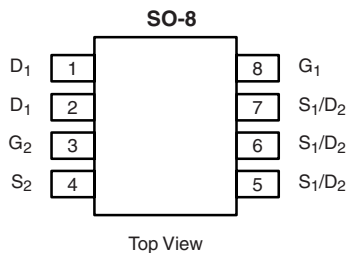




Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY				
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ)
Channel-1	30	0.021 at V _{GS} = 10 V	8.4	6.7
		0.027 at V _{GS} = 4.5 V	7.4	
Channel-2		0.020 at V _{GS} = 10 V	8 ^d	7.0
		0.025 at V _{GS} = 4.5 V	8 ^d	

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: Si4914BDY-T1-E3 (Lead (Pb)-free)

FEATURES

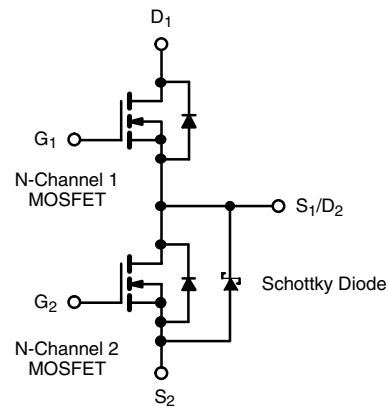
- LITTLE FOOT[®] Plus Integrated Schottky
- 100 % R_g and UIS Tested



RoHS
COMPLIANT

APPLICATIONS

- Notebook PC
- System Power DC/DC



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	8.4	8 ^d	A
		T _C = 70 °C	6.7	7.4	
		T _A = 25 °C	6.7 ^{b, c}	7.4 ^{b, c}	
		T _A = 70 °C	5.3 ^{b, c}	5.7 ^{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	2.4		2.8
		T _A = 25 °C	1.0 ^{b, c}		1.1 ^{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		W	
Maximum Power Dissipation ^{a, b}	P _D	T _C = 25 °C	2.7		3.1
		T _C = 70 °C	1.7		2.0
		T _A = 25 °C	1.7 ^{b, c}		2.0 ^{b, c}
		T _A = 70 °C	1.1 ^{b, c}	1.2 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	

Notes:

- Based on T_C = 25 °C.
- Surface Mounted on 1" x 1" FR4 Board.
- t = 10 s.
- Package Limited.


THERMAL RESISTANCE RATINGS

Parameter		Symbol	Channel-1		Channel-2		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ s	R_{thJA}	59	70	52	62.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	36	45	32	40	

Notes:

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

b. Maximum under Steady State conditions is 120 °C/W for Channel 1 and 115 °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		35	mV/°C	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		Ch-1		- 6.2		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	Ch-1	1.2		2.7	V
			Ch-2	1.2		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			10000	
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, $I_D = 8$ A	Ch-1		0.0165	0.021	Ω
		$V_{GS} = 10$ V, $I_D = 8$ A	Ch-2		0.0155	0.020	
		$V_{GS} = 4.5$ V, $I_D = 6$ A	Ch-1		0.0215	0.027	
		$V_{GS} = 4.5$ V, $I_D = 6$ A	Ch-2		0.020	0.025	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15$ V, $I_D = 8$ A	Ch-1		29	S	
		$V_{DS} = 15$ V, $I_D = 8$ A	Ch-2		33		
Diode Forward Voltage ^b	V_{SD}	$I_S = 1.7$ A, $V_{GS} = 0$ V	Ch-1		0.77	1.1	V
		$I_S = 1$ A, $V_{GS} = 0$ V	Ch-2		0.46	0.5	
Dynamic^a							
Total Gate Charge	Q_g	Channel-1 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 8$ A	Ch-1		6.7	10.5	nC
			Ch-2		7.0	11.0	
Gate-Source Charge	Q_{gs}		Ch-1		2.8		
			Ch-2		2.8		
Gate-Drain Charge	Q_{gd}	Channel-2 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = - 8$ A	Ch-1		2.0		
			Ch-2		2.0		
Gate Resistance	R_g		Ch-1		2.9	6.0	Ω
			Ch-2		2.0	4.0	



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 $V_{DD} = 15\text{ V}$, $R_L = 3\ \Omega$ $I_D \cong 5\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\ \Omega$	Ch-1		9	18	ns	
			Ch-2		10	20		
Rise Time	t_r		Ch-1		10	20		
			Ch-2		9	18		
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 3\ \Omega$ $I_D \cong 5\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\ \Omega$	Ch-1		16	32		
			Ch-2		16	32		
Fall Time	t_f		Ch-1		9	18		
			Ch-2		8	16		
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = 2.2\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1		35	55	
			$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2		21	35	
Body Diode Reverse Recovery Charge	Q_{rr}		$I_F = 2.2\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1		40		nC
			$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2		11		
Reverse Recovery Fall Time	t_a	$I_F = 2.2\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1		19		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	$I_F = 2.2\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$	Ch-1		16			
		$I_F = 2.2\text{ A}$, $di/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2		10			

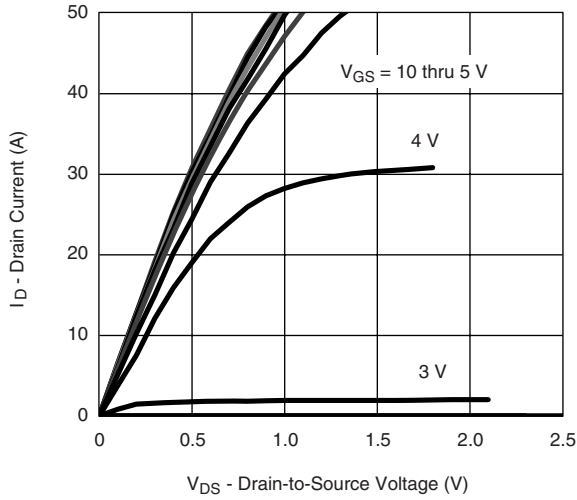
Notes:

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

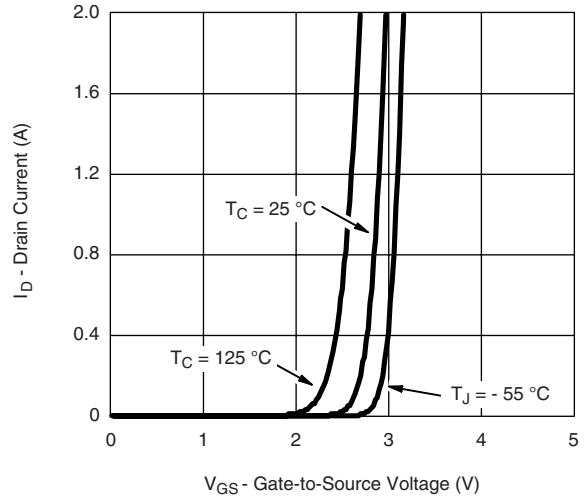
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



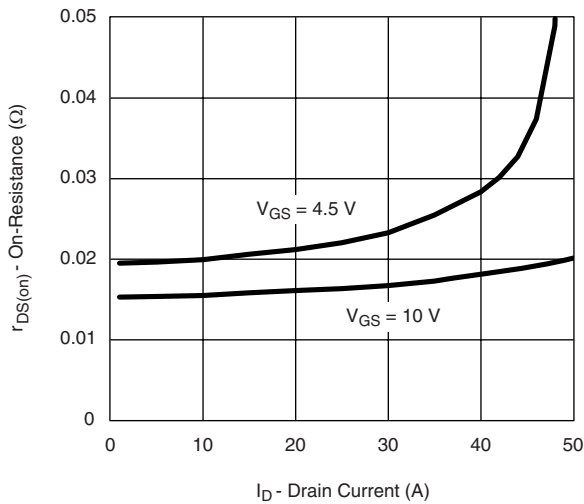
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



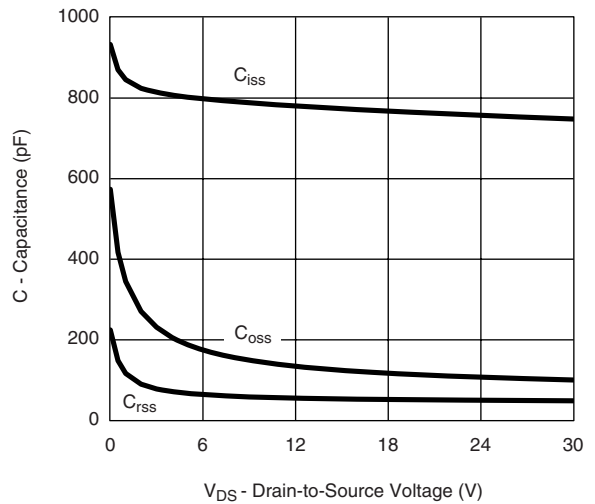
Output Characteristics



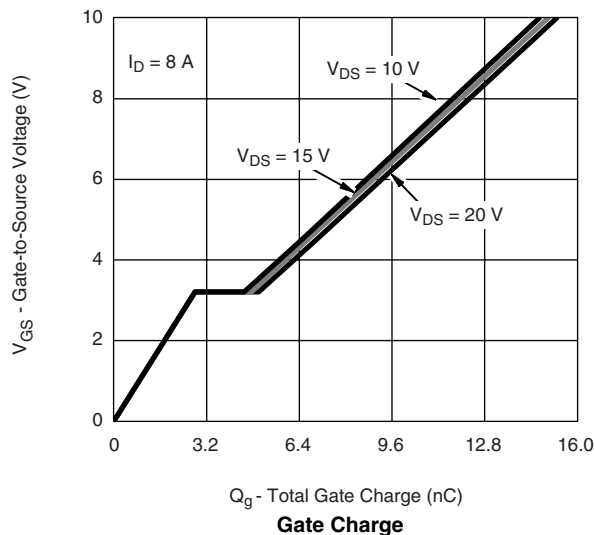
Transfer Characteristics



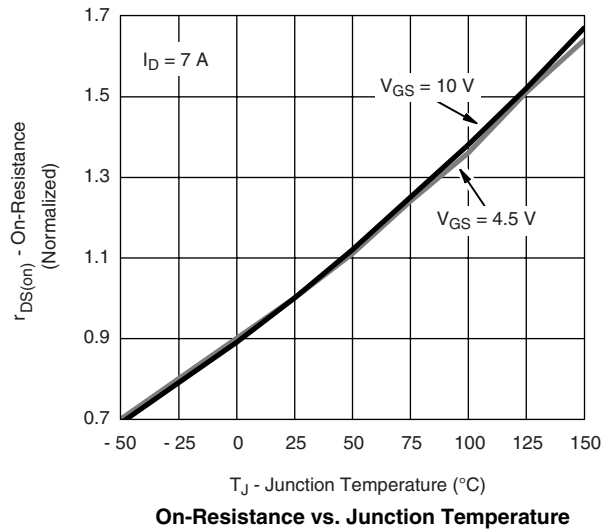
On-Resistance vs. Drain Current



Capacitance



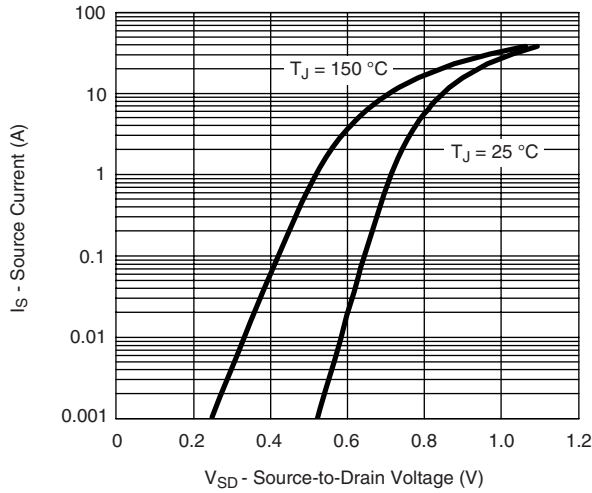
Gate Charge



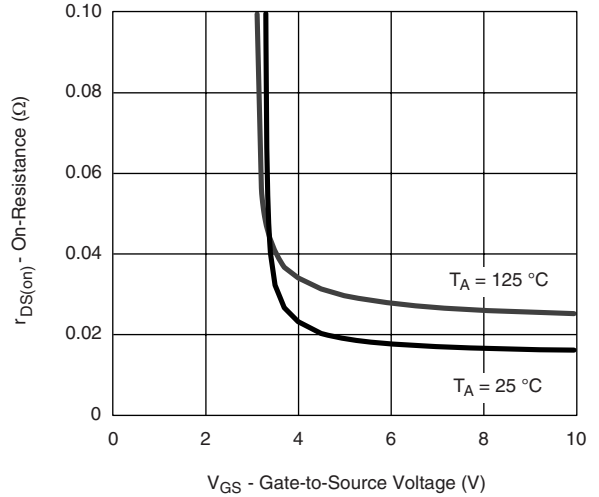
On-Resistance vs. Junction Temperature



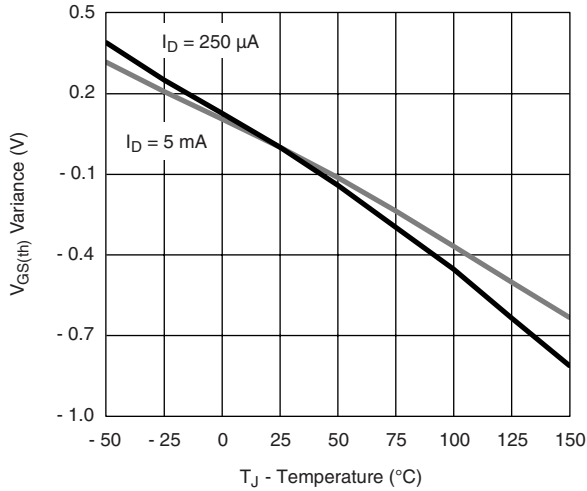
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



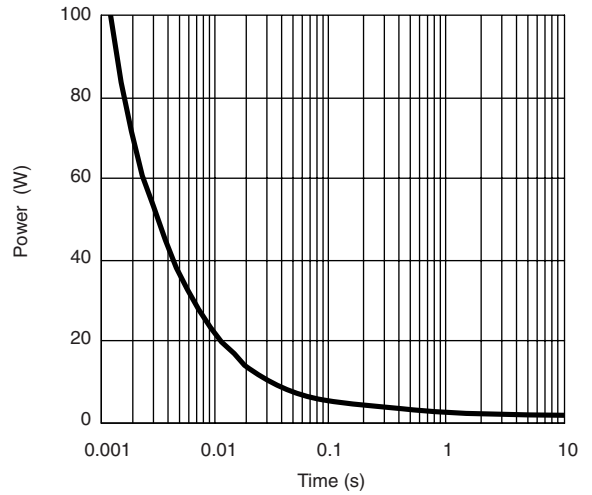
Source-Drain Diode Forward Voltage



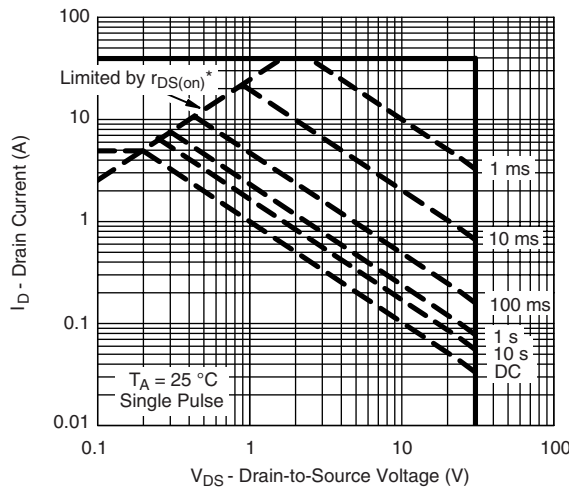
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

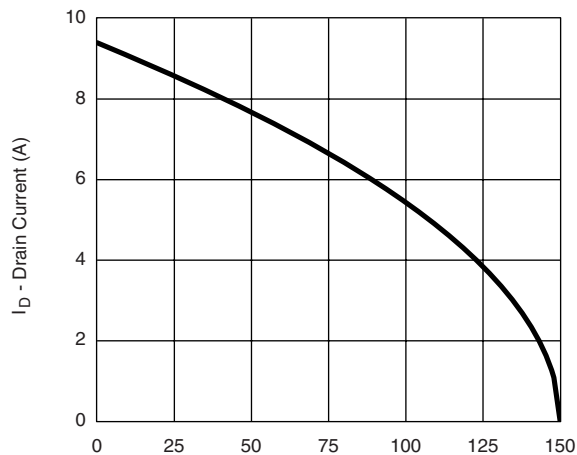


* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area

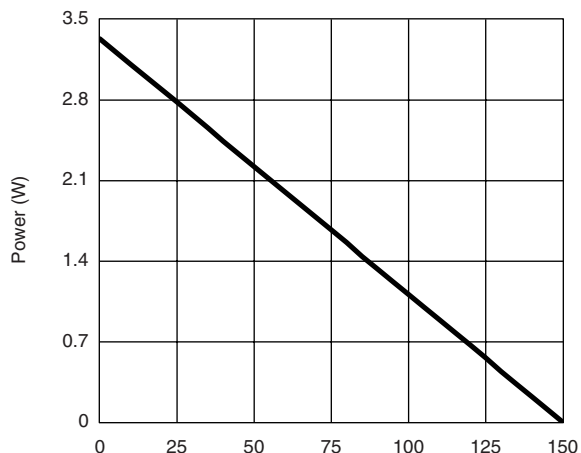


CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



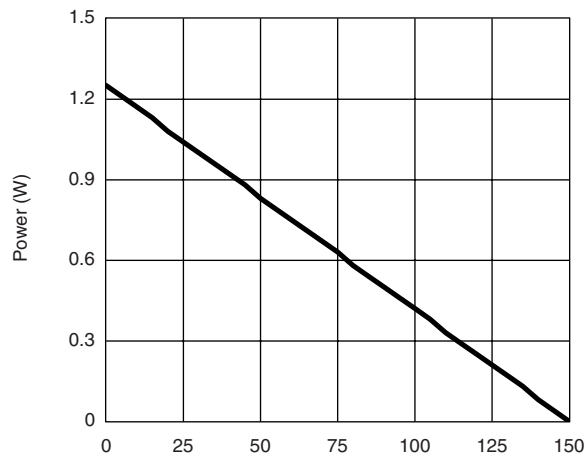
T_C - Case Temperature (°C)

Current Derating*



T_C - Case Temperature (°C)

Power, Junction-to-Foot



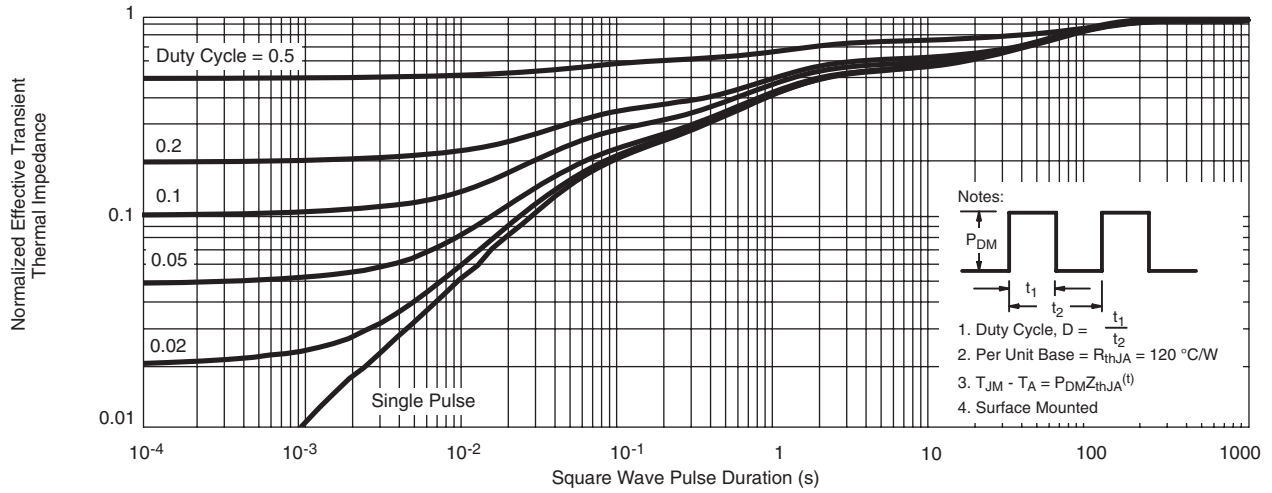
T_A - Ambient Temperature (°C)

Power, Junction-to-Ambient

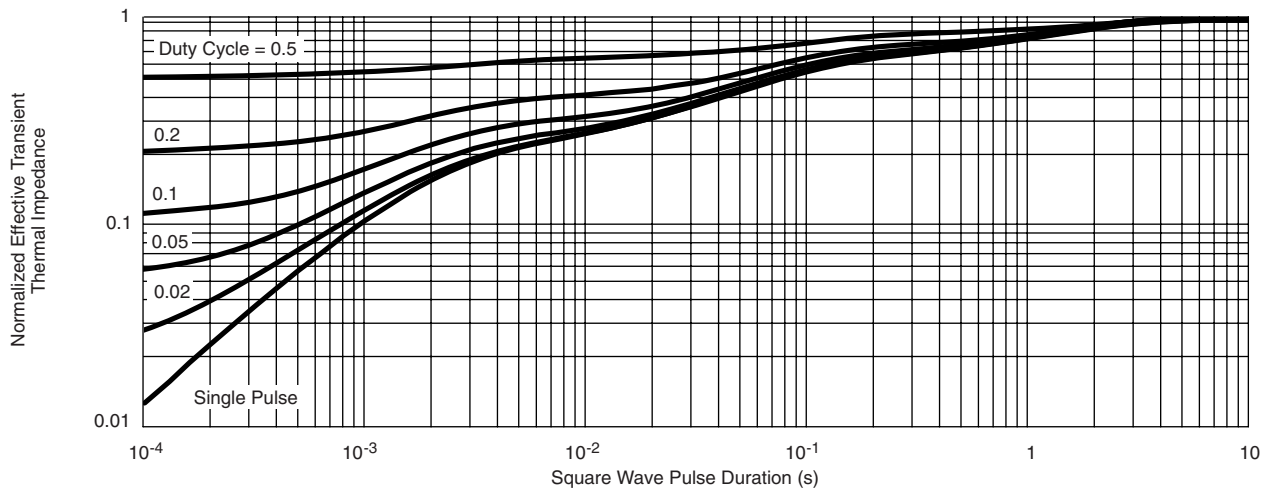
* The power dissipation P_D is based on $T_{J(max)} = 175$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



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



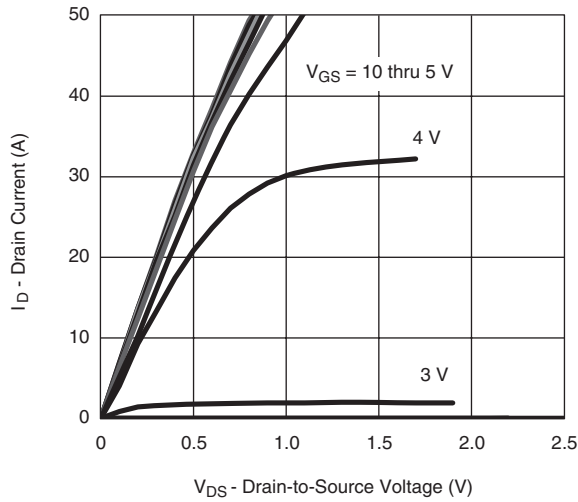
Normalized Thermal Transient Impedance, Junction-to-Ambient



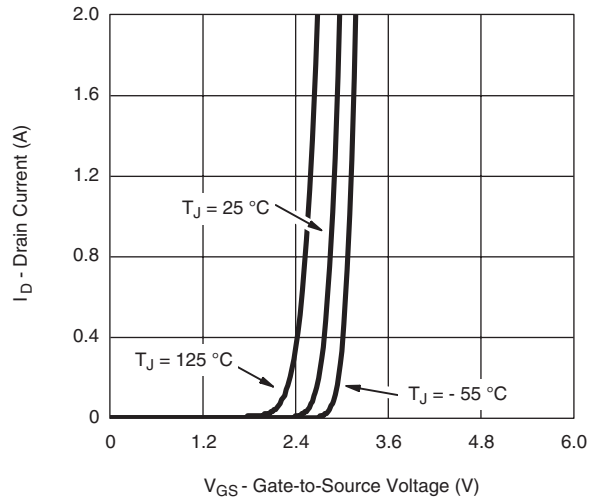
Normalized Thermal Transient Impedance, Junction-to-Foot



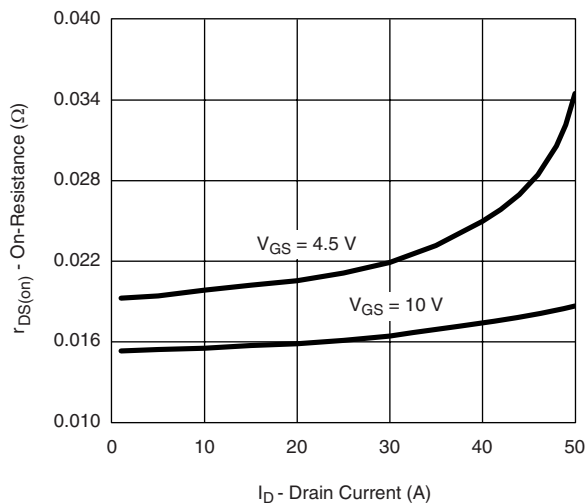
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



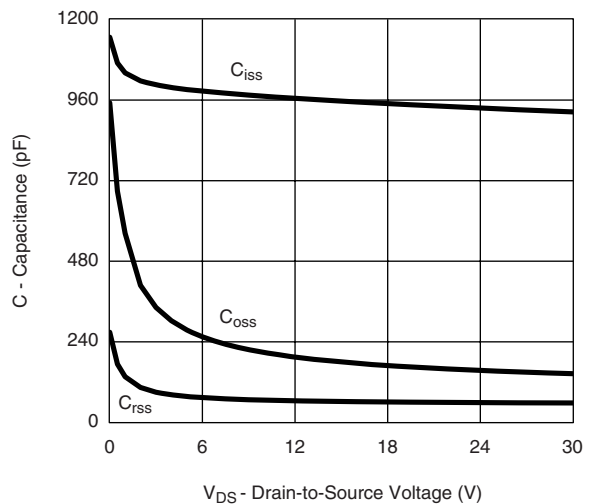
Output Characteristics



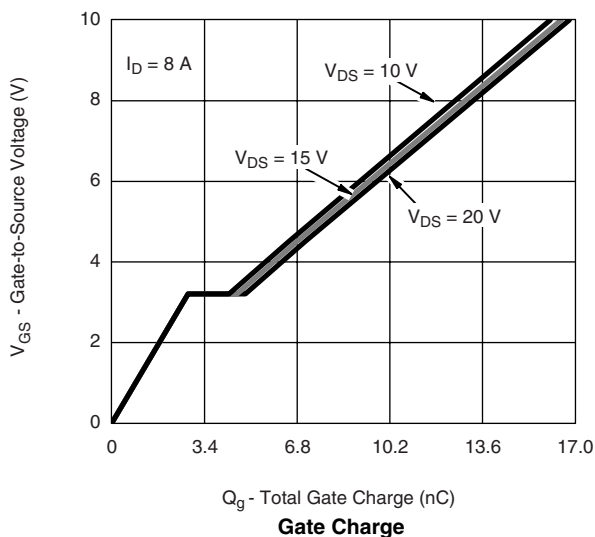
Transfer Characteristics



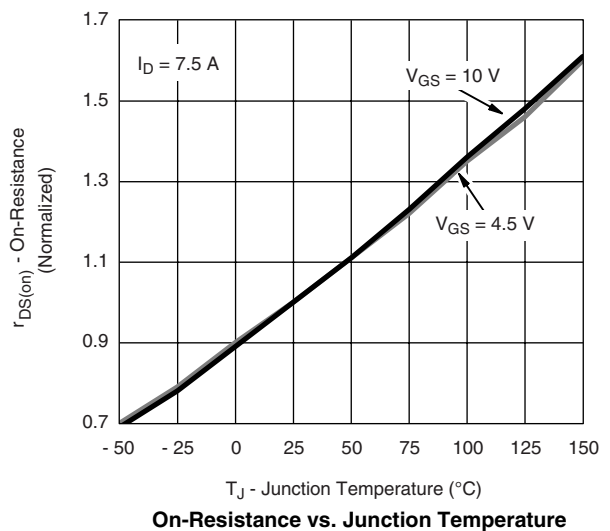
On-Resistance vs. Drain Current



Capacitance



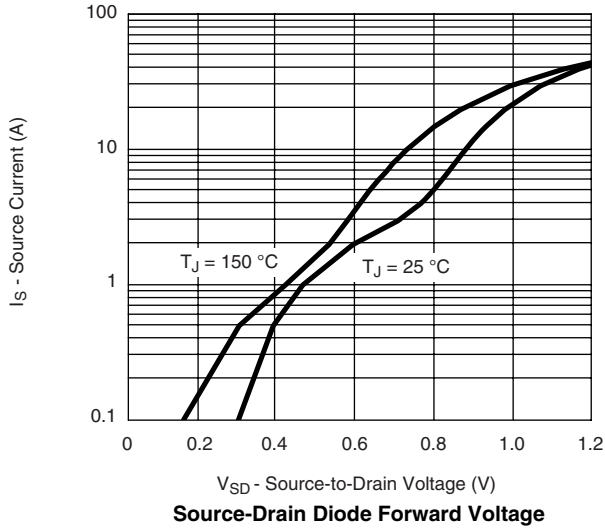
Gate Charge



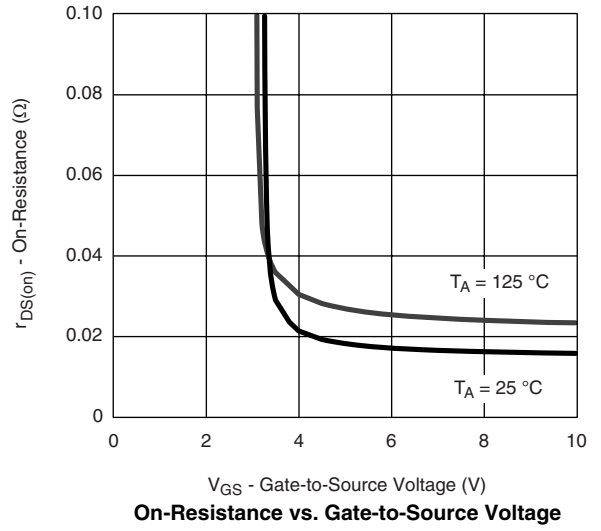
On-Resistance vs. Junction Temperature



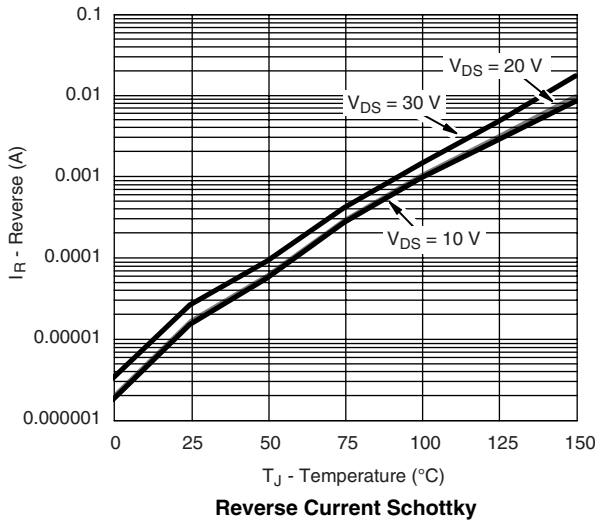
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



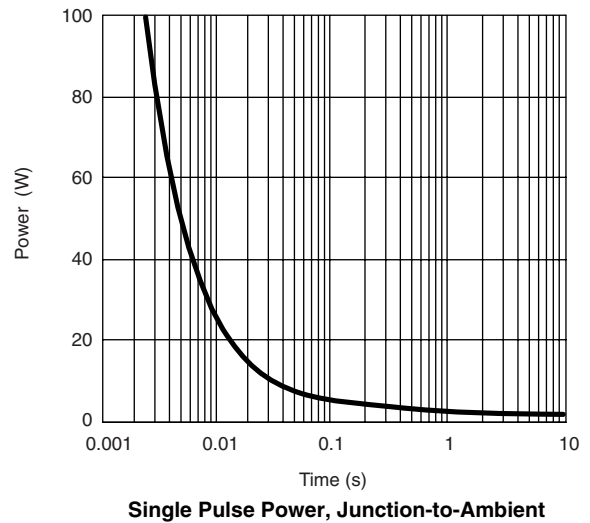
Source-Drain Diode Forward Voltage



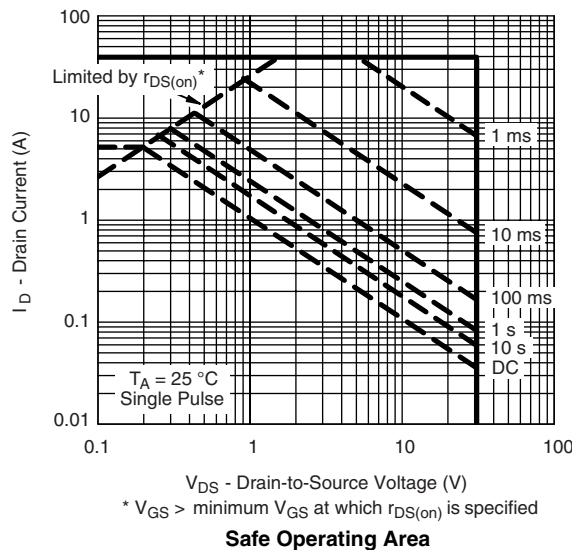
On-Resistance vs. Gate-to-Source Voltage



Reverse Current Schottky



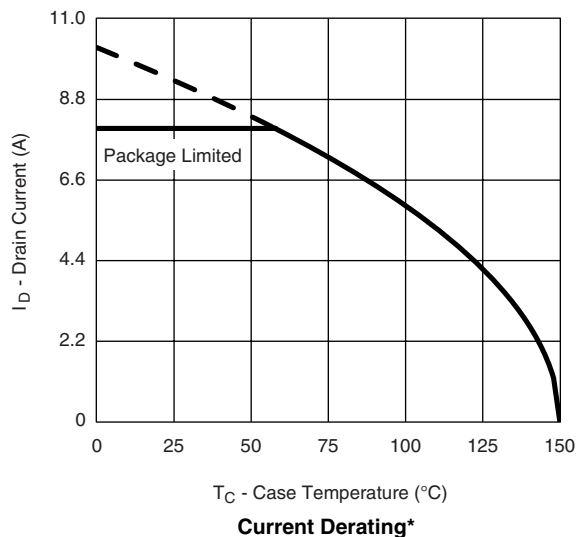
Single Pulse Power, Junction-to-Ambient



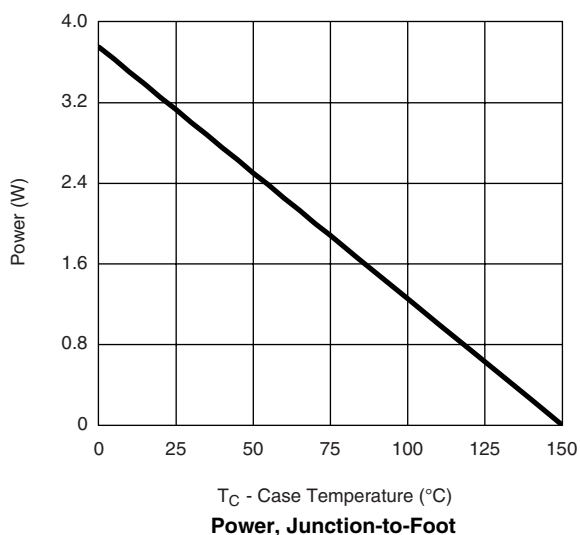
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified



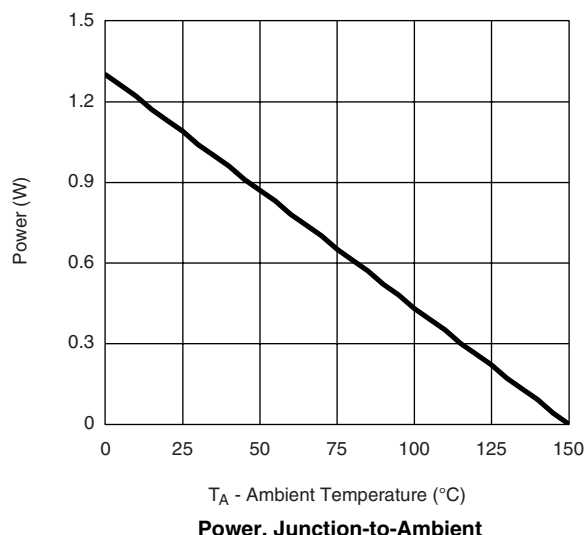
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



Power, Junction-to-Foot

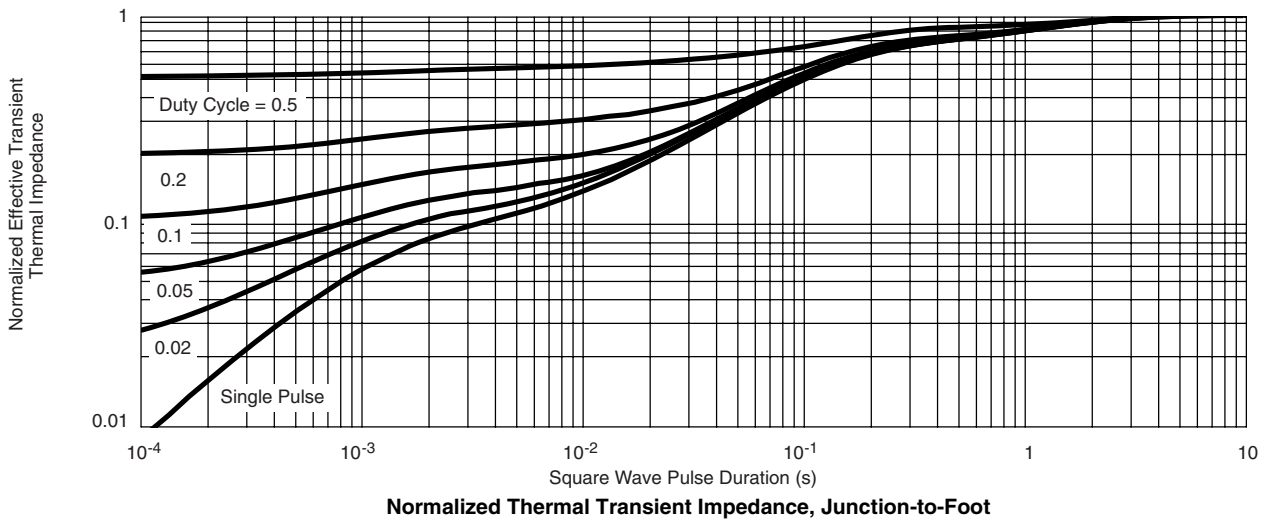
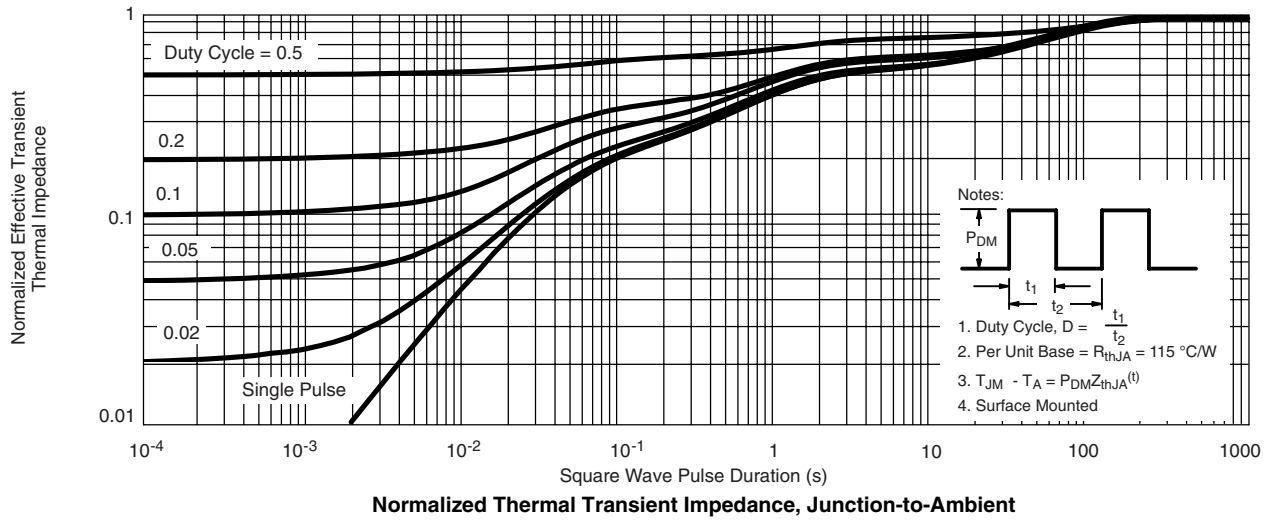


Power, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)} = 175$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



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



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