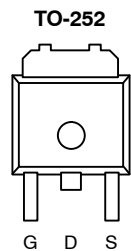


## N-Channel 20-V (D-S), 175 °C MOSFET

<b>PRODUCT SUMMARY</b>		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a, b</sup>
20	0.006 @ $V_{GS} = 4.5$ V	30
	0.009 @ $V_{GS} = 2.5$ V	25

**FEATURES**

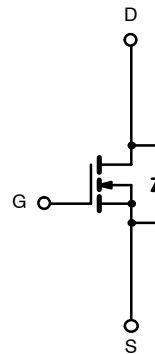
- TrenchFET® Power MOSFET
- 175 °C Maximum Junction Temperature
- 100%  $R_g$  Tested



Top View

 Order Number:  
SUD50N02-06

Drain Connected to Tab



N-Channel MOSFET

<b>ABSOLUTE MAXIMUM RATINGS (<math>T_A = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b>				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	20	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	
Continuous Drain Current <sup>a, b</sup>	$T_A = 25^\circ\text{C}$	$I_D$	30	A
	$T_A = 100^\circ\text{C}$		21	
Pulsed Drain Current		$I_{DM}$	100	
Continuous Source Current (Diode Conduction) <sup>a, b</sup>		$I_S$	30	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	100	W
	$T_A = 25^\circ\text{C}$		8,3 <sup>a, b</sup>	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

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

**Notes**

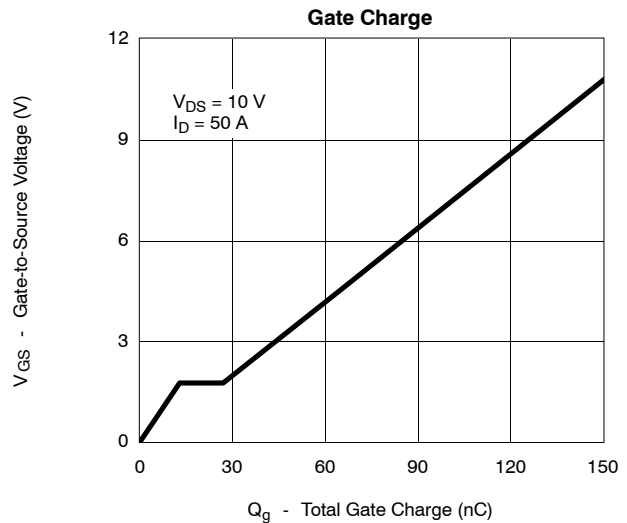
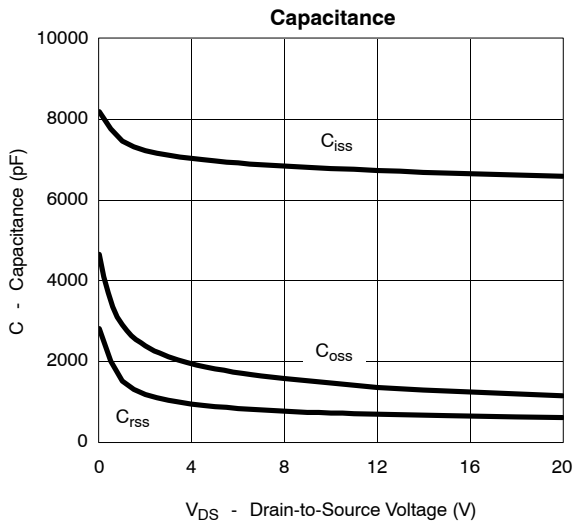
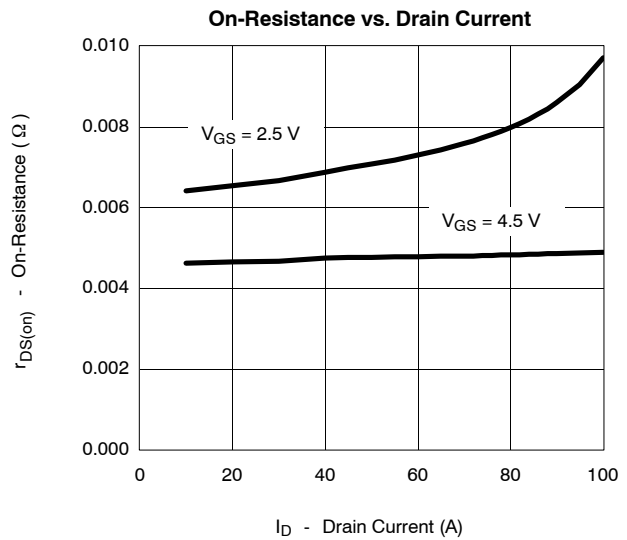
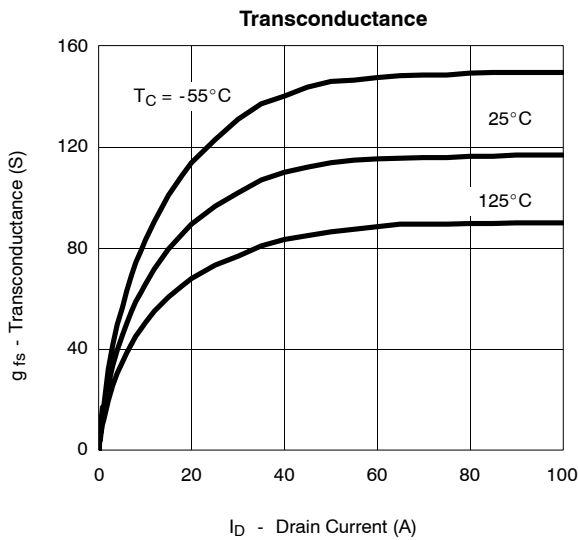
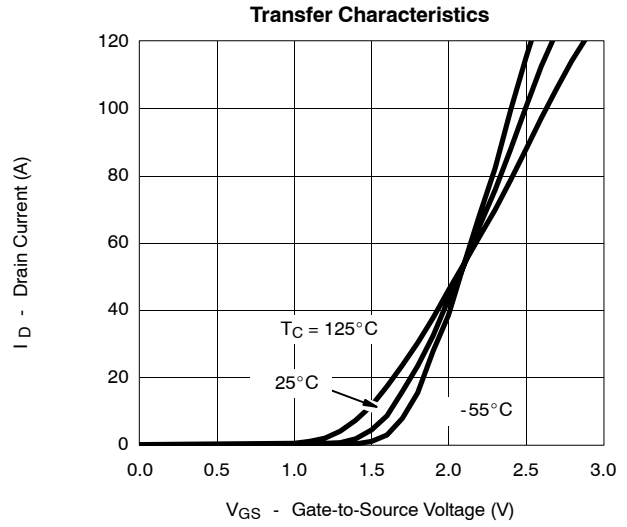
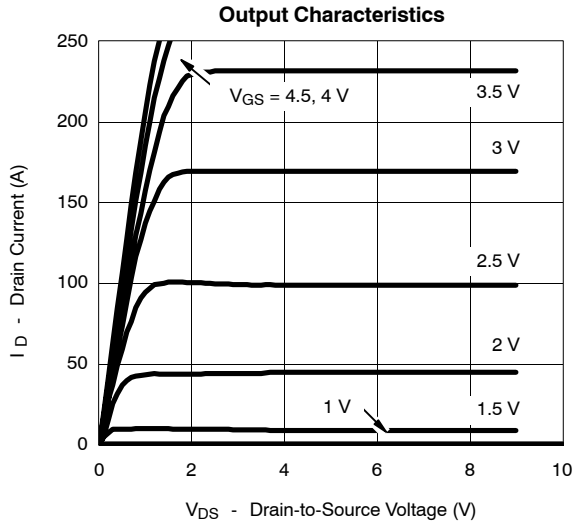
- a. Surface Mounted on 1" x 1" FR4 Board  
 b.  $t \leq 10$  sec.

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

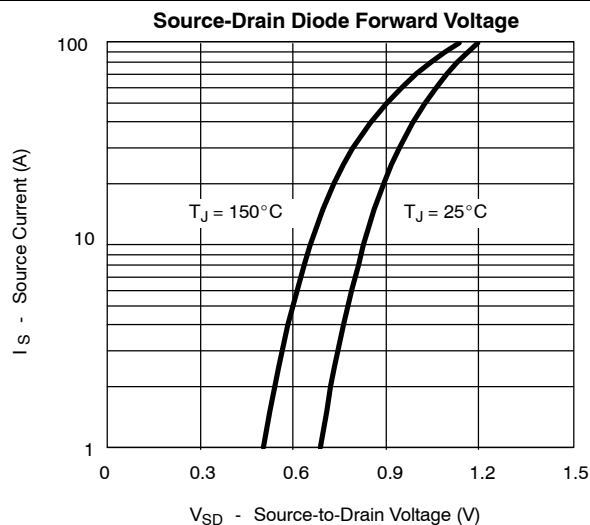
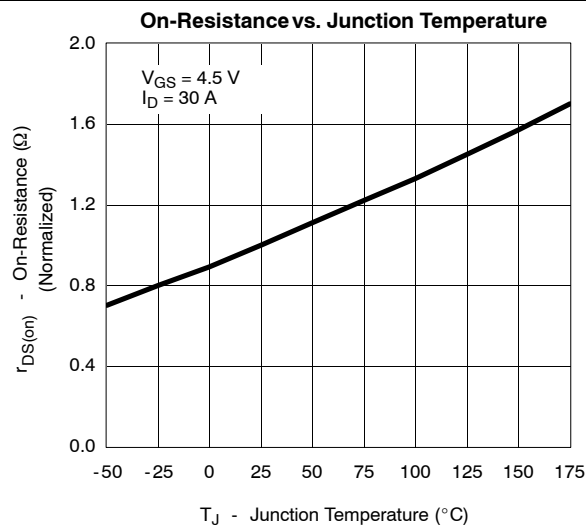
## Notes

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

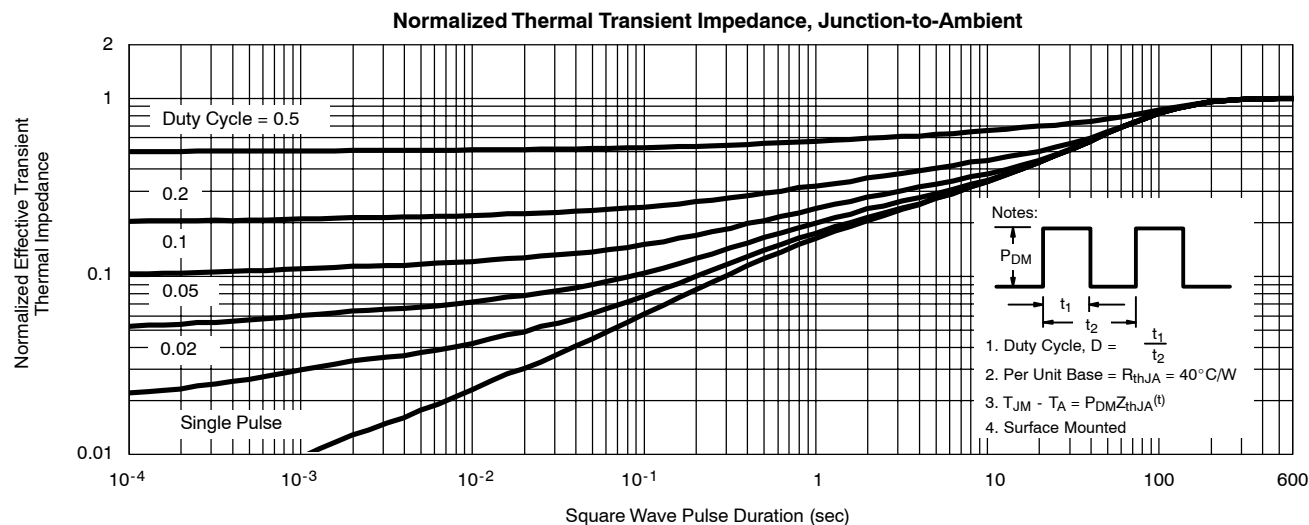
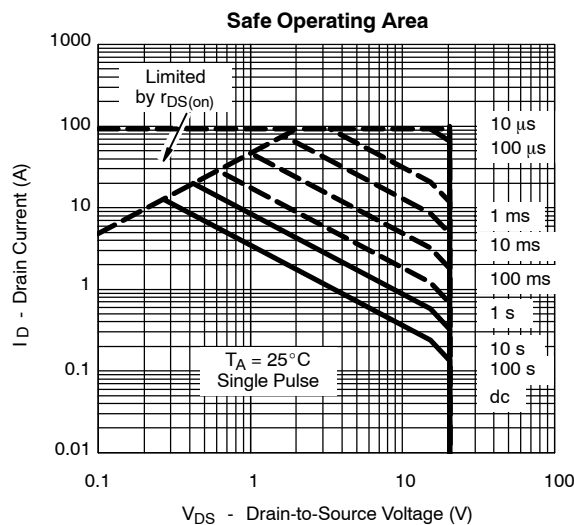
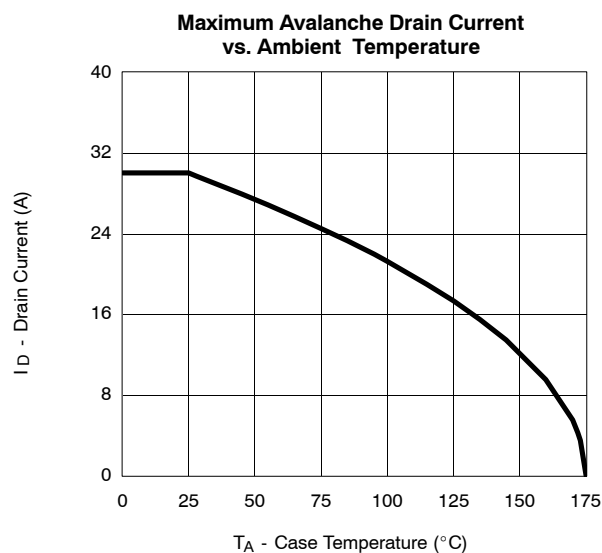
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



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



**THERMAL RATINGS**





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