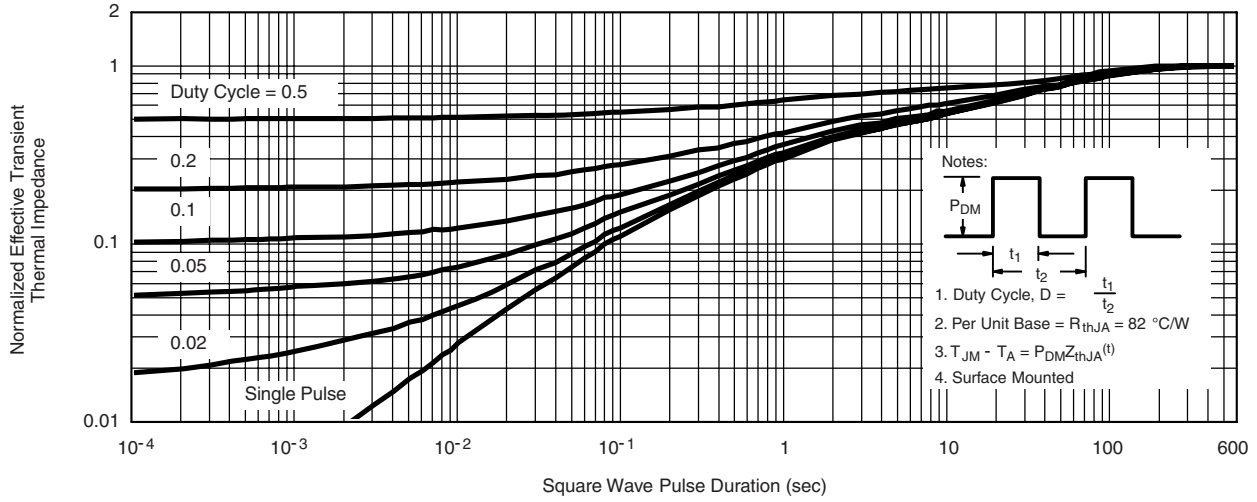
Reverse Current vs. Junction Temperature



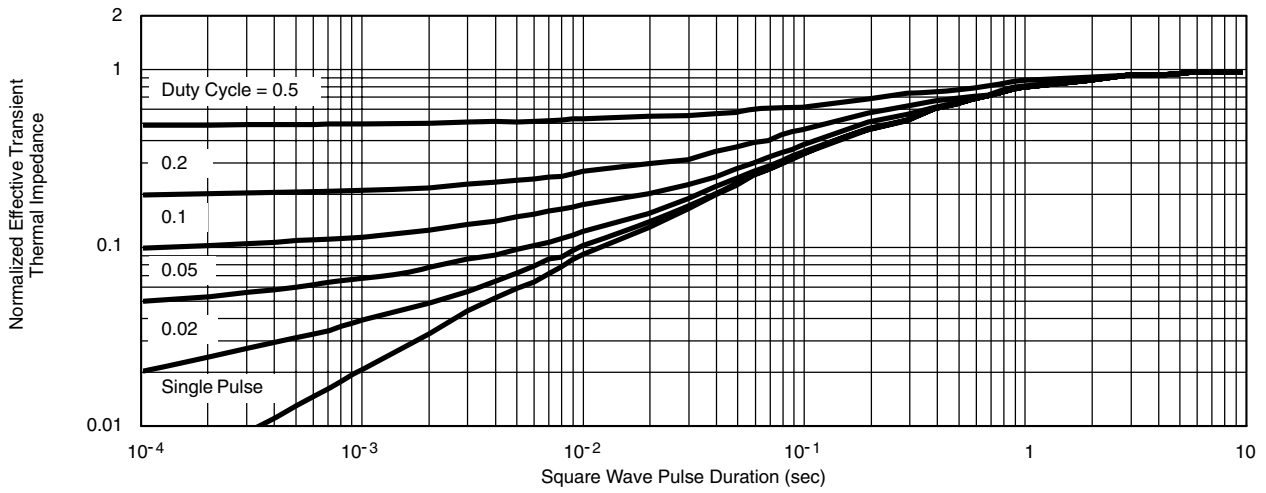
Single Pulse Power, Junction-to-Ambient



**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless noted



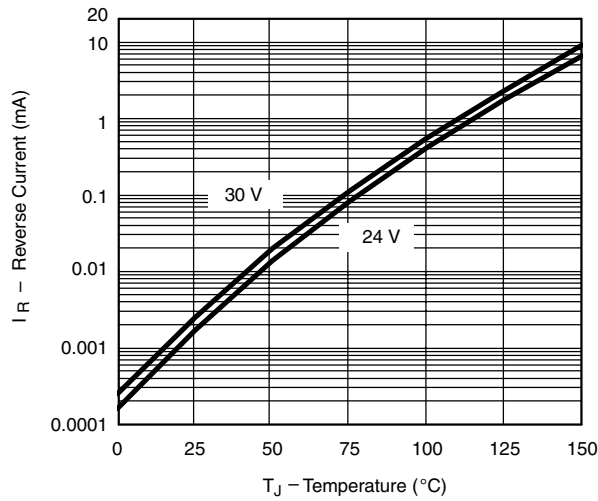
**Normalized Thermal Transient Impedance, Junction-to-Ambient**



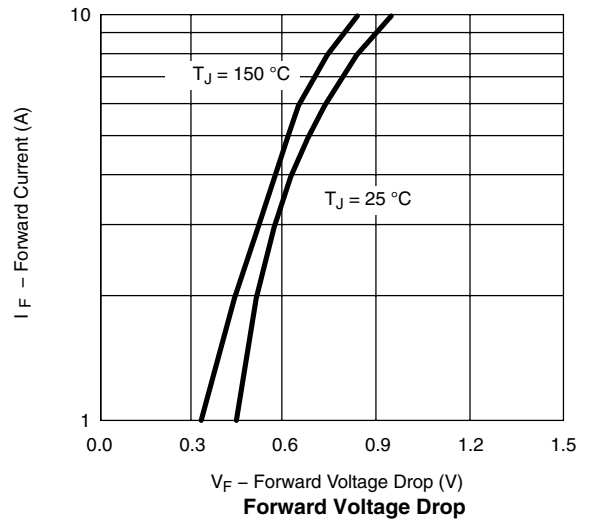
**Normalized Thermal Transient Impedance, Junction-to-Foot**



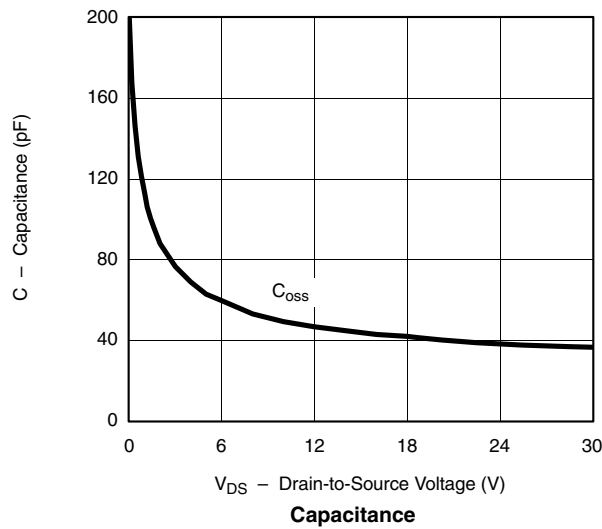
**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop



Capacitance

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?73026>.



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