



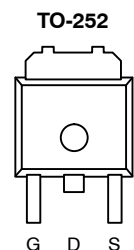
N-Channel 50-V (D-S), 175°C MOSFET, Logic Level

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
50	0.018 @ $V_{GS} = 10$ V	30
	0.020 @ $V_{GS} = 4.5$ V	30

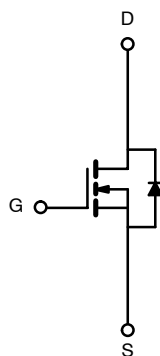
FEATURES

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



Top View

Order Number:
SUD45N05-20L



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	50	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_C = 25^\circ\text{C}$	I_D	30	A
	$T_C = 100^\circ\text{C}$		30	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a		I_S	43	
Avalanche Current		I_{AR}	37	
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$)		E_{AR}	93	mJ
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	75	W
	$T_A = 25^\circ\text{C}$		2.5 ^a	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Maximum Junction-to-Ambient	Free Air, FR4 Board Mount	R_{thJA}	60	$^\circ\text{C/W}$
	Free Air, Vertical Mount		110	
Maximum Junction-to-Case		R_{thJC}	2.0	

Notes

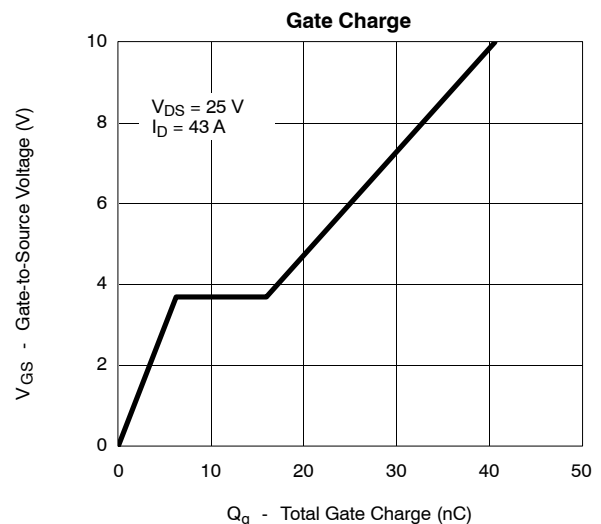
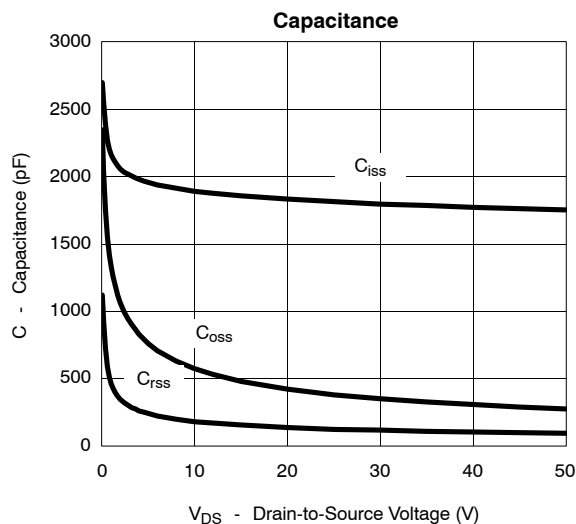
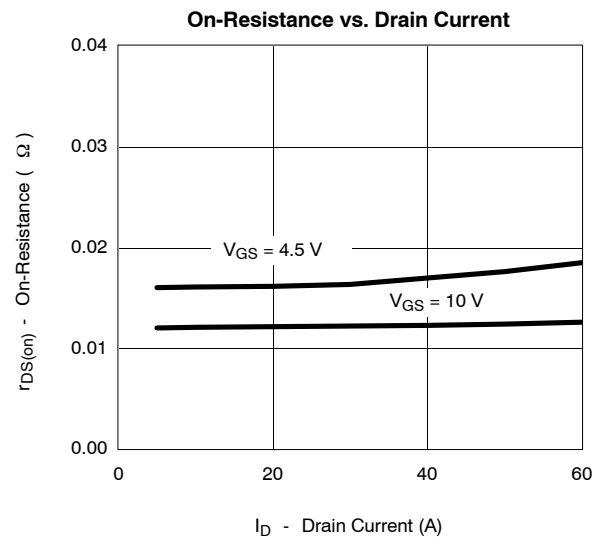
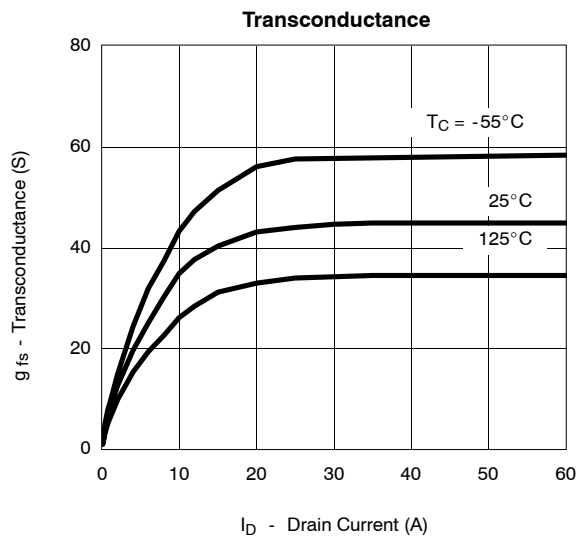
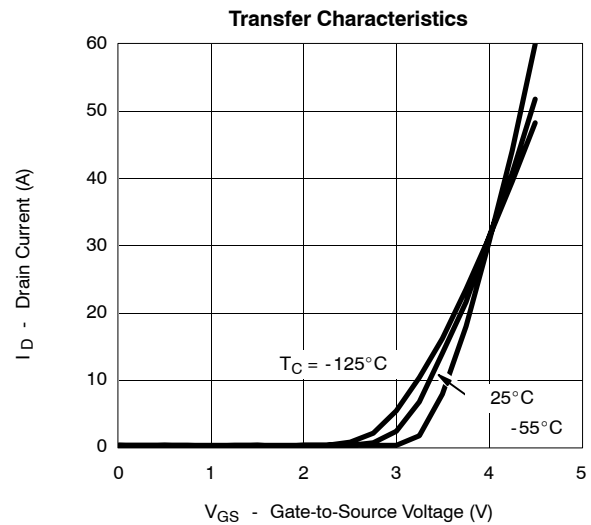
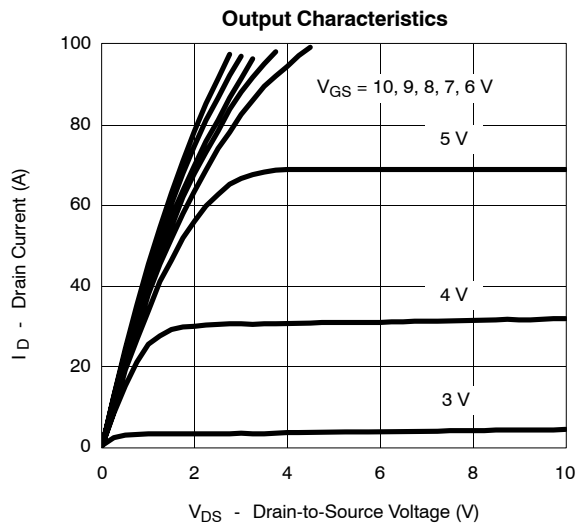
- a. Package limited.
b. Surface Mounted on FR4 Board, $t \leq 10$ sec.

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>

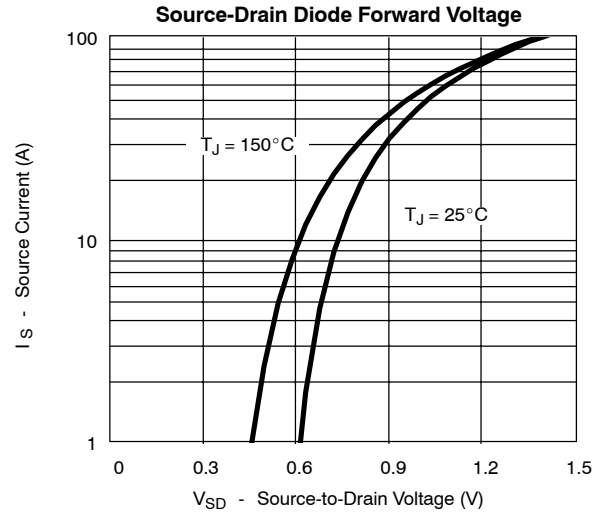
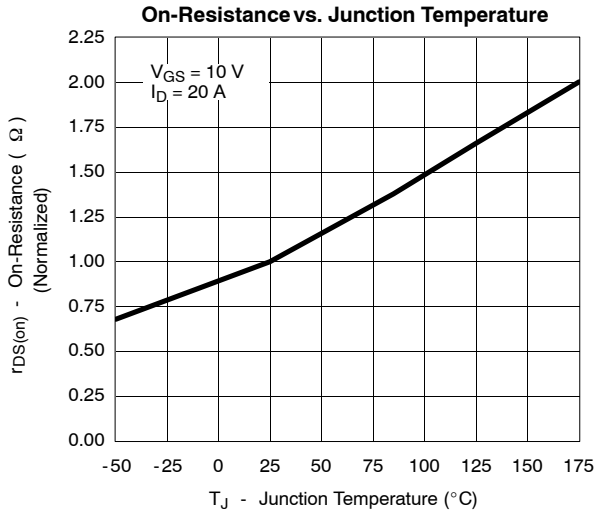
SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	50			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0	2.0		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V			1	μA
		V _{DS} = 50 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 50 V, V _{GS} = 0 V, T _J = 175 °C			150	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	43			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A			0.018	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.036	
		V _{GS} = 10 V, I _D = 43 A, T _J = 125 °C			0.040	
		V _{GS} = 4.5 V, I _D = 43 A			0.020	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 43 A	20			S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1800	3600	pF
Output Capacitance	C _{oss}			370		
Reverse Transfer Capacitance	C _{rss}			130		
Total Gate Charge ^c	Q _g	V _{DS} = 25 V, V _{GS} = 10 V, I _D = 43 A		43	60	nC
Gate-Source Charge ^c	Q _{gs}			7		
Gate-Drain Charge ^c	Q _{gd}			10		
Gate Resistance	R _g		0.5		3.6	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 25 V, R _L = 0.6 Ω I _D ≅ 43 A, V _{GEN} = 10 V, R _G = 2.5 Ω		10	20	ns
Rise Time ^c	t _r			10	20	
Turn-Off Delay Time ^c	t _{d(off)}			32	60	
Fall Time ^c	t _f			7	15	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				43	A
Diode Forward Voltage ^b	V _{SD}	I _F = 43 A, V _{GS} = 0 V			1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 43 A, di/dt = 100 A/μs		49	100	ns

Notes

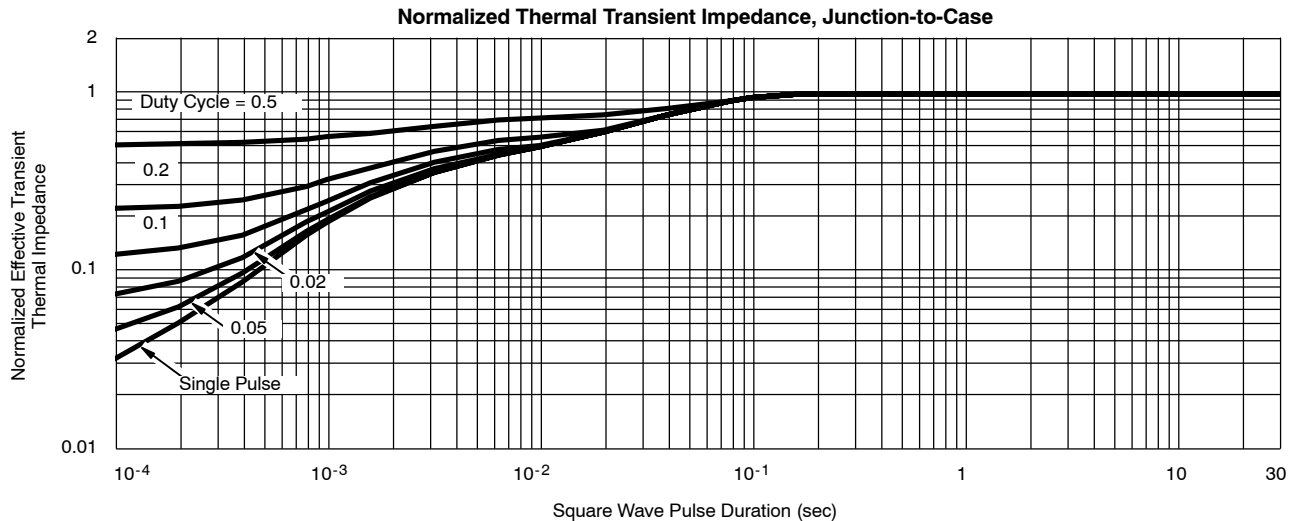
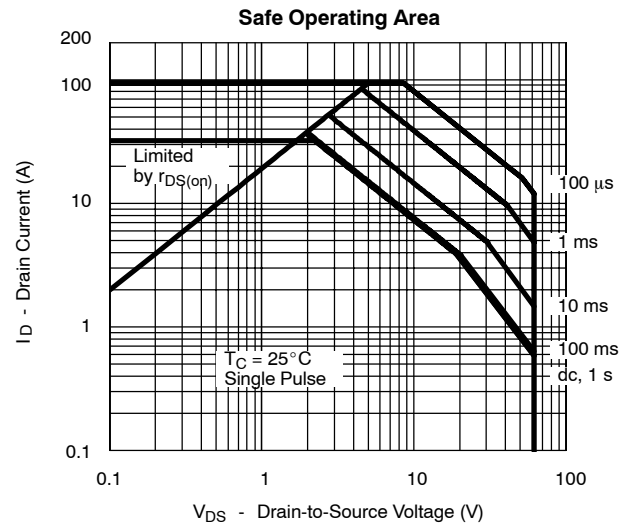
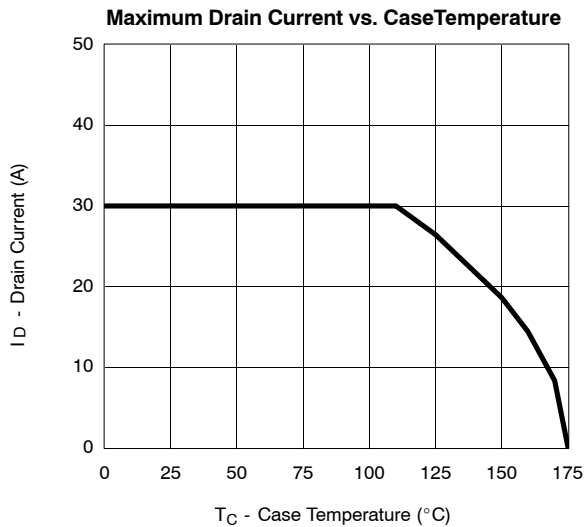
- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
c. Independent of operating temperature.

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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



THERMAL RATINGS





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