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

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	30	0.018 @ V_{GS} = 10 V	8.8
		0.027 @ V_{GS} = 4.5 V	7.0
P-Channel	-8	0.042 @ V_{GS} = -4.5 V	- 5.7
		0.060 @ V_{GS} = -2.5 V	-4.8

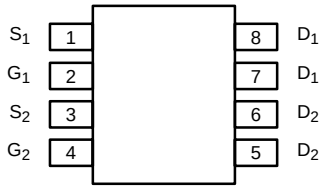
FEATURES

- TrenchFET® Power MOSFET

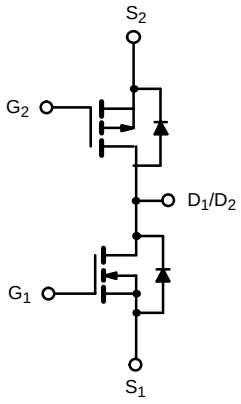
APPLICATIONS

- Level Shift
- Load Switch

SO-8



Top View



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)							
			N-Channel		P-Channel		
Parameter		Symbol	10 sec.	Steady State	10 sec.	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		-8		V
Gate-Source Voltage		V_{GS}	±20		±8		
Continuous Drain Current (T_J = 150°C)[a, b]	T_A = 25°C	I_D	8.8	6.3	- 5.7	-4.1	A
	T_A = 70°C		7	5.2	-4.5	-3.3	
Pulsed Drain Current		I_{DM}	30		-30		
Continuous Source Current (Diode Conduction)[a, b]		I_S	1.8	1.0	-1.8	1.0	
Maximum Power Dissipation[a, b]	T_A = 25°C	P_D	2.5	1.3	2.5	1.3	W
	T_A = 70°C		1.6	0.84	1.6	0.84	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150				°C

THERMAL RESISTANCE RATINGS							
			N-Channel		P- Channel		
Parameter		Symbol	Typ	Max	Typ	Max	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	40	50	42	50	°C/W
	Steady-State		75	95	76	95	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	18	23	21	26	

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

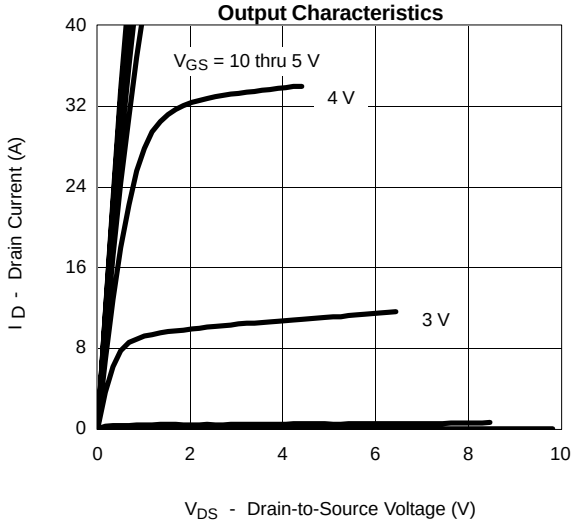
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

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	0.8		1.8	V
		V_{DS} = V_{GS}, I_D = -250 µA	P-Ch	-0.45		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} = ±8 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} = -6.4 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} = -6.4 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} = 10 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} = 10 V, I_D = 8.8 A	N-Ch		0.015	0.018	Ω
		V_{GS} = -4.5 V, I_D = -5.7 A	P-Ch		0.030	0.042	
		V_{GS} = 4.5 V, I_D = 7.0 A	N-Ch		0.022	0.027	
		V_{GS} = -2.5 V, I_D = -4.8 A	P-Ch		0.048	0.060	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 8.8 A	N-Ch		18		S
		V_{DS} = -15 V, I_D = -5.7 A	P-Ch		12		
Diode Forward Voltage[b]	V_{SD}	I_S = 1.8 A, V_{GS} = 0 V	N-Ch		0.73	1.1	V
		I_S = -1.8 A, V_{GS} = 0 V	P-Ch		-0.75	-1.1	
Dynamic[a]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 15 V, V_{GS} = 5 V, I_D = 8.8 A P-Channel V_{DS} = -4 V, V_{GS} = -5 V, I_D = -5.7 A	N-Ch		11.5	20	nC
			P-Ch		13.5	20	
Gate-Source Charge	Q_{gs}		N-Ch		3		
			P-Ch		2.2		
Gate-Drain Charge	Q_{gd}		N-Ch		4		
			P-Ch		3		
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} = -4 V, R_L = 4 Ω I_D ≅ -1 A, V_{GEN} = -4.5 V, R_G = 6 Ω	N-Ch		15	22	ns
			P-Ch		21	40	
Rise Time	t_r		N-Ch		8	15	
			P-Ch		45	70	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		35	50	
			P-Ch		60	100	
Fall Time	t_f		N-Ch		10	20	
			P-Ch		55	85	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.8 A, di/dt = 100 A/µs	N-Ch		30	60	
			P-Ch		50	100	

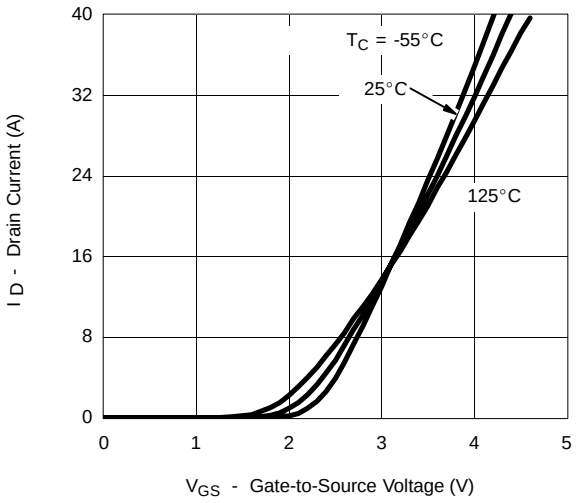
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

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

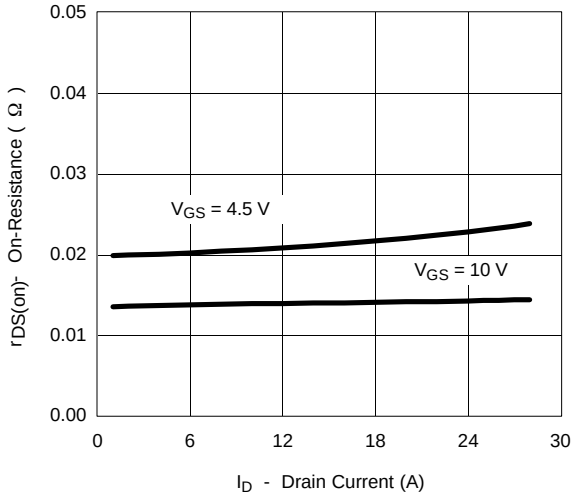
Output Characteristics



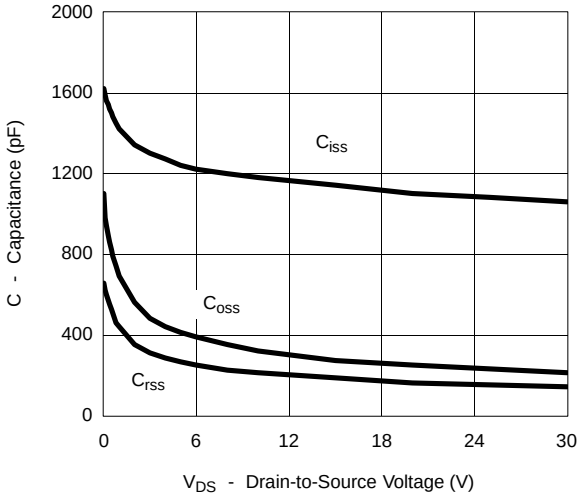
Transfer Characteristics



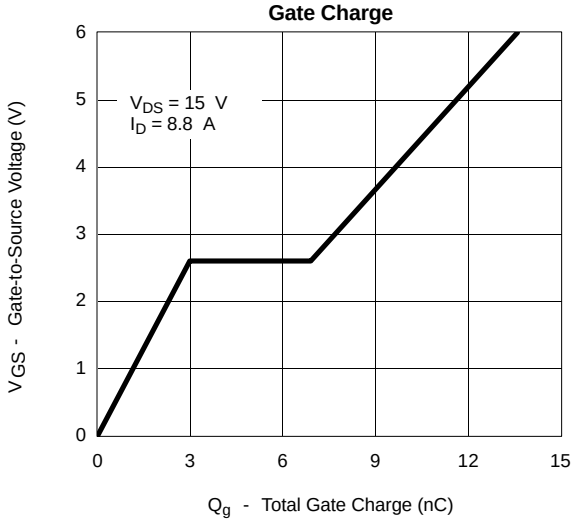
On-Resistance vs. Drain Current



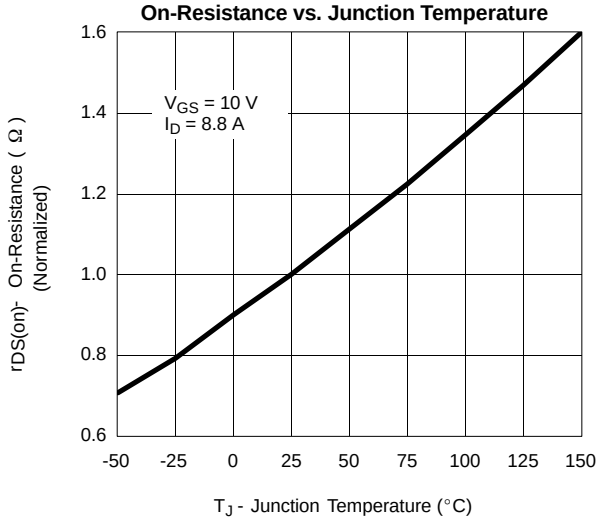
Capacitance



Gate Charge

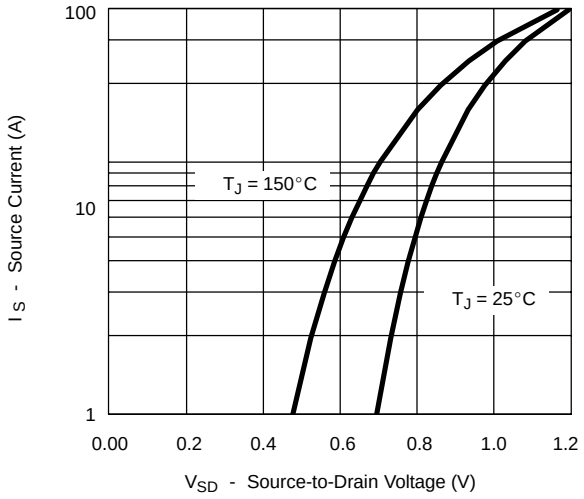


On-Resistance vs. Junction Temperature

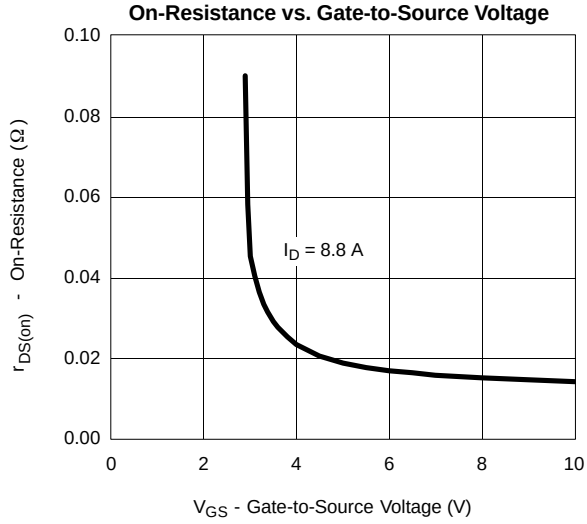


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

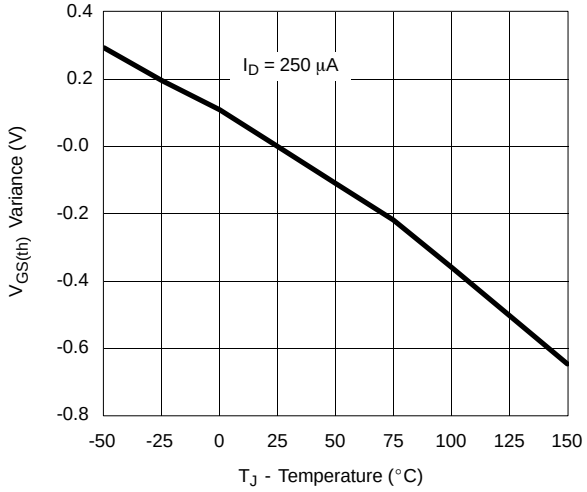
Source-Drain Diode Forward Voltage



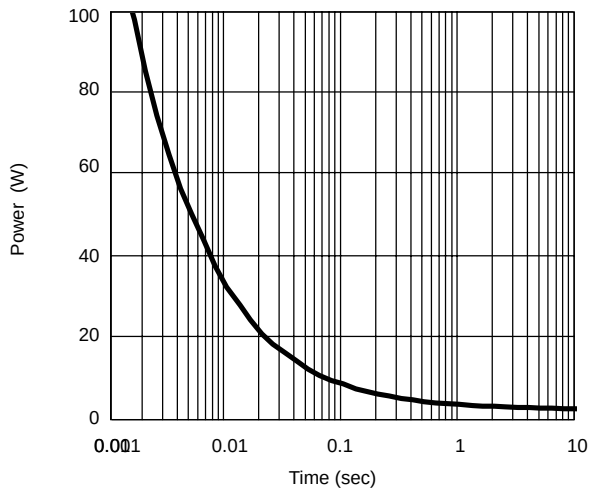
On-Resistance vs. Gate-to-Source Voltage



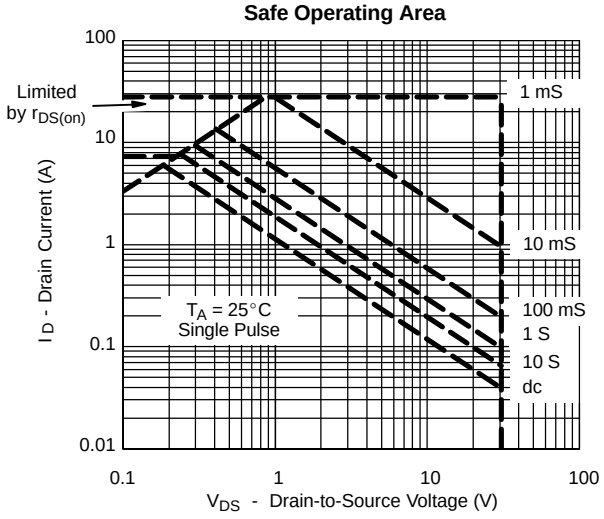
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

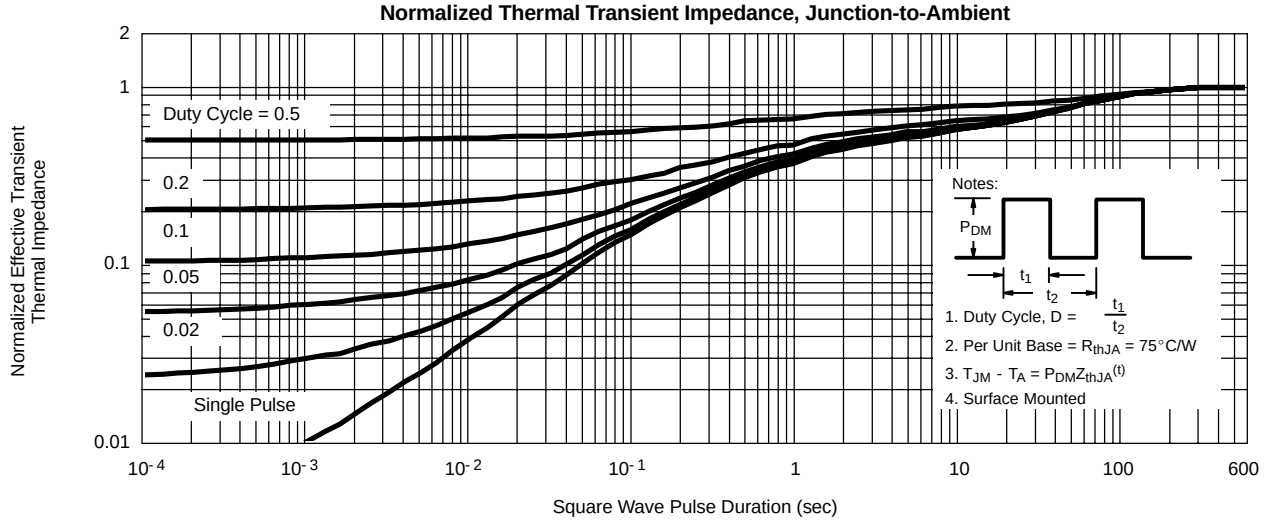


Safe Operating Area

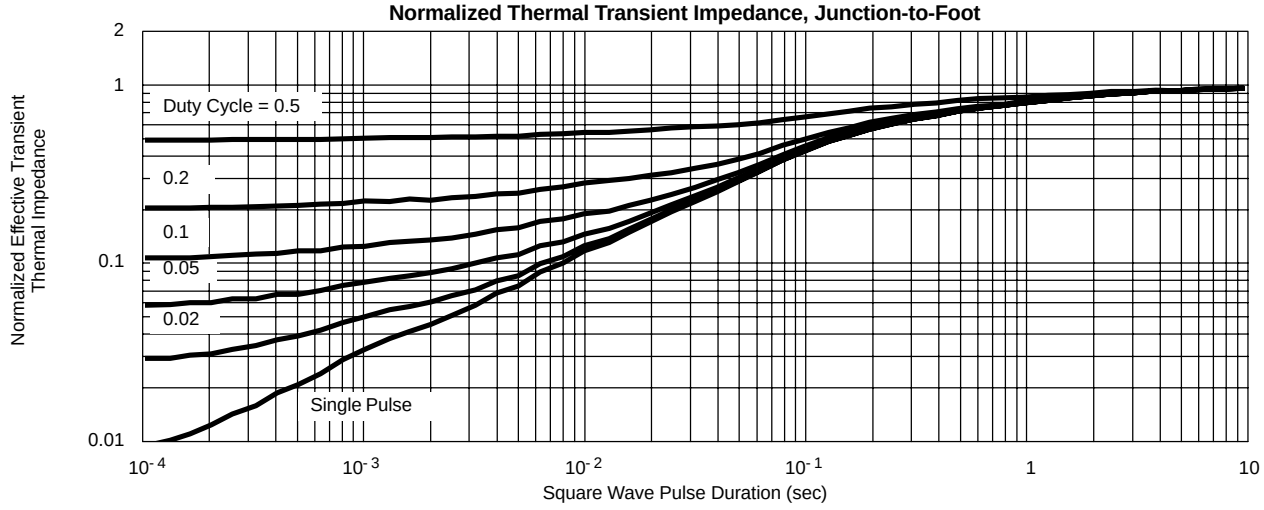


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient

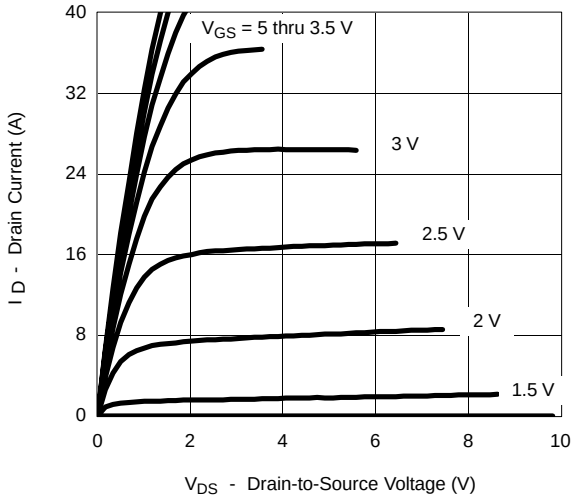


Normalized Thermal Transient Impedance, Junction-to-Foot

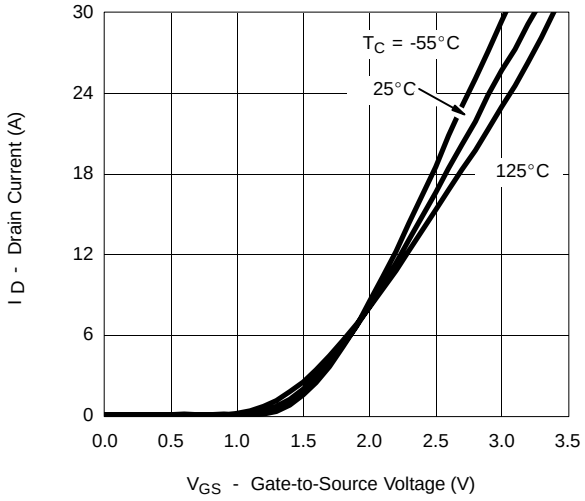


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

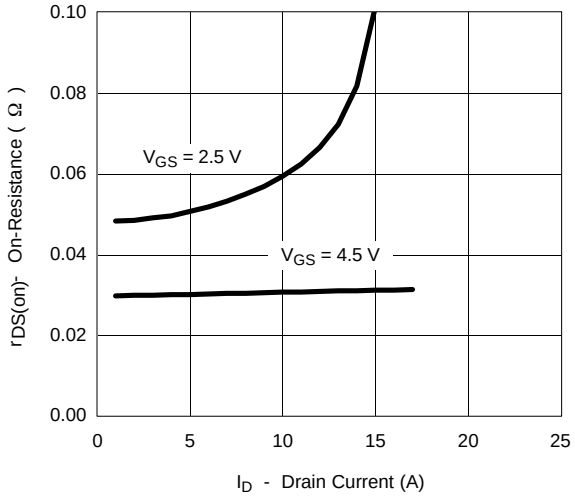
Output Characteristics



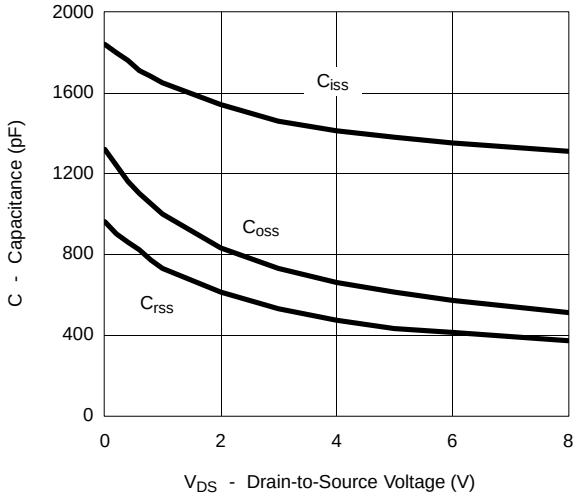
Transfer Characteristics



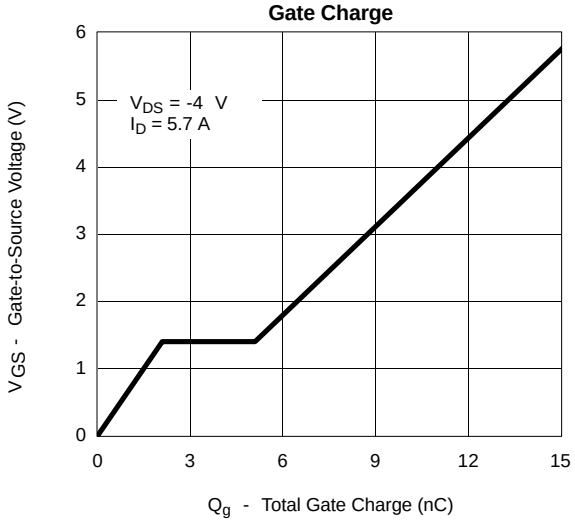
On-Resistance vs. Drain Current



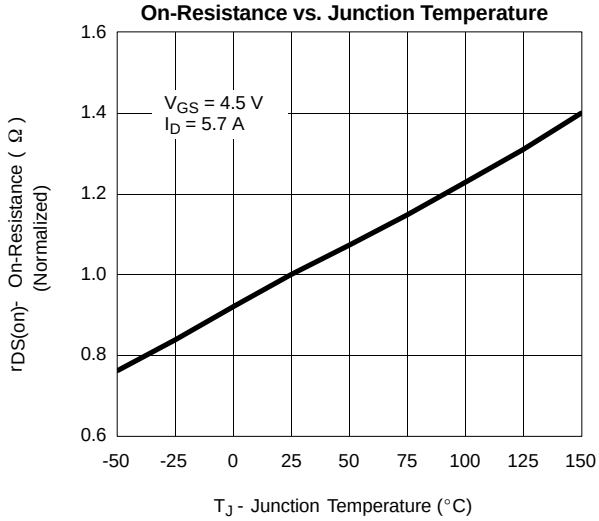
Capacitance



Gate Charge

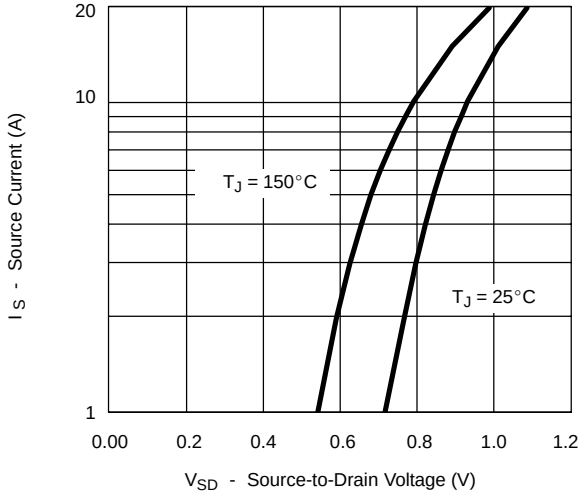


On-Resistance vs. Junction Temperature

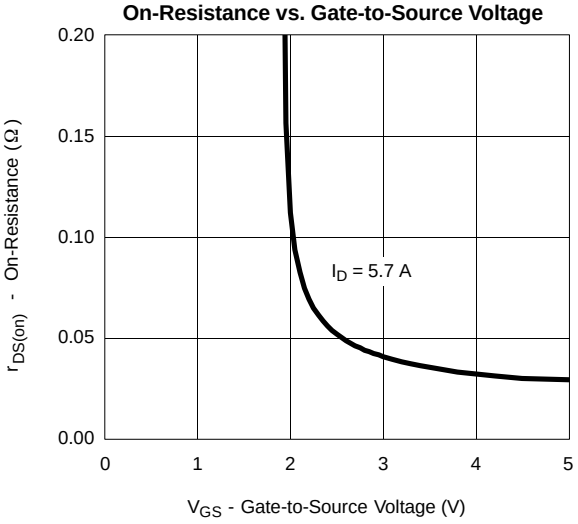


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

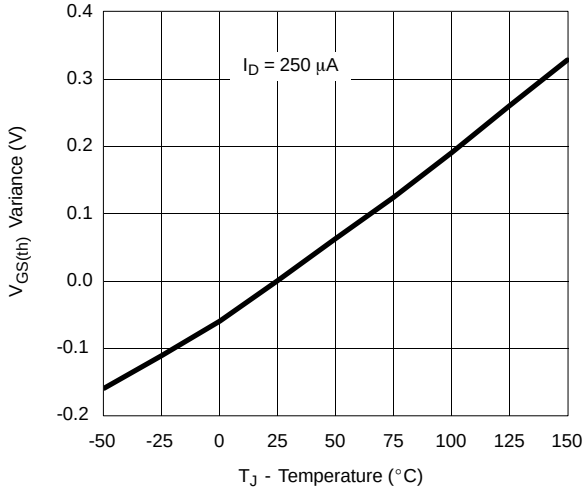
Source-Drain Diode Forward Voltage



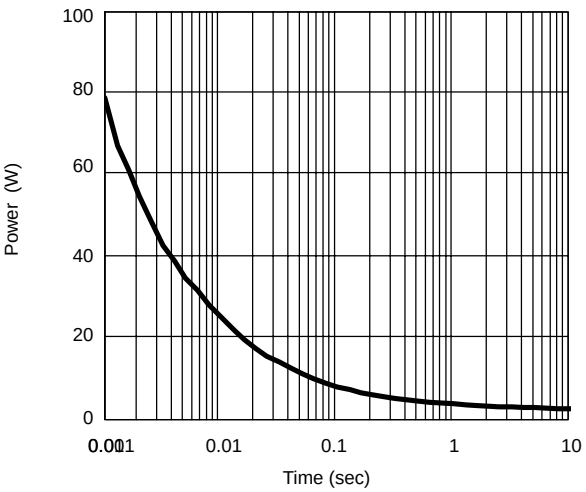
On-Resistance vs. Gate-to-Source Voltage



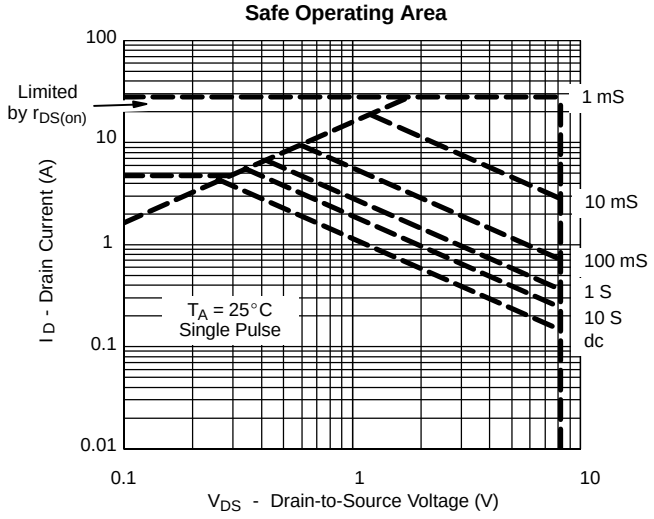
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

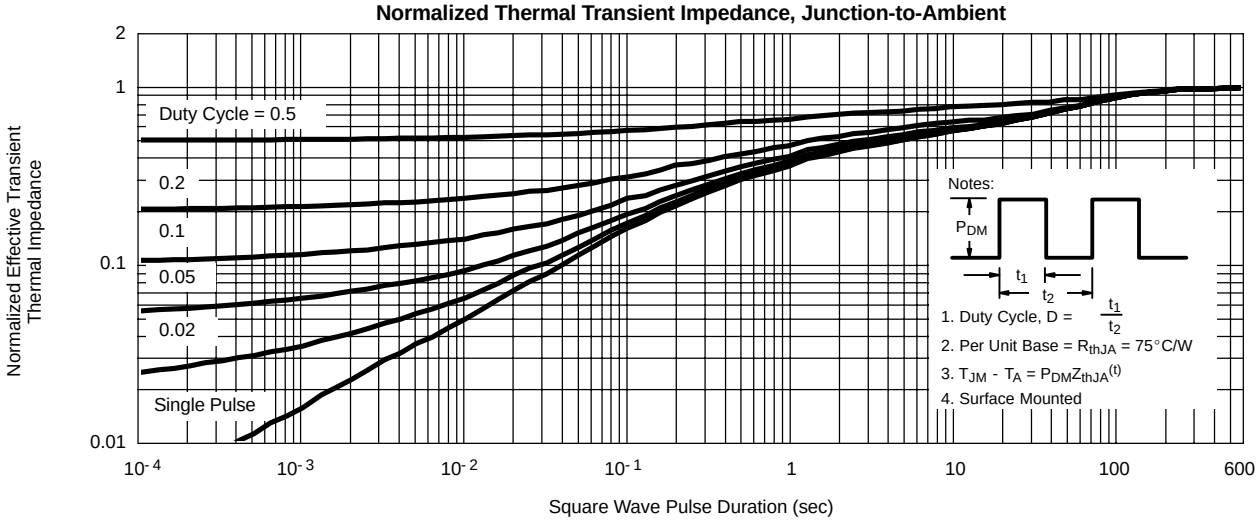


Safe Operating Area



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

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot