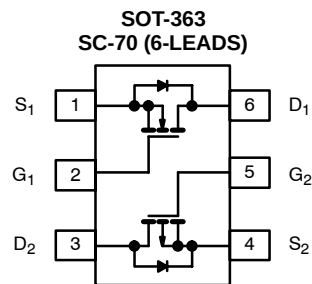




Complementary 20-V (D-S) MOSFET

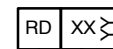
PRODUCT SUMMARY				
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
N-Channel	20	1.9 @ $V_{GS} = 4.5$ V	0.30	0.72
		3.7 @ $V_{GS} = 2.7$ V	0.22	
		4.2 @ $V_{GS} = 2.5$ V	0.21	
P-Channel	-20	0.995 @ $V_{GS} = -4.5$ V	-0.44	0.52
		1.600 @ $V_{GS} = -2.7$ V	-0.34	
		1.800 @ $V_{GS} = -2.5$ V	-0.32	

TrenchFET®
Power MOSFETs
2.5-V Rated



Top View

Marking Code



Lot Traceability
and Date Code

Part # Code

Ordering Information: Si1551DL-T1
Si1551DL-T1—E3 (Lead (Pb)-Free)

ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED)							
Parameter		Symbol	N-Channel		P-Channel		Unit
			5 secs	Steady State	5 secs	Steady State	
Drain-Source Voltage		V _{DS}	20		-20		V
Gate-Source Voltage		V _{GS}	± 12				
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	0.30	0.29	-0.44	-0.41	A
	T _A = 85°C		0.22	0.21	-0.31	-0.30	
Pulsed Drain Current		I _{DM}	0.6		-1.0		
Continuous Source Current (Diode Conduction) ^a		I _S	0.25	0.23	-0.25	-0.23	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	0.30	0.27	0.30	0.27	W
	T _A = 85°C		0.16	0.14	0.16	0.14	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150				°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 5$ sec	R_{thJA}	360	415	$^\circ\text{C/W}$
	Steady State		400	460	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	300	350	

Notes

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

**SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit	
Static								
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	0.6		1.5	V	
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-0.6		-1.5		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±12 V	N-Ch P-Ch			±100 ±100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	N-Ch			1	μA	
		V _{DS} = -20 V, V _{GS} = 0 V	P-Ch			-1		
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 85°C	N-Ch			5		
		V _{DS} = -20 V, V _{GS} = 0 V, T _J = 85°C	P-Ch			-5		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	N-Ch	0.6			A	
		V _{DS} ≤ -5 V, V _{GS} = -4.5 V	P-Ch	-1.0				
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 0.29 A	N-Ch		1.55	1.9	Ω	
		V _{GS} = -4.5 V, I _D = -0.41 A	P-Ch		0.850	0.995		
		V _{GS} = 2.7 V, I _D = 0.1 A	N-Ch		2.8	3.7		
		V _{GS} = -2.7 V, I _D = -0.25 A	P-Ch		1.23	1.600		
		V _{GS} = 2.5 V, I _D = 0.1 A	N-Ch		3.0	4.2		
		V _{GS} = -2.5 V, I _D = -0.25 A	P-Ch		1.4	1.800		
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 0.29 A	N-Ch		0.3		S	
		V _{DS} = -10 V, I _D = -0.41 A	P-Ch		0.8			
Diode Forward Voltage ^a	V _{SD}	I _S = 0.23 A, V _{GS} = 0 V	N-Ch		0.8	1.2	V	
		I _S = -0.23 A, V _{GS} = 0 V	P-Ch		-0.8	-1.2		
Dynamic ^b								
Total Gate Charge	Q _g	N-Channel V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 0.29 A P-Channel V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -0.41 A	N-Ch P-Ch		0.72 0.52	1.5 1.8	nC	
Gate-Source Charge	Q _{gs}		N-Ch P-Ch		0.22 0.11			
Gate-Drain Charge	Q _{gd}		N-Ch P-Ch		0.13 0.14			
Turn-On Delay Time	t _{d(on)}		N-Ch P-Ch		23 7.5	40 15		ns
Rise Time	t _r	N-Channel V _{DD} = 10 V, R _L = 20 Ω I _D ≅ 0.5 A, V _{GEN} = 4.5 V, R _g = 6 Ω P-Channel V _{DD} = -10 V, R _L = 20 Ω I _D ≅ -0.5 A, V _{GEN} = -4.5 V, R _g = 6 Ω	N-Ch P-Ch		30 20	60 40		
Turn-Off Delay Time	t _{d(off)}	N-Ch P-Ch		10 8.5	20 17			
Fall Time	t _f	N-Ch P-Ch		15 12	30 24			
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 0.23 A, di/dt = 100 A/μs	N-Ch		20	40		
		I _F = -0.23 A, di/dt = 100 A/μs	P-Ch		25	40		

Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
 b. Guaranteed by design, not subject to production testing.

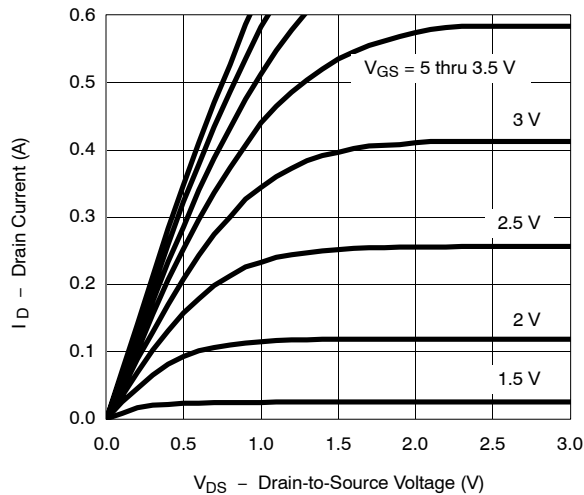
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



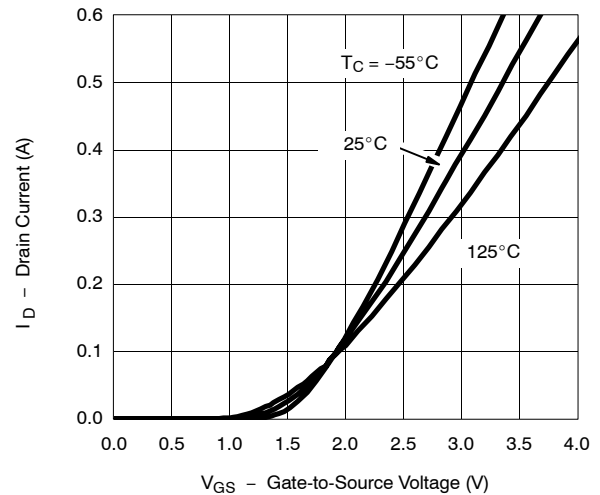
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL

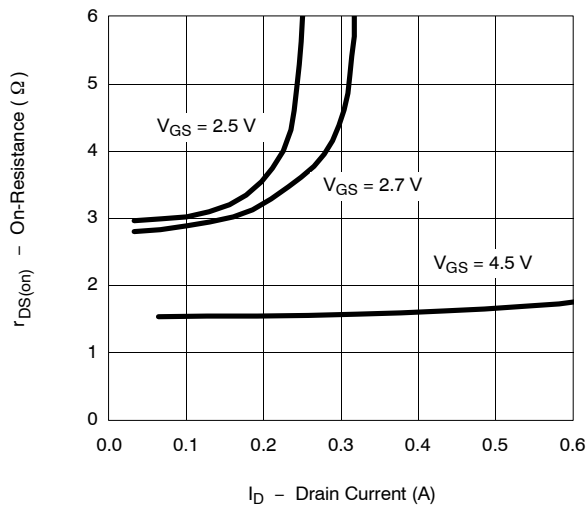
Output Characteristics



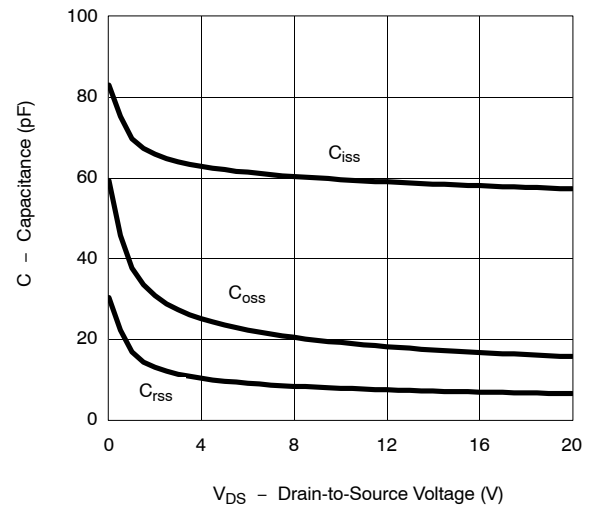
Transfer Characteristics



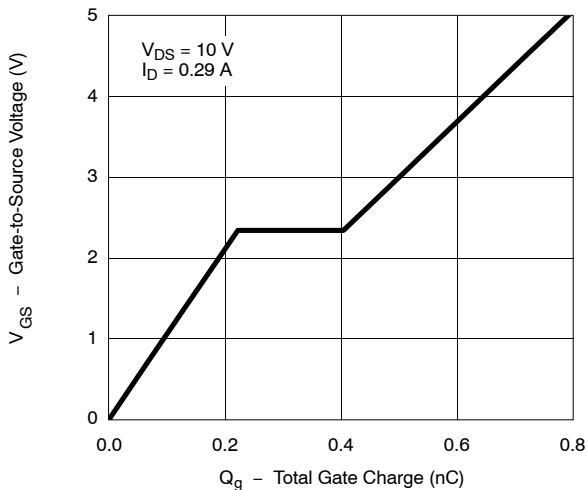
On-Resistance vs. Drain Current



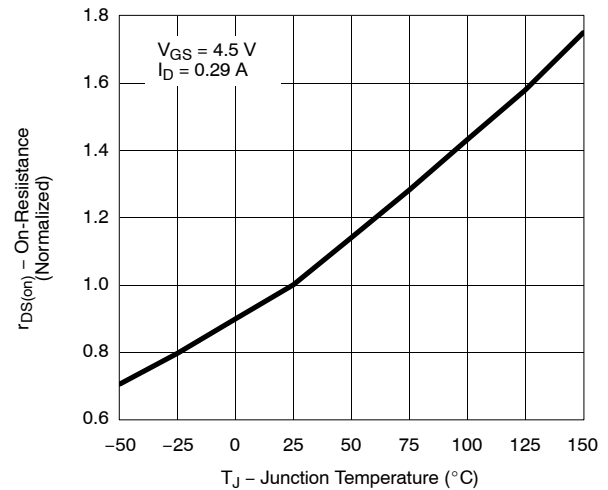
Capacitance



Gate Charge

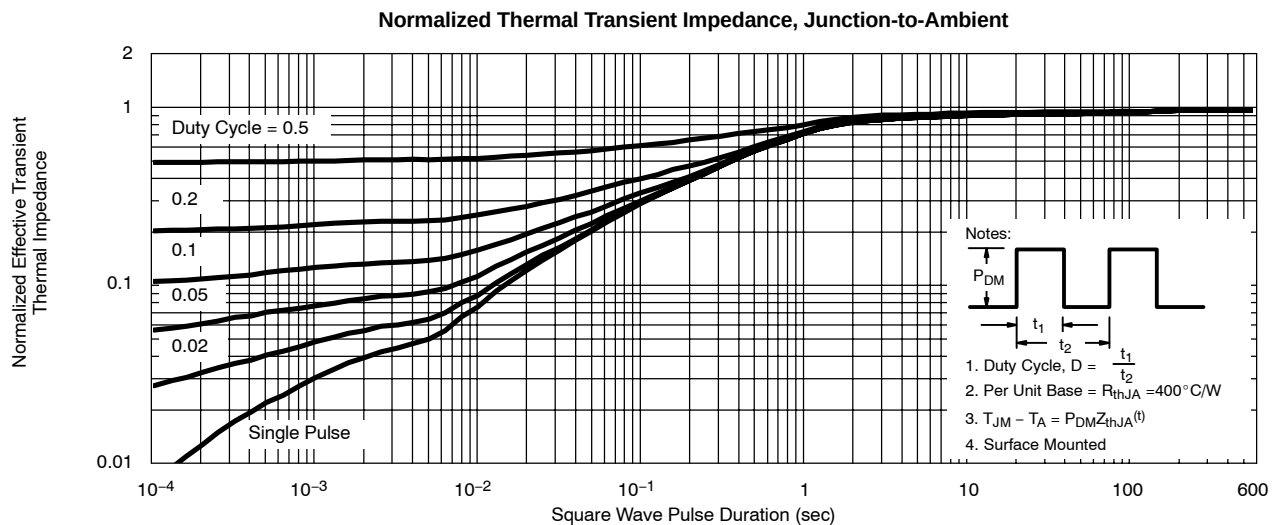
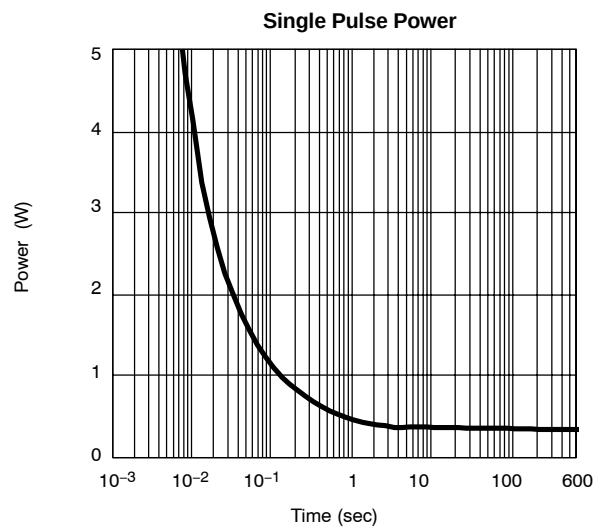
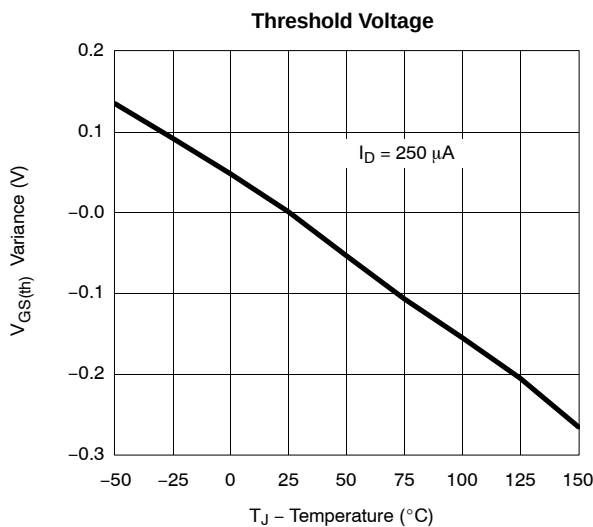
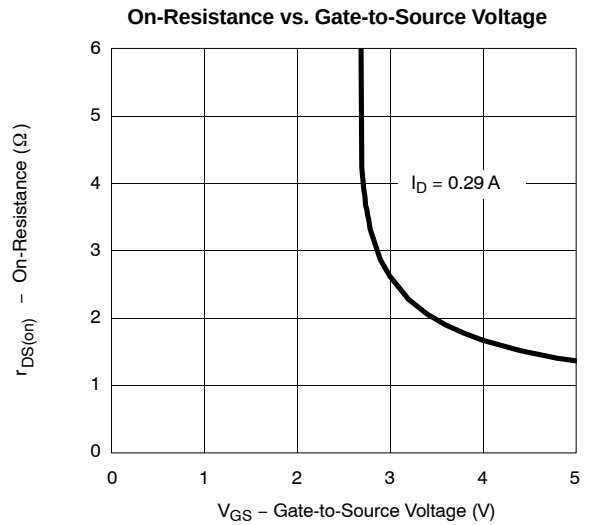
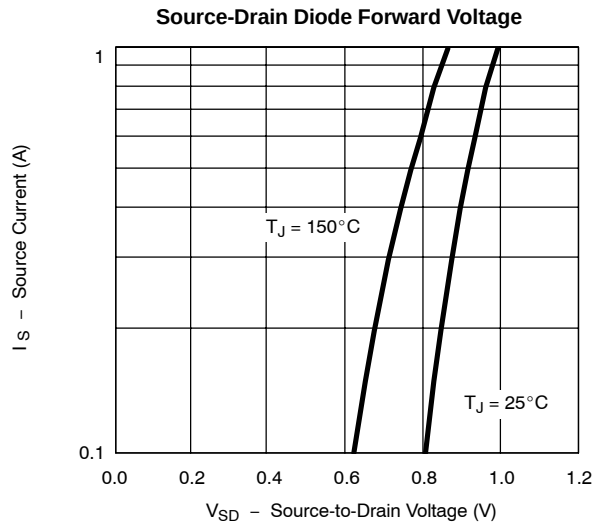


On-Resistance vs. Junction Temperature





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

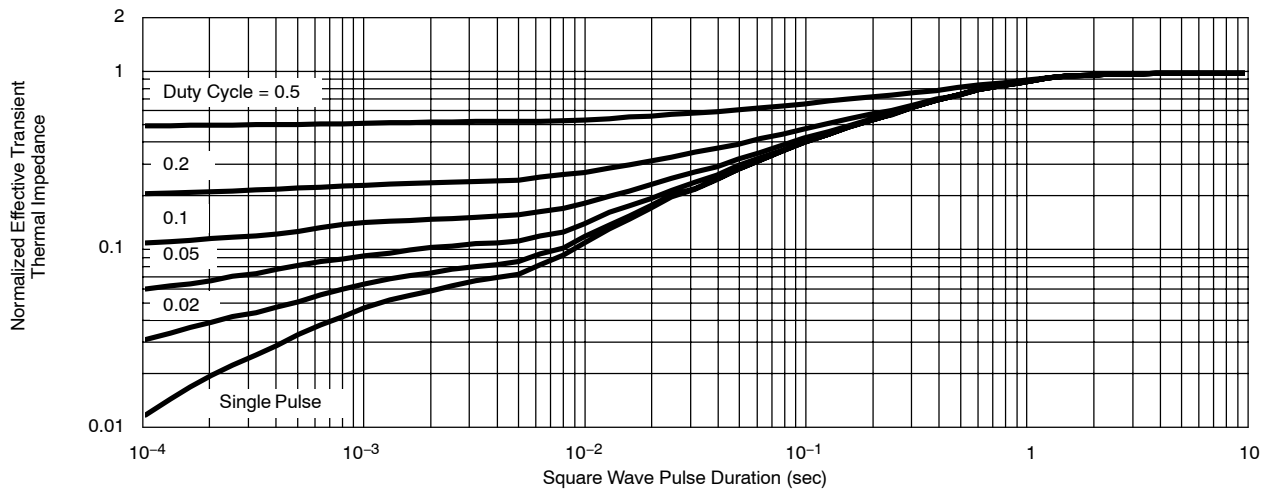




TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL

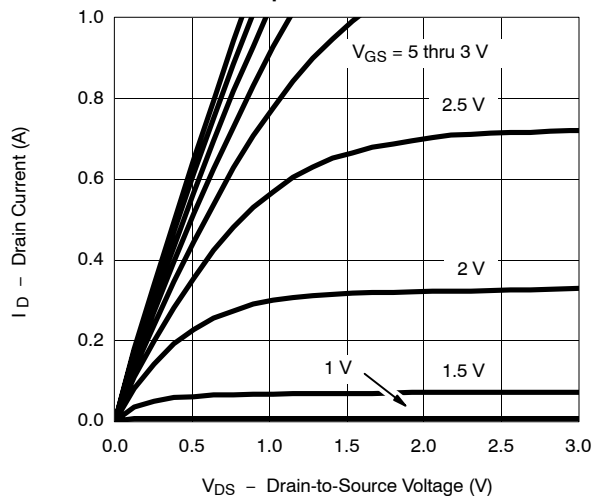
Normalized Thermal Transient Impedance, Junction-to-Foot



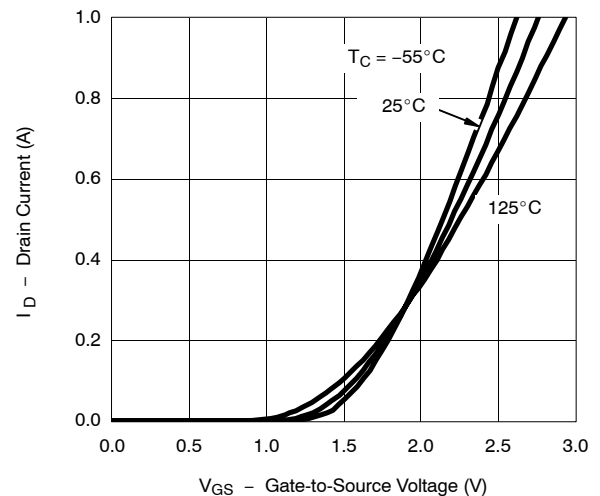
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

P-CHANNEL

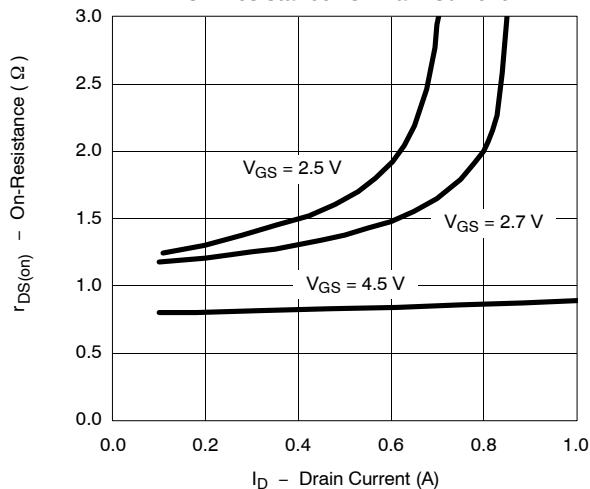
Output Characteristics



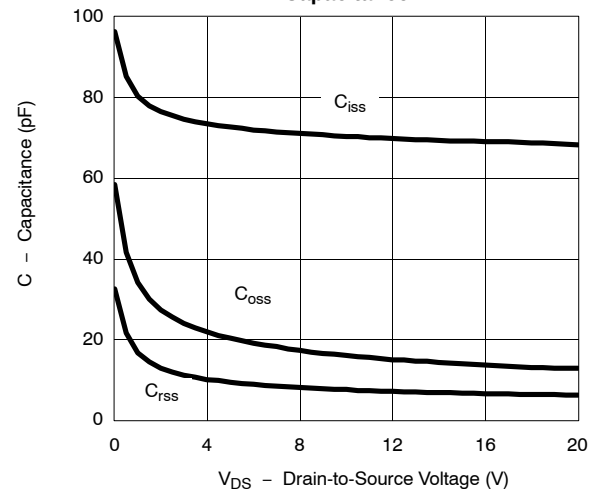
Transfer Characteristics



On-Resistance vs. Drain Current

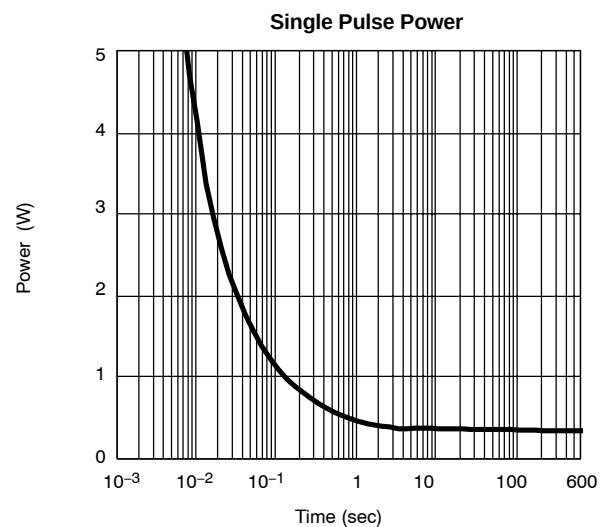
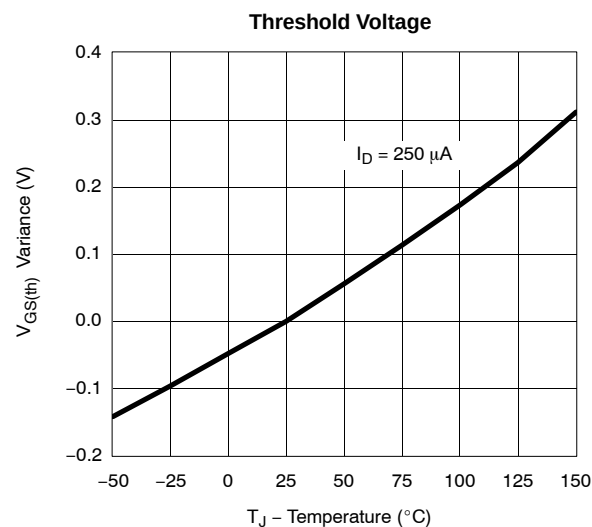
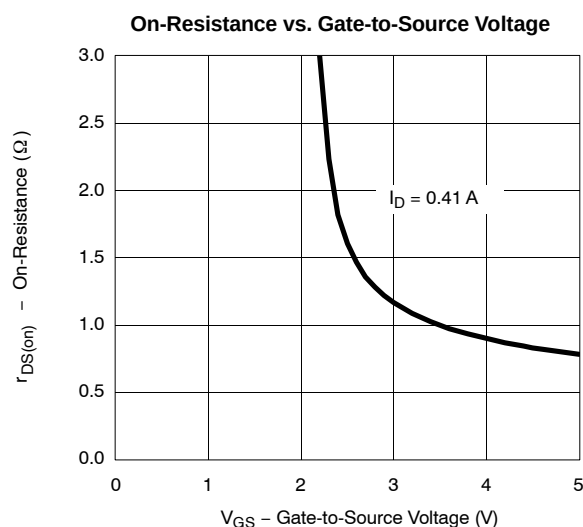
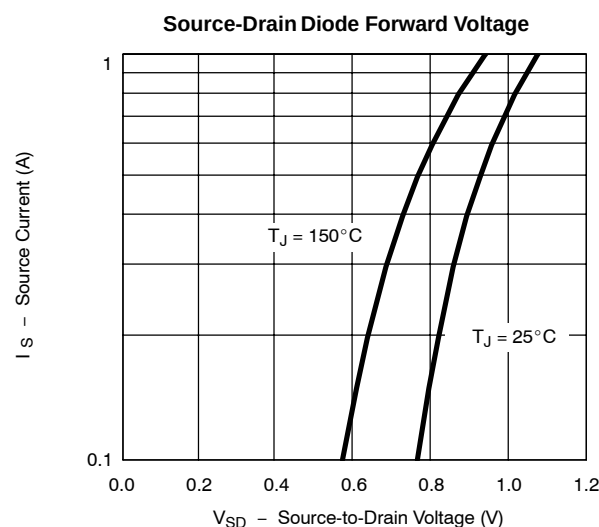
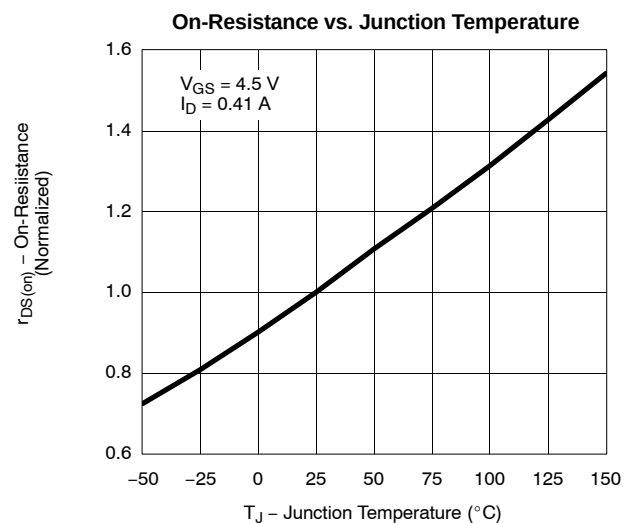
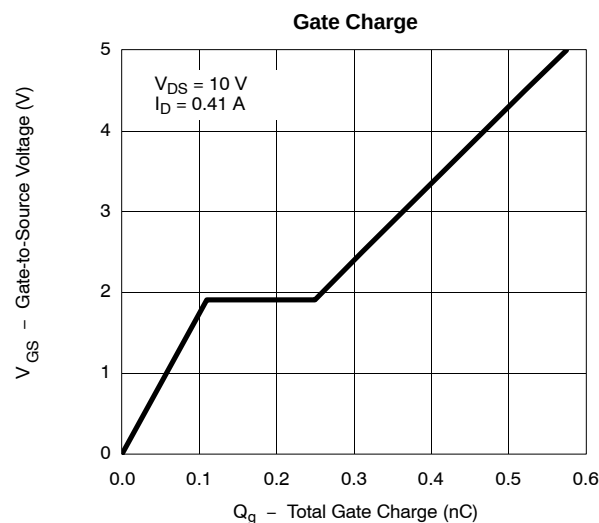


Capacitance



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

P-CHANNEL

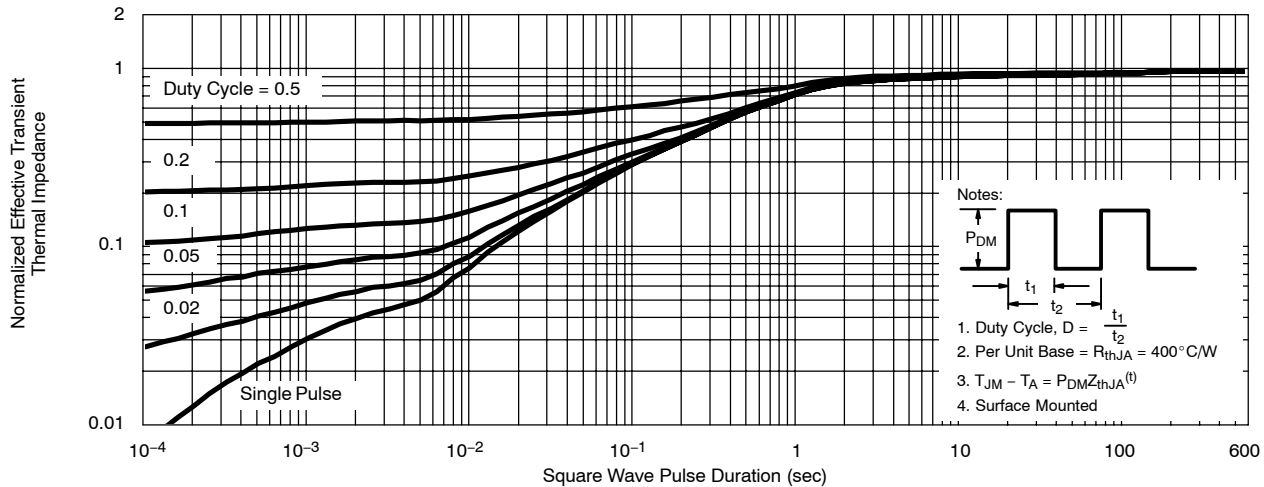




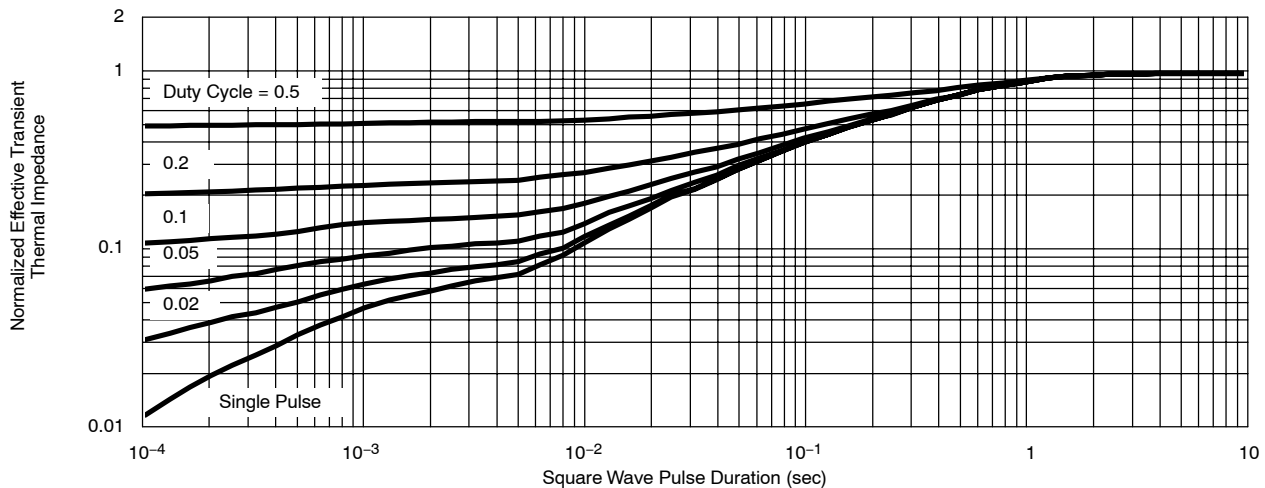
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

P-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



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