



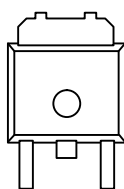
N-Channel 40-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.025 @ $V_{GS} = 10$ V	25
	0.040 @ $V_{GS} = 4.5$ V	20

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

TO-252

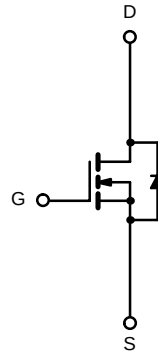


G D S

Top View

Order Number:
SUD25N04-25

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}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$) ^b	$T_C = 25^\circ\text{C}$	I_D	25	A
	$T_C = 125^\circ\text{C}$		15	
Pulsed Drain Current		I_{DM}	50	
Continuous Source Current (Diode Conduction) ^b		I_S	50	
Avalanche Current		I_{AR}	25	
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$)	$L = 0.1$ mH	E_{AR}	31	mJ
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	33 ^b	W
	$T_A = 25^\circ\text{C}$		3 ^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
Junction-to-Ambient ^b	$t \leq 10$ sec	R_{thJA}	20	25	$^\circ\text{C/W}$
	Steady State		40	50	
Junction-to-Case		R_{thJC}	3.7	4.5	

Notes

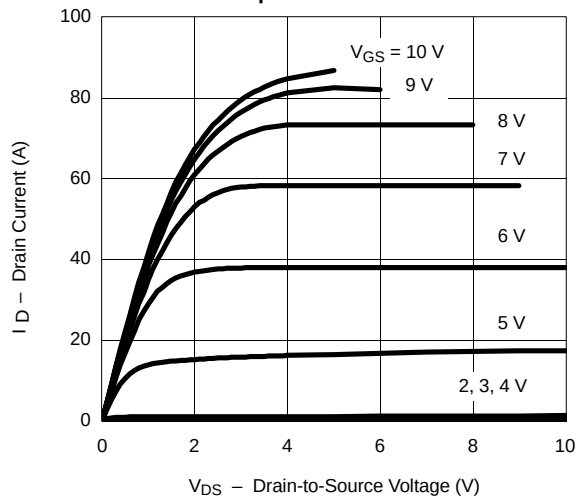
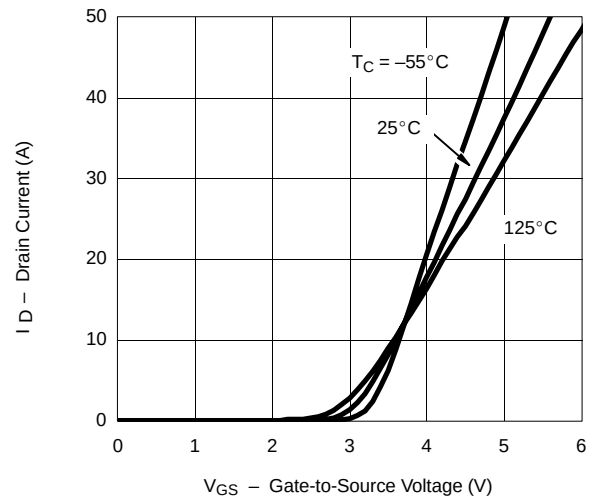
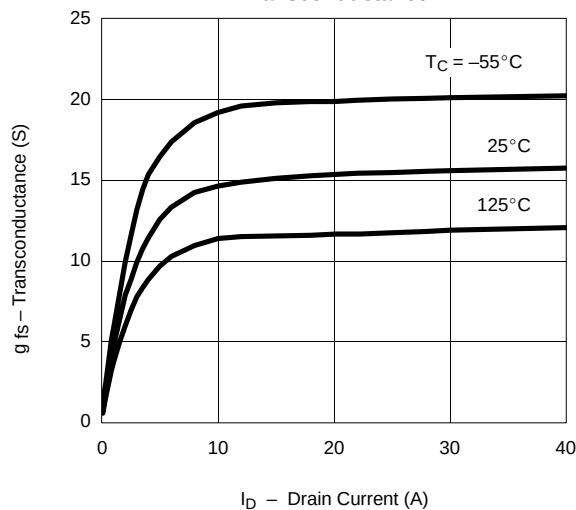
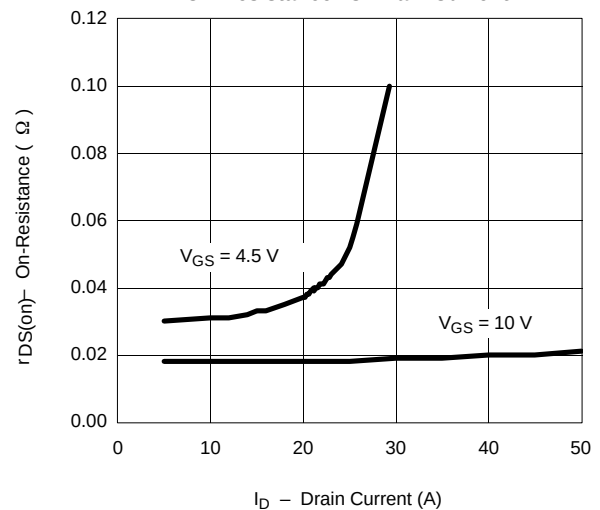
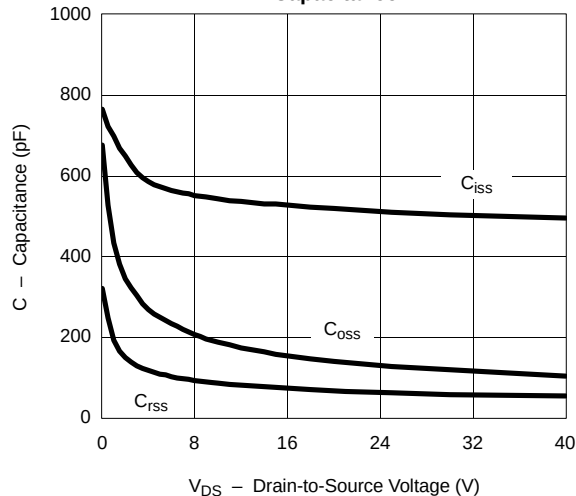
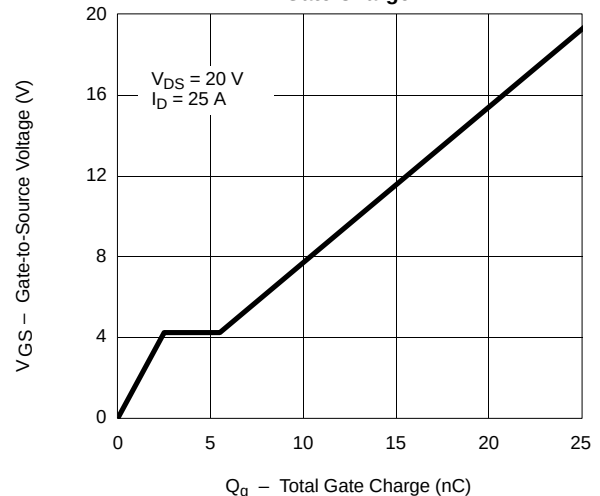
- a. Surface Mounted on 1" x1" FR4 Board.
b. See SOA curve for voltage derating.

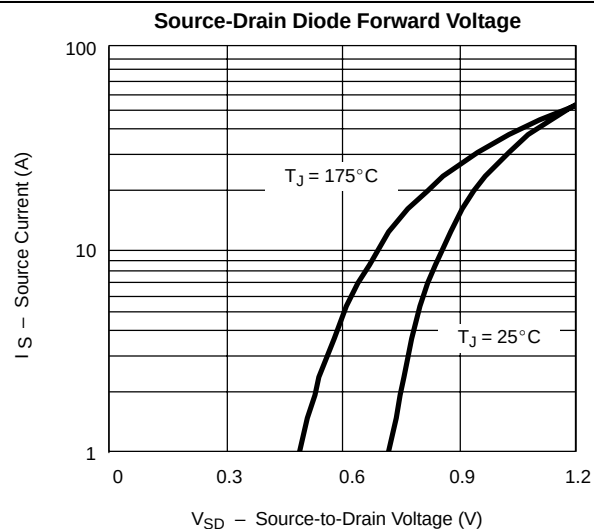
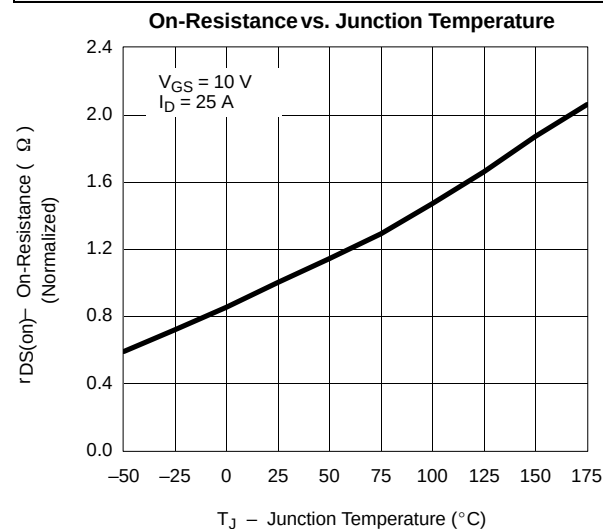


SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0	2.0	3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V			1	μA
		V _{DS} = 40 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 40 V, V _{GS} = 0 V, T _J = 175 °C			150	
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 = 25 A		0.02	0.025	Ω
		V _{GS} = 10 V, I _D = 25 A, T _J = 125 °C			0.040	
		V _{GS} = 10 V, I _D = 25 A, T _J = 175 °C			0.053	
		V _{GS} = 4.5 V, I _D = 10 A		0.031	0.040	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 25 A		15		S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, F = 1 MHz		510		pF
Output Capacitance	C _{oss}			125		
Reverse Transfer Capacitance	C _{rss}			65		
Total Gate Charge ^c	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 25 A		13	20	nC
Gate-Source Charge ^c	Q _{gs}			2.5		
Gate-Drain Charge ^c	Q _{gd}			3		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 0.8 Ω I _D ≅ 25 A, V _{GEN} = 10 V, R _G = 2.5 Ω		5	10	ns
Rise Time ^c	t _r			47	70	
Turn-Off Delay Time ^c	t _{d(off)}			15	30	
Fall Time ^c	t _f			5	10	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				50	A
Diode Forward Voltage ^b	V _{SD}	I _F = 25 A, V _{GS} = 0 V		1.1	1.3	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 25 A, di/dt = 100 A/μs		17	30	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)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

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