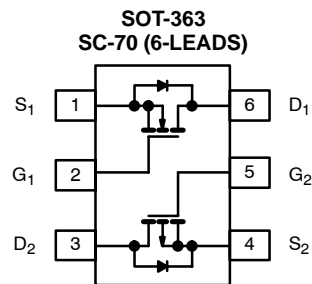


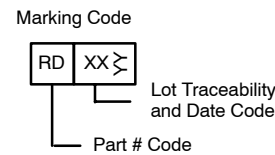
## Complementary 20-V (D-S) MOSFET

PRODUCT SUMMARY				
	V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ)
N-Channel	20	1.9 @ V <sub>GS</sub> = 4.5 V	0.30	0.72
		3.7 @ V <sub>GS</sub> = 2.7 V	0.22	
		4.2 @ V <sub>GS</sub> = 2.5 V	0.21	
P-Channel	-20	0.995 @ V <sub>GS</sub> = -4.5 V	-0.44	0.52
		1.600 @ V <sub>GS</sub> = -2.7 V	-0.34	
		1.800 @ V <sub>GS</sub> = -2.5 V	-0.32	

**TrenchFET®**  
Power MOSFETS  
2.5-V Rated



Top View



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

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

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	t ≤ 5 sec	R <sub>thJA</sub>	360	415	°C/W
	Steady State		400	460	
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	300	350	

**Notes**

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

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

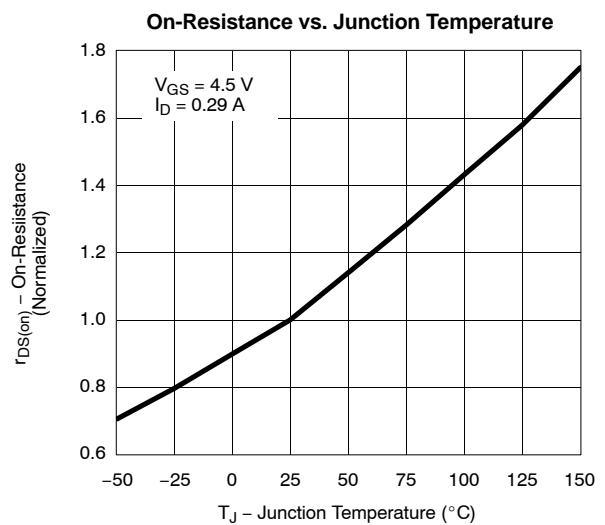
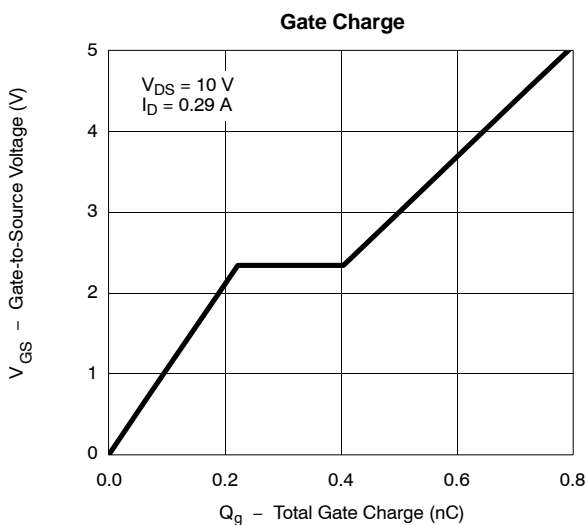
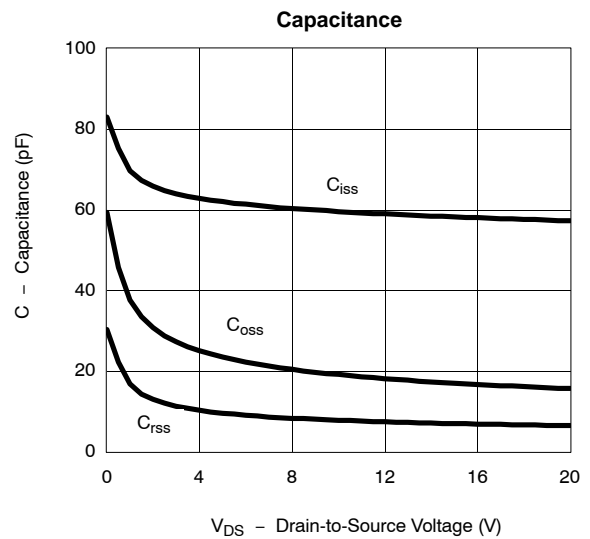
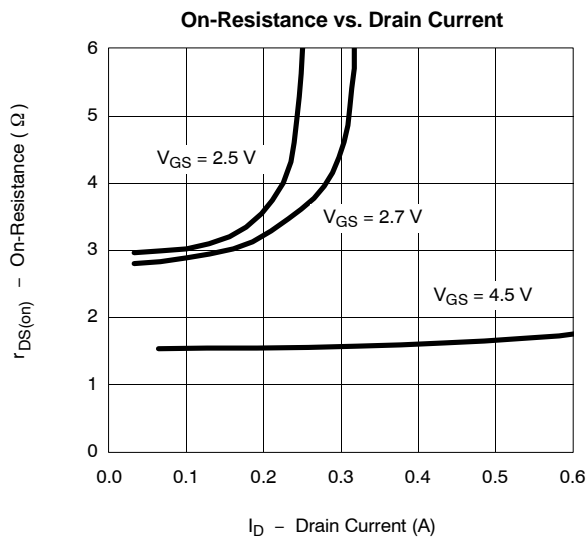
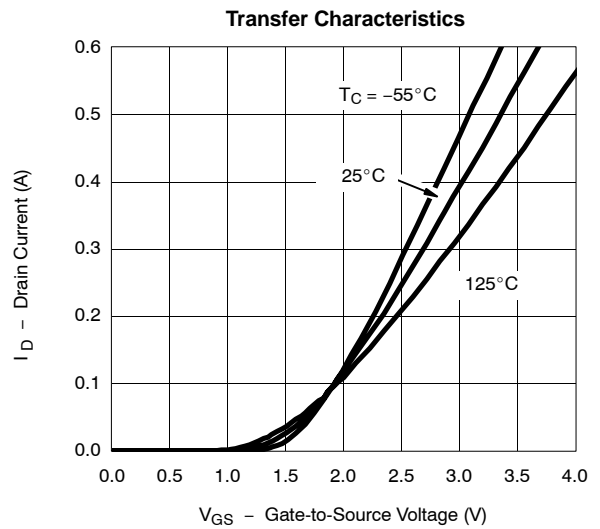
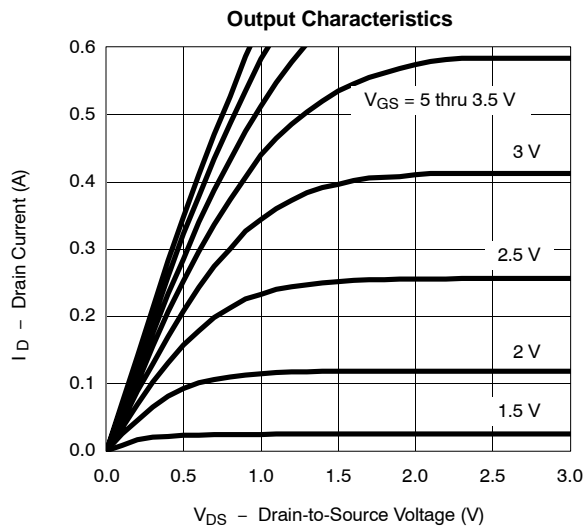
## Notes

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

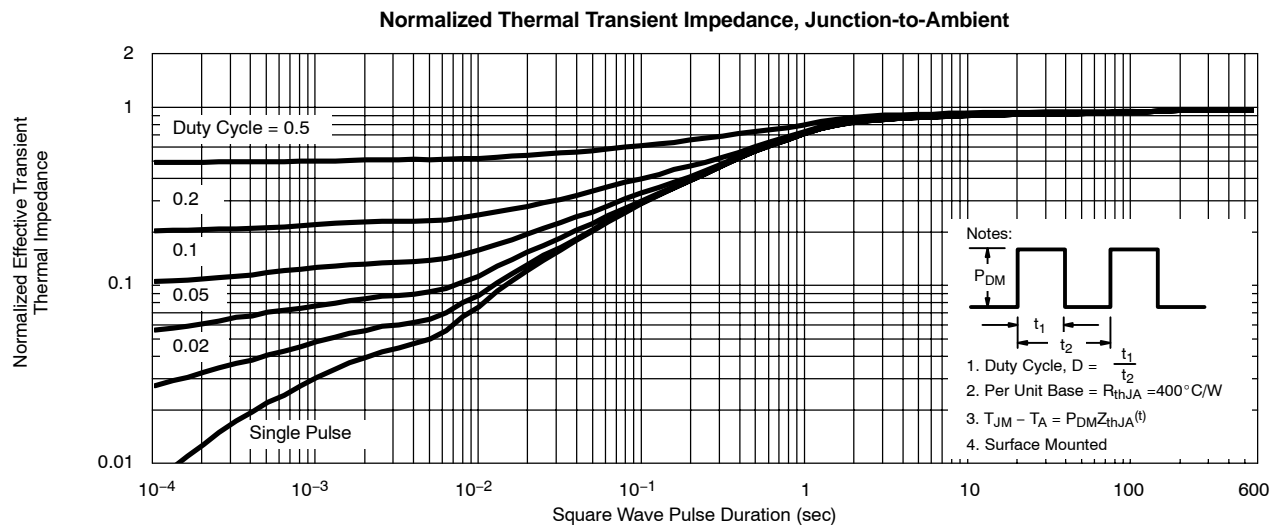
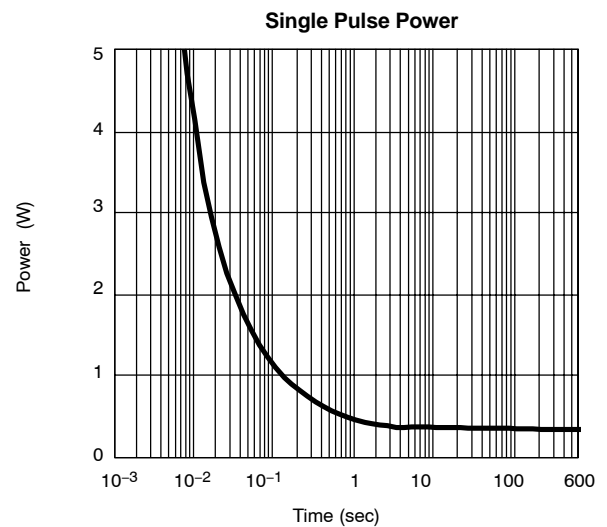
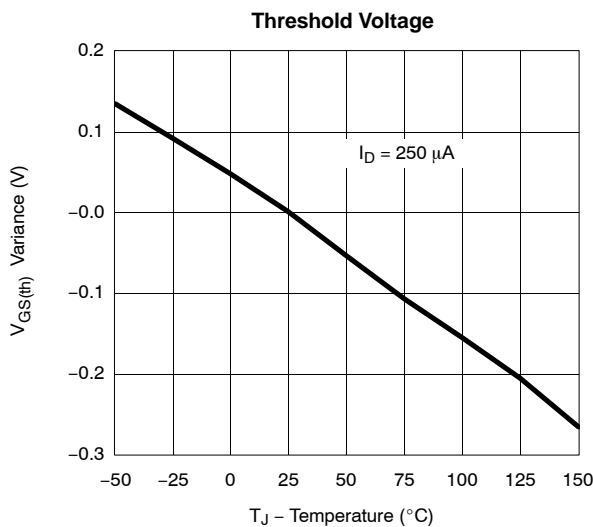
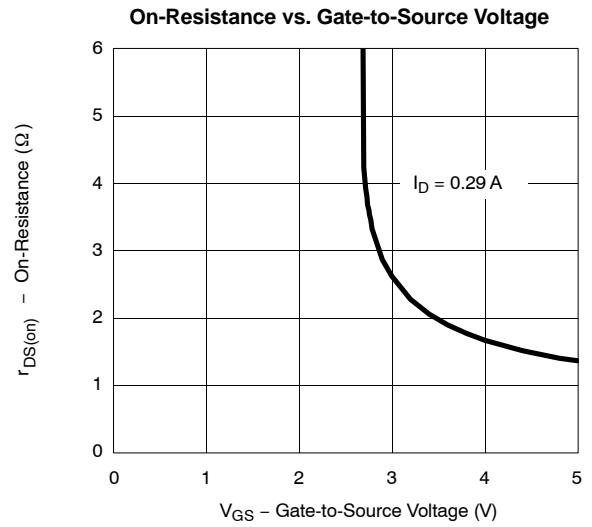
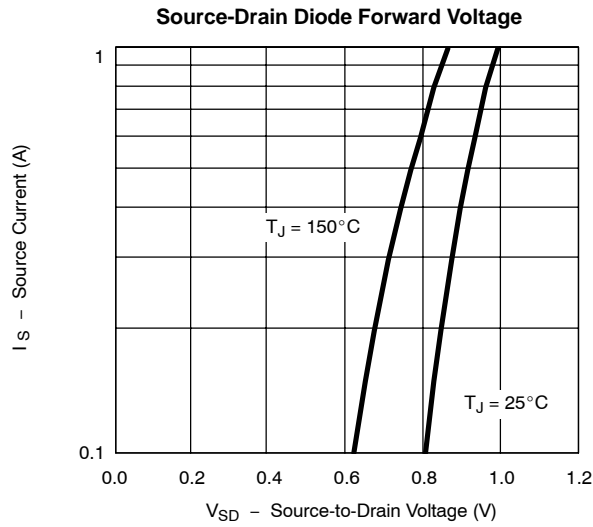
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

## N-CHANNEL



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

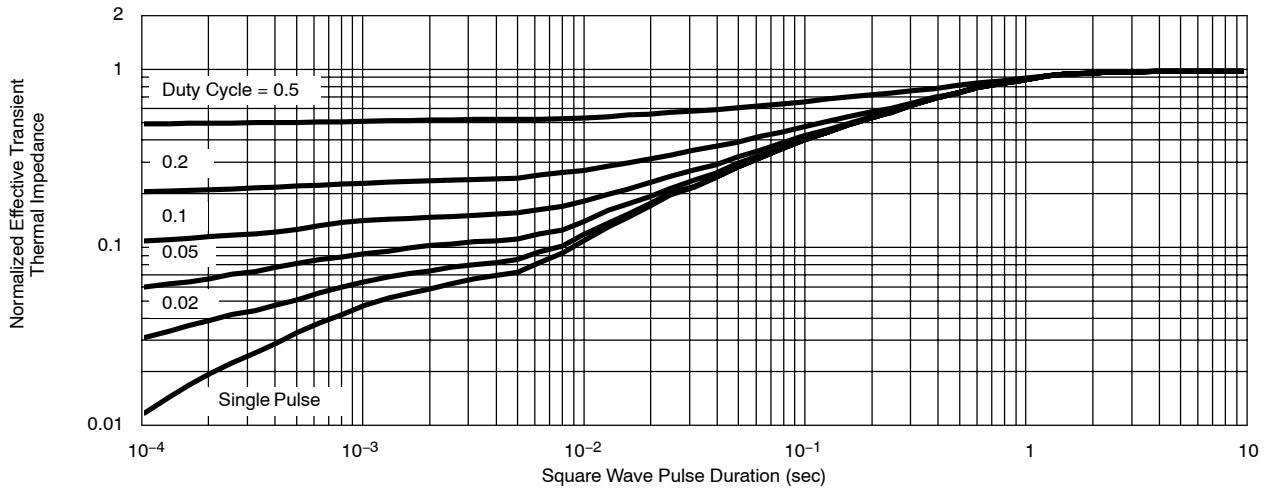




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**N-CHANNEL**

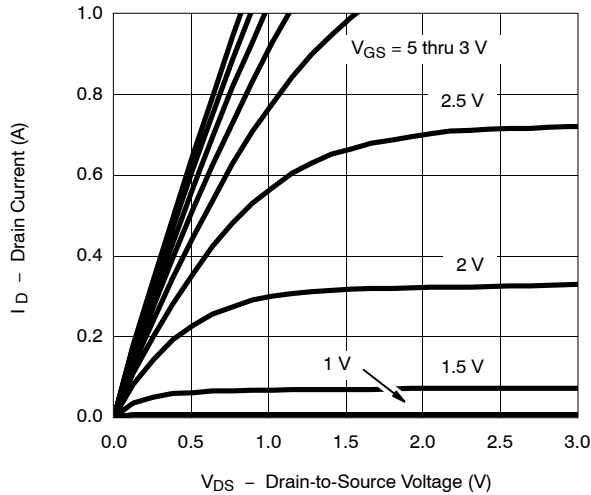
Normalized Thermal Transient Impedance, Junction-to-Foot



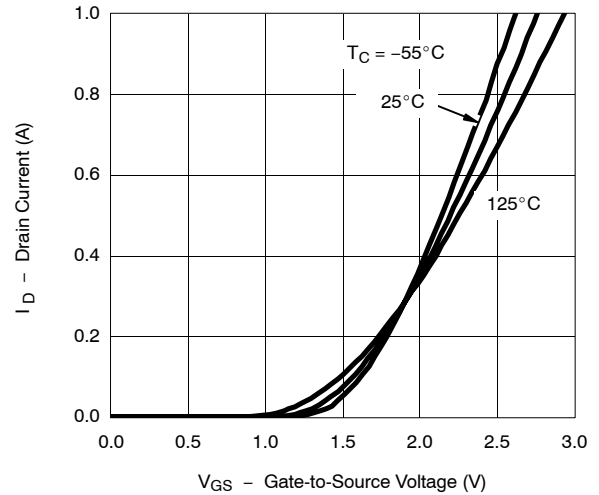
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**P-CHANNEL**

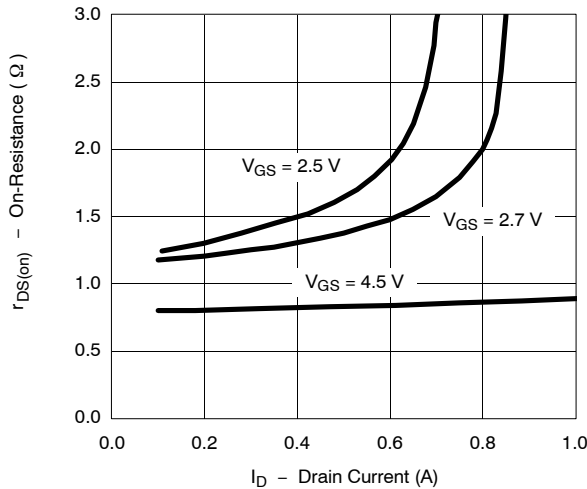
Output Characteristics



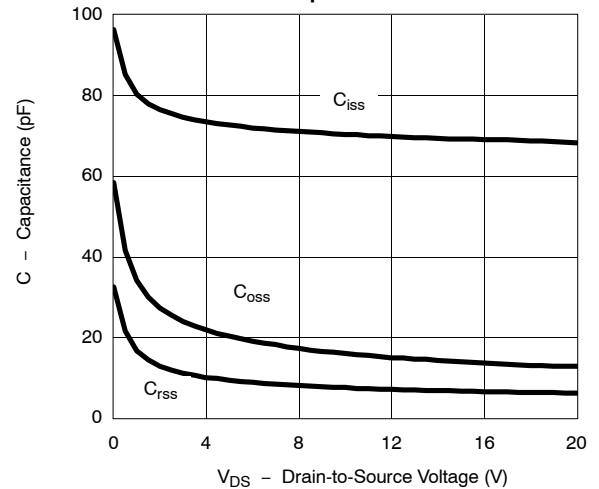
Transfer Characteristics



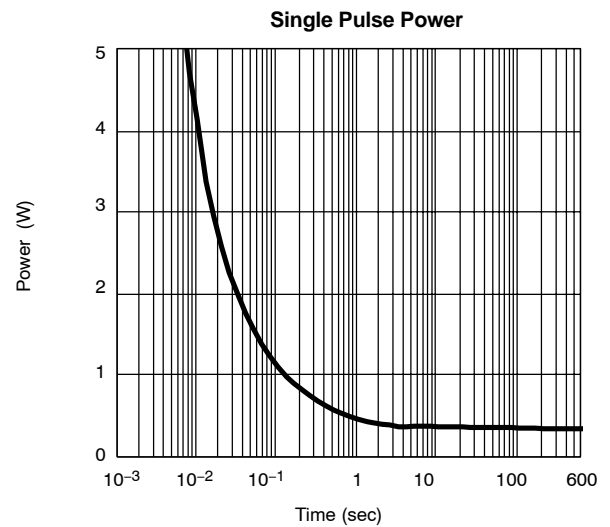
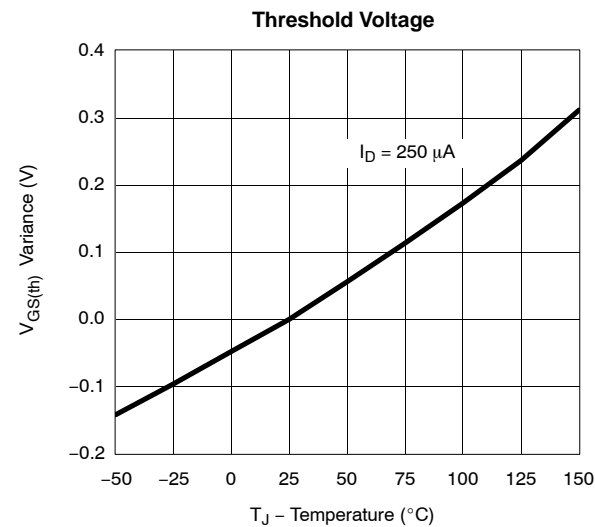
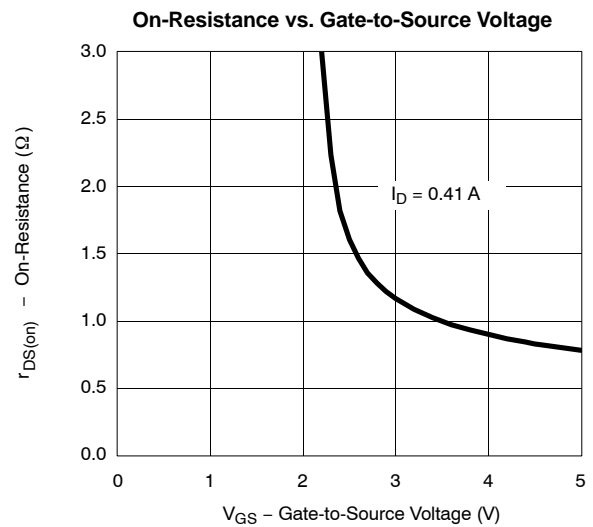
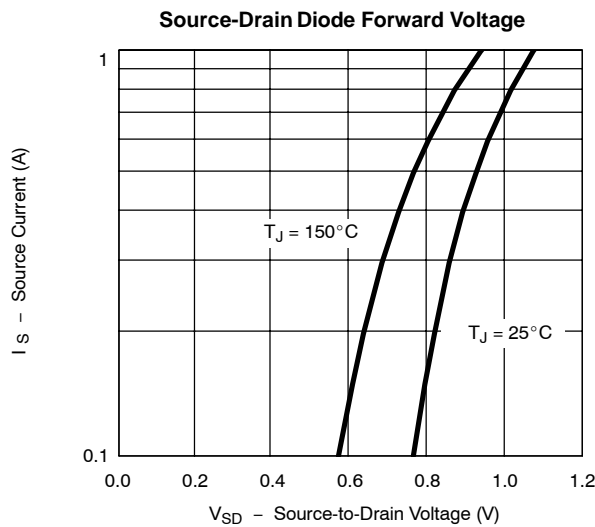
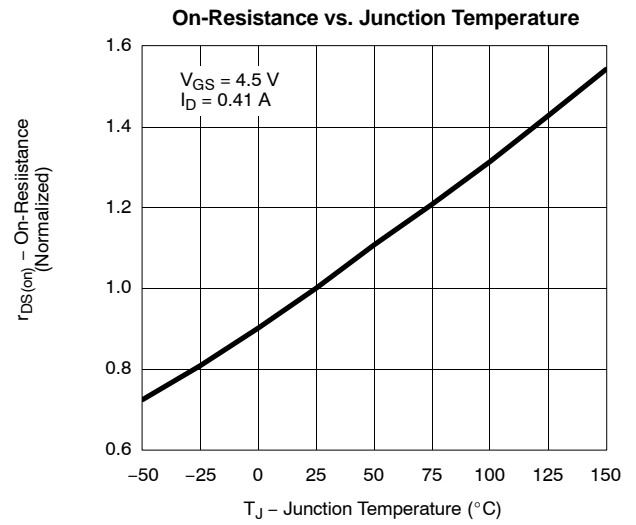
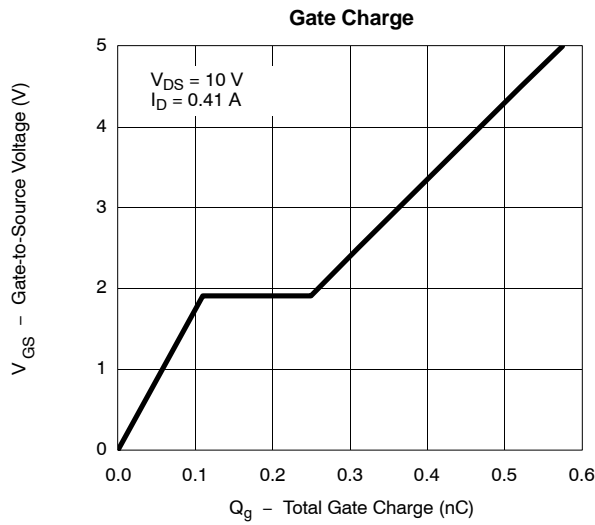
On-Resistance vs. Drain Current



Capacitance



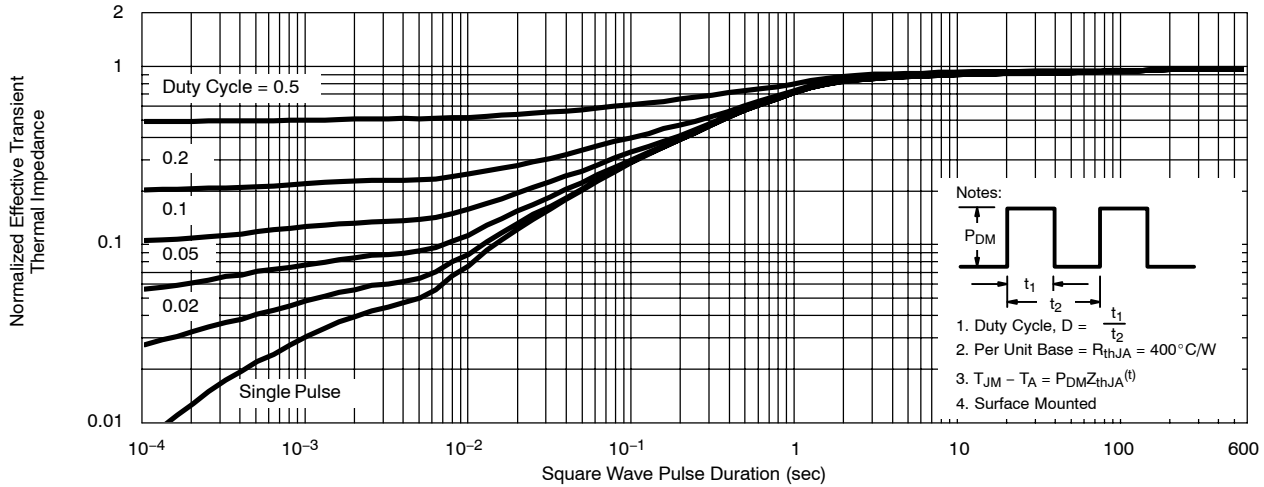
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) P-CHANNEL**



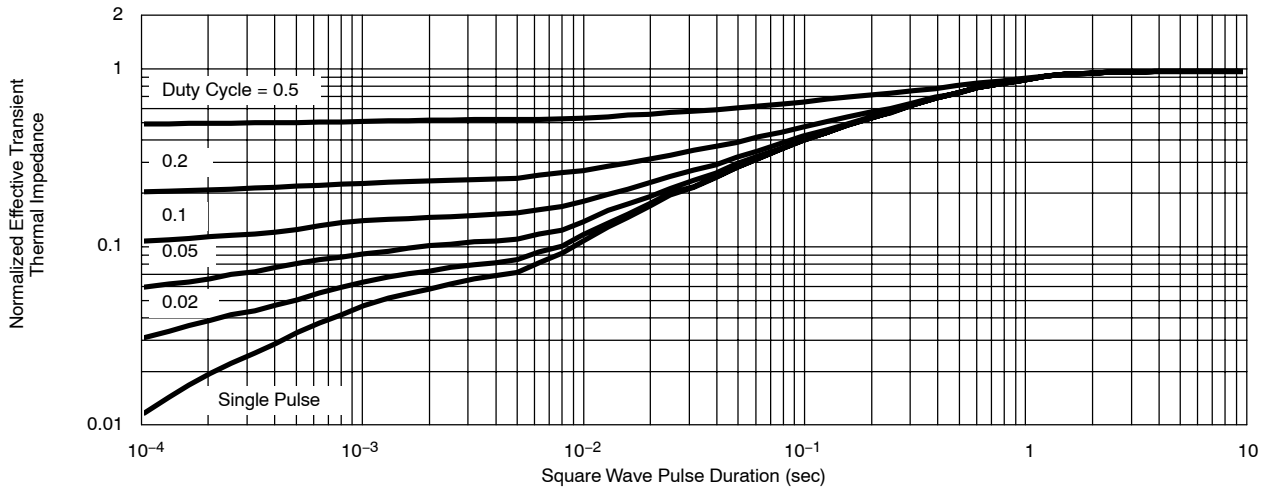
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**P-CHANNEL**

**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Foot**



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