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## 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		0.0155 at V <sub>GS</sub> = 10 V	9.5
		0.0205 at V <sub>GS</sub> = 4.5 V	8.2

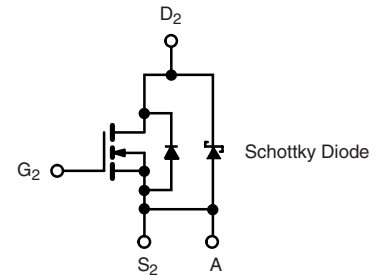
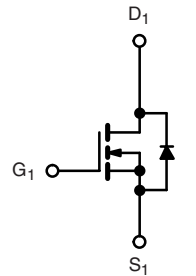
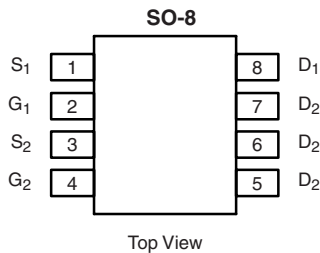
SCHOTTKY PRODUCT SUMMARY		
V <sub>DS</sub> (V)	V <sub>SD</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
30	0.50 V at 1.0 A	2.0

### FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus
- Compliant to RoHS directive 2002/95/EC



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



**Ordering Information:** Si4818DY-T1-E3 (Lead (Pb)-free)  
Si4818DY-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	9.5	7.0	A
		T <sub>A</sub> = 70 °C	5.4	4.2	7.6	5.6	
Pulsed Drain Current	I <sub>DM</sub>	30		40		W	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1.3	0.9	2.2	1.15		
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	0.80	
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:

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	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	Ch-1 Ch-2	0.8 1.0		V	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = 20\text{ V}$	Ch-1 Ch-2		100 100	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24\text{ V}$ , $V_{GS} = 0\text{ V}$	Ch-1		1	$\mu\text{A}$	
			Ch-2		100		
		$V_{DS} = 24\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 85\text{ }^\circ\text{C}$	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 Ch-2	20 30		A	
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	$\Omega$
		$V_{GS} = 10\text{ V}$ , $I_D = 9.5\text{ A}$	Ch-2		0.0125	0.0155	
		$V_{GS} = 4.5\text{ V}$ , $I_D = 5.4\text{ A}$	Ch-1		0.024	0.030	
		$V_{GS} = 4.5\text{ V}$ , $I_D = 8.2\text{ A}$	Ch-2		0.0165	0.0205	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}$ , $I_D = 6.3\text{ A}$	Ch-1		17	S	
		$V_{DS} = 15\text{ V}$ , $I_D = 9.5\text{ A}$	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
		$I_S = 1\text{ A}$ , $V_{GS} = 0\text{ V}$	Ch-2		0.47	0.5	
<b>Dynamic<sup>a</sup></b>							
Total Gate Charge	$Q_g$	Channel-1 $V_{DS} = 15\text{ V}$ , $V_{GS} = 5\text{ V}$ , $I_D = 6.3\text{ A}$	Ch-1 Ch-2		8.0 15	12 23	nC
Gate-Source Charge	$Q_{gs}$		Channel-2	Ch-1 Ch-2		1.75 5.3	
Gate-Drain Charge	$Q_{gd}$		Channel-2 $V_{DS} = 15\text{ V}$ , $V_{GS} = 5\text{ V}$ , $I_D = -9.5\text{ A}$	Ch-1 Ch-2		3.2 4.6	
Gate Resistance	$R_g$		Ch-1 Ch-2	1.5 0.5		6.1 2.6	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$ , $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 6\text{ }\Omega$	Ch-1 Ch-2		10 15	20 30	ns
Rise Time	$t_r$		Ch-1 Ch-2		5 5	10 10	
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$ , $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 6\text{ }\Omega$	Ch-1 Ch-2		26 44	50 80	
			Ch-1 Ch-2		8 12	16 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	
		$I_F = 2.2\text{ A}$ , $di/dt = 100\text{ }\mu\text{A}/\mu\text{s}$	Ch-2		32	70	

Notes:

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

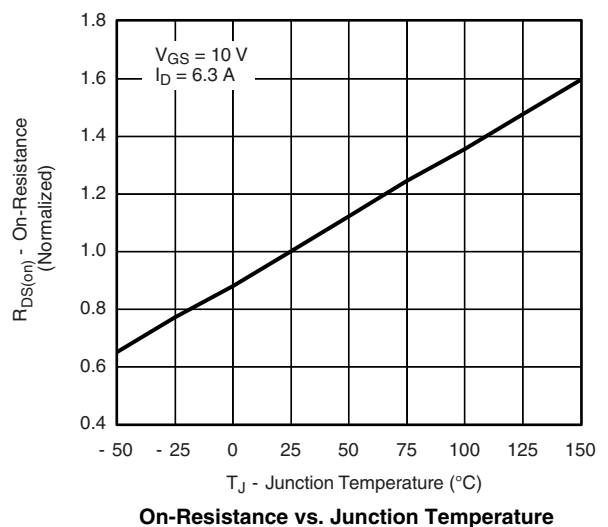
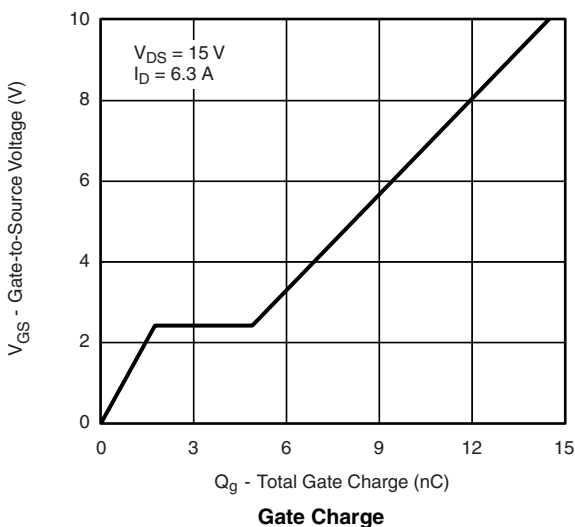
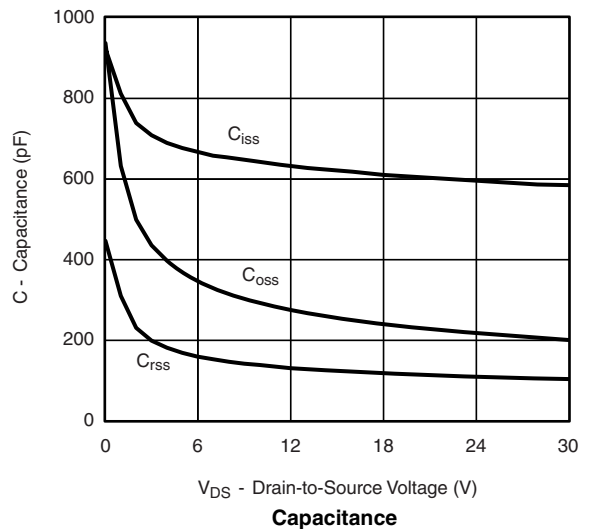
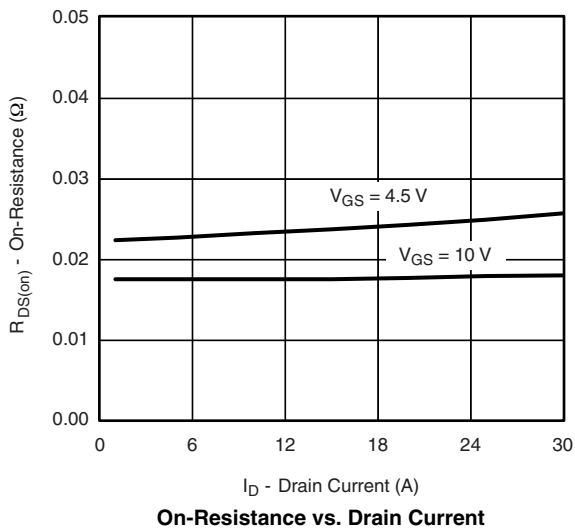
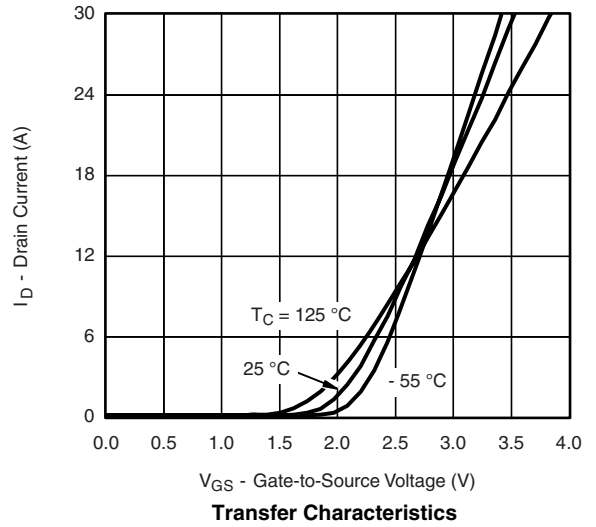
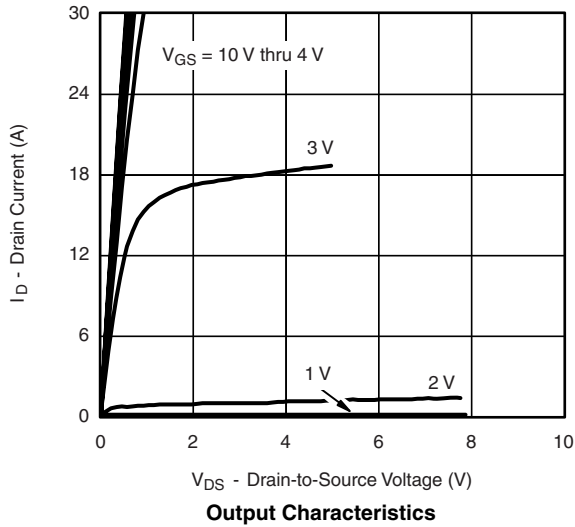
b. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , 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	

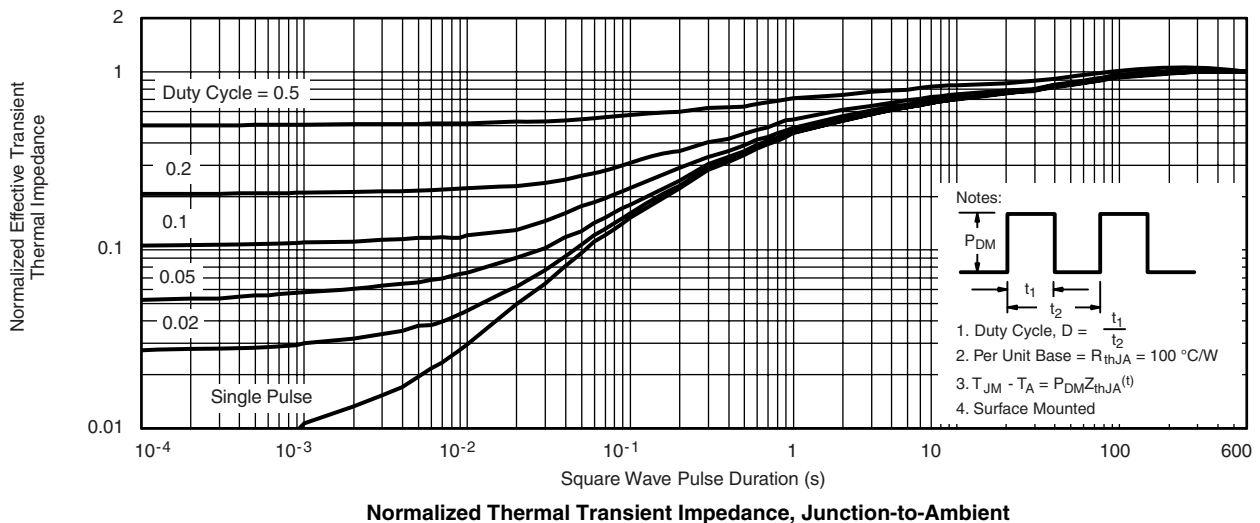
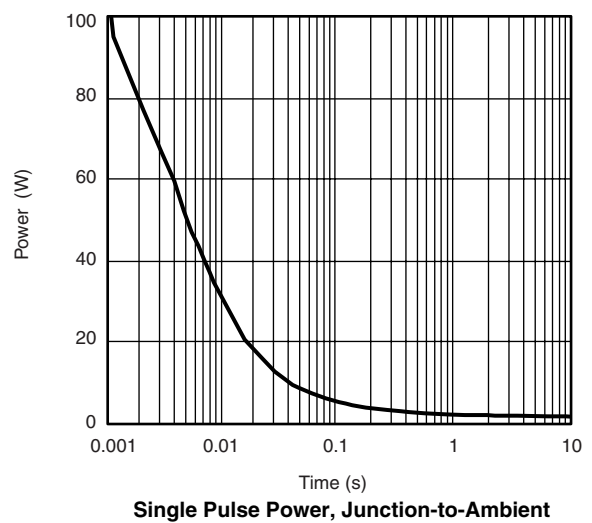
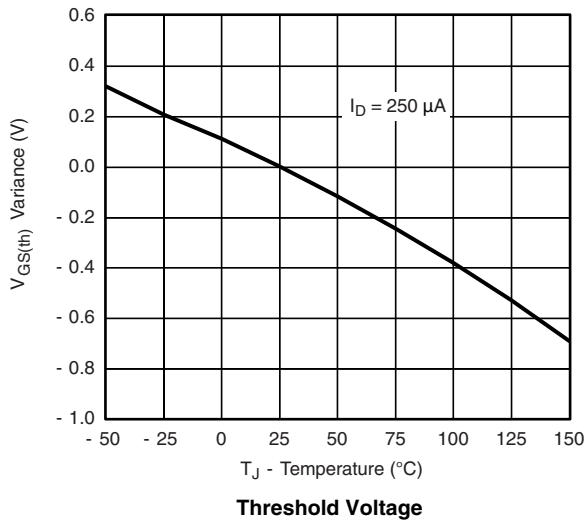
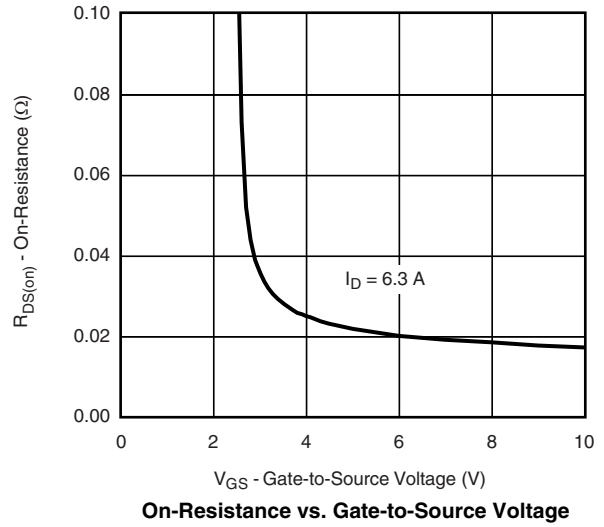
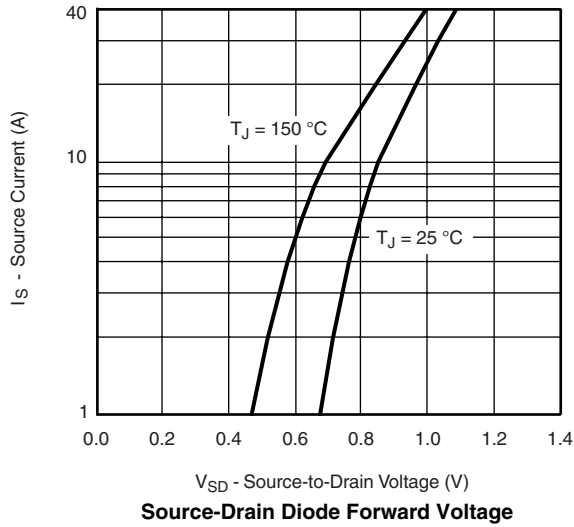
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



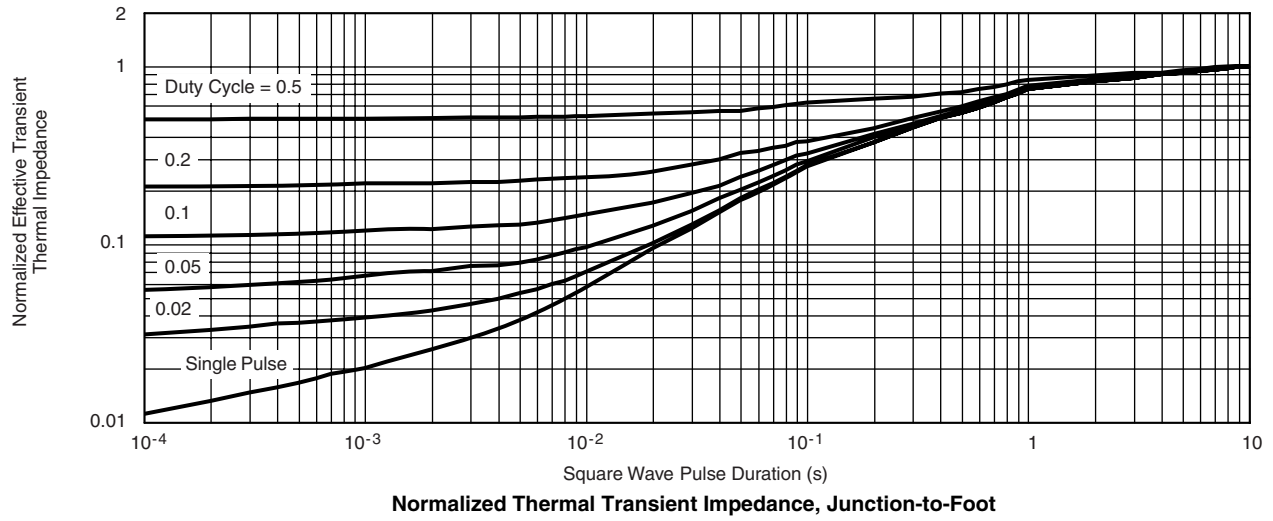
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



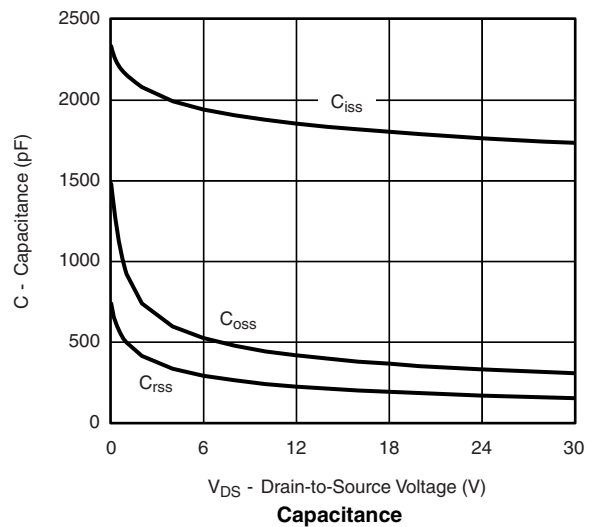
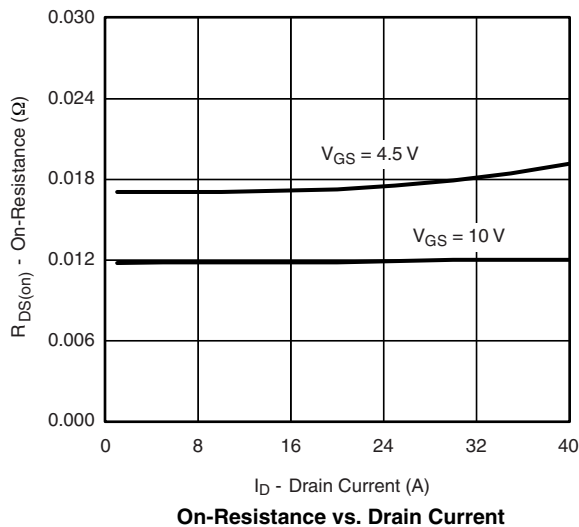
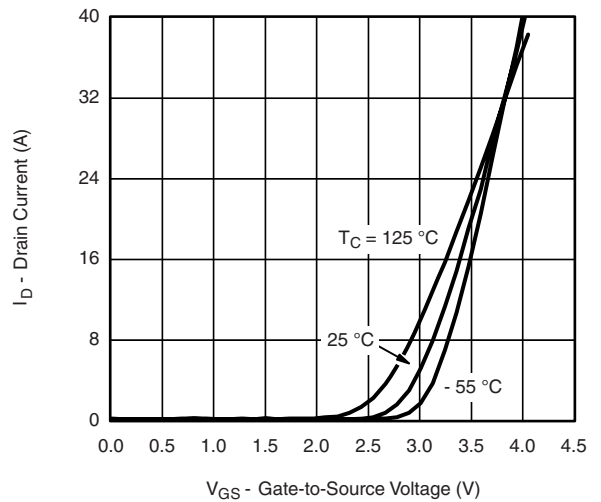
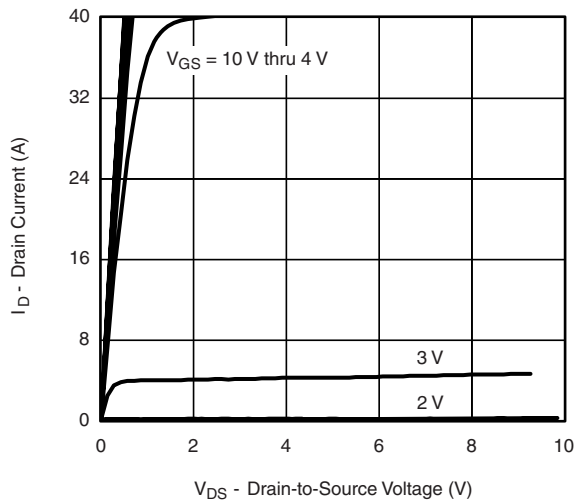
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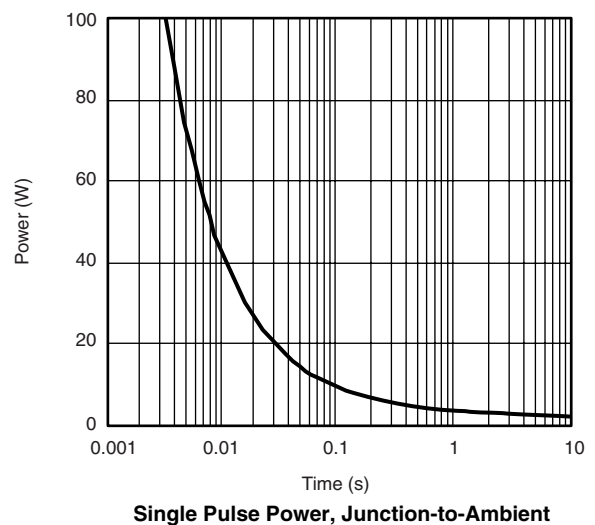
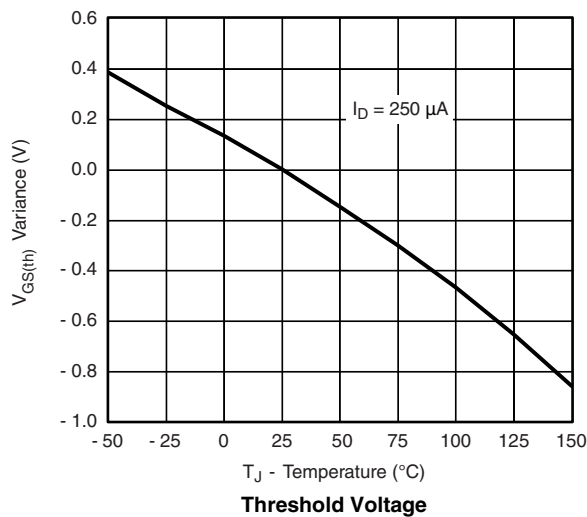
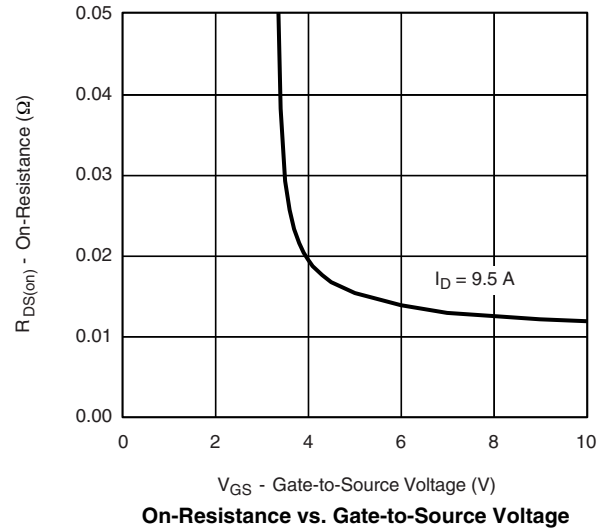
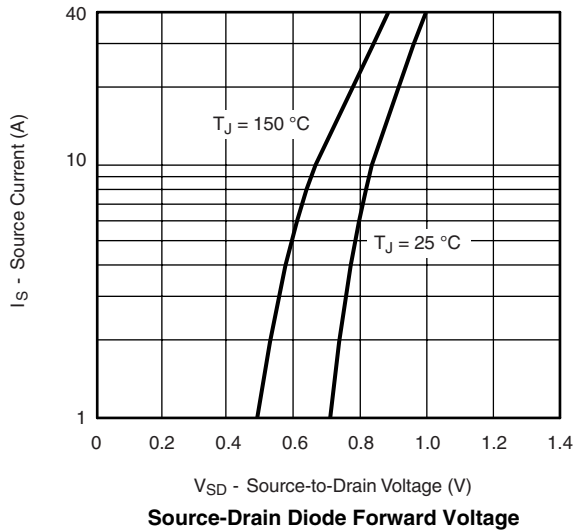
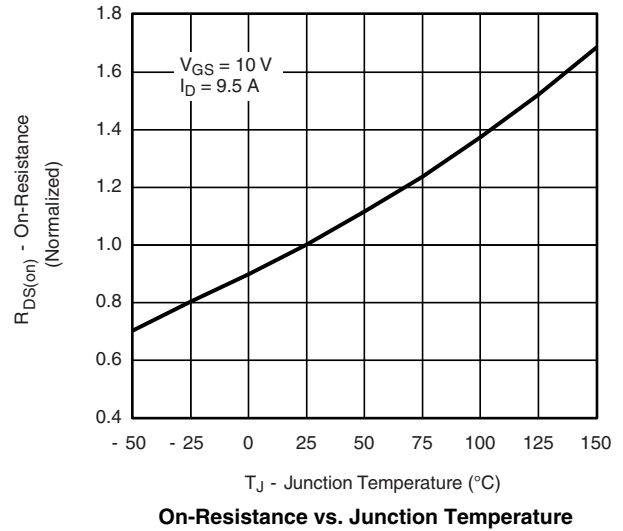
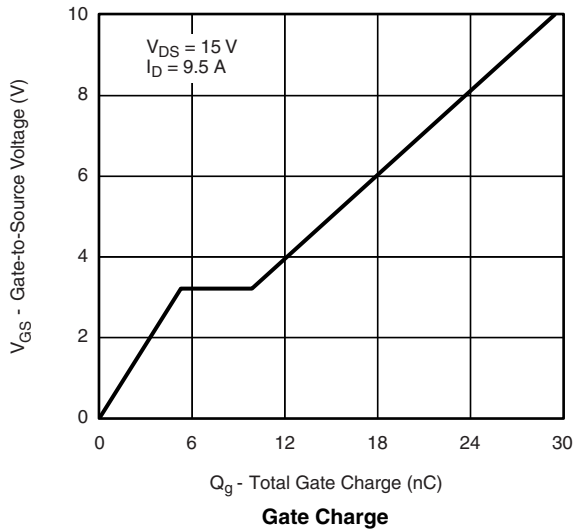
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



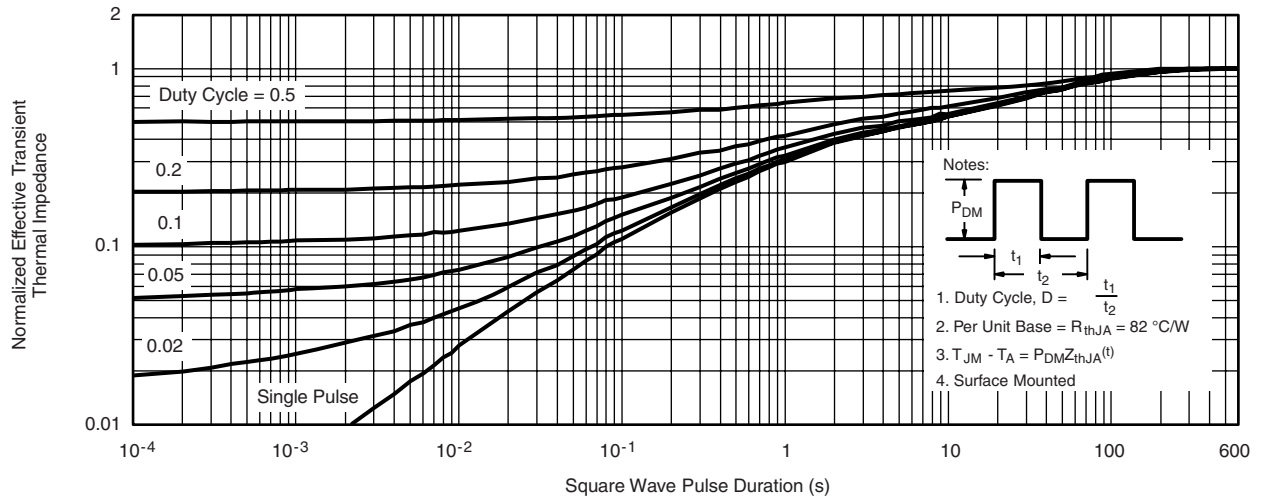
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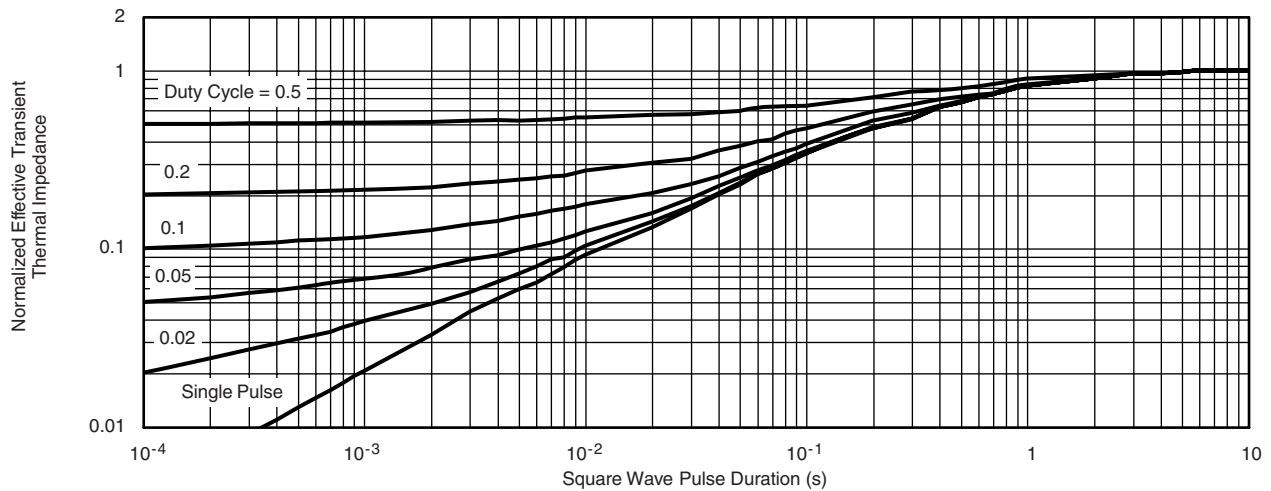
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**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



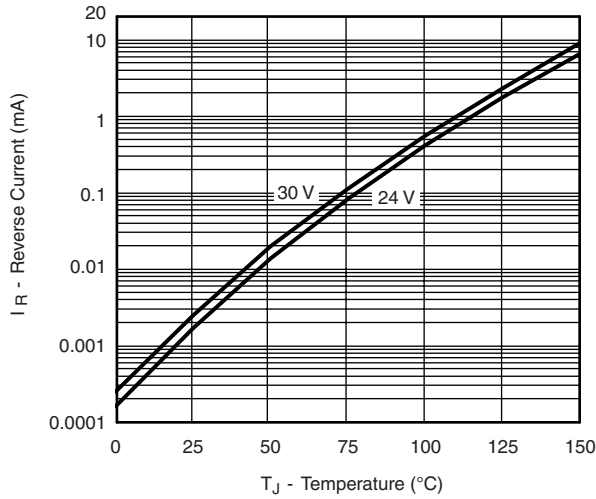
**Normalized Thermal Transient Impedance, Junction-to-Ambient**



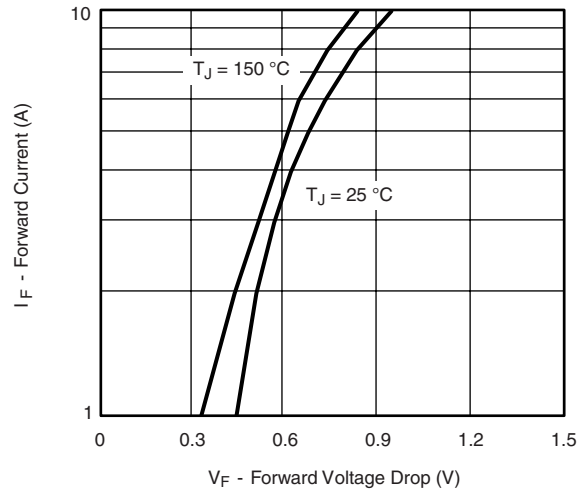
**Normalized Thermal Transient Impedance, Junction-to-Foot**



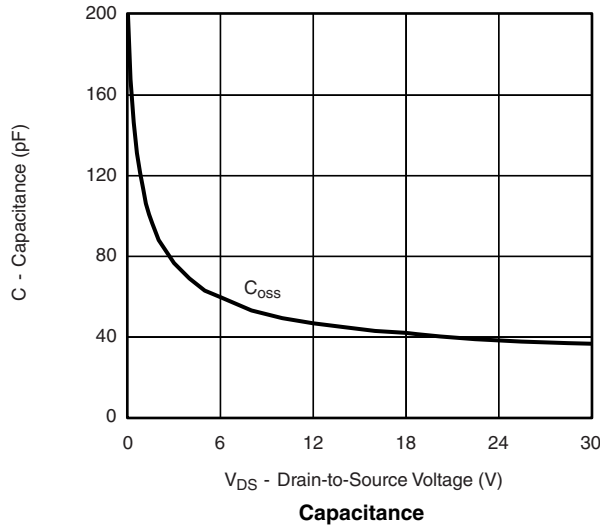
**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Reverse Current vs. Junction Temperature**



**Forward Voltage Drop**



**Capacitance**

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