



N-Channel 60-V (D-S), 175°C MOSFET, Logic Level

PRODUCT SUMMARY

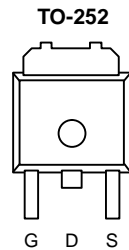
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
60	0.0093 @ $V_{GS} = 10$ V	50
	0.0122 @ $V_{GS} = 4.5$ V	50

FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature

APPLICATIONS

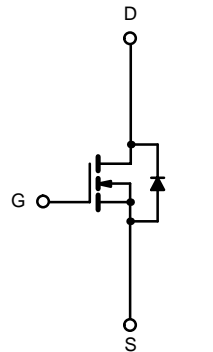
- Automotive
 - ABS
 - Motor Drives
 - Fuel Injection



Top View

Order Number:
SUD50N06-09L

Drain Connected to Tab



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175^\circ\text{C}$) ^b	$T_C = 25^\circ\text{C}$	I_D	50	A
	$T_C = 100^\circ\text{C}$		50 ^a	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	50 ^a	
Avalanche Current		I_{AR}	50	
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$)		E_{AR}	125	mJ
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	100	W
	$T_A = 25^\circ\text{C}$		3 ^b , 8.3 ^b , c	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Limit	Unit
Maximum Junction-to-Ambient	$t \leq 10$ sec.	R_{thJA}	15	18	$^\circ\text{C/W}$
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.2	1.5	

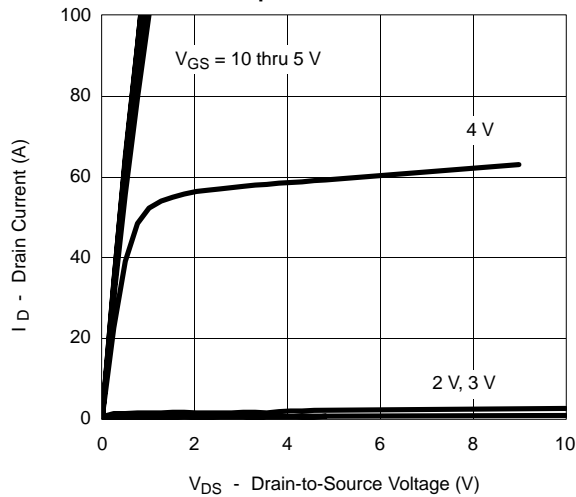
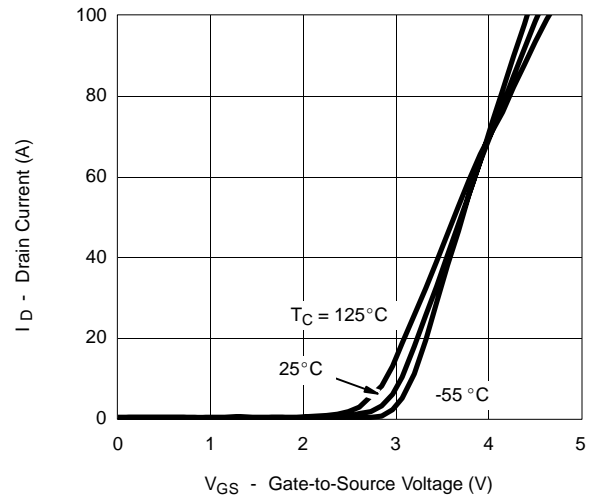
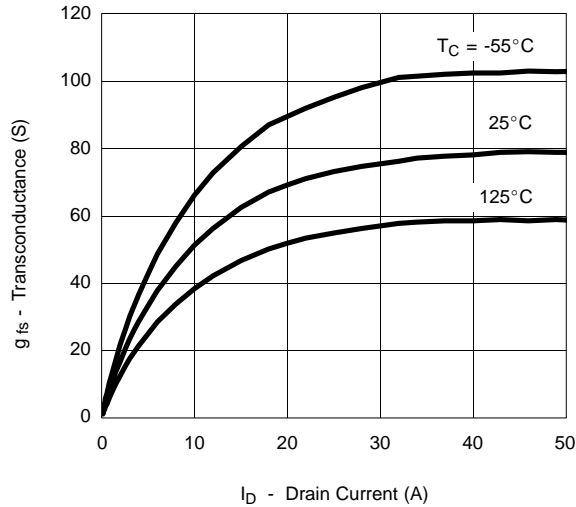
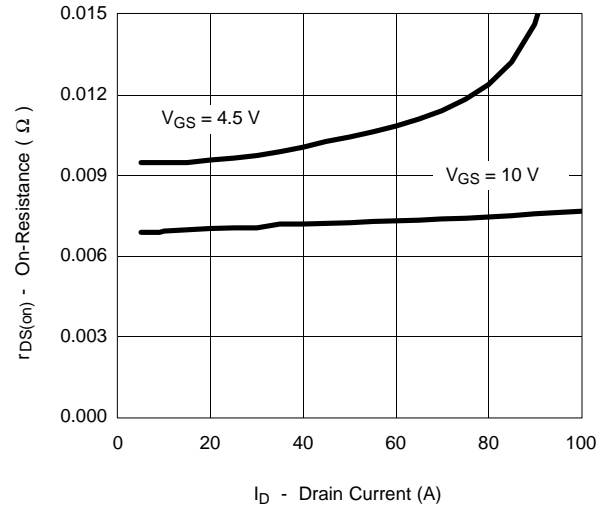
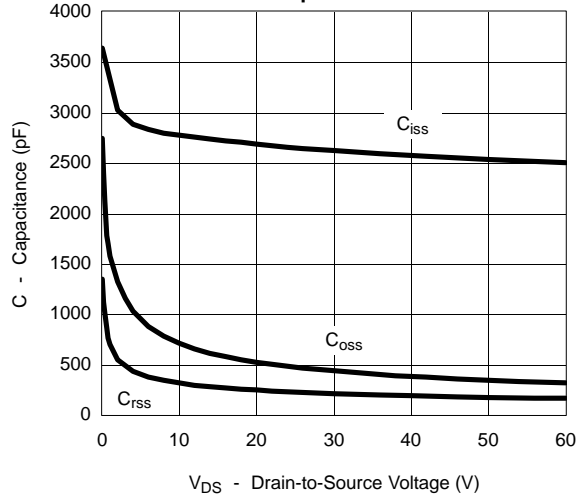
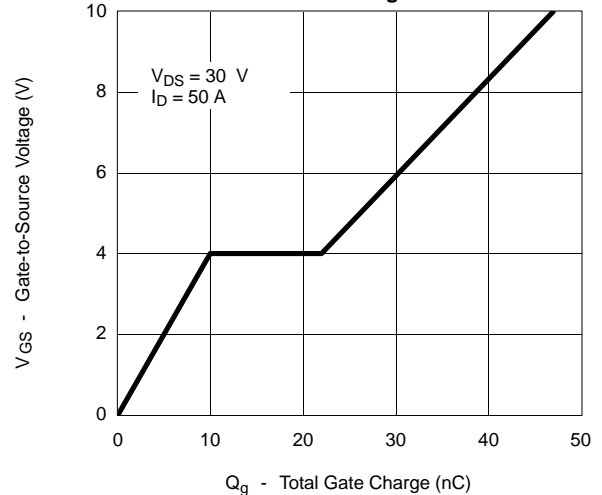
Notes:

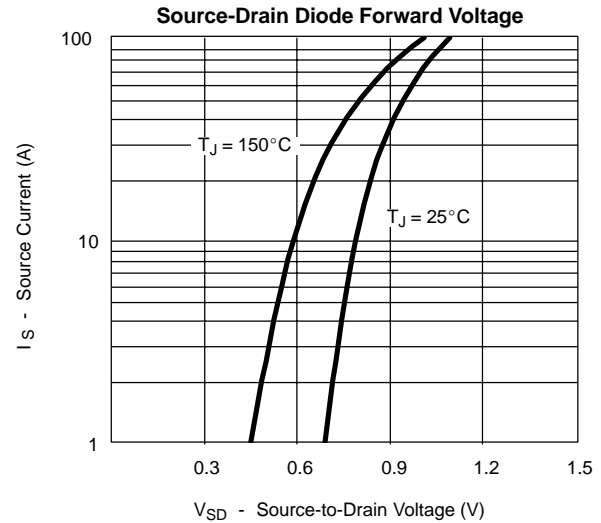
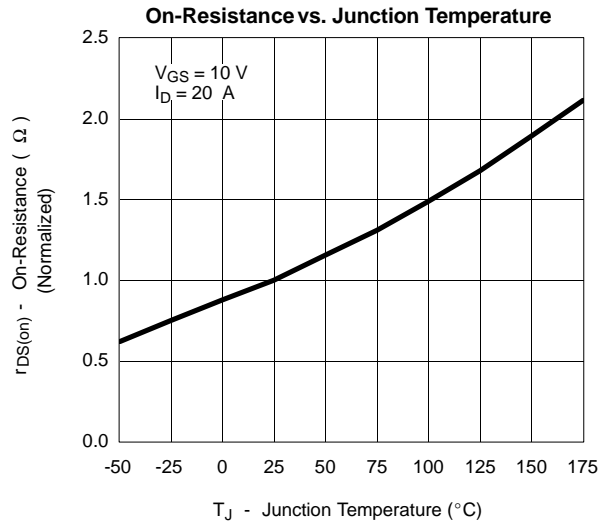
- a. Package limited.
b. Surface mounted on 1" x 1" FR4 Board, $t \leq 10$ sec.
c. $t \leq 10$ sec.

SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0	2.0	3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 48 V, V _{GS} = 0 V			1	μA
		V _{DS} = 48 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 48 V, V _{GS} = 0 V, T _J = 175°C			250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0074	0.0093	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.016	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175°C			0.020	
		V _{GS} = 4.5 V, I _D = 15 A			0.0122	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A				S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		2650		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			225		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		47	70	nC
Gate-Source Charge ^c	Q _{gs}			10		
Gate-Drain Charge ^c	Q _{gd}			12		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω		10	20	ns
Rise Time ^c	t _r			15	25	
Turn-Off Delay Time ^c	t _{d(off)}			35	50	
Fall Time ^c	t _f			20	30	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns

Notes:

- For design aid only; not subject to production testing.
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- 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
