



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

PRODUCT SUMMARY

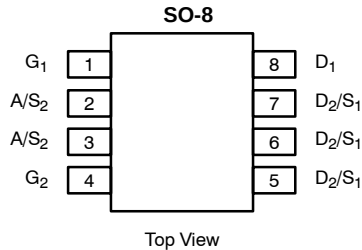
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)	Q _g (Typ)
Channel-1	30	0.0185 @ V _{GS} = 10 V	6.8	7.8
		0.0225 @ V _{GS} = 4.5 V	6.0	
Channel-2		0.0115 @ V _{GS} = 10 V	11.4	11.6
		0.016 @ V _{GS} = 4.5 V	9.5	

FEATURES

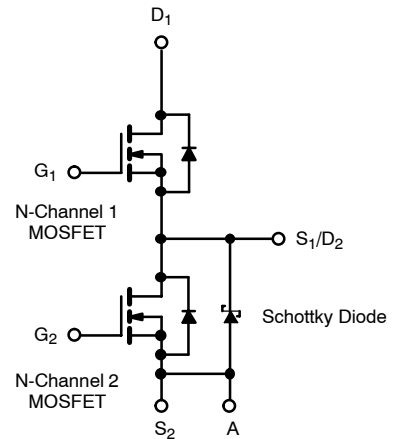
- LITTLE FOOT® Plus Power MOSFET
- 100% R_g Tested

SCHOTTKY PRODUCT SUMMARY

V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V @ 1.0 A	2.0



Ordering Information: Si4816BDY—E3
Si4816BDY-T1—E3 (with Tape and Reel)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Channel-1		Channel-2		Unit
		10 secs	Steady State	10 secs	Steady State	
Drain-Source Voltage	V_{DS}	30				V
Gate-Source Voltage	V_{GS}	20				
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	6.8	5.8	11.4	8.2	A
		5.5	4.6	9.0	6.5	
Pulsed Drain Current	I_{DM}	30		40		
Continuous Source Current (Diode Conduction) ^a	I_S	1	0.9	2.2	1.15	
Maximum Power Dissipation ^a	P_D	1.4	1.0	2.4	1.25	W
		0.9	0.64	1.5	0.8	
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	$^\circ\text{C/W}$
		100	125	82	100	80	100	
Maximum Junction-to-Foot (Drain)	R_{thJF}	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 Condition		Min	Typ ^a	Max	Unit	
Static								
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	Ch-1 Ch-2	1.0 1.0		3.0 3.0	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} = 30 V, V _{GS} = 0 V	Ch-1 Ch-2			1 100	μA	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1 Ch-2			15 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 = 6.8 A	Ch-1		0.0155	0.0185	Ω	
		V _{GS} = 10 V, I _D = 11.4 A	Ch-2		0.0093	0.0115		
		V _{GS} = 4.5 V, I _D = 6.0 A	Ch-1		0.0185	0.0225		
		V _{GS} = 4.5 V, I _D = 9.5 A	Ch-2		0.013	0.016		
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 6.8 A	Ch-1		30		S	
		V _{DS} = 15 V, I _D = 11.4 A	Ch-2		31			
Diode Forward Voltage ^b	V _{SD}	I _S = 1 A, V _{GS} = 0 V	Ch-1		0.73	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 = 6.8 A Channel-2 V _{DS} = 15 V, V _{GS} = 5 V, I _D = -11.4 A	Ch-1 Ch-2		7.8 11.6	10 18	nC	
Gate-Source Charge	Q _{gs}		Ch-1 Ch-2		2.9 4.8			
Gate-Drain Charge	Q _{gd}		Ch-1 Ch-2		2.3 3.7			
Gate Resistance	R _g		Ch-1 Ch-2	1.5 0.9	3.0 1.8	4.5 2.7		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 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		11 13	17 20	ns
Rise Time	t _r			Ch-1 Ch-2		9 9	15 15	
Turn-Off Delay Time	t _{d(off)}	Ch-1 Ch-2			24 31	40 50		
Fall Time	t _f	Ch-1 Ch-2			9 11	15 17		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.3 A, di/dt = 100 A/μs		Ch-1		20	35	
		I _F = 2.2 A, di/dt = 100 μA/μs		Ch-2		25	40	

Notes

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

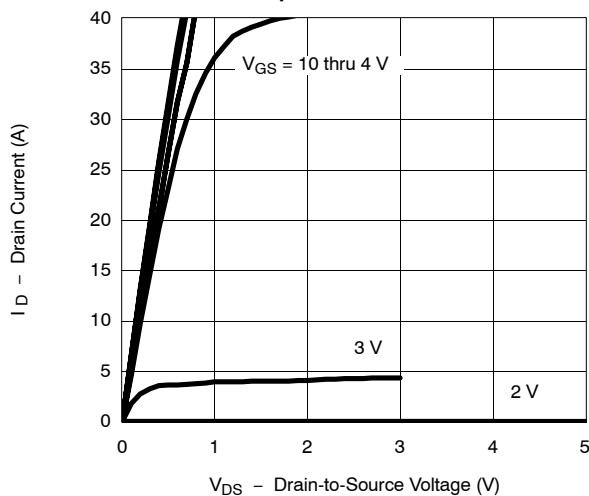
**SCHOTTKY SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}, T_J = 125^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 30\text{ V}$		0.004	0.100	mA
		$V_r = 30\text{ V}, T_J = 100^\circ\text{C}$		0.7	10	
		$V_r = -30\text{ V}, T_J = 125^\circ\text{C}$		3.0	20	
Junction Capacitance	C_T	$V_r = 10\text{ V}$		50		pF

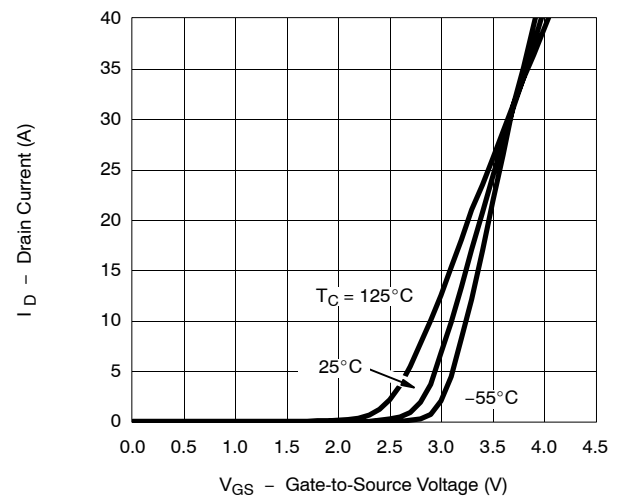
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**CHANNEL-1**

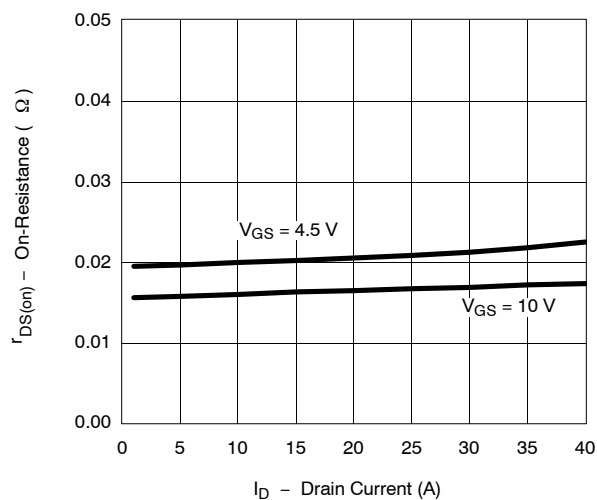
Output Characteristics



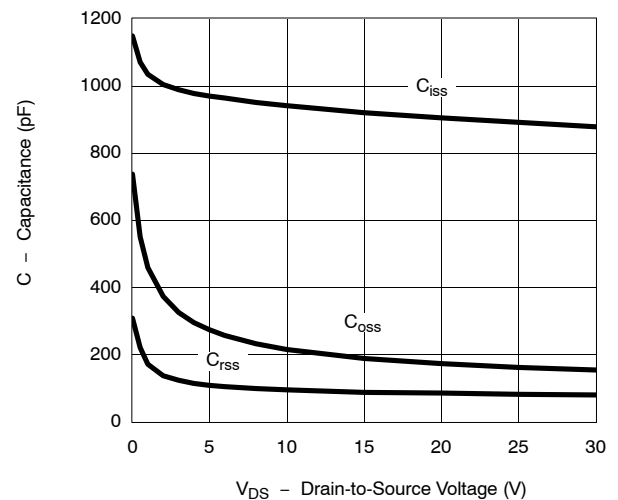
Transfer Characteristics



On-Resistance vs. Drain Current

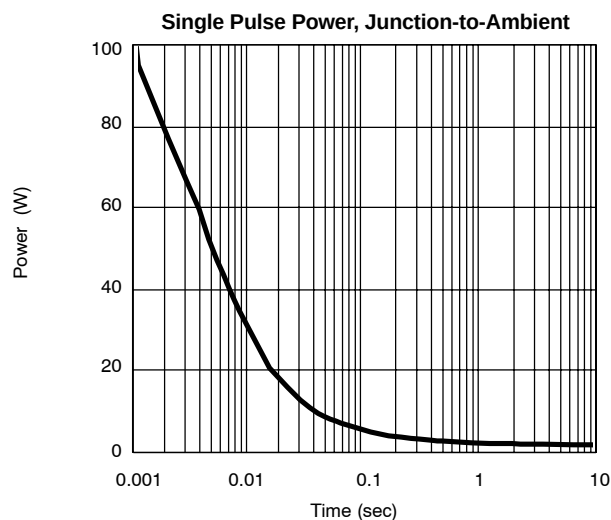
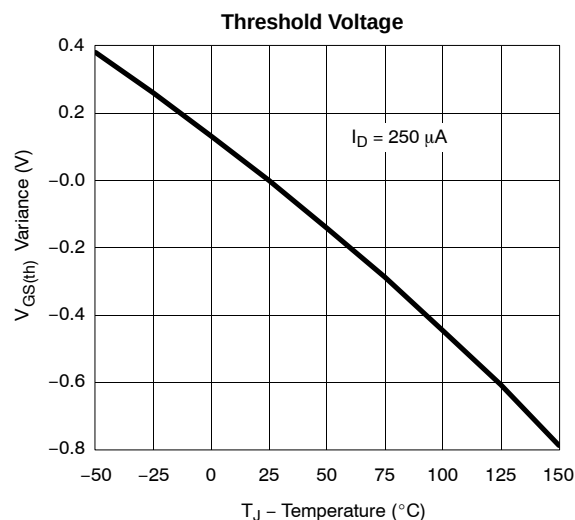
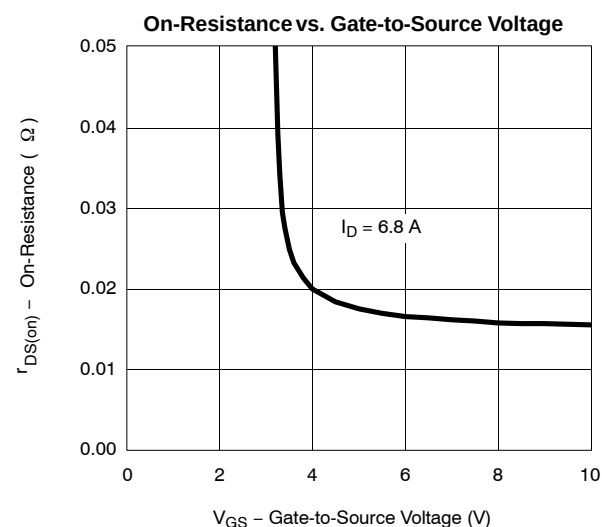
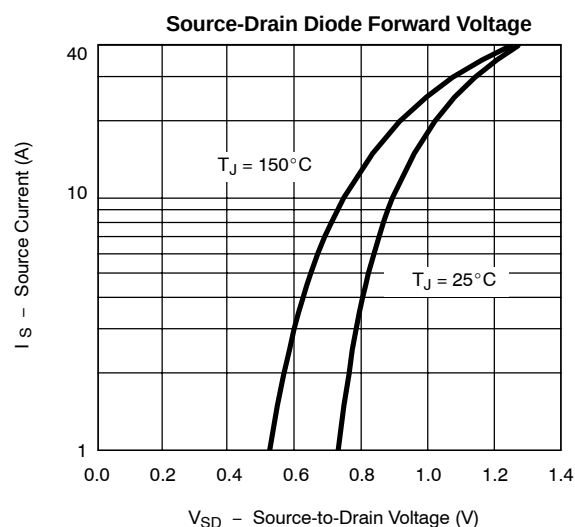
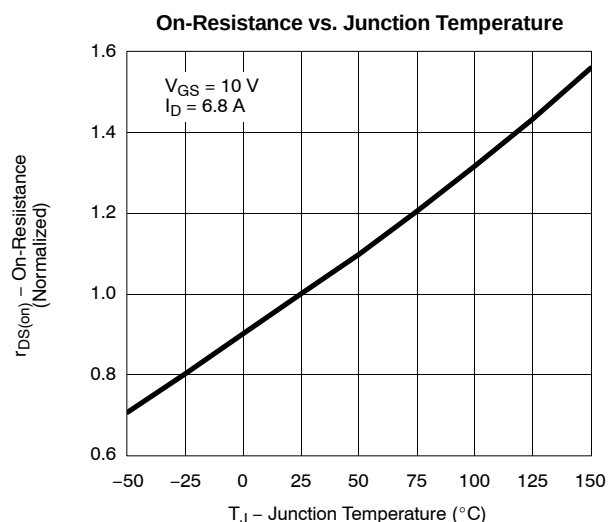
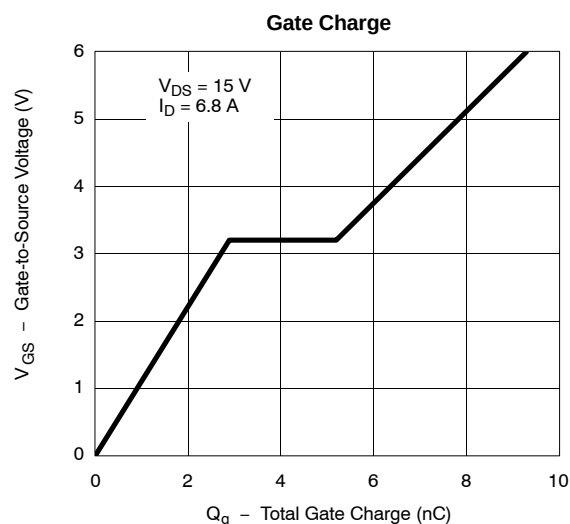


Capacitance



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

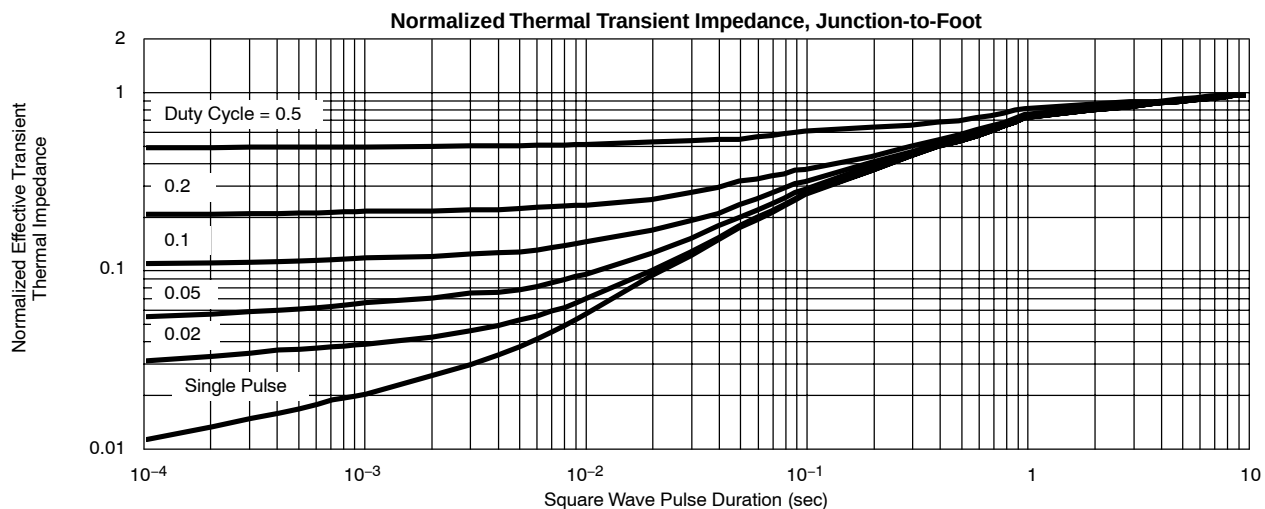
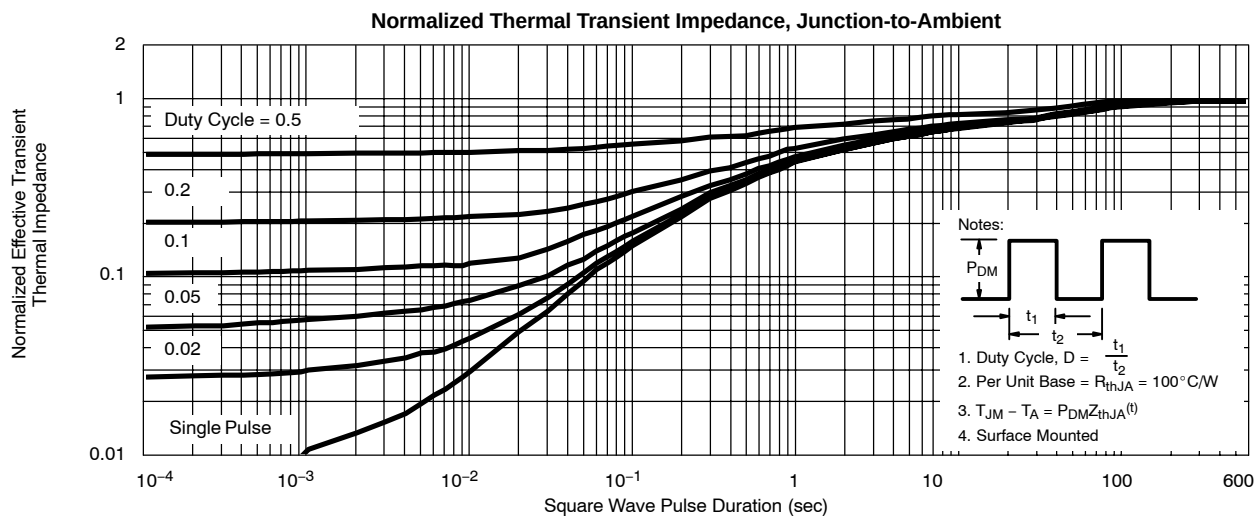
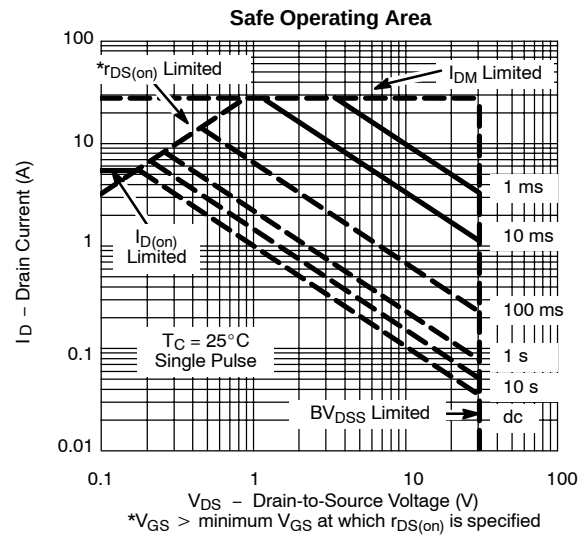
CHANNEL-1





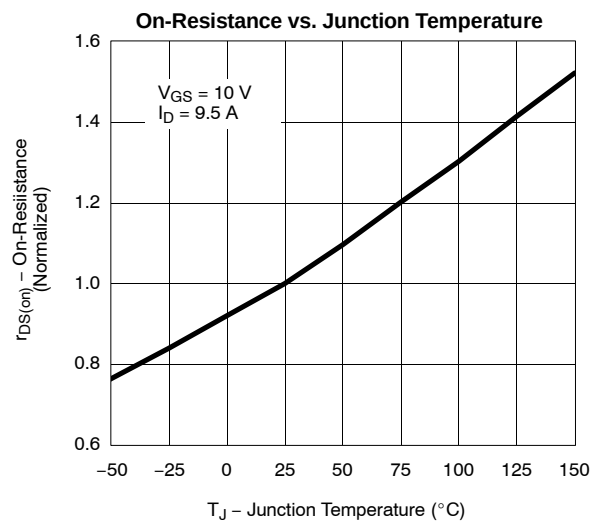
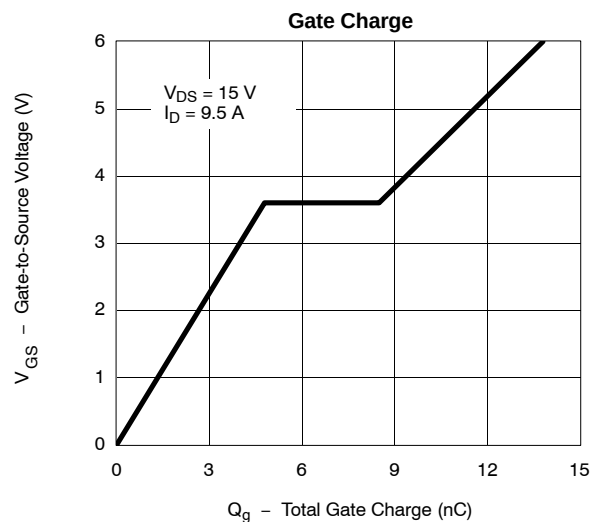
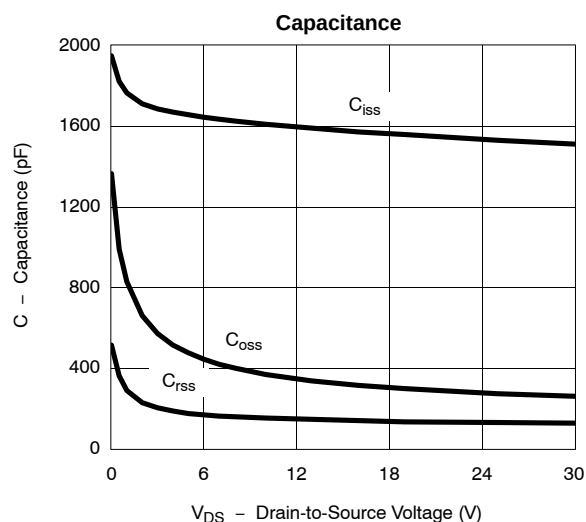
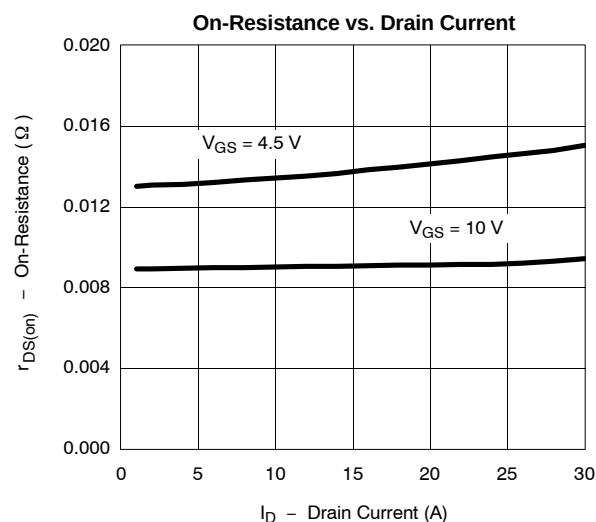
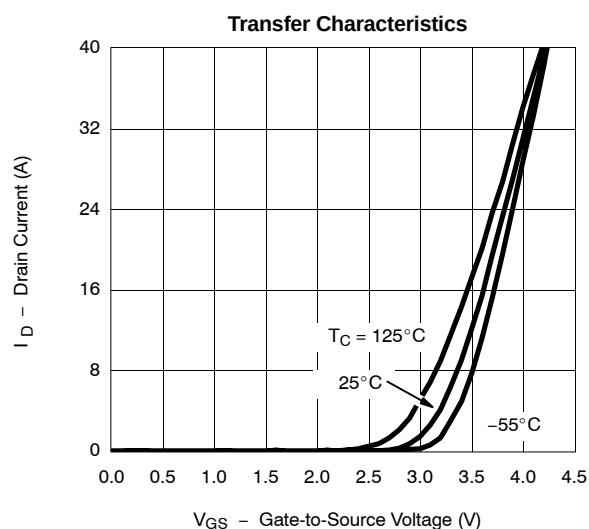
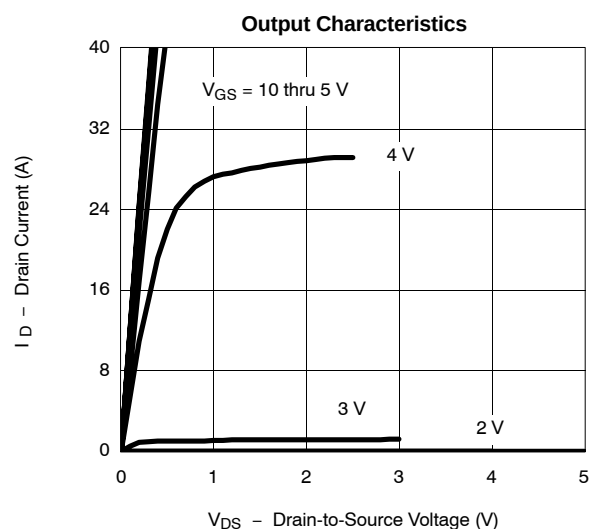
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-1



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

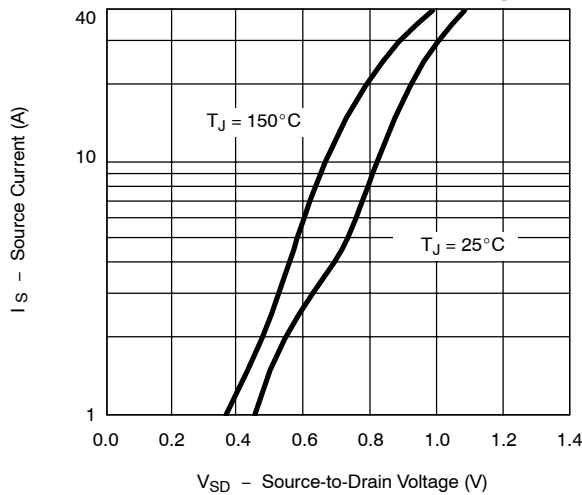




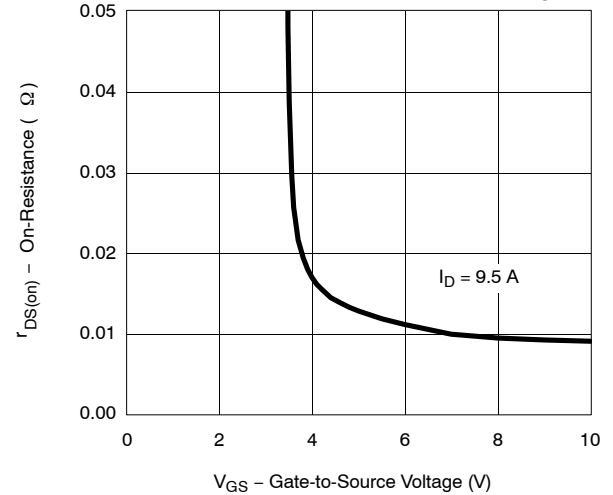
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-2

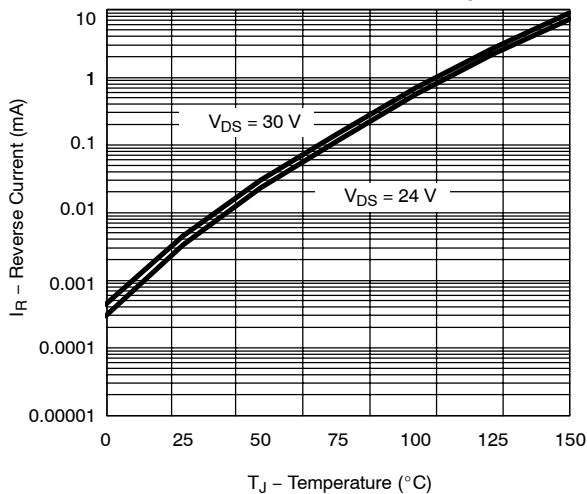
Source-Drain Diode Forward Voltage



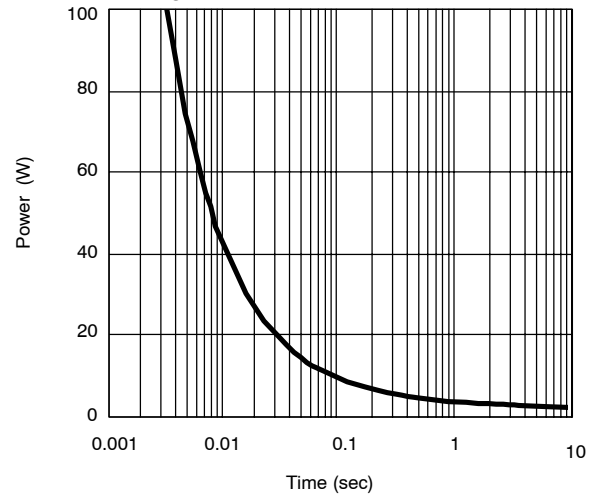
On-Resistance vs. Gate-to-Source Voltage



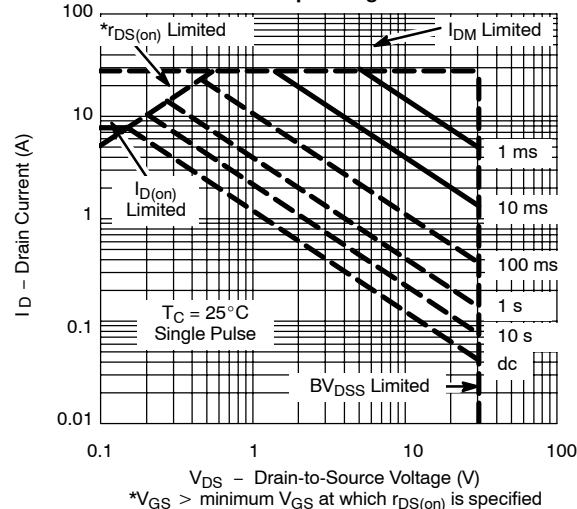
Reverse Current vs. Junction Temperature



Single Pulse Power, Junction-to-Ambient

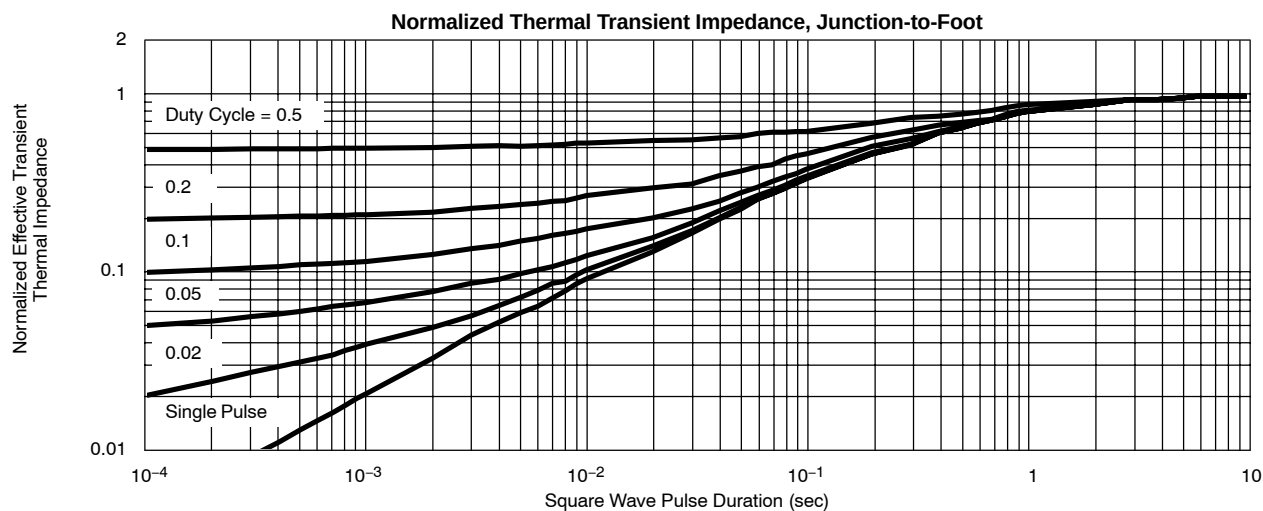
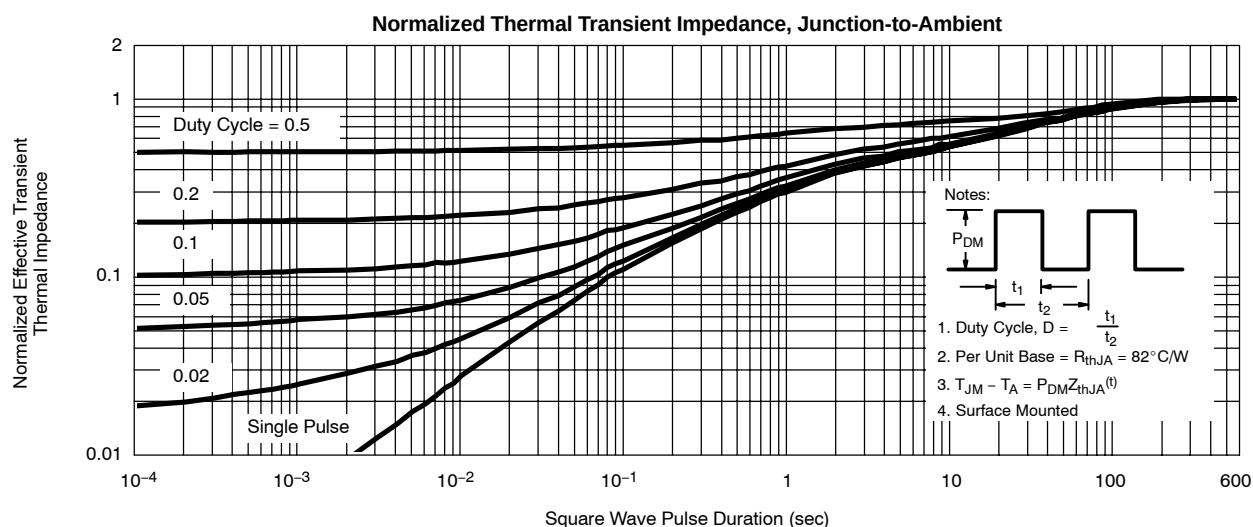


Safe Operating Area



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

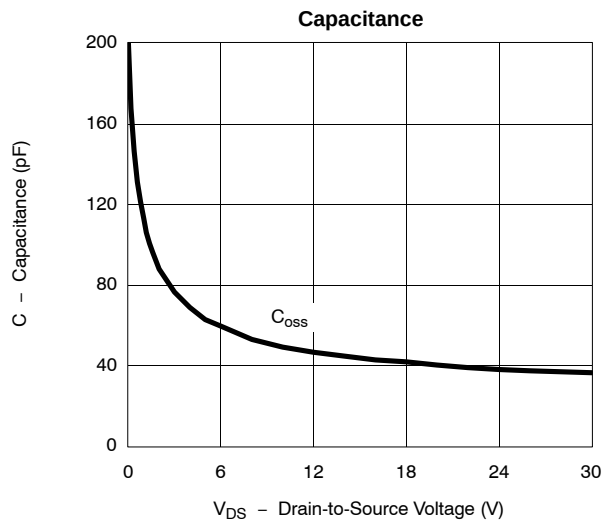
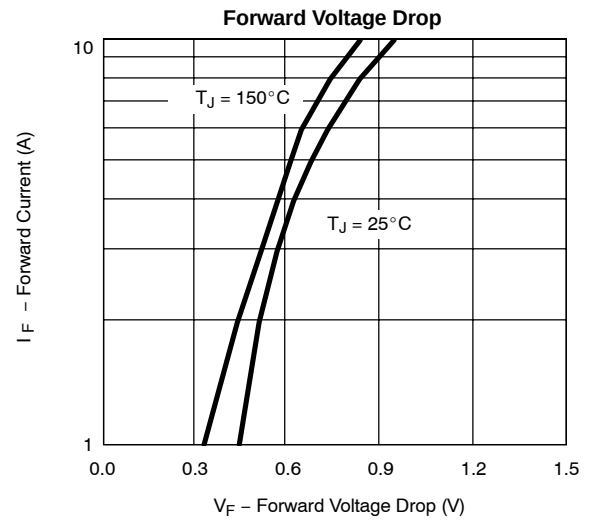
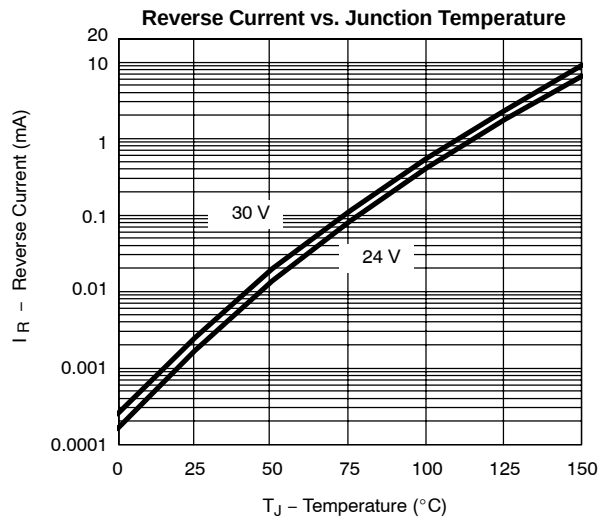
CHANNEL-2





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY



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