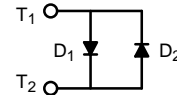
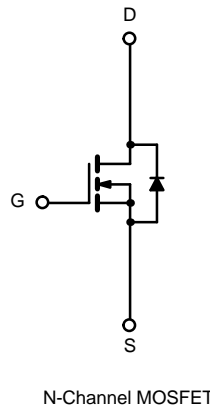
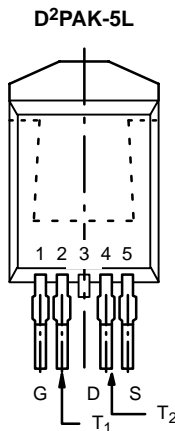




N-Channel 40-V (D-S) MOSFET with Sensing Diode

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.0075 @ $V_{GS} = 10$ V	50 ^a

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$) ^d	$T_C = 25^\circ\text{C}$	I_D	50 ^a	A
	$T_C = 100^\circ\text{C}$		50 ^a	
Pulsed Drain Current		I_{DM}	200	
Continuous Diode Current (Diode Conduction) ^d		I_S	50 ^a	
Avalanche Current		I_{AR}	50 ^a	
Repetitive Avalanche Energy ^b	$L = 0.1$ mH	E_{AR}	125	
Maximum Power Dissipation ^a	$T_C = 25^\circ\text{C}$	P_D	200 ^c	W
	$T_A = 25^\circ\text{C}$		3.75 ^d	
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 ^d	PCB Mount ^d	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case		R_{thJC}	0.75	

Notes

- a. Package limited.
- b. Duty cycle $\leq 1\%$.
- c. See SOA curve for voltage derating.
- d. When mounted on 1" square PCB (FR-4 material).

MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{DS} = 250\ \mu\text{A}$	2			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			500	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	120			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		0.0063	0.0075	Ω
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 125^\circ\text{C}$			0.011	
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 175^\circ\text{C}$			0.014	
Sense Diode Forward Voltage	V_{FD1}	$I_F = 50\ \mu\text{A}$	655		715	mV
	V_{FD2}	$I_F = 25\ \mu\text{A}$	600		660	
Sense Diode Forward Voltage Increase	ΔV_F	From $I_F = 25\ \mu\text{A}$ to $I_F = 50\ \mu\text{A}$	30		80	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		35		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		6400		pF
Output Capacitance	C_{oss}			1100		
Reverse Transfer Capacitance	C_{rss}			630		
Total Gate Charge ^c	Q_g	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		115	150	nC
Gate-Source Charge ^c	Q_{gs}			35		
Gate-Drain Charge ^c	Q_{gd}			35		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 0.8\ \Omega$ $I_D = 25\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		15	20	ns
Rise Time ^c	t_r			150	210	
Turn-Off Delay Time ^c	$t_{d(off)}$			60	85	
Fall Time ^c	t_f			80	110	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)^b						
Continuous Current	I_s				50	A
Pulsed Current	I_{SM}				200	
Forward Voltage ^a	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45	70	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.06	0.18	μC

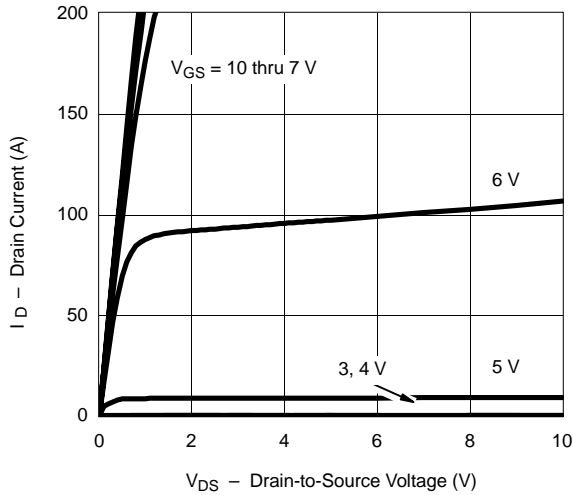
Notes:

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

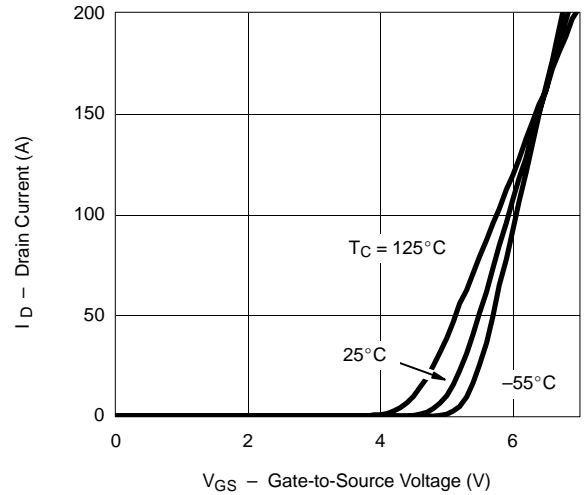


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

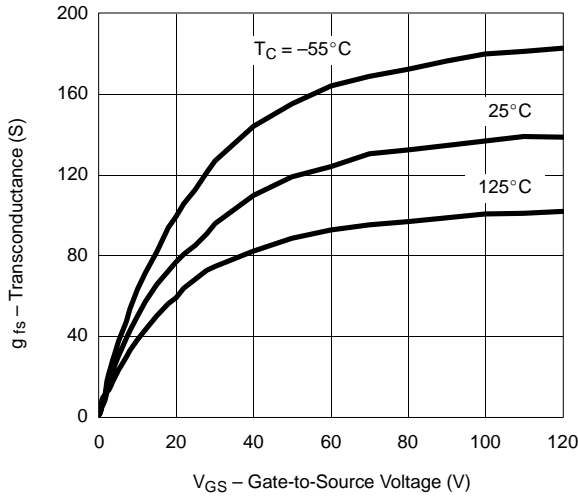
Output Characteristics



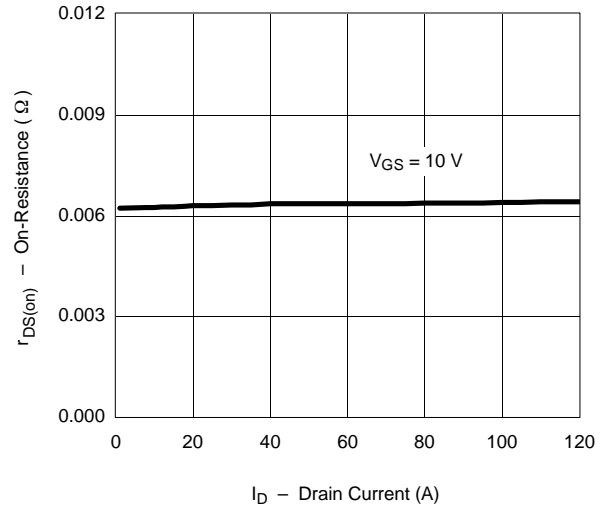
Transfer Characteristics



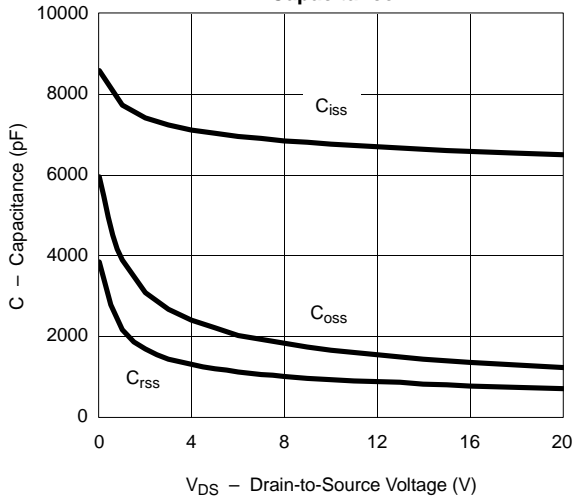
Transconductance



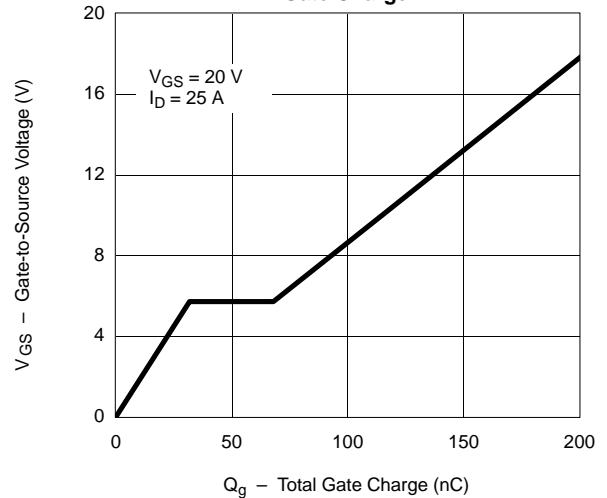
On-Resistance vs. Drain Current



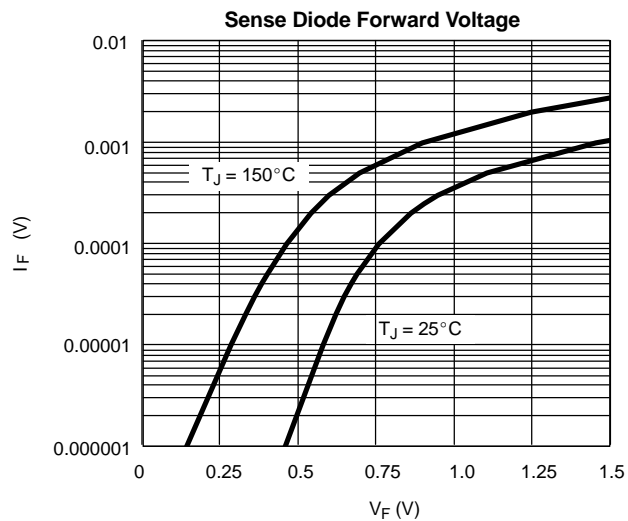
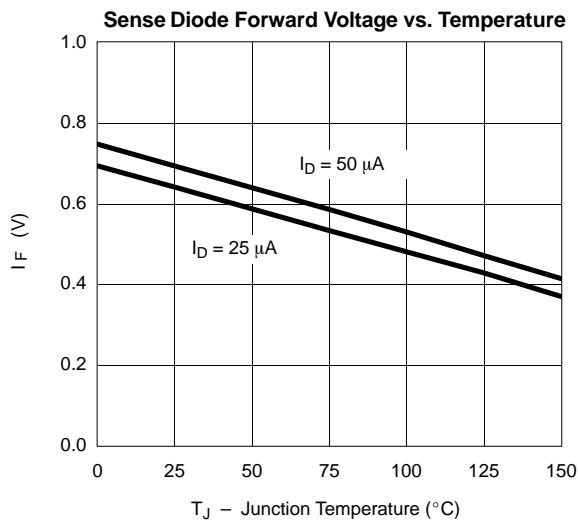
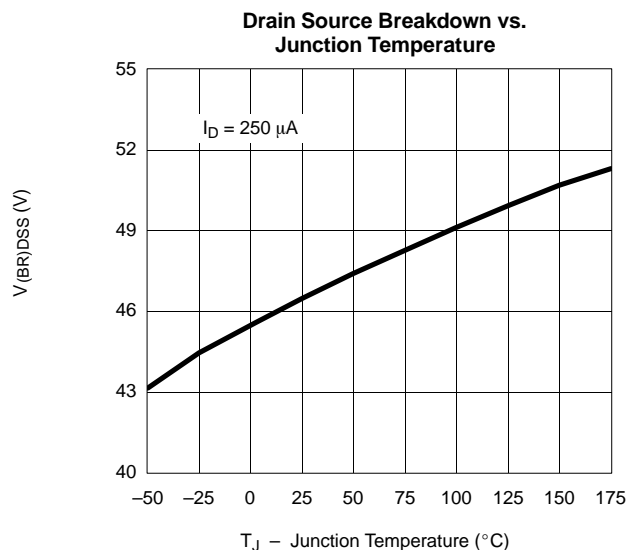
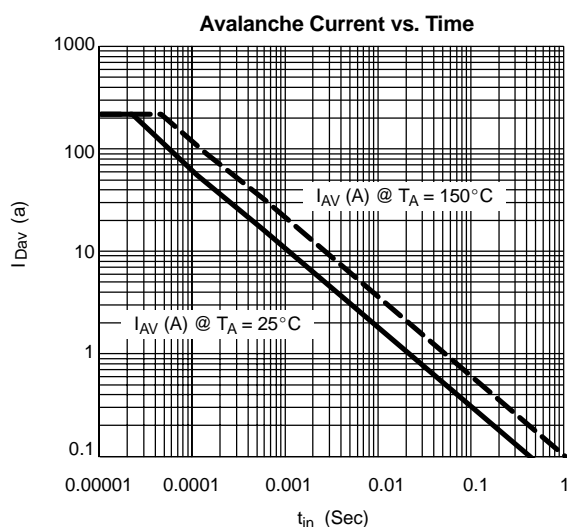
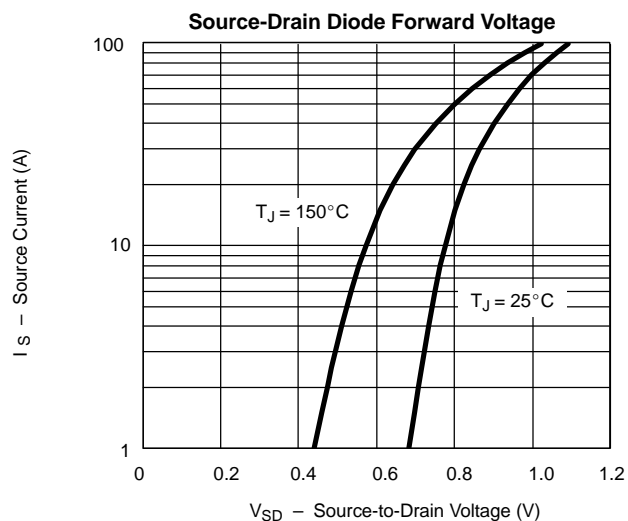
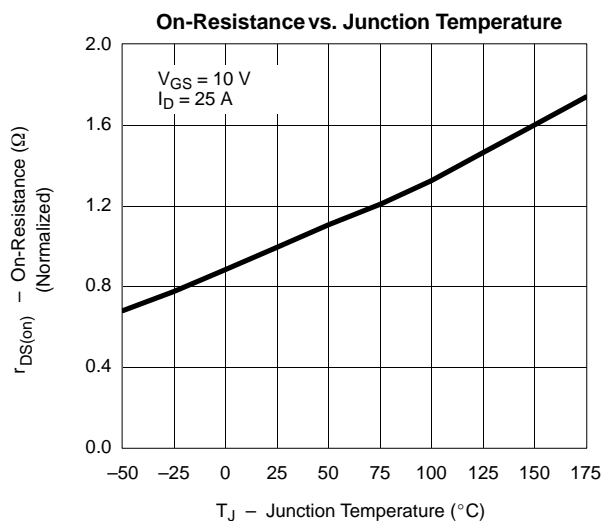
Capacitance



Gate Charge



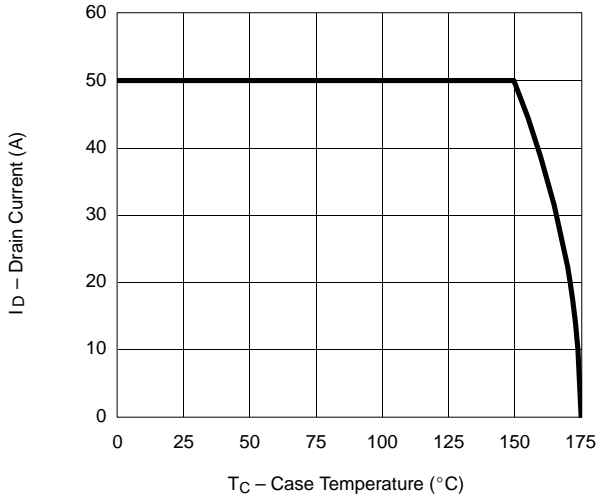
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



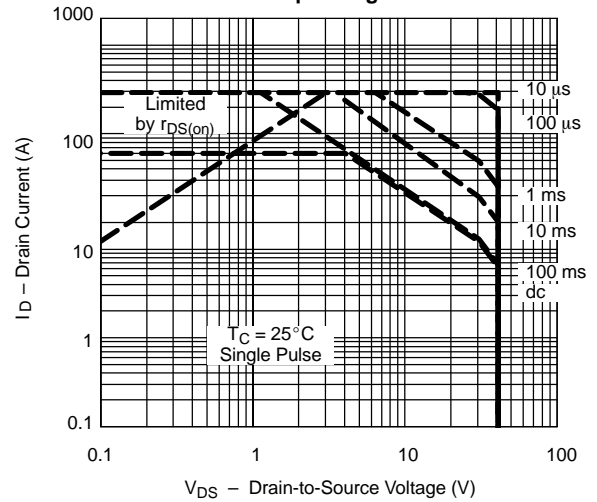


THERMAL RATINGS

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

