

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

PRODUCT SUMMARY

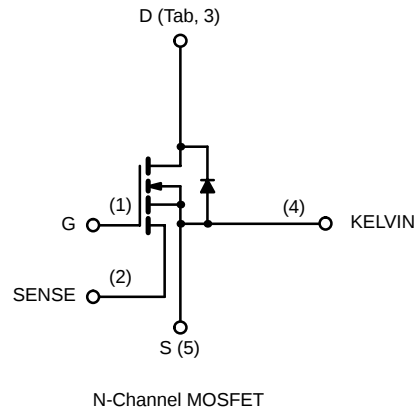
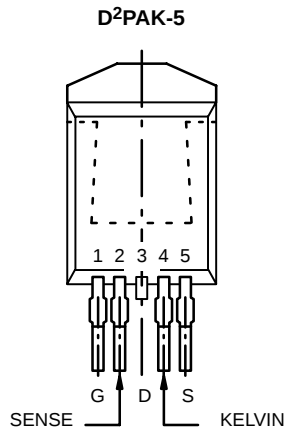
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.013 @ $V_{GS} = 10$ V	50 ^a
	0.017 @ $V_{GS} = 4.5$ V	48 ^a

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 ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	50 ^a	A
	$T_C = 125^\circ\text{C}$		32 ^a	
Pulsed Drain Current		I_{DM}	100	
Avalanche Current		I_{AR}	25	mJ
Repetitive Avalanche Energy ^b		E_{AR}	31	
Maximum Power Dissipation ^b	$T_C = 25^\circ\text{C}$	P_D	83 ^c	W
	$T_A = 25^\circ\text{C}$		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	PCB Mount ^d	R_{thJA}	55	$^\circ\text{C/W}$
Junction-to-Case		R_{thJC}	1.8	

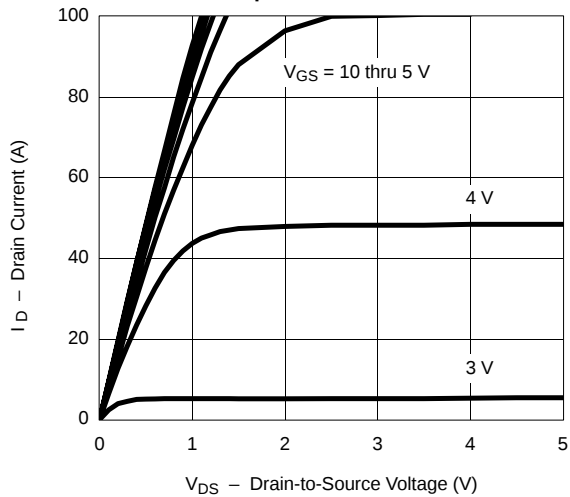
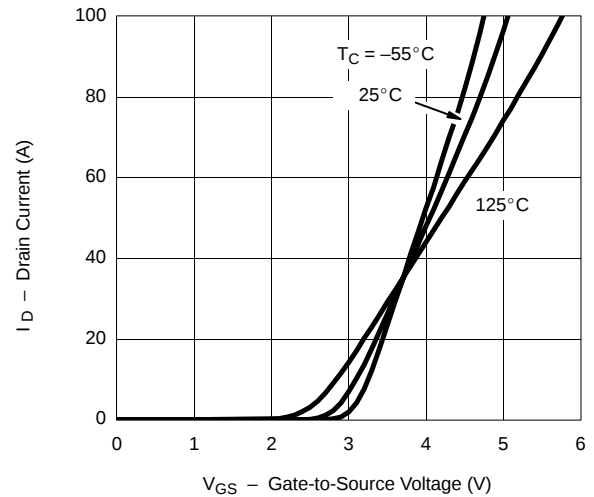
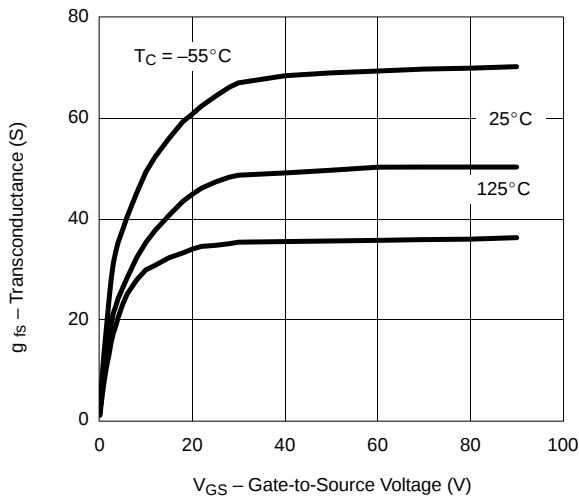
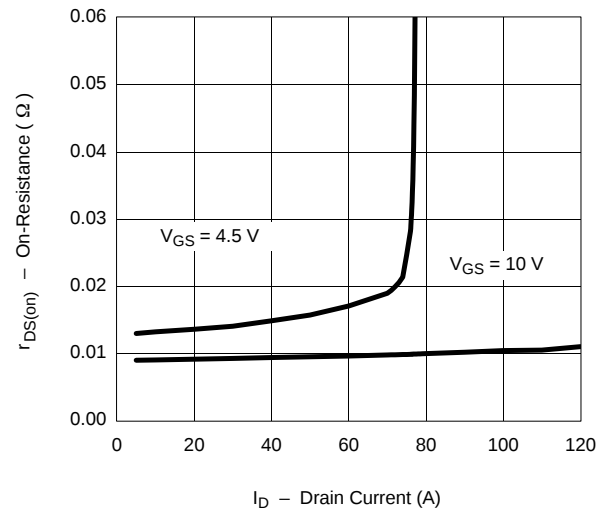
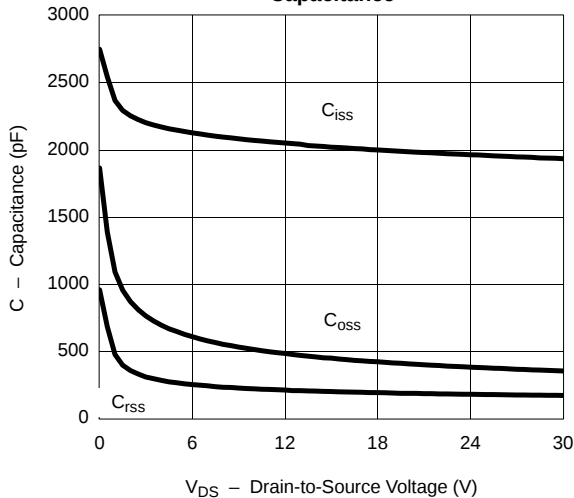
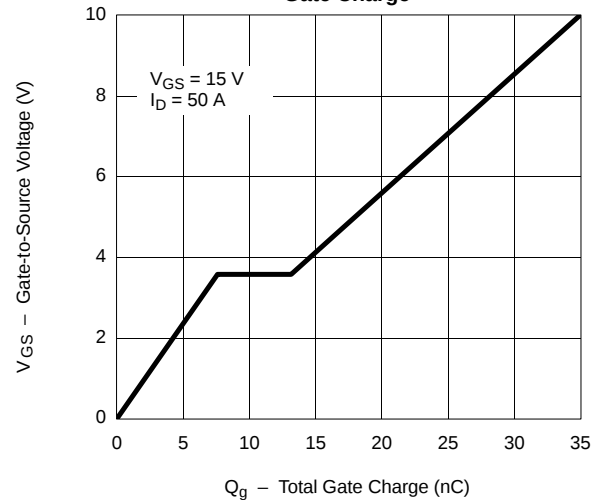
Notes

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

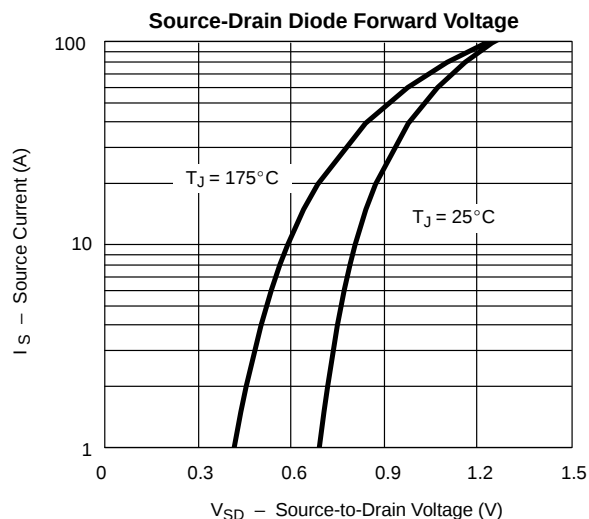
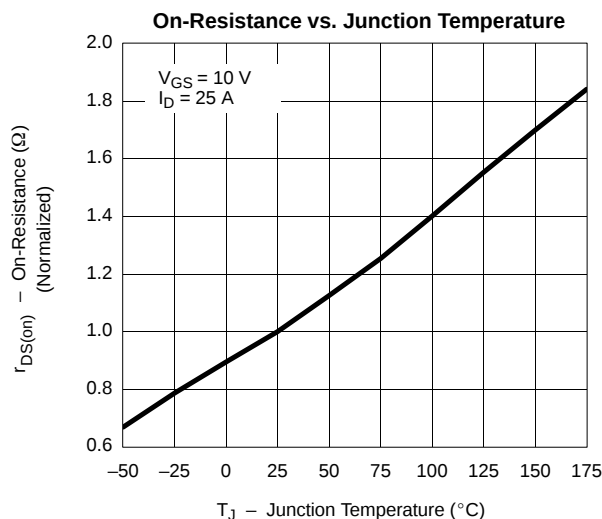
MOSFET SPECIFICATIONS (T _J =25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	30			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{DS} = 250 μA	1		3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 175°C			150	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 25 A		0.010	0.013	Ω
		V _{GS} = 10 V, I _D = 25 A, T _J = 125°C		0.016	0.021	
		V _{GS} = 10 V, I _D = 25 A, T _J = 175°C		0.018	0.024	
		V _{GS} = 4.5 V, I _D = 24 A		0.014	0.017	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 25 A	30			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1960		pF
Output Capacitance	C _{oss}			380		
Reversen Transfer Capacitance	C _{rss}			180		
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 20 V, I _D = 50 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 V, R _L = 0.3 Ω I _D ≈ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω		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°C) ^b						
Continuous Current	I _S				50	A
Pulsed Current	I _{SM}				100	
Forward Voltage ^a	V _{SD}	I _F = 50 A, V _{GS} = 0 V		1.3	1.6	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		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 A, V _{GSS} = 10 V, R _{SENSE} = 1.1 Ω	420	520	620	
Mirror Active Resistance	r _{m(on)}	V _{GS} = 10 V, I _D = 10 mA		3.5		Ω

Notes:

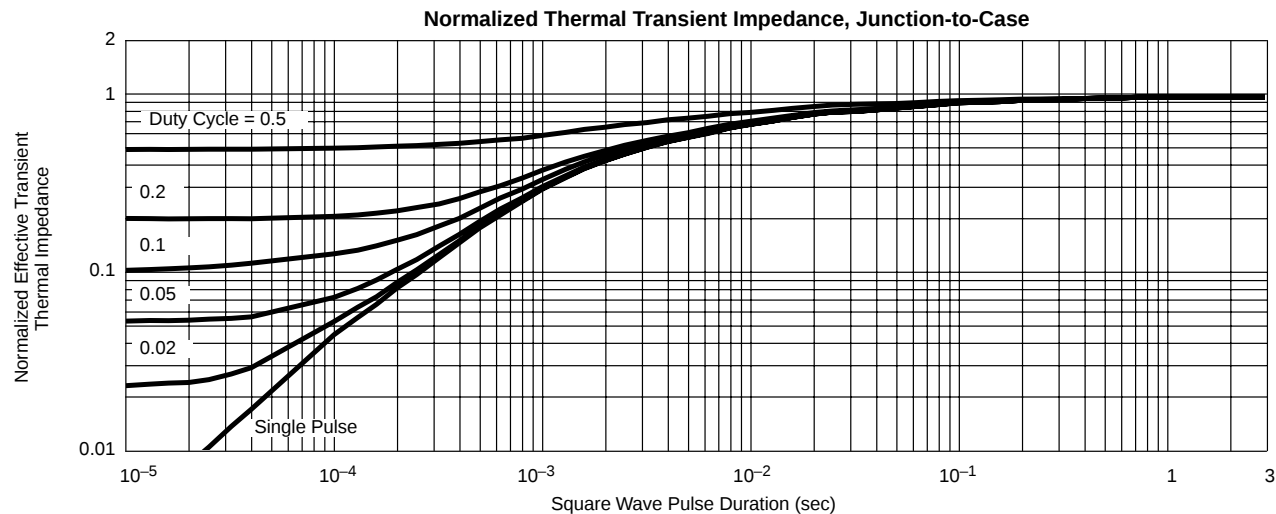
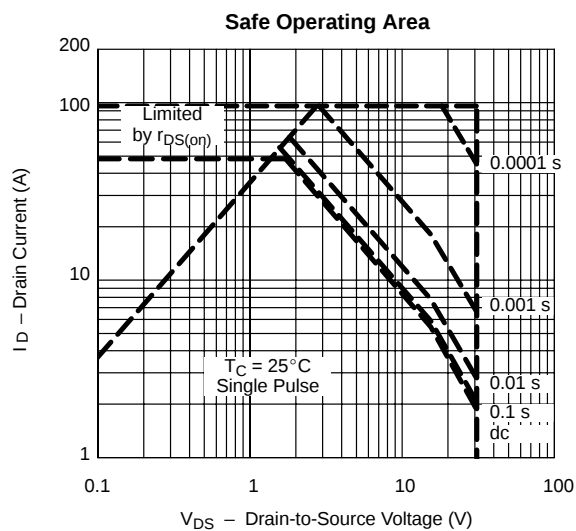
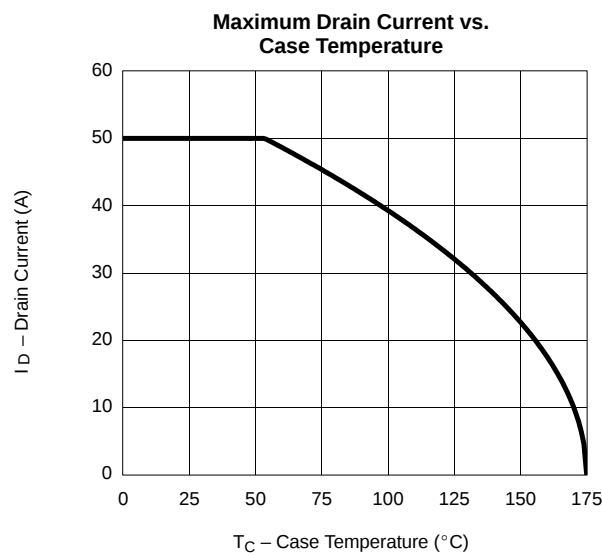
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
e. Guaranteed by design, not subject to production testing.
b. Independent of operating temperature.

**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





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

SENSE DIE

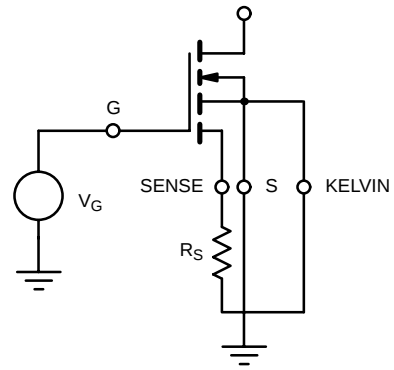
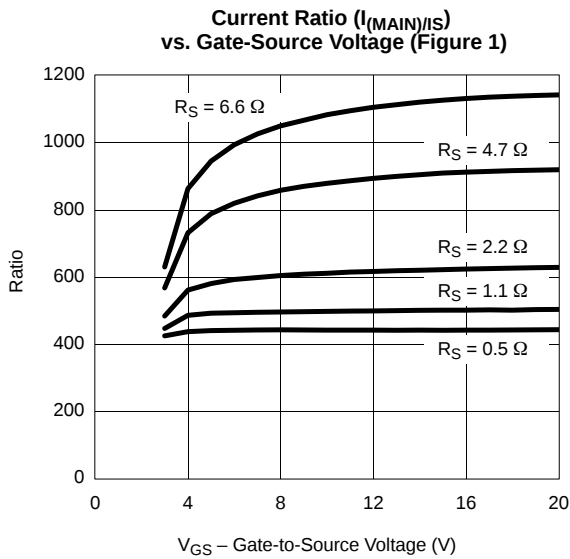
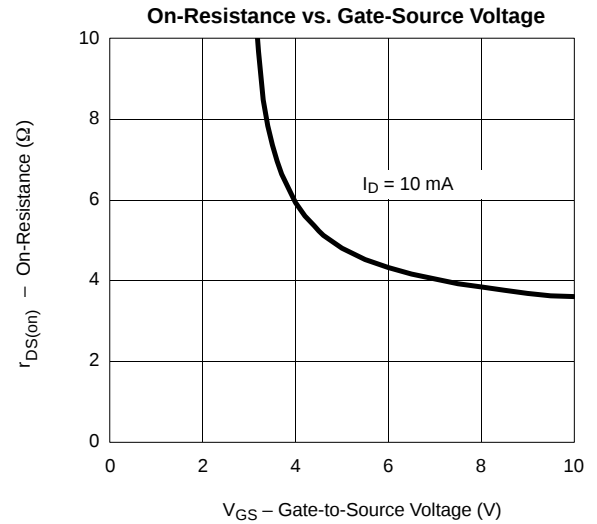
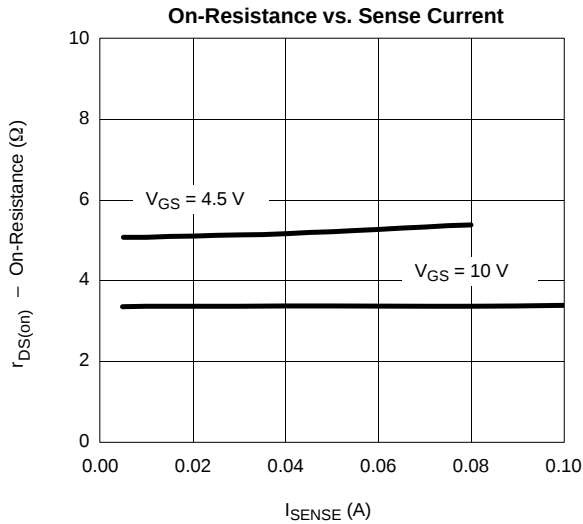


Figure 1