

N- and P-Channel 20-V (D-S) MOSFET

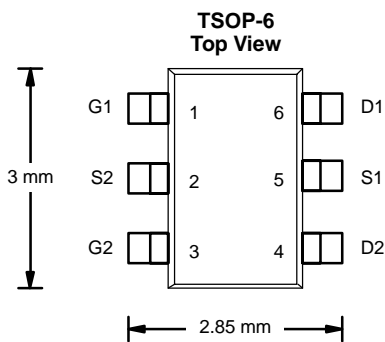
PRODUCT SUMMARY			
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
N-Channel	20	0.060 @ V _{GS} = 4.5 V	3.4
		0.070 @ V _{GS} = 2.5 V	3.2
		0.100 @ V _{GS} = 1.8 V	2.5
P-Channel	-20	0.110 @ V _{GS} = -4.5 V	-2.5
		0.145 @ V _{GS} = -2.5 V	-2.0
		0.220 @ V _{GS} = -1.8 V	-1.0

FEATURES

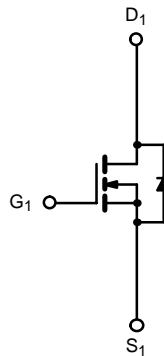
- TrenchFET® Power MOSFETS
- Fast Switching In Small Footprint
- Very Low r_{DS(on)} for Increased Efficiency

APPLICATIONS

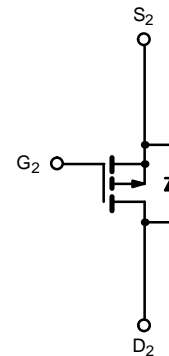
- Load Switch for Portable Devices



Ordering Information: Si3586DV-T1



N-Channel MOSFET



P-Channel MOSFET

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}	±8					
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	3.4	2.9	-2.5	-2.1	A
		T _A = 70 °C	2.7	2.3	-2.0	-1.7	
Pulsed Drain Current	I _{DM}	±8					
Continuous Source Current (Diode Conduction) ^a	I _S	1.05	0.75	-1.05	-0.75		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	1.15	0.83	1.15	0.83	W
		T _A = 70 °C	0.73	0.53	0.73	0.53	
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 ≤ 5 sec	R _{thJA}	93	110	°C/W
	Steady State		130	150	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	90	90	

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	0.40		1.1	V
		V _{DS} = V _{GS} , I _D = -250 μA	P-Ch	-0.40		-1.1	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V	N-Ch			±100	nA
		V _{DS} = 0 V, V _{GS} = ±8 V	P-Ch			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 16 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = -16 V, V _{GS} = 0 V	P-Ch			-1	
		V _{DS} = 16 V, V _{GS} = 0 V, T _J = 85 °C	N-Ch			10	
		V _{DS} = -16 V, V _{GS} = 0 V, T _J = 85 °C	P-Ch			-10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	N-Ch	5			A
		V _{DS} ≤ -5 V, V _{GS} = -4.5 V	P-Ch	-5			
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 3.4 A	N-Ch		0.047	0.060	Ω
		V _{GS} = -4.5 V, I _D = -2.5 A	P-Ch		0.086	0.110	
		V _{GS} = 2.5 V, I _D = 3.2 A	N-Ch		0.054	0.070	
		V _{GS} = -2.5 V, I _D = -2.0 A	P-Ch		0.116	0.145	
		V _{GS} = -1.8 V, I _D = -2.5 A	N-Ch		0.075	0.100	
		V _{GS} = -1.8 V, I _D = -1.0 A	P-Ch		0.170	0.220	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 3.4 A	N-Ch		13		S
		V _{DS} = -5 V, I _D = -2.5 A	P-Ch		6		
Diode Forward Voltage ^a	V _{SD}	I _S = 1.05 A, V _{GS} = 0 V	N-Ch		0.8	1.1	V
		I _S = -1.05 A, V _{GS} = 0 V	P-Ch		-0.8	-1.1	
Dynamic^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 3.4 A P-Channel V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -2.5 A	N-Ch		4.1	6.0	nC
Gate-Source Charge	Q _{gs}		N-Ch		0.65		
			P-Ch		0.68		
Gate-Drain Charge	Q _{gd}		N-Ch		0.8		
			P-Ch		1.3		
Gate Resistance	R _g		N-Ch		2.6		
		P-Ch		9.8			
Turn-On Delay Time	t _{d(on)}	N-channel V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 4.5 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		30	45	ns
Rise Time	t _r		N-Ch		52	85	
			P-Ch		55	85	
Turn-Off Delay Time	t _{d(off)}		N-Ch		25	40	
			P-Ch		55	85	
Fall Time	t _f		N-Ch		20	30	
			P-Ch		32	50	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 1.05 A, di/dt = 100 A/μs	N-Ch		25	
		I _F = -1.05 A, di/dt = 100 A/μs	P-Ch		25	40	

Notes

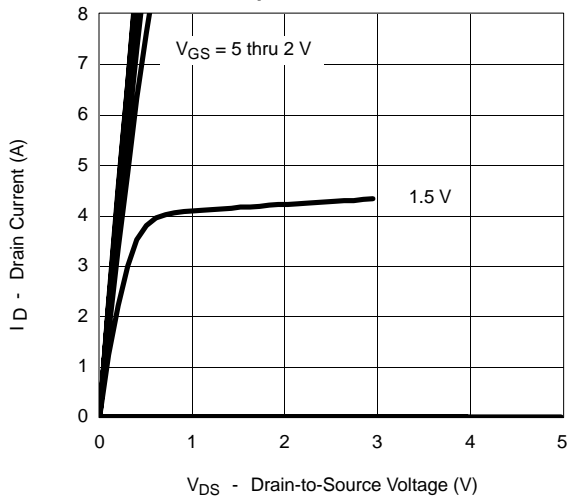
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
 b. Guaranteed by design, not subject to production testing.



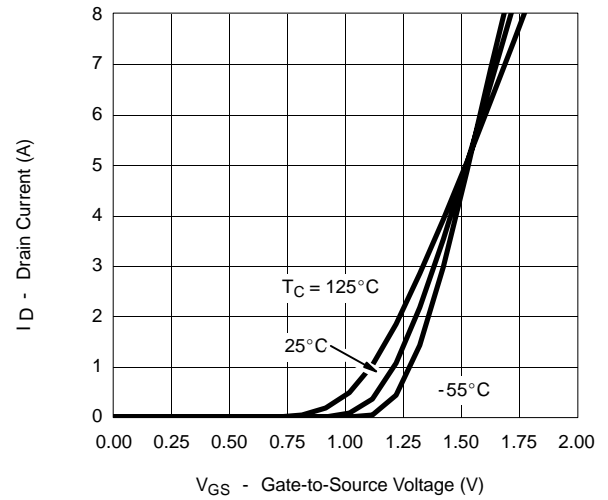
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

NCHANNEL

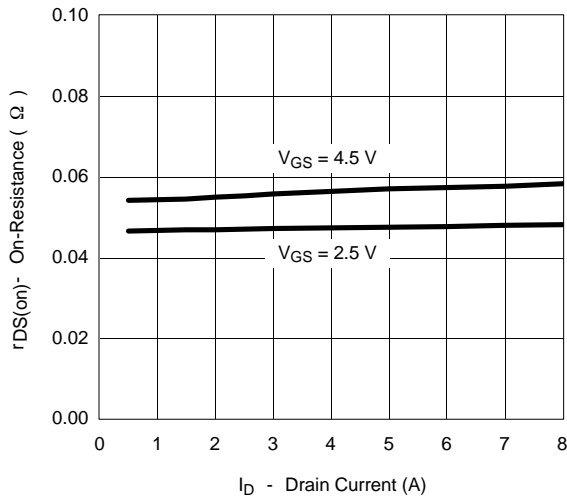
Output Characteristics



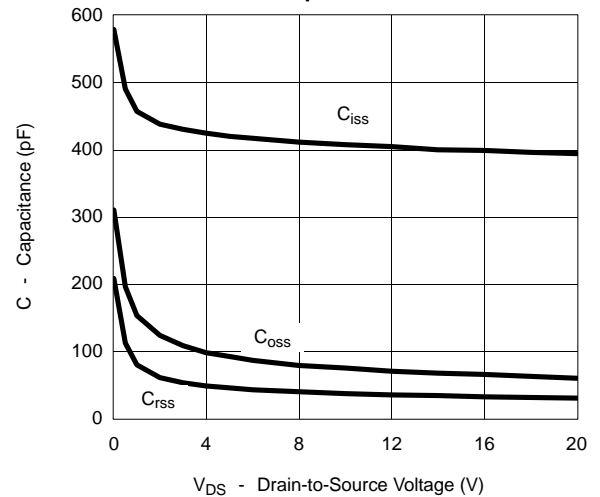
Transfer Characteristics



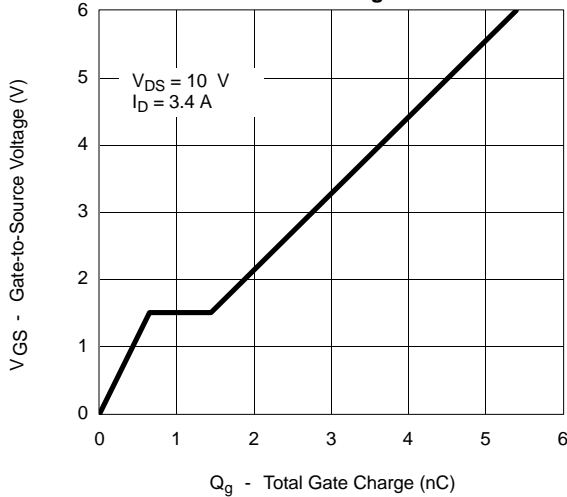
On-Resistance vs. Drain Current



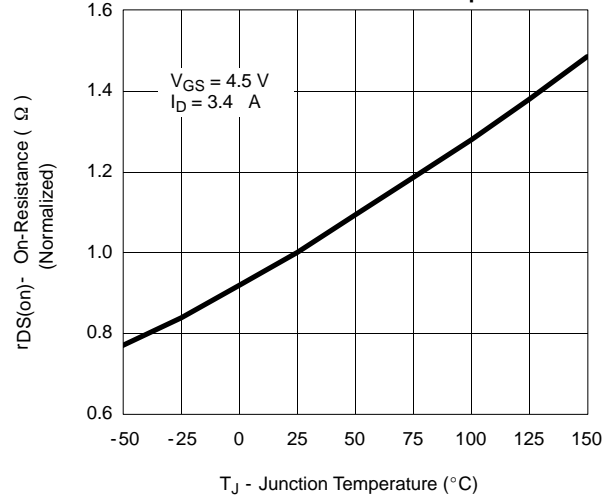
Capacitance



Gate Charge



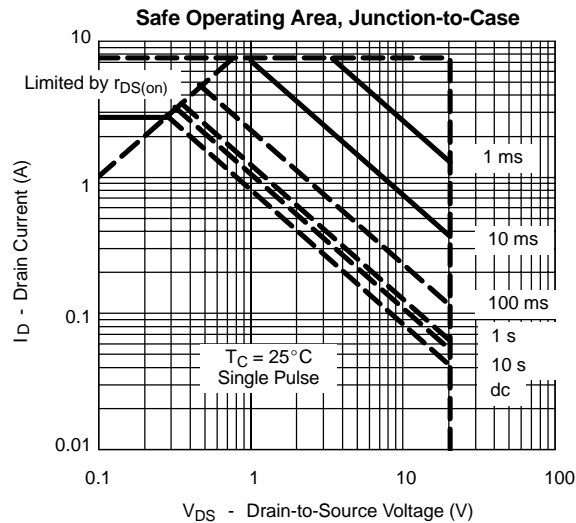
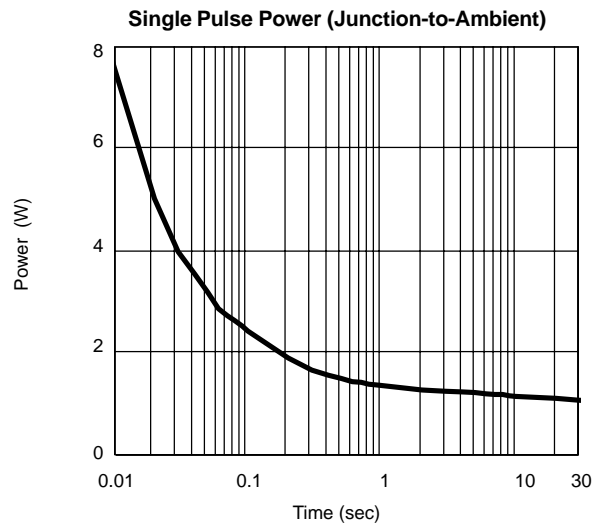
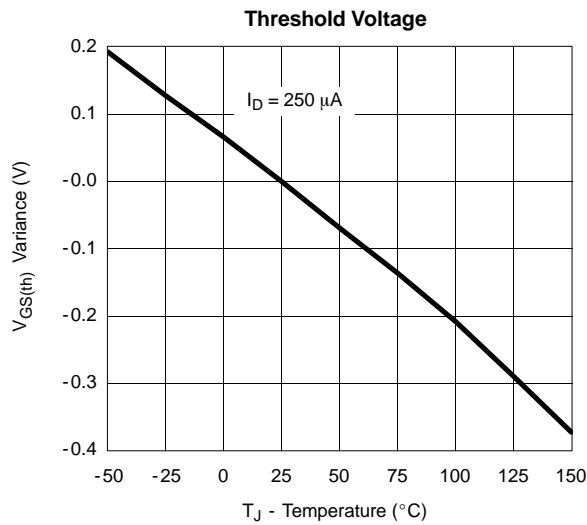
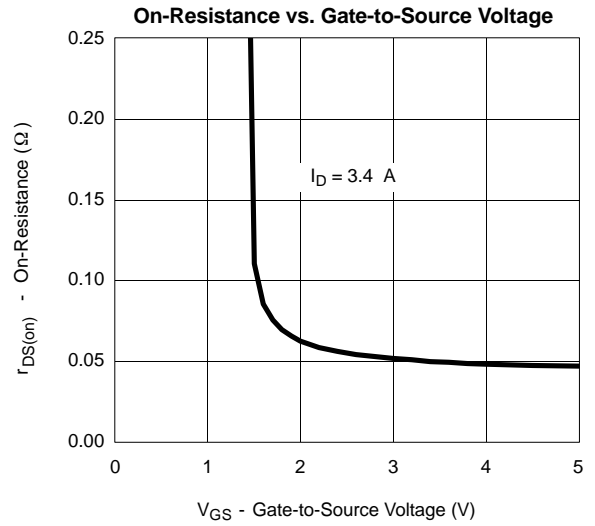
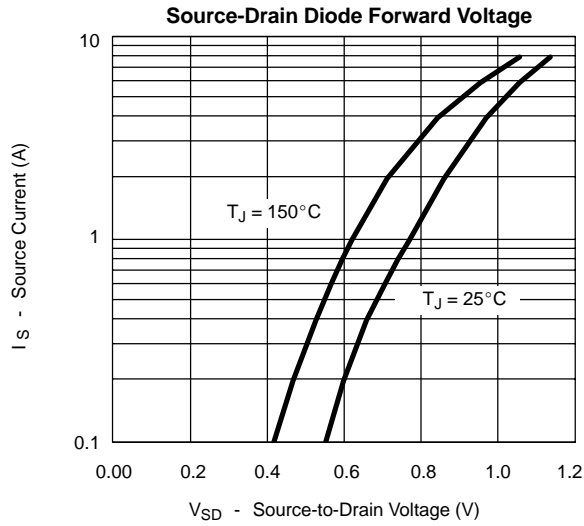
On-Resistance vs. Junction Temperature





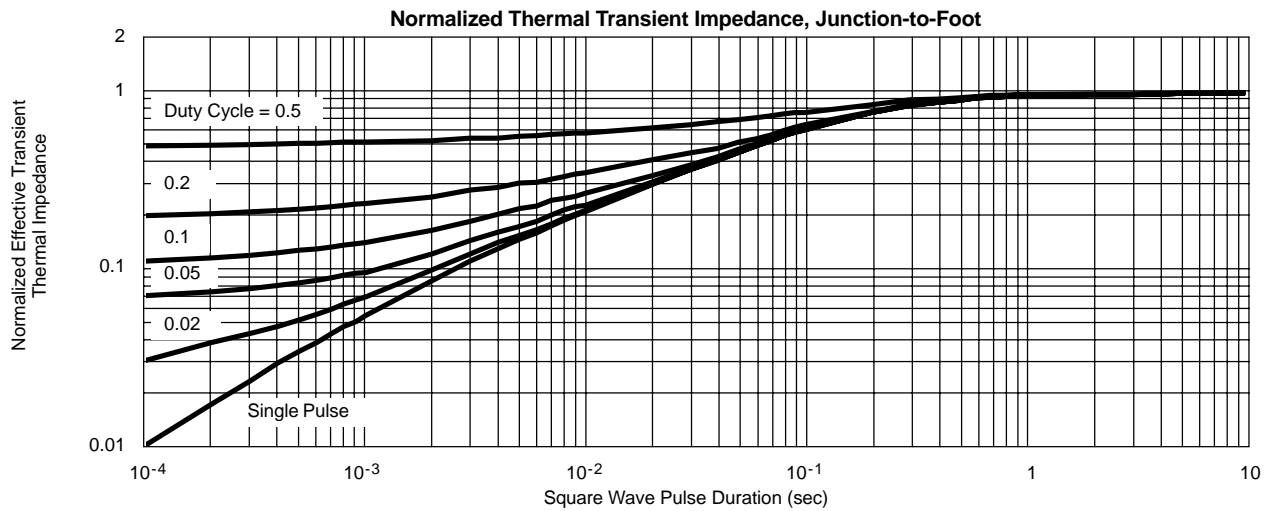
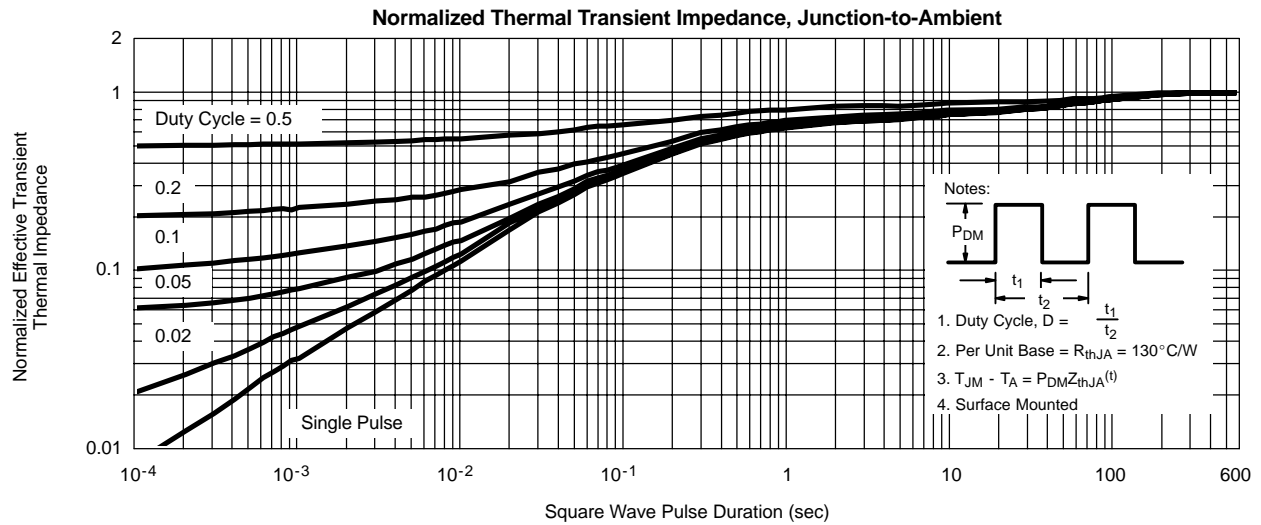
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

NCHANNEL



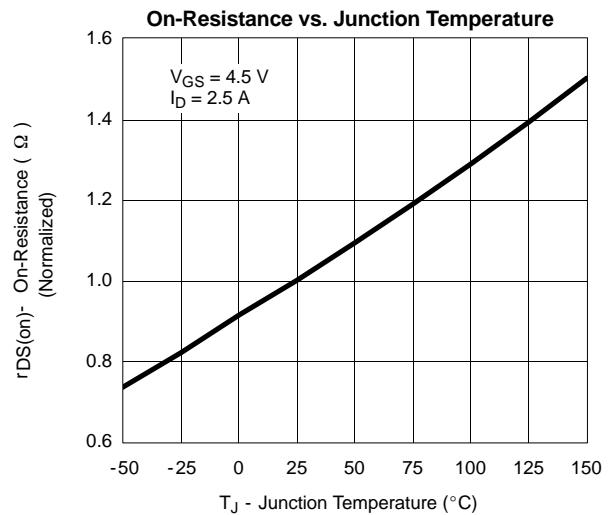
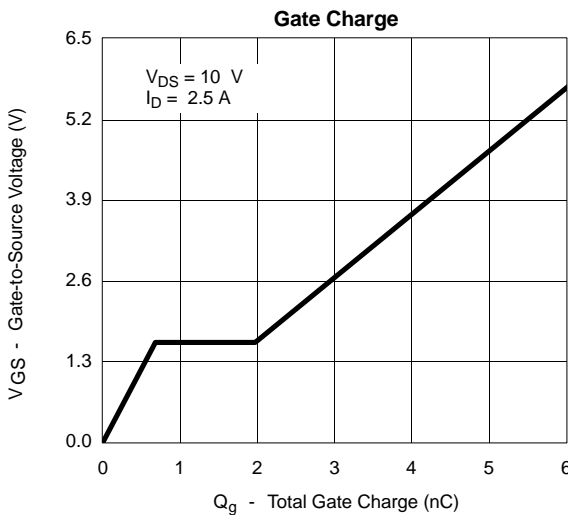
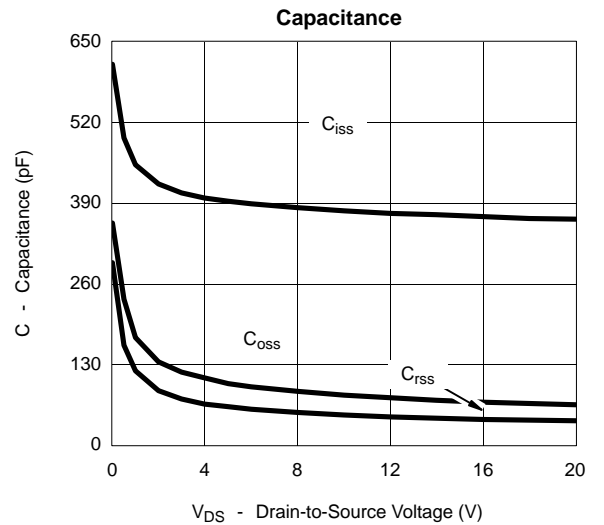
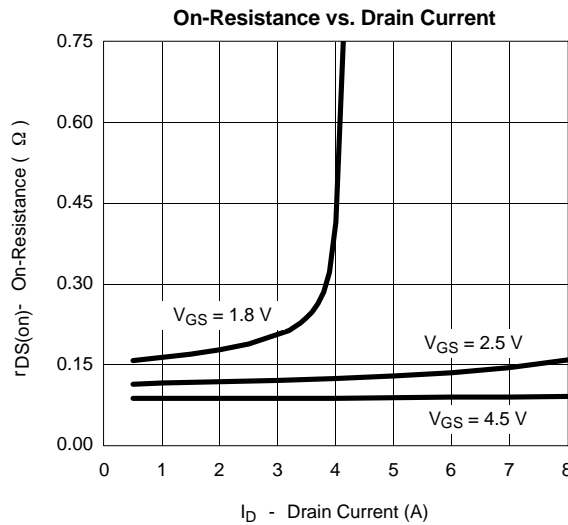
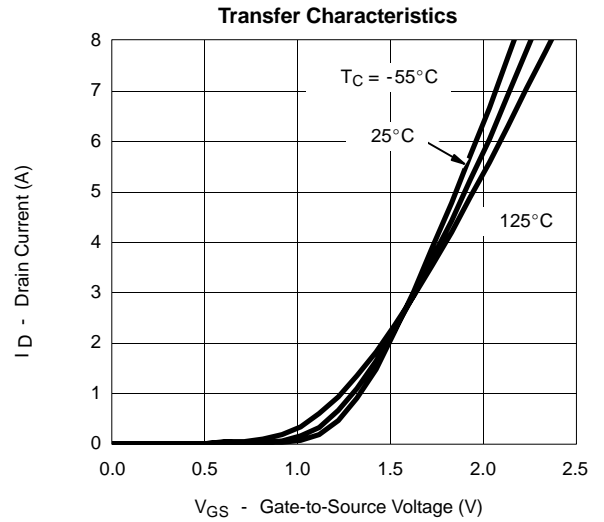
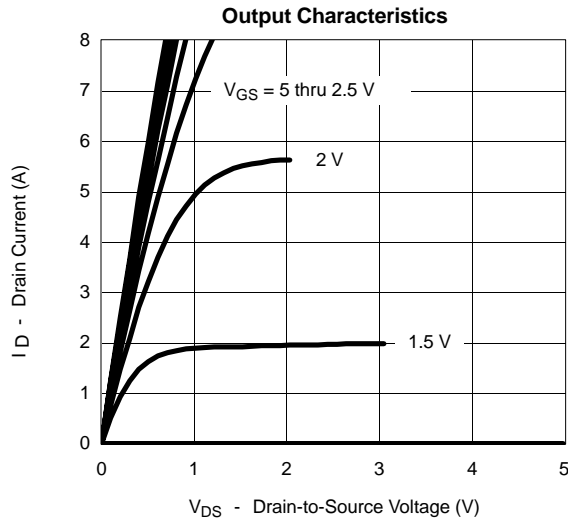


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) **NCHANNEL**





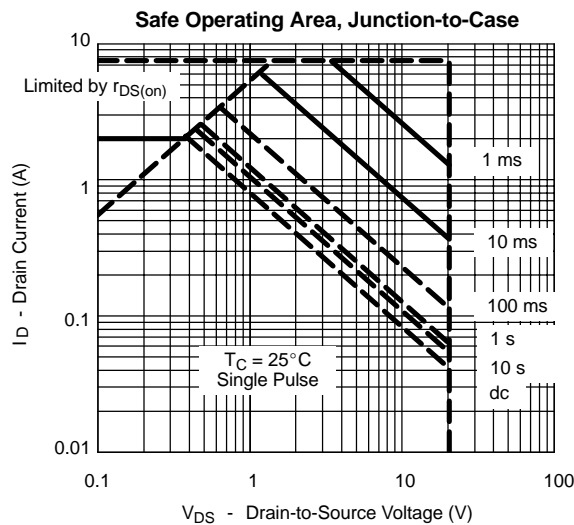
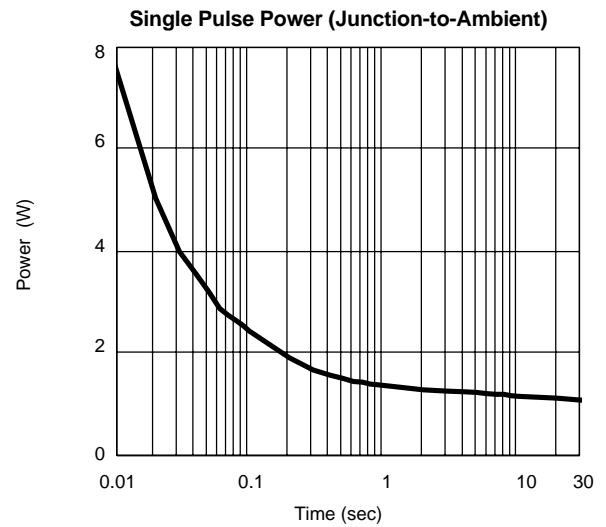
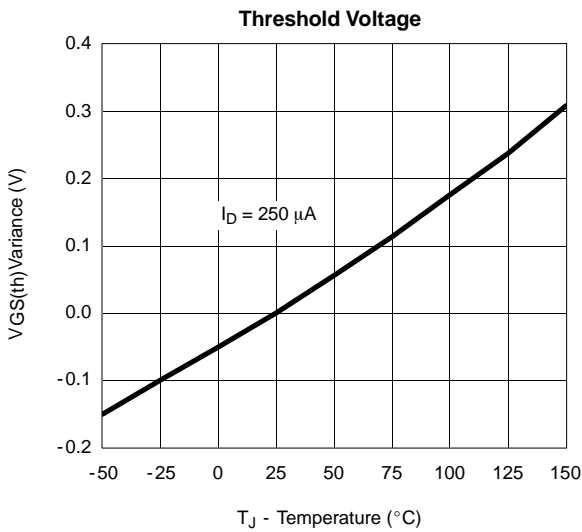
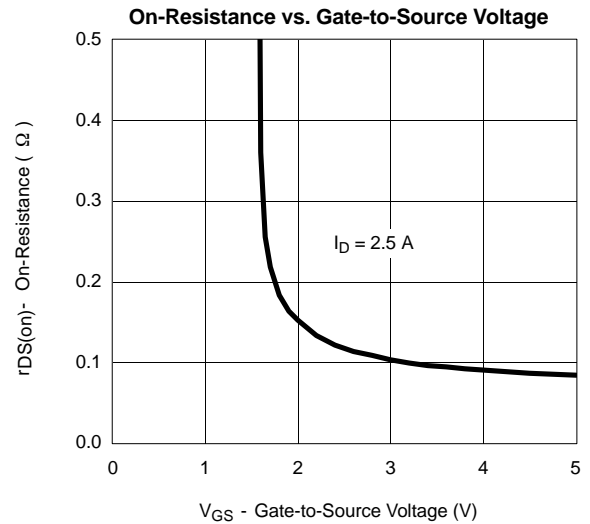
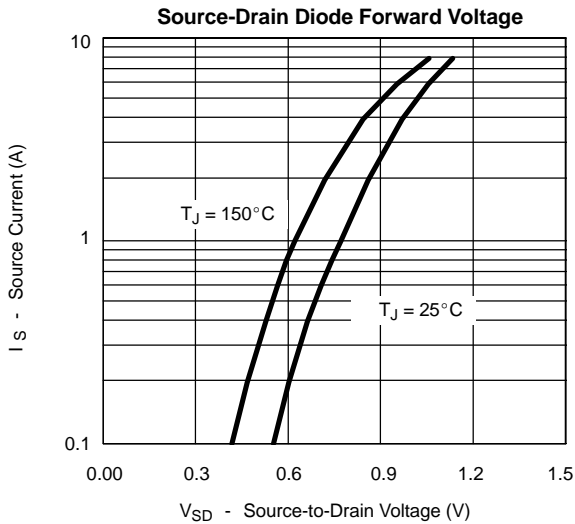
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) PCHANNEL





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

PCHANNEL





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) PCHANNEL

