

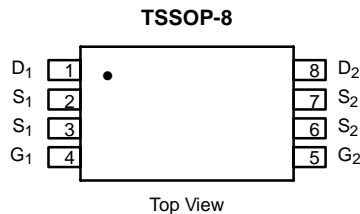


## N- and P-Channel 30-V (D-S) MOSFET

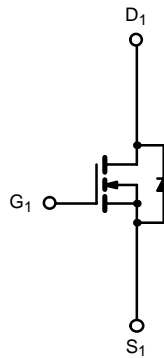
PRODUCT SUMMARY			
	$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
N-Channel	30	0.032 @ $V_{GS} = 10$ V	4.3
		0.046 @ $V_{GS} = 4.5$ V	3.7
P-Channel	-30	0.043 @ $V_{GS} = -10$ V	-3.8
		0.073 @ $V_{GS} = -4.5$ V	-2.8

### FEATURES

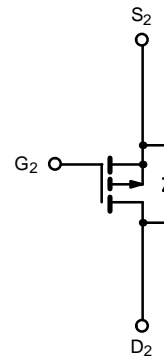
- TrenchFET® Power MOSFETS



Ordering Information: Si6544BDQ-T1



N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	N-Channel		P-Channel		Unit
		10 sec	Steady State	10 sec	Steady State	
Drain-Source Voltage	$V_{DS}$	30		-30		V
Gate-Source Voltage	$V_{GS}$	$\pm 20$				
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$T_A = 25^\circ\text{C}$	4.3	3.7	-3.8	-3.8	A
	$T_A = 70^\circ\text{C}$	3.5	3.0	-3.0	-2.6	
Pulsed Drain Current	$I_{DM}$	20		-20		
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	1.0	0.7	-1.0	-0.7	
Maximum Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	1.14	0.83	1.14	0.83	W
	$T_A = 70^\circ\text{C}$	0.73	0.53	0.73	0.53	
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>	$R_{thJA}$	$t \leq 10$ sec	88	110	$^\circ\text{C/W}$
		Steady State	120	150	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	65	80		

Notes

a. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

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> = 250 μA	N-Ch	1.0		3.0	V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	P-Ch	-1.0		-3.0	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V	N-Ch P-Ch			±100 ±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V	N-Ch			1	μA
		V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V	P-Ch			-1	
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C	N-Ch			5	
		V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °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> = 10 V	N-Ch	20			A
		V <sub>DS</sub> ≥ -5 V, V <sub>GS</sub> = -10 V	P-Ch	-20			
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.3 A	N-Ch		0.025	0.032	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -3.8 A	P-Ch		0.034	0.043	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.7 A	N-Ch		0.037	0.046	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -2.8 A	P-Ch		0.058	0.073	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 4.3 A	N-Ch		11		S
		V <sub>DS</sub> = -15 V, I <sub>D</sub> = -3.8 A	P-Ch		11		
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = 1.25 A, V <sub>GS</sub> = 0 V	N-Ch		0.77	1.1	V
		I <sub>S</sub> = -1.25 A, V <sub>GS</sub> = 0 V	P-Ch		-0.77	-1.1	
<b>Dynamic<sup>b</sup></b>							
Total Gate Charge	Q <sub>g</sub>	N-Channel V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.3 A  P-Channel V <sub>DS</sub> = -15 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -3.8 A	N-Ch		9.5	15	nC
			P-Ch		16	25	
Gate-Source Charge	Q <sub>gs</sub>		N-Ch		1.8		
			P-Ch		2.3		
Gate-Drain Charge	Q <sub>gd</sub>		N-Ch		1.55		
			P-Ch		4.5		
Gate Resistance	R <sub>g</sub>	N-Ch		0.45		Ω	
		P-Ch		8.8			
Turn-On Delay Time	t <sub>d(on)</sub>	N-Ch		13	25	ns	
		P-Ch		14	25		
Rise Time	t <sub>r</sub>	N-Ch		14	25		
		P-Ch		14	25		
Turn-Off Delay Time	t <sub>d(off)</sub>	N-Ch		30	50		
		P-Ch		40	65		
Fall Time	t <sub>f</sub>	N-Ch		10	20		
		P-Ch		30	50		
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 1.25 A, di/dt = 100 A/μs	N-Ch		30	60	
		I <sub>F</sub> = -1.25 A, di/dt = 100 A/μs	P-Ch		30		

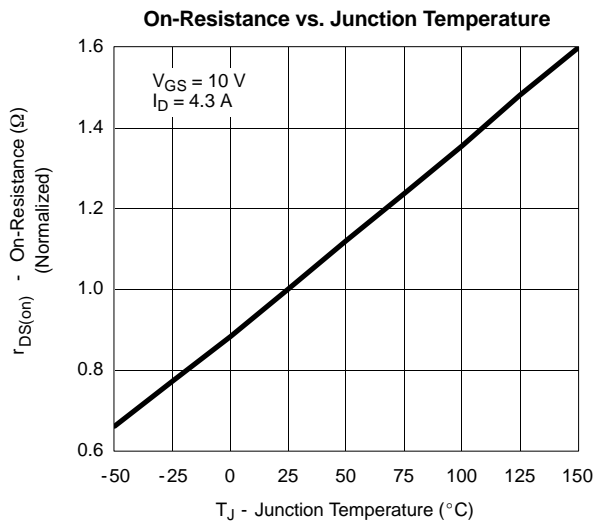
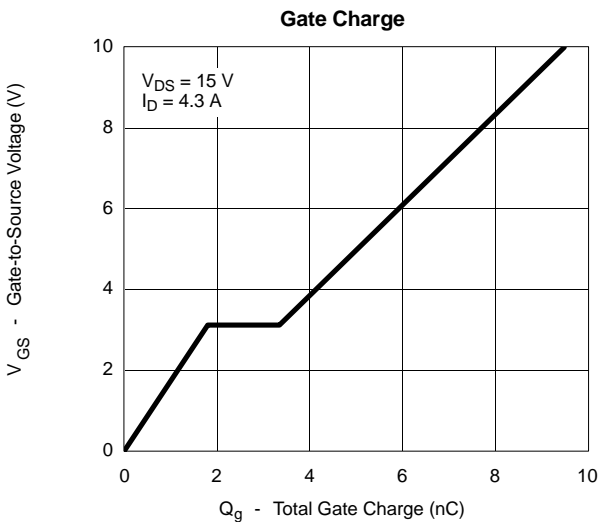
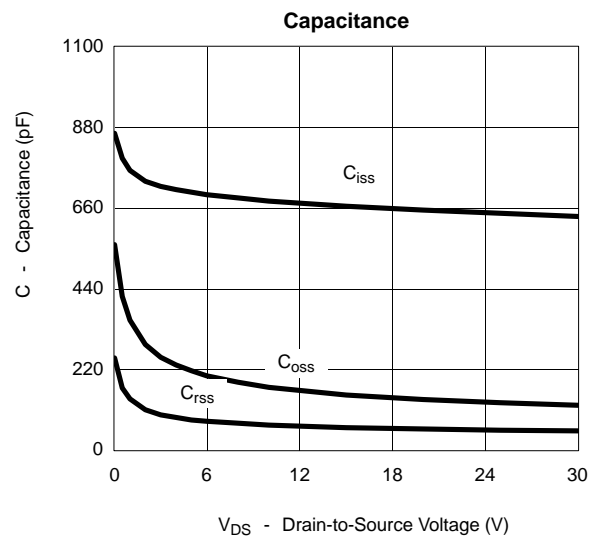
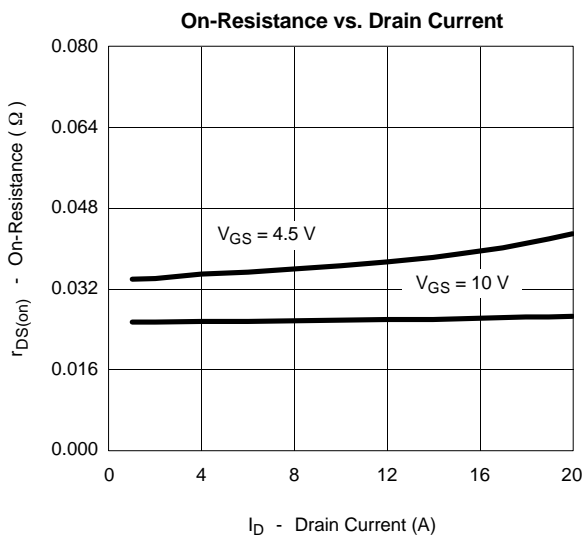
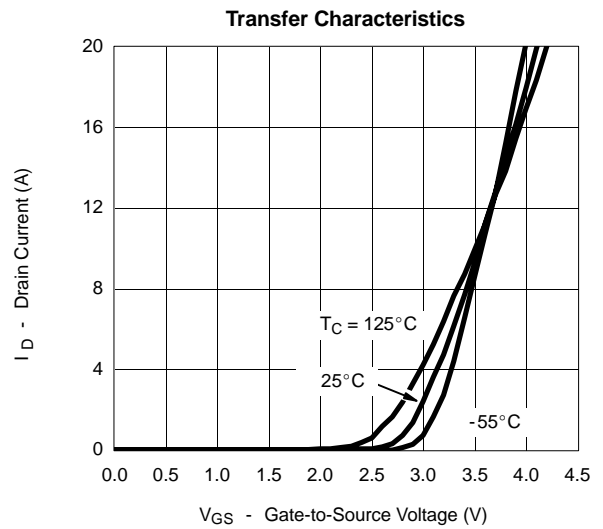
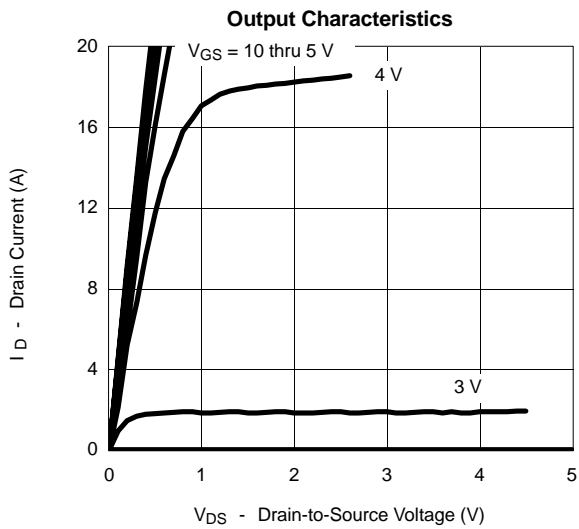
## Notes

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



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

**N-CHANNEL**

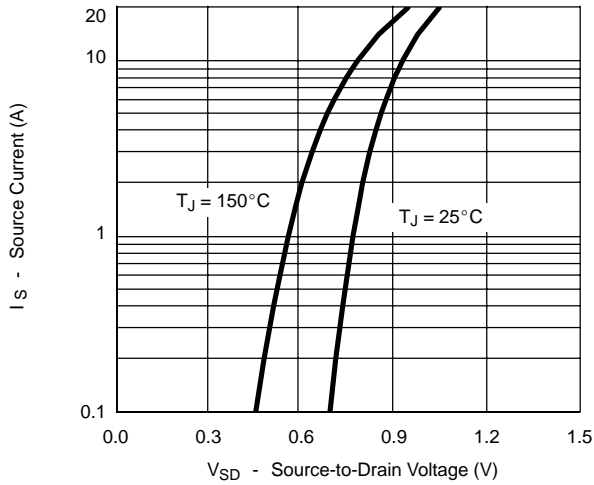




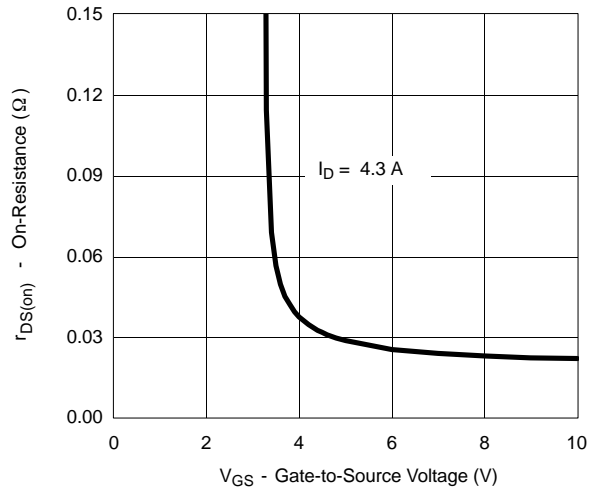
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**N-CHANNEL**

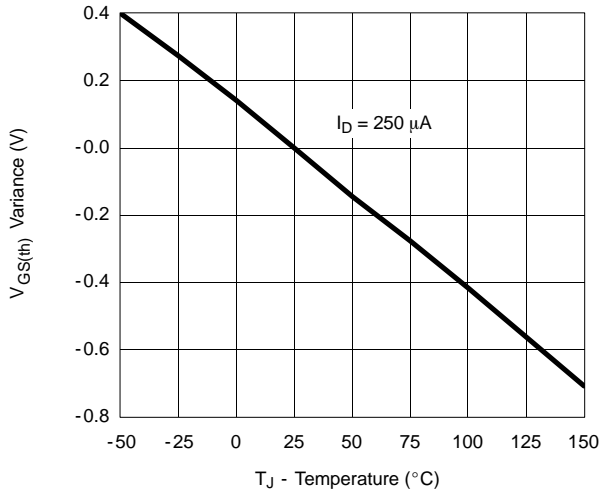
Source-Drain Diode Forward Voltage



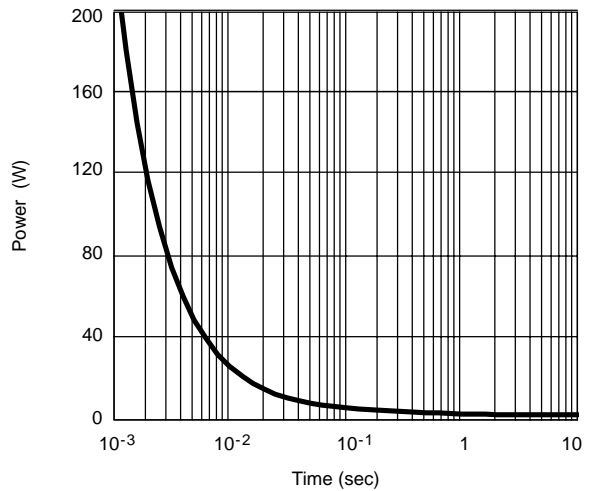
On-Resistance vs. Gate-to-Source Voltage



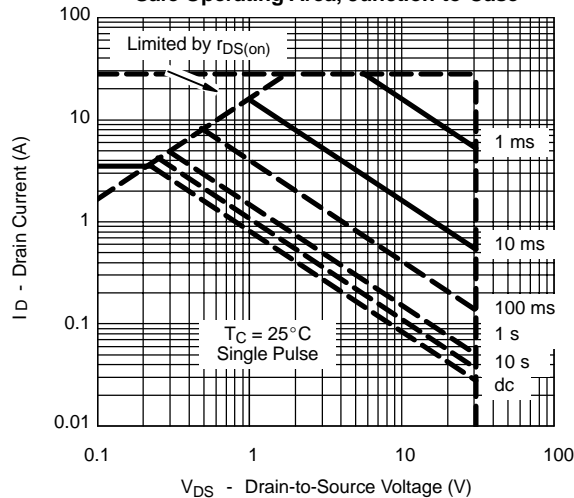
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Case

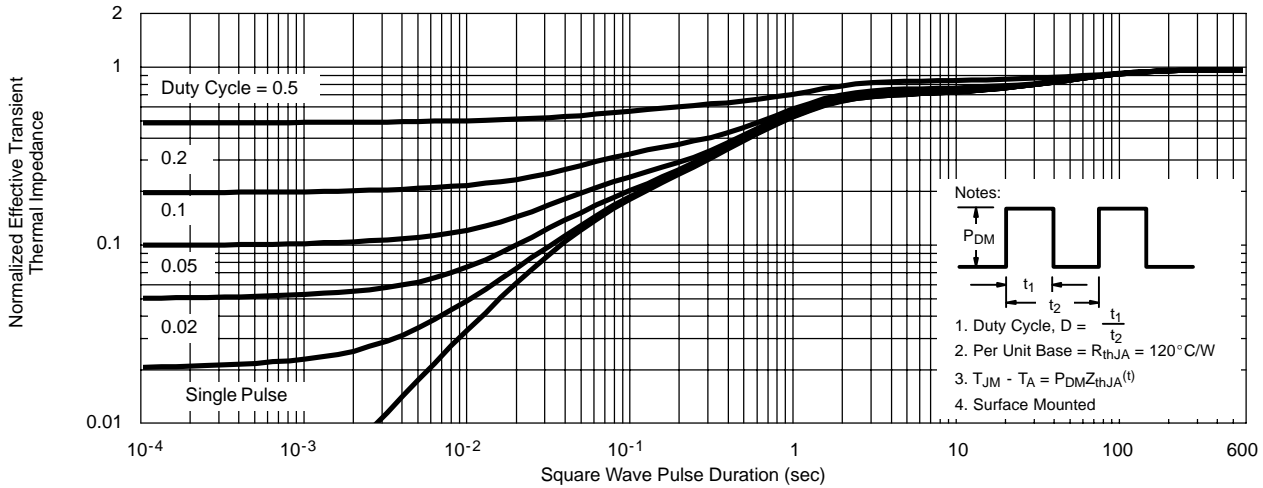




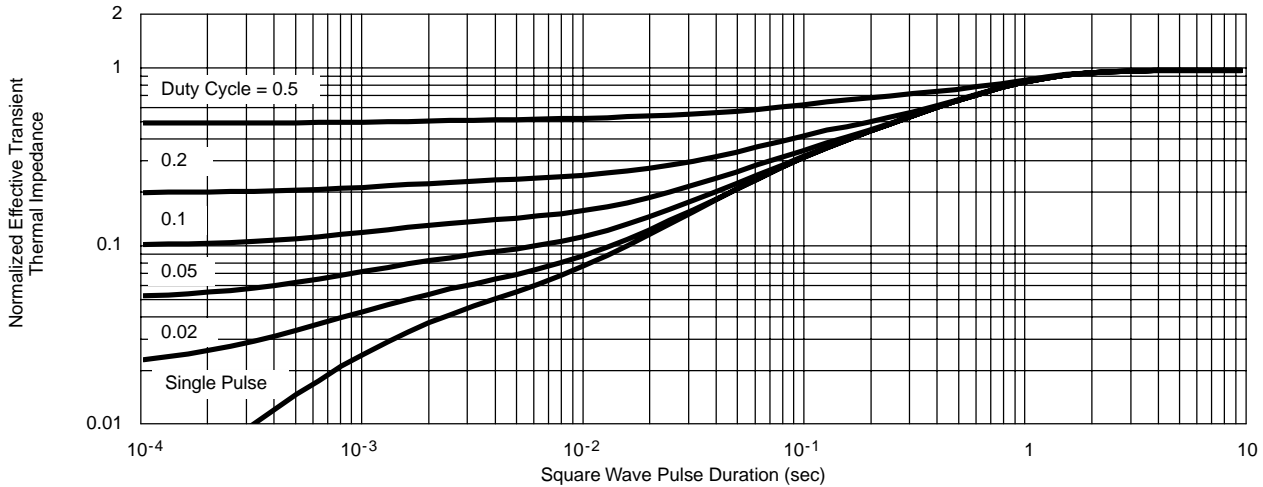
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**N-CHANNEL**

Normalized Thermal Transient Impedance, Junction-to-Ambient



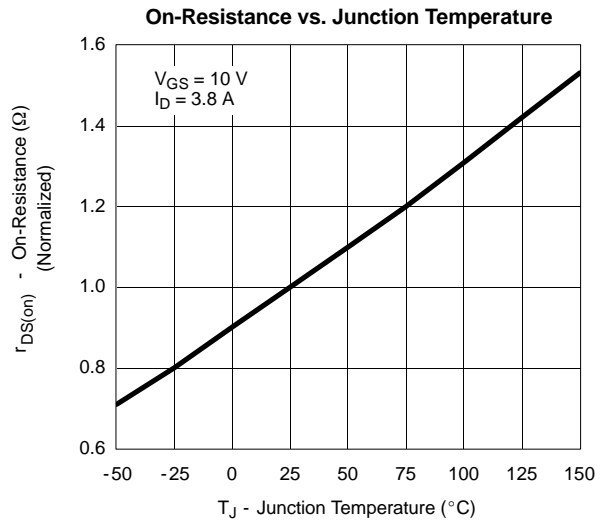
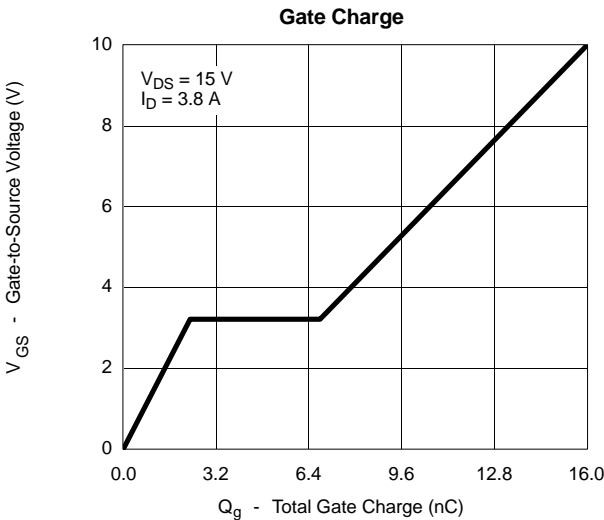
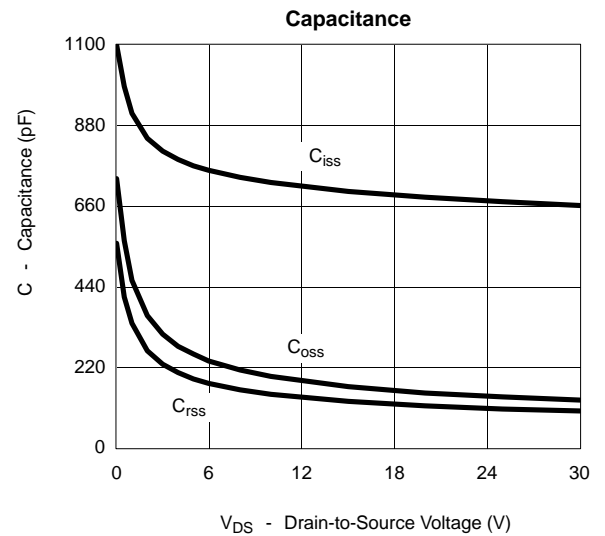
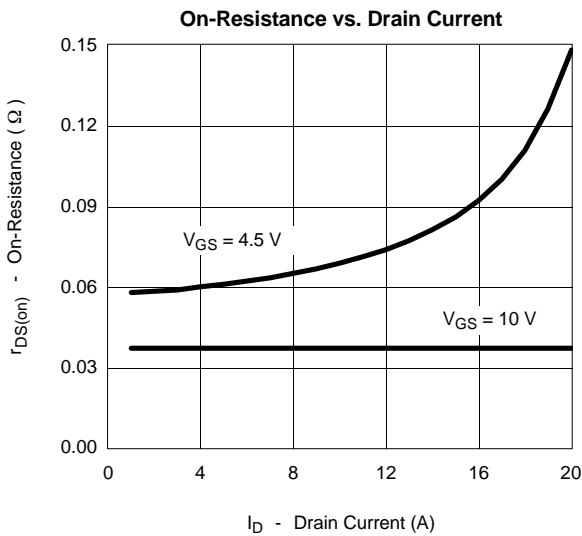
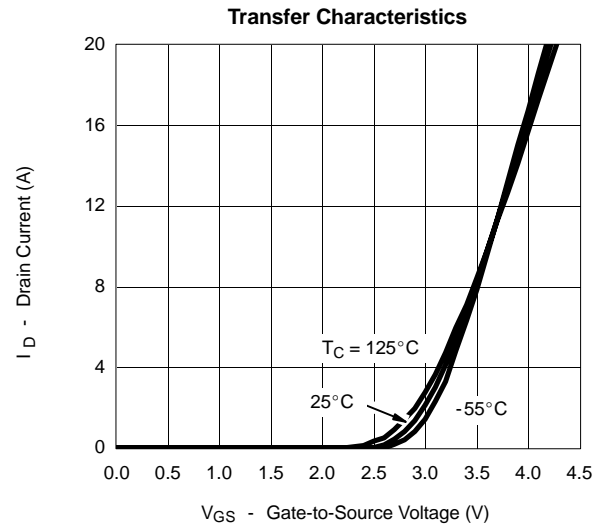
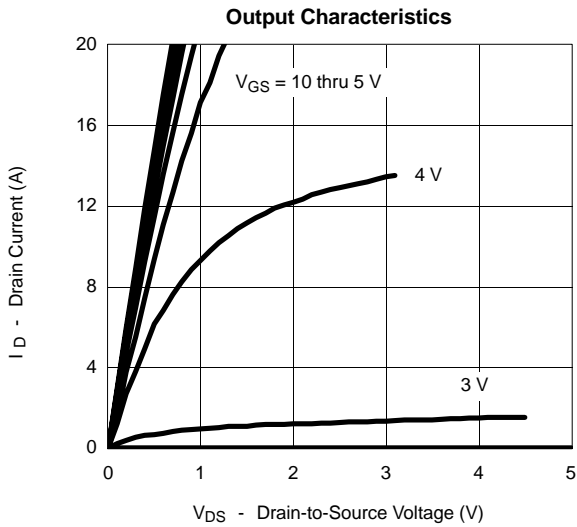
Normalized Thermal Transient Impedance, Junction-to-Foot





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

**P-CHANNEL**

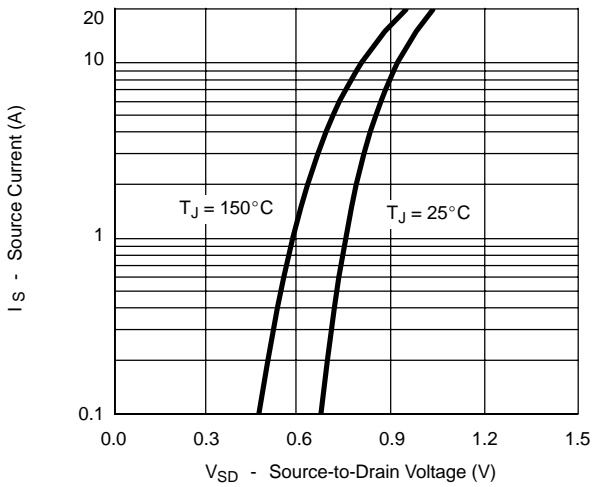




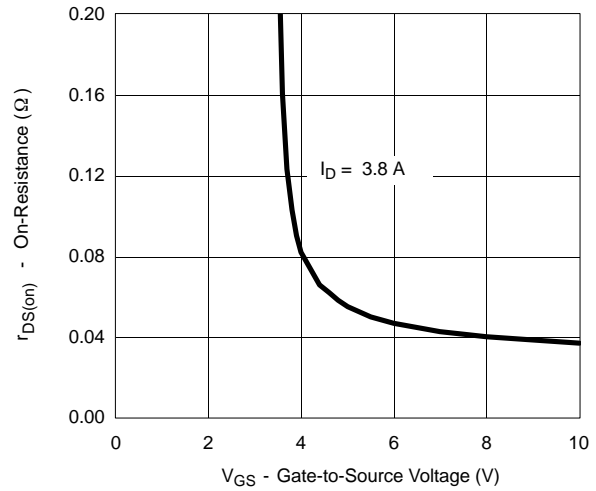
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**P-CHANNEL**

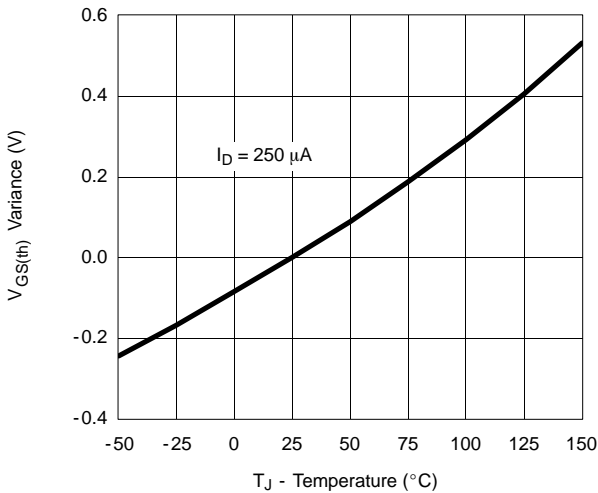
Source-Drain Diode Forward Voltage



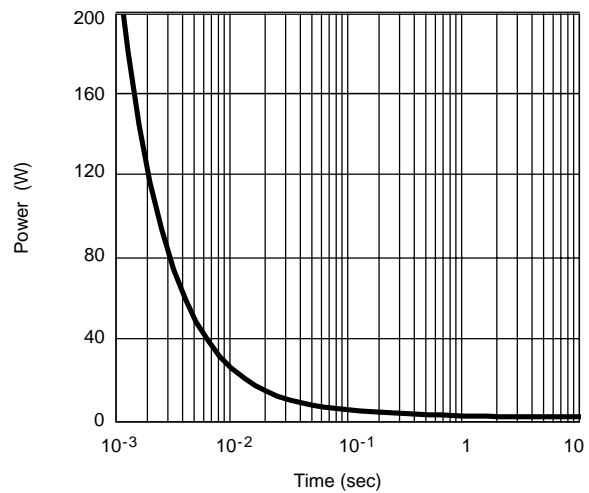
On-Resistance vs. Gate-to-Source Voltage



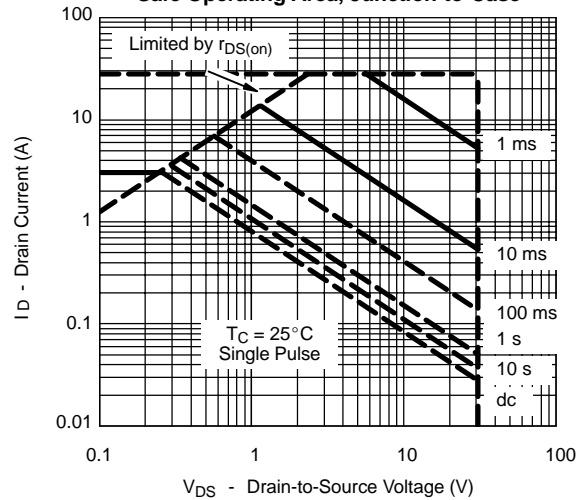
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Case

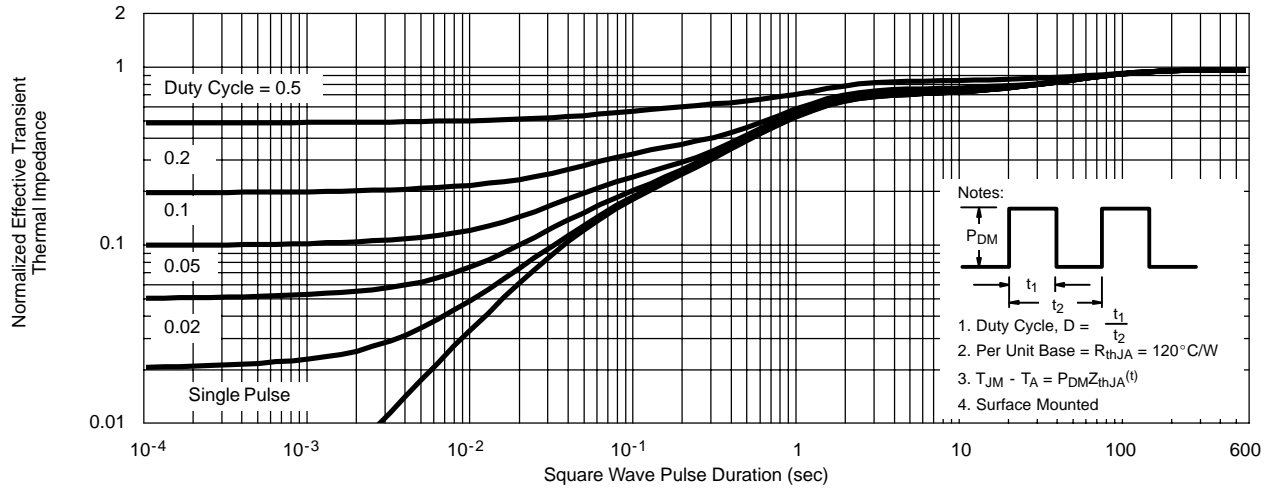




**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**P-CHANNEL**

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

