

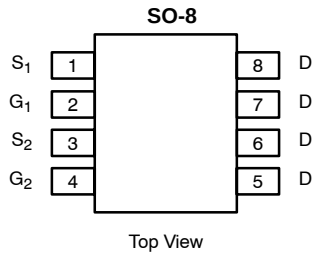


Complementary MOSFET Half-Bridge (N- and P-Channel)

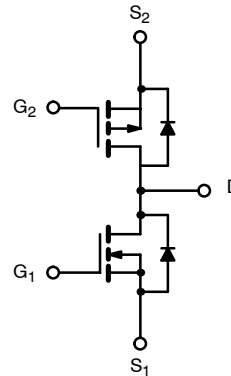
PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.020 @ $V_{GS} = 4.5$ V	9.1
		0.030 @ $V_{GS} = 2.5$ V	7.5
P-Channel	-20	0.060 @ $V_{GS} = -4.5$ V	-5.3
		0.100 @ $V_{GS} = -2.5$ V	-4.1

FEATURES

- TrenchFET® Power MOSFET



Ordering Information: Si4500BDY
Si4500BDY-T1 (with Tape and Reel)
Si4500BDY—E3 (Lead (Pb)-Free)
Si4500BDY-T1—E3 (Lead (Pb)-Free with Tape and Reel)



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

Parameter	Symbol	N-Channel		P-Channel		Unit
		10 sec.	Steady State	10 sec.	Steady State	
Drain-Source Voltage	V_{DS}	20		-20		V
Gate-Source Voltage	V_{GS}	± 12		± 12		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^{a, b}	$T_A = 25^\circ\text{C}$	9.1	6.6	-5.3	-3.8	A
	$T_A = 70^\circ\text{C}$	7.3	5.3	-4.9	-3.1	
Pulsed Drain Current	I_{DM}	30		-20		
Continuous Source Current (Diode Conduction) ^{a, b}	I_S	2.1	1.1	-2.1	-1.1	
Maximum Power Dissipation ^{a, b}	$T_A = 25^\circ\text{C}$	2.5	1.3	2.5	1.3	W
	$T_A = 70^\circ\text{C}$	1.6	0.8	1.6	0.8	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150				$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	N-Channel		P-Channel		Unit
		Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	40	50	41	50	$^\circ\text{C/W}$
	Steady-State	75	95	75	95	
Maximum Junction-to-Foot (Drain)	Steady-State	20	22	23	26	

Notes

- a. Surface Mounted on FR4 Board.
b. $t \leq 10$ sec

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	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			±100	nA
			P-Ch			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = -16 V, V _{GS} = 0 V	P-Ch			-1	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55°C	N-Ch			5	
		V _{DS} = -16 V, V _{GS} = 0 V, T _J = 55°C	P-Ch			-5	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 4.5 V	N-Ch	30			A
		V _{DS} = -5 V, V _{GS} = -4.5 V	P-Ch	-20			
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 9.1 A	N-Ch		0.016	0.020	Ω
		V _{GS} = -4.5 V, I _D = -5.3 A	P-Ch		0.048	0.060	
		V _{GS} = 2.5 V, I _D = 3.3 A	N-Ch		0.024	0.030	
		V _{GS} = -2.5 V, I _D = -1 A	P-Ch		0.082	0.100	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 9.1 A	N-Ch		29		S
		V _{DS} = -15 V, I _D = -5.3 A	P-Ch		11		
Diode Forward Voltage ^b	V _{SD}	I _S = 2.1 A, V _{GS} = 0 V	N-Ch		0.8	1.2	V
		I _S = -2.1 A, V _{GS} = 0 V	P-Ch		-0.8	-1.2	
Dynamic ^a							
Total Gate Charge	Q _g	N-Channel V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 9.1 A P-Channel V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -5.3 A	N-Ch		11	17	nC
Gate-Source Charge	Q _{gs}		P-Ch		6.0	9	
			N-Ch		2.5		
Gate-Drain Charge	Q _{gd}		P-Ch		1.3		
			N-Ch		3.2		
			P-Ch		1.6		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω P-Channel V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _g = 6 Ω	N-Ch		35	50	ns
Rise Time	t _r		P-Ch		20	30	
			N-Ch		50	80	
Turn-Off Delay Time	t _{d(off)}		P-Ch		35	60	
			N-Ch		31	50	
Fall Time	t _f		P-Ch		55	85	
			N-Ch		15	30	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 2.1 A, di/dt = 100 A/μs	N-Ch		30	
		I _F = -2.1 A, di/dt = 100 A/μs	P-Ch		25	50	

Notes

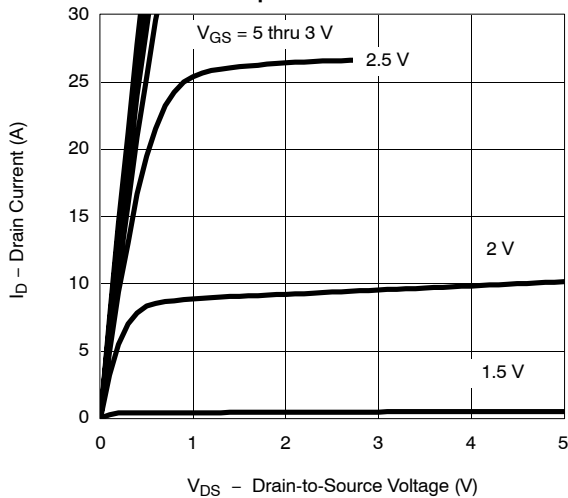
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.



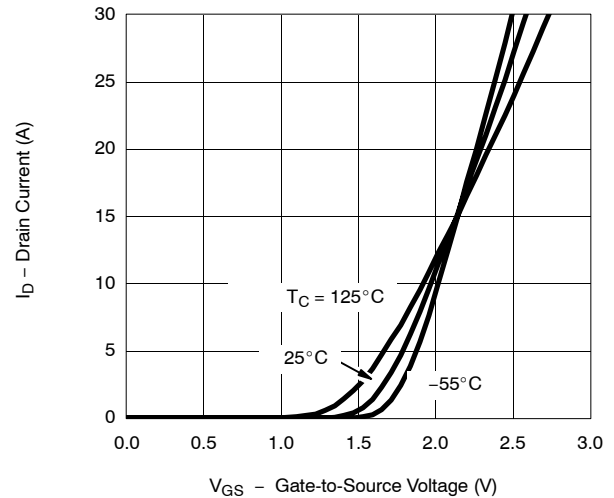
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

N-CHANNEL

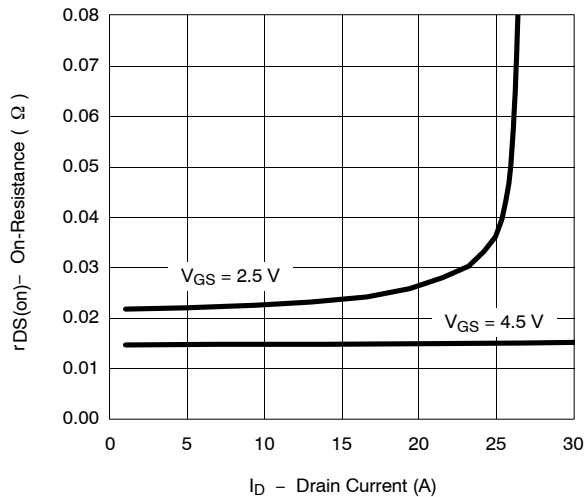
Output Characteristics



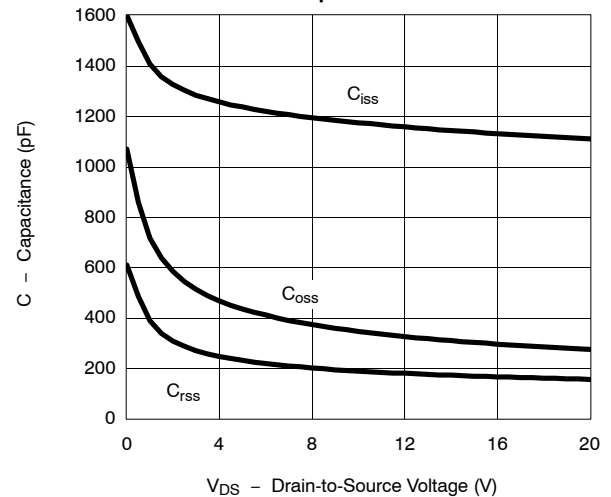
Transfer Characteristics



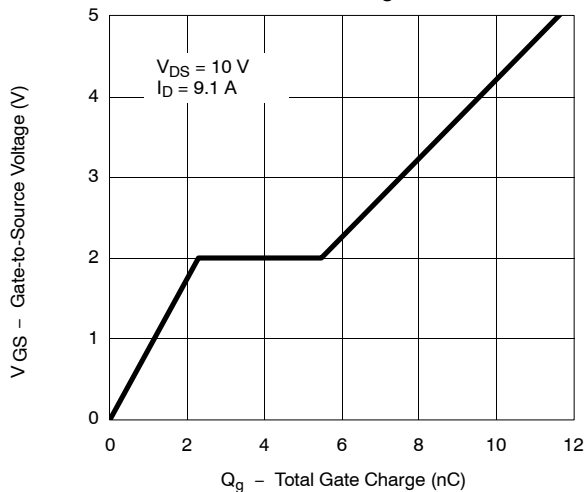
On-Resistance vs. Drain Current



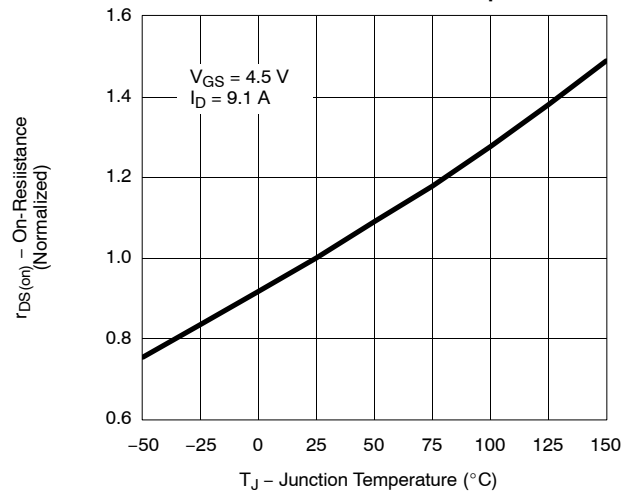
Capacitance



Gate Charge

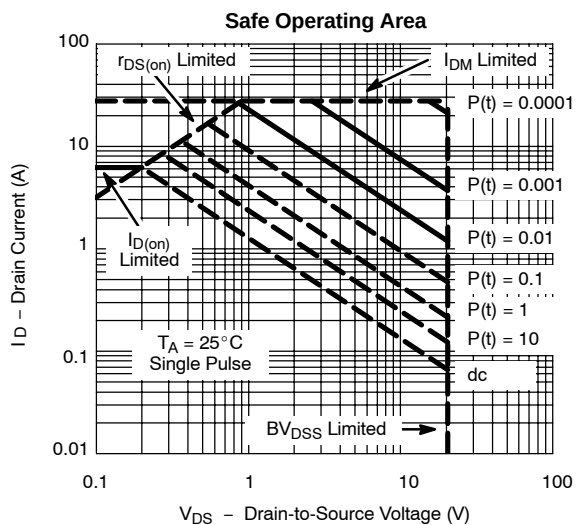
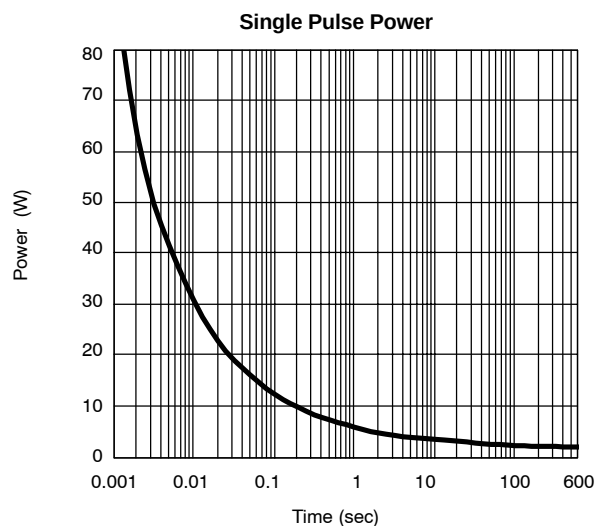
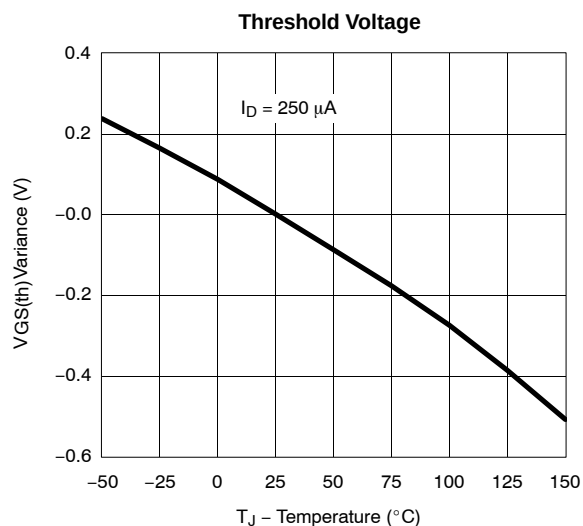
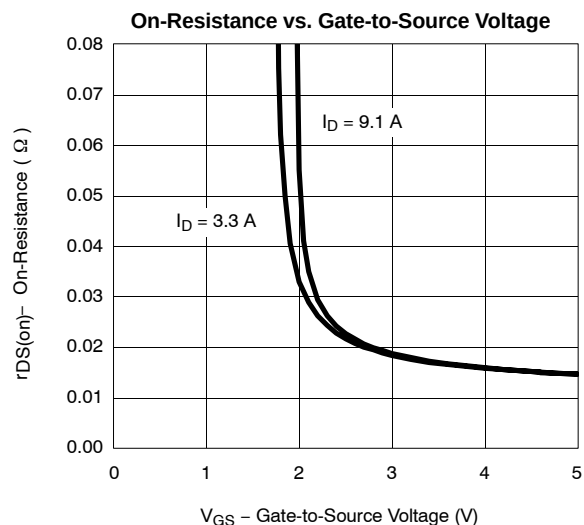
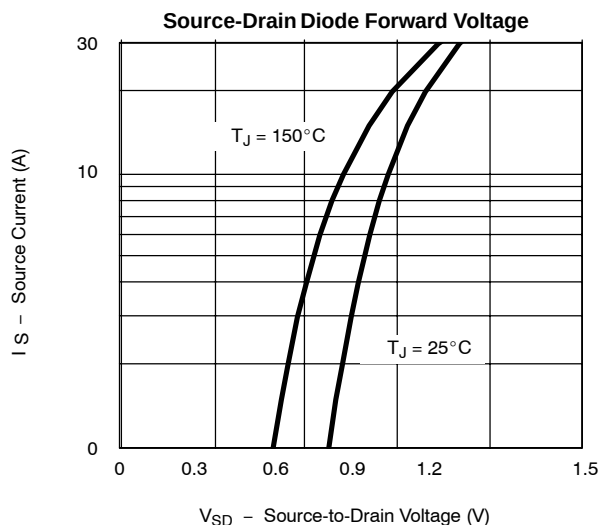


On-Resistance vs. Junction Temperature



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

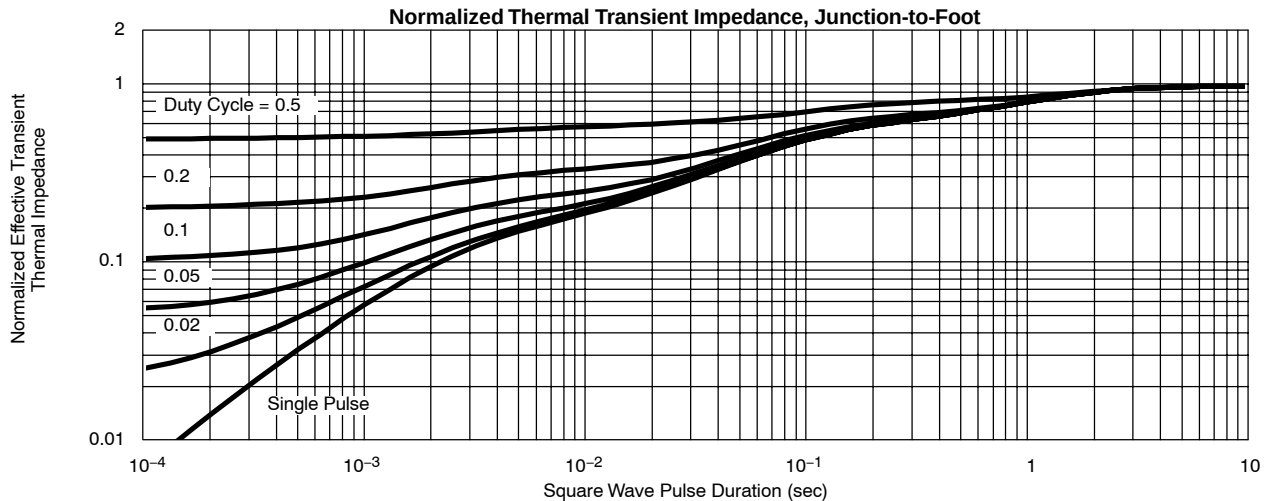
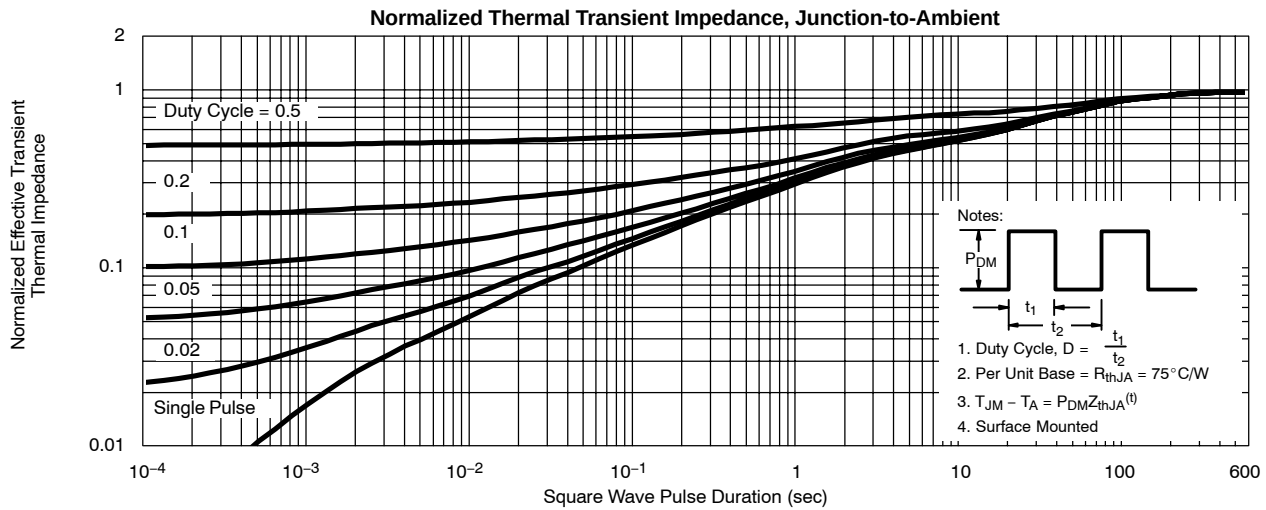
N-CHANNEL





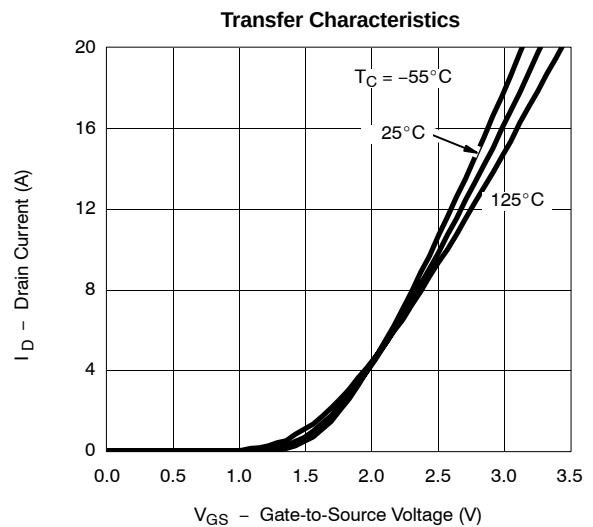
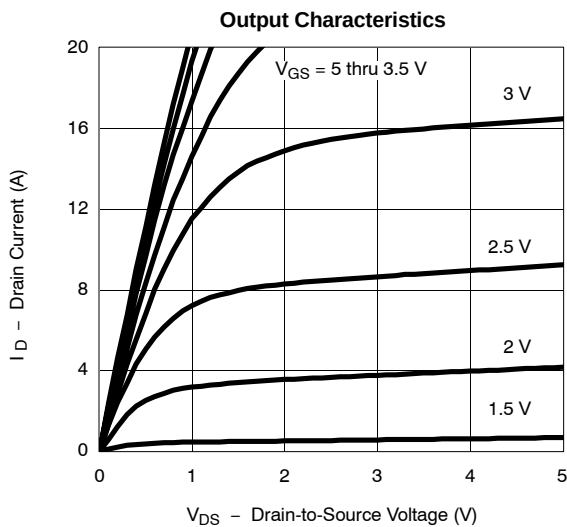
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

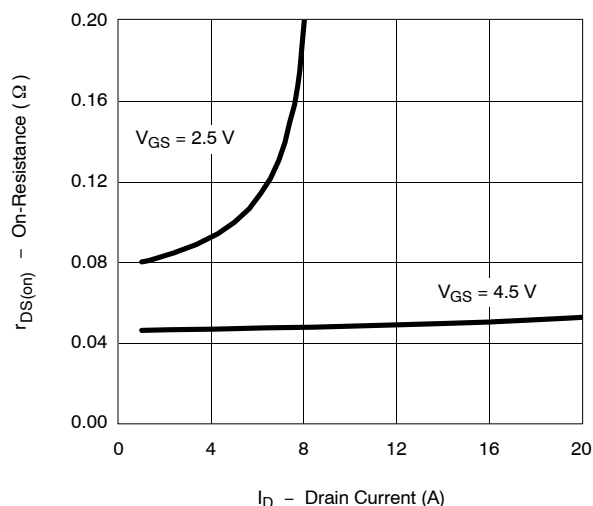
P-CHANNEL



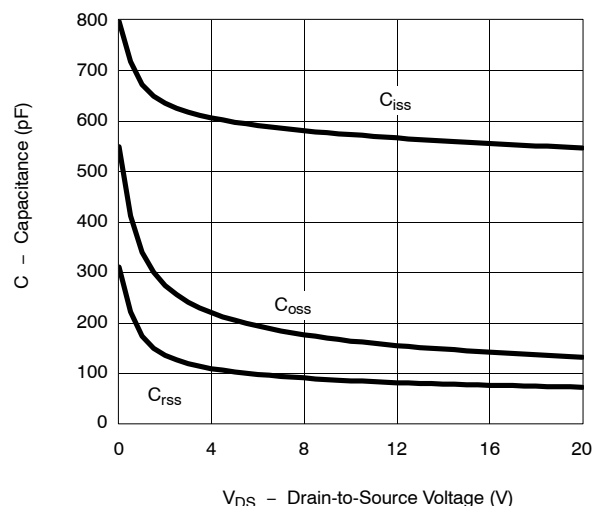
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

P-CHANNEL

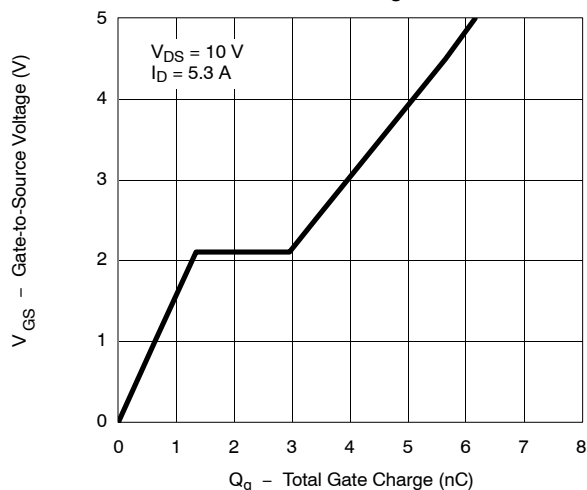
On-Resistance vs. Drain Current



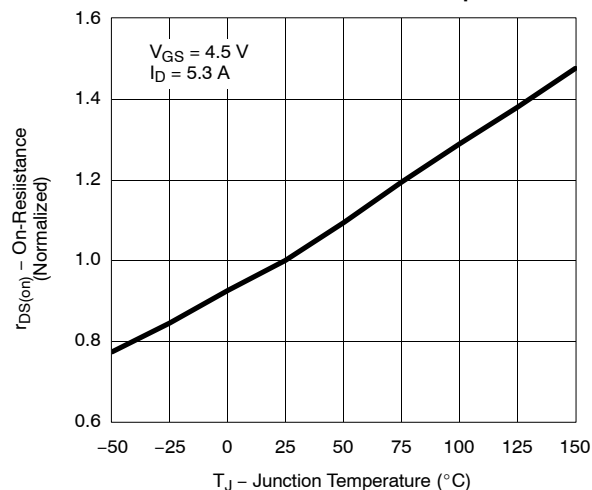
Capacitance



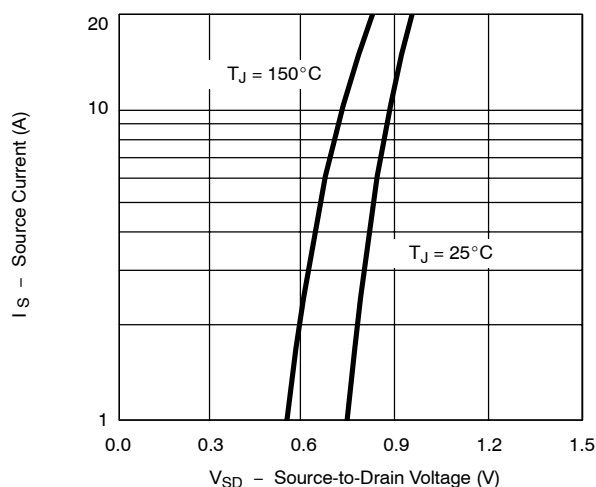
Gate Charge



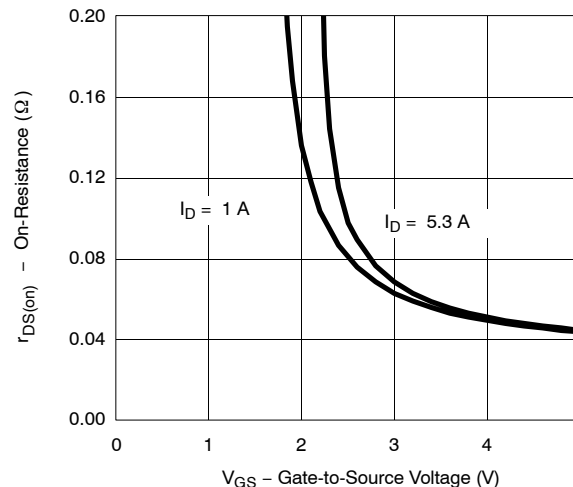
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



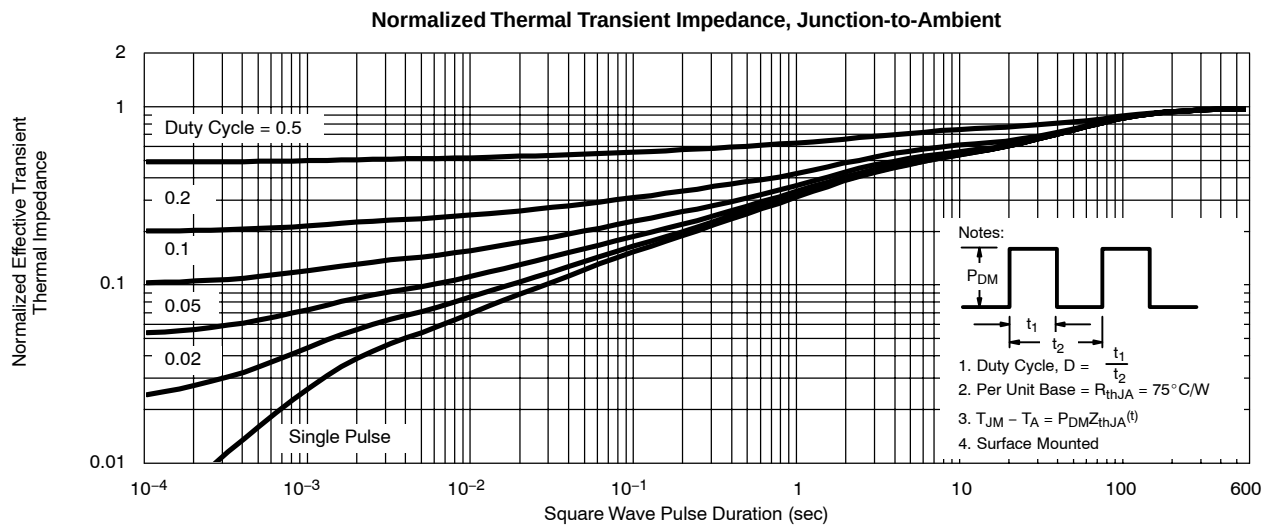
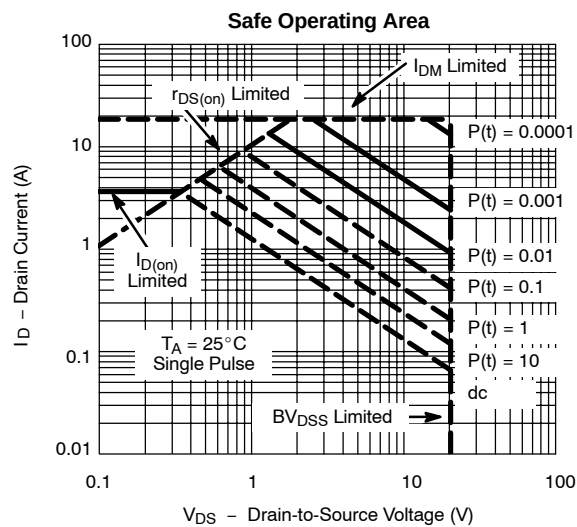
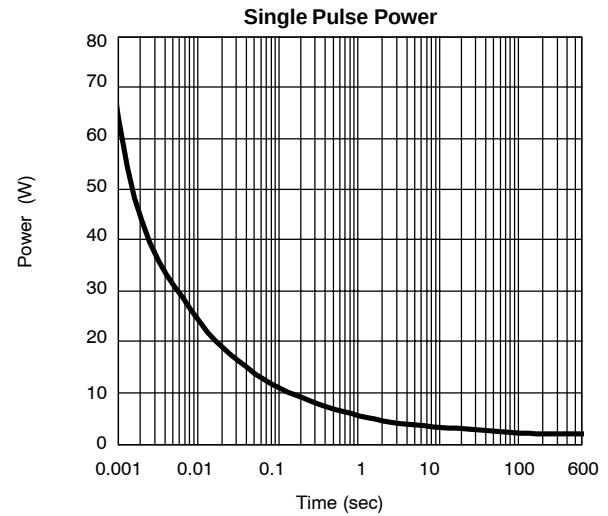
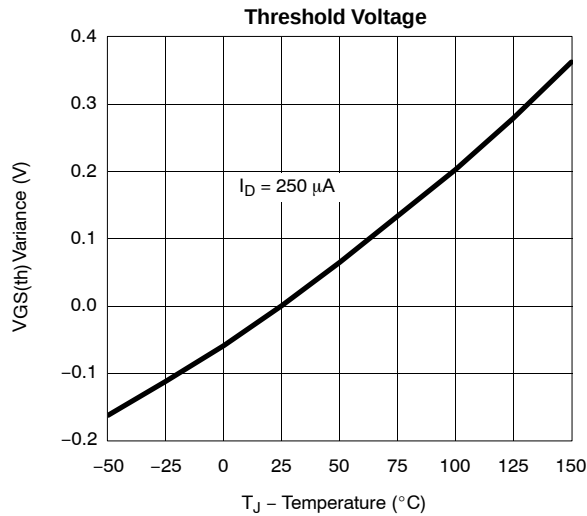
On-Resistance vs. Gate-to-Source Voltage





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

P-CHANNEL



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