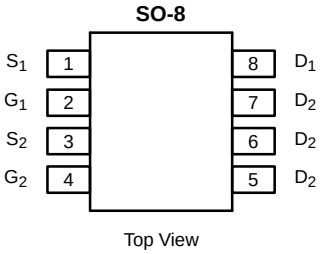
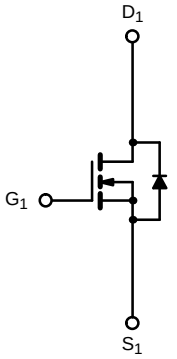
Asymmetric N-Channel, Reduced Q_g, Fast Switching MOSFET

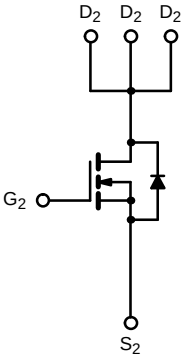
PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel 1	30	0.040 @ V_{GS} = 10 V	±4.7
		0.065 @ V_{GS} = 4.5 V	±3.7
N-Channel 2		0.0175 @ V_{GS} = 10 V	±9
		0.027 @ V_{GS} = 4.5 V	±7.3

High-Efficiency PWM Optimized





N-Channel MOSFET 1



N-Channel MOSFET 2

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	N-Channel 1	N-Channel 2	Unit
Drain-Source Voltage		V_{DS}	30	30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current (T_J = 150°C)[a, b]	T_A = 25°C	I_D	±4.7	±9	A
	T_A = 70°C		±3.7	±7.2	
Pulsed Drain Current		I_{DM}	±40	±60	
Continuous Source Current (Diode Conduction)[a, b]		I_S	1.2	2.0	
Maximum Power Dissipation[a, b]	T_A = 25°C	P_D	1.4	2.25	W
	T_A = 70°C		0.9	1.5	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	–55 to 150	°C

THERMAL RESISTANCE RATINGS						
Parameter			Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	N-Ch 1	t ≤ 10 sec	R_{thJA}		90	°C/W
		Steady State		125		
	N-Ch 2	t ≤ 10 sec			55	
		Steady State		80		

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

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

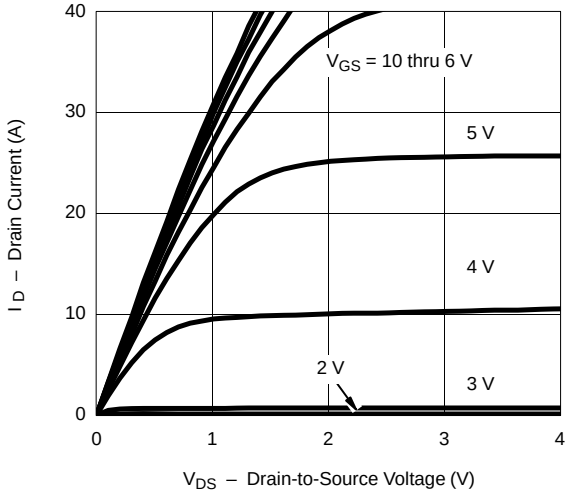
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

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	1.0			V
			N-Ch 2	1.0			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V	N-Ch 1			±100	nA
			N-Ch 2			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V	N-Ch 1			1	µA
			N-Ch 2			1	
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55°C	N-Ch 1			5	
			N-Ch 2			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	N-Ch 1	20			A
			N-Ch 2	30			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 4.7 A	N-Ch 1		0.033	0.040	Ω
		V_{GS} = 10 V, I_D = 9 A	N-Ch 2		0.014	0.0175	
		V_{GS} = 4.5 V, I_D = 3.7 A	N-Ch 1		0.048	0.065	
		V_{GS} = 4.5 V, I_D = 7.3 A	N-Ch 2		0.020	0.027	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 4.7 A	N-Ch 1		12		S
		V_{DS} = 15 V, I_D = 9 A	N-Ch 2		25		
Diode Forward Voltage[a]	V_{SD}	I_S = 1.2 A, V_{GS} = 0 V	N-Ch 1		0.7	1.2	V
		I_S = 2.0 A, V_{GS} = 0 V	N-Ch 2		0.7	1.2	
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel 1 V_{DS} = 15 V, V_{GS} = 5 V, I_D = 4.7 A N-Channel 2 V_{DS} = 15 V, V_{GS} = 5 V, I_D = 9 A	N-Ch 1		6.5	10	nC
			N-Ch 2		17.5	27	
Gate-Source Charge	Q_{gs}		N-Ch 1		3.0		
			N-Ch 2		7.5		
Gate-Drain Charge	Q_{gd}		N-Ch 1		2.5		
			N-Ch 2		6.5		
Turn-On Delay Time	$t_{d(on)}$	N-Channel 1 V_{DD} = 15 V, R_L = 15 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 6 Ω N-Channel 2 V_{DD} = 15 V, R_L = 15 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 6 Ω	N-Ch 1		10	20	ns
			N-Ch 2		15	30	
Rise Time	t_r		N-Ch 1		12	20	
			N-Ch 2		15	30	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch 1		20	35	
			N-Ch 2		45	70	
Fall Time	t_f		N-Ch 1		10	20	
			N-Ch 2		20	35	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.2 A, di/dt = 100 A/µs	N-Ch 1		40	80	
		I_F = 2.0 A, di/dt = 100 A/µs	N-Ch 2		40	80	

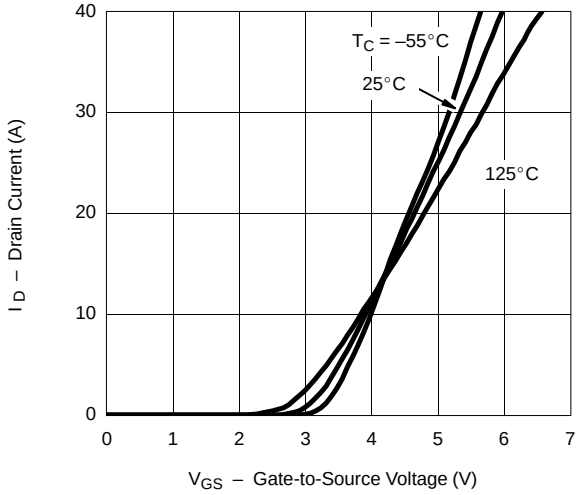
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. For design aid only; not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL 1

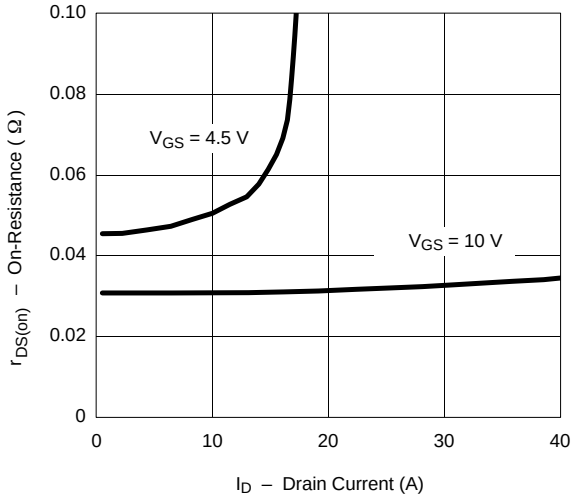
Output Characteristics



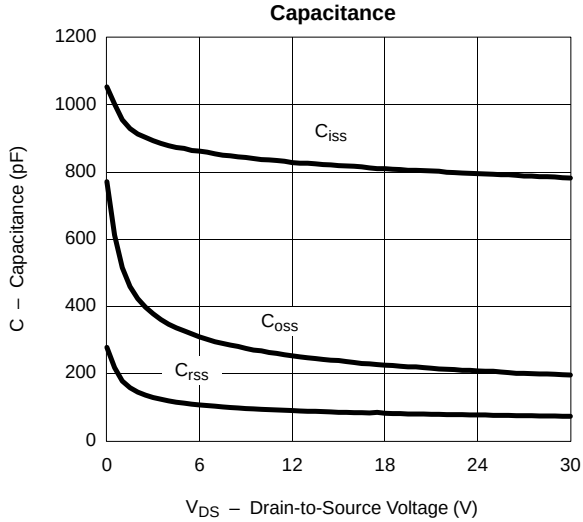
Transfer Characteristics



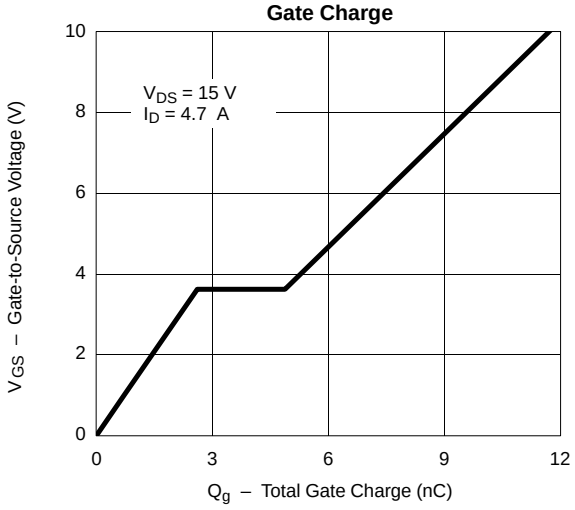
On-Resistance vs. Drain Current



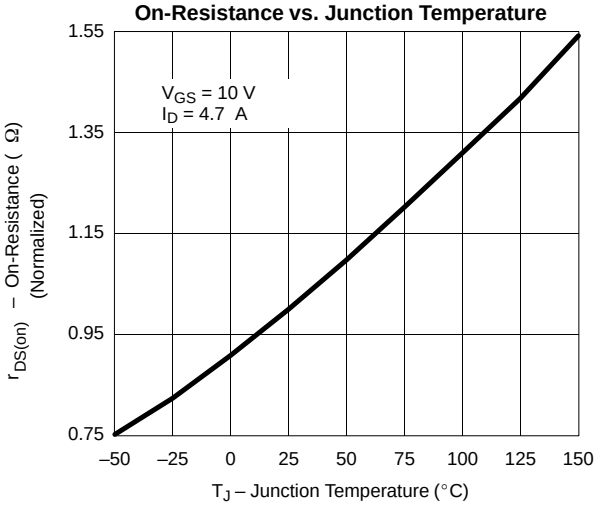
Capacitance



Gate Charge

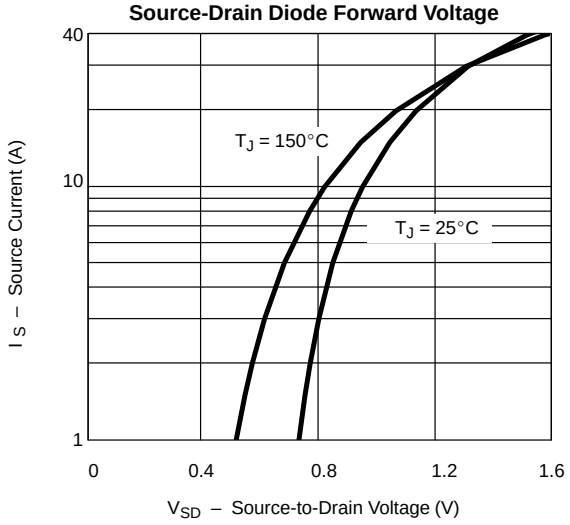


On-Resistance vs. Junction Temperature

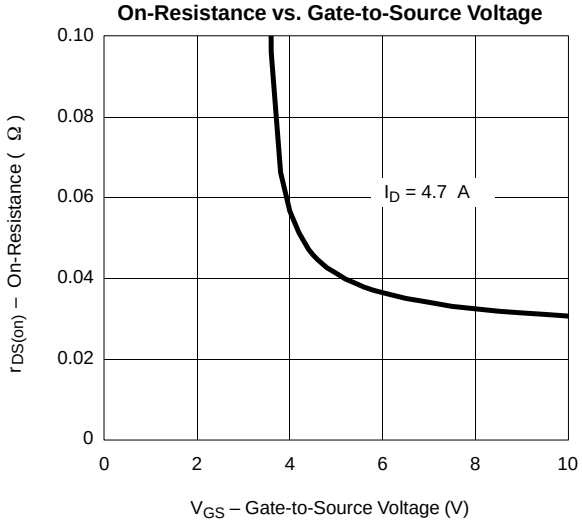


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL 1

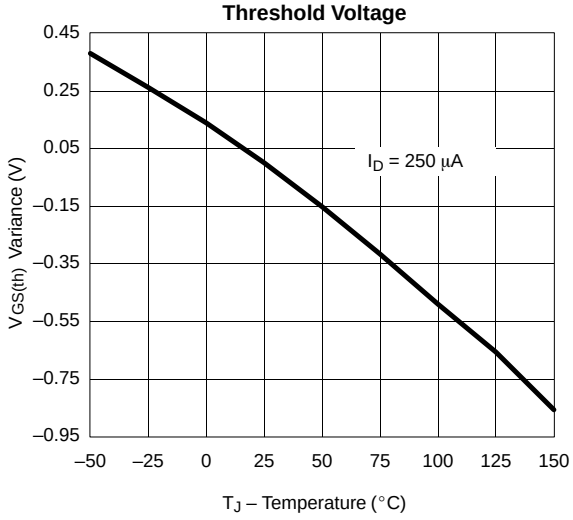
Source-Drain Diode Forward Voltage



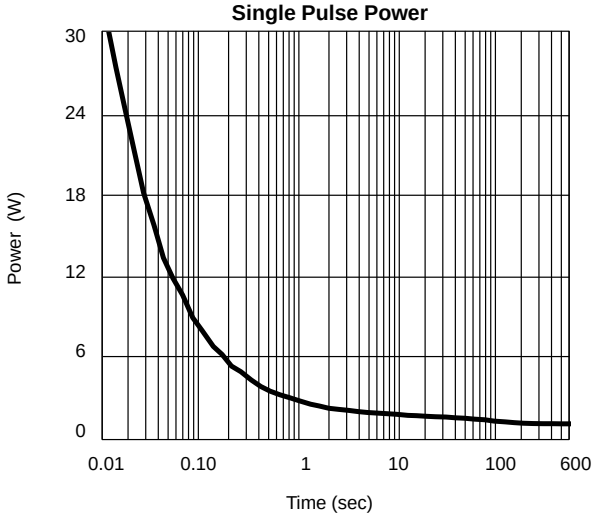
On-Resistance vs. Gate-to-Source Voltage



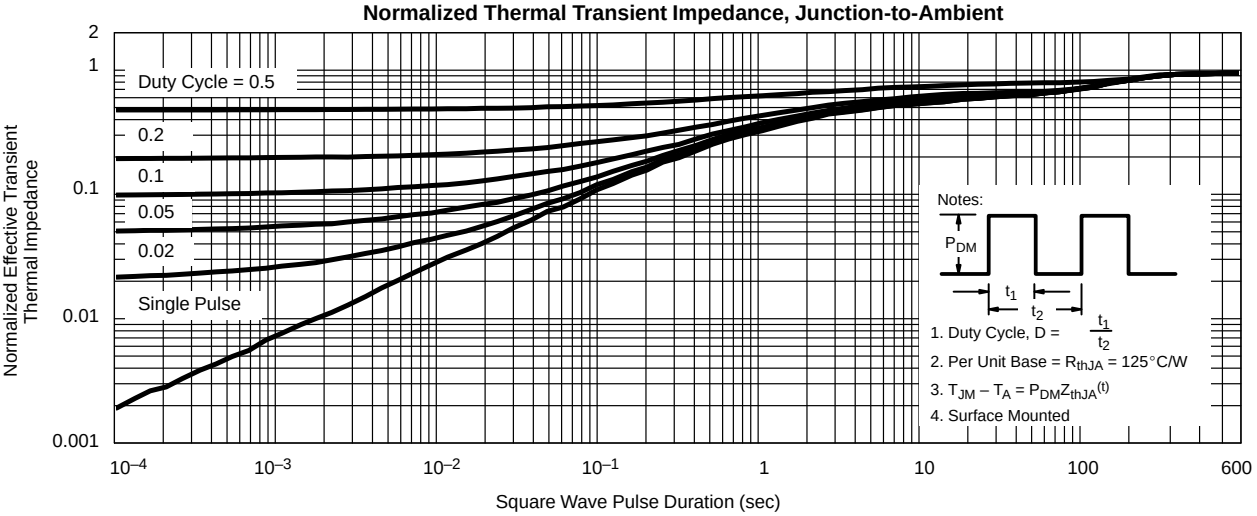
Threshold Voltage



Single Pulse Power

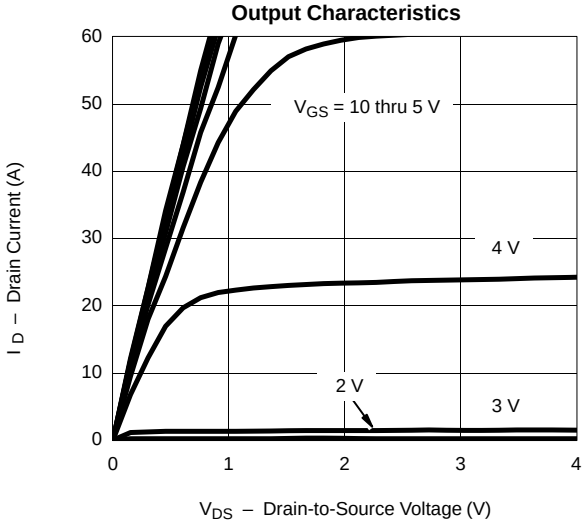


Normalized Thermal Transient Impedance, Junction-to-Ambient

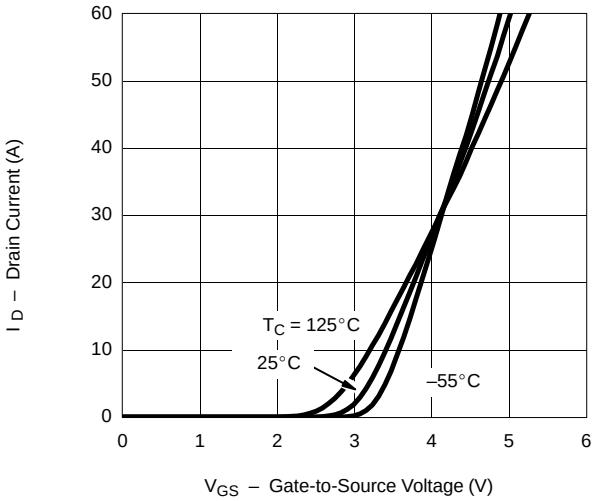


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL 2

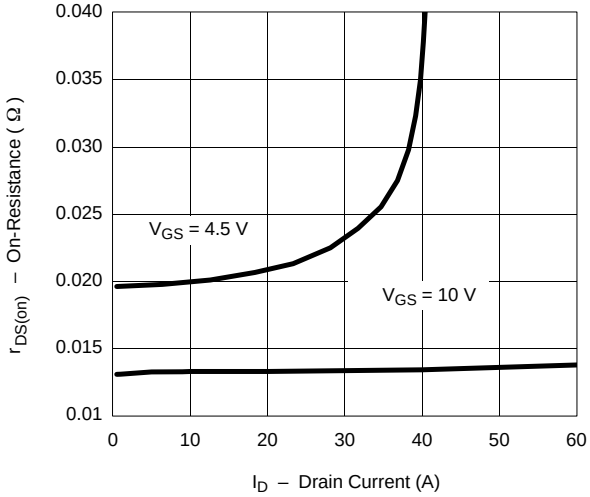
Output Characteristics



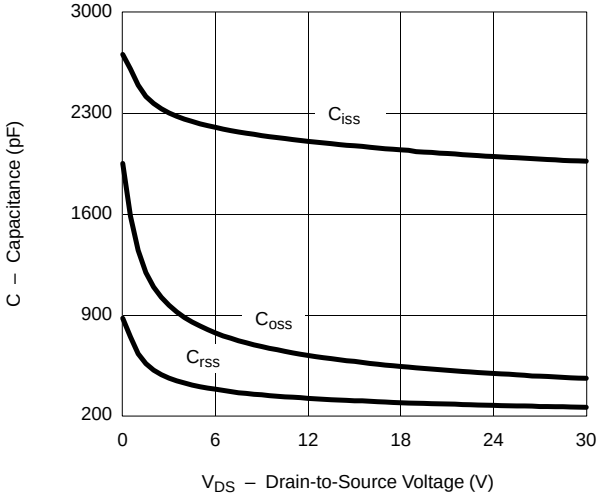
Transfer Characteristics



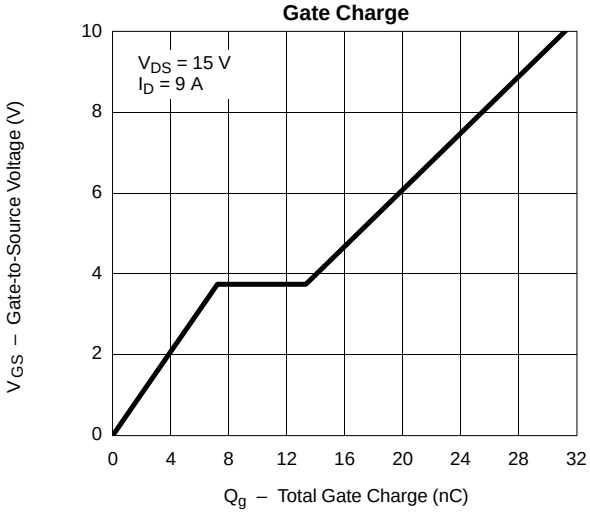
On-Resistance vs. Drain Current



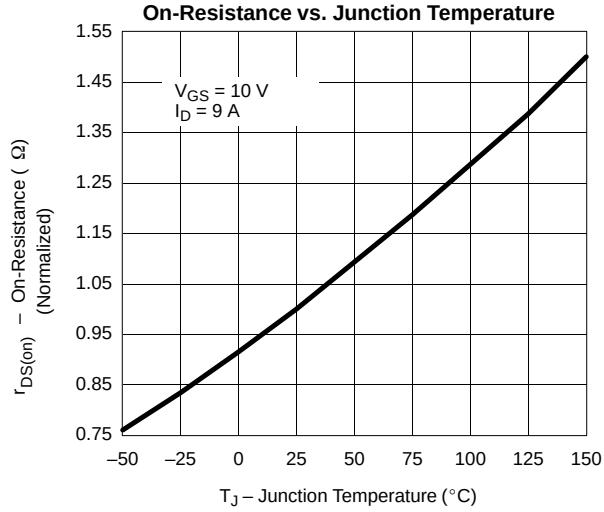
Capacitance



Gate Charge

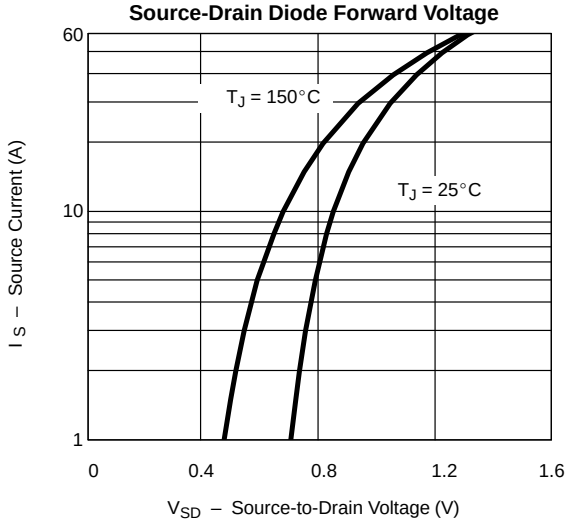


On-Resistance vs. Junction Temperature

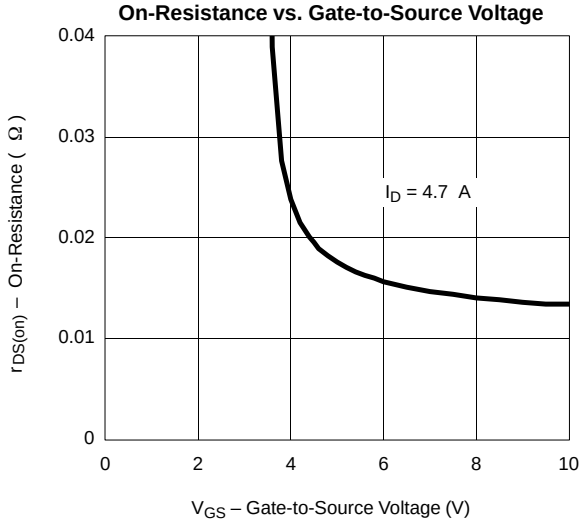


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL 2

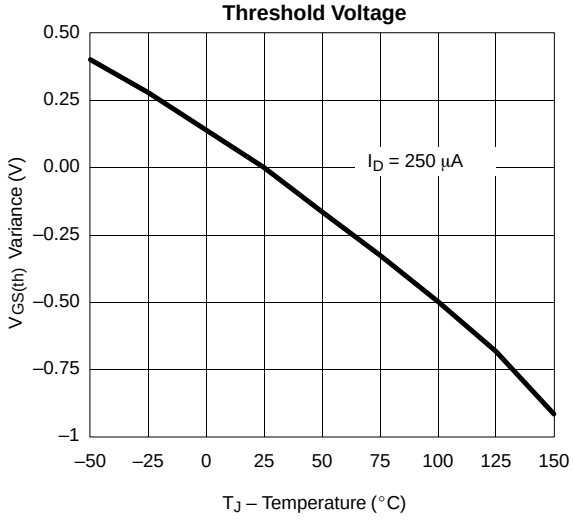
Source-Drain Diode Forward Voltage



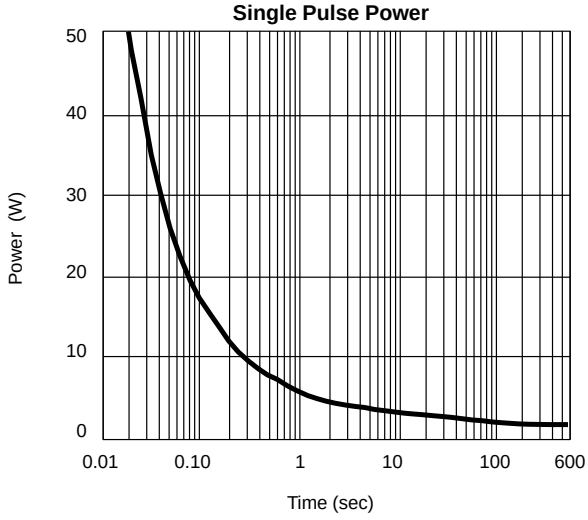
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient