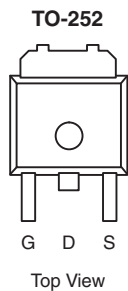


N-Channel 20 V (D-S), 175 °C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
20	0.0085 at $V_{GS} = 4.5$ V	40
	0.014 at $V_{GS} = 2.5$ V	40

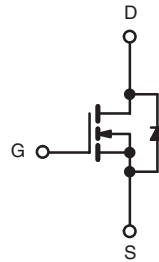
FEATURES

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



Order Number:
SUD40N02-08

Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °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	I_D	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current	I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a	I_S	40	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_A = 25$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 10$ sec	15	18	°C/W
		Steady State	40	50	
Maximum Junction-to-Case	R_{thJC}	1.75	2.1		

Notes:

- Package Limited.
- Surface Mounted on 1" x1" FR4 Board.
- $t \leq 10$ sec.

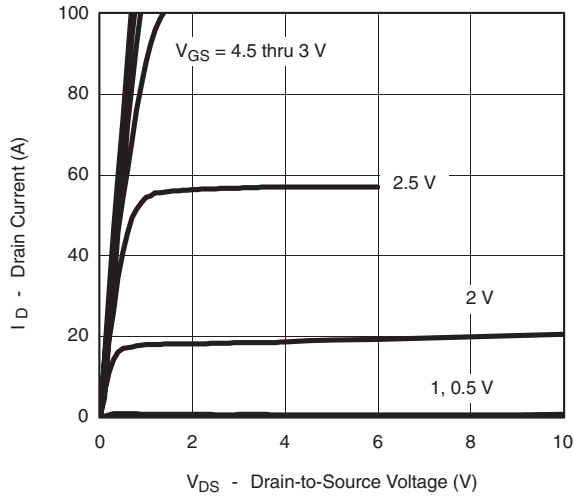
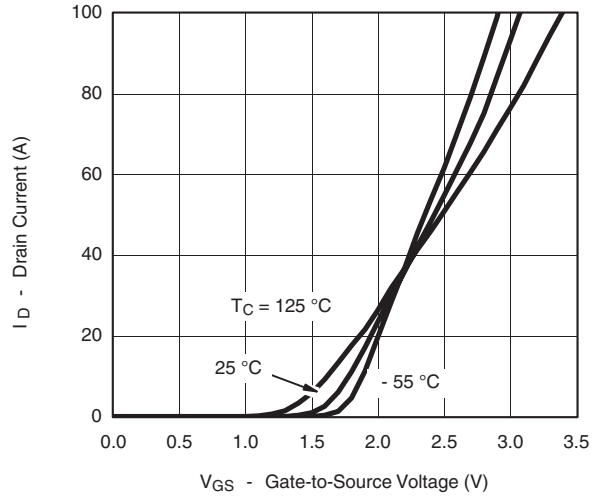
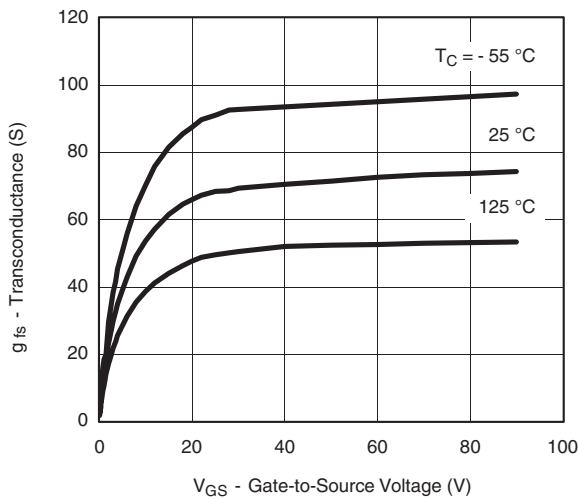
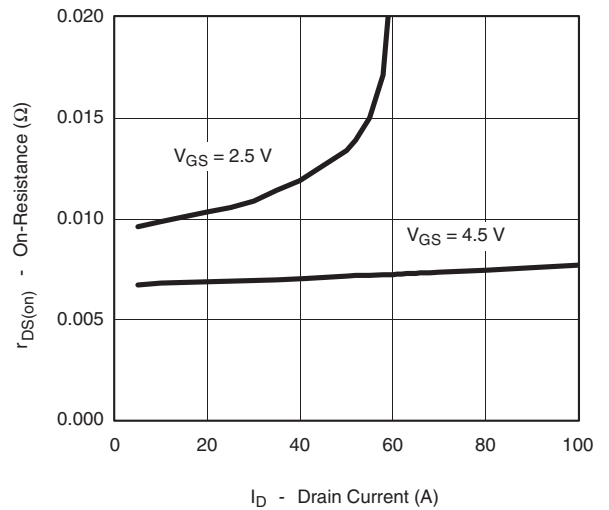
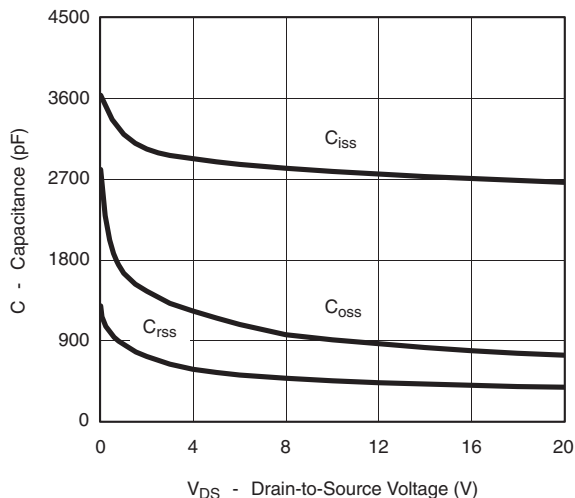
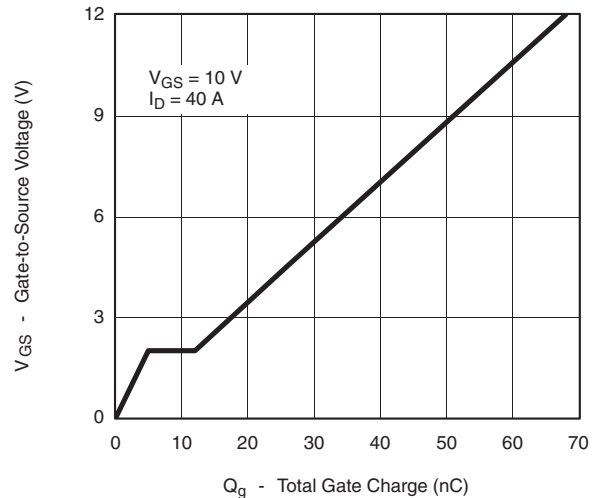


SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.6			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 4.5\text{ V}$	40			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0068	0.0085	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.0104	0.013	
		$V_{GS} = 2.5\text{ V}, I_D = 20\text{ A}$		0.011	0.014	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 40\text{ A}$	20			S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}, f = 1\text{ MHz}$		2660		pF
Output Capacitance	C_{oss}			730		
Reverse Transfer Capacitance	C_{rss}			375		
Total Gate Charge ^c	Q_g	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 40\text{ A}$		26	35	nC
Gate-Source Charge ^c	Q_{gs}			5		
Gate-Drain Charge ^c	Q_{gd}			7		
Gate Resistance	R_g		1		3.7	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 0.25\text{ }\Omega$ $I_D \cong 40\text{ A}, V_{GEN} = 4.5\text{ V}, R_G = 2.5\text{ }\Omega$		20	35	ns
Rise Time ^c	t_r			120	190	
Turn-Off Delay Time ^c	$t_{d(off)}$			45	70	
Fall Time ^c	t_f			20	35	
Source-Drain Diode Ratings and Characteristic ($T_C = 25\text{ }^\circ\text{C}$)						
Pulsed Current	I_{SM}				100	A
Diode Forward Voltage ^b	V_{SD}	$I_F = 100\text{ A}, V_{GS} = 0\text{ V}$		1.2	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 40\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		35	70	ns

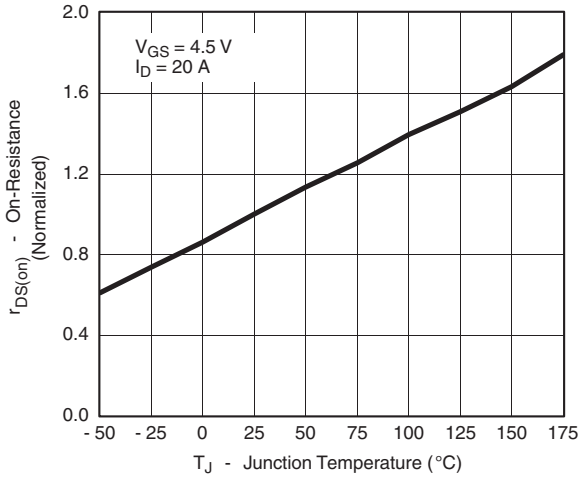
Notes:

- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Independent of operating temperature.

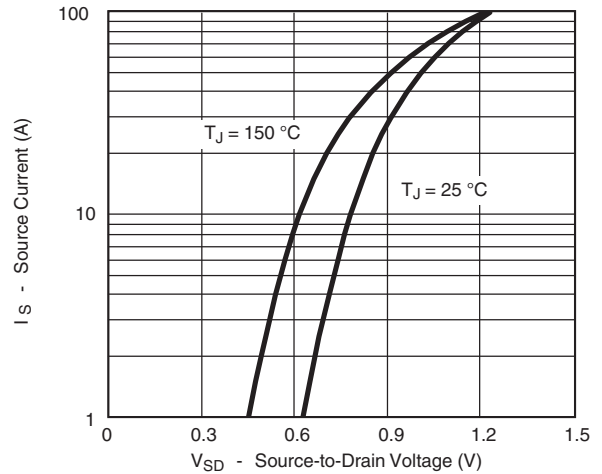
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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

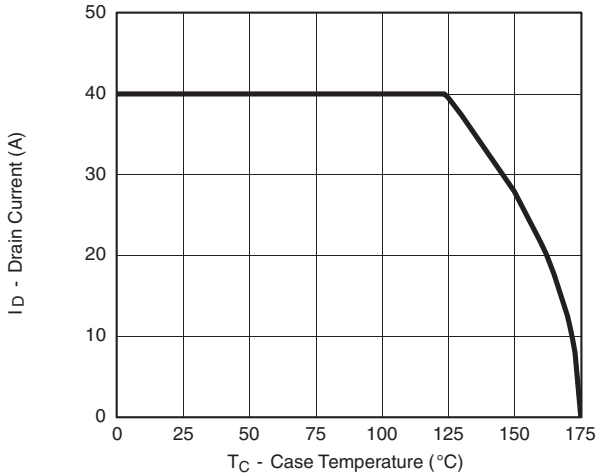


On-Resistance vs. Junction Temperature

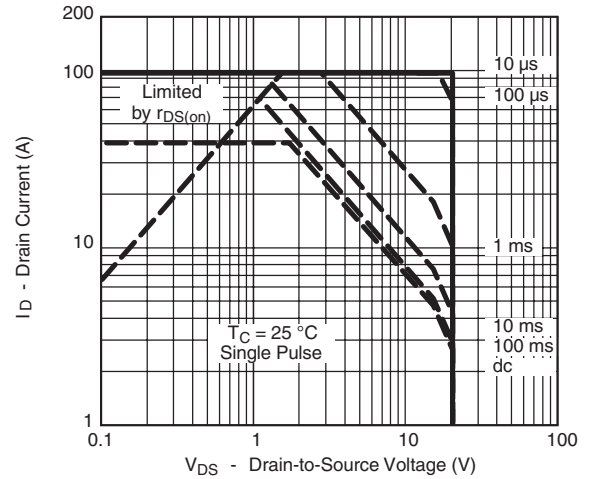


Source-Drain Diode Forward Voltage

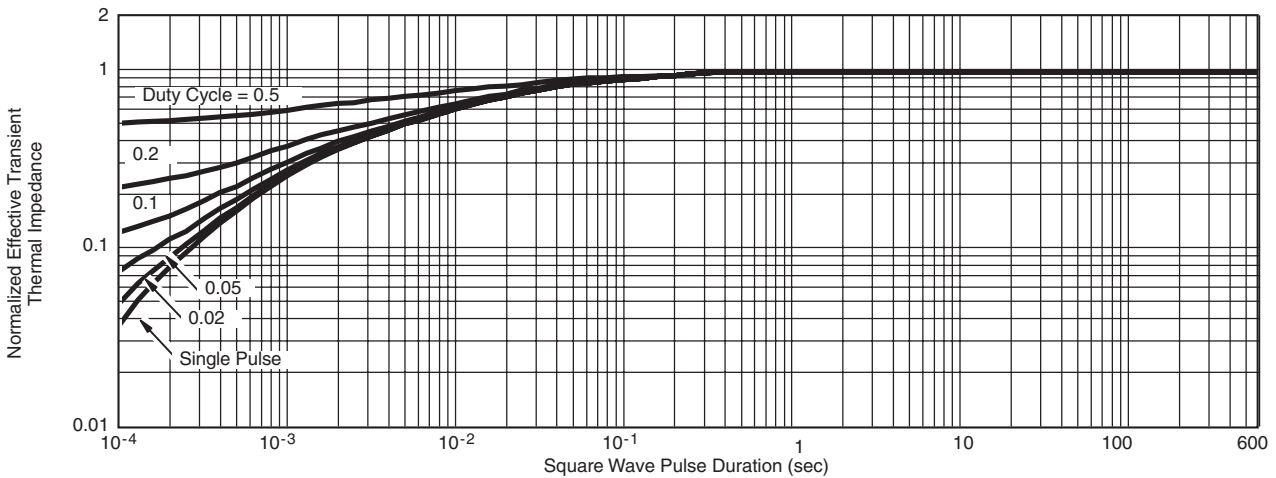
THERMAL RATINGS



Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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