



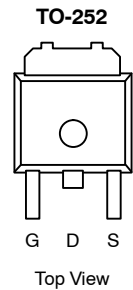
N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

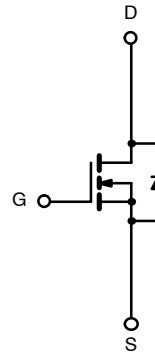
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
30	0.012 @ $V_{GS} = 10$ V	17.5
	0.0175 @ $V_{GS} = 4.5$ V	14.5

FEATURES

- TrenchFET® Power MOSFET



Order Number:
SUD50N03-12P



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_A = 25^\circ\text{C}$	I_D	17.5	A
	$T_A = 100^\circ\text{C}$		12.4	
Pulsed Drain Current		I_{DM}	40	
Continuous Source Current (Diode Conduction) ^a		I_S	5	
Avalanche Current		I_{AS}	30	
Single Pulse Avalanche Energy	$L = 0.1$ mH	E_{AS}	45	mJ
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	46.8	W
	$T_A = 25^\circ\text{C}$		6.5 ^a	
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}	18	23	$^\circ\text{C/W}$
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	2.6	3.2	

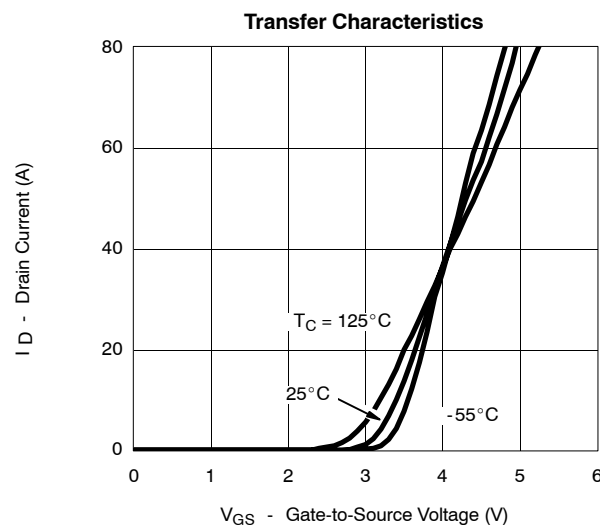
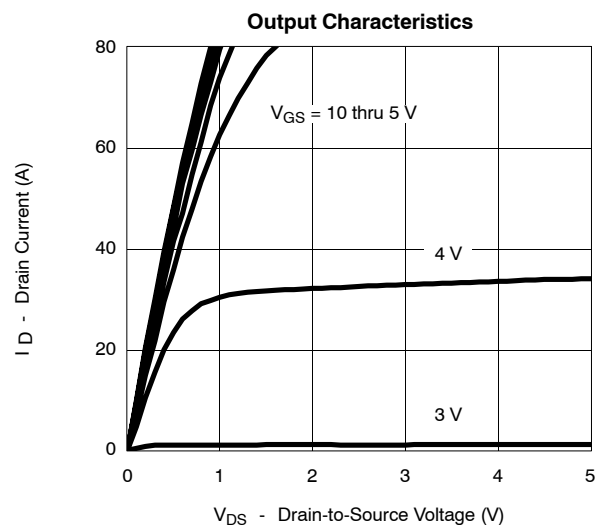
Notes

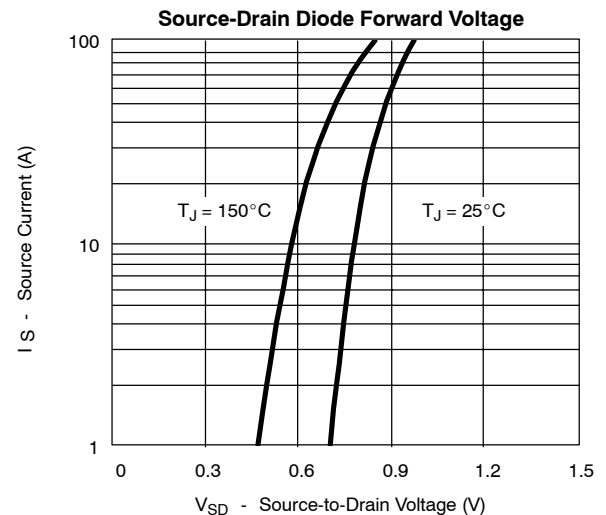
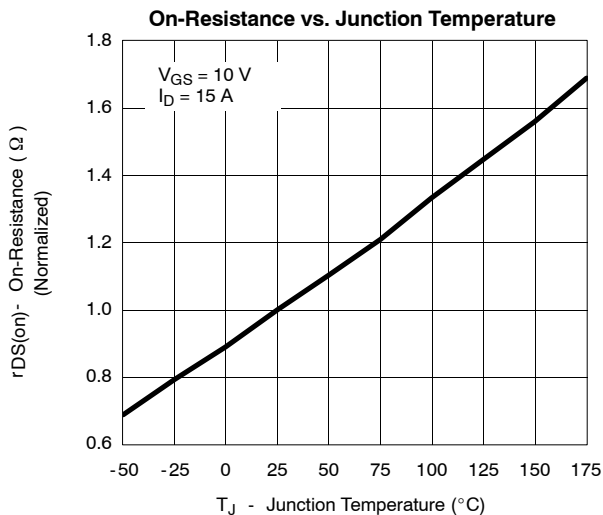
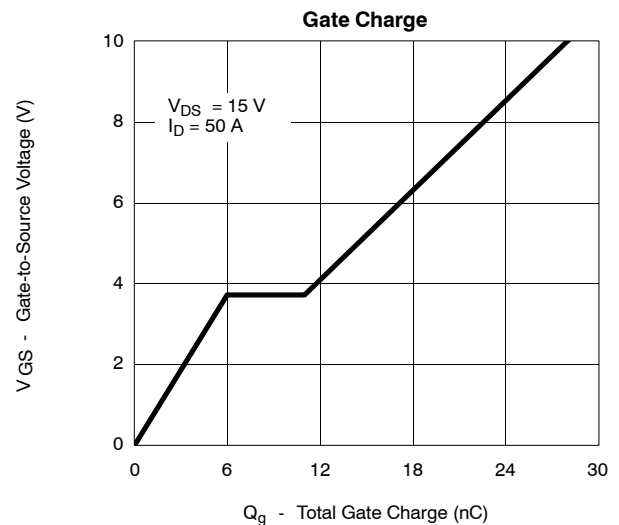
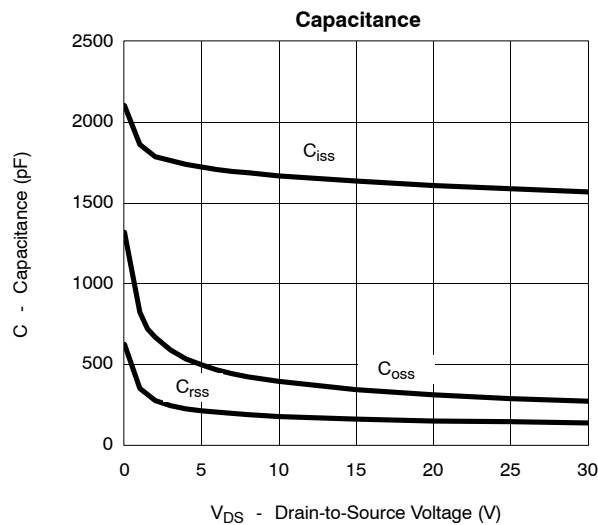
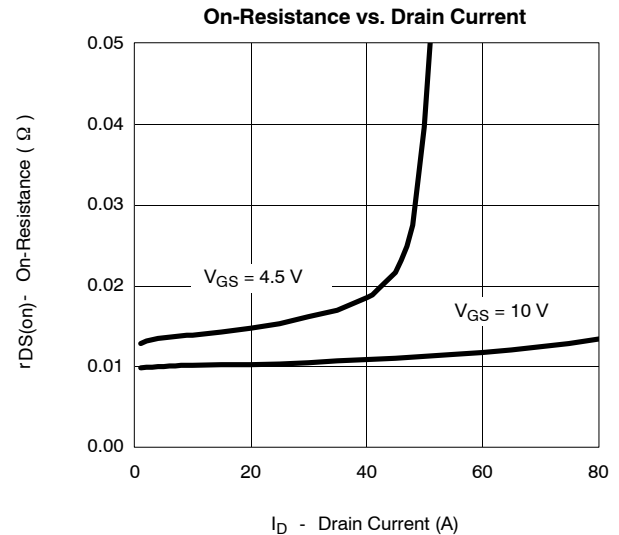
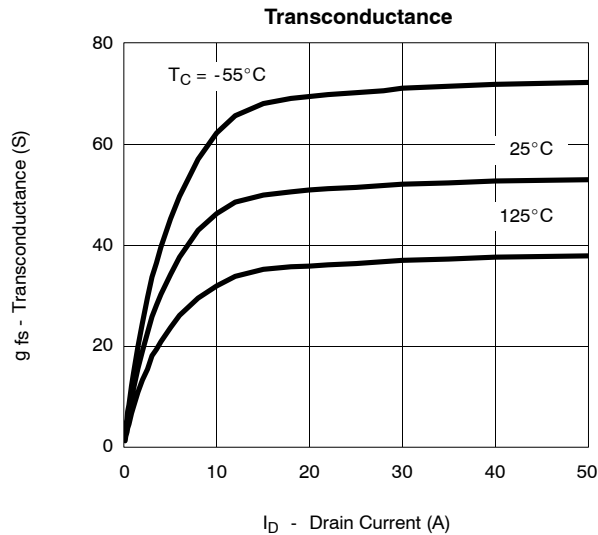
a. Surface Mounted on FR4 Board, $t \leq 10$ sec.

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	30			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		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} = 24 V, V _{GS} = 0 V			1	μA
		V _{DS} = 24 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	40			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.010	0.012	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.017	
		V _{GS} = 4.5 V, I _D = 15 A		0.0138	0.0175	
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} = 25 V, f = 1 MHz		1600		pF
Output Capacitance	C _{oss}			285		
Reverse Transfer Capacitance	C _{rss}			140		
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 50 A		28	42	nC
Gate-Source Charge ^c	Q _{gs}			6.0		
Gate-Drain Charge ^c	Q _{gd}			5.0		
Gate Resistance	R _g			1.5		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 15 V, R _L = 0.3 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω		9	15	ns
Rise Time ^c	t _r			15	25	
Turn-Off Delay Time ^c	t _{d(off)}			20	30	
Fall Time ^c	t _f			12	20	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 40 A, V _{GS} = 0 V		1.2	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		25	70	ns

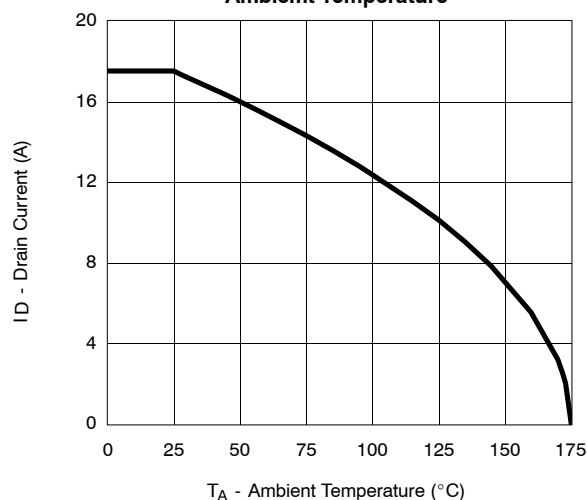
Notes

- 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.

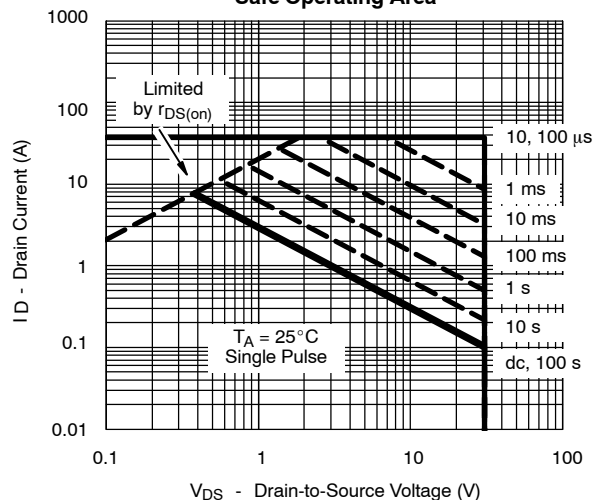
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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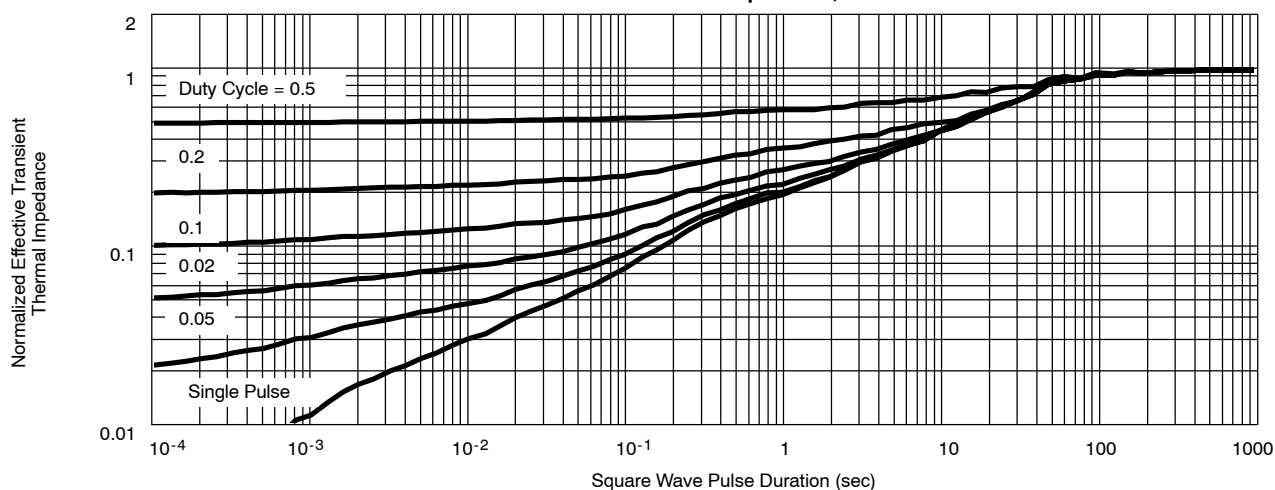
THERMAL RATINGS

Maximum Drain Current vs.
Ambient Temperature

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

