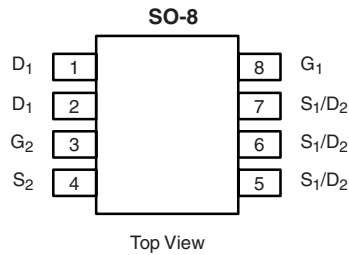




Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY				
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ)
Channel-1	30	0.018 at V _{GS} = 10 V	10	6.6
		0.023 at V _{GS} = 4.5 V	8.5	
Channel-2		0.018 at V _{GS} = 10 V	10.5	8.9
		0.022 at V _{GS} = 4.5 V	9.3	

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



Ordering Information: Si4916DY-T1-E3 (Lead (Pb)-free)

FEATURES

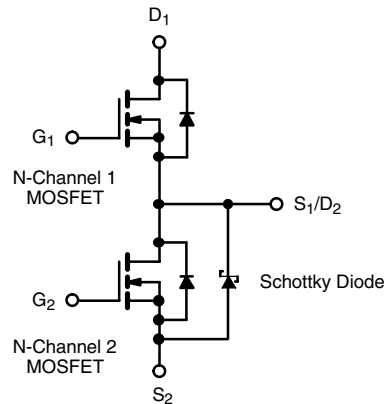
- LITTLE FOOT[®] Plus Integrated Schottky
- 100 % R_g Tested

APPLICATIONS

- DC/DC Converters
- Notebook



RoHS
COMPLIANT



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	Channel-1	Channel-2	Unit	
Drain-Source Voltage	V _{DS}	30		V	
Gate-Source Voltage	V _{GS}	20			
Continuous Drain Current (T _J = 150 °C) ^{a,b}	I _D	T _C = 25 °C	10	10.5	A
		T _C = 70 °C	8	8.3	
		T _A = 25 °C	7.5 ^{a, b, c}	7.8 ^{a, b, c}	
		T _A = 70 °C	6 ^{a, b, c}	6.3 ^{a, b, c}	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	40	40	A	
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	3		3.2
		T _A = 25 °C	1.7 ^{a, b, c}		1.8 ^{a, b, c}
PulseD Source-Drain Current	I _{SM}	40	40		mJ
Single-Pulse Avalanche Current	I _{AS}	15			
Single-Pulse Avalanche Energy	E _{AS}	11.2			
Maximum Power Dissipation ^{a, b}	P _D	T _C = 25 °C	3.3	3.5	W
		T _C = 70 °C	2.1	2.2	
		T _A = 25 °C	1.9 ^{a, b, c}	2.0 ^{a, b, c}	
		T _A = 70 °C	1.2 ^{a, b, c}	1.3 ^{a, b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	

Notes:

- a. Based on T_C = 25 °C.
- b. Surface Mounted on 1" x 1" FR4 Board.
- c. t = 10 sec.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Channel-1		Channel-2		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	54	65	47	60	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	32	38	30	35	

Notes:

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

b. Maximum under Steady State conditions is 112 °C/W for Channel 1 and 107 °C/W for Channel 2.

MOSFET SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = 250$ μ A	Ch-1	30		V	
			Ch-2	30			
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250$ μ A	Ch-1		24	mV/°C	
			Ch-2		25		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	Ch-1		- 6	V	
			Ch-2		- 6		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	Ch-1	1.5	3.0	nA	
			Ch-2	1.5	2.7		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = 20$ V	Ch-1		100	nA	
			Ch-2		100		
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30$ V, $V_{GS} = 0$ V	Ch-1		1	μ A	
			Ch-2		100		
		$V_{DS} = 30$ 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	20		A	
			Ch-2	20			
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 10$ A	Ch-1		0.0145	0.018	Ω
		$V_{GS} = 10$ V, $I_D = 10.5$ A	Ch-2		0.015	0.018	
		$V_{GS} = 4.5$ V, $I_D = 8.5$ A	Ch-1		0.019	0.023	
		$V_{GS} = 4.5$ V, $I_D = 9.3$ A	Ch-2		0.018	0.022	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15$ V, $I_D = 10$ A	Ch-1		30	S	
		$V_{DS} = 15$ V, $I_D = 10.5$ A	Ch-2		35		
Diode Forward Voltage ^b	V_{SD}	$I_S = 1.7$ A, $V_{GS} = 0$ V	Ch-1		0.75	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, $V_{GS} = 4.5$ V, $I_D = 10$ A	Ch-1		6.6	10	nC
			Ch-2		8.9	14	
Gate-Source Charge	Q_{gs}	Channel-2 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = -10.5$ A	Ch-1		2.9		
			Ch-2		3.4		
Gate-Drain Charge	Q_{gd}		Ch-1		2.3		
			Ch-2		2.4		
Gate Resistance	R_g		Ch-1	0.5	1.9	2.9	Ω
			Ch-2	0.5	2.3	3.5	



MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit	
Dynamic^a							
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 15\ \Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\ \Omega$	Ch-1	8	15	ns	
Rise Time	t_r		Ch-2	9	15		
Turn-Off Delay Time	$t_{d(off)}$	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	18		
			Ch-2	13	20		
Fall Time	t_f		Ch-1	21	32		
			Ch-2	27	40		
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = 1.3\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1	28		40
			$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	24		35
Body Diode Reverse Recovery Charge	Q_{rr}		$I_F = 1.3\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1	17		nC
			$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	12		
Reverse Recovery Fall Time	t_a	$I_F = 1.3\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1	12		ns	
		$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	11			
Reverse Recovery Rise Time	t_b	$I_F = 1.3\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1	16			
		$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	13			

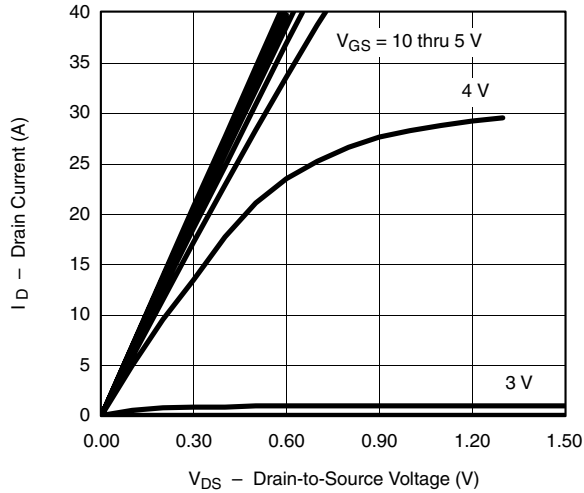
Notes:

- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

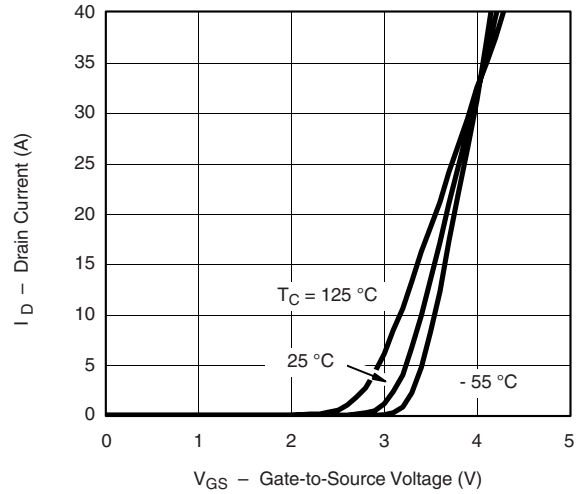
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 30\text{ V}$		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.

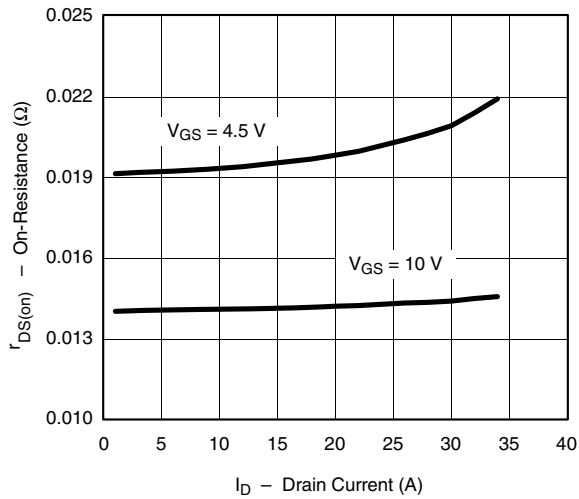
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



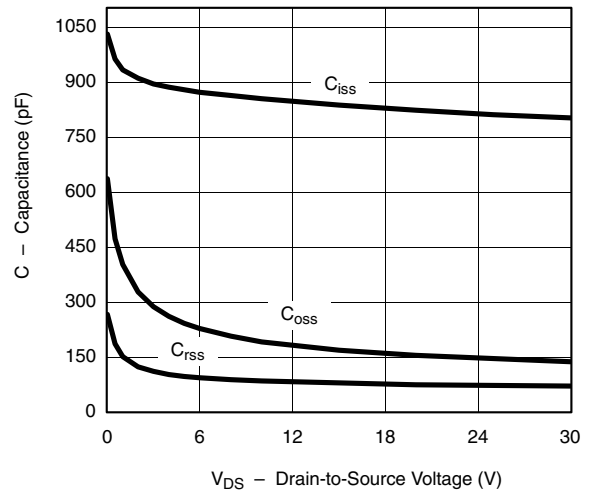
Output Characteristics



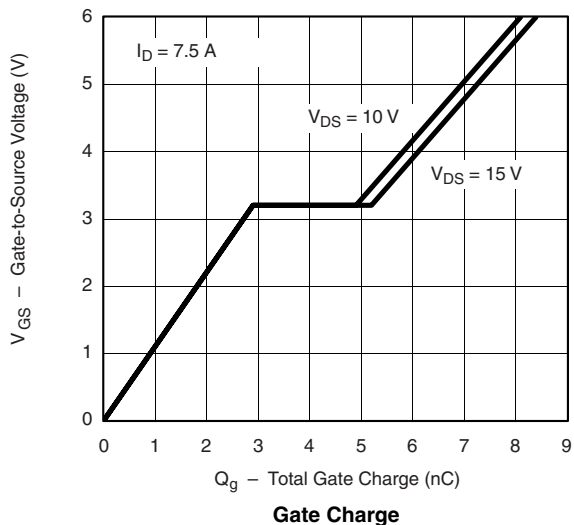
Transfer Characteristics



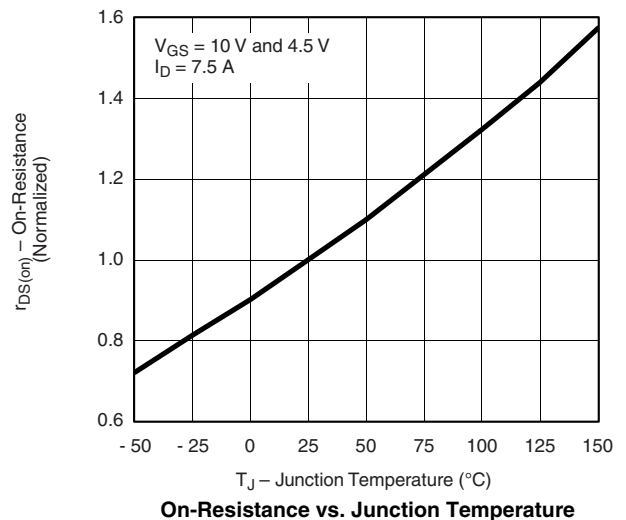
On-Resistance vs. Drain Current



Capacitance

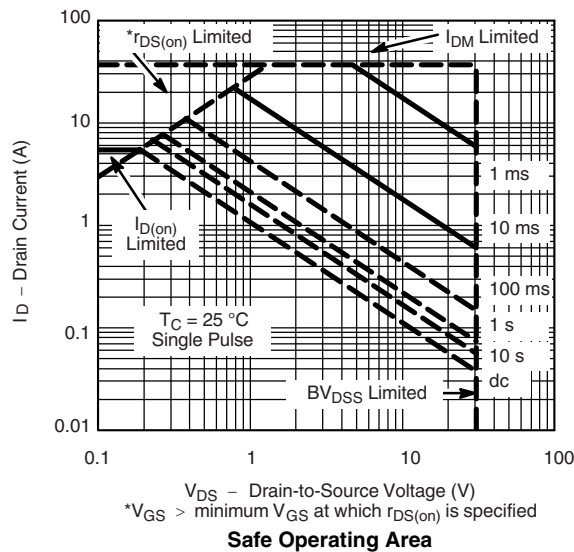
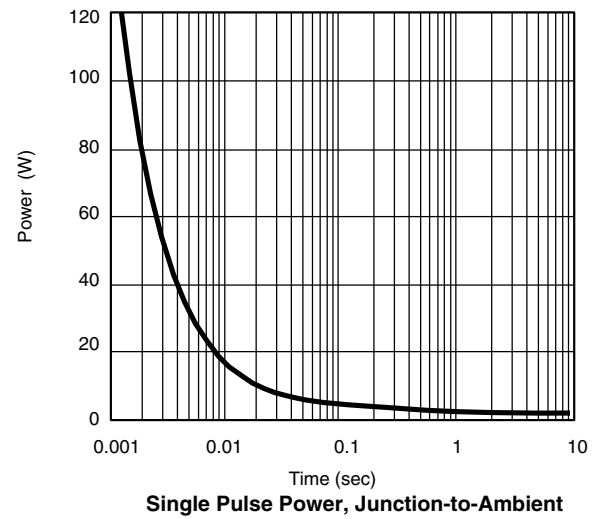
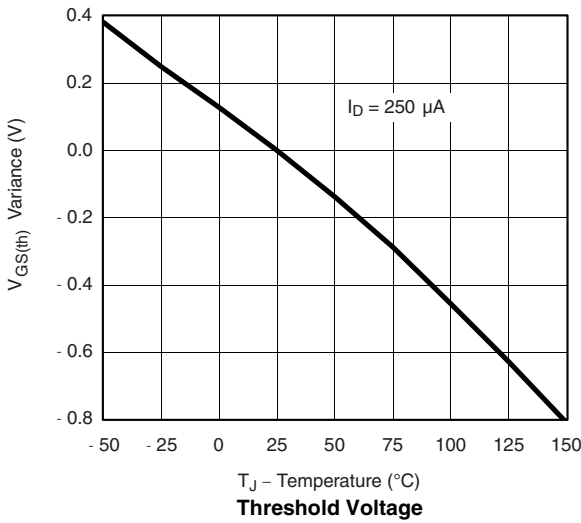
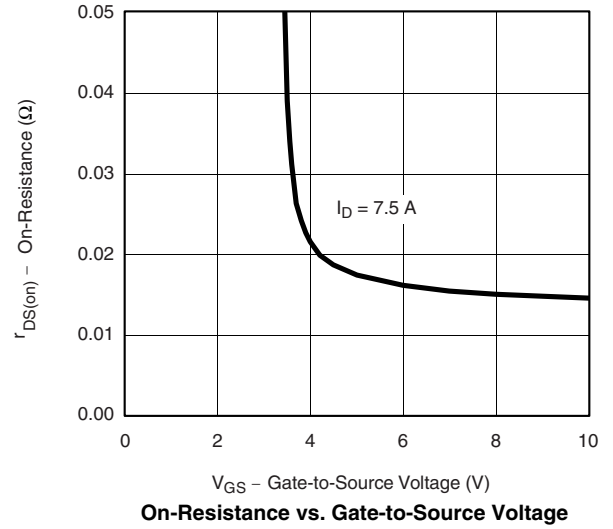
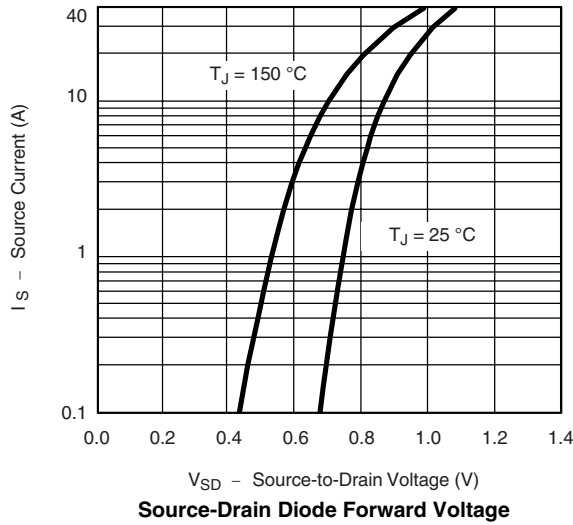


Gate Charge

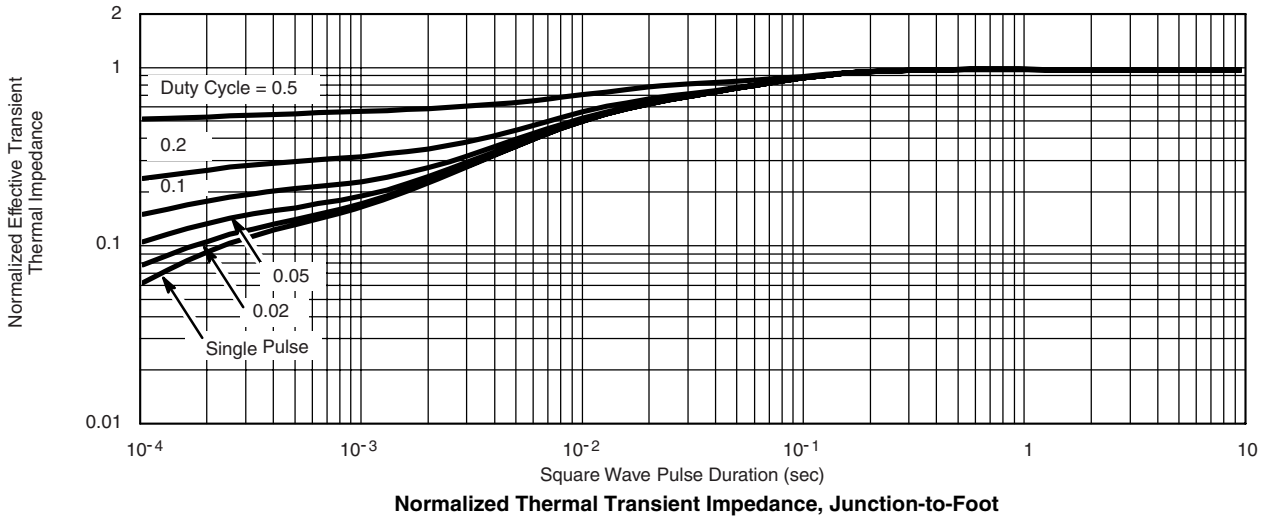
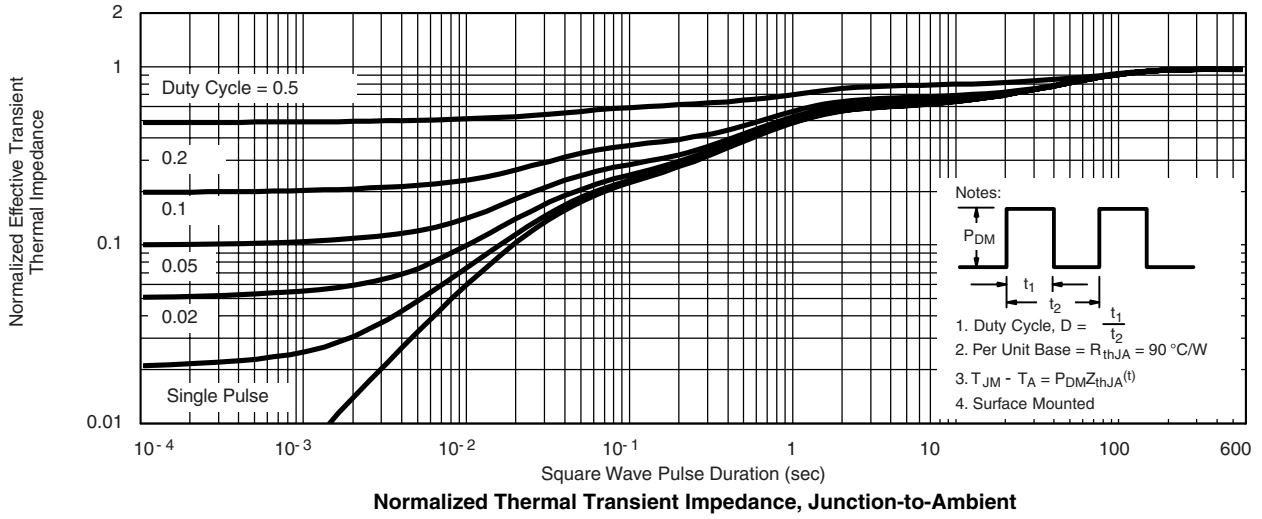


On-Resistance vs. Junction Temperature

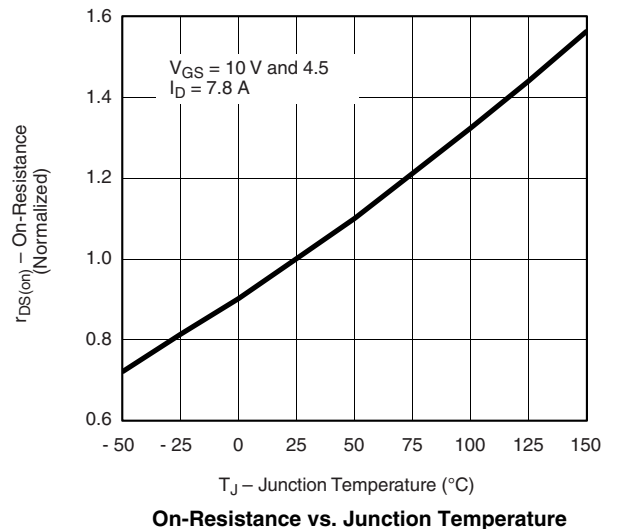
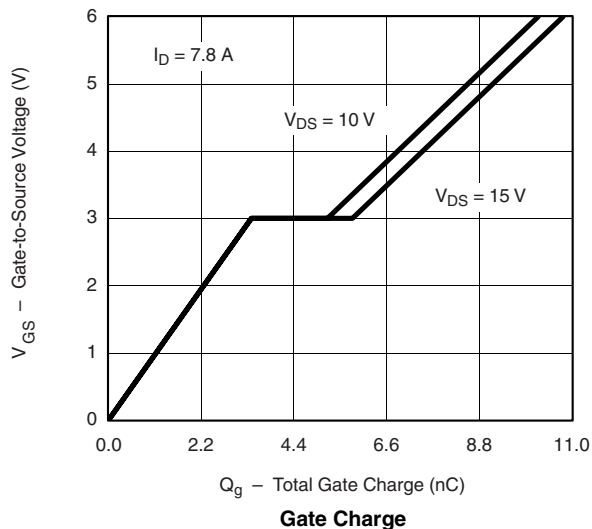
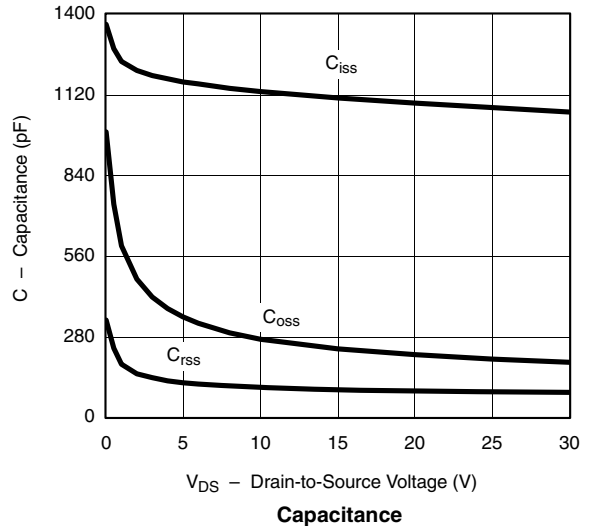
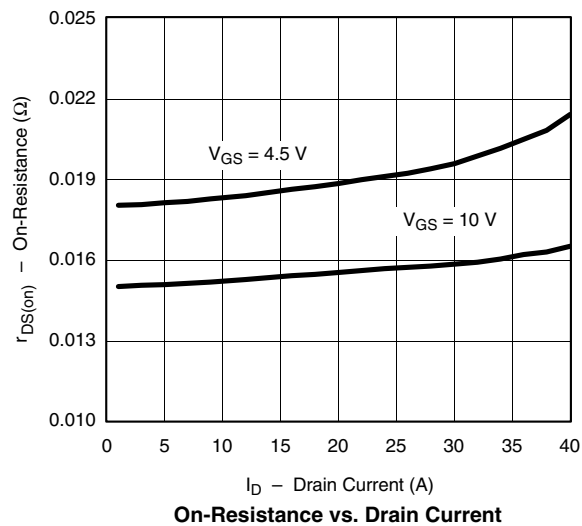
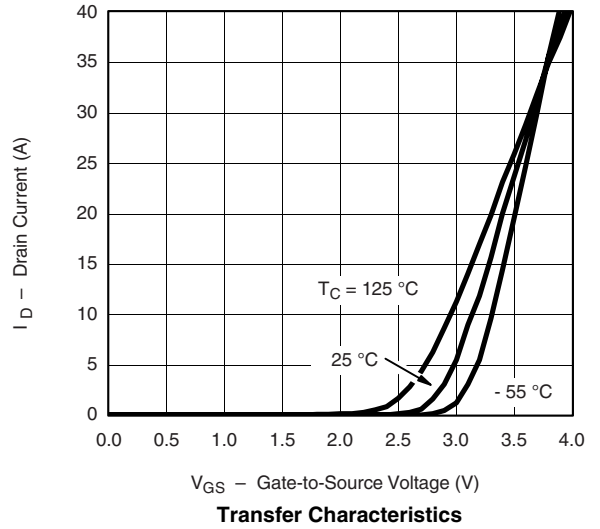
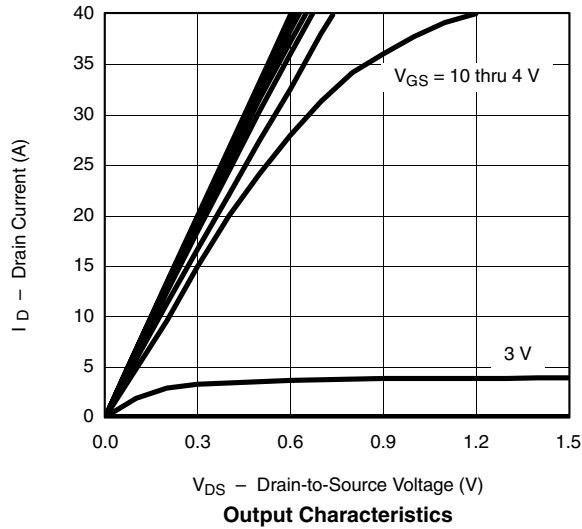
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



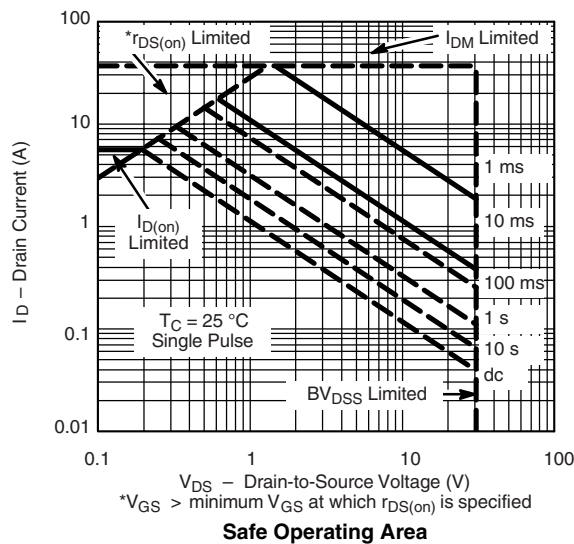
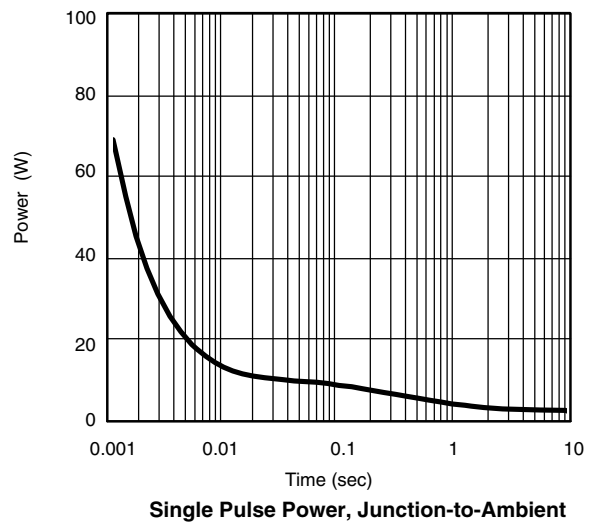
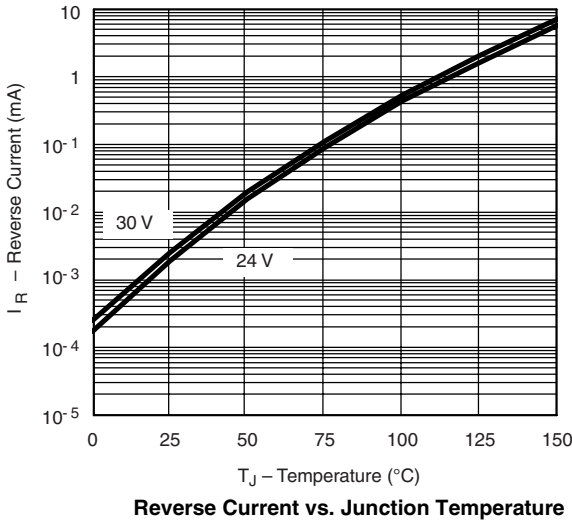
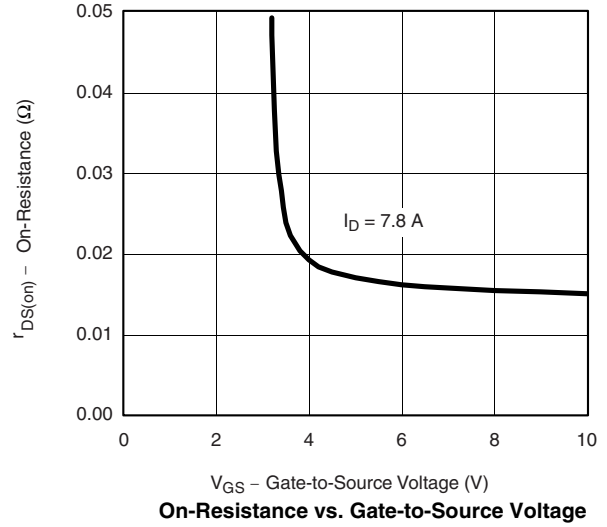
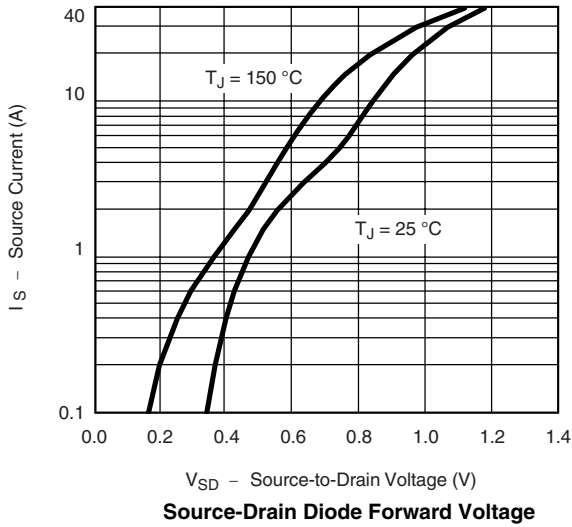
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



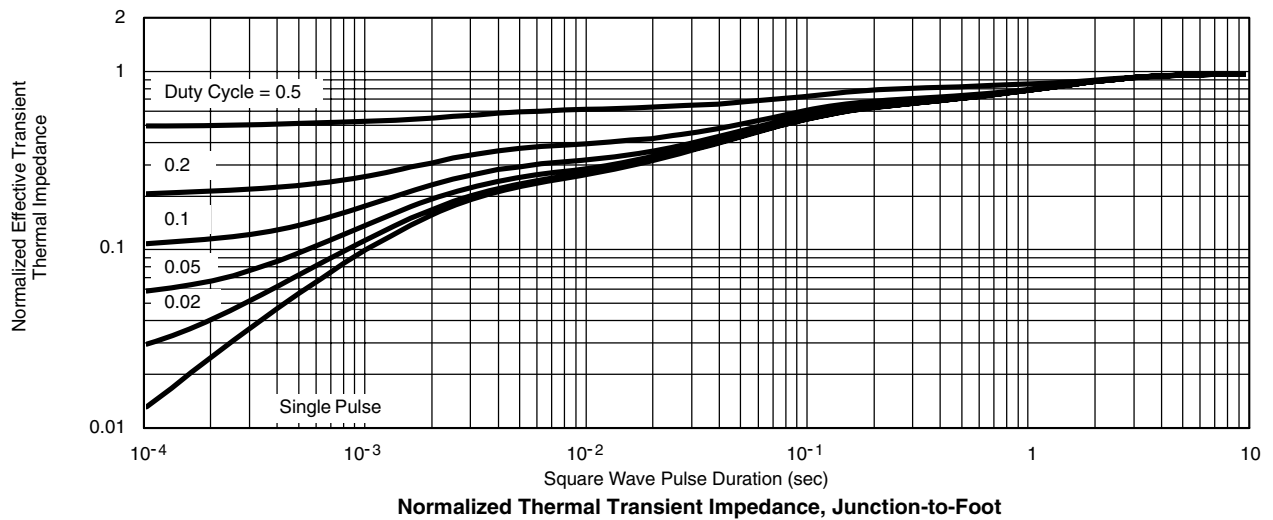
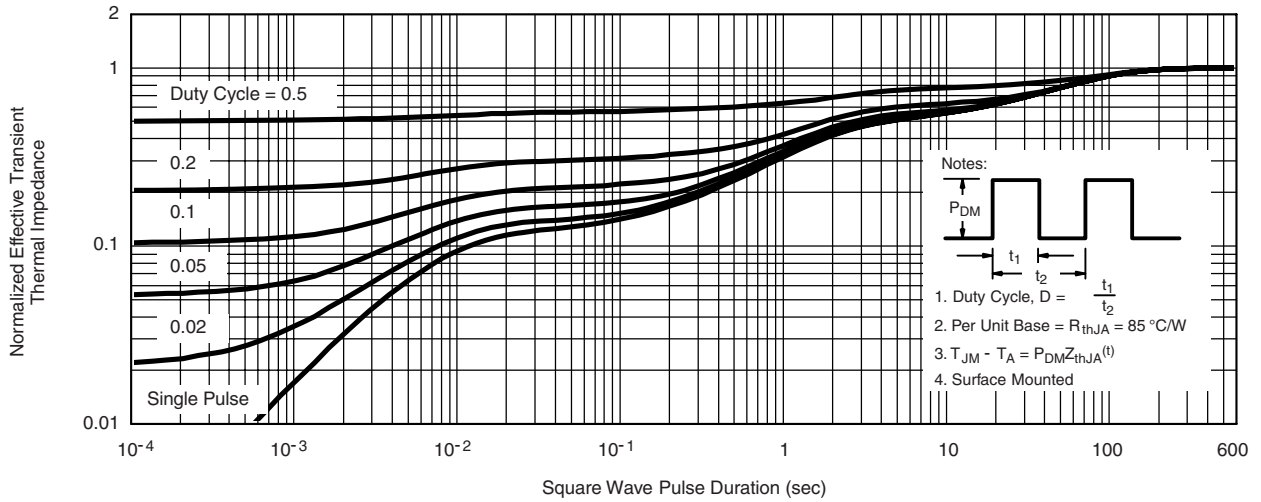
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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



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



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