

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

PRODUCT SUMMARY			
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
Channel-1	30	0.022 at V _{GS} = 10 V	6.3
		0.030 at V _{GS} = 4.5 V	5.4
Channel-2		0.0155 at V _{GS} = 10 V	9.5
		0.0205 at V _{GS} = 4.5 V	8.2

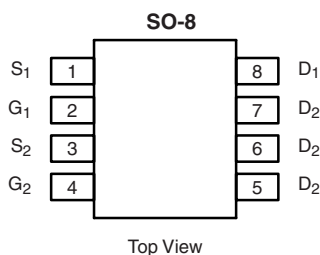
SCHOTTKY PRODUCT SUMMARY		
V _{DS} (V)	V _{SD} (V) Diode Forward Voltage	I _F (A)
30	0.50 V at 1.0 A	2.0

FEATURES

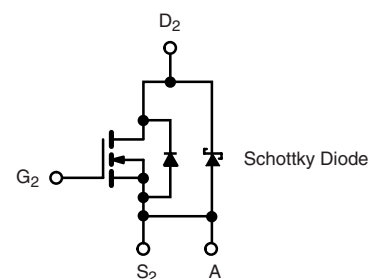
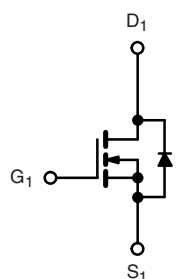
- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus
- Compliant to RoHS directive 2002/95/EC



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 $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted							
Parameter		Symbol	Channel-1		Channel-2		Unit
			10 s	Steady State	10 s	Steady State	
Drain-Source Voltage		V_{DS}	30				V
Gate-Source Voltage		V_{GS}	20				
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	6.3	5.3	9.5	7.0	A
	$T_A = 70\text{ }^{\circ}\text{C}$		5.4	4.2	7.6	5.6	
Pulsed Drain Current		I_{DM}	30		40		
Continuous Source Current (Diode Conduction) ^a		I_S	1.3	0.9	2.2	1.15	
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	1.4	1.0	2.4	1.25	W
	$T_A = 70\text{ }^{\circ}\text{C}$		0.9	0.64	1.5	0.80	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150				$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS									
Parameter	Symbol	Channel-1		Channel-2		Schottky		Unit	
		Typ.	Max.	Typ.	Max.	Typ.	Max.		
Maximum Junction-to-Ambient ^a	R _{thJA}	72	90	43	53	48	60	°C/W	
		100	125	82	100	80	100		
Maximum Junction-to-Foot (Drain)	R _{thJC}	51	63	25	30	28	35		

Notes:

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

MOSFET SPECIFICATIONS T _J = 25 °C, unless otherwise noted								
Parameter	Symbol	Test Conditions		Min.	Typ. ^a	Max.	Unit	
Static								
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	Ch-1 Ch-2	0.8 1.0			V	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = 20 V	Ch-1 Ch-2			100 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V	Ch-1			1	μA	
			Ch-2			100		
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1			15		
			Ch-2			2000		
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	Ch-1 Ch-2	20 30			A	
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 6.3 A	Ch-1		0.018	0.022	Ω	
		V _{GS} = 10 V, I _D = 9.5 A	Ch-2		0.0125	0.0155		
		V _{GS} = 4.5 V, I _D = 5.4 A	Ch-1		0.024	0.030		
		V _{GS} = 4.5 V, I _D = 8.2 A	Ch-2		0.0165	0.0205		
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 6.3 A	Ch-1		17		S	
		V _{DS} = 15 V, I _D = 9.5 A	Ch-2		28			
Diode Forward Voltage ^b	V _{SD}	I _S = 1.3 A, V _{GS} = 0 V	Ch-1		0.7	1.1	V	
		I _S = 1 A, V _{GS} = 0 V	Ch-2		0.47	0.5		
Dynamic ^a								
Total Gate Charge	Q _g	Channel-1 V _{DS} = 15 V, V _{GS} = 5 V, I _D = 6.3 A	Ch-1 Ch-2		8.0 15	12 23	nC	
Gate-Source Charge	Q _{gs}		Ch-1 Ch-2		1.75 5.3			
Gate-Drain Charge	Q _{gd}	Channel-2 V _{DS} = 15 V, V _{GS} = 5 V, I _D = - 9.5 A	Ch-1 Ch-2		3.2 4.6			
			Ch-1 Ch-2					
Gate Resistance	R _g		Ch-1 Ch-2	1.5 0.5		6.1 2.6	Ω	
Turn-On Delay Time	t _{d(on)}	Channel-1 V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	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 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	Ch-1 Ch-2		26 44		50 80
				Ch-1 Ch-2		8 12		16 24
Fall Time	t _f							
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.3 A, dI/dt = 100 A/μs	Ch-1		30	60		
		I _F = 2.2 A, dI/dt = 100 μA/μs	Ch-2		32	70		

Notes:

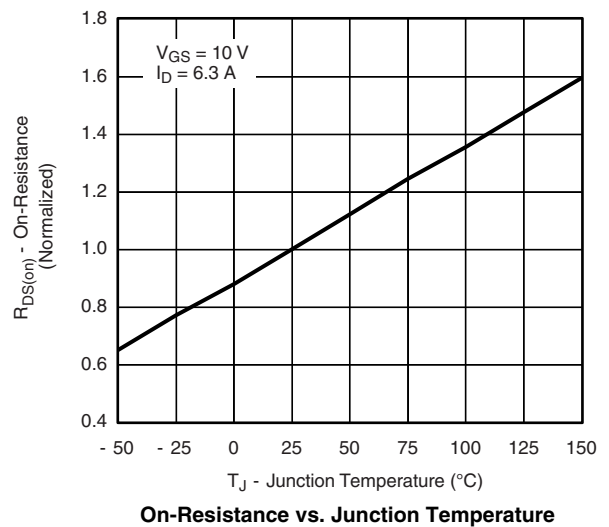
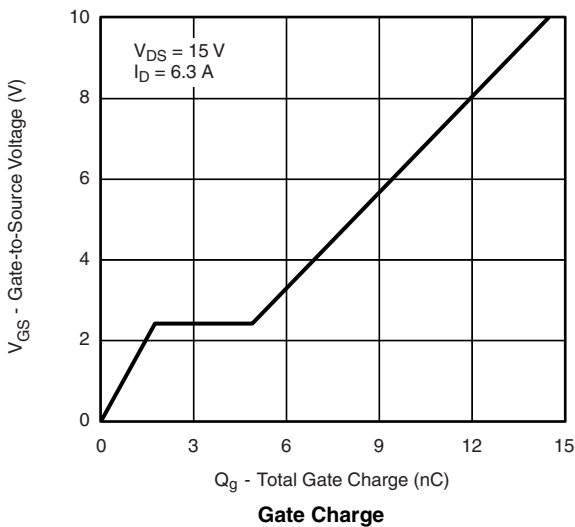
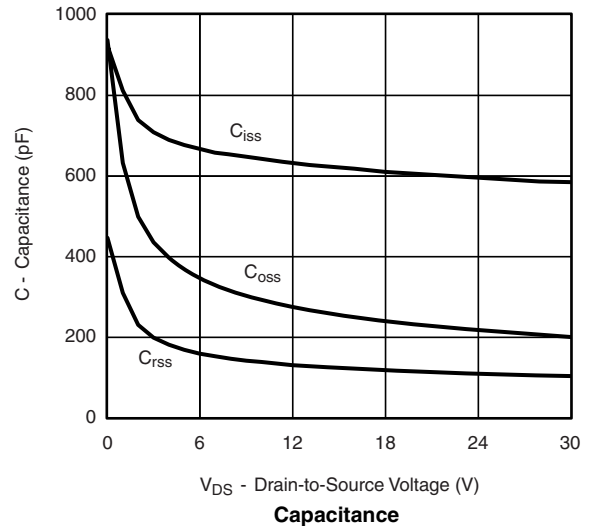
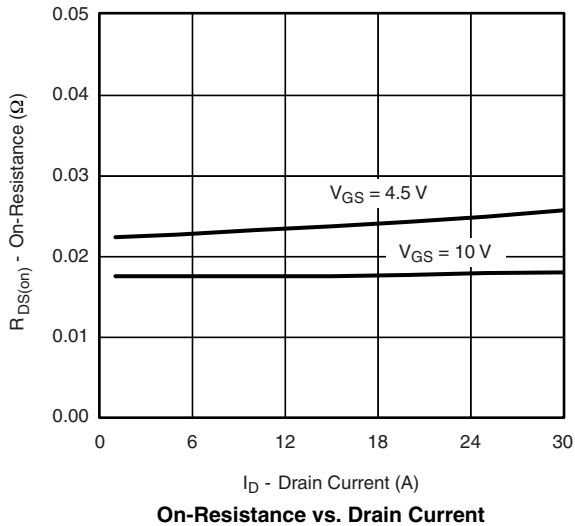
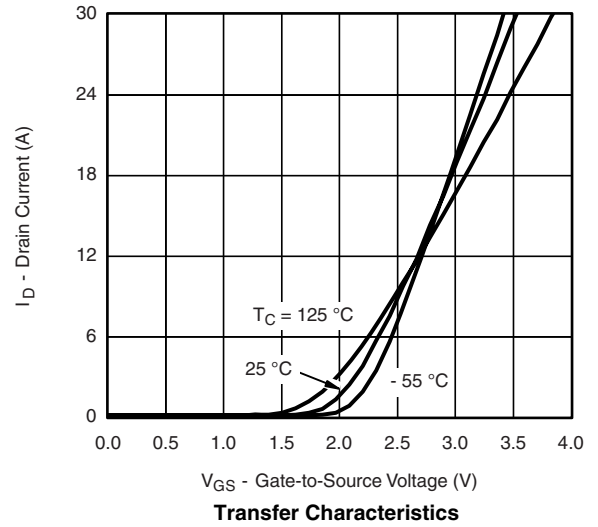
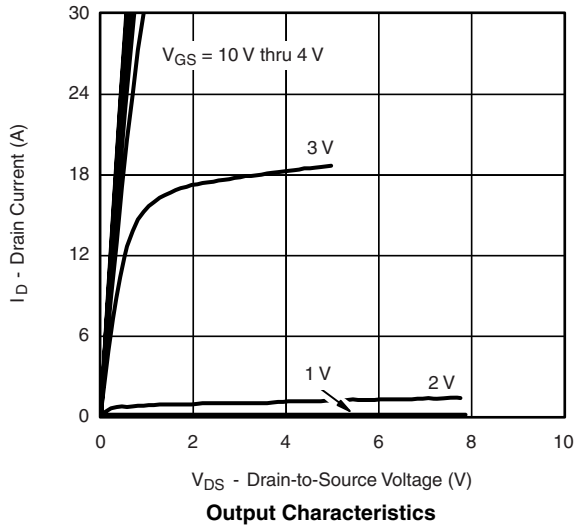
a. Guaranteed by design, not subject to production testing.

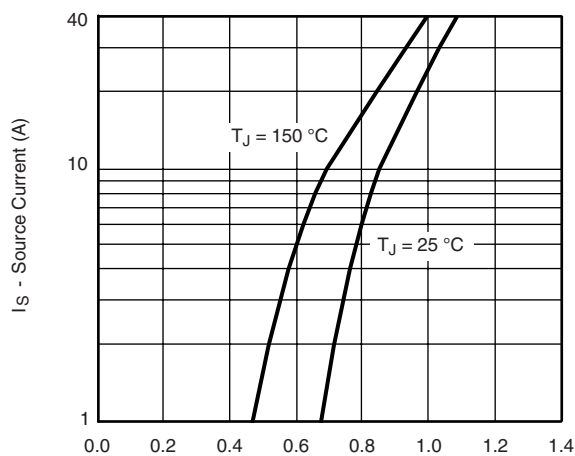
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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

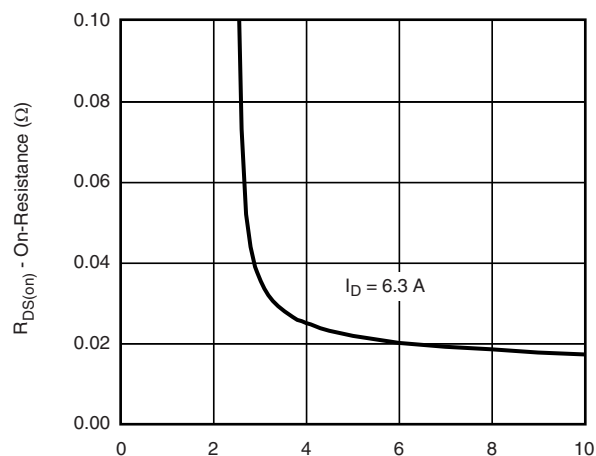
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

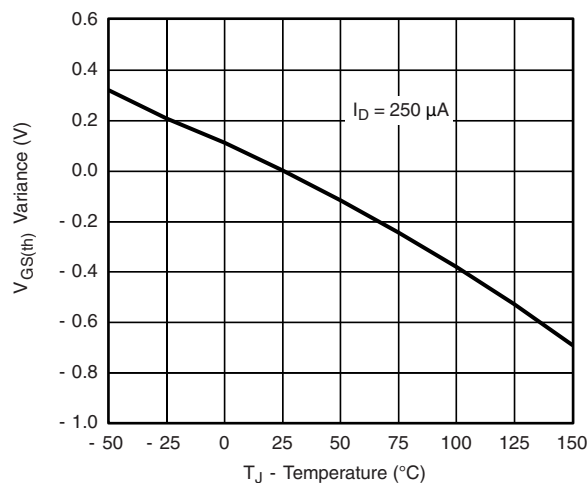


CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

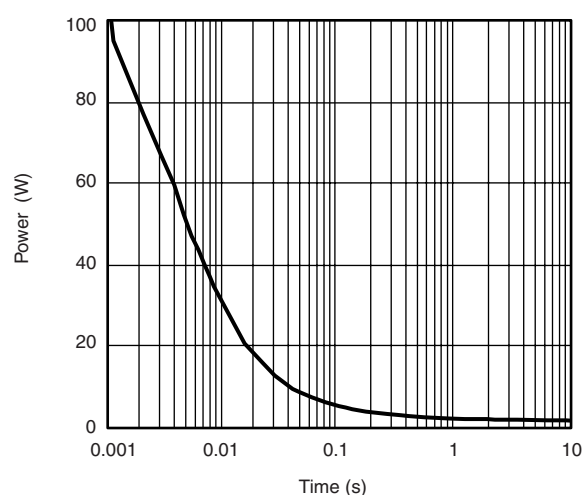
Source-Drain Diode Forward Voltage



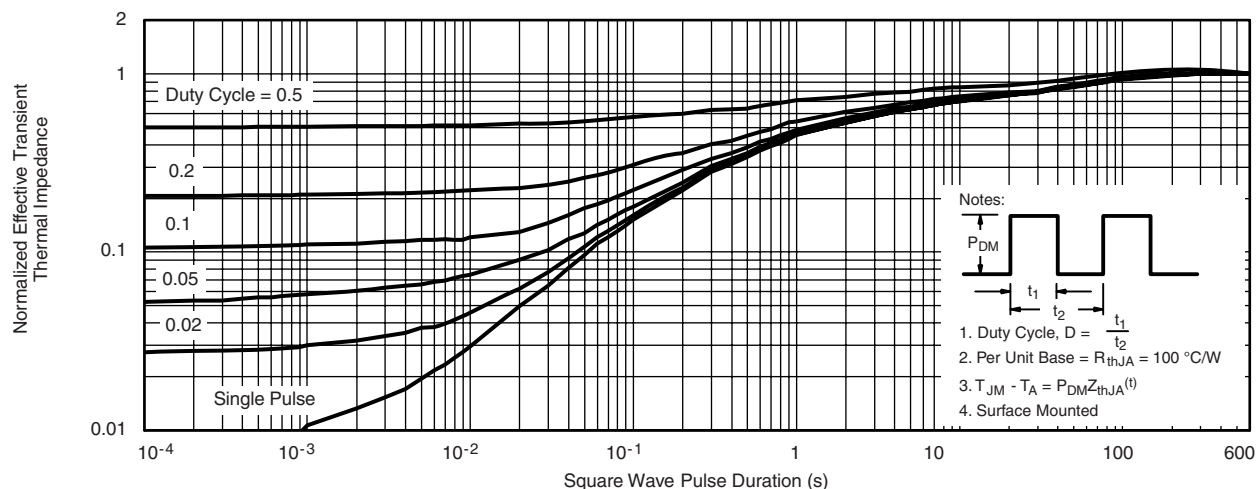
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

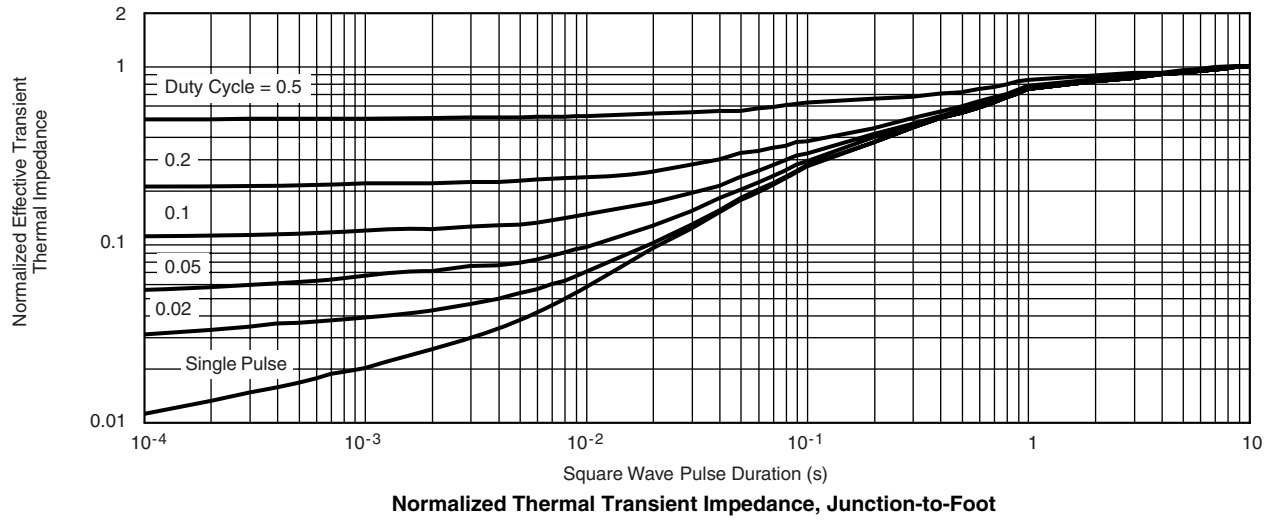


Single Pulse Power, Junction-to-Ambient

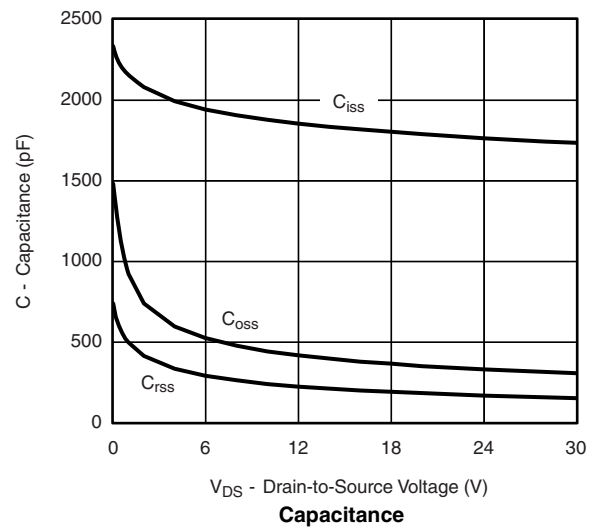
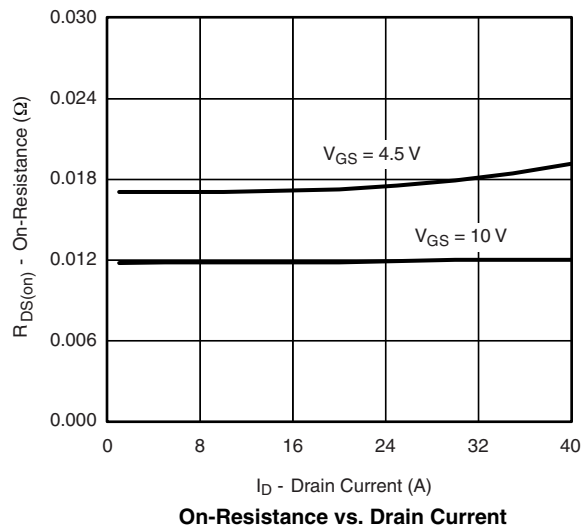
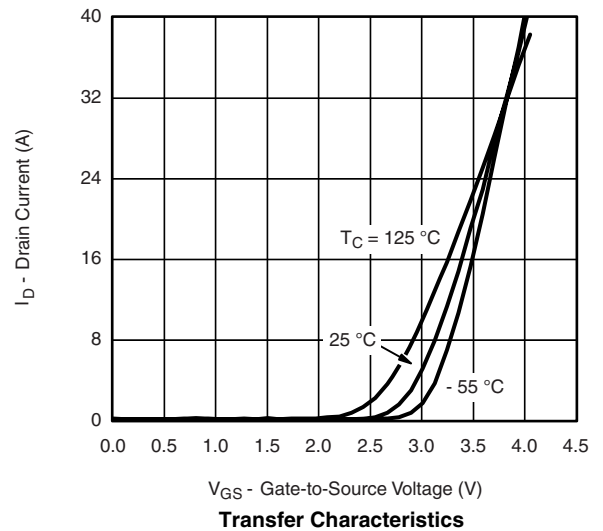
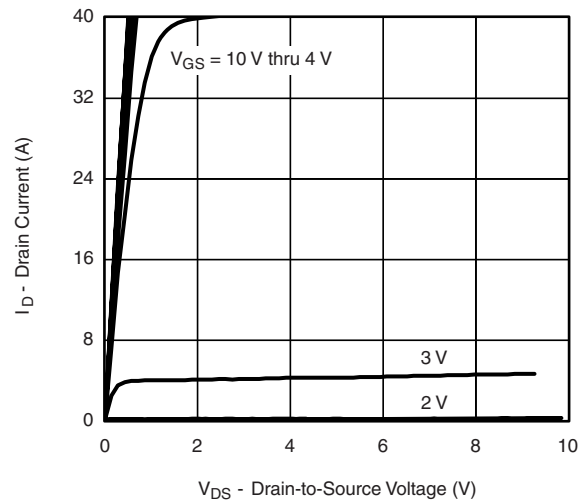


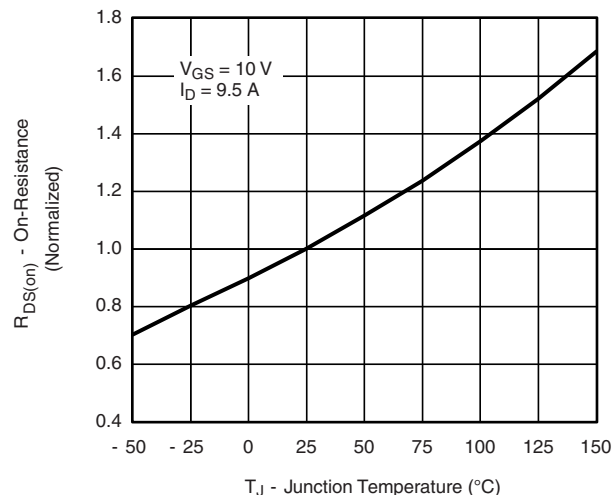
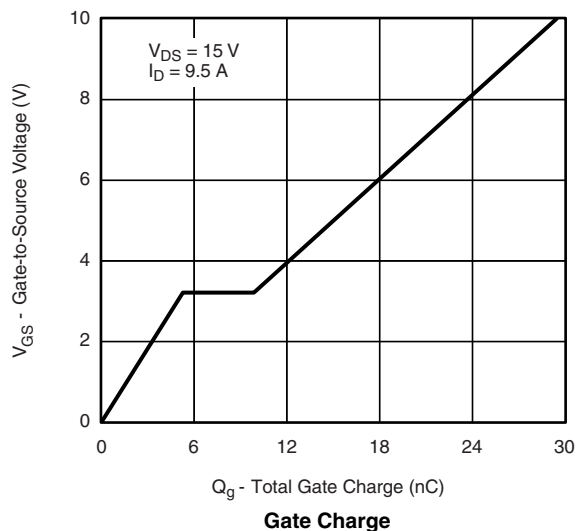
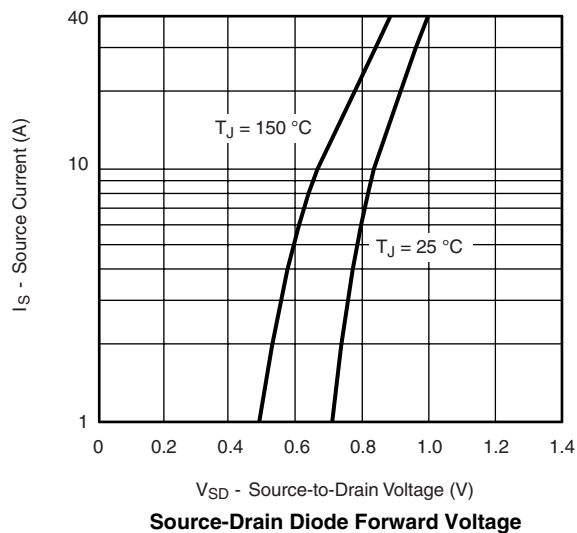
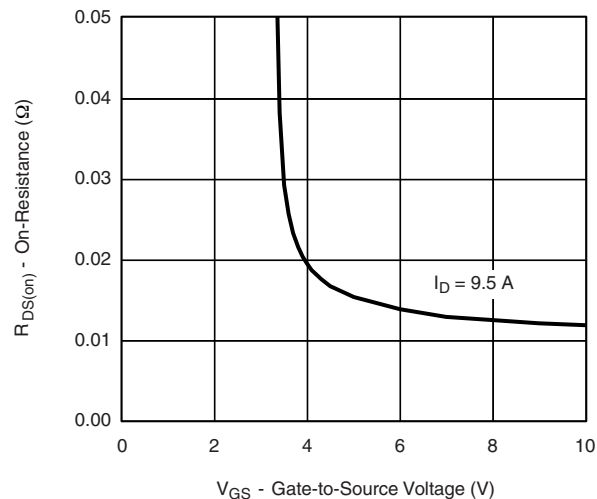
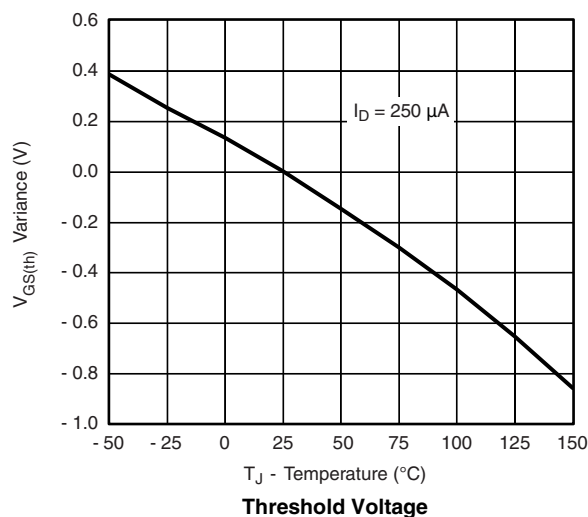
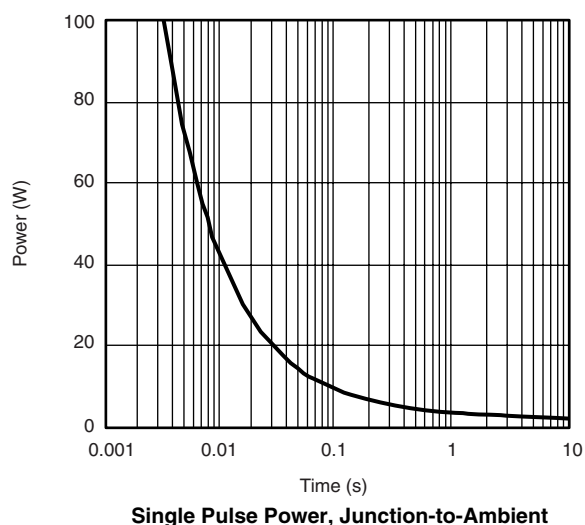
Normalized Thermal Transient Impedance, Junction-to-Ambient

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

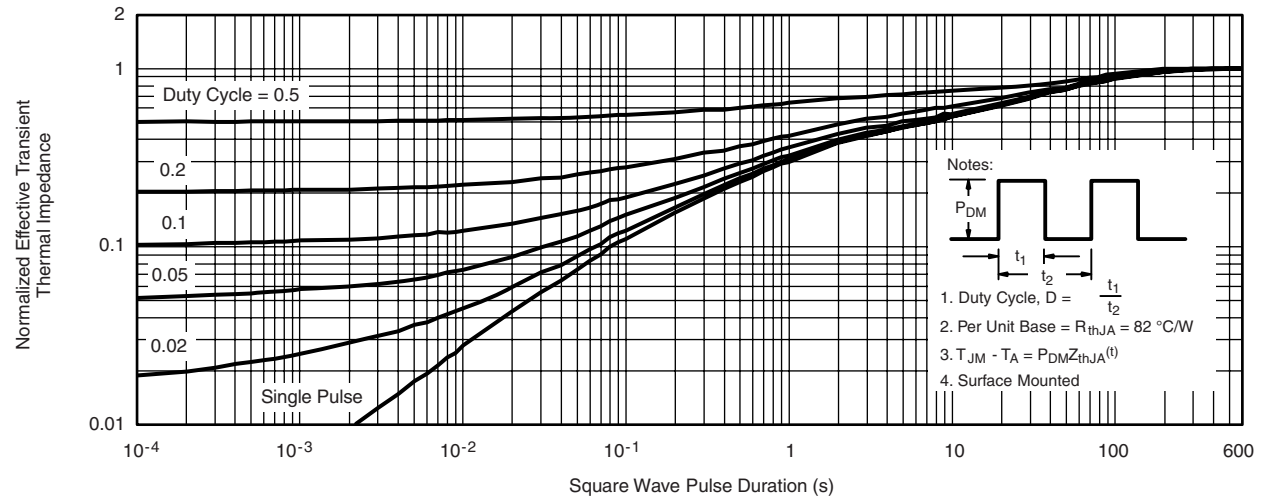


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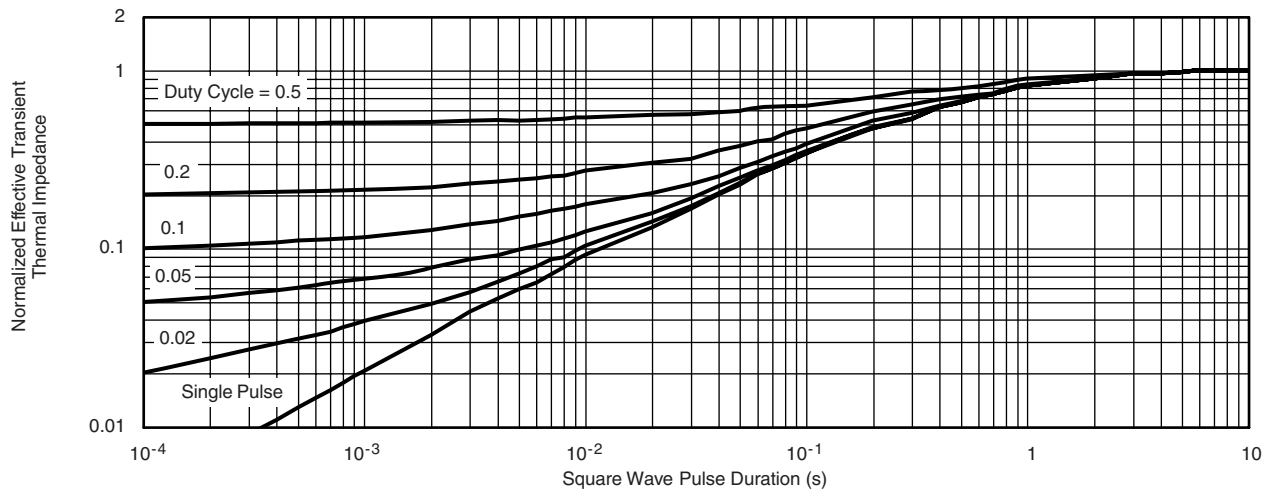


CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power, Junction-to-Ambient**

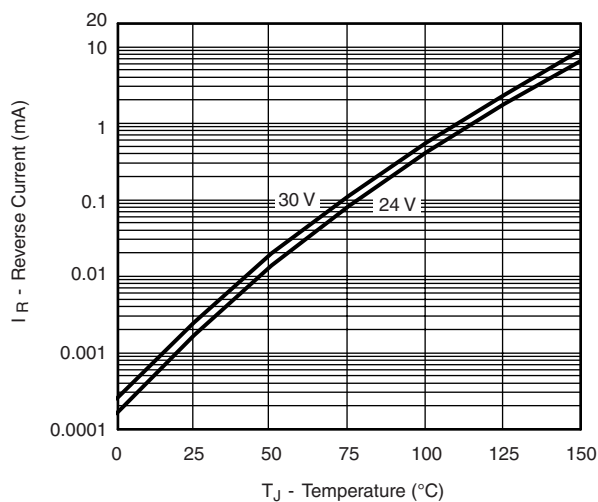
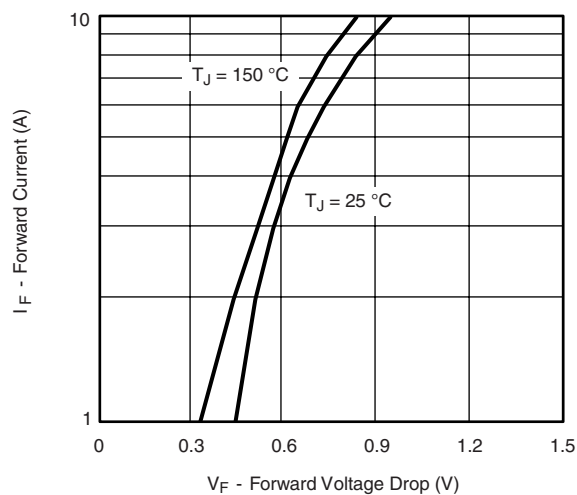
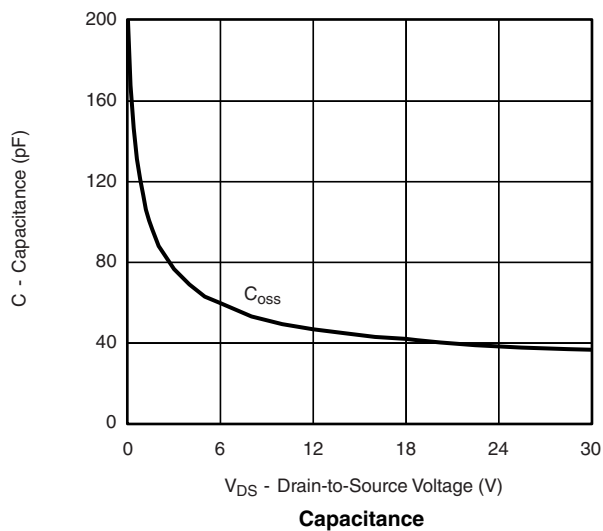
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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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