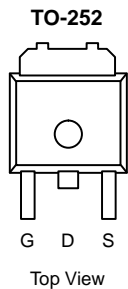




## N-Channel 100-V (D-S) 175°C MOSFET

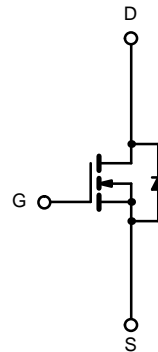
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
100	0.025 @ $V_{GS} = 10$ V	40
	0.028 @ $V_{GS} = 4.5$ V	38

**175°C Rated**  
Maximum Junction Temperature  
**TrenchFET®**  
Power MOSFETs



Drain Connected to Tab

Order Number:  
SUD40N10-25



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ ) <sup>b</sup>	$I_D$	$T_C = 25^\circ\text{C}$	A
		$T_C = 125^\circ\text{C}$	
Pulsed Drain Current	$I_{DM}$	70	
Continuous Source Current (Diode Conduction)	$I_S$	40	
Avalanche Current	$I_{AR}$	40	mJ
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$ )	$E_{AR}$	80	
Maximum Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	W
		$T_A = 25^\circ\text{C}$	
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 <sup>a</sup>	$R_{thJA}$	$t \leq 10$ sec	15	$^\circ\text{C}/\text{W}$
		Steady State	40	
Junction-to-Case	$R_{thJC}$	1.2	1.5	

Notes

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



SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	100			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0		3.0	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	70			A
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 40 A		0.02	0.025	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 40 A, T <sub>J</sub> = 125 °C			0.05	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 40 A, T <sub>J</sub> = 175 °C			0.063	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.022	0.028	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 40 A		70		S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, F = 1 MHz		2400		pF
Output Capacitance	C <sub>oss</sub>			290		
Reverse Transfer Capacitance	C <sub>rss</sub>			120		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 40 A		40	60	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			11		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			9		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, R <sub>L</sub> = 1.25 Ω I <sub>D</sub> ≅ 40 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		8	13	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			40	60	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			15	25	
Fall Time <sup>c</sup>	t <sub>f</sub>			80	120	
<b>Source-Drain Diode Ratings and Characteristic (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				70	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 40 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 40 A, di/dt = 100 A/μs		75	120	ns

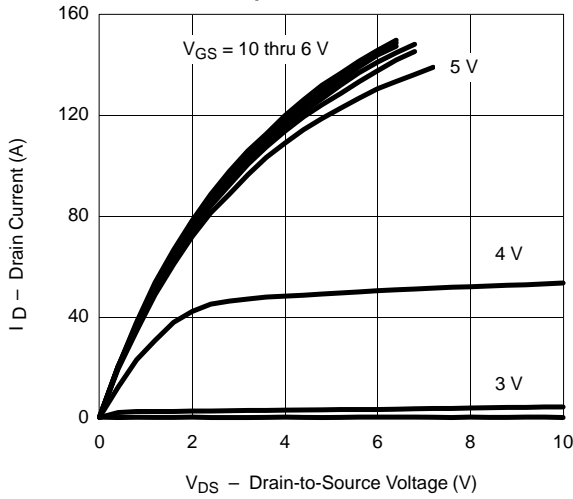
## Notes

- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Independent of operating temperature.

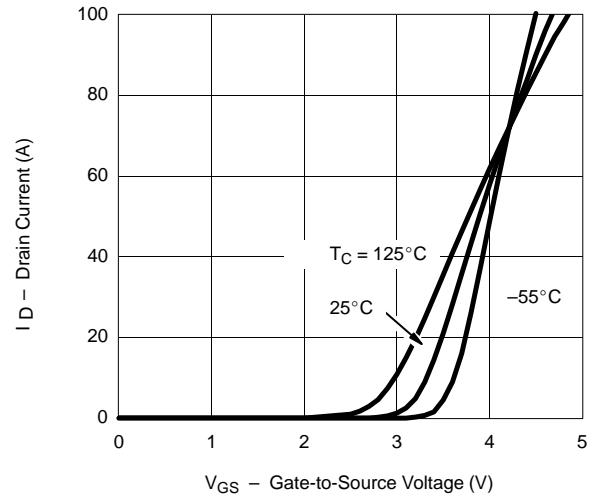


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

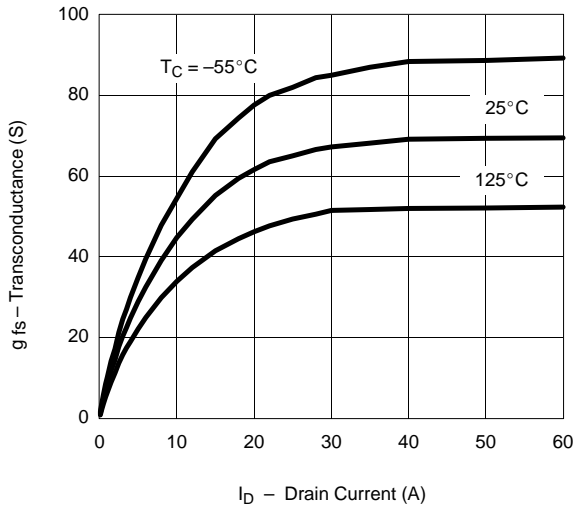
Output Characteristics



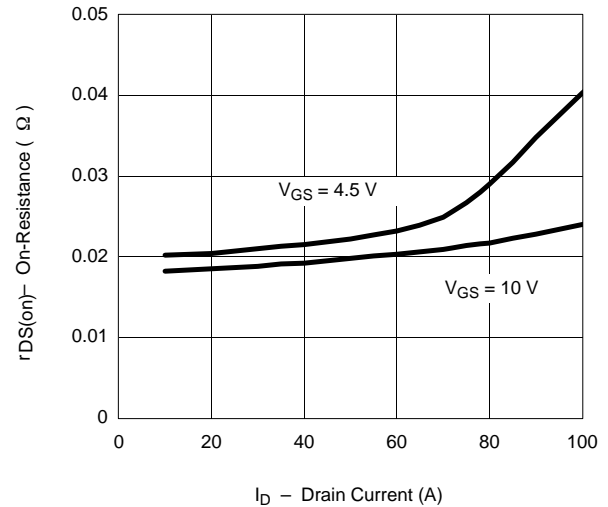
Transfer Characteristics



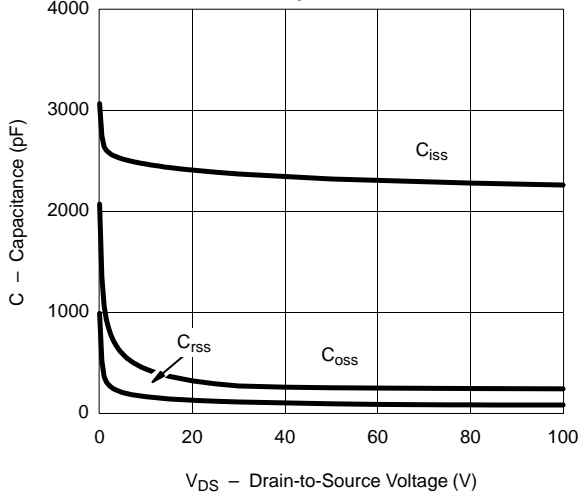
Transconductance



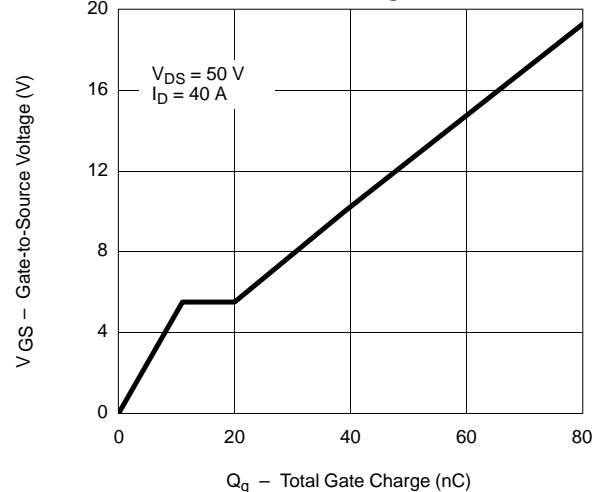
On-Resistance vs. Drain Current



Capacitance



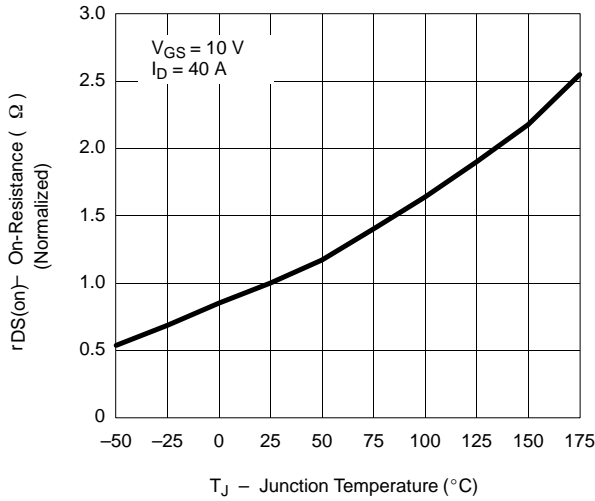
Gate Charge



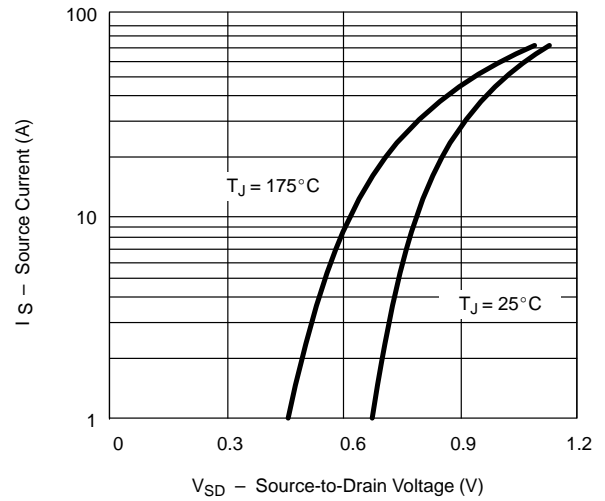


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

On-Resistance vs. Junction Temperature

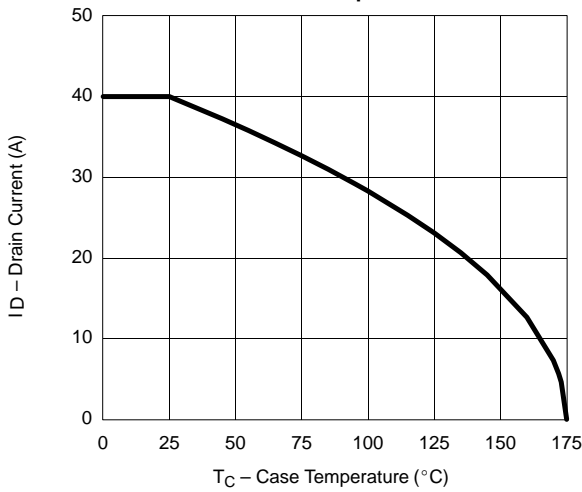


Source-Drain Diode Forward Voltage

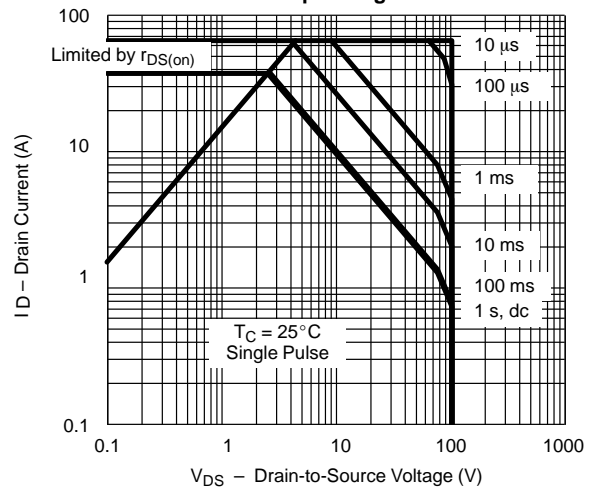


**THERMAL RATINGS**

Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

