



N-Channel 20-V (D-S), 175°C MOSFET

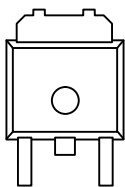
PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^{a, b}
20	0.006 @ $V_{GS} = 4.5$ V	30
	0.009 @ $V_{GS} = 2.5$ V	25

FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100% R_g Tested

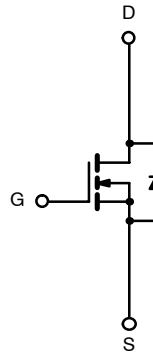
TO-252



Top View

Order Number:
SUD50N02-06

Drain Connected to Tab



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current ^{a, b}	$T_A = 25^\circ\text{C}$	I_D	30	A
	$T_A = 100^\circ\text{C}$		21	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction) ^{a, b}		I_S	30	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	100	W
	$T_A = 25^\circ\text{C}$		8.3 ^{a, b}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

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

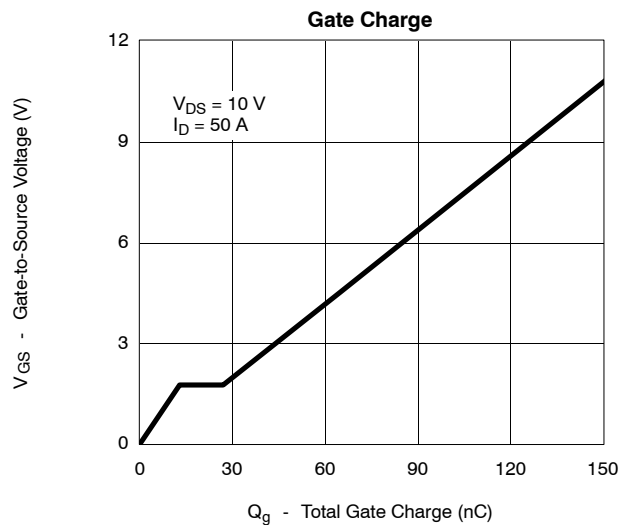
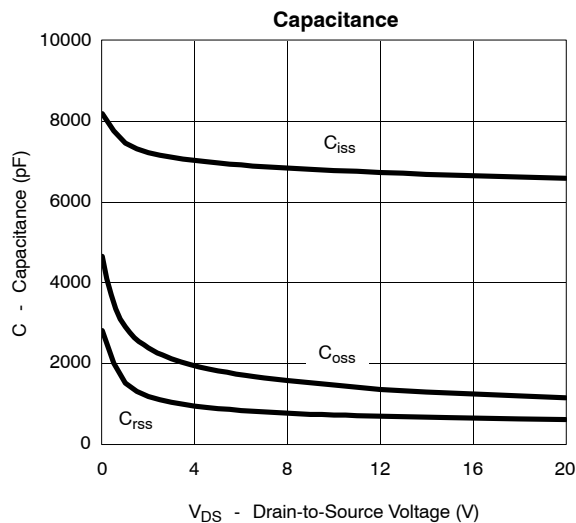
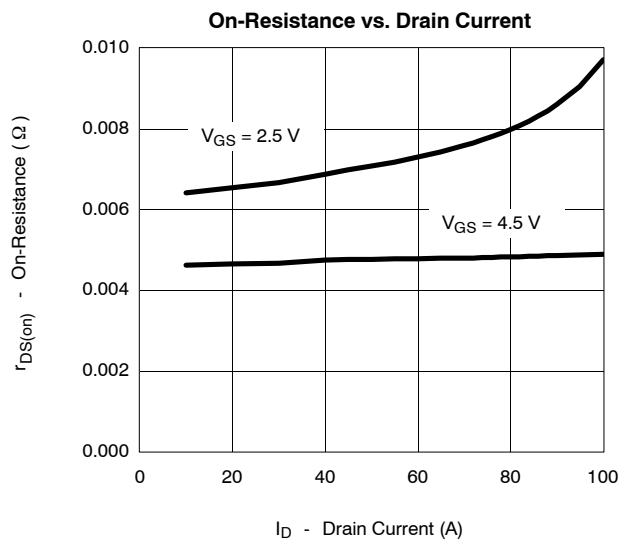
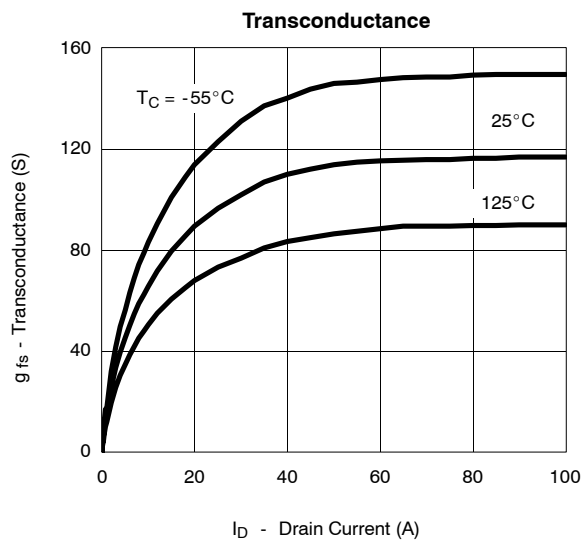
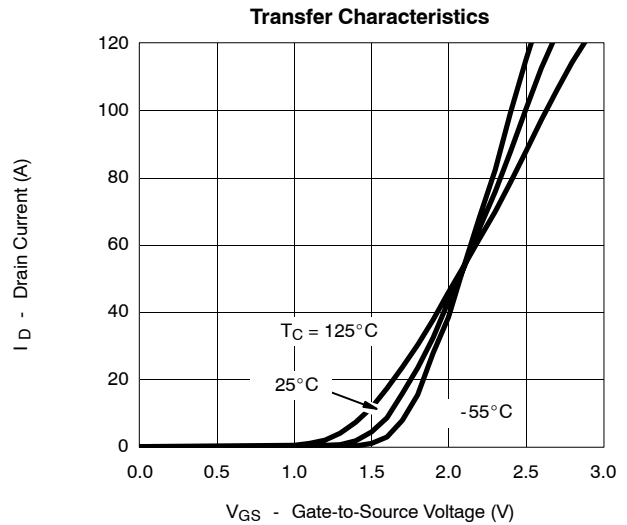
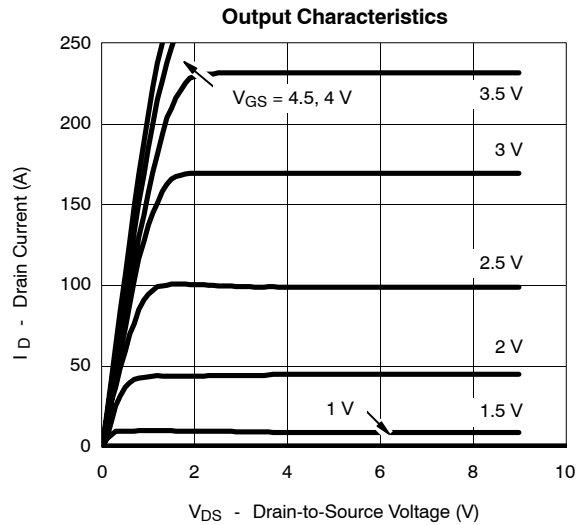
Notes

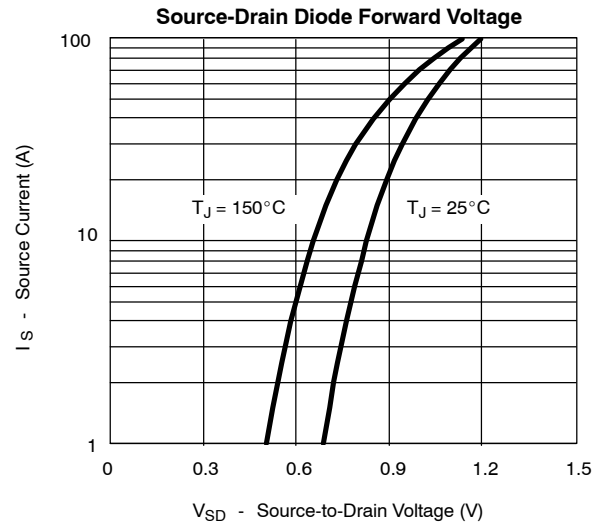
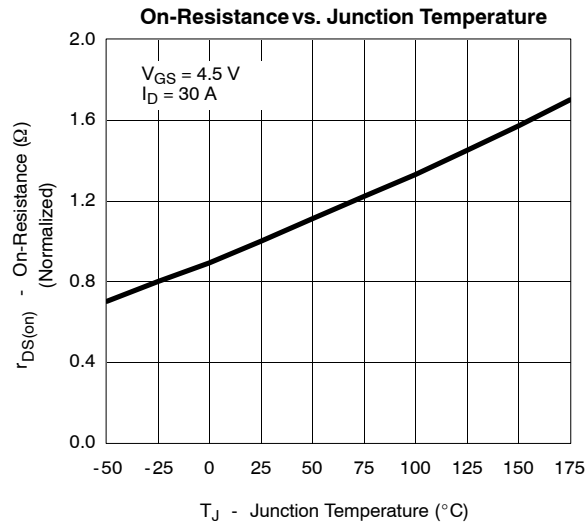
- a. Surface Mounted on 1" x 1" FR4 Board
b. $t \leq 10$ sec.

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	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.6			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125 °C			50	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 4.5 V	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 30 A			0.006	Ω
		V _{GS} = 4.5 V, I _D =30 A, T _J = 125 °C			0.009	
		V _{GS} = 2.5 V, I _D = 20 A			0.009	
Forward Transconductance ^b	g _{fs}	V _{DS} = 5 V, I _D = 30 A	20			S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 20 V, f = 1 MHz		6600		pF
Output Capacitance	C _{oss}			1150		
Reverse Transfer Capacitance	C _{rss}			600		
Total Gate Charge ^c	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 50 A		65	130	nC
Gate-Source Charge ^c	Q _{gs}			13		
Gate-Drain Charge ^c	Q _{gd}			14		
Gate Resistance	R _g		1		3.1	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 10 V, R _L = 0.2 Ω I _D ≅ 50 A, V _{GEN} = 4.5 V, R _G = 2.5 Ω		25	40	ns
Rise Time ^c	t _r			120	180	
Turn-Off Delay Time ^c	t _{d(off)}			80	120	
Fall Time ^c	t _f			100	150	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 100 A, V _{GS} = 0 V		1.2	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		45	100	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)**

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**THERMAL RATINGS**