



N-Channel 30-V (D-S) MOSFET With Sense Terminal

PRODUCT SUMMARY

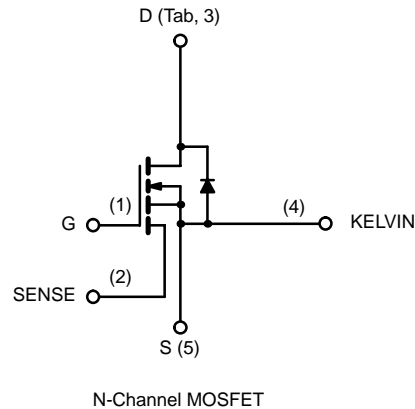
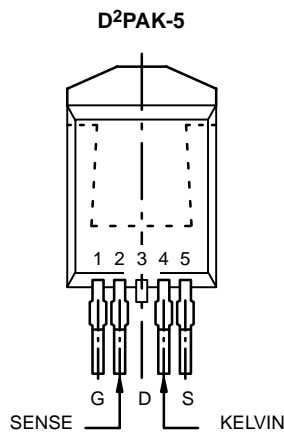
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.013 @ $V_{GS} = 10$ V	50 ^a
	0.017 @ $V_{GS} = 4.5$ V	48 ^a

FEATURES

- TrenchFET® Power MOSFET Plus Current Sensing Diode
- New Low Thermal Resistance Package

APPLICATIONS

- Automotive
- Industrial



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	50 ^a
		$T_C = 125^\circ\text{C}$	32 ^a
Pulsed Drain Current	I_{DM}	100	A
Avalanche Current	I_{AR}	25	
Repetitive Avalanche Energy ^b	E_{AR}	31	mJ
Maximum Power Dissipation ^b	P_D	$T_C = 25^\circ\text{C}$	83 ^c
		$T_A = 25^\circ\text{C}$	2.7 ^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	R_{thJA}	55	$^\circ\text{C/W}$
Junction-to-Case	R_{thJC}	1.8	

Notes

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

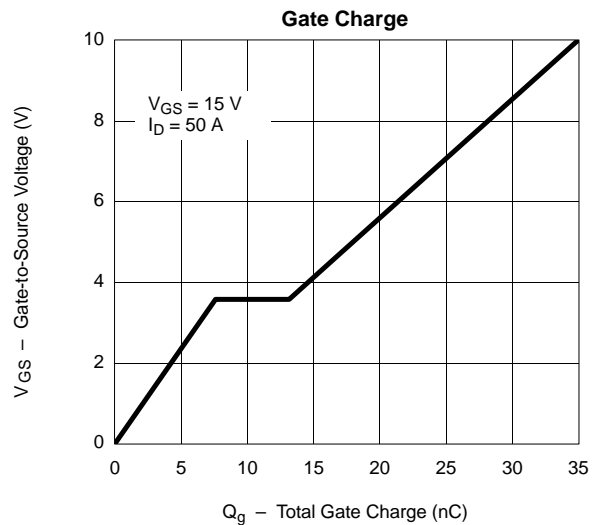
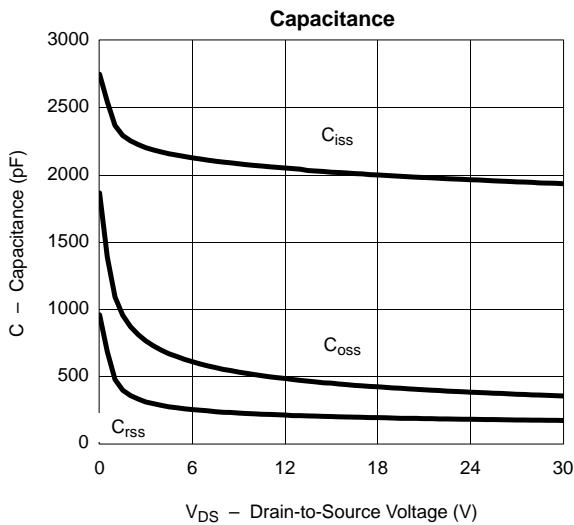
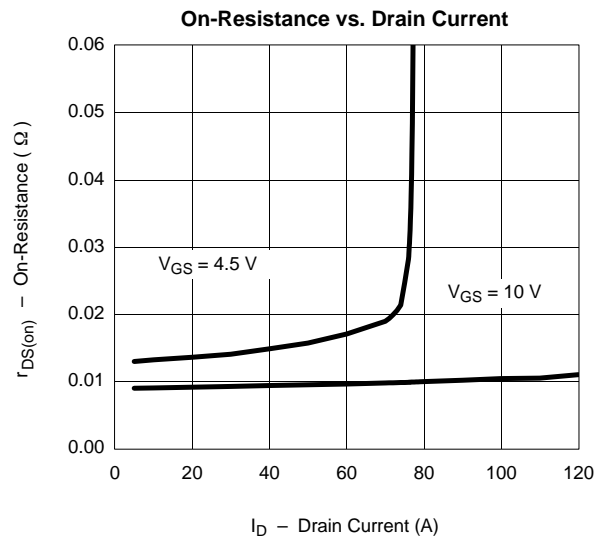
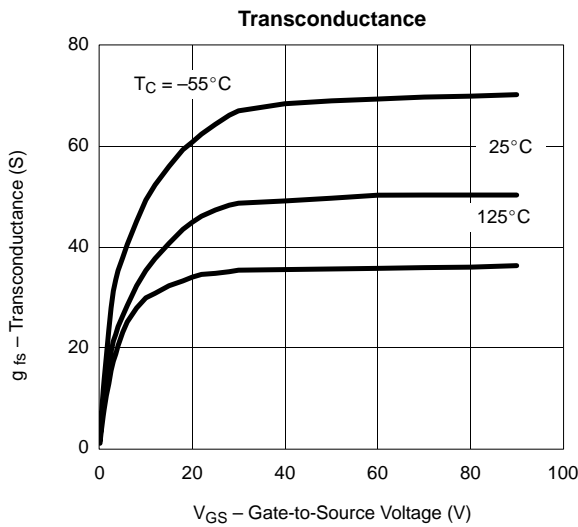
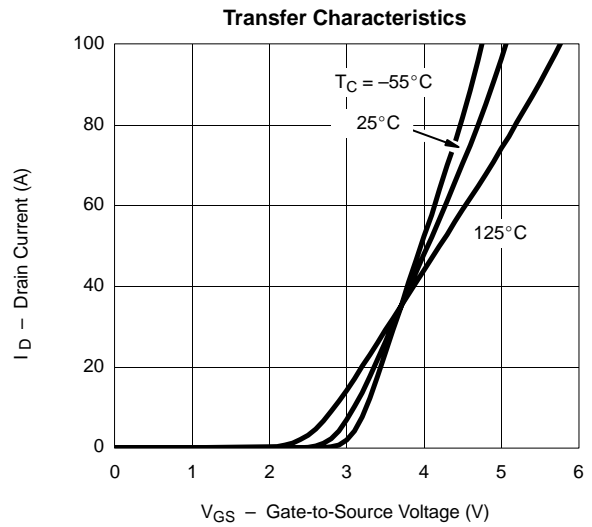
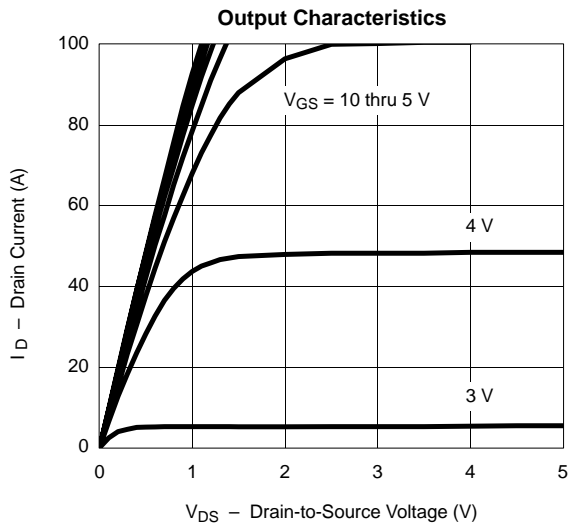
MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{DS} = 250\ \mu\text{A}$	1		3	
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}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		0.010	0.013	Ω
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 125^\circ\text{C}$		0.016	0.021	
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 175^\circ\text{C}$		0.018	0.024	
		$V_{GS} = 4.5\text{ V}, I_D = 24\text{ A}$		0.014	0.017	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 25\text{ A}$	30			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1960		pF
Output Capacitance	C_{oss}			380		
Reverse Transfer Capacitance	C_{rss}			180		
Total Gate Charge ^c	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 20\text{ V}, I_D = 50\text{ A}$		35	50	nC
Gate-Source Charge ^c	Q_{gs}			7.6		
Gate-Drain Charge ^c	Q_{gd}			5.6		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.3\ \Omega$ $I_D = 50\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		10	20	ns
Rise Time ^c	t_r			93	180	
Turn-Off Delay Time ^c	$t_{d(off)}$			30	60	
Fall Time ^c	t_f			10	20	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)^b						
Continuous Current	I_S				50	A
Pulsed Current	I_{SM}				100	
Forward Voltage ^a	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0\text{ V}$		1.3	1.6	V
Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		35	70	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			1.5		A
Reverse Recovery Charge	Q_{rr}			0.026		μC
Current Sense Characteristics						
Current Sensing Ratio	r	$I_D = 1\text{ A}, V_{GSS} = 10\text{ V}, R_{SENSE} = 1.1\ \Omega$	420	520	620	
Mirror Active Resistance	$r_{m(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ mA}$		3.5		Ω

Notes:

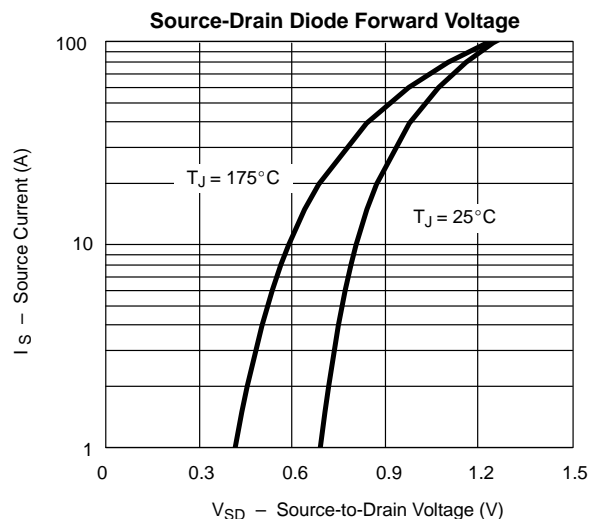
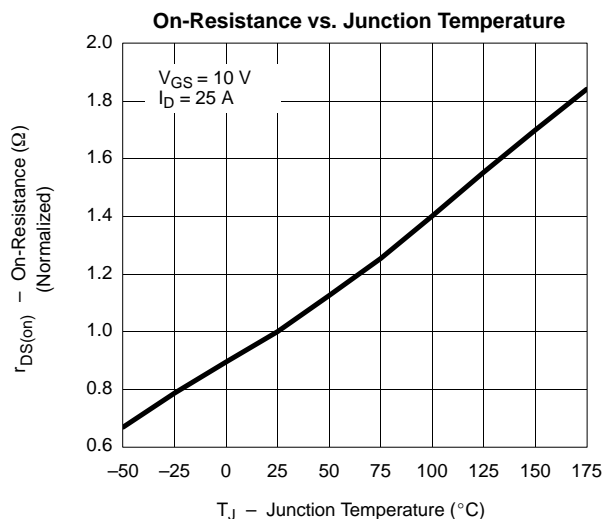
- Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.



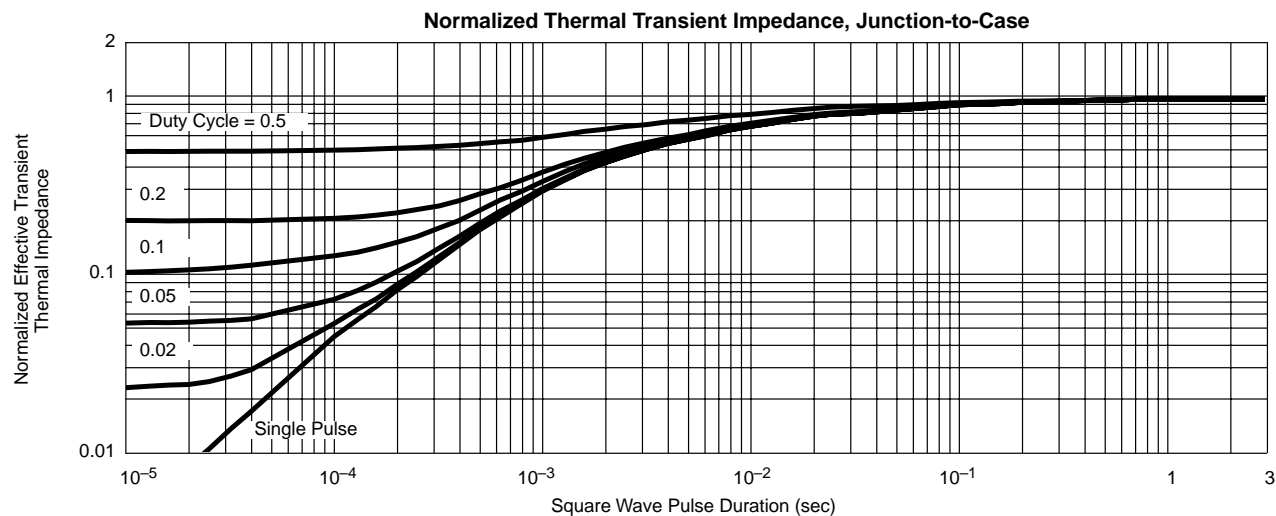
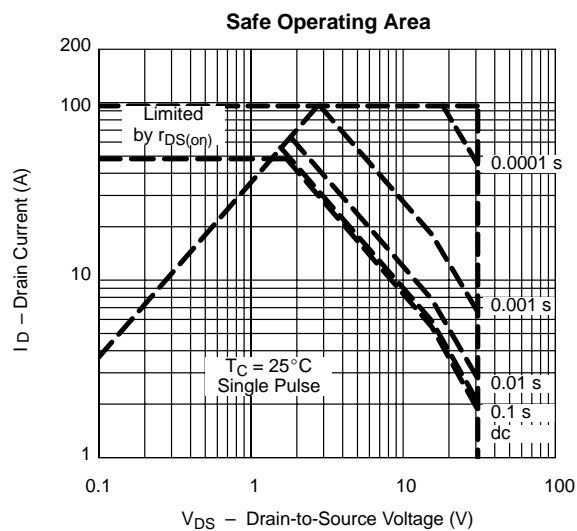
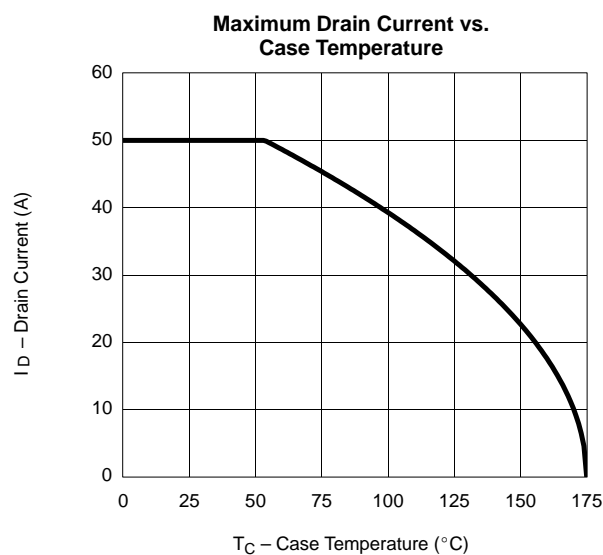
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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THERMAL RATINGS



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SENSE DIE

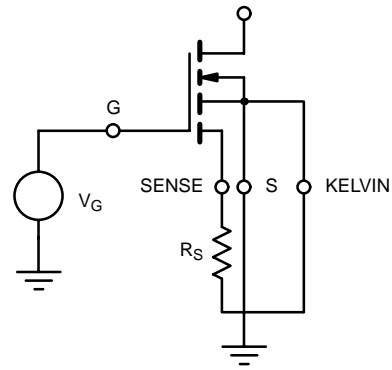
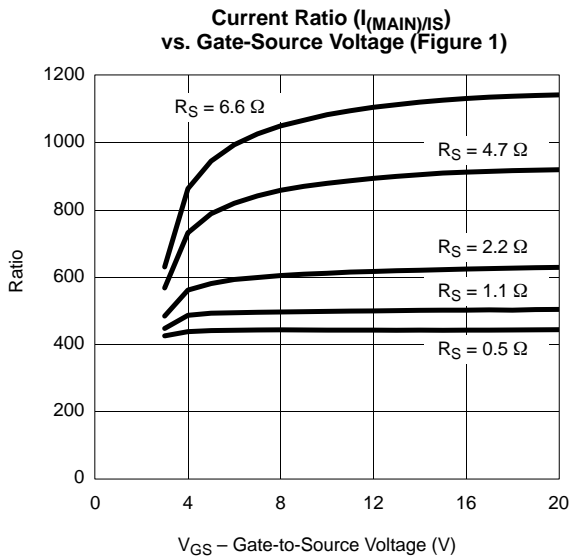
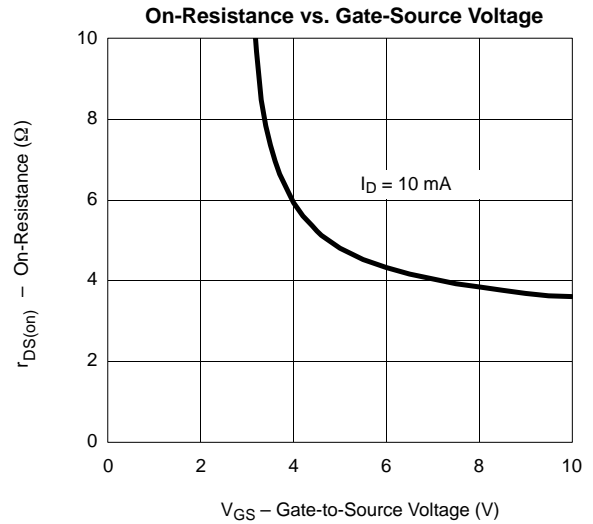
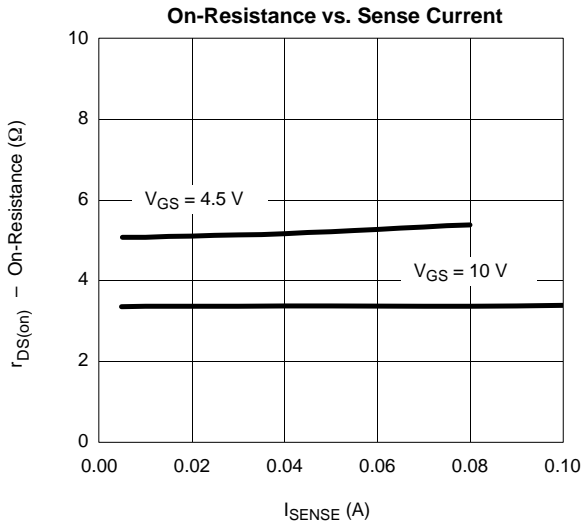


Figure 1