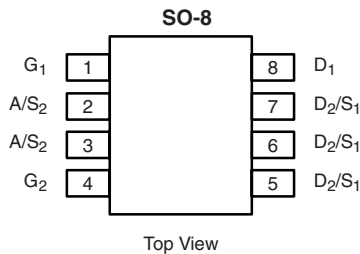




## Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY			
	V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
Channel-1	30	0.022 at V <sub>GS</sub> = 10 V	6.3
		0.030 at V <sub>GS</sub> = 4.5 V	5.4
Channel-2		0.013 at V <sub>GS</sub> = 10 V	10
		0.0185 at V <sub>GS</sub> = 4.5 V	8.6

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

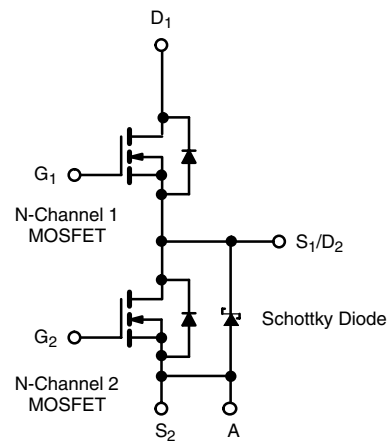


### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus Power MOSFET
- 100 % R<sub>g</sub> Tested
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available



**Ordering Information:** Si4816DY-T1-E3 (Lead (Pb)-free)  
Si4816DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 s	Steady State	10 s	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	6.3	5.3	10	7.7	A
		T <sub>A</sub> = 70 °C	5.4	4.2	8.2	6.2	
Pulsed Drain Current	I <sub>DM</sub>	30		40			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1.3	0.9	2.2	1.15		
Avalanche Current <sup>b</sup>	L = 0.1 mH	I <sub>AS</sub>	12		25		
Single Pulse Avalanche Energy <sup>b</sup>			E <sub>AS</sub>	7.2		31.25	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>		1.4	1.0	2.4	1.25
			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 s	72	90	43	53	48	60	°C/W
		Steady State	100	125	82	100	80	100	
Maximum Junction-to-Foot (Drain)	R <sub>thJC</sub>	51	63	25	30	28	35		

Notes:

- Surface Mounted on 1" x 1" FR4 board.
- Starting date code W46BAA.

<b>MOSFET SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , 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	0.8	2	V	
			Ch-2	1.0	3		
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>	$R_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 6.3\ \text{A}$	Ch-1	0.018	0.022	$\Omega$	
			Ch-2	0.0105	0.013		
			$V_{GS} = 4.5\ \text{V}, I_D = 5.4\ \text{A}$	Ch-1	0.024		0.030
				Ch-2	0.015		0.0185
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 6.3\ \text{A}$	Ch-1	17		S	
			Ch-2	28			
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 1.3\ \text{A}, V_{GS} = 0\ \text{V}$	Ch-1	0.7	1.1	V	
			Ch-2	0.47	0.5		
<b>Dynamic<sup>a</sup></b>							
Total Gate Charge	$Q_g$	Channel-1 $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = 6.3\ \text{A}$	Ch-1	8.0	12	nC	
			Ch-2	15	23		
Gate-Source Charge	$Q_{gs}$	Channel-2 $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = -10\ \text{A}$	Ch-1	1.75			
			Ch-2	5.3			
Gate-Drain Charge	$Q_{gd}$	Channel-2 $V_{DS} = 15\ \text{V}, V_{GS} = 5\ \text{V}, I_D = -10\ \text{A}$	Ch-1	3.2			
			Ch-2	4.6			
Gate Resistance	$R_g$		Ch-1	1.5	6.1	$\Omega$	
			Ch-2	0.5	2.6		
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$	Ch-1	10	20	ns	
Rise Time	$t_r$	$I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$	Ch-2	15	30		
			Ch-1	5	10		
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$	Ch-1	26	50		
			Ch-2	44	80		
Fall Time	$t_f$	$I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$	Ch-1	8	16		
			Ch-2	12	24		
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 1.3\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$	Ch-1	30	60		
			Ch-2	32	70		

Notes:

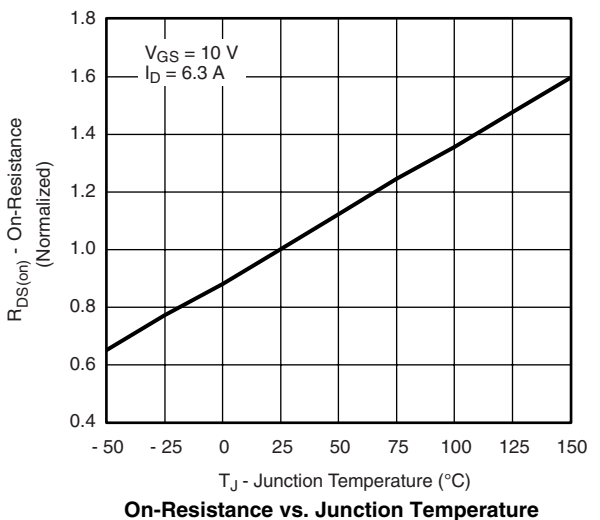
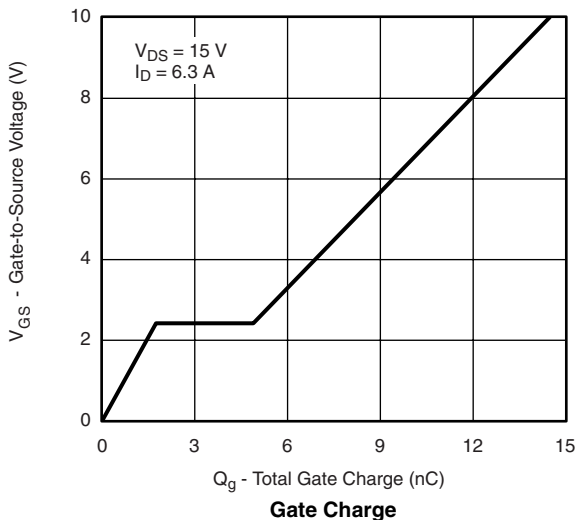
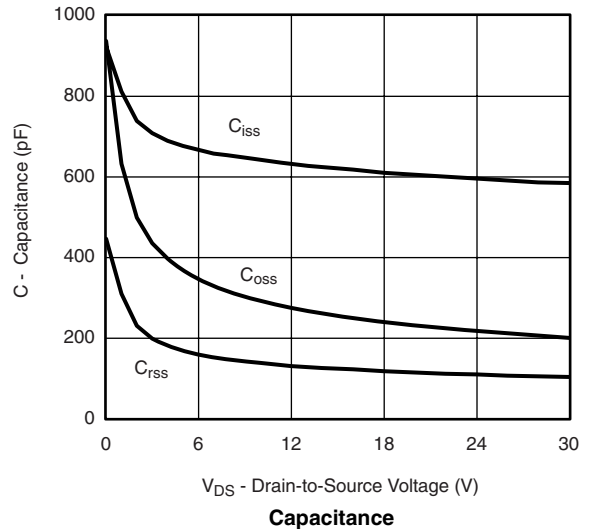
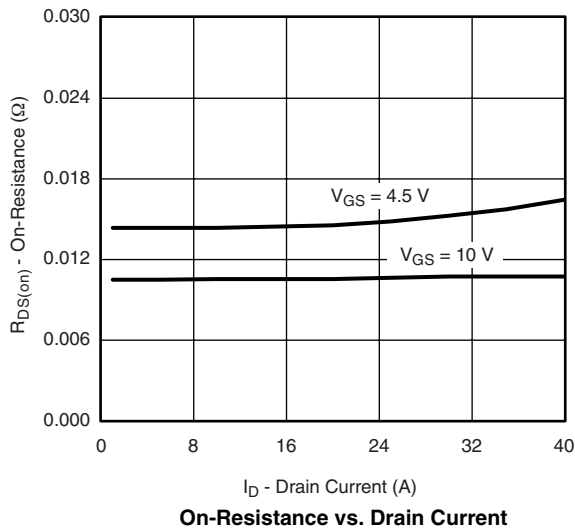
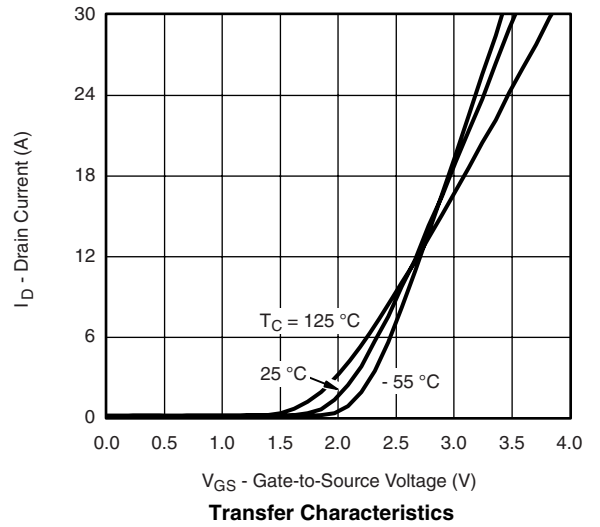
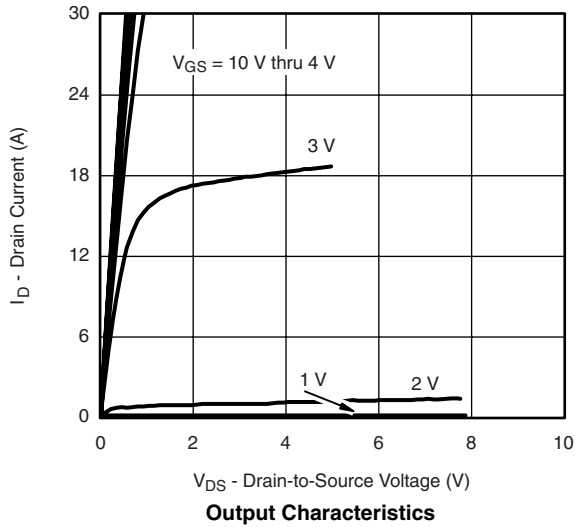
a. Guaranteed by design, not subject to production testing.

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

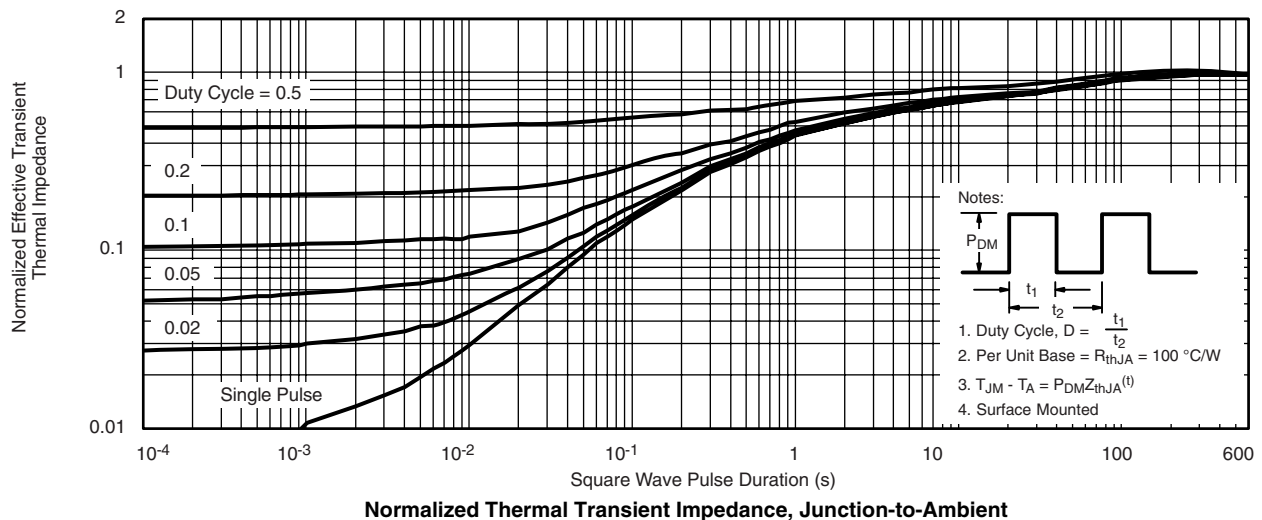
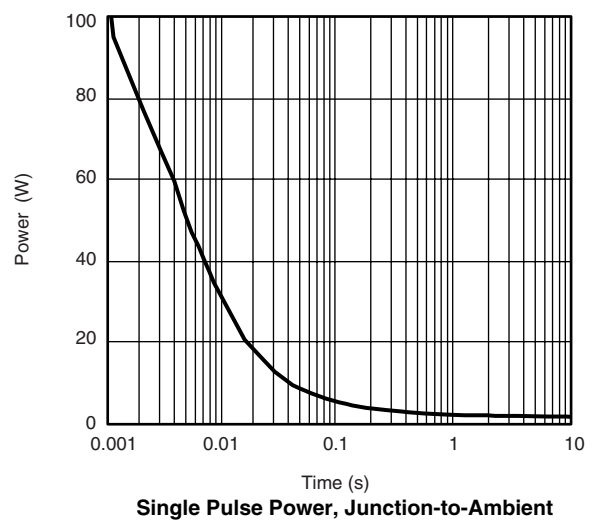
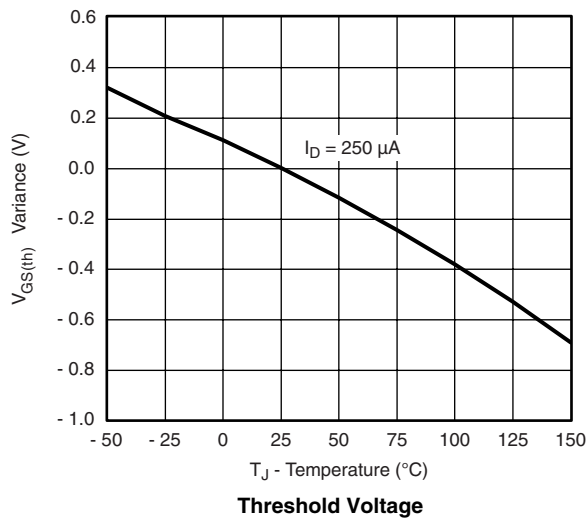
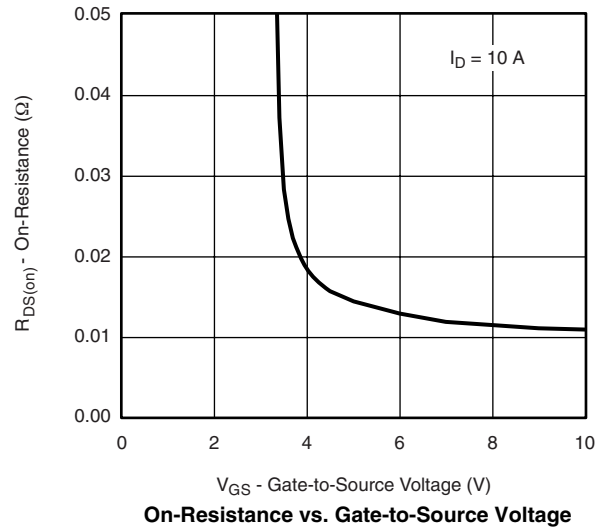
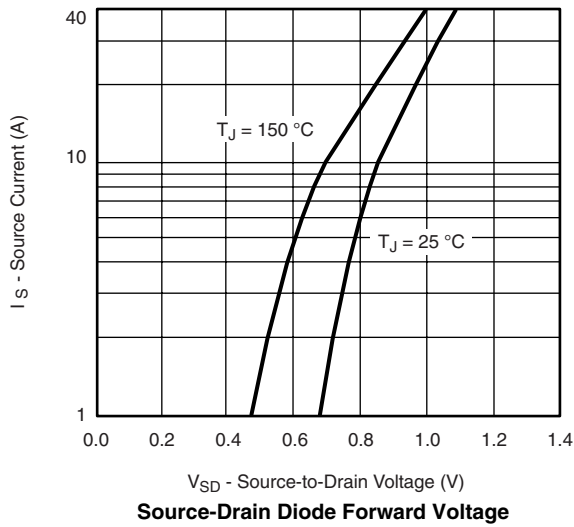
<b>SCHOTTKY SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0\ \text{A}$		0.47	0.50	V
		$I_F = 1.0\ \text{A}, T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage 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.

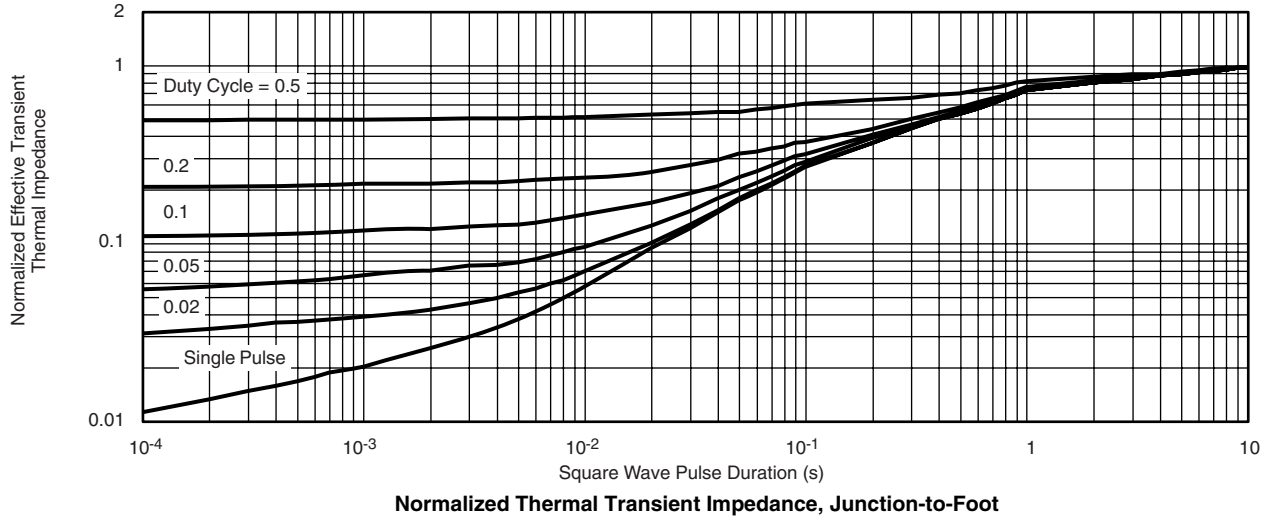
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



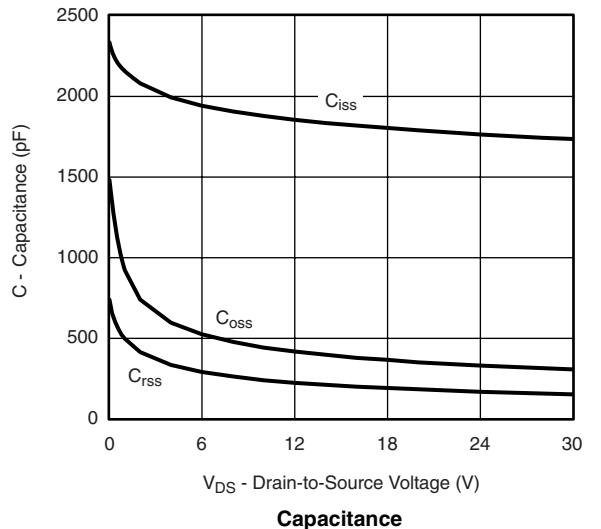
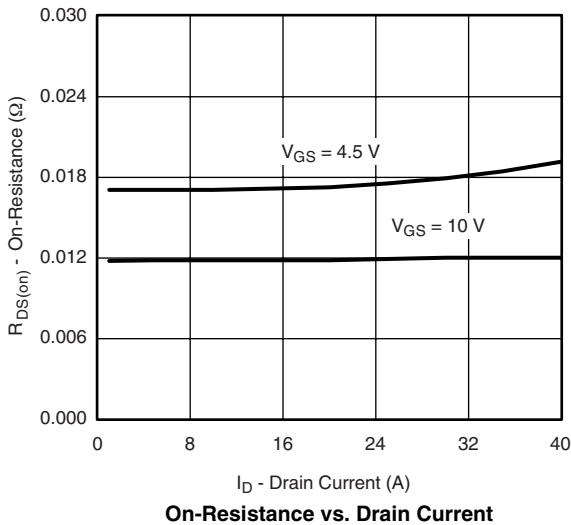
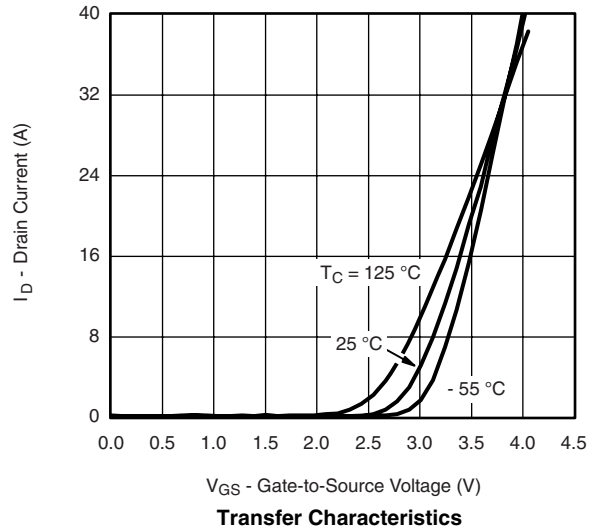
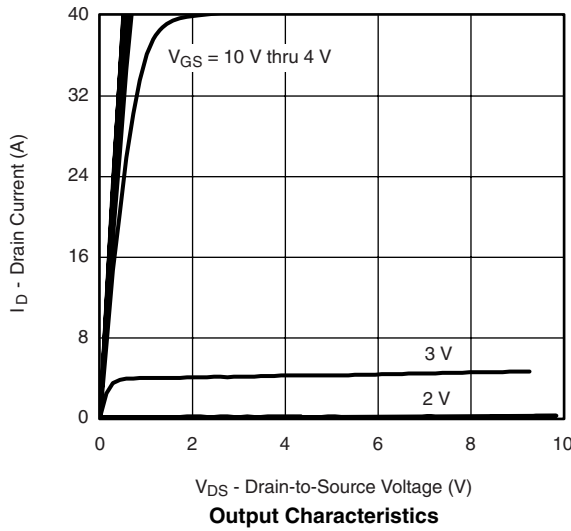
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



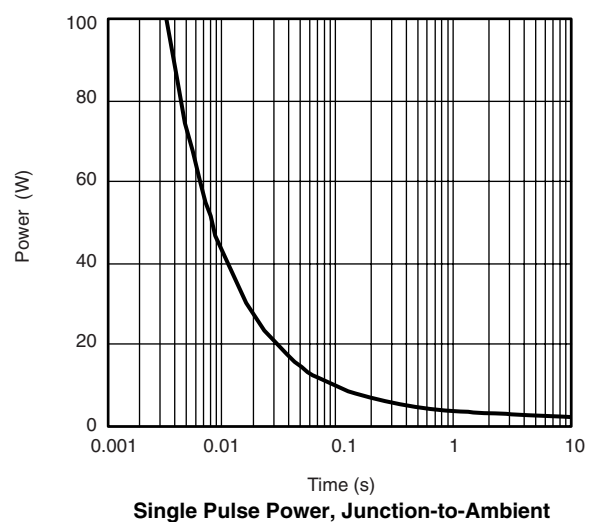
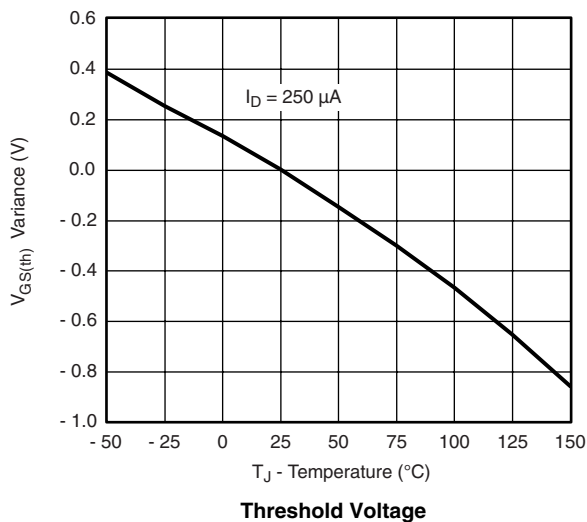
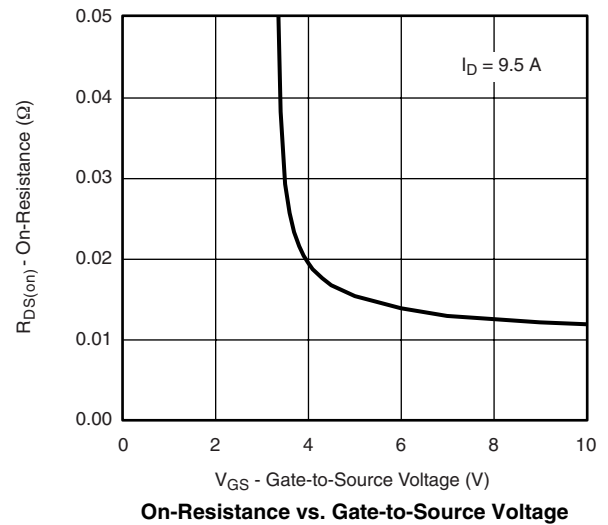
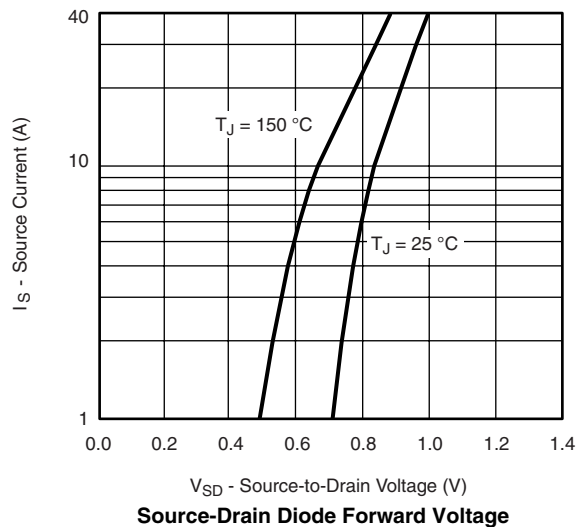
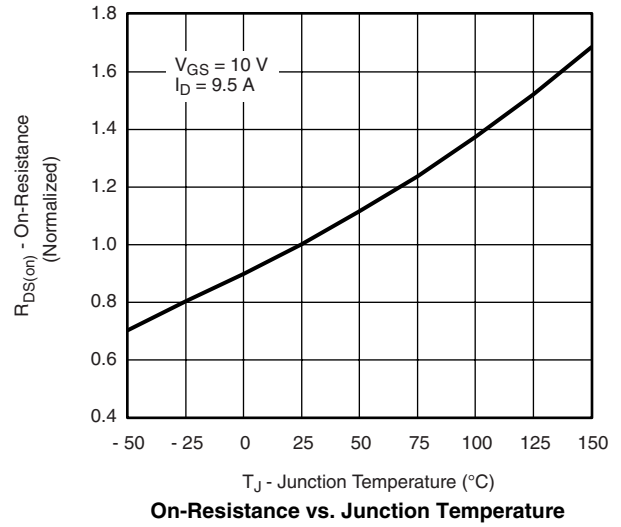
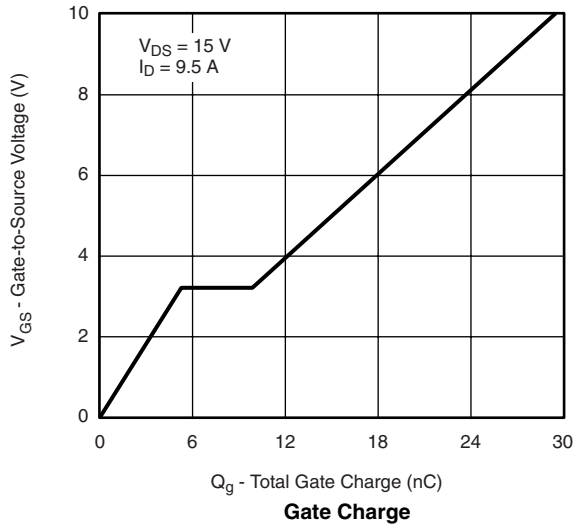
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



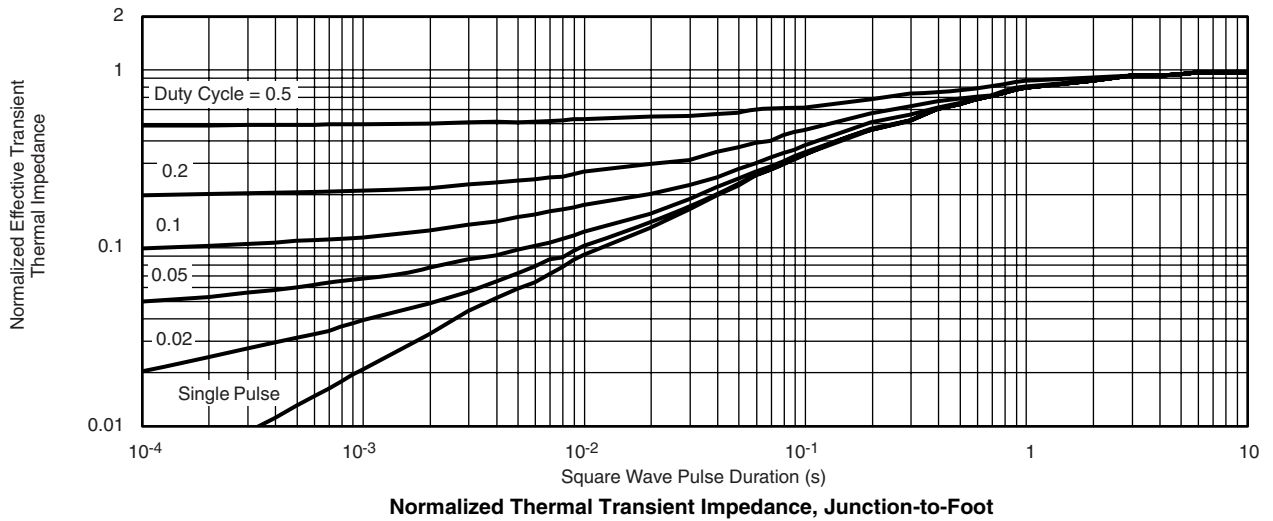
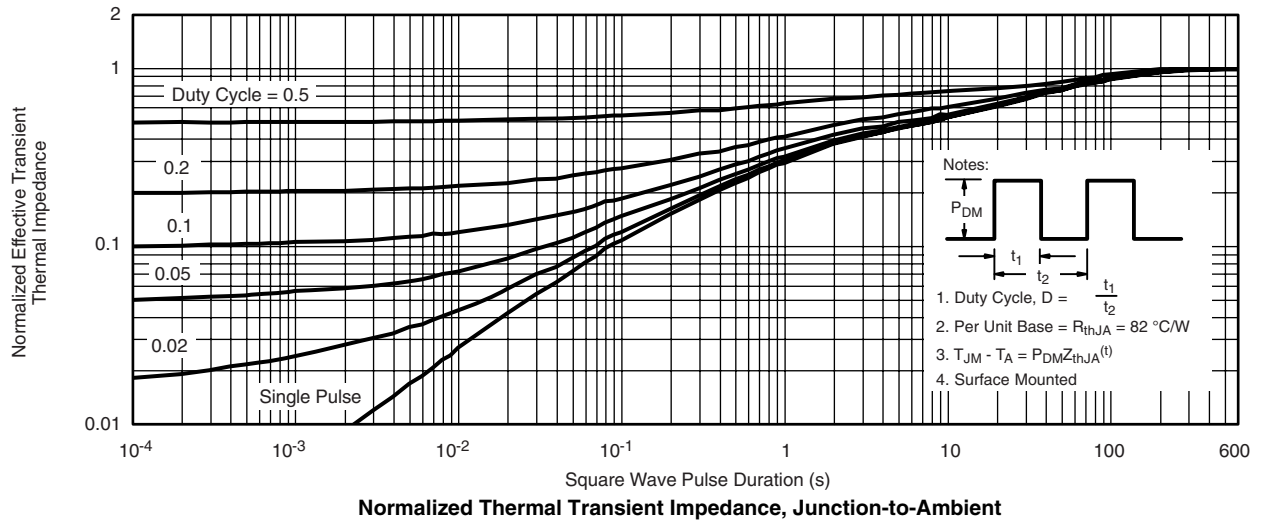
**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



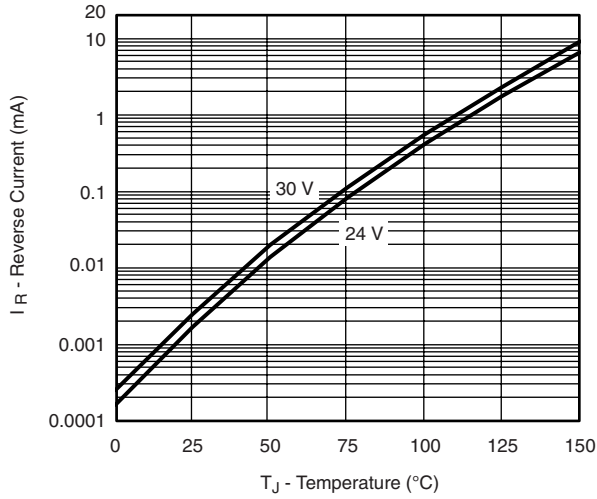
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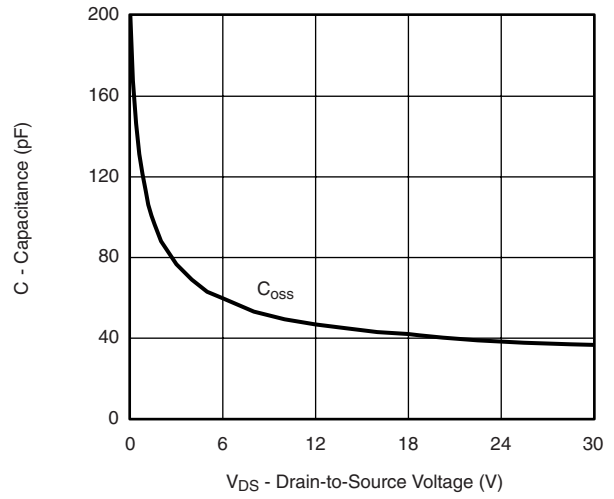
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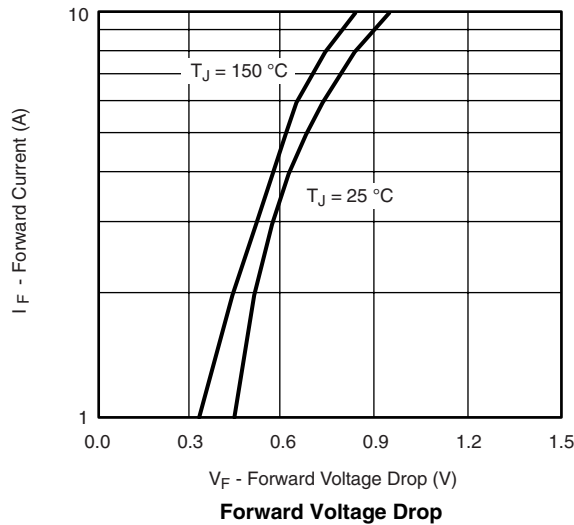
**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Reverse Current vs. Junction Temperature**



**Capacitance**



**Forward Voltage Drop**

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