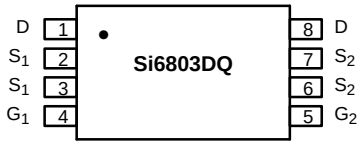
N- and P-Channel Half-Bridge, Reduced Q_g, Fast Switching

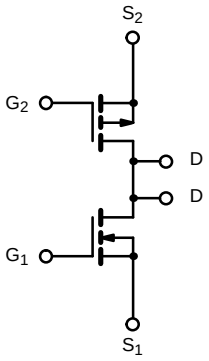
High-Efficiency PWM Optimized

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.095 @ V_{GS} = 4.5 V	±2.5
		0.145 @ V_{GS} = 3.0 V	±2.0
P-Channel	–20	0.110 @ V_{GS} = –4.5 V	±2.3
		0.165 @ V_{GS} = –3.0 V	±1.9

TSSOP-8



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	N-Channel	P-Channel	Unit
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	±2.5	±2.3	A
	T_A = 70°C		±2.0	±1.9	
Pulsed Drain Current		I_{DM}	±10		
Continuous Source Current (Diode Conduction)[a]		I_S	1.0	–1.0	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	1.0		W
	T_A = 70°C		0.64		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	N- or P-Channel	Unit
Maximum Junction-to-Ambient[a]	R_{thJA}	125	°C/W

Notes
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

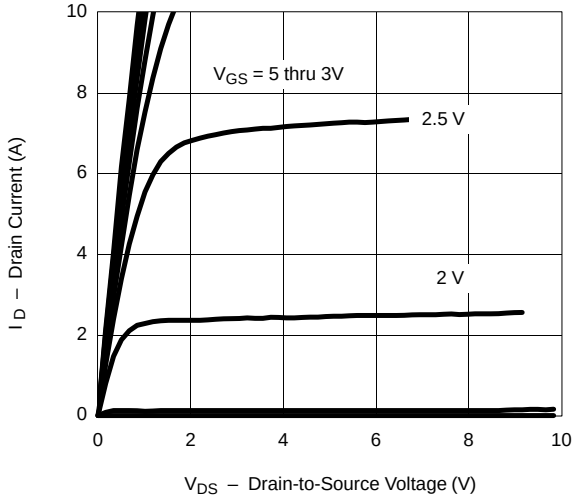
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

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			V
		V_{DS} = V_{GS}, I_D = –250 μA	P-Ch	–0.6			
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} = –20 V, V_{GS} = 0 V	P-Ch			–1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 70°C	N-Ch			25	
		V_{DS} = –20 V, V_{GS} = 0 V, T_J = 70°C	P-Ch			–25	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	N-Ch	10			A
		V_{DS} = –5 V, V_{GS} = –4.5 V	P-Ch	–10			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 2.5 A	N-Ch		0.076	0.095	Ω
		V_{GS} = –4.5 V, I_D = –2.3 A	P-Ch		0.086	0.110	
		V_{GS} = 3.0 V, I_D = 2.0 A	N-Ch		0.105	0.145	
		V_{GS} = –3.0 V, I_D = –1.9 A	P-Ch		0.122	0.165	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 2.5 A	N-Ch		5.5		S
		V_{DS} = –15 V, I_D = –2.3 A	P-Ch		6.0		
Diode Forward Voltage[a]	V_{SD}	I_S = 1.0 A, V_{GS} = 0 V	N-Ch		0.75	1.1	V
		I_S = –1.0 A, V_{GS} = 0 V	P-Ch		0.75	1.1	
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 3.5 V, V_{GS} = 4.5 V, I_D = 0.3 A P-Channel V_{DS} = –3.5 V, V_{GS} = –4.5 V I_D = –0.3 A	N-Ch		3.8	7.5	nC
			P-Ch		5.2	10	
Gate-Source Charge	Q_{gs}		N-Ch		0.8		
			P-Ch		1.3		
Gate-Drain Charge	Q_{gd}		N-Ch		0.3		
			P-Ch		0.6		
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 3.5 V, R_L = 11.5 Ω I_D ≅ 0.3 A, V_{GEN} = 4.5 V, R_G = 6 Ω P-Channel V_{DD} = –3.5 V, R_L = 11.5 Ω I_D ≅ –0.3 A, V_{GEN} = –4.5 V, R_G = 6 Ω	N-Ch		14	30	ns
			P-Ch		12	30	
Rise Time	t_r		N-Ch		34	70	
			P-Ch		32	70	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		25	50	
			P-Ch		22	50	
Fall Time	t_f		N-Ch		10	25	
			P-Ch		12	25	
Source-Drain Reverse Recovery Time	t_{rr}	N-Channel—I_F = 1.0 A, di/dt = 100 A/μs	N-Ch		50	80	
		P-Channel—I_F = –1.0 A, di/dt = 100 A/μs	P-Ch		50	80	

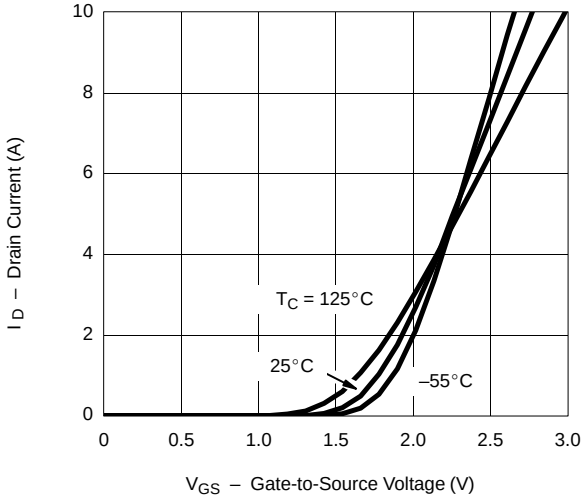
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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

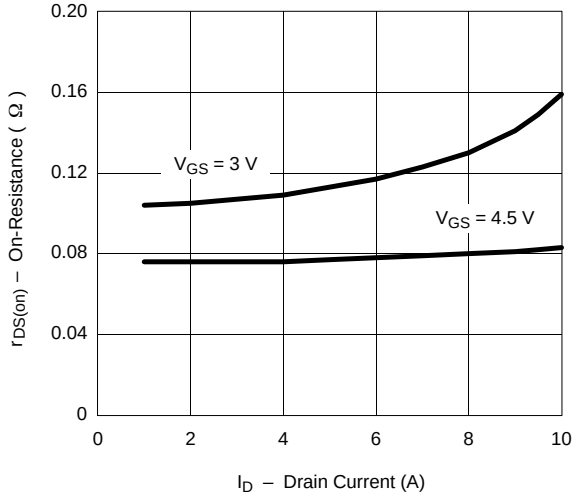
Output Characteristics



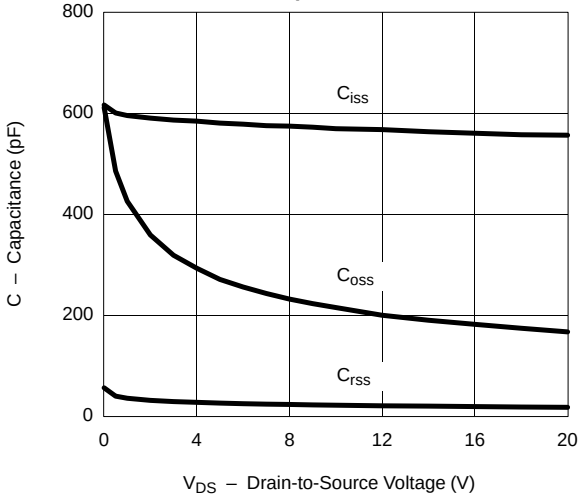
Transfer Characteristics



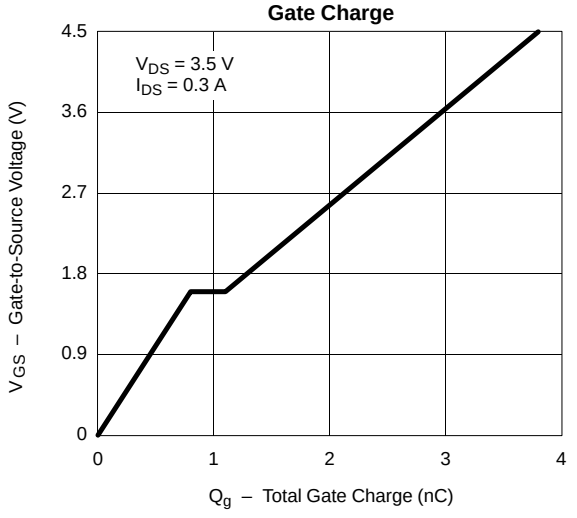
On-Resistance vs. Drain Current



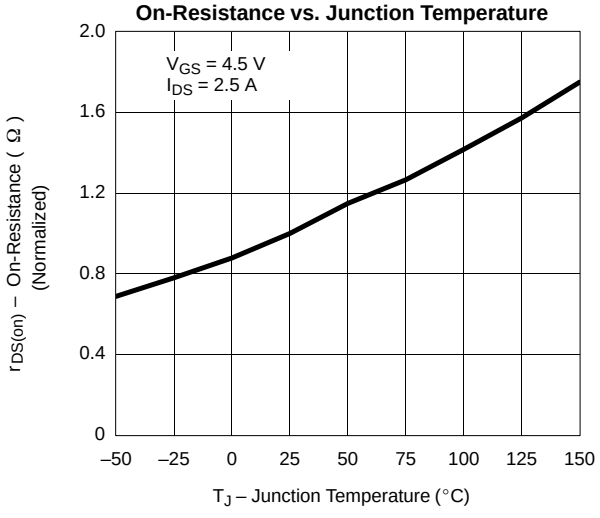
Capacitance



Gate Charge

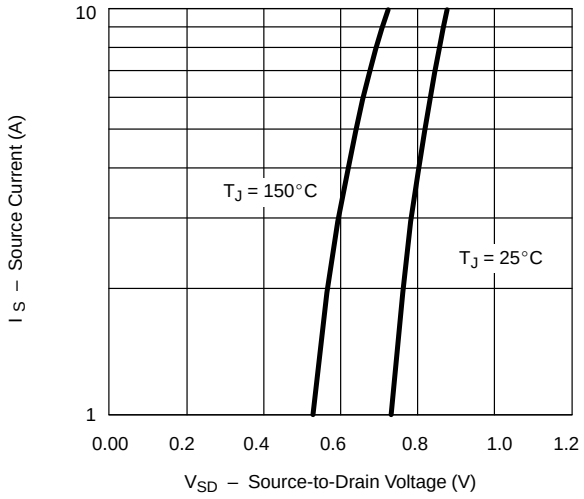


On-Resistance vs. Junction Temperature

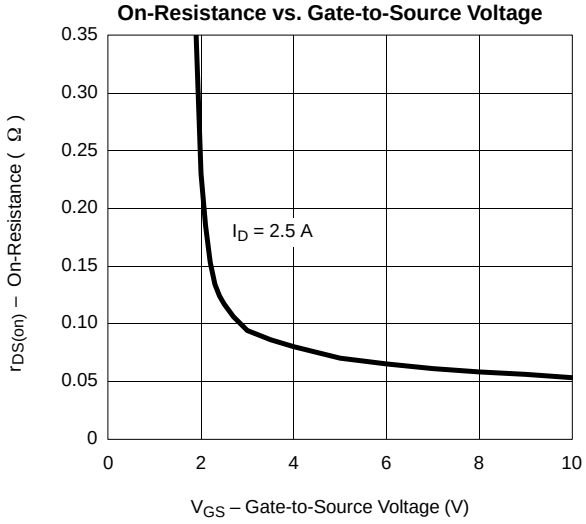


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

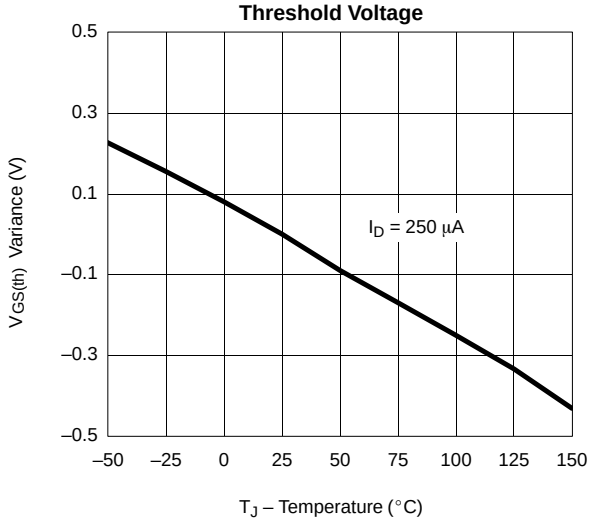
Source-Drain Diode Forward Voltage



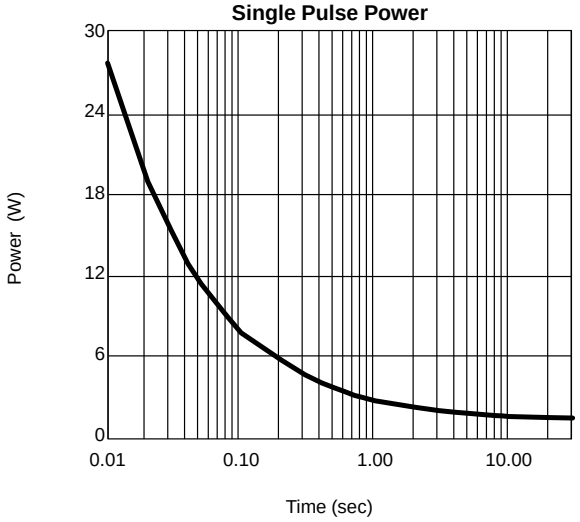
On-Resistance vs. Gate-to-Source Voltage



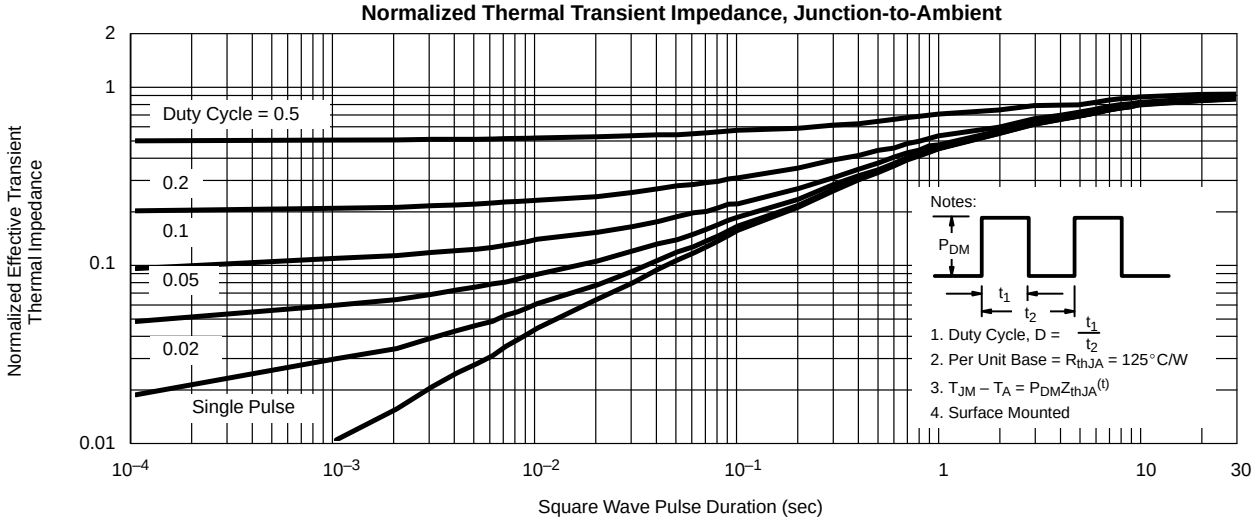
Threshold Voltage



Single Pulse Power

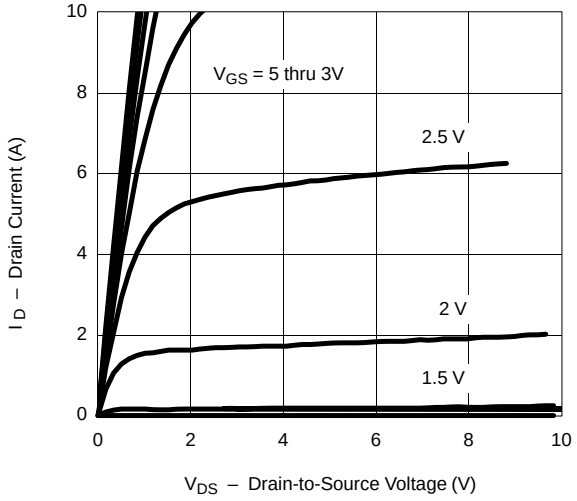


Normalized Thermal Transient Impedance, Junction-to-Ambient

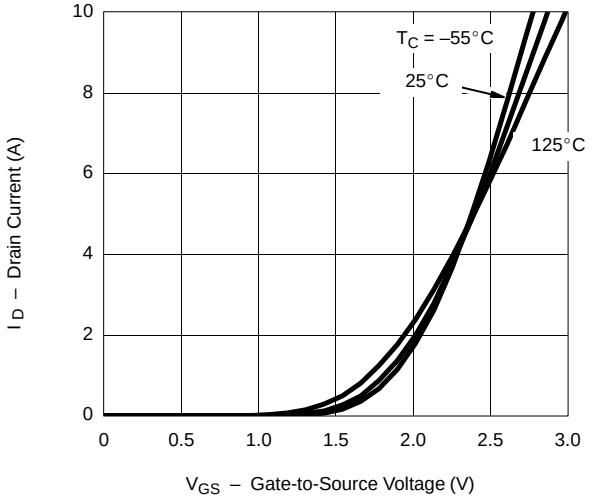


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

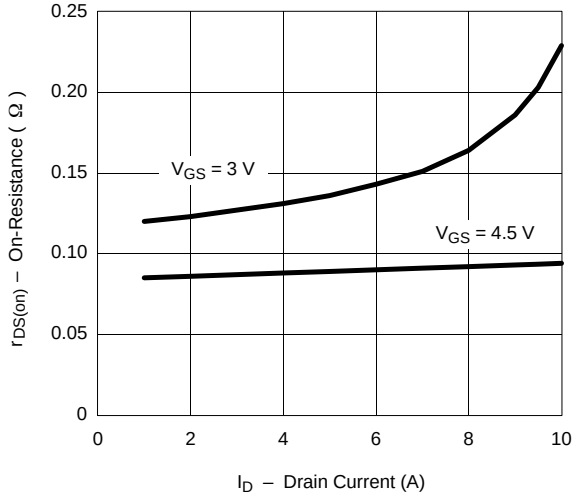
Output Characteristics



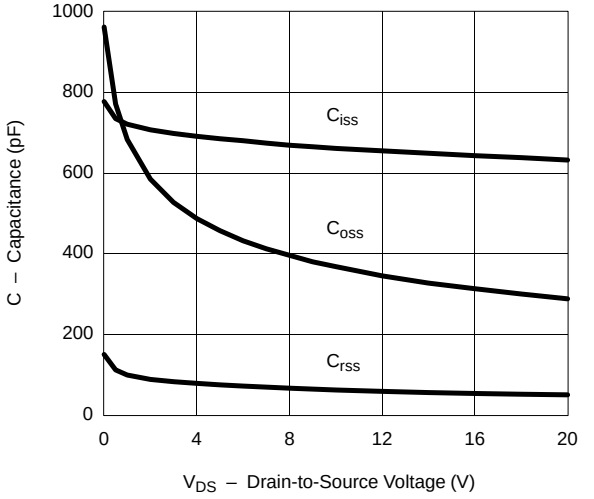
Transfer Characteristics



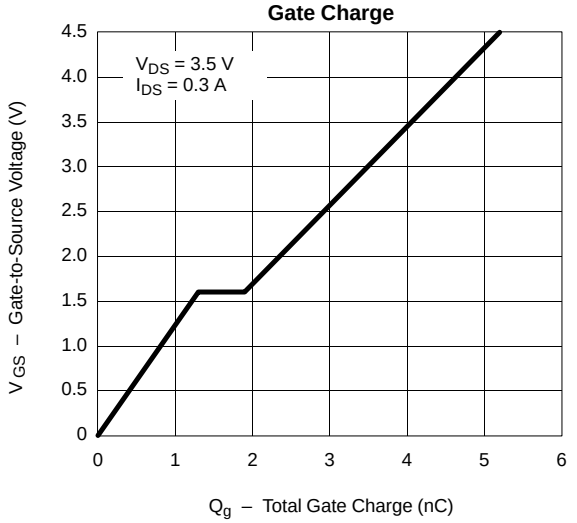
On-Resistance vs. Drain Current



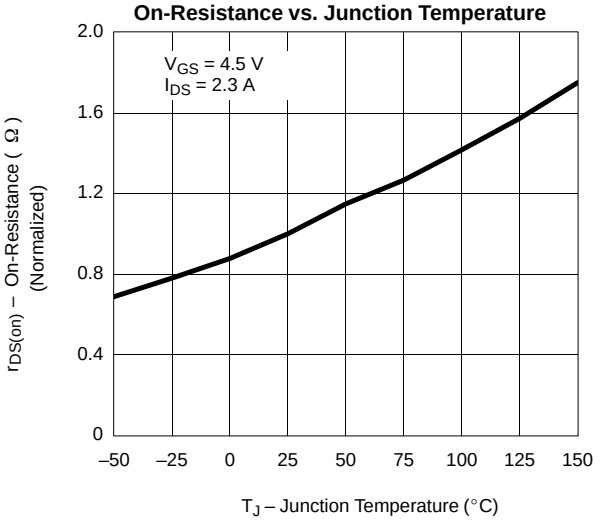
Capacitance



Gate Charge

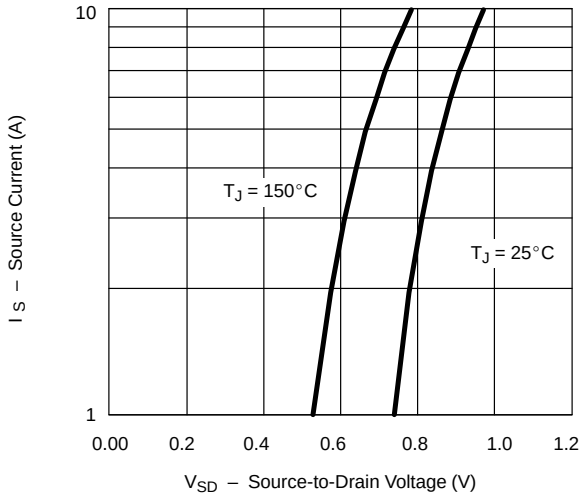


On-Resistance vs. Junction Temperature

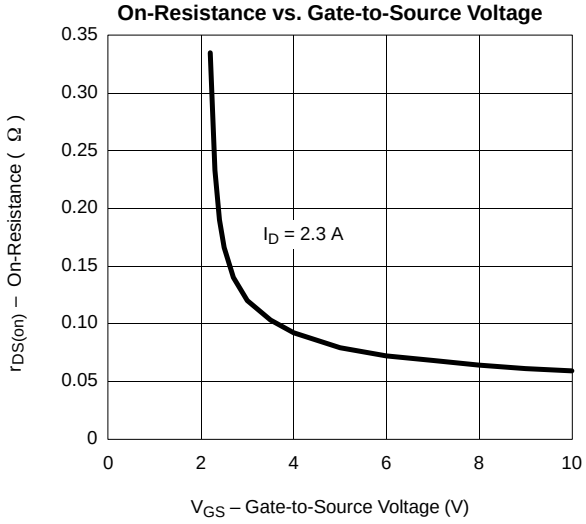


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

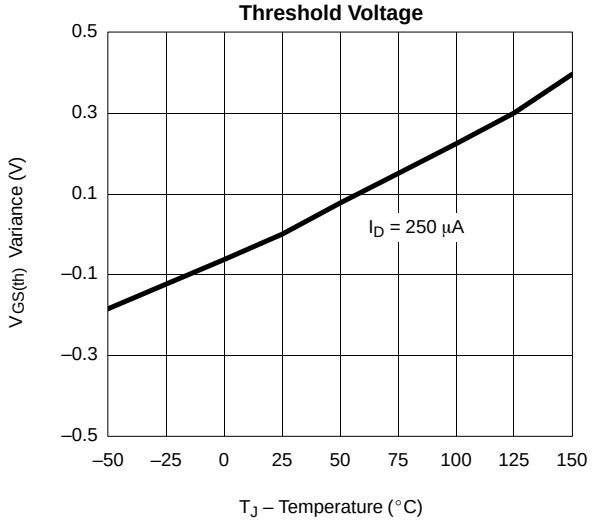
Source-Drain Diode Forward Voltage



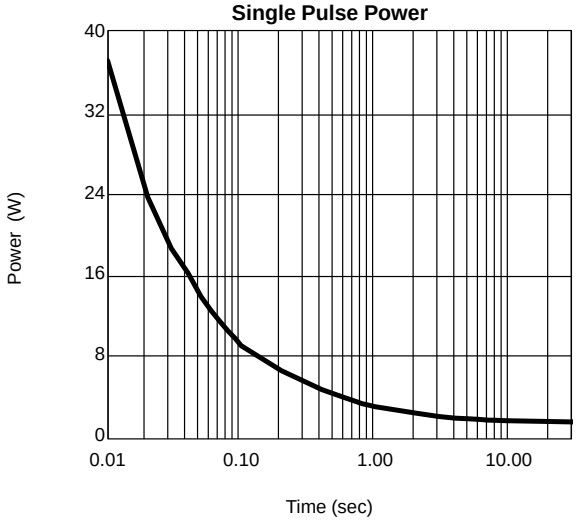
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient