

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = -250\text{ }\mu\text{A}$	- 20			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 20		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	- 0.35		- 0.85	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 5\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20\text{ V}$ , $V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -20\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^{\circ}\text{C}$			- 10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}$ , $V_{GS} = -4.5\text{ V}$	- 10			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$ , $I_D = -5.9\text{ A}$		0.025	0.030	$\Omega$
		$V_{GS} = -2.5\text{ V}$ , $I_D = -5.1\text{ A}$		0.032	0.039	
		$V_{GS} = -1.8\text{ V}$ , $I_D = -2\text{ A}$		0.042	0.051	
		$V_{GS} = -1.5\text{ V}$ , $I_D = -1.5\text{ A}$		0.049	0.066	
		$V_{GS} = -1.2\text{ V}$ , $I_D = -0.88\text{ A}$		0.075	0.113	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}$ , $I_D = -5.9\text{ A}$		20		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -10\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$		1500		pF
Output Capacitance	$C_{oss}$			210		
Reverse Transfer Capacitance	$C_{rss}$			150		
Total Gate Charge	$Q_g$	$V_{DS} = -10\text{ V}$ , $V_{GS} = -5\text{ V}$ , $I_D = -8.8\text{ A}$		19	29	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -10\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -8.8\text{ A}$		17.5	27	
Gate-Drain Charge	$Q_{gd}$			2.1		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		5.2		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}$ , $R_L = 1.4\text{ }\Omega$ $I_D \cong -7\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ , $R_g = 1\text{ }\Omega$		9		ns
Rise Time	$t_r$			16	25	
Turn-Off Delay Time	$t_{d(off)}$			46	70	
Fall Time	$t_f$			90	135	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}$ , $R_L = 1.4\text{ }\Omega$ $I_D \cong -7\text{ A}$ , $V_{GEN} = -5\text{ V}$ , $R_g = 1\text{ }\Omega$		52	80	
Rise Time	$t_r$			10	15	
Turn-Off Delay Time	$t_{d(off)}$			15	25	
Fall Time	$t_f$			91	135	
				50	75	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^{\circ}\text{C}$			- 12	A
Pulse Diode Forward Current	$I_{SM}$				- 30	
Body Diode Voltage	$V_{SD}$	$I_S = -7\text{ A}$ , $V_{GS} = 0\text{ V}$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -7\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^{\circ}\text{C}$		20	40	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			12	20	nC
Reverse Recovery Fall Time	$t_a$			12		ns
Reverse Recovery Rise Time	$t_b$			8		

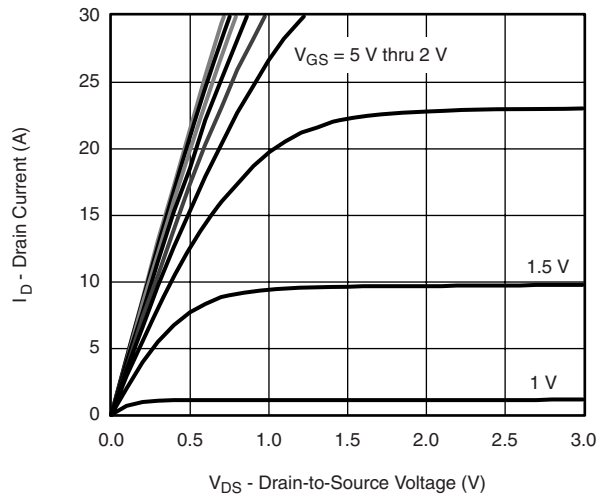
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

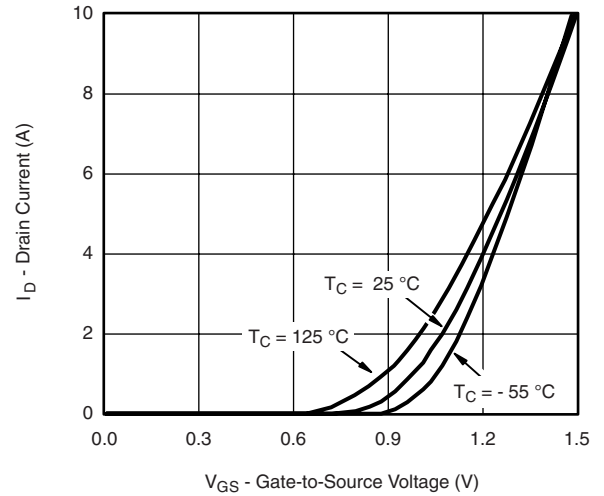
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

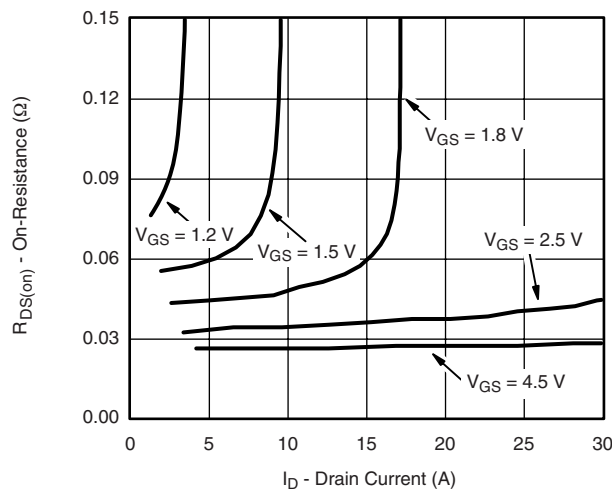
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



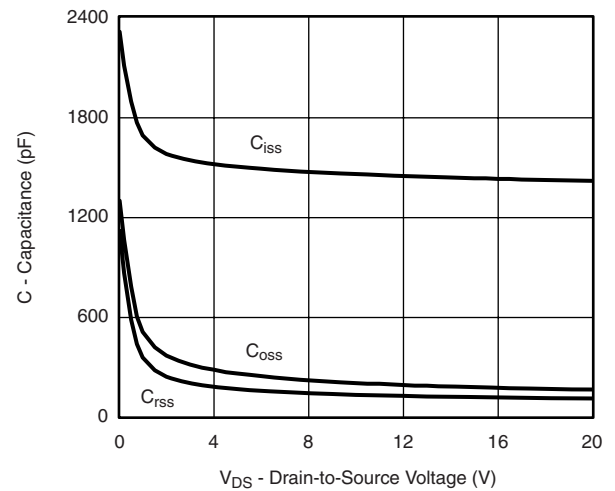
Output Characteristics



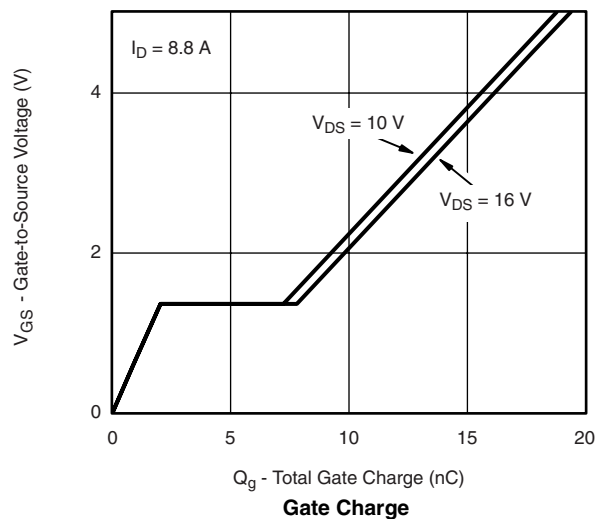
Transfer Characteristics



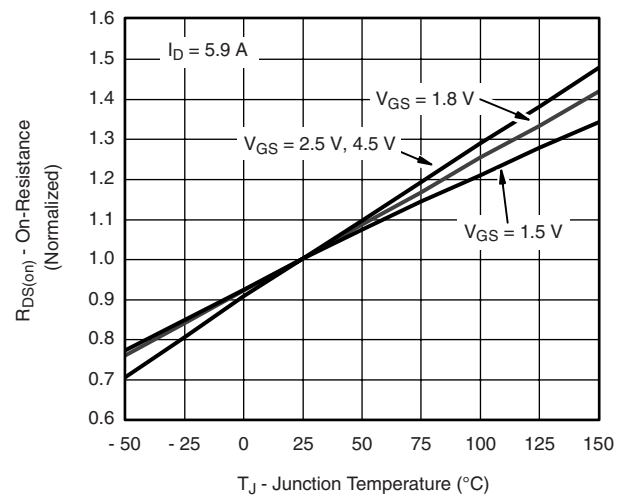
On-Resistance vs. Drain Current and Gate Voltage



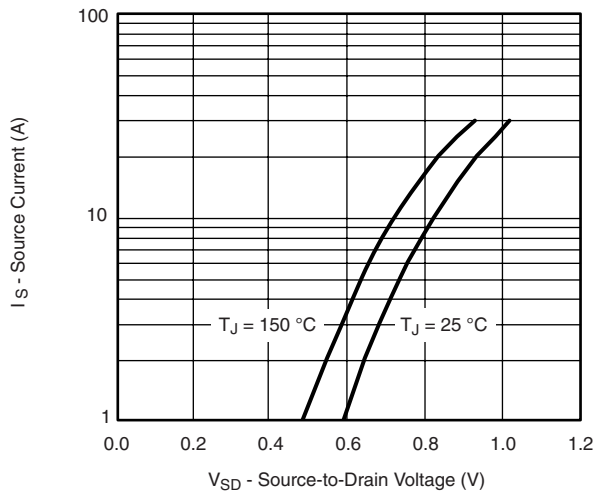
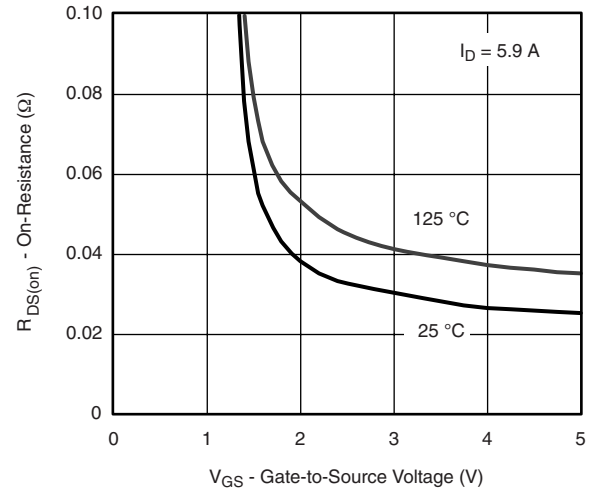
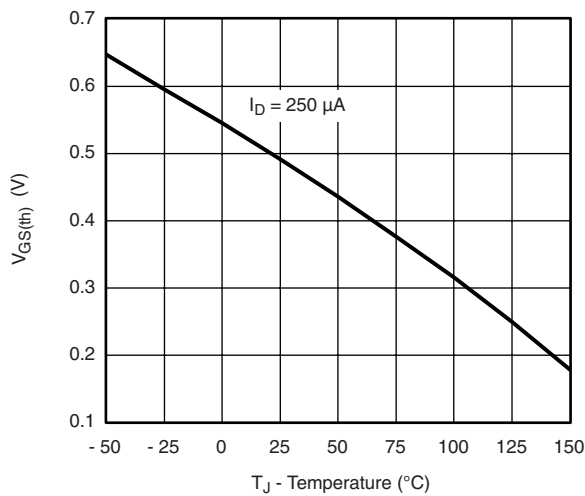
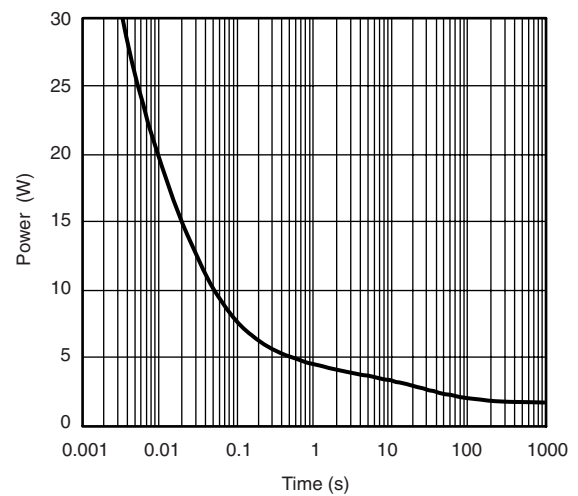
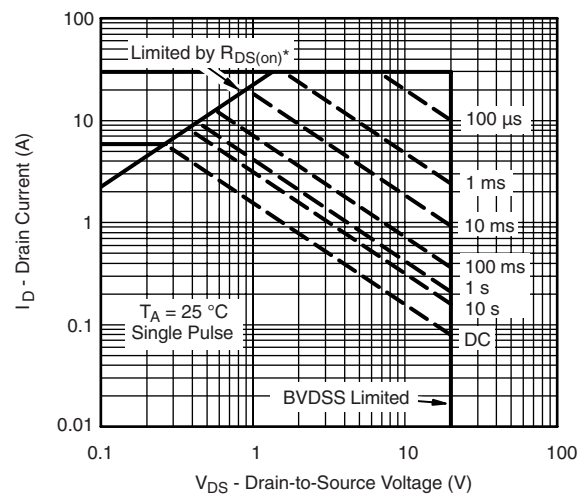
Capacitance



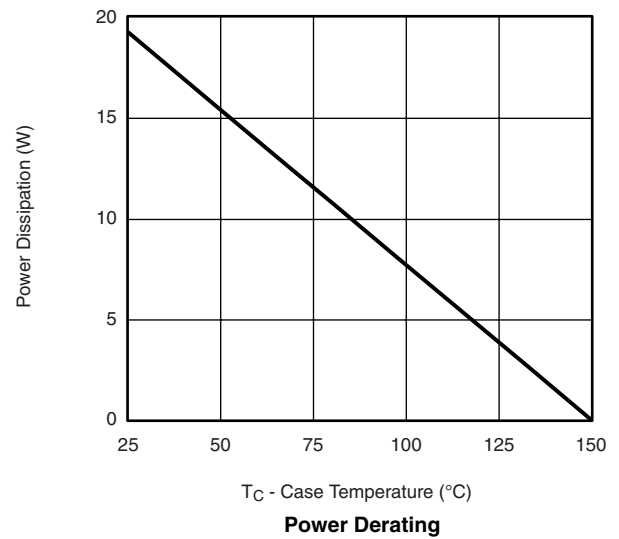
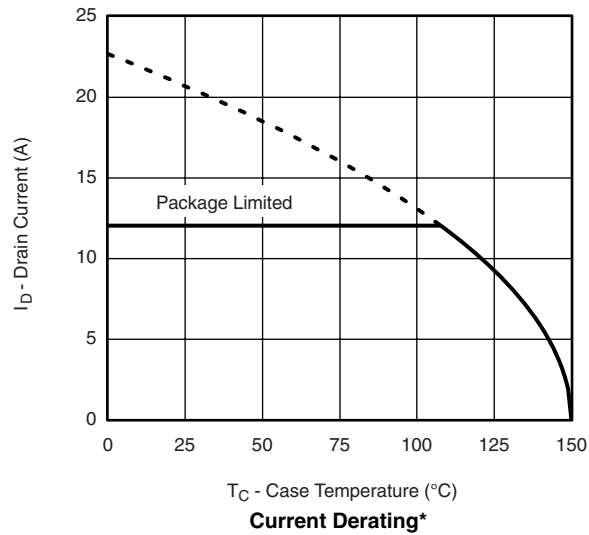
Gate Charge



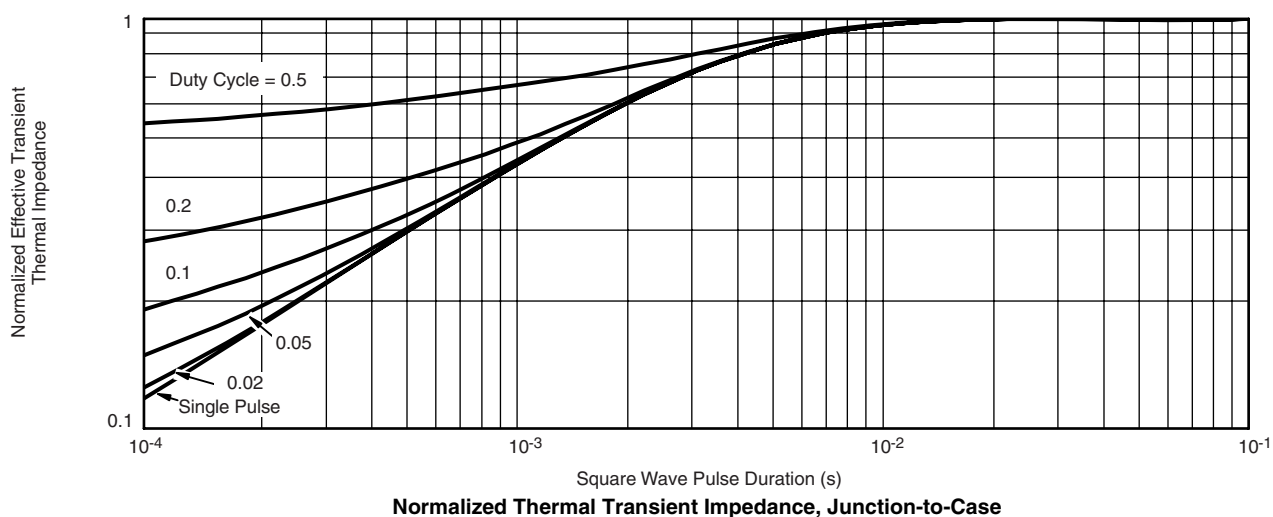
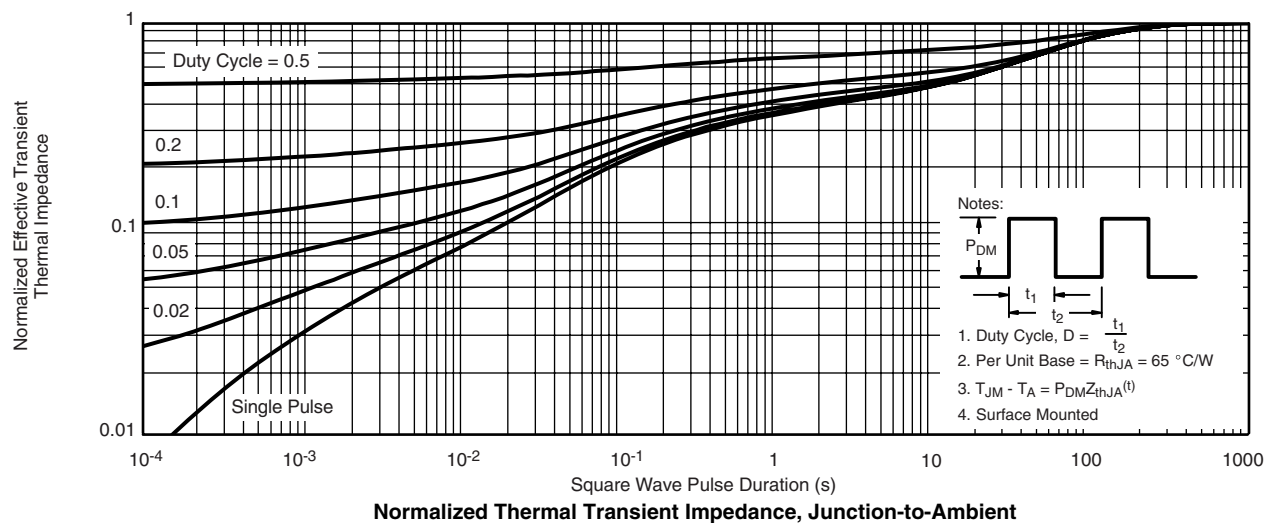
On-Resistance vs. Junction Temperature

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power, Junction-to-Ambient**\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified**Safe Operating Area, Junction-to-Ambient**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

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