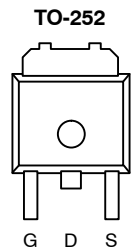


N-Channel 20-V (D-S), 175 °C MOSFET

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

FEATURES

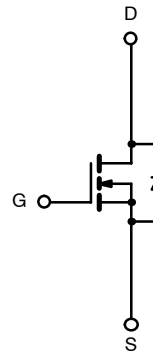
- TrenchFET® Power MOSFET
- 175 °C Maximum Junction Temperature
- 100% R_g Tested



Top View

 Order Number:
SUD40N02-08

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}	20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current ^a	$T_C = 25^\circ\text{C}$	I_D	40	A
	$T_C = 100^\circ\text{C}$		40	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a		I_S	40	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	71	W
	$T_A = 25^\circ\text{C}$		8.3 ^{b, 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
Maximum Junction-to-Ambient ^b	$t \leq 10$ sec.	R_{thJA}	15	18	$^\circ\text{C/W}$
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.75	2.1	

Notes

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

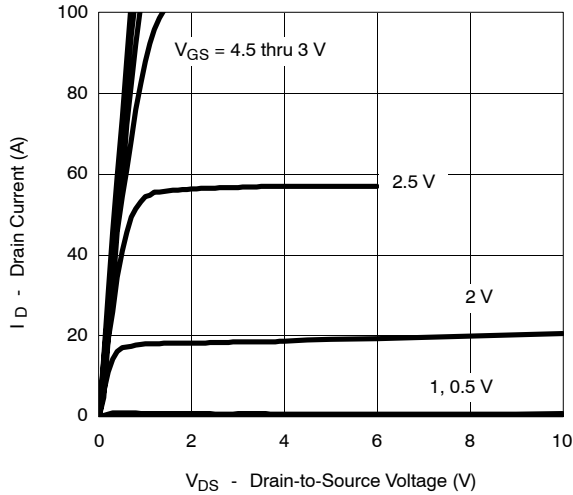
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	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
		$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			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
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}, T_J = 125^\circ\text{C}$		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	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 0.25\ \Omega$ $I_D \cong 40\text{ A}, V_{GEN} = 4.5\text{ V}, R_G = 2.5\ \Omega$		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 ($T_C = 25^\circ\text{C}$)						
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

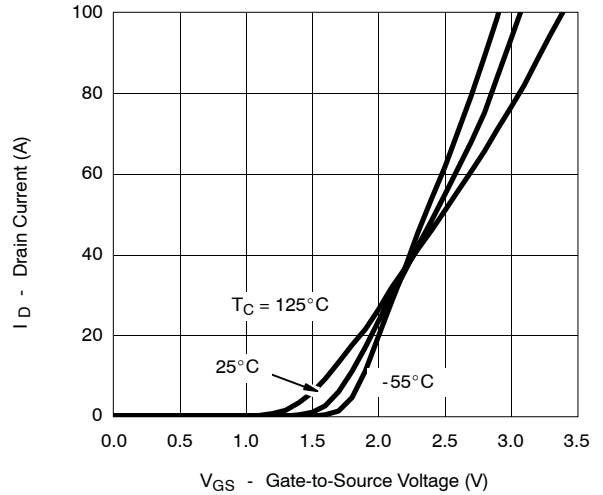
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
 c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

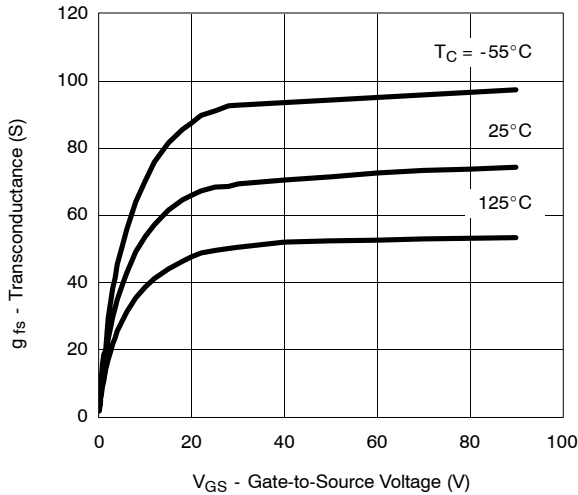
Output Characteristics



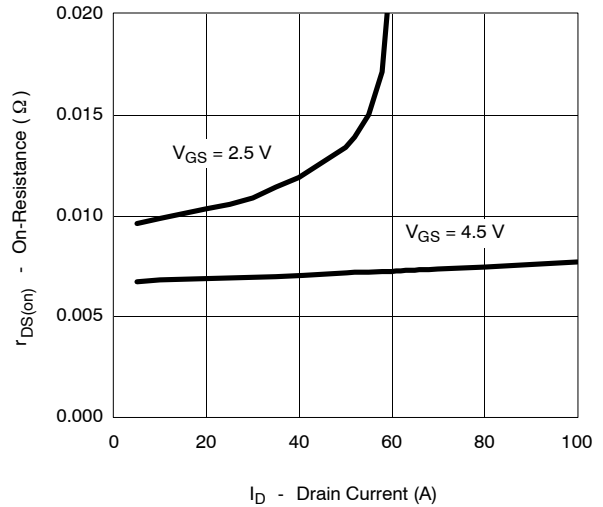
Transfer Characteristics



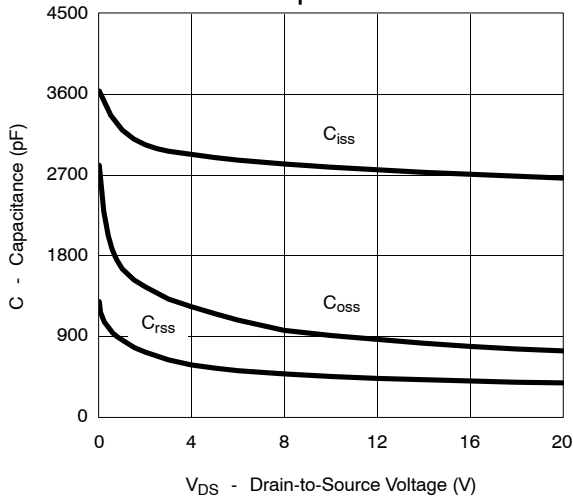
Transconductance



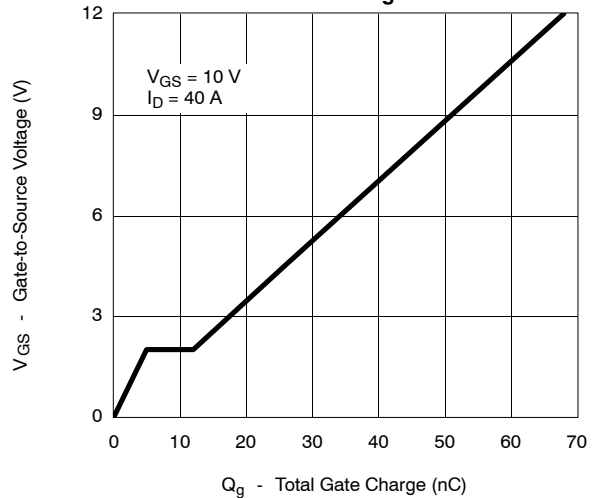
On-Resistance vs. Drain Current



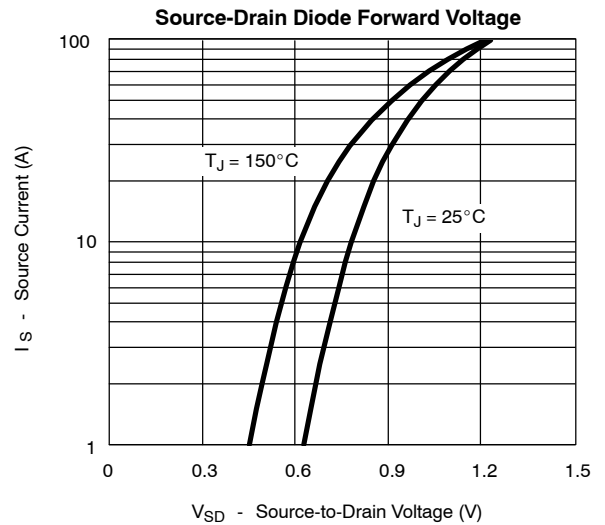
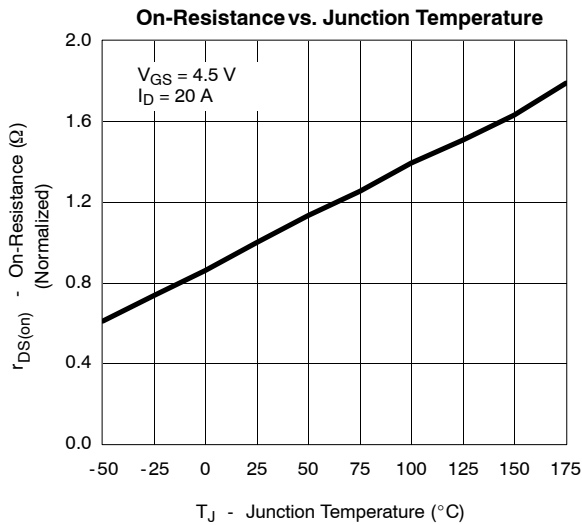
Capacitance



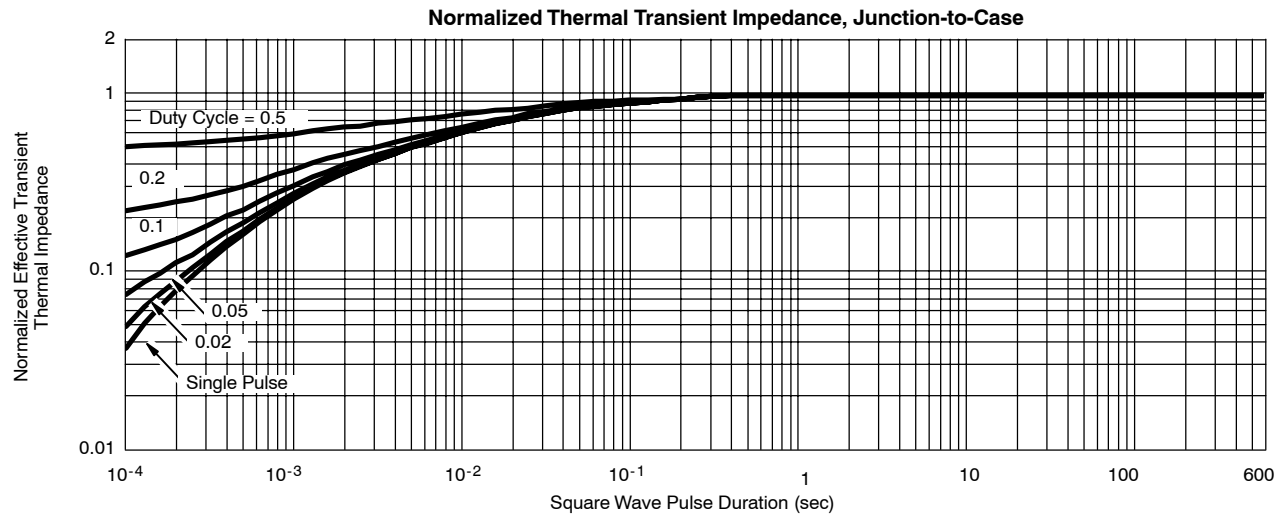
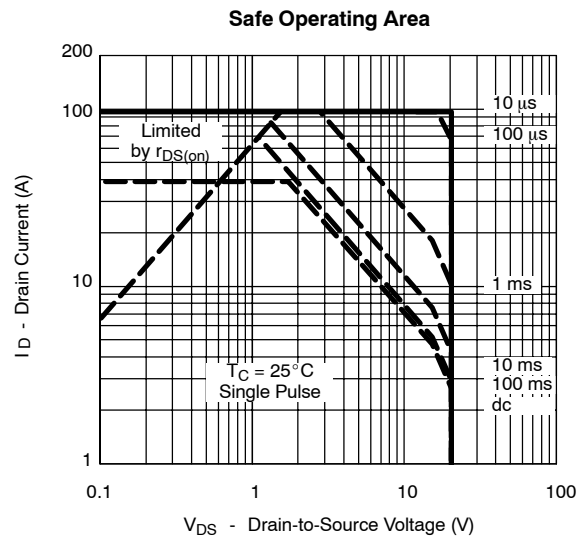
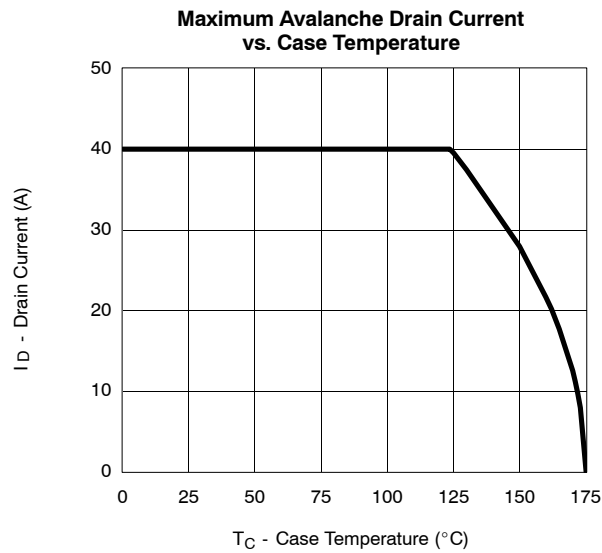
Gate Charge



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



THERMAL RATINGS





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