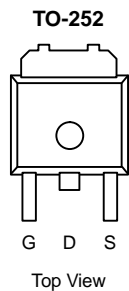




## N-Channel 40-V (D-S) 175°C MOSFET

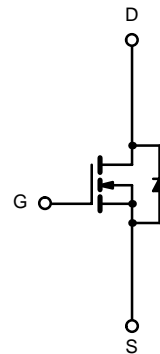
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
40	0.025 @ V <sub>GS</sub> = 10 V	25
	0.040 @ V <sub>GS</sub> = 4.5 V	20

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



Order Number:  
SUD25N04-25

Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	40	V
Gate-Source Voltage		V <sub>GS</sub>	±20	
Continuous Drain Current (T <sub>J</sub> = 175°C) <sup>b</sup>	T <sub>C</sub> = 25°C	I <sub>D</sub>	25	A
	T <sub>C</sub> = 125°C		15	
Pulsed Drain Current		I <sub>DM</sub>	50	
Continuous Source Current (Diode Conduction) <sup>b</sup>		I <sub>S</sub>	50	
Avalanche Current		I <sub>AR</sub>	25	mJ
Repetitive Avalanche Energy (Duty Cycle ≤ 1%)	L = 0.1 mH	E <sub>AR</sub>	31	
Maximum Power Dissipation	T <sub>C</sub> = 25°C	P <sub>D</sub>	33 <sup>b</sup>	W
	T <sub>A</sub> = 25°C		3 <sup>b</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient <sup>b</sup>	t ≤ 10 sec	R <sub>thJA</sub>	20	25	°C/W
	Steady State		40	50	
Junction-to-Case		R <sub>thJC</sub>	3.7	4.5	

Notes

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

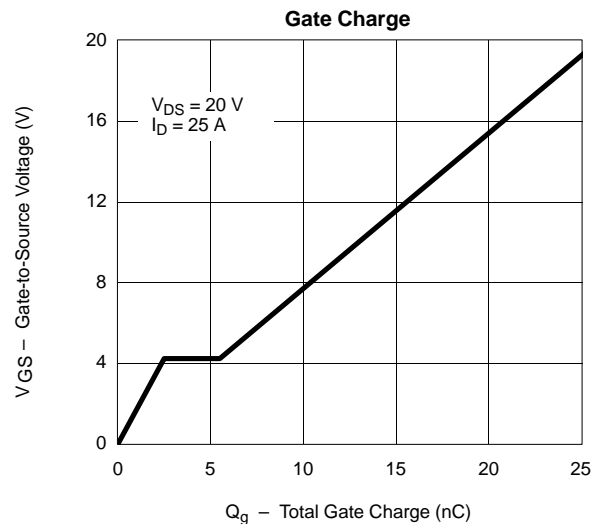
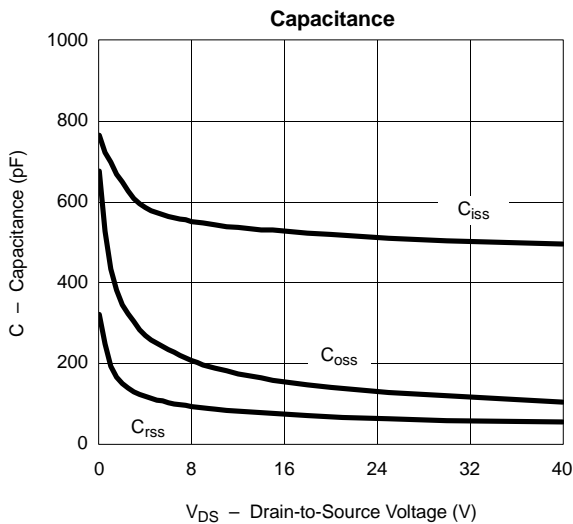
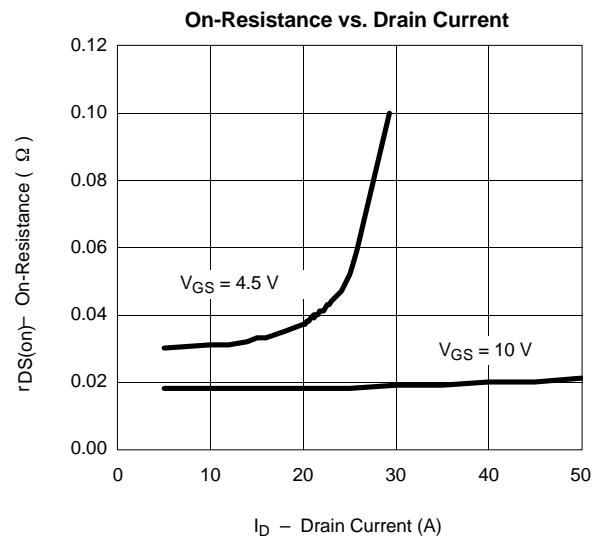
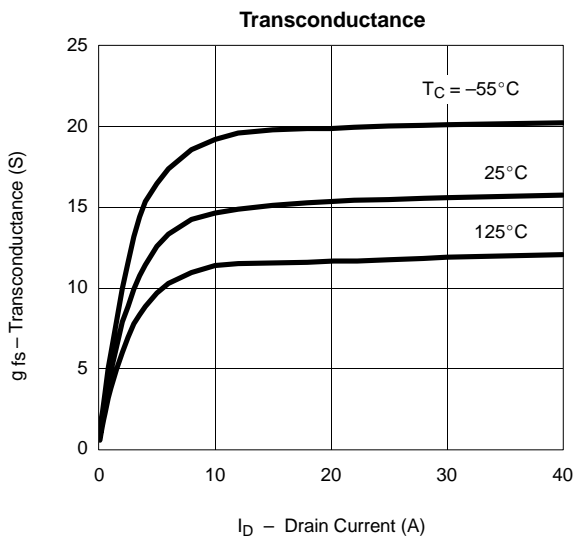
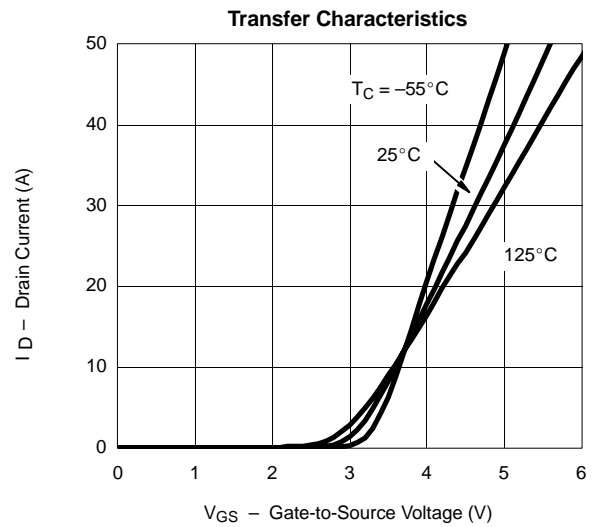
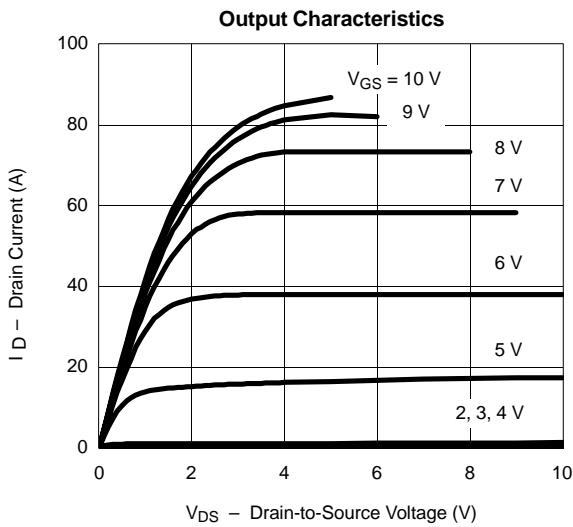
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0	2.0	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> = 40 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			150	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	50			A
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A		0.02	0.025	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A, T <sub>J</sub> = 125 °C			0.040	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A, T <sub>J</sub> = 175 °C			0.053	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A		0.031	0.040	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 25 A		15		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		510		pF
Output Capacitance	C <sub>oss</sub>			125		
Reverse Transfer Capacitance	C <sub>rss</sub>			65		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A		13	20	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			2.5		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			3		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 20 V, R <sub>L</sub> = 0.8 Ω I <sub>D</sub> = 25 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		5	10	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			47	70	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			15	30	
Fall Time <sup>c</sup>	t <sub>f</sub>			5	10	
<b>Source-Drain Diode Ratings and Characteristic (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				50	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 25 A, V <sub>GS</sub> = 0 V		1.1	1.3	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 25 A, di/dt = 100 A/μs		17	30	ns

## Notes

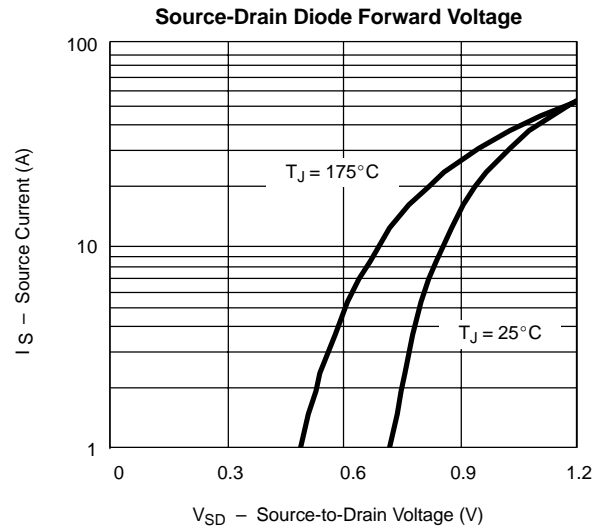
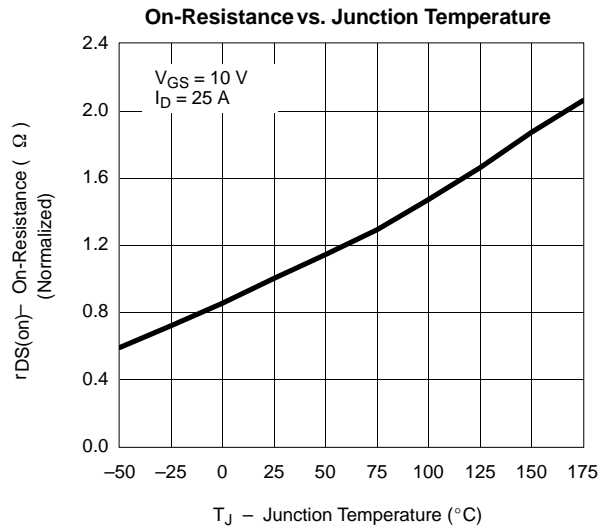
- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Independent of operating temperature.



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



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



### THERMAL RATINGS

