

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

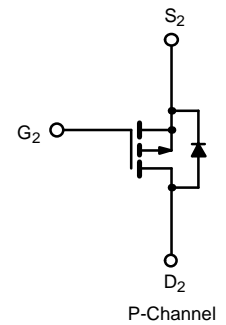
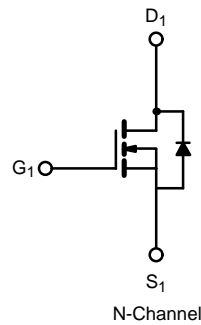
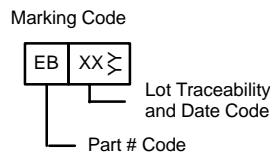
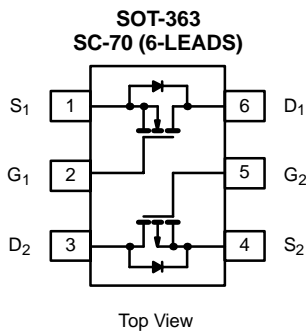
PRODUCT SUMMARY			
	$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
N-Channel	20	0.280 @ $V_{GS} = 4.5$ V	1.28
		0.360 @ $V_{GS} = 2.5$ V	1.13
		0.450 @ $V_{GS} = 1.8$ V	1.00
P-Channel	-20	0.490 @ $V_{GS} = -4.5$ V	-1.00
		0.750 @ $V_{GS} = -2.5$ V	-0.81
		1.10 @ $V_{GS} = -1.8$ V	-0.67

### FEATURES

- TrenchFET® Power MOSFETS: 1.8-V Rated
- Thermally Enhanced SC-70 Package
- Fast Switching

### APPLICATIONS

- Load Switch for Portable Devices



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ 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	$V_{GS}$	$\pm 8$		$\pm 8$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$T_A = 25^\circ\text{C}$	1.28	1.13	-1.00	-0.88	A
	$T_A = 85^\circ\text{C}$	0.92	0.81	-0.72	-0.63	
Pulsed Drain Current	$I_{DM}$	4.0		-3.0		
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	0.61	0.48	-0.61	-0.48	
Maximum Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	0.74	0.57	0.30	0.57	W
	$T_A = 85^\circ\text{C}$	0.38	0.30	0.16	0.3	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150				$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 5$ sec	$R_{thJA}$	130	170	$^\circ\text{C/W}$
	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<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>Static</b>							
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 100 μA	N-Ch	0.45		1	V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -100 μA	P-Ch	-0.45		1	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V	N-Ch			±100	nA
			P-Ch			±100	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V	N-Ch			1	μA
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V	P-Ch			-1	
		V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C	N-Ch			5	
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C	P-Ch			-5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 4.5 V	N-Ch	2			A
		V <sub>DS</sub> ≤ -5 V, V <sub>GS</sub> = -4.5 V	P-Ch	-2			
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 1.13 A	N-Ch		0.220	0.280	Ω
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.88 A	P-Ch		0.400	0.490	
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 0.99 A	N-Ch		0.281	0.360	
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -0.71 A	P-Ch		0.610	0.750	
		V <sub>GS</sub> = 1.8 V, I <sub>D</sub> = 0.20 A	N-Ch		0.344	0.450	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -0.20 A	P-Ch		0.850	1.10	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.13 A	N-Ch		2.6		S
		V <sub>DS</sub> = -10 V, I <sub>D</sub> = -0.88 A	P-Ch		1.5		
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 0.48 A, V <sub>GS</sub> = 0 V	N-Ch		0.8	1.2	V
		I <sub>S</sub> = -0.48 A, V <sub>GS</sub> = 0 V	P-Ch		-0.8	-1.2	
<b>Dynamic<sup>b</sup></b>							
Total Gate Charge	Q <sub>g</sub>	<b>N-Channel</b> V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 1.13 A  <b>P-Channel</b> V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.88 A	N-Ch		1.25	2	nC
Gate-Source Charge	Q <sub>gs</sub>		N-Ch		0.21		
Gate-Drain Charge	Q <sub>gd</sub>		P-Ch		0.3		
Turn-On Delay Time	t <sub>d(on)</sub>	<b>N-Channel</b> V <sub>DD</sub> = 10 V, R <sub>L</sub> = 20 Ω I <sub>D</sub> ≅ 0.5 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 6 Ω  <b>P-Channel</b> V <sub>DD</sub> = -10 V, R <sub>L</sub> = 20 Ω I <sub>D</sub> ≅ -0.5 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω	N-Ch		15	25	ns
Rise Time	t <sub>r</sub>		P-Ch		18	30	
Turn-Off Delay Time	t <sub>d(off)</sub>		N-Ch		22	35	
			P-Ch		25	40	
Fall Time	t <sub>f</sub>		N-Ch		25	40	
			P-Ch		15	25	
Reverse Recovery Time	t <sub>rr</sub>		N-Ch		12	20	
			P-Ch		12	20	
		I <sub>F</sub> = 0.48 A, di/dt = 100 A/μs	N-Ch		30	60	
			P-Ch		30	60	

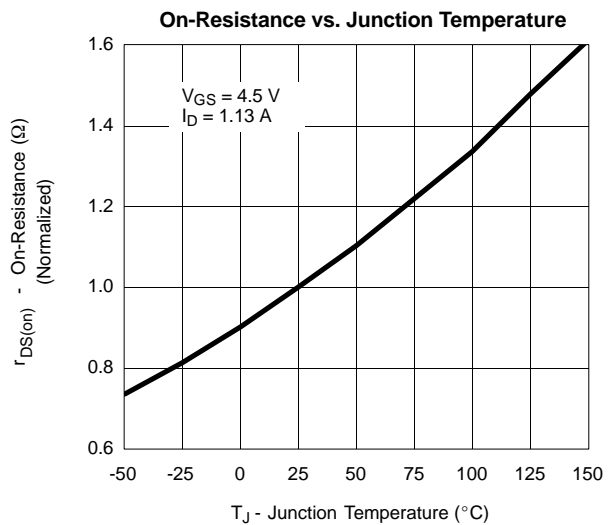
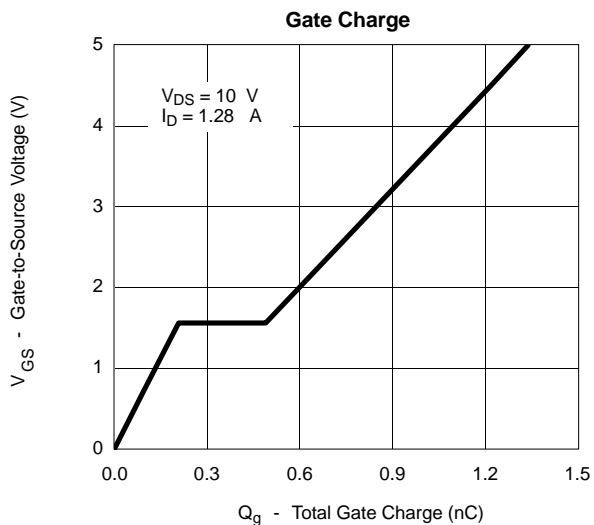
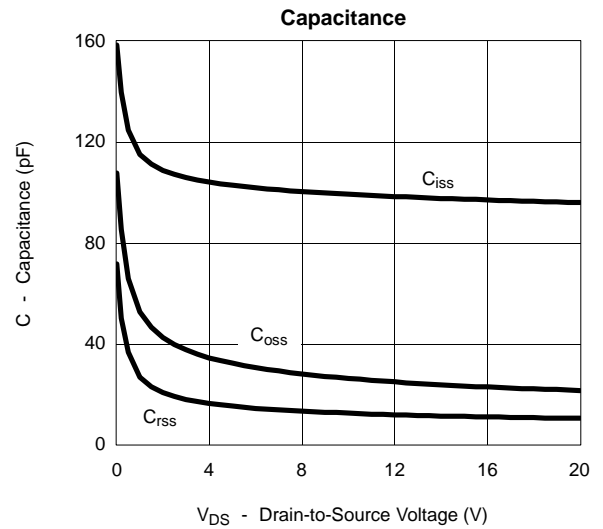
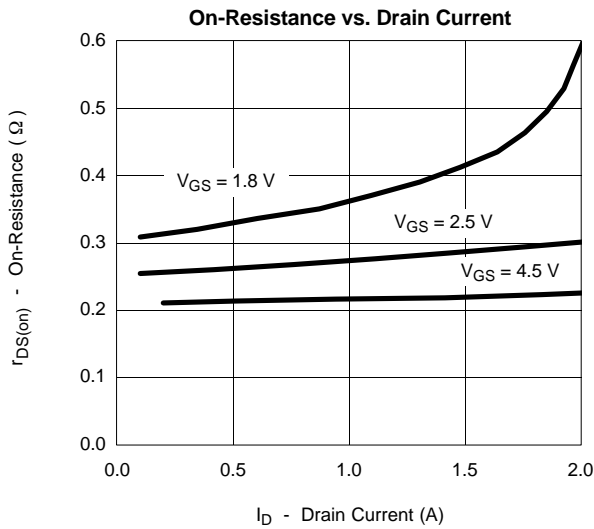
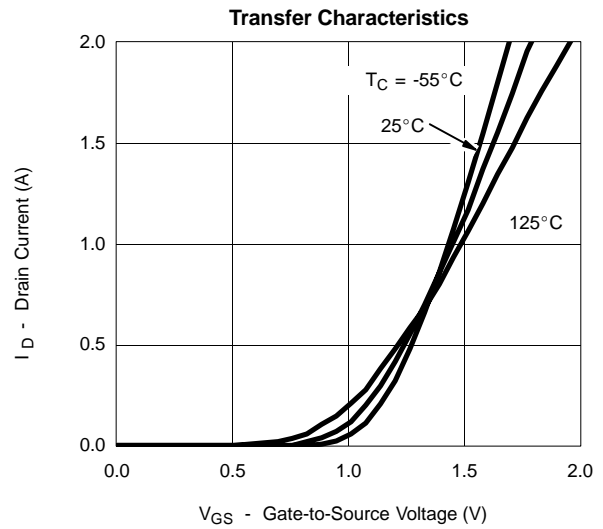
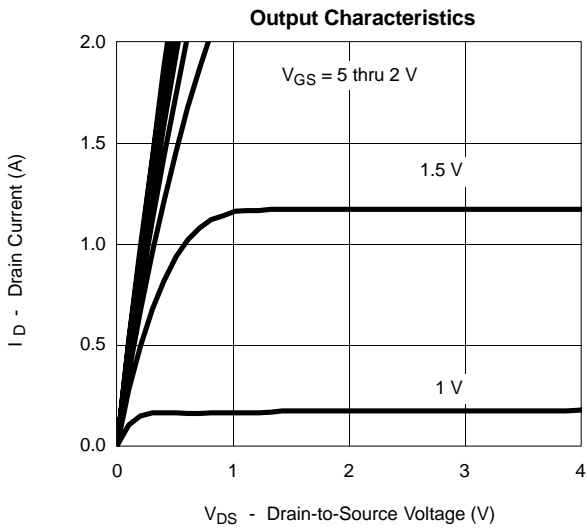
## Notes

- 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**

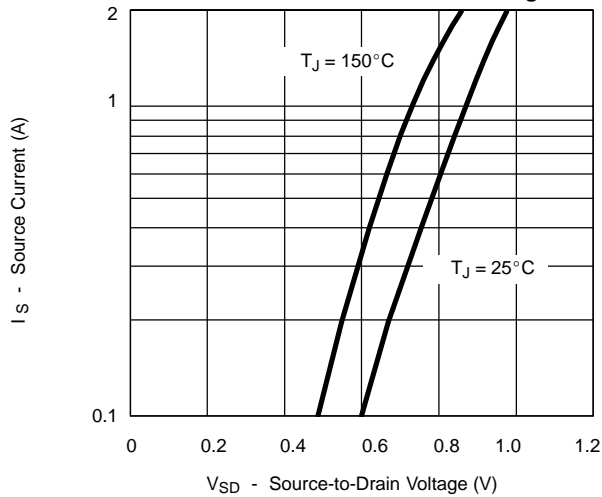




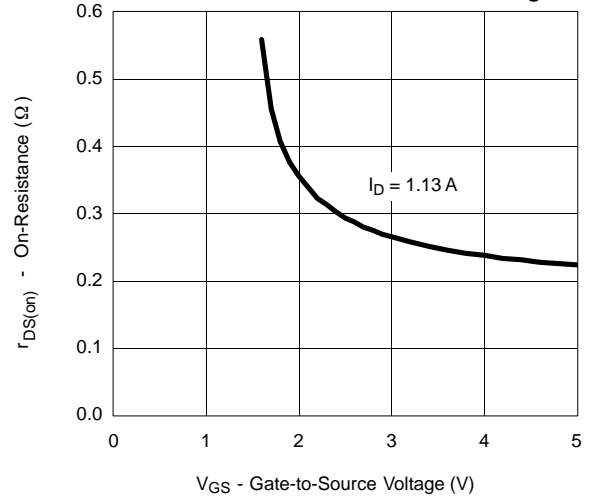
### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

### N-CHANNEL

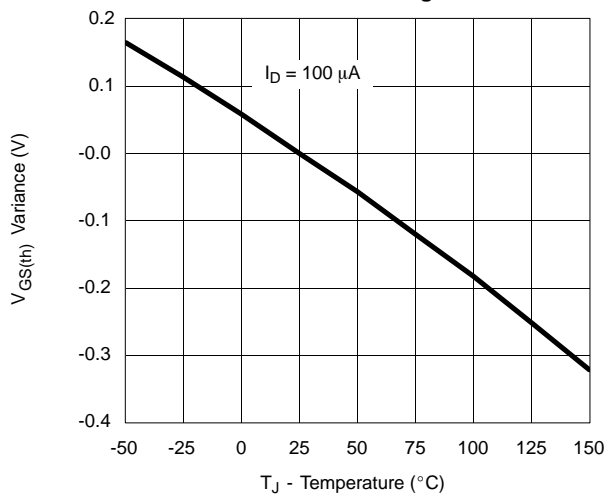
Source-Drain Diode Forward Voltage



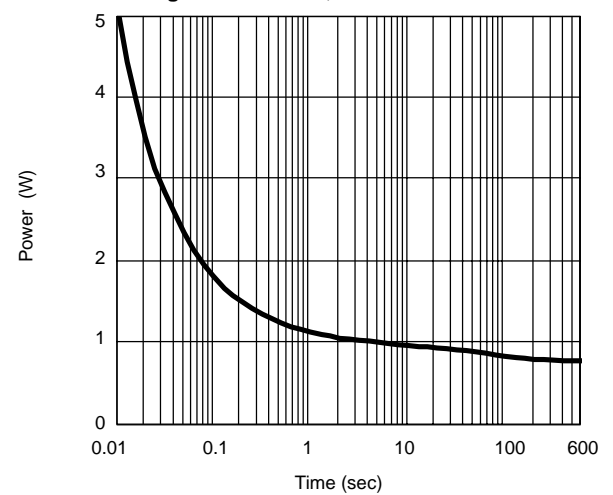
On-Resistance vs. Gate-to-Source Voltage



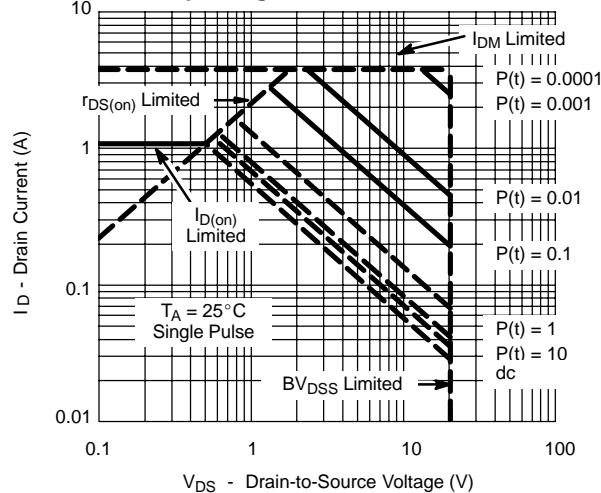
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient

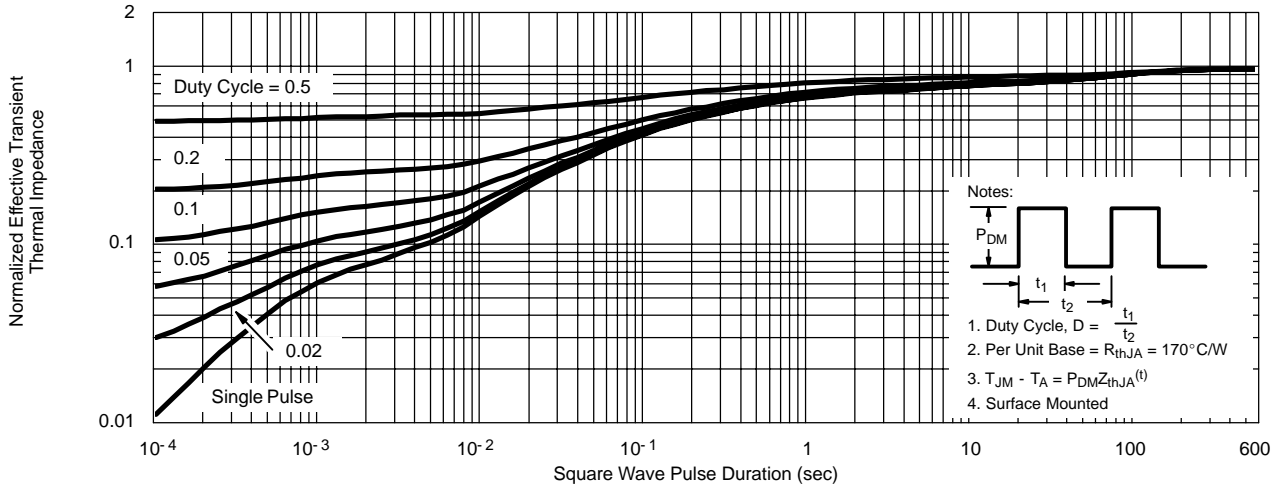




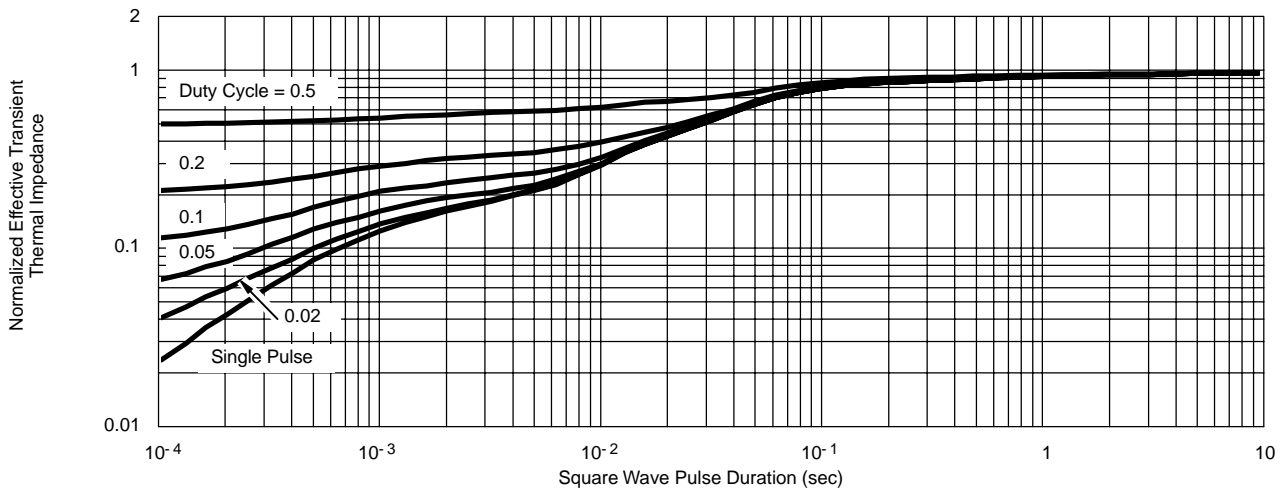
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**N-CHANNEL**

Normalized Thermal Transient Impedance, Junction-to-Ambient

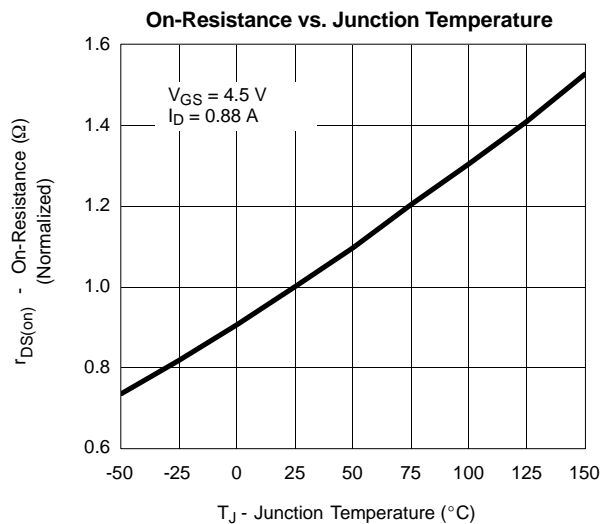
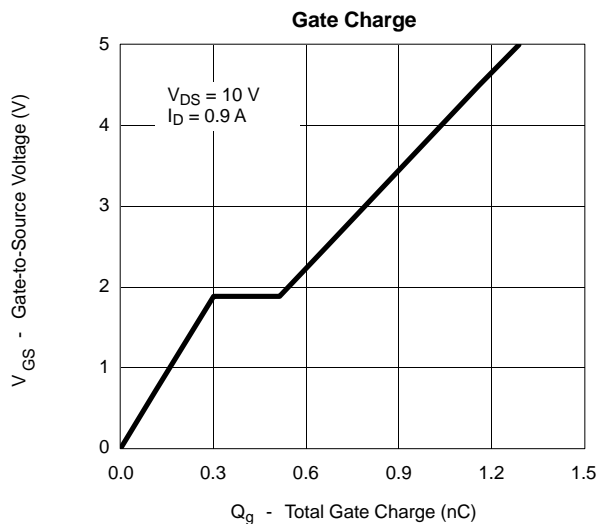
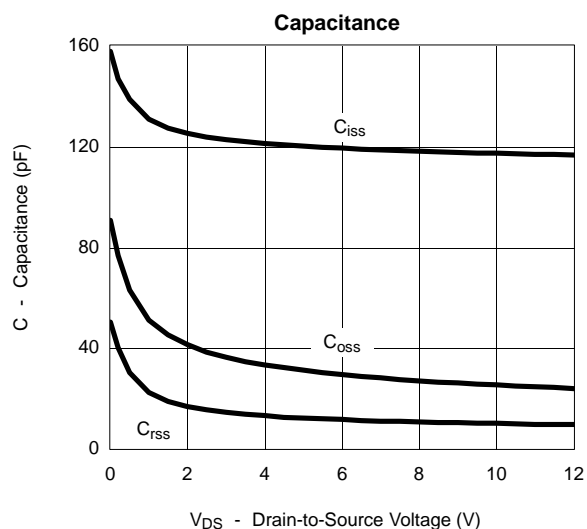
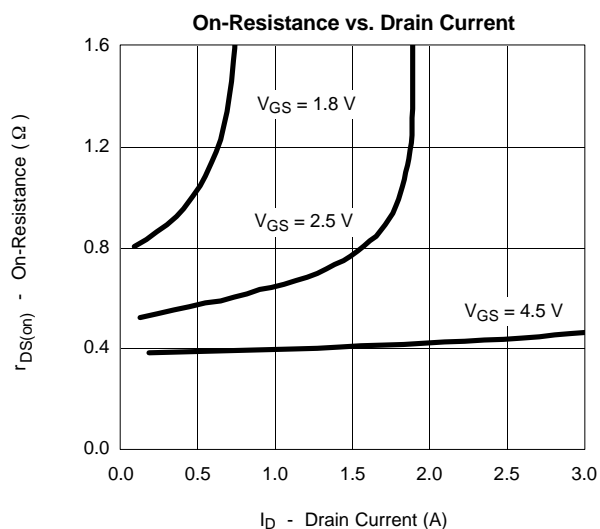
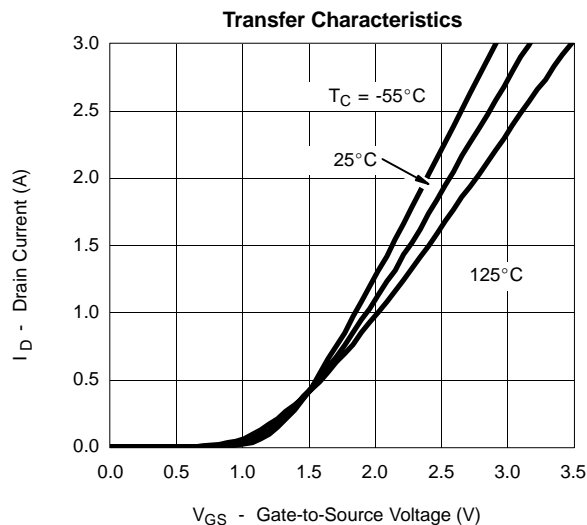
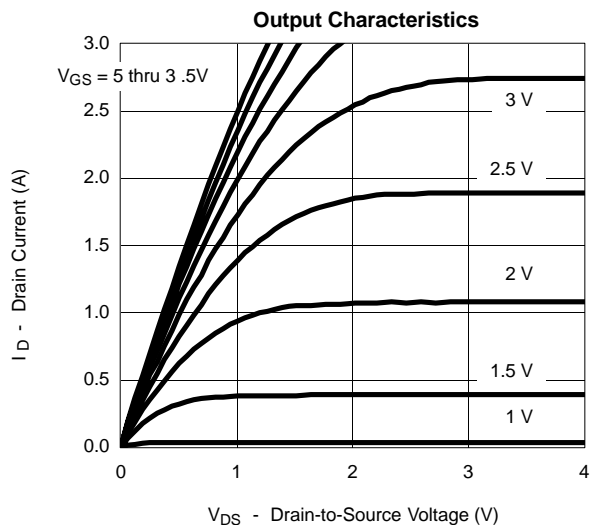


Normalized Thermal Transient Impedance, Junction-to-Foot



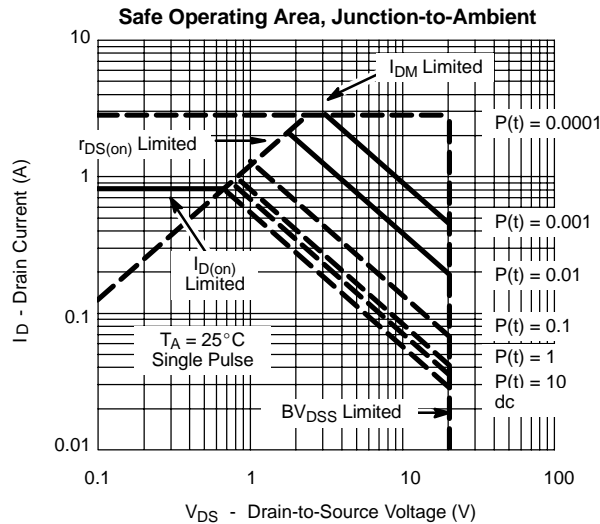
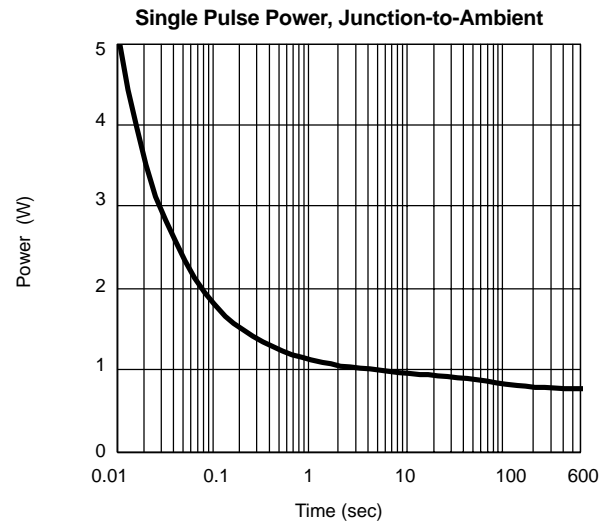
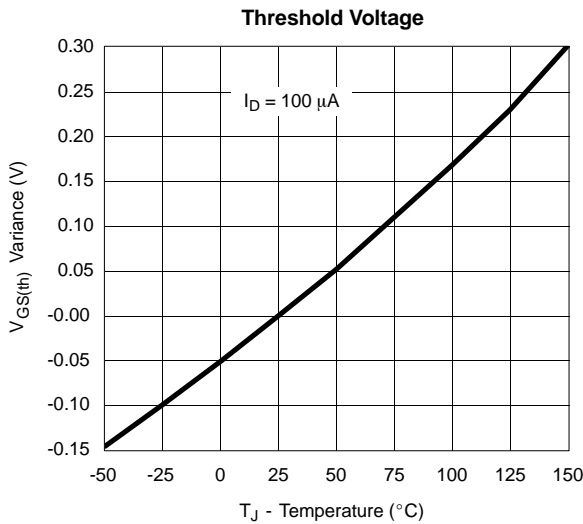
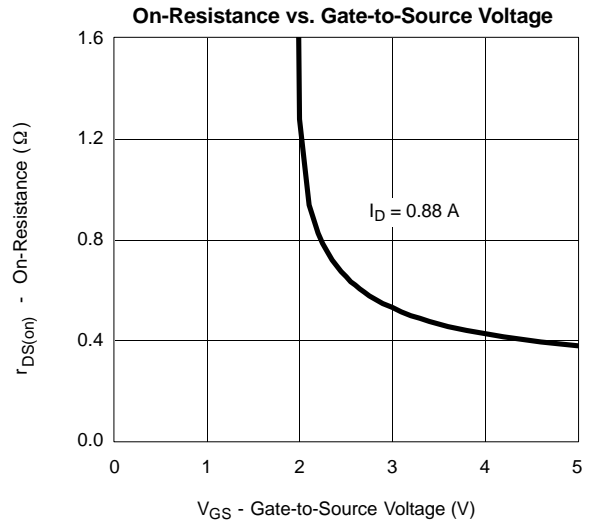
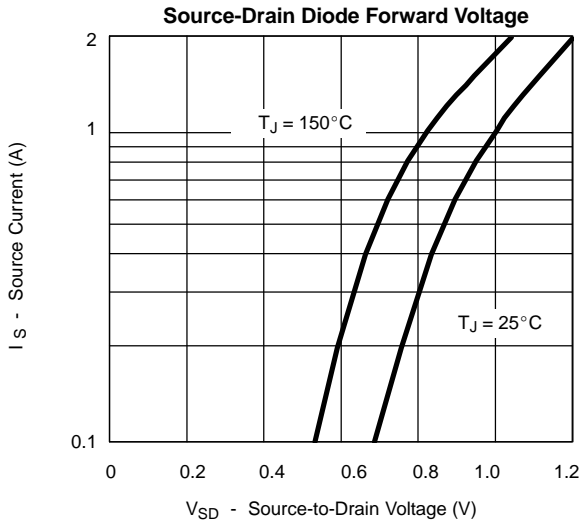
### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

### P-CHANNEL





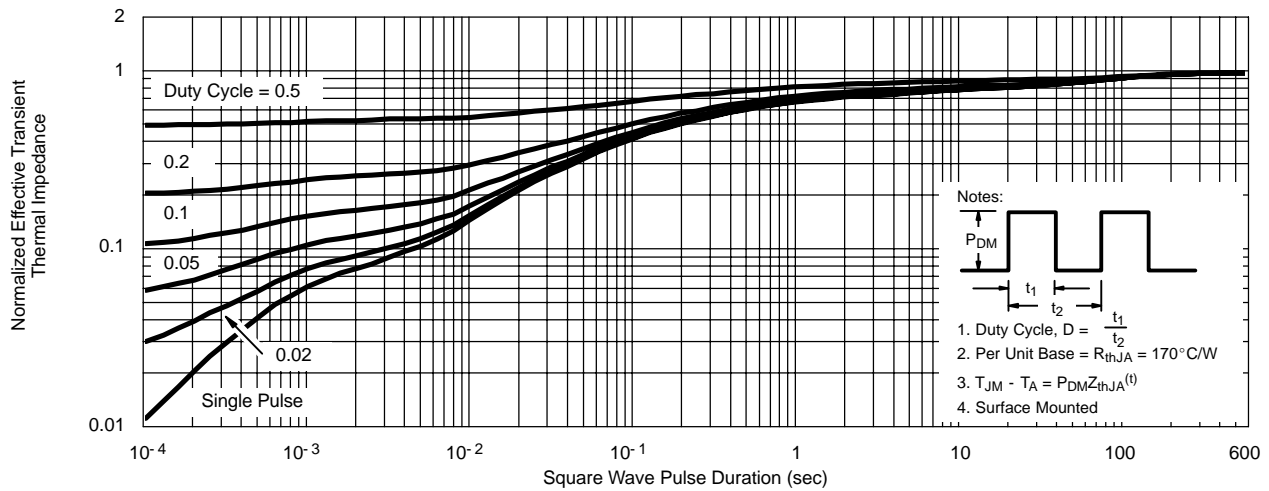
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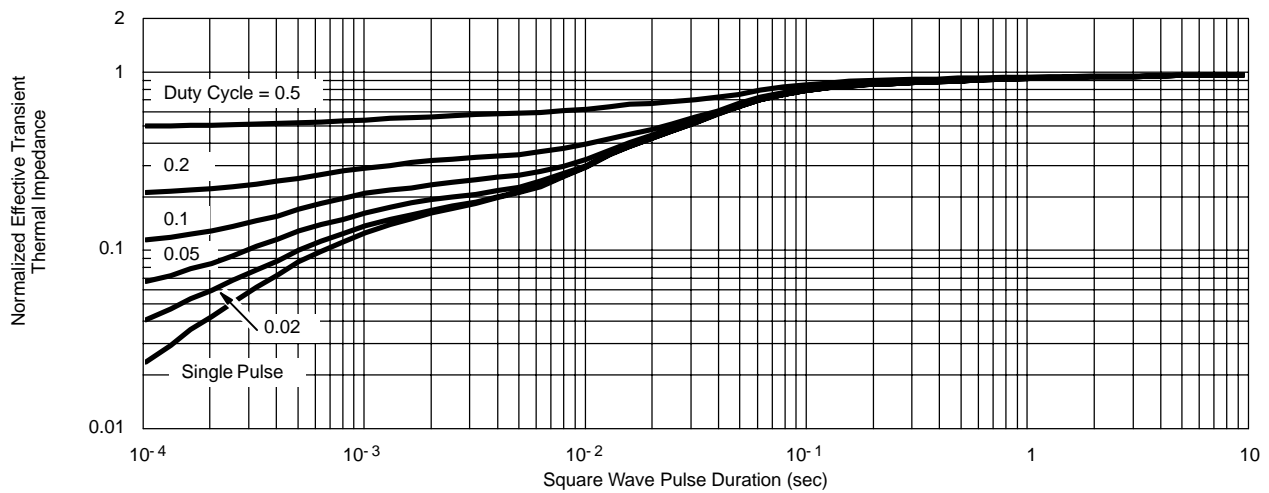
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**P-CHANNEL**

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot







## Disclaimer

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