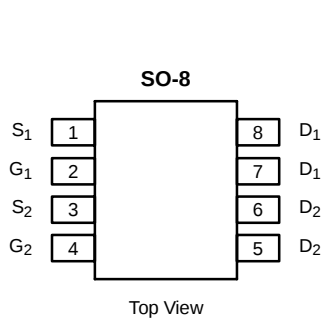




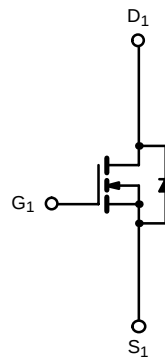
N- and P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	30	0.036 @ $V_{GS} = 10$ V	5.9
		0.053 @ $V_{GS} = 4.5$ V	4.9
P-Channel	-30	0.053 @ $V_{GS} = -10$ V	-4.9
		0.090 @ $V_{GS} = -4.5$ V	-3.7

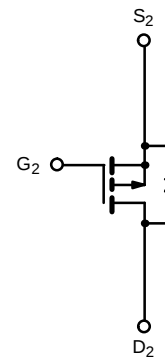
TrenchFET®
Power MOSFETs



Ordering Information:
Si4539ADY
Si4539ADY-T1 (with Tape and Reel)



N-Channel MOSFET



P-Channel MOSFET

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

Parameter		Symbol	N-Channel		P-Channel		Unit
			10 secs	Steady State	10 secs	Steady State	
Drain-Source Voltage		V _{DS}	30		-30		V
Gate-Source Voltage		V _{GS}	± 20		± 20		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	5.9	4.4	-4.9	-3.7	A
	T _A = 70°C		4.7	3.6	-3.9	-2.9	
Pulsed Drain Current		I _{DM}	30				
Continuous Source Current (Diode Conduction) ^a		I _S	1.7	0.9	-1.7	-0.9	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2.0	1.1	2	1.1	W
	T _A = 70°C		1.3	0.7	1.3	0.7	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150				°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	N-Channel		P-Channel		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	50	62.5	52	62.5	$^\circ\text{C/W}$
	Steady State		90	110	90	110	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	32	40	32	40	

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	1.0			V
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-1.0			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V	N-Ch			±100	nA
		V _{DS} = 0 V, V _{GS} = ±20 V	P-Ch			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = -24 V, V _{GS} = 0 V	P-Ch			-1	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			5	
		V _{DS} = -24 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	N-Ch	30			A
		V _{DS} ≤ -5 V, V _{GS} = -10 V	P-Ch	-30			
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 5.9 A	N-Ch		0.032	0.036	Ω
		V _{GS} = -10 V, I _D = -4.9 A	P-Ch		0.043	0.053	
		V _{GS} = 4.5 V, I _D = 4.9 A	N-Ch		0.042	0.053	
		V _{GS} = -4.5 V, I _D = -3.7 A	P-Ch		0.075	0.090	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 5.9 A	N-Ch		15		S
		V _{DS} = -15 V, I _D = -4.9 A	P-Ch		9		
Diode Forward Voltage ^a	V _{SD}	I _S = 1.7 A, V _{GS} = 0 V	N-Ch		0.80	1.2	V
		I _S = -1.7 A, V _{GS} = 0 V	P-Ch		-0.80	-1.2	
Dynamic ^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 5.9 A P-Channel V _{DS} = -15 V, V _{GS} = -10 V, I _D = -4.9 A	N-Ch		13	20	nC
			P-Ch		15	25	
Gate-Source Charge	Q _{gs}		N-Ch		2.3		
			P-Ch		4		
Gate-Drain Charge	Q _{gd}		N-Ch		2		
			P-Ch		2.0		
Gate Resistance	R _g		N-Ch	0.5		2.2	Ω
			P-Ch	5		12.6	
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω P-Channel V _{DD} = -15 V, R _L = 15 Ω I _D ≅ -1 A, V _{GEN} = -10 V, R _G = 6 Ω	N-Ch		6	12	ns
			P-Ch		7	15	
Rise Time	t _r		N-Ch		14	25	
			P-Ch		10	20	
Turn-Off Delay Time	t _{d(off)}		N-Ch		30	60	
			P-Ch		40	80	
Fall Time	t _f		N-Ch		5	10	
			P-Ch		20	40	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.7 A, di/dt = 100 A/μs	N-Ch		30	60	
		I _F = -1.7 A, di/dt = 100 A/μs	P-Ch		30	60	

Notes

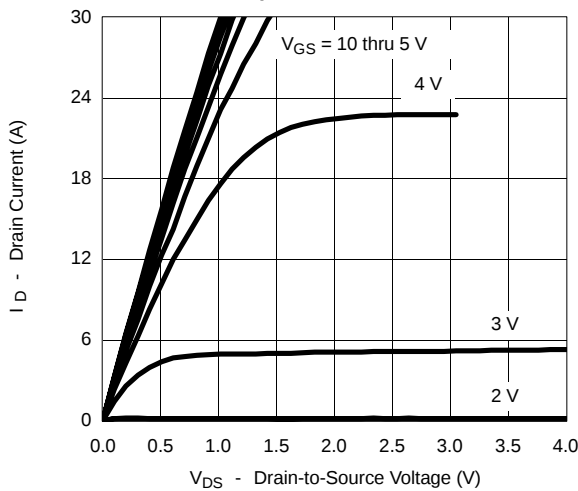
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
 b. Guaranteed by design, not subject to production testing.



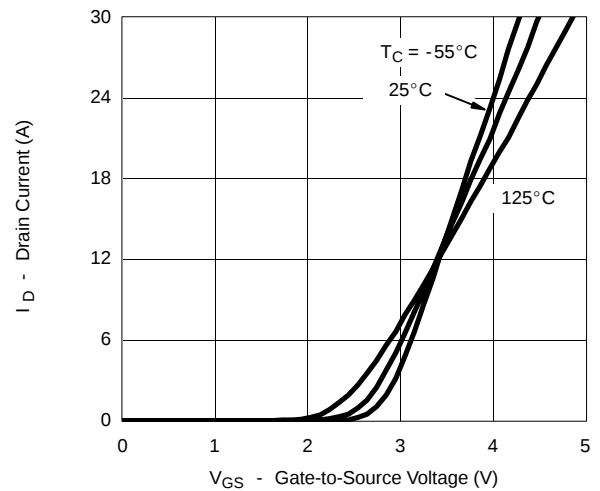
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

NCHANNEL

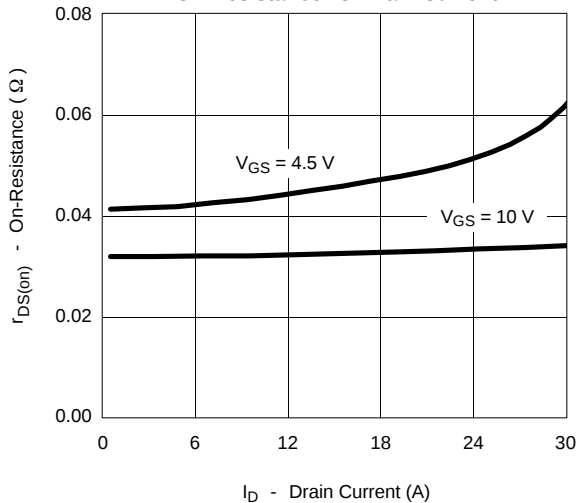
Output Characteristics



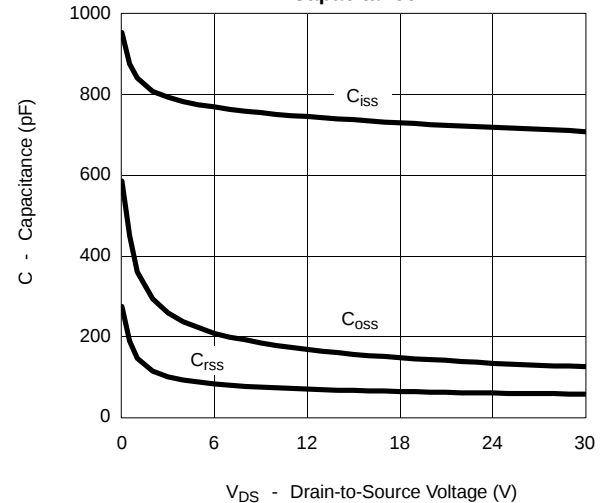
Transfer Characteristics



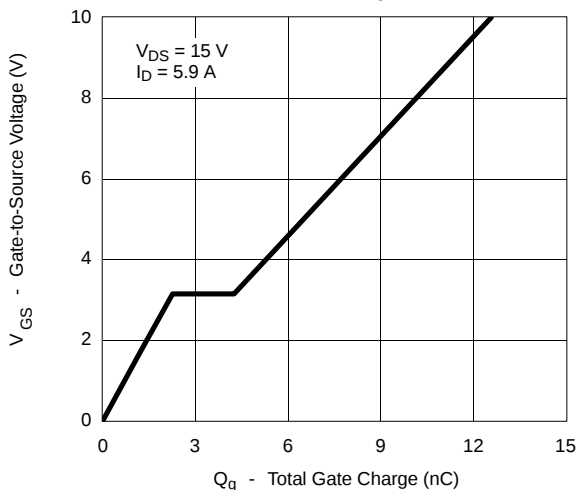
On-Resistance vs. Drain Current



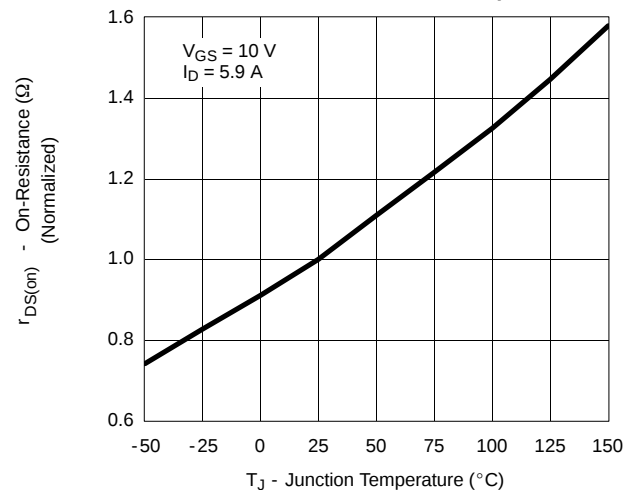
Capacitance



Gate Charge



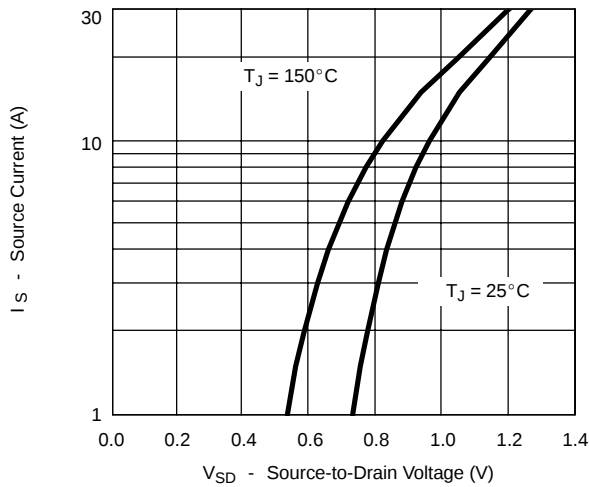
On-Resistance vs. Junction Temperature



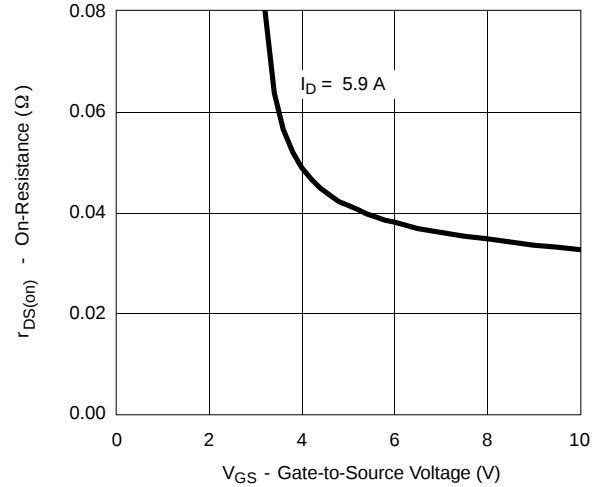
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

NCHANNEL

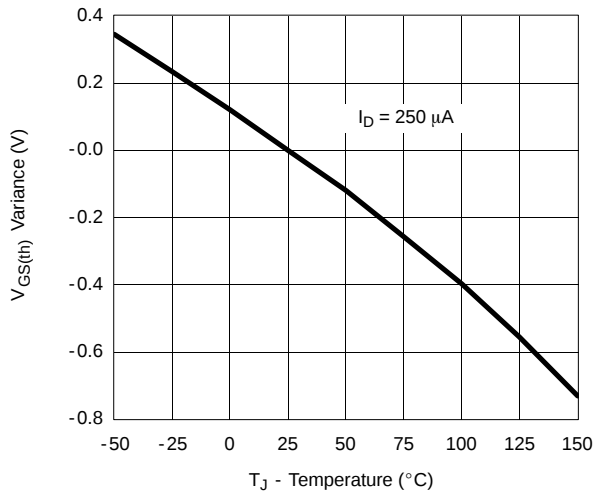
Source-Drain Diode Forward Voltage



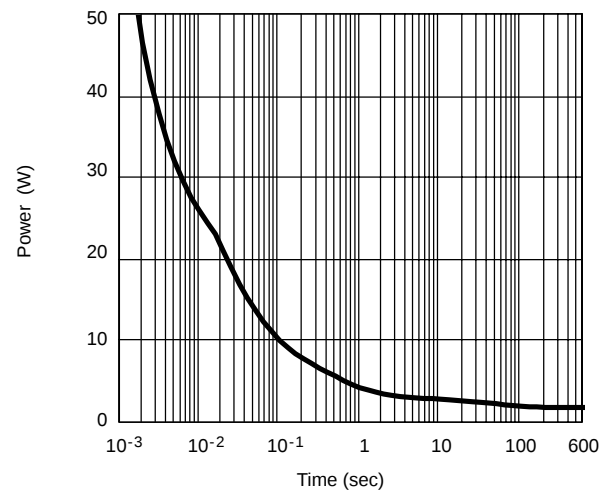
On-Resistance vs. Gate-to-Source Voltage



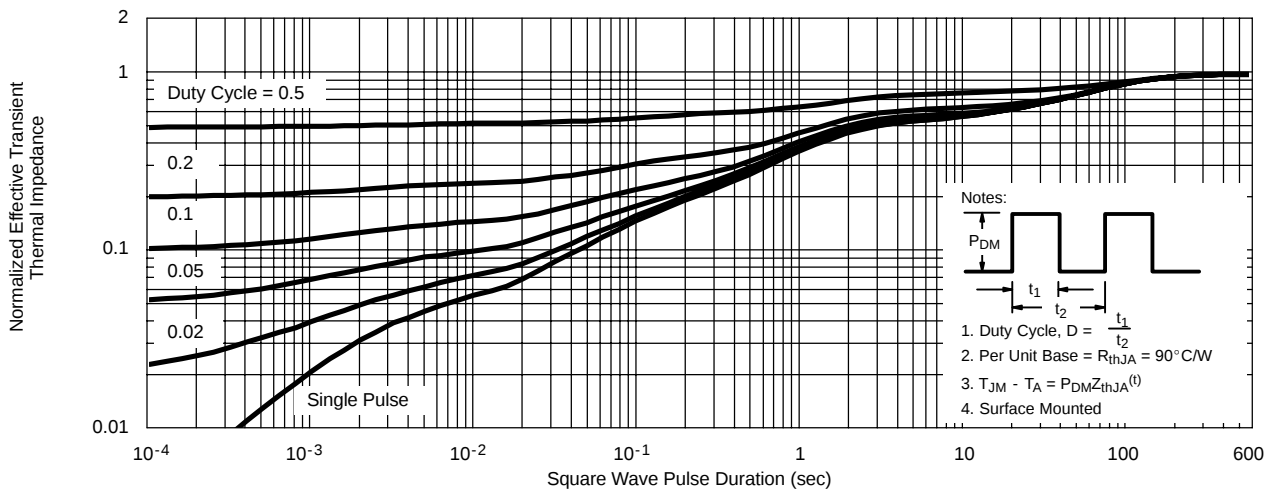
Threshold Voltage



Single Pulse Power



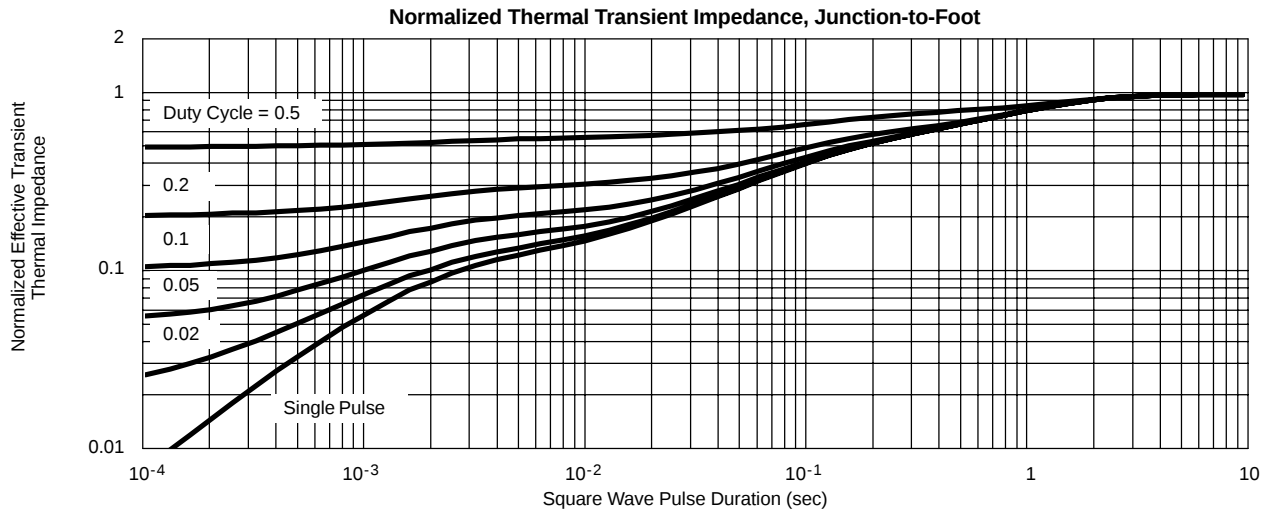
Normalized Thermal Transient Impedance, Junction-to-Ambient





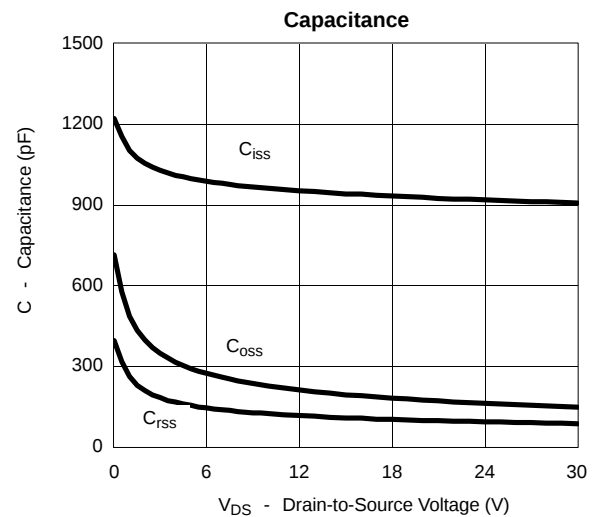
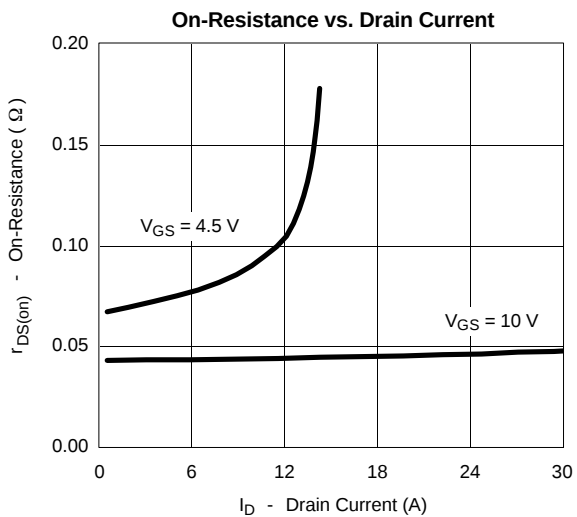
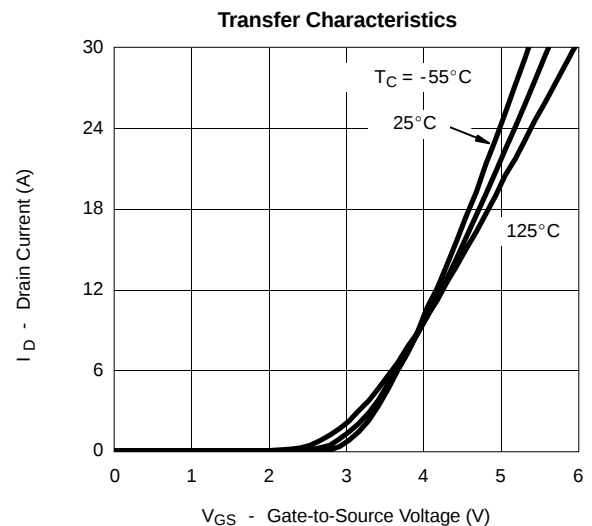
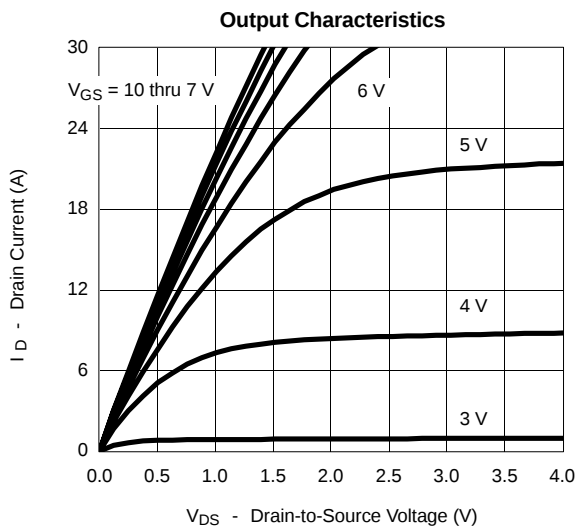
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

NCHANNEL



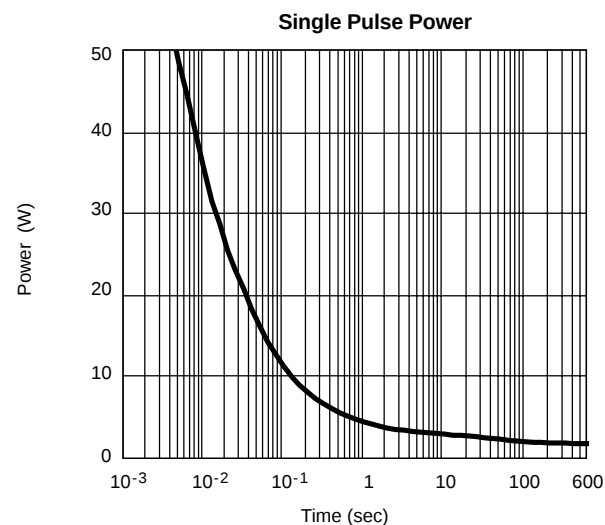
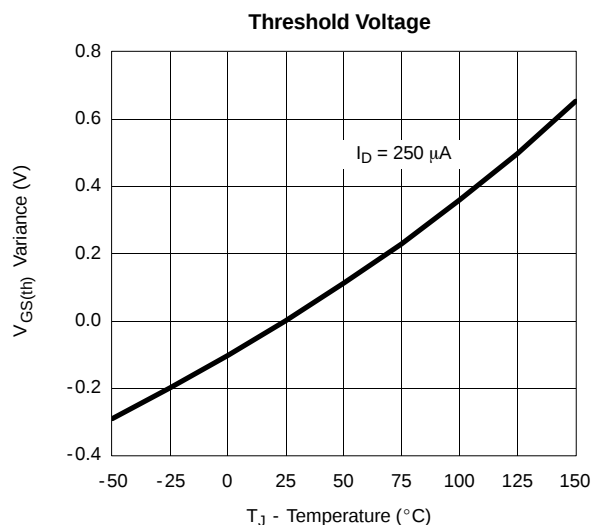
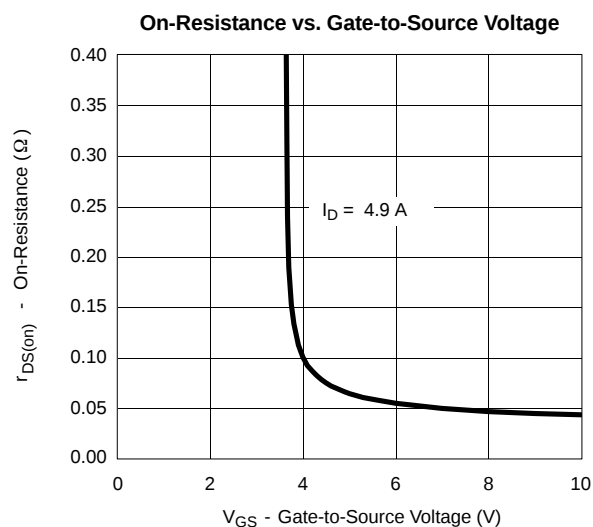
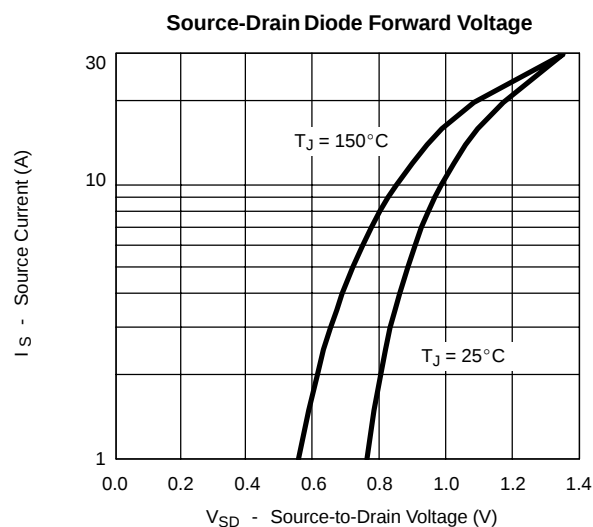
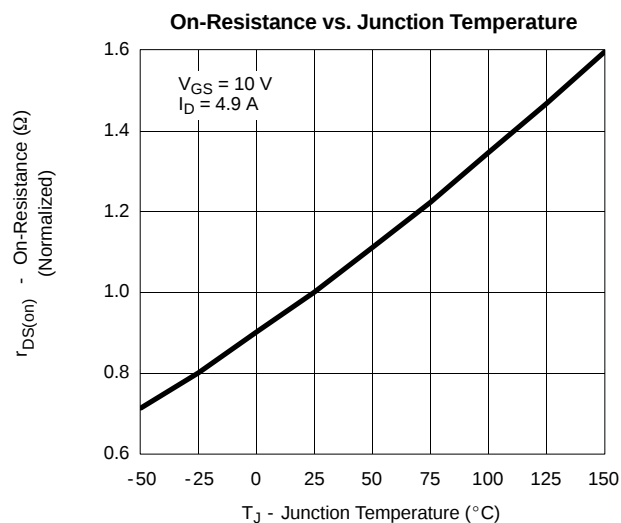
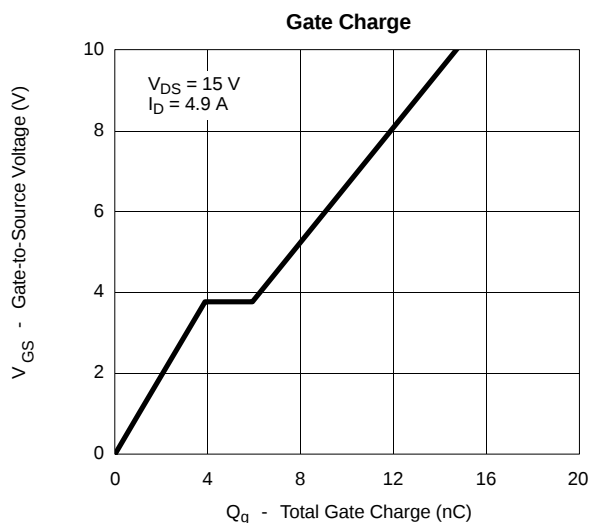
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

PCHANNEL



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

PCHANNEL

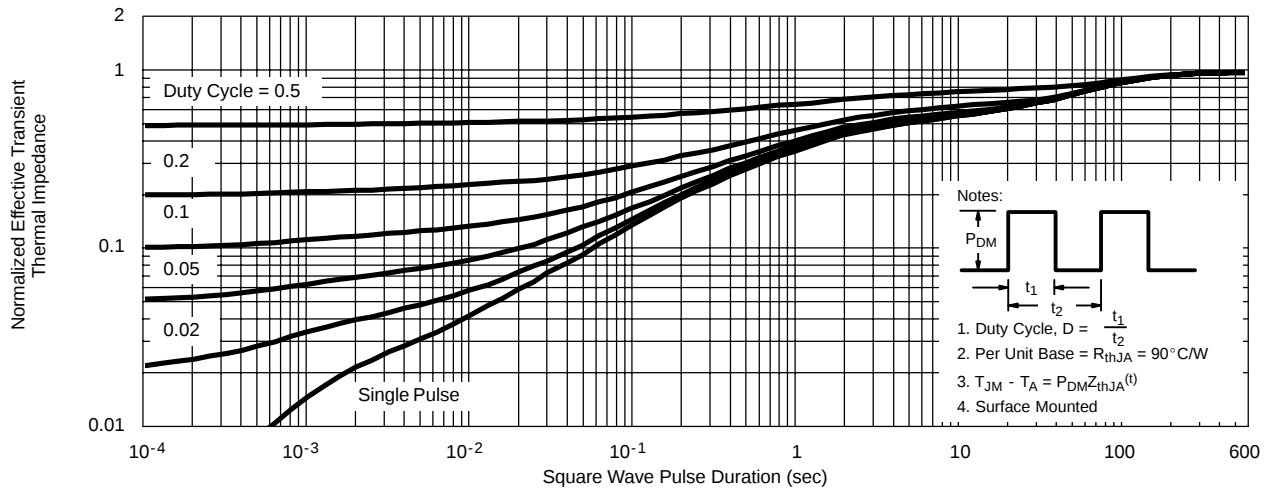




TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

PCHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

