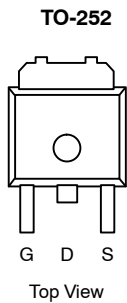


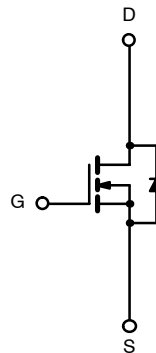


N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
20	0.0043 @ $V_{GS} = 10$ V	34
	0.006 @ $V_{GS} = 4.5$ V	28



Drain Connected to Tab



FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized for High Efficiency

APPLICATIONS

- Synchronous Buck Converter
 - Low-Side
 - Desktop, Servers, Desknote
- Synchronous Rectification
 - POL

Ordering Information:

SUD50N02-04P
SUD50N02-04P—E3 (Lead Free)

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}	± 20	
Continuous Drain Current ^a	$T_A = 25^\circ\text{C}$	I_D	34 ^a	A
	$T_C = 25^\circ\text{C}$		50 ^b	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a		I_S	8.3 ^a	
Avalanche Current ^c	L = 0.1 mH	I_{AS}	50	A
Avalanche Energy ^c		E _{as}	125	mJ
Maximum Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	8.3 ^a	W
	$T_C = 25^\circ\text{C}$		136	
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 ^a	$t \leq 10$ sec	R_{thJA}	15	18	$^\circ\text{C}/\text{W}$
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	0.85	1.1	

Notes

- a. Surface Mounted on FR4 Board, $t \leq 10$ sec.
- b. Limited by package
- c. Single Pulse

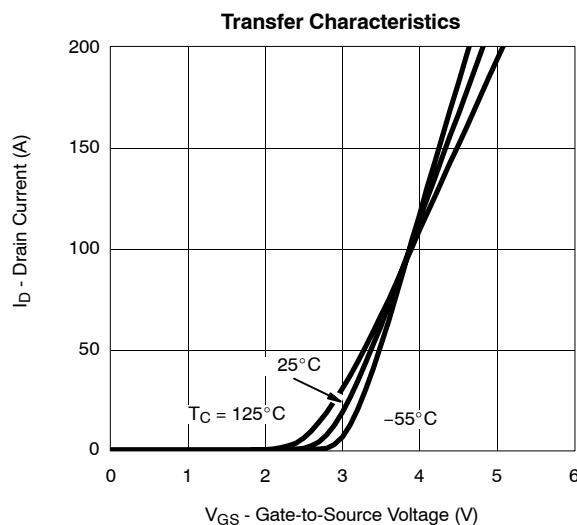
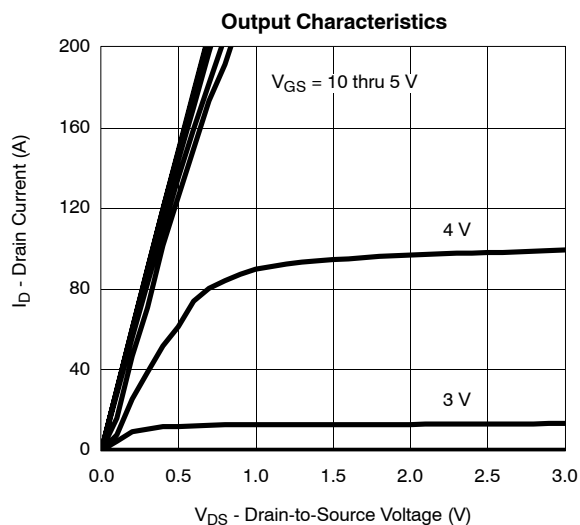


SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.8		3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125 °C			50	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0035	0.0043	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.0061	
		V _{GS} = 4.5 V, I _D = 20 A		0.0048	0.006	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A	15			S
Dynamic^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 10 V, f = 1 MHz		5000		pF
Output Capacitance	C _{oss}			1650		
Reverse Transfer Capacitance	C _{rss}			770		
Gate Resistance	R _g	f = 1 MHz		1.6		Ω
Total Gate Charge ^c	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 50 A		40	60	nC
Gate-Source Charge ^c	Q _{gs}			14		
Gate-Drain Charge ^c	Q _{gd}			13		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 10 V, R _L = 0.2 Ω I _D = 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		20	30	ns
Rise Time ^c	t _r			20	30	
Turn-Off Delay Time ^c	t _{d(off)}			50	75	
Fall Time ^c	t _f			15	25	
Source-Drain Diode Ratings and Characteristic (T_C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 50 A, V _{GS} = 0 V		0.9	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		45	70	ns

Notes

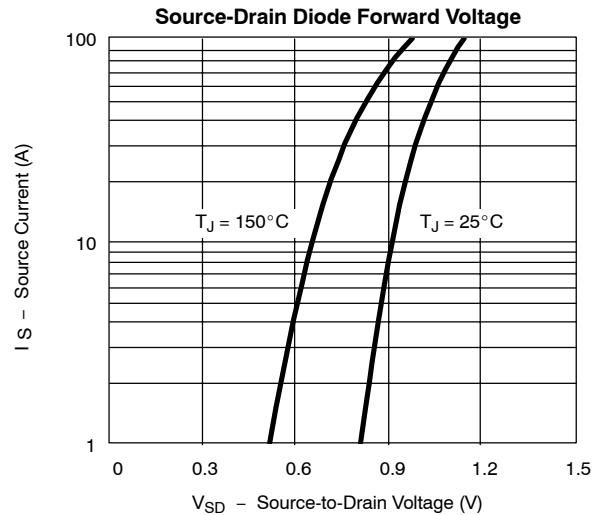
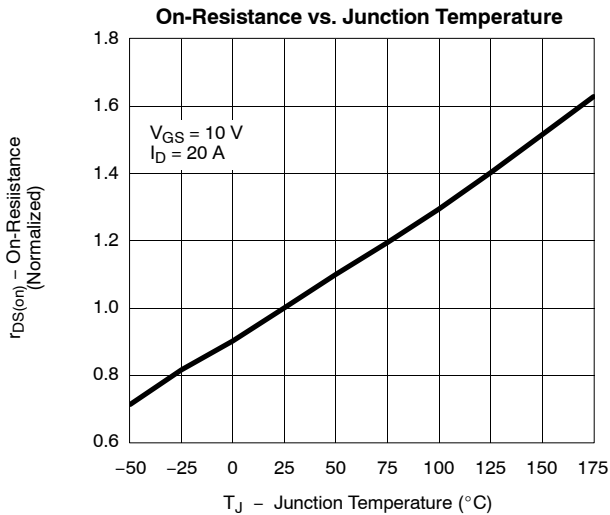
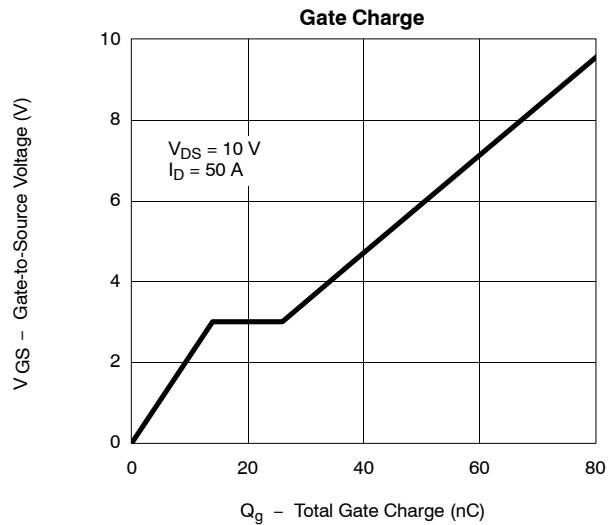
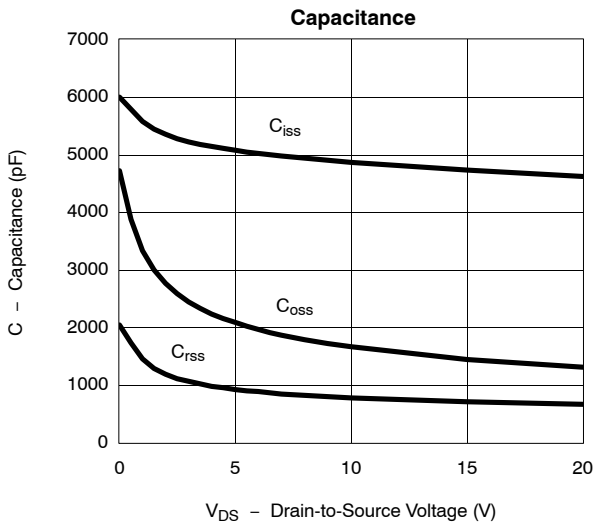
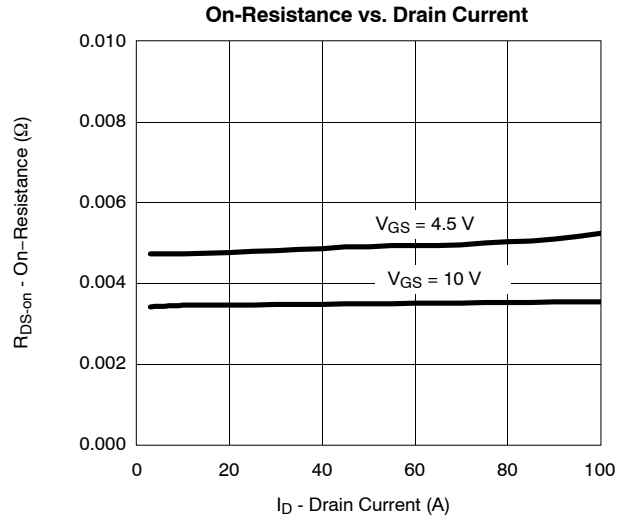
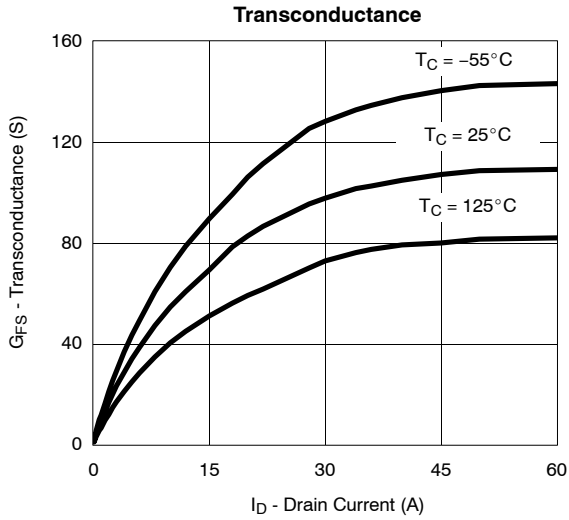
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



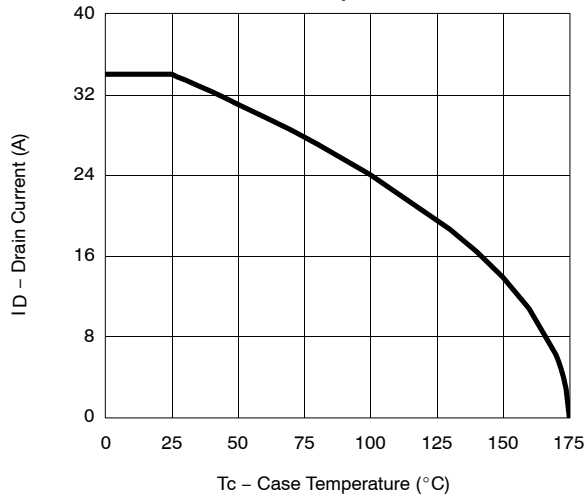


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

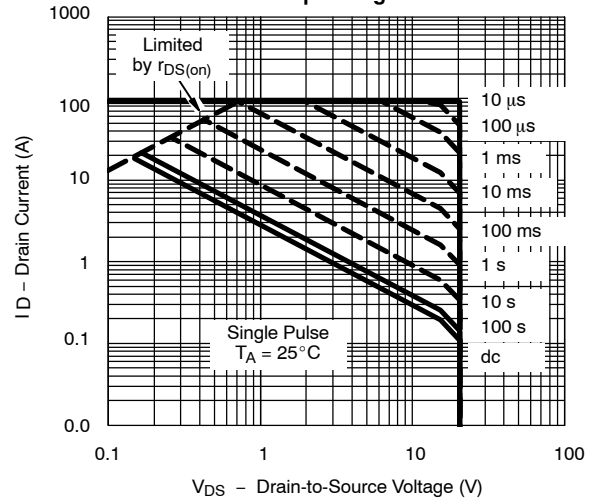


THERMAL RATINGS

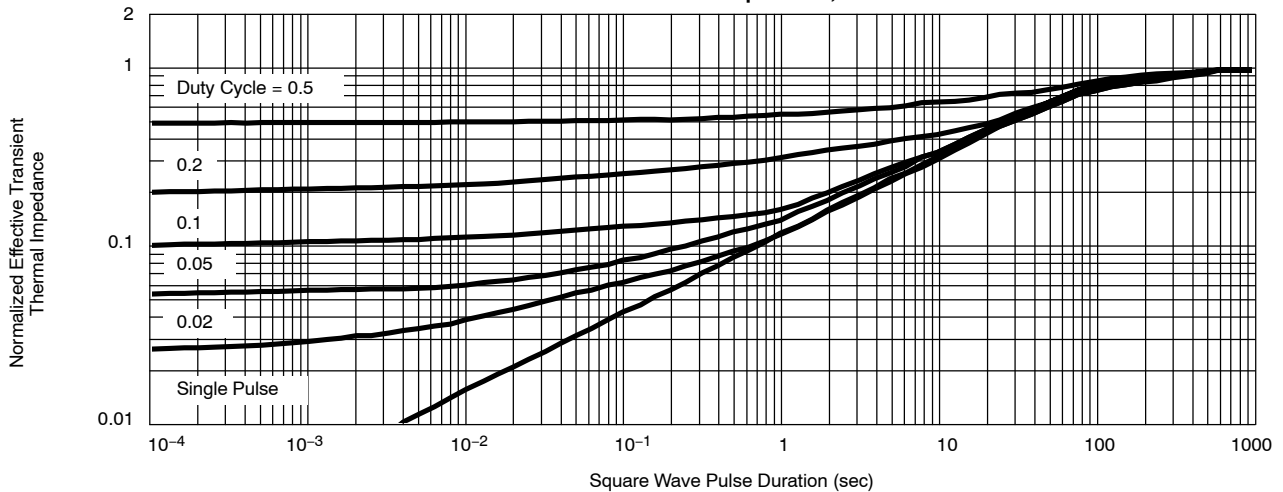
Max Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient





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