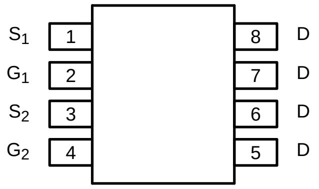
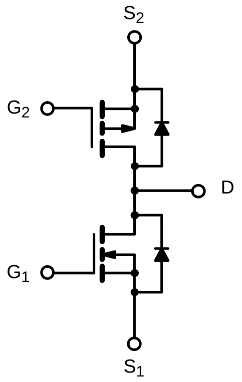
Complementary MOSFET Half-Bridge (N- and P-Channel)

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.030 @ V_{GS} = 4.5 V	± 7.0
		0.040 @ V_{GS} = 2.5 V	± 6.0
P-Channel	–20	0.065 @ V_{GS} = –4.5 V	± 4.5
		0.100 @ V_{GS} = –2.5 V	± 3.5

SO-8



Top View



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	± 12	
Continuous Drain Current (T_J = 150°C)[a, b]	T_A = 25°C	I_D	± 7.0	± 4.5	A
	T_A = 70°C		± 5.5	± 3.5	
Pulsed Drain Current		I_{DM}	± 30	± 20	
Continuous Source Current (Diode Conduction)[a, b]		I_S	1.7	–1.7	
Maximum Power Dissipation[a, b]	T_A = 25°C	P_D	2.5		W
	T_A = 70°C		1.6		
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}	38	50	40	50	°C/W
	Steady-State		73	95	73	95	
Maximum Junction-to-Foot	Steady-State	R_{thJC}	17	22	20	26	

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

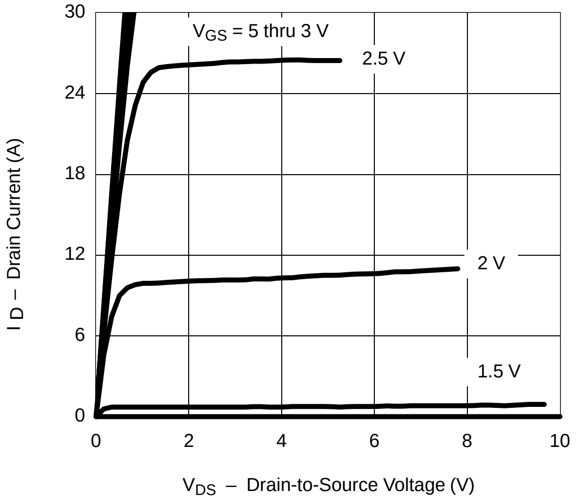
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition		Min	Typ[a]	Max	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu A$	N-Ch	0.6			V
		$V_{DS} = V_{GS}$, $I_D = -250\ \mu A$	P-Ch	–0.6			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 12$ V	N-Ch			± 100	nA
			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, $T_J = 55°C$	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, $I_D = 7.0$ A	N-Ch		0.022	0.030	Ω
		$V_{GS} = -4.5$ V, $I_D = -4.5$ A	P-Ch		0.058	0.065	
		$V_{GS} = 2.5$ V, $I_D = 6.0$ A	N-Ch		0.030	0.040	
		$V_{GS} = -2.5$ V, $I_D = -3.5$ A	P-Ch		0.087	0.100	
Forward Transconductance[b]	g_{fs}	$V_{DS} = 15$ V, $I_D = 7.0$ A	N-Ch		22		S
		$V_{DS} = -15$ V, $I_D = -4.5$ A	P-Ch		10		
Diode Forward Voltage[b]	V_{SD}	$I_S = 1.7$ A, $V_{GS} = 0$ V	N-Ch		0.70	1.2	V
		$I_S = -1.7$ A, $V_{GS} = 0$ V	P-Ch		–0.80	–1.2	
Dynamic[a]							
Total Gate Charge	Q_g	N-Channel $V_{DS} = 10$ V, $V_{GS} = 4.5$ V, $I_D = 3.5$ A P-Channel $V_{DS} = -10$ V, $V_{GS} = -4.5$ V, $I_D = -4.5$ A	N-Ch		13	25	nC
			P-Ch		8.5	15	
Gate-Source Charge	Q_{gs}		N-Ch		3.0		
			P-Ch		2.8		
Gate-Drain Charge	Q_{gd}		N-Ch		3.3		
			P-Ch		1.7		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 10$ V, $R_L = 10\ \Omega$ $I_D \cong 1$ A, $V_{GEN} = 4.5$ V, $R_G = 6\ \Omega$ P-Channel $V_{DD} = -10$ V, $R_L = 10\ \Omega$ $I_D \cong -1$ A, $V_{GEN} = -4.5$ V, $R_G = 6\ \Omega$	N-Ch		22	40	ns
			P-Ch		15	30	
Rise Time	t_r		N-Ch		40	80	
			P-Ch		32	60	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		50	100	
			P-Ch		57	100	
Fall Time	t_f		N-Ch		20	40	
			P-Ch		40	80	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7$ A, di/dt = 100 A/µs	N-Ch		40	80	
			P-Ch		40	80	

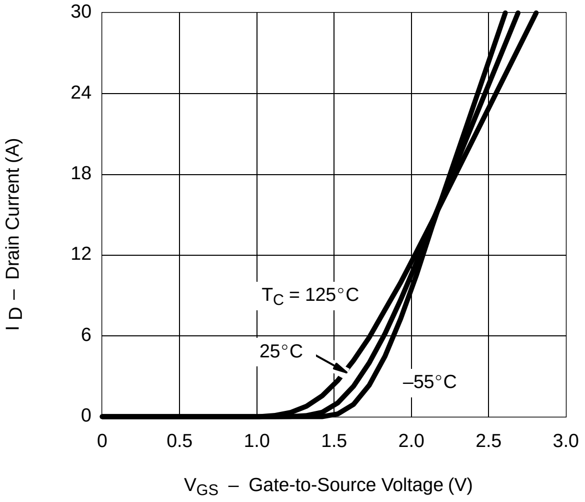
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

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

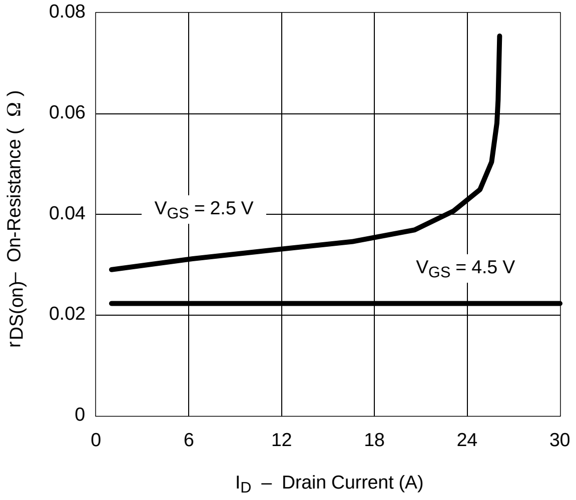
Output Characteristics



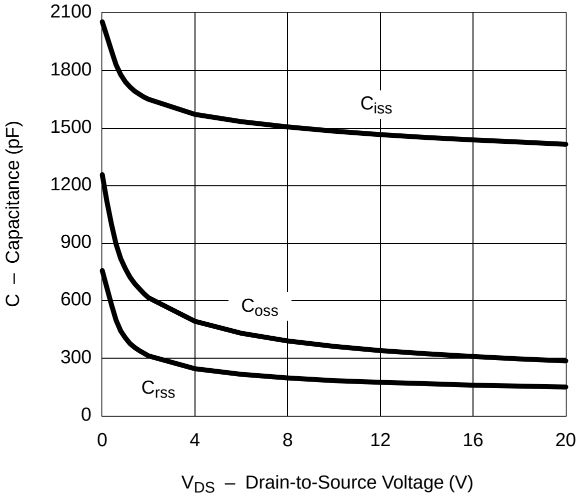
Transfer Characteristics



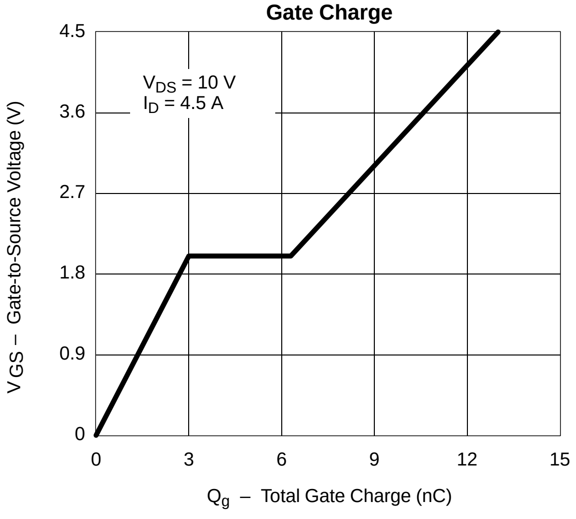
On-Resistance vs. Drain Current



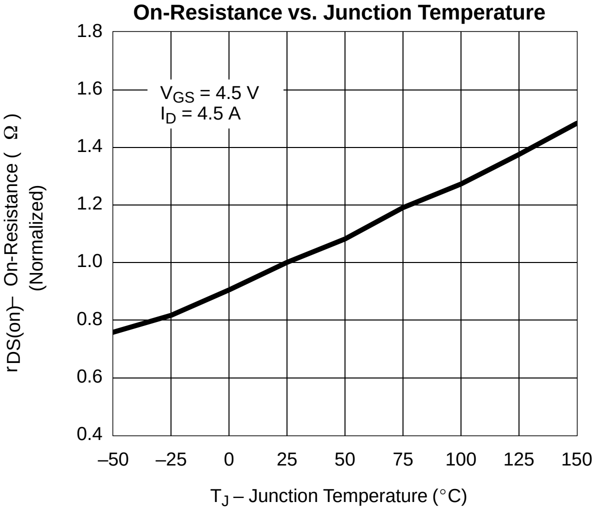
Capacitance



Gate Charge

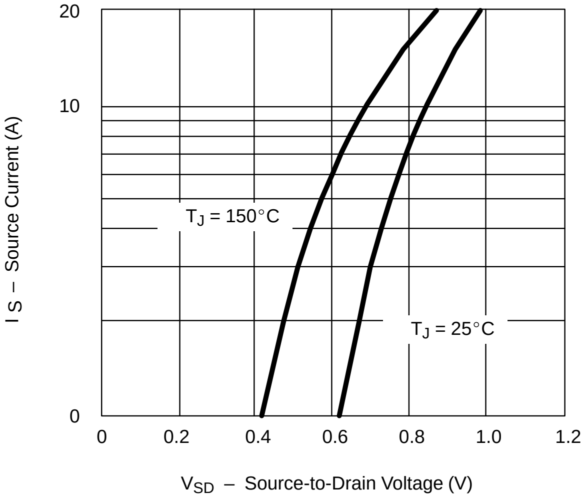


On-Resistance vs. Junction Temperature

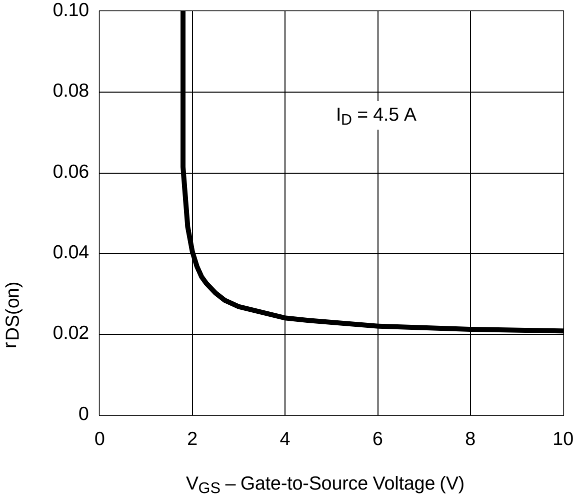


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

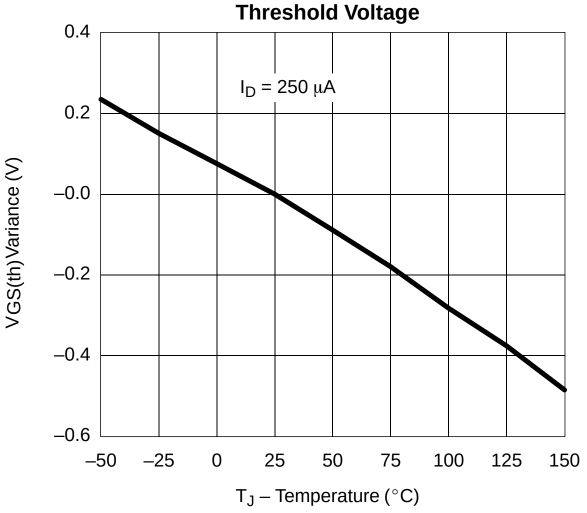
Source-Drain Diode Forward Voltage



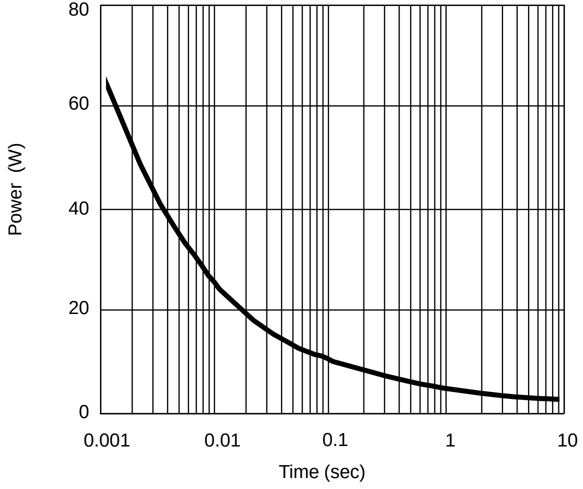
On-Resistance vs. Gate-to-Source Voltage



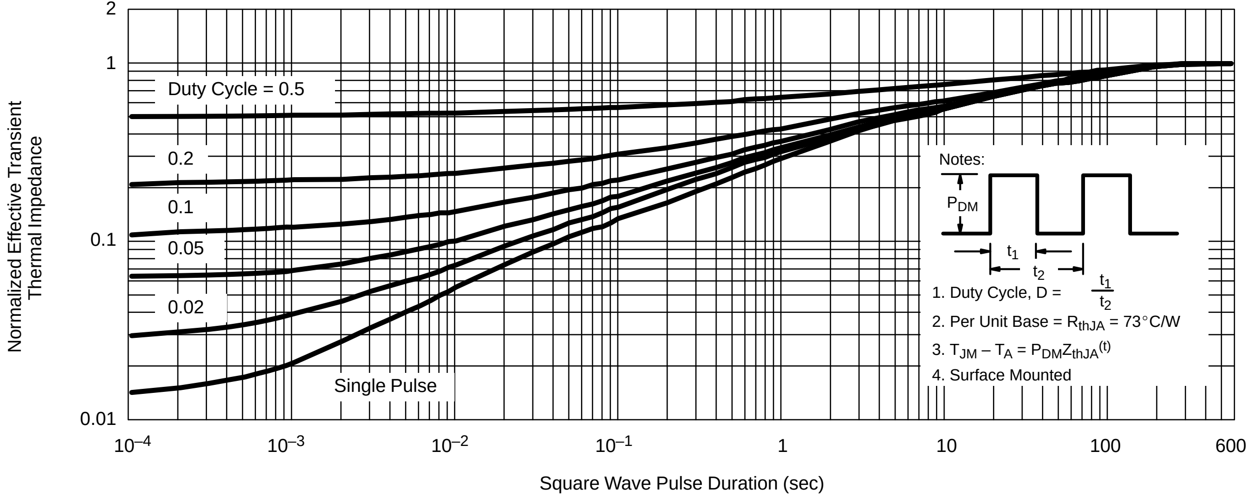
Threshold Voltage



Single Pulse Power, Juncion-To-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

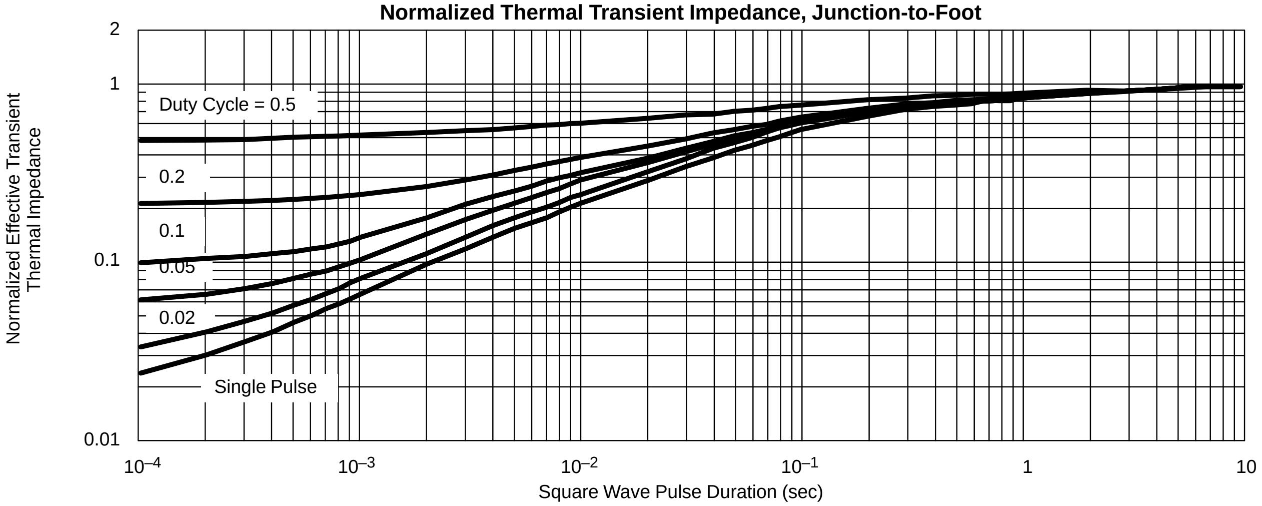


Notes:

1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 73°C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

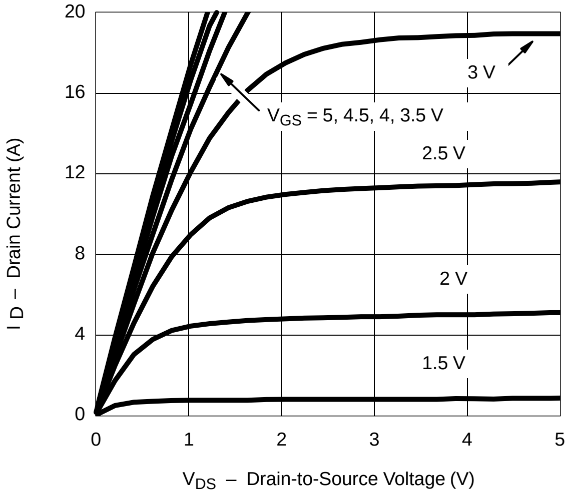
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Foot

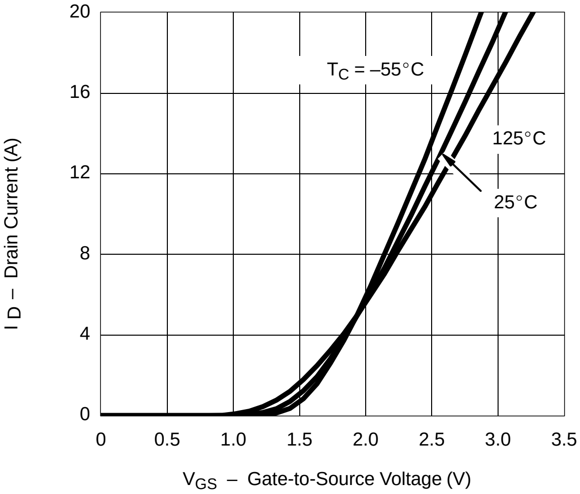


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

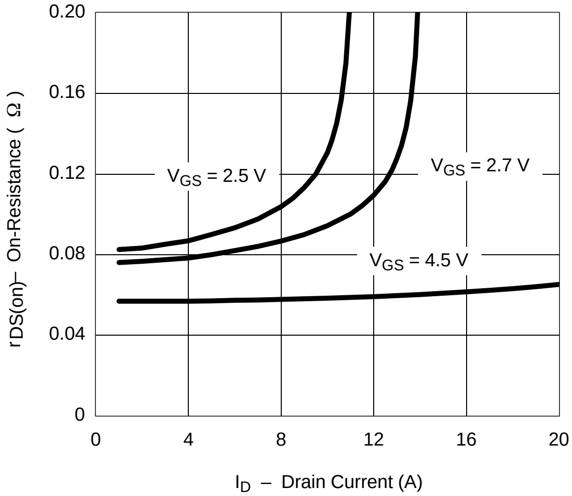
Output Characteristics



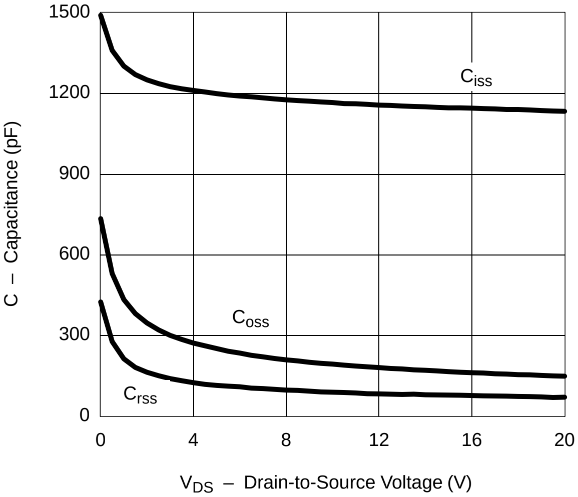
Transfer Characteristics



On-Resistance vs. Drain Current

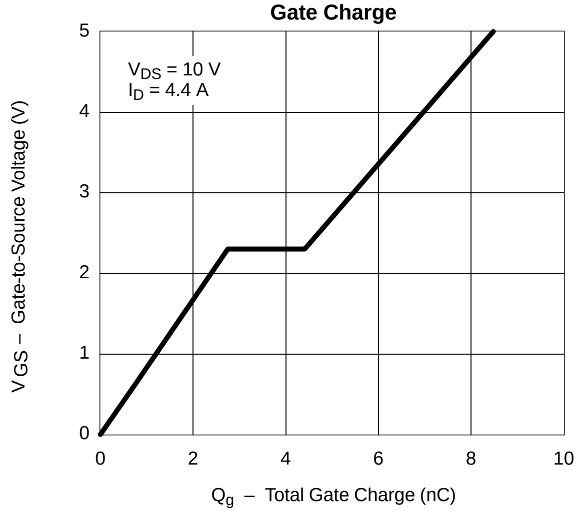


Capacitance

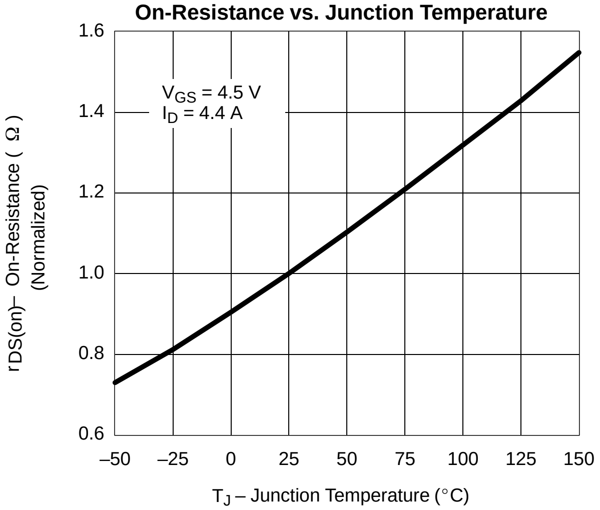


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

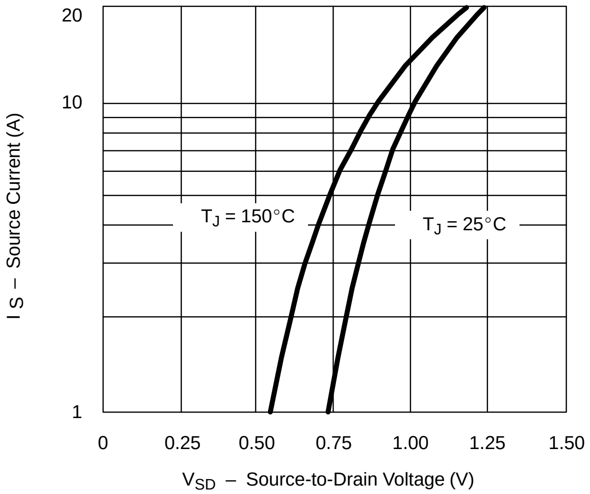
Gate Charge



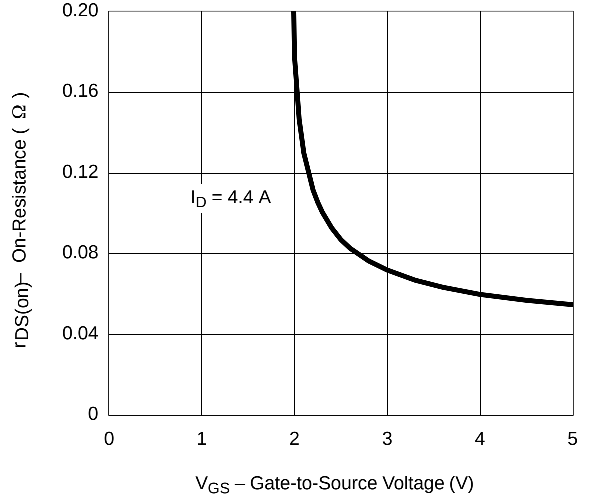
On-Resistance vs. Junction Temperature



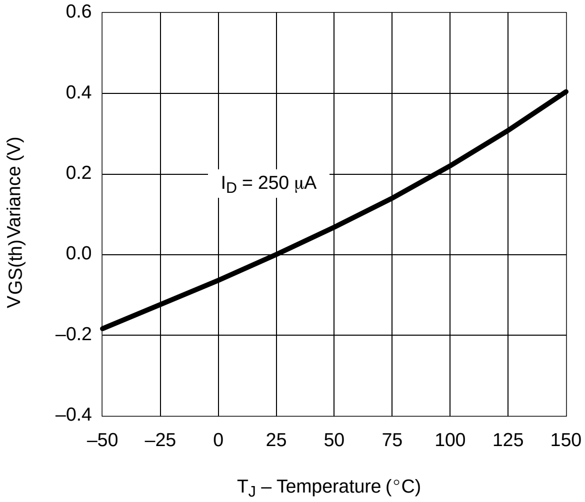
Source-Drain Diode Forward Voltage



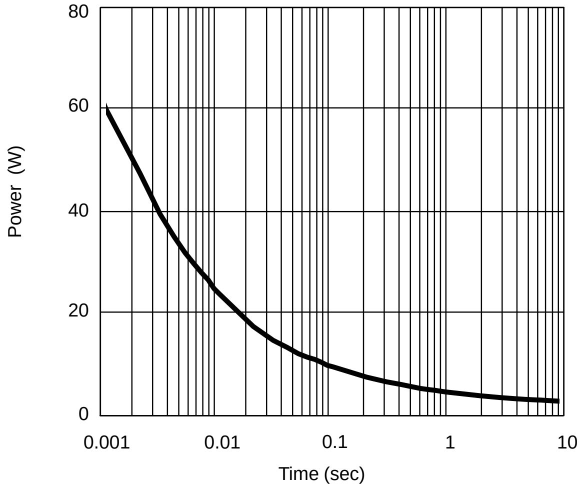
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

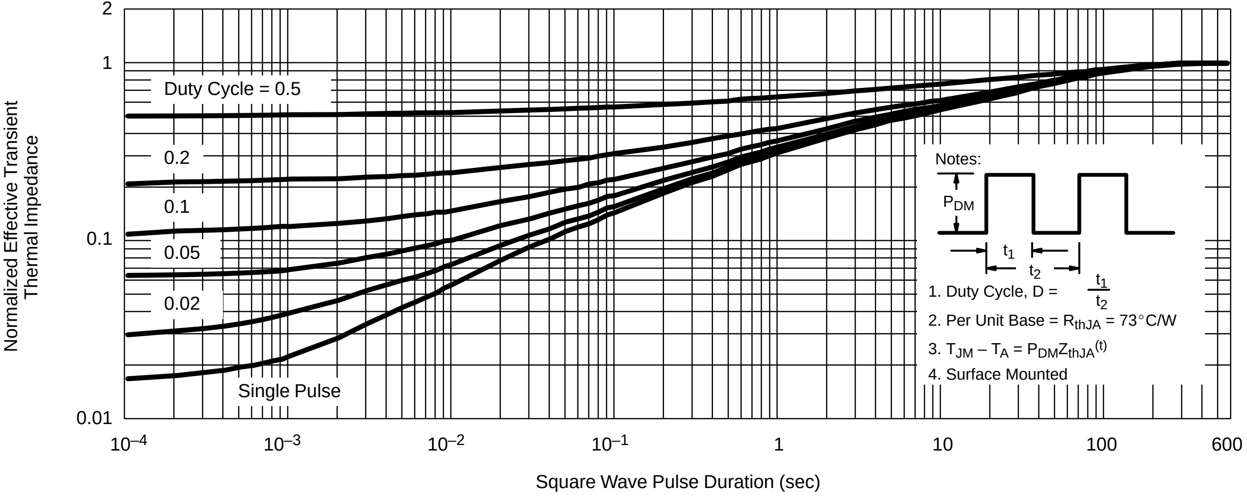


Single Pulse Power, Juncion-To-Ambient



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

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot