Complementary 20-V (D-S) Low-Threshold MOSFET

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.280 @ V_{GS} = 4.5 V	1.28
		0.360 @ V_{GS} = 2.5 V	1.13
		0.450 @ V_{GS} = 1.8 V	1.00
P-Channel	–20	0.490 @ V_{GS} = –4.5 V	–1.00
		0.750 @ V_{GS} = –2.5 V	–0.81
		1.10 @ V_{GS} = –1.8 V	–0.67

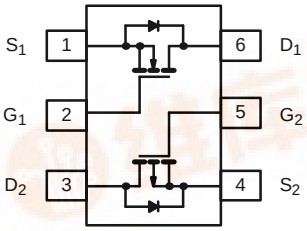
FEATURES

- TrenchFET® Power MOSFETS: 1.8-V Rated
- ESD Protected: 2000 V
- Thermally Enhanced SC-70 Package

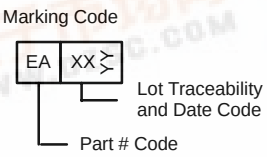
APPLICATIONS

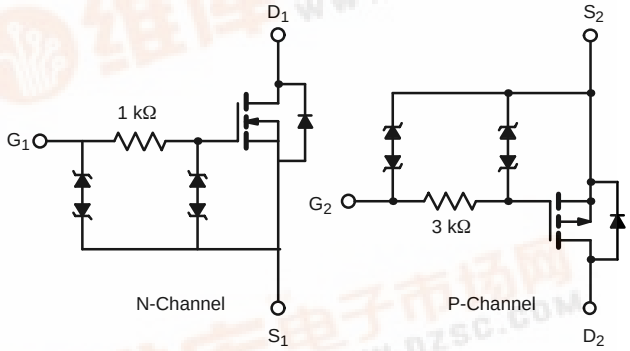
- Load Switching
- PA Switch
- Level Switch

SOT-363
SC-70 (6-LEADS)



Top View





ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)							
Parameter		Symbol	N-Channel		P-Channel		Unit
			5 secs	Steady State	5 secs	Steady State	
Drain-Source Voltage		V_{DS}	20		–20		V
Gate-Source Voltage		V_{GS}	±12		±12		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	1.28	1.13	–1.00	–0.88	A
	T_A = 85°C		0.92	0.81	–0.72	–0.63	
Pulsed Drain Current		I_{DM}	4.0		–3.0		
Continuous Source Current (Diode Conduction)[a]		I_S	0.61	0.48	–0.61	–0.48	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	0.74	0.57	0.30	0.57	W
	T_A = 85°C		0.38	0.30	0.16	0.3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150				°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 5 sec	R_{thJA}	130	170	°C/W
	Steady State		170	220	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	80	100	

Notes:
a. Surface Mounted on 1” x 1” FR4 Board.

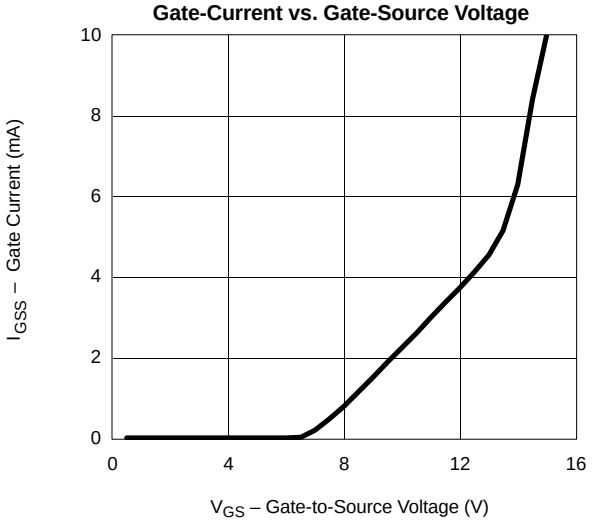
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 100 μA	N-Ch	0.45			V
		V_{DS} = V_{GS}, I_D = –100 μA	P-Ch	–0.45			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±4.5 V	N-Ch			±1	μA
			P-Ch			±1	
		V_{DS} = 0 V, V_{GS} = ±12 V	N-Ch			±10	mA
			P-Ch			±10	
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 = 85°C	N-Ch			5	
		V_{DS} = –16 V, V_{GS} = 0 V, T_J = 85°C	P-Ch			–5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 4.5 V	N-Ch	2			A
		V_{DS} ≤ –5 V, V_{GS} = –4.5 V	P-Ch	–2			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 1.13 A	N-Ch		0.220	0.280	Ω
		V_{GS} = –4.5 V, I_D = –0.88 A	P-Ch		0.400	0.490	
		V_{GS} = 2.5 V, I_D = 0.99 A	N-Ch		0.281	0.360	
		V_{GS} = –2.5 V, I_D = –0.71 A	P-Ch		0.610	0.750	
		V_{GS} = 1.8 V, I_D = 0.20 A	N-Ch		0.344	0.450	
		V_{GS} = –1.8 V, I_D = –0.20 A	P-Ch		0.850	1.10	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 1.13 A	N-Ch		2.6		S
		V_{DS} = –10 V, I_D = –0.88 A	P-Ch		1.5		
Diode Forward Voltage[a]	V_{SD}	I_S = 0.48 A, V_{GS} = 0 V	N-Ch		0.8	1.2	V
		I_S = –0.48 A, V_{GS} = 0 V	P-Ch		–0.8	–1.2	
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 1.13 A P-Channel V_{DS} = –10 V, V_{GS} = –4.5 V, I_D = –0.88 A	N-Ch		0.65	1.0	nC
			P-Ch		1.2	1.8	
Gate-Source Charge	Q_{gs}		N-Ch		0.2		
			P-Ch		0.3		
Gate-Drain Charge	Q_{gd}		N-Ch		0.23		
			P-Ch		0.3		
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 10 V, R_L = 20 Ω I_D ≅ 0.5 A, V_{GEN} = 4.5 V, R_G = 6 Ω P-Channel V_{DD} = –10 V, R_L = 20 Ω I_D ≅ –0.5 A, V_{GEN} = –4.5 V, R_G = 6 Ω	N-Ch		45	70	ns
			P-Ch		150	230	
Rise Time	t_r		N-Ch		85	130	
			P-Ch		480	720	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		350	530	
			P-Ch		840	1200	
Fall Time	t_f		N-Ch		210	320	
			P-Ch		850	1200	

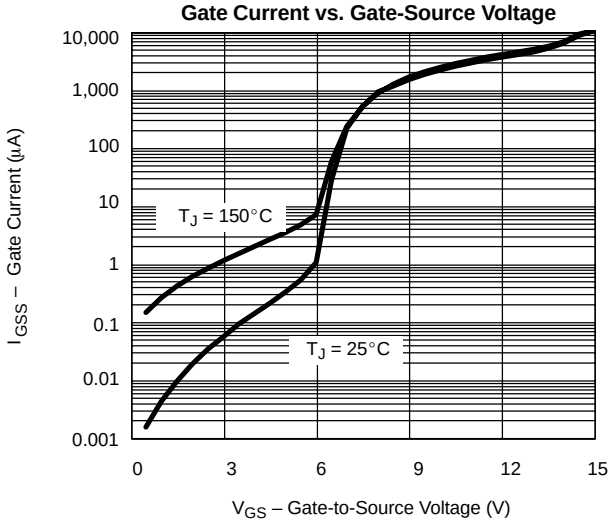
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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

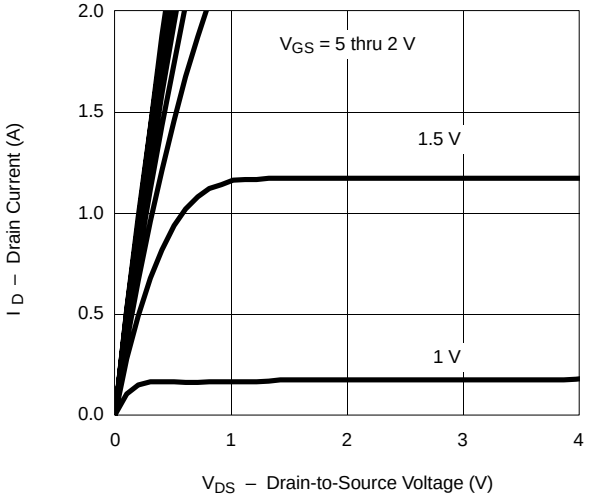
Gate-Current vs. Gate-Source Voltage



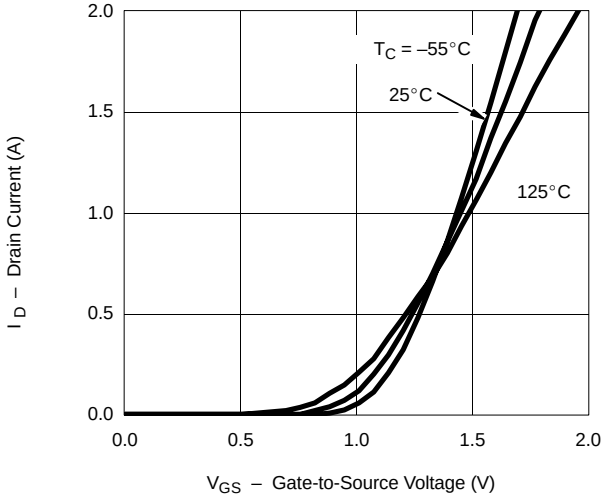
Gate Current vs. Gate-Source Voltage



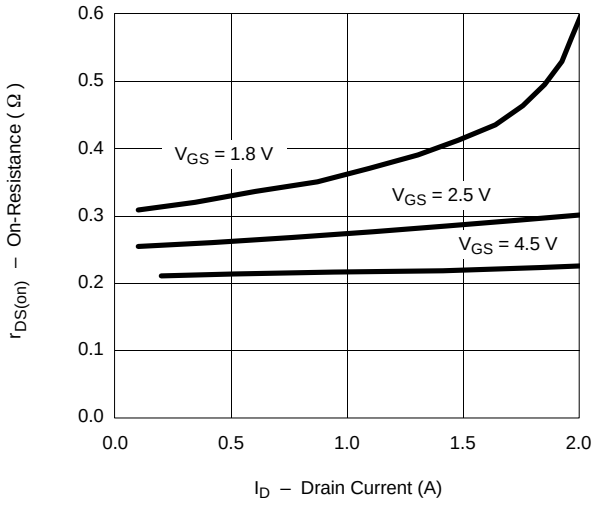
Output Characteristics



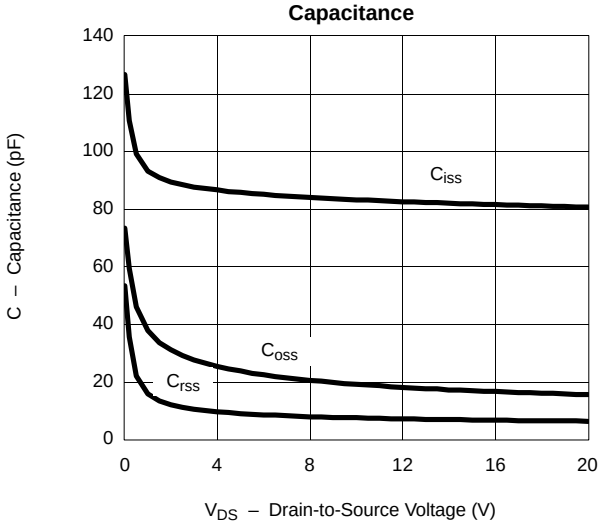
Transfer Characteristics



On-Resistance vs. Drain Current

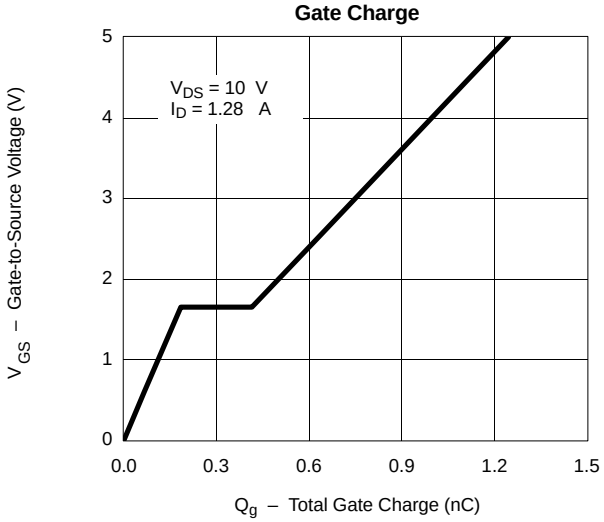


Capacitance

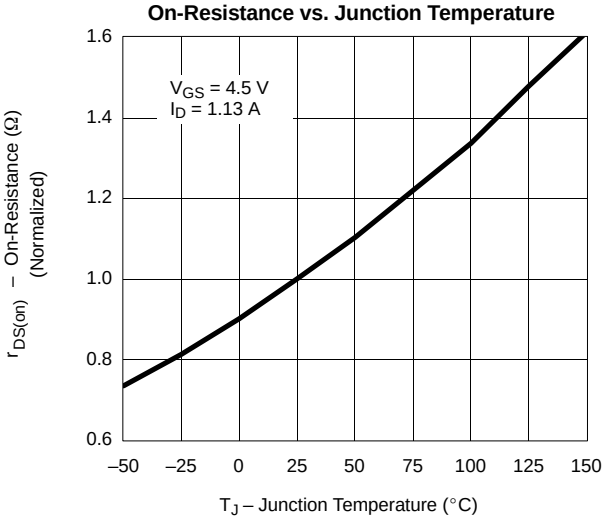


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

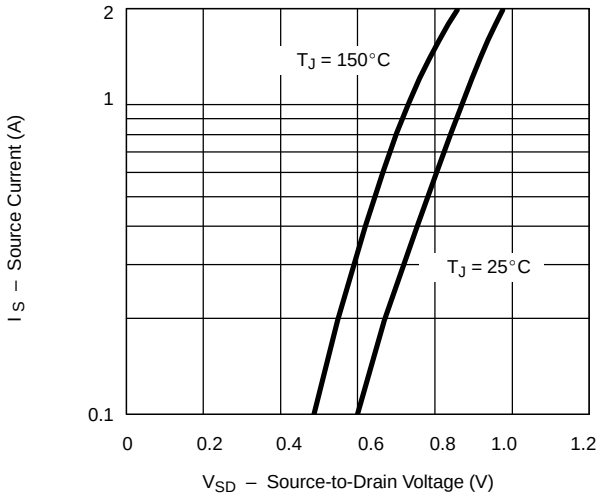
Gate Charge



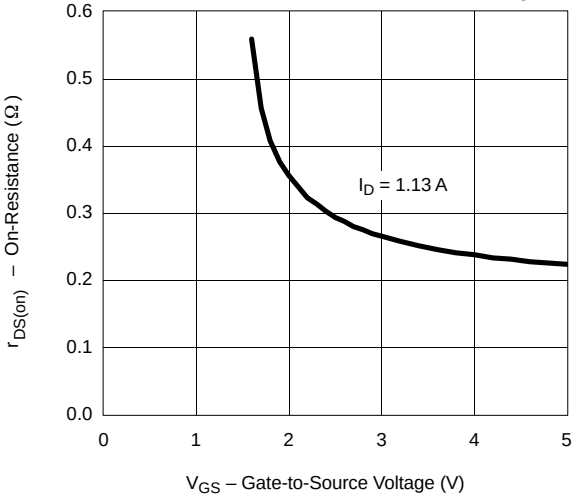
On-Resistance vs. Junction Temperature



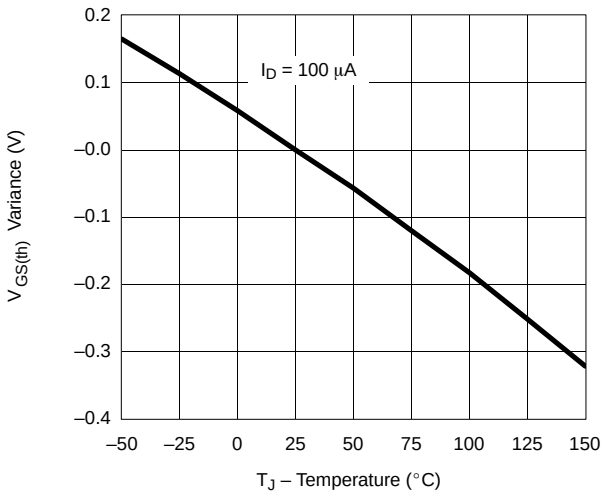
Source-Drain Diode Forward Voltage



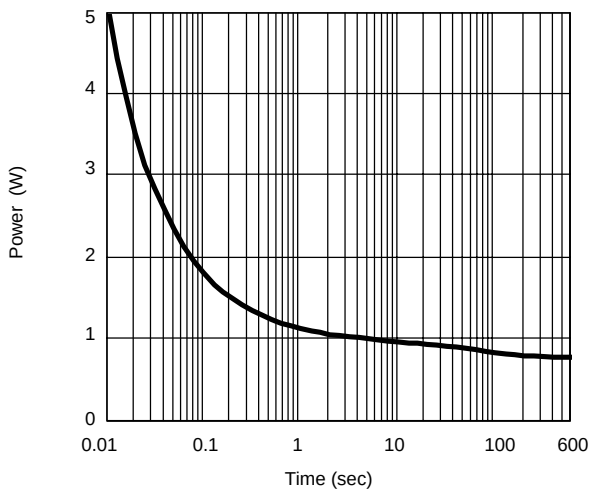
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

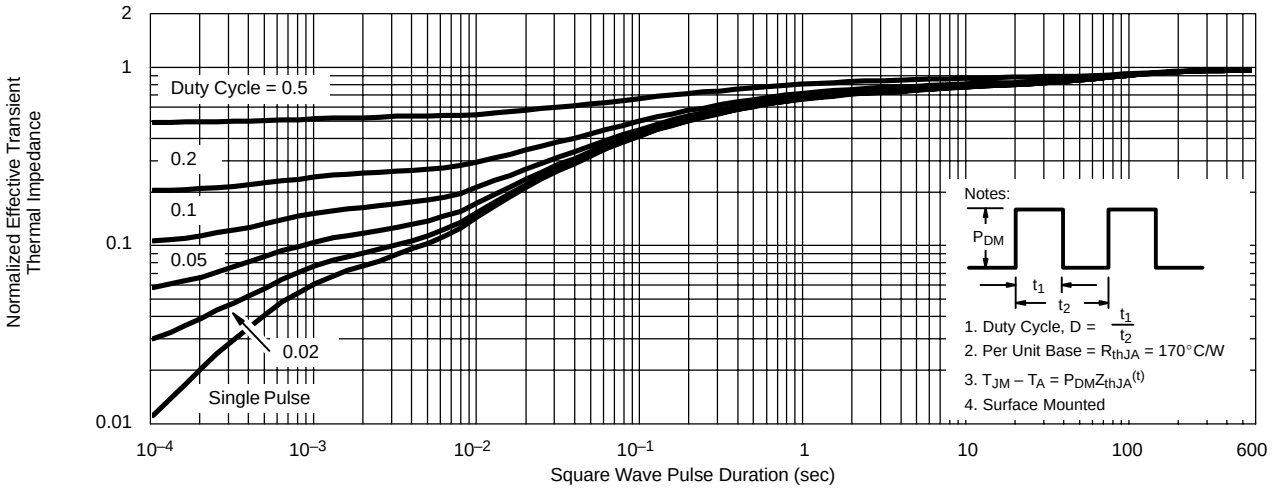


Single Pulse Power, Junction-to-Ambient

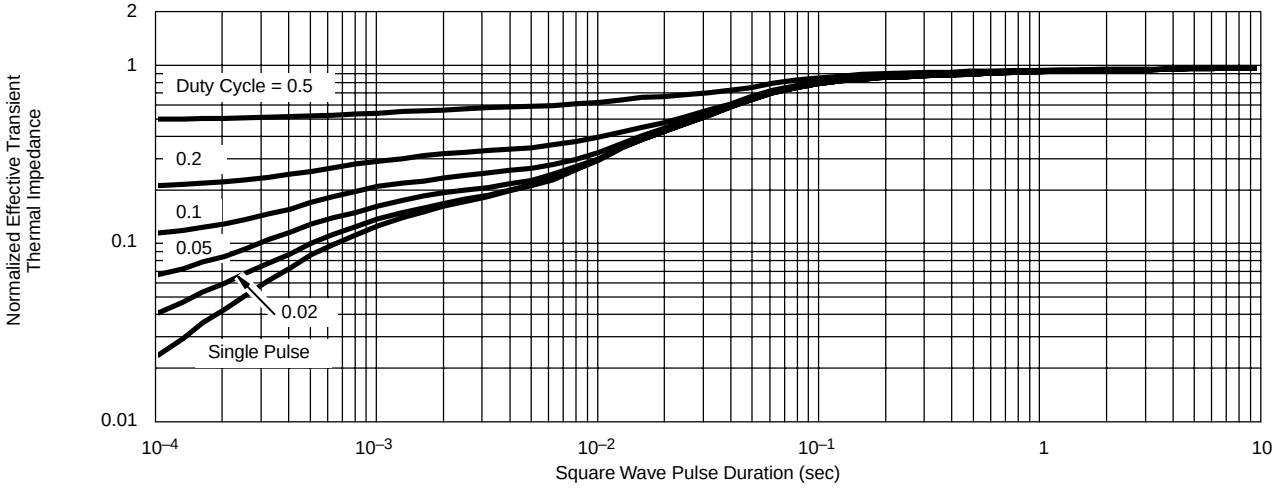


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient

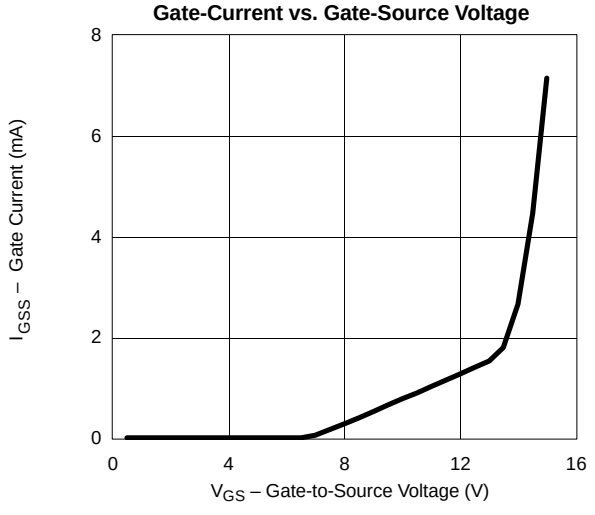


Normalized Thermal Transient Impedance, Junction-to-Foot

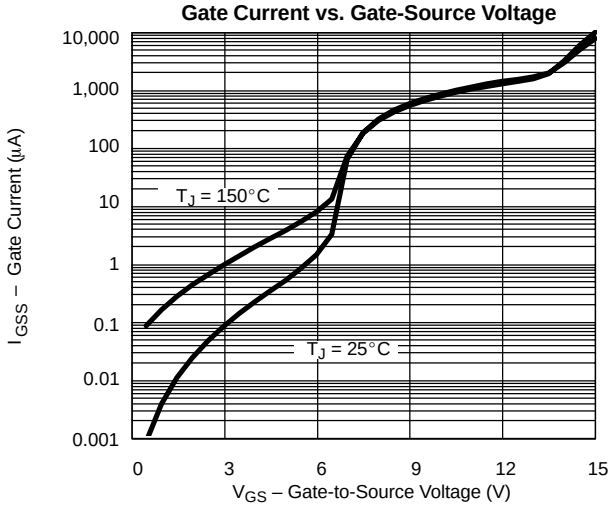


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

Gate-Current vs. Gate-Source Voltage

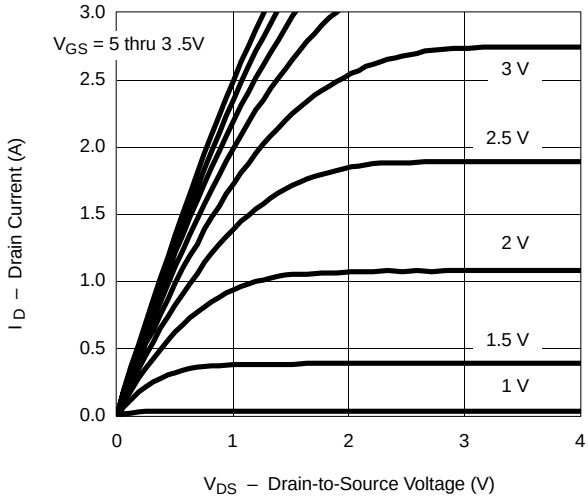


Gate Current vs. Gate-Source Voltage

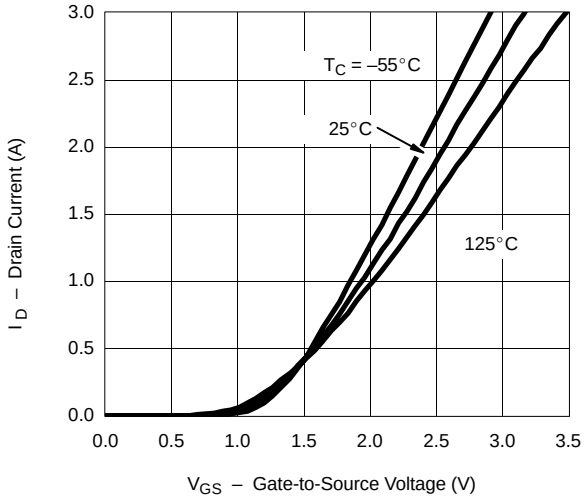


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

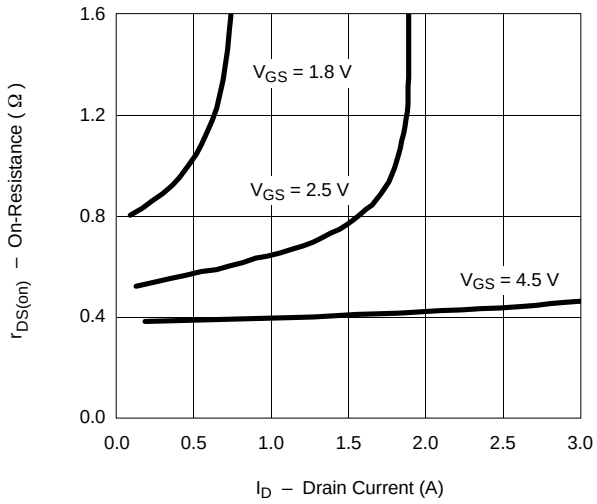
Output Characteristics



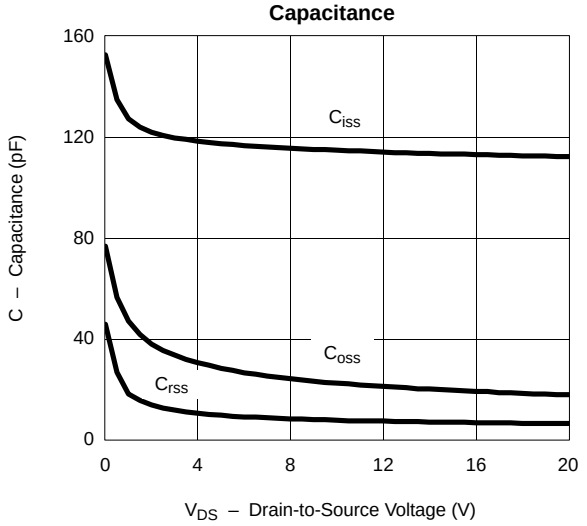
Transfer Characteristics



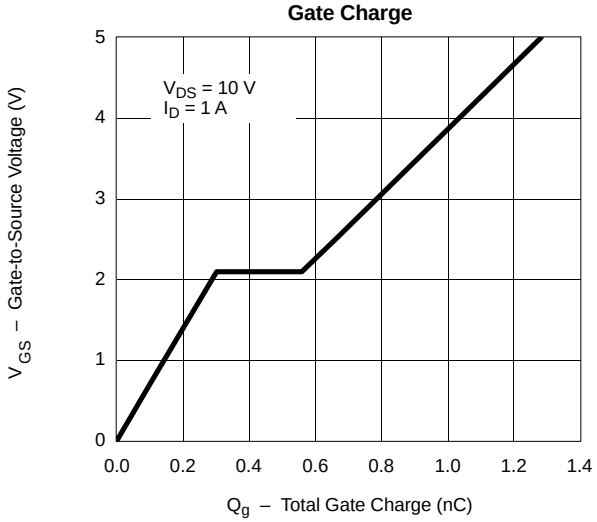
On-Resistance vs. Drain Current



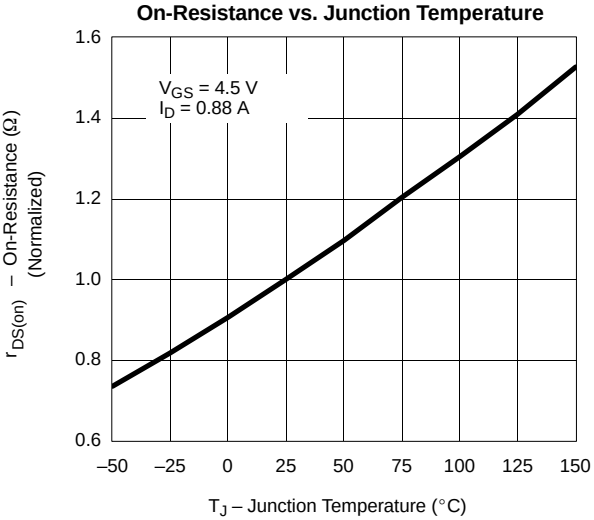
Capacitance



Gate Charge

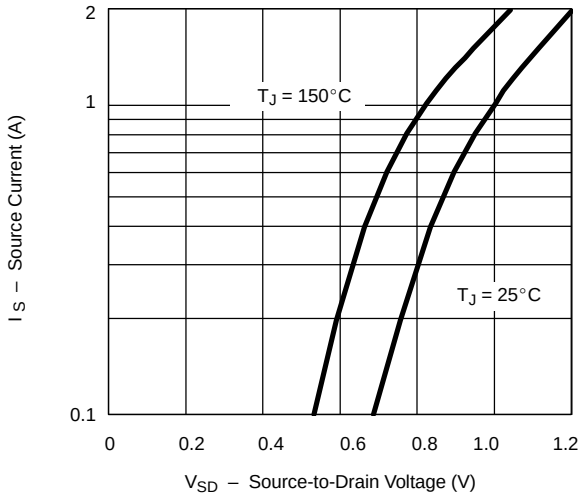


On-Resistance vs. Junction Temperature

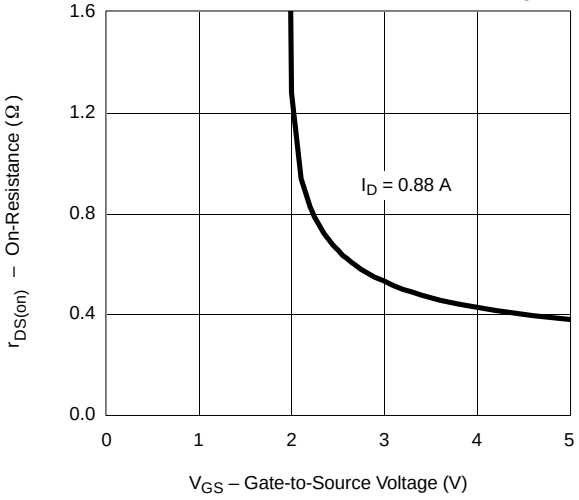


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

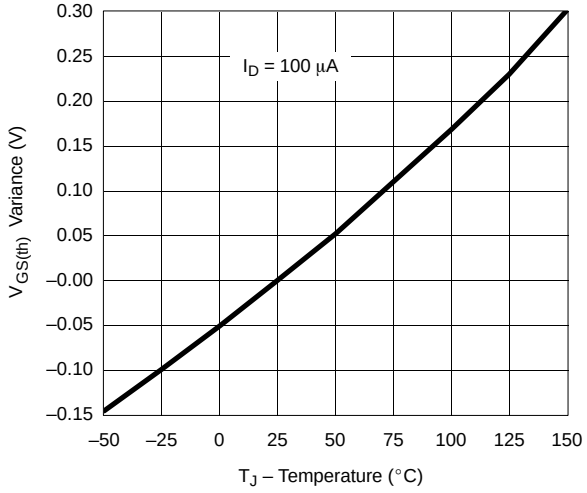
Source-Drain Diode Forward Voltage



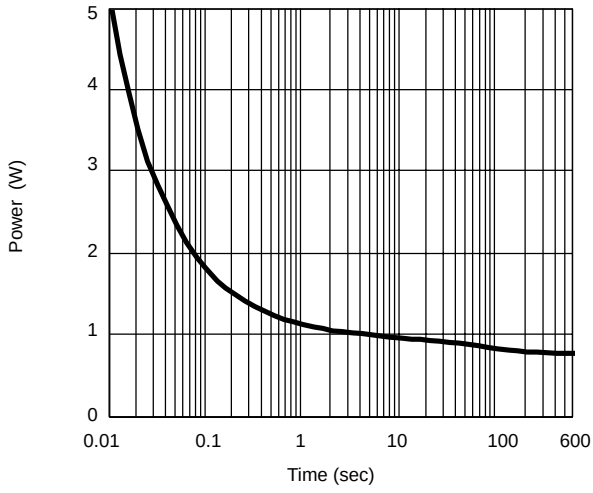
On-Resistance vs. Gate-to-Source Voltage



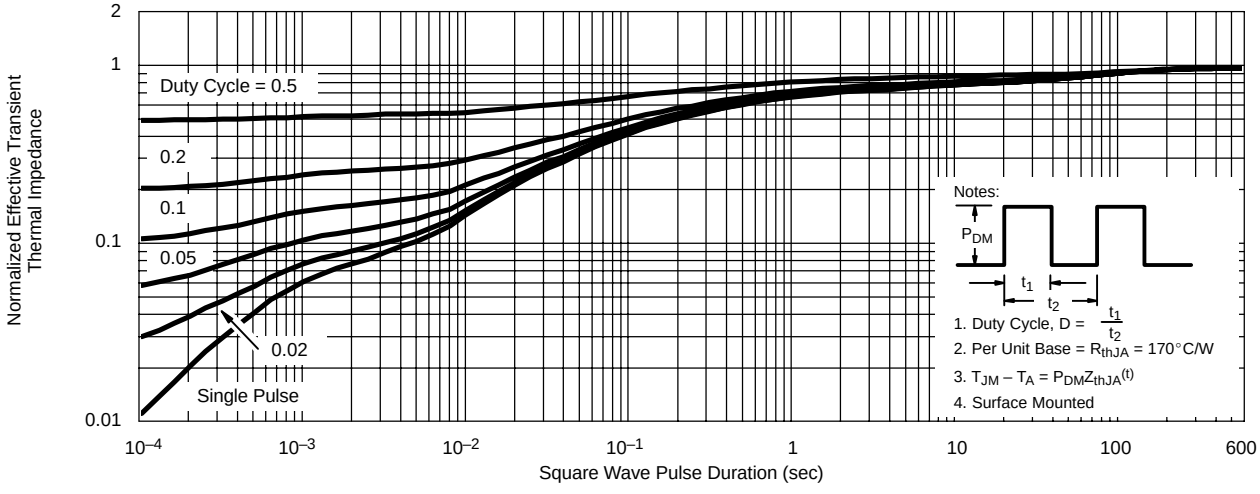
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)