

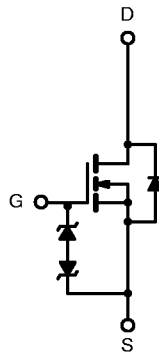
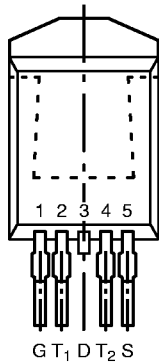


N-Channel 40-V (D-S) MOSFET With Sensing Diodes

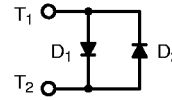
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.012 @ $V_{GS} = 10$ V	$\pm 60^a$
	0.015 @ $V_{GS} = 4.5$ V	± 60

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

D²Pak
TO-236, 5 Leads



N-Channel MOSFET



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	± 40	V
Gate-Source Voltage		V_{GS}	± 20	
V_{GS} Clamp Current		I_G	± 50	mA
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_c = 25^\circ\text{C}$	I_D	$\pm 60^a$	A
	$T_c = 100^\circ\text{C}$		± 50	
Avalanche Current		I_{AR}	± 50	
Repetitive Avalanche Energy	$L = 0.1$ mH	E_{AR}	125	mJ
Source-to-Anode Voltage		V_{SA}	± 100	V
Source-to-Cathode Voltage		V_{SC}	± 100	
Maximum Power Dissipation ^c	$T_A = 25^\circ\text{C}$	P_D	111	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case	R_{thJC}	1.35	

Notes:

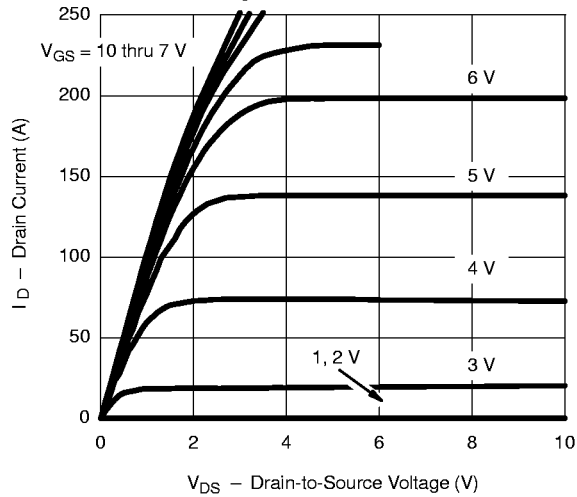
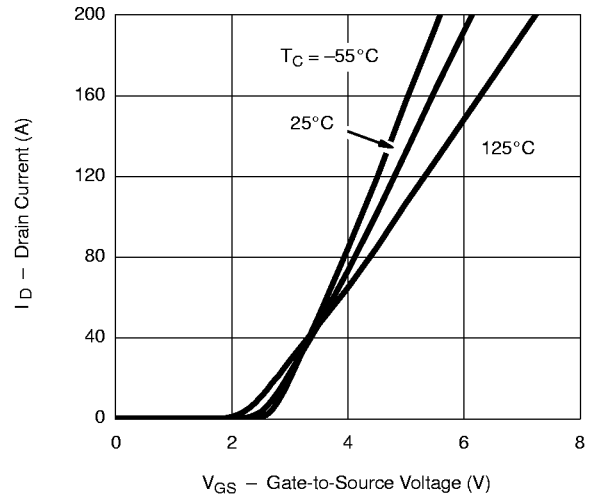
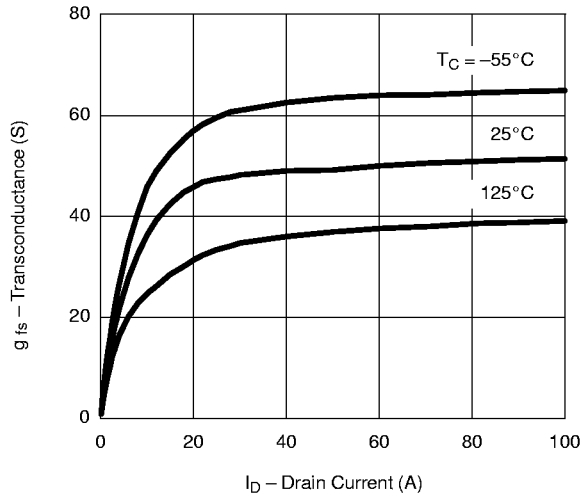
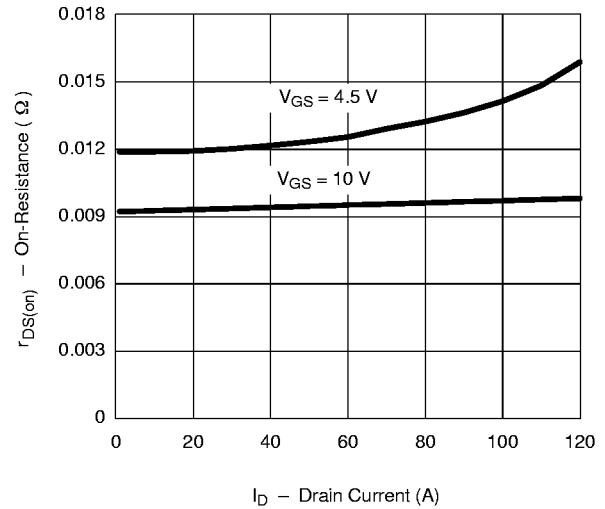
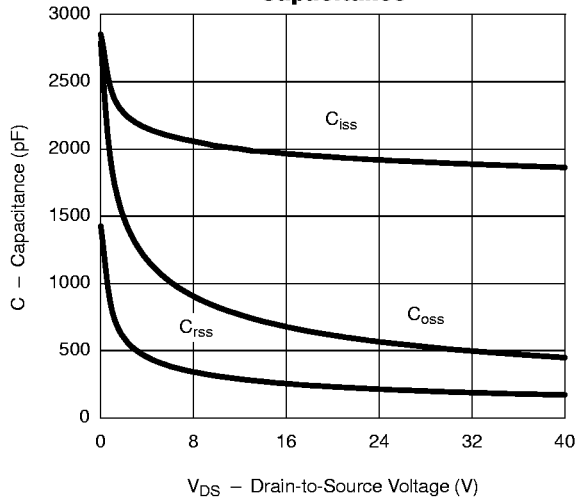
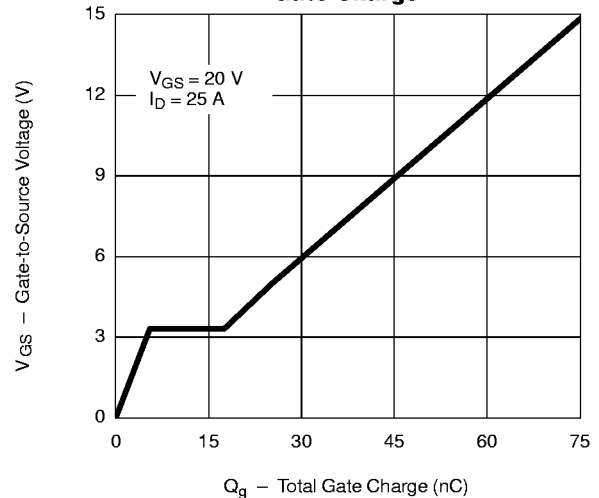
- a. Package limited.
- b. Duty Cycle $\leq 1\%$.
- c. See SOA curve for voltage derating.



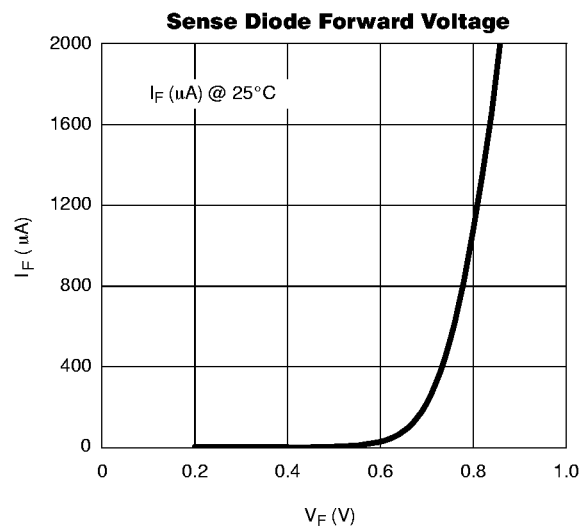
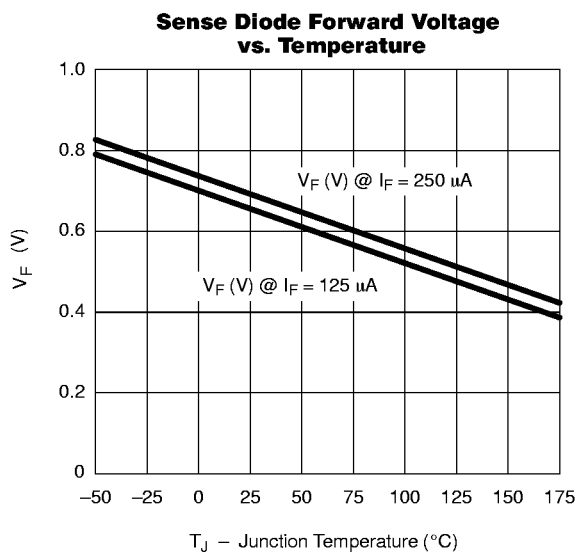
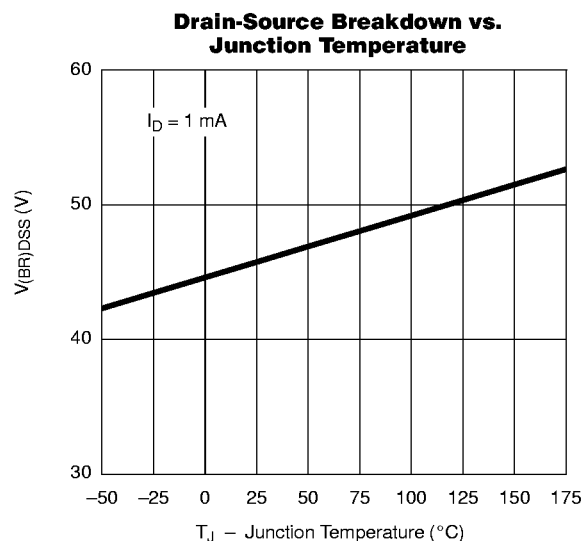
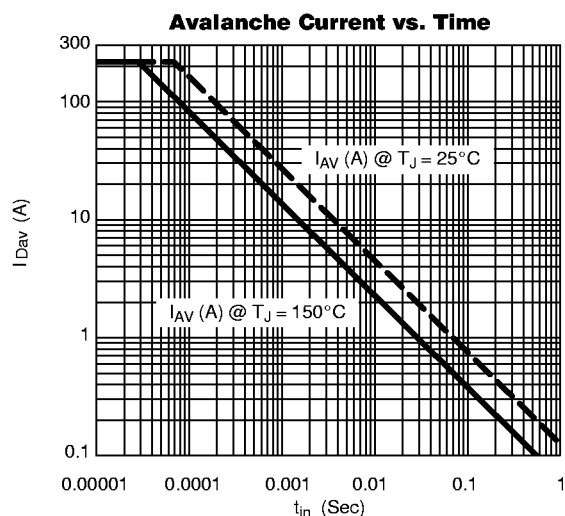
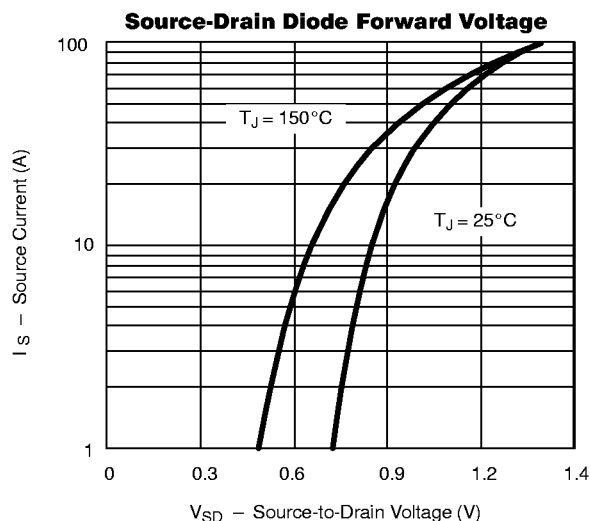
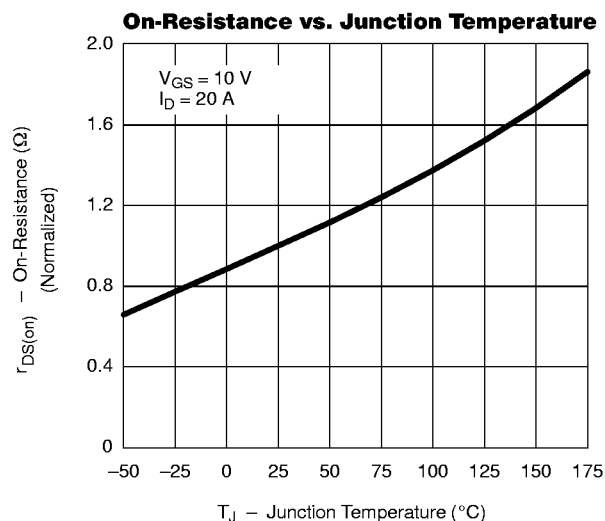
MOSFET SPECIFICATIONS (T _J =25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 1 mA	40			V
V _{GS} Clamp Voltage	V _{GS}	V _{DS} = 0 V, I _G = 20 μA	10		20	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{DS} = 1 mA	1		2	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 5 V			± 250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 35 V, V _{GS} = 0 V			1	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 35 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 35 V, V _{GS} = 0 V, T _J = 175°C			250	
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0095	0.012	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.018	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175°C			0.024	
		V _{GS} = 4.5 V, I _D = 20 A		0.012	0.015	
Sense Diode Forward Voltage	V _{FD1}	I _F = 250 μA	675		735	mV
	V _{FD2}	I _R = 250 μA	675		735	
Sense Diode Forward Voltage Increase	ΔV _F	From I _F = 125 μA to I _F = 250 μA	25		50	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A		35		S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1920		pF
Output Capacitance	C _{oss}			560		
Reversen Transfer Capacitance	C _{rss}			210		
Total Gate Charge ^c	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 25 A		51	70	nC
Gate-Source Charge ^c	Q _{gs}			5.5		
Gate-Drain Charge ^c	Q _{gd}			12		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 0.8 Ω I _D ≈ 25 A, V _{GEN} = 10 V, R _G = 2.5 Ω		20	40	ns
Rise Time ^c	t _r			70	120	
Turn-Off Delay Time ^c	t _{d(off)}			35	70	
Fall Time ^c	t _f			20	40	
Source-Drain Diode Ratings and Characteristics (T _C = 25° C) ^a						
Continuous Current	I _S				60	A
Pulsed Current	I _{SM}				240	
Forward Voltage ^b	V _{SD}	I _F = 60 A, V _{GS} = 0 V			1.4	V
Reverse Recovery Time	t _{rr}	I _F = 60 A, di/dt = 100 A/μs		40	60	ns

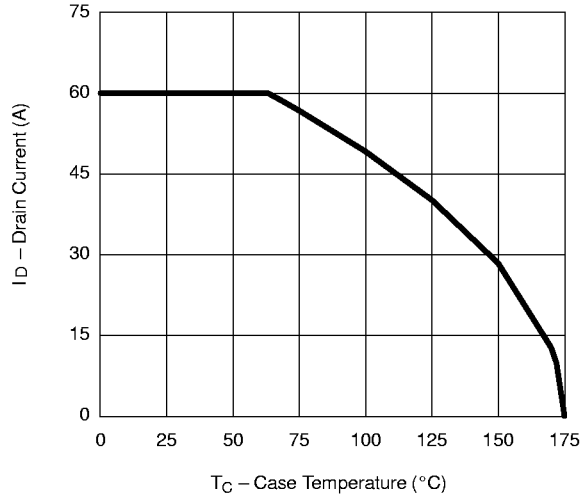
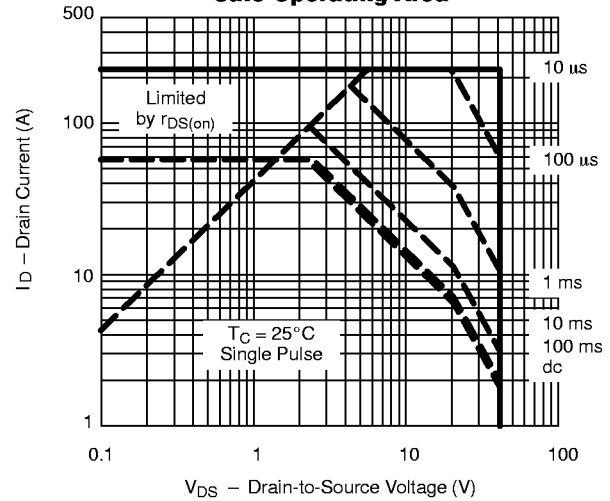
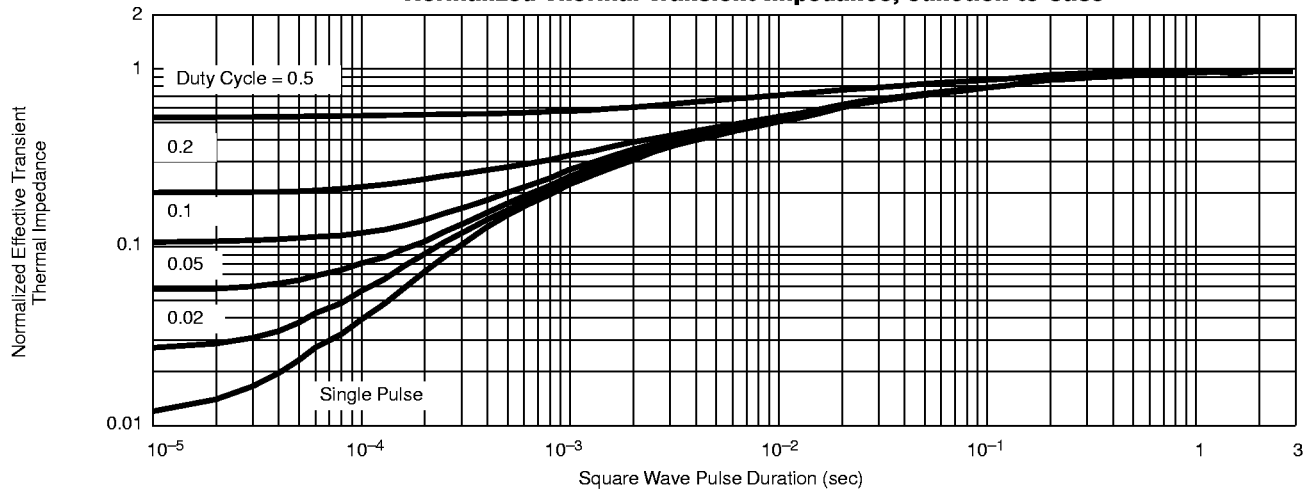
Notes:

- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 c. Independent of operating temperature.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



**THERMAL RATINGS****Maximum Avalanche and Drain Current vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case****Gate-Source Voltage vs. Gate Current**