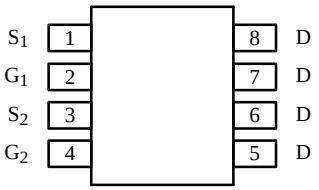
Complementary MOSFET Half-Bridge (N- and P-Channel)

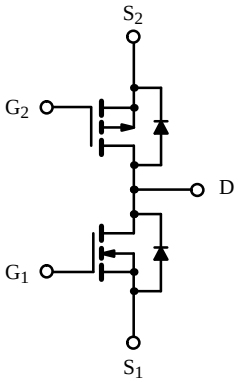
Product Summary

	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	30	0.040 @ V_{GS} = 10 V	± 6
		0.060 @ V_{GS} = 4.5 V	± 4.8
P-Channel	–30	0.040 @ V_{GS} = –10 V	± 6
		0.070 @ V_{GS} = –4.5 V	± 4.4

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}	30	–30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	± 6	± 6	A
	T_A = 70°C		± 4.7	± 4.7	
Pulsed Drain Current		I_{DM}	± 30	± 30	
Continuous Source Current (Diode Conduction)[a]		I_S	2	–2	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	2.4		W
	T_A = 70°C		1.5		
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}	52	°C/W

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

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70633.

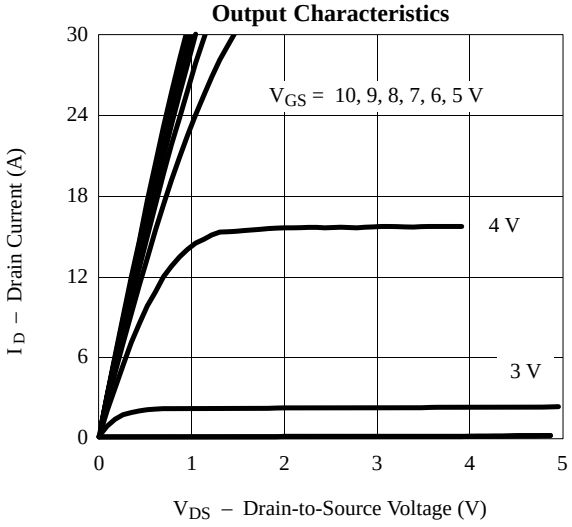
Specifications (T_J = 25°C Unless Otherwise Noted)

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	1.0			V
		V_{DS} = V_{GS}, I_D = –250 µA	P-Ch	–1.0			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	N-Ch			1	µA
		V_{DS} = –30 V, V_{GS} = 0 V	P-Ch			–1	
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 70°C	N-Ch			5	
		V_{DS} = –24 V, V_{GS} = 0 V, T_J = 70°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} = –10 V	P-Ch	–30			
		V_{DS} = 5 V, V_{GS} = 4.5 V	N-Ch	8.0			
		V_{DS} = –5 V, V_{GS} = –4.5 V	P-Ch	–8.0			
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 6 A	N-Ch		0.032	0.040	Ω
		V_{GS} = –10 V, I_D = 6 A	P-Ch		0.032	0.040	
		V_{GS} = 4.5 V, I_D = 4.8 A	N-Ch		0.045	0.060	
		V_{GS} = –4.5 V, I_D = 4.4 A	P-Ch		0.056	0.070	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 6 A	N-Ch		13		S
		V_{DS} = –15 V, I_D = –6 A	P-Ch		10.6		
Diode Forward Voltage[b]	V_{SD}	I_S = 2 A, V_{GS} = 0 V	N-Ch		0.77	1.2	V
		I_S = –2 A, V_{GS} = 0 V	P-Ch		0.77	–1.2	
Dynamic[a]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 15 V, V_{GS} = 10 V, I_D = 6 A P-Channel V_{DS} = –15 V, V_{GS} = –10 V I_D = –6 A	N-Ch		16	30	nC
			P-Ch		22	35	
Gate-Source Charge	Q_{gs}		N-Ch		3.4		
			P-Ch		5.4		
Gate-Drain Charge	Q_{gd}		N-Ch		2.3		
			P-Ch		3.6		
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} = –15 V, R_L = 15 Ω I_D ≅ –1 A, V_{GEN} = –10 V, R_G = 6 Ω	N-Ch		12	25	ns
			P-Ch		12	25	
Rise Time	t_r		N-Ch		12	25	
			P-Ch		12	25	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		27	55	
			P-Ch		38	55	
Fall Time	t_f		N-Ch		24	50	
			P-Ch		25	50	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 2 A, di/dt = 100 A/µs	N-Ch		45	80	
			P-Ch		50	80	

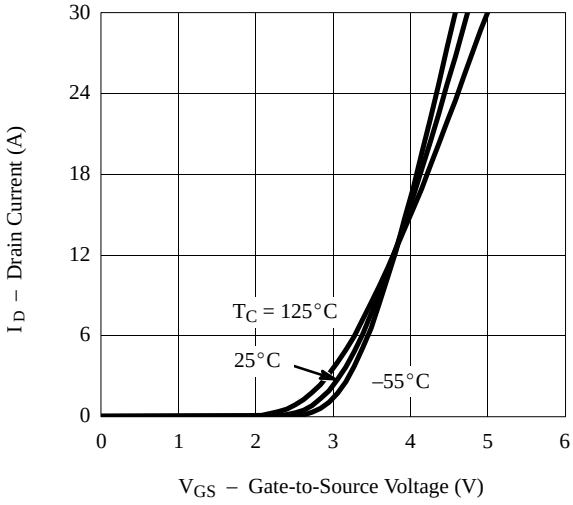
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

Typical Characteristics (25°C Unless Otherwise Noted) N-Channel

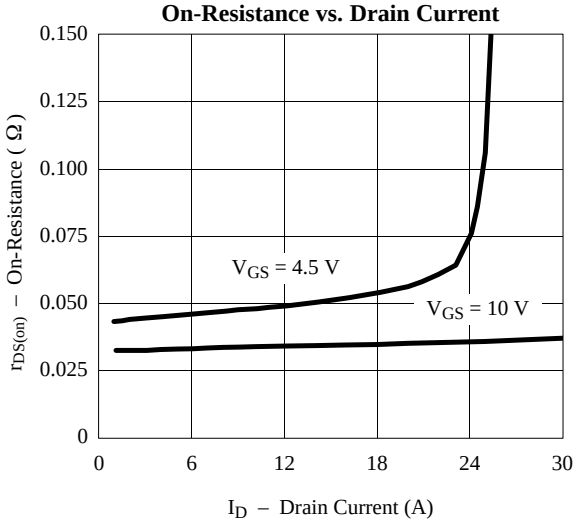
Output Characteristics



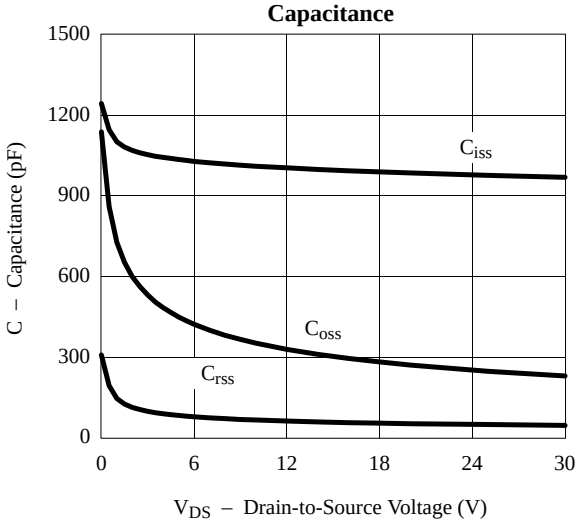
Transfer Characteristics



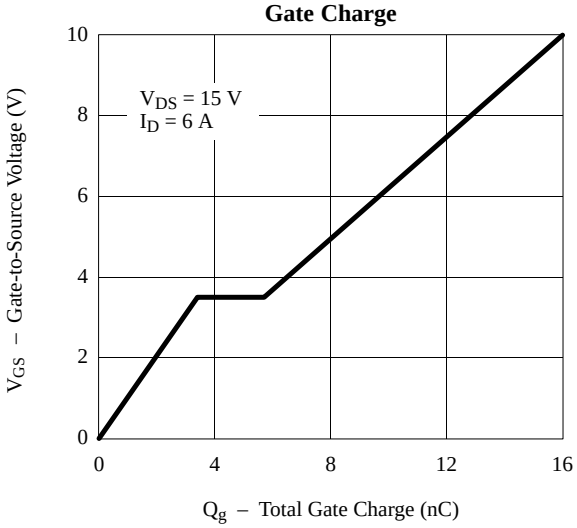
On-Resistance vs. Drain Current



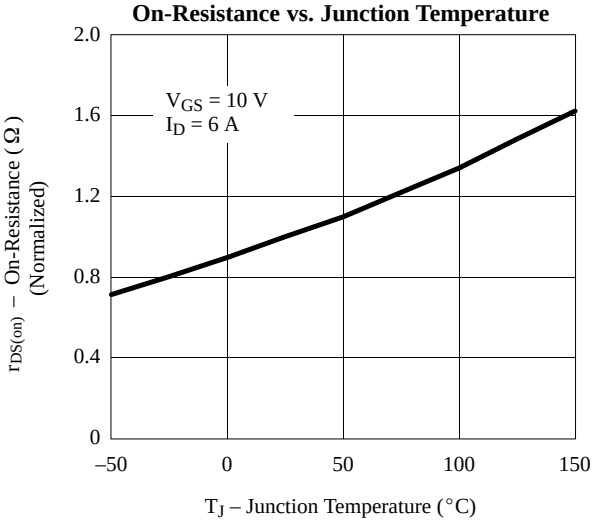
Capacitance



Gate Charge

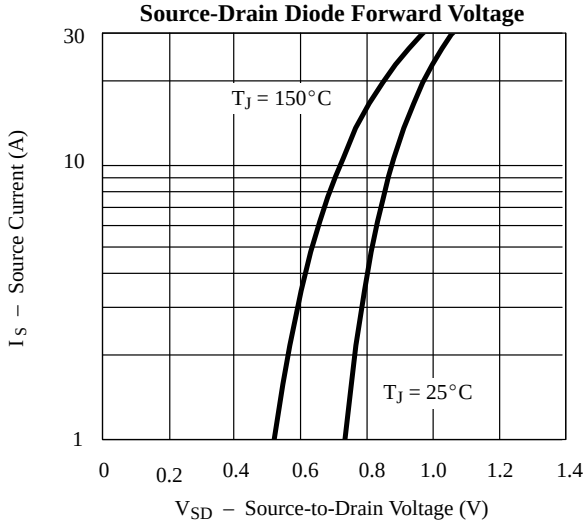


On-Resistance vs. Junction Temperature

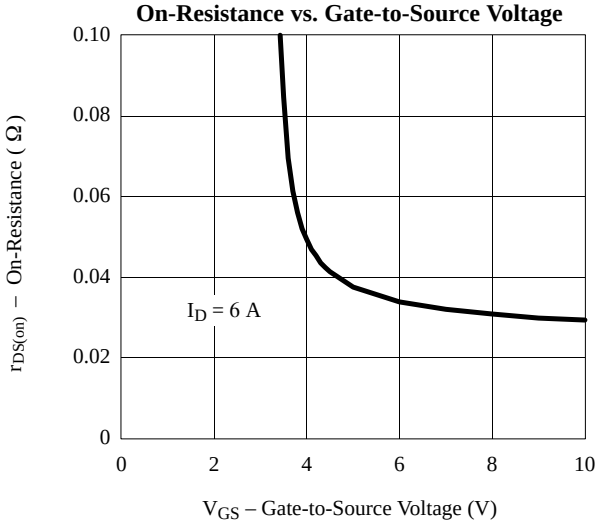


Typical Characteristics (25°C Unless Otherwise Noted) N-Channel

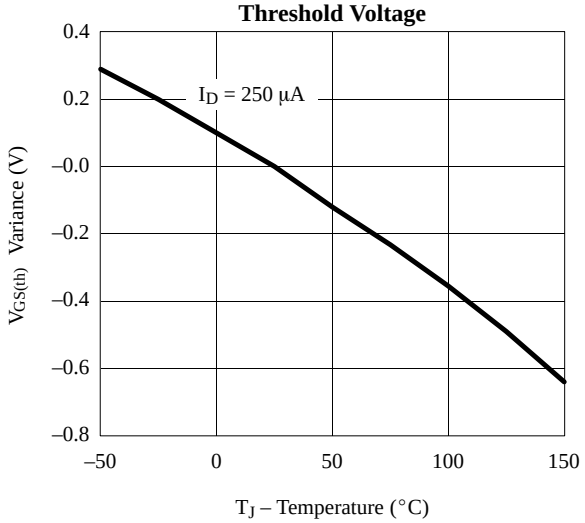
Source-Drain Diode Forward Voltage



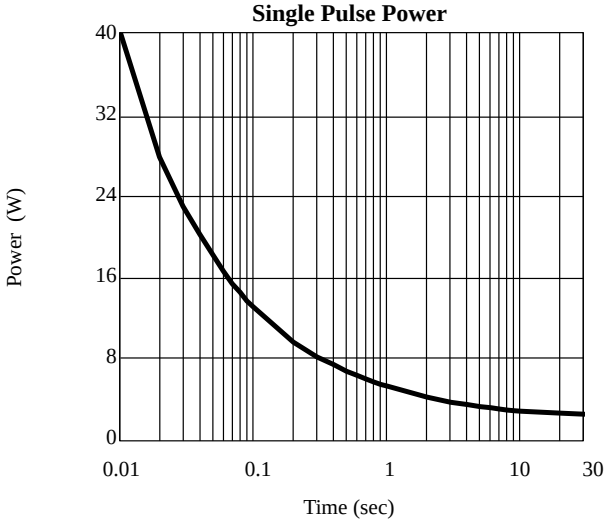
On-Resistance vs. Gate-to-Source Voltage



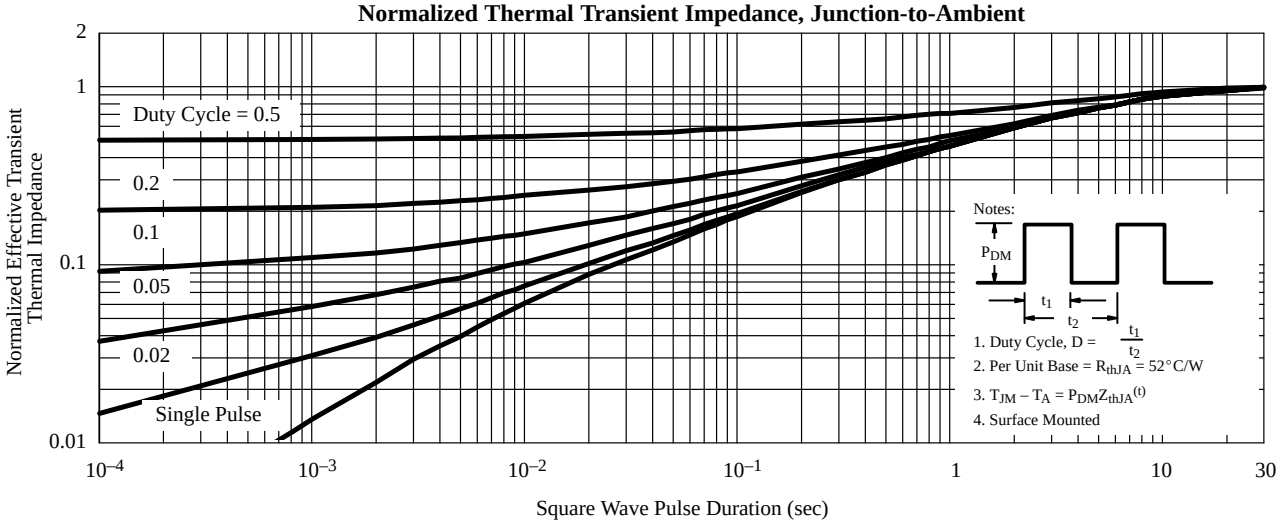
Threshold Voltage



Single Pulse Power

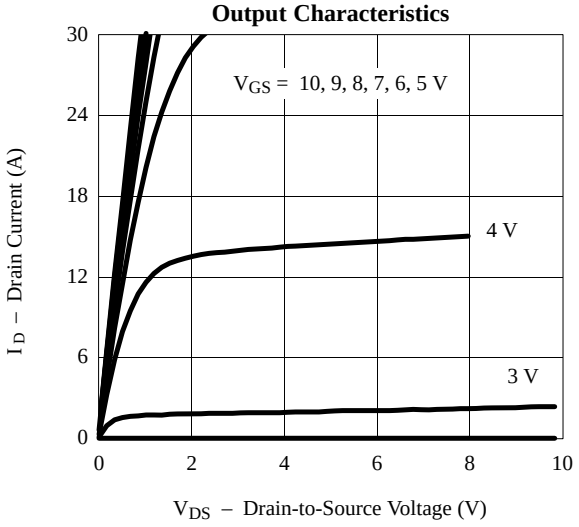


Normalized Thermal Transient Impedance, Junction-to-Ambient

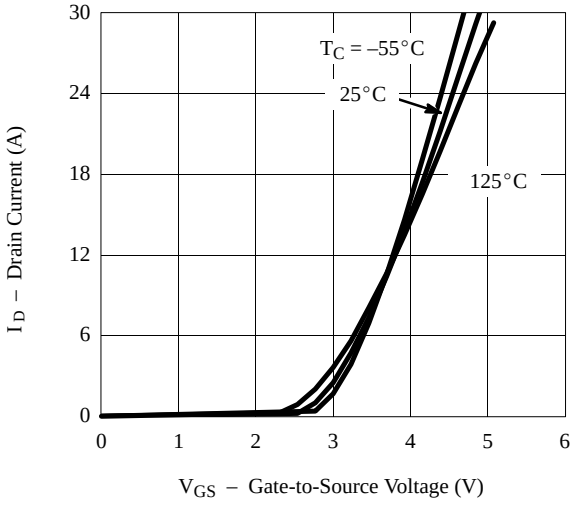


Typical Characteristics (25°C Unless Otherwise Noted) P-Channel

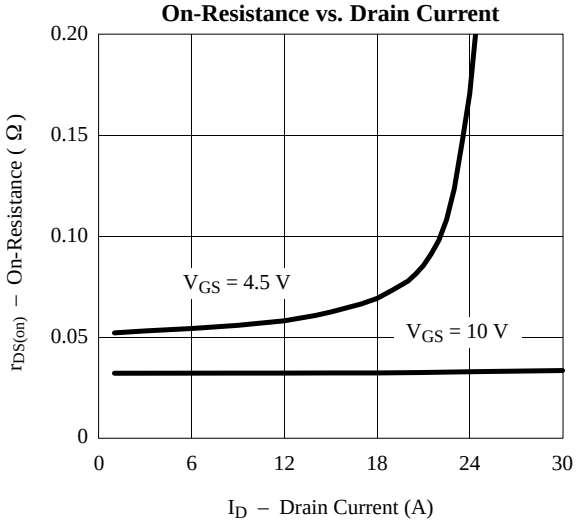
Output Characteristics



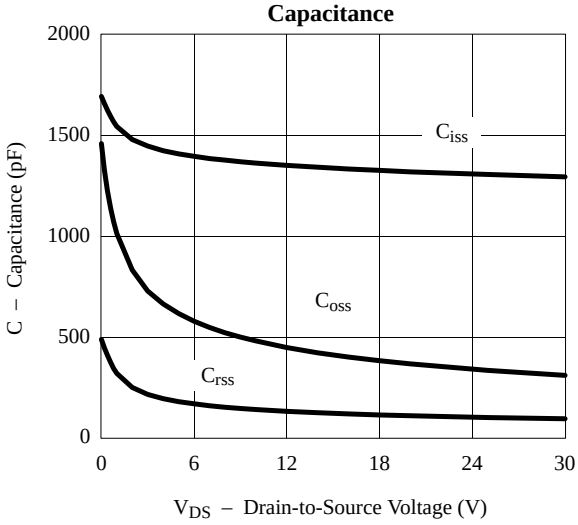
Transfer Characteristics



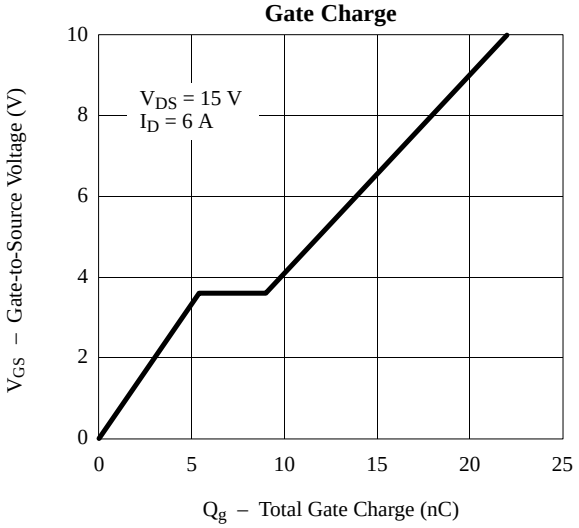
On-Resistance vs. Drain Current



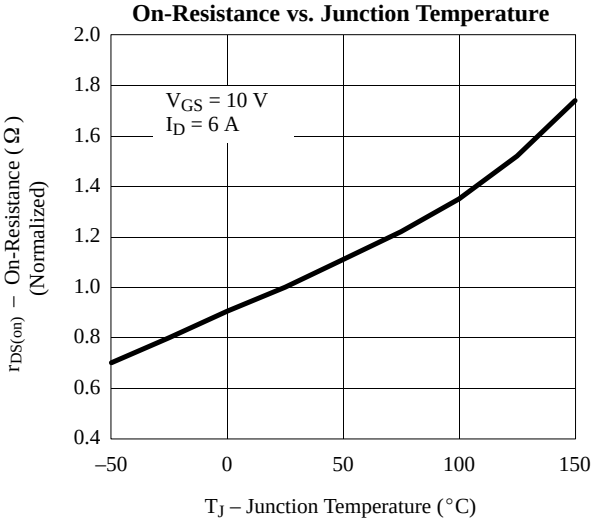
Capacitance



Gate Charge

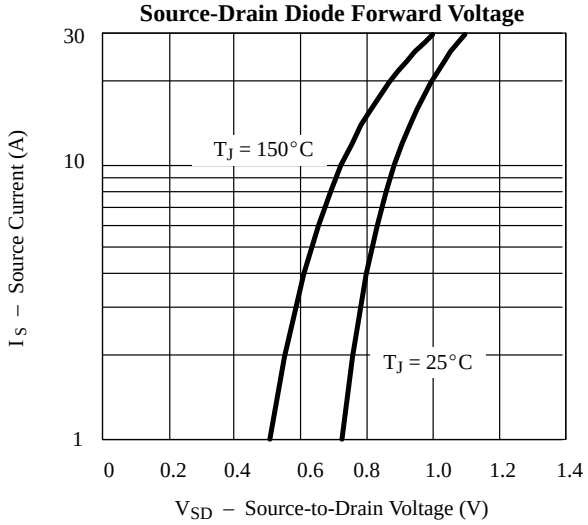


On-Resistance vs. Junction Temperature

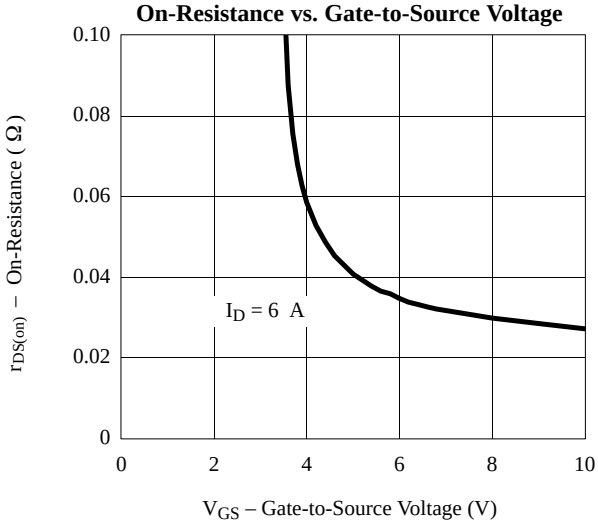


Typical Characteristics (25°C Unless Otherwise Noted) P-Channel

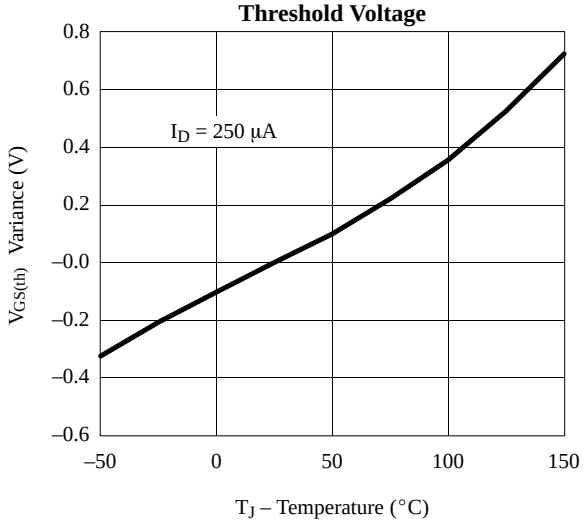
Source-Drain Diode Forward Voltage



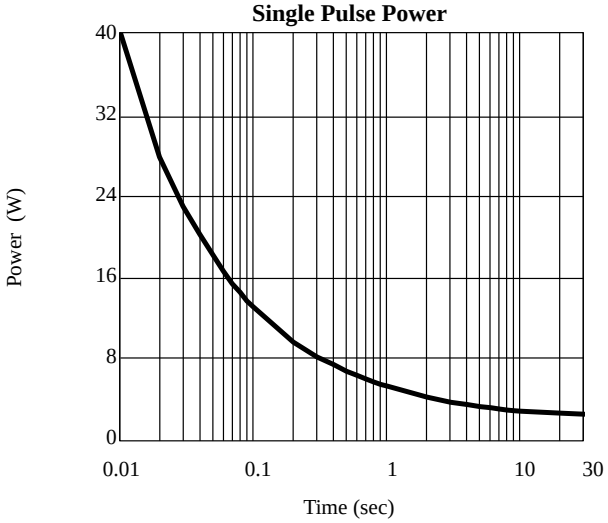
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient