

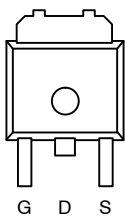


N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
30	0.016 @ $V_{GS} = 10$ V	15
	0.024 @ $V_{GS} = 4.5$ V	12

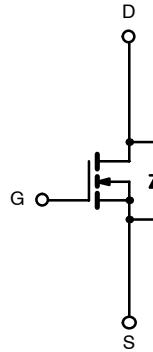
TO-252



Top View

Drain Connected to Tab

Ordering Information: SUD50N03-16P—E3 (Lead Free)



N-Channel MOSFET

FEATURES

- TrenchFET® Power MOSFET
- PWM Optimized
- 100% R_g Tested

APPLICATIONS

- High-Side DC/DC
 - Desktop
 - Server
- DDR DC/DC Converter

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	$T_C = 25^\circ\text{C}$	I_D	37	A
	$T_A = 25^\circ\text{C}$		15	
	$T_A = 100^\circ\text{C}$		10.6	
Pulsed Drain Current		I_{DM}	40	
Continuous Source Current (Diode Conduction) ^a		I_S	5	mJ
Avalanche Current	L = 0.1 mH	I_{AS}	25	
Single Pulse Avalanche Energy		E_{AS}	31.25	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	40.8	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}	3.0	3.7	

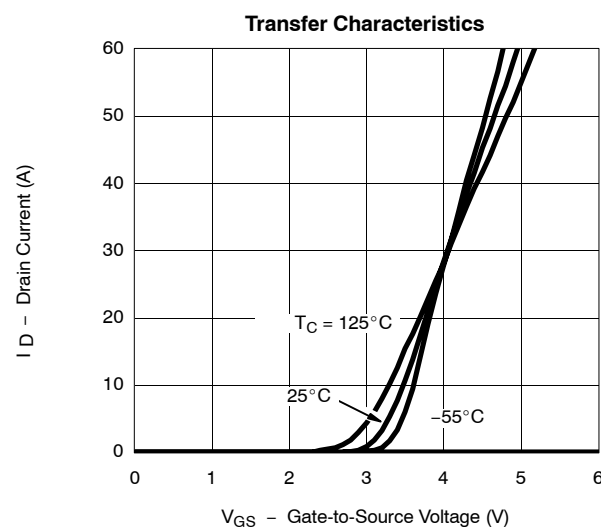
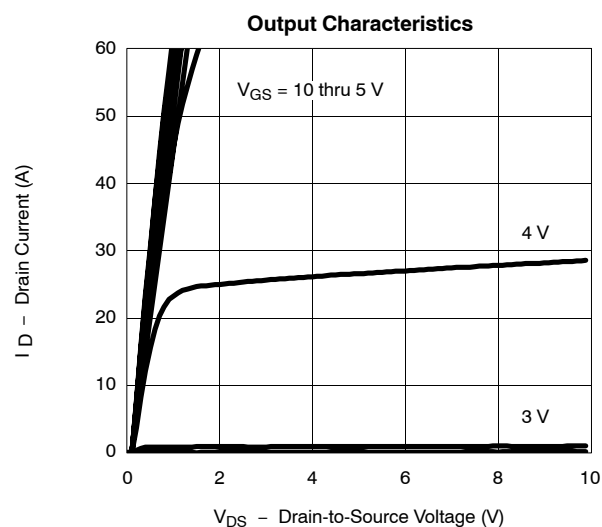
Notes

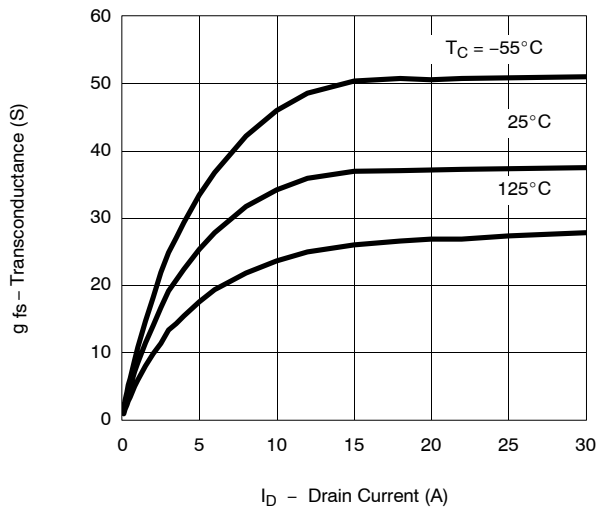
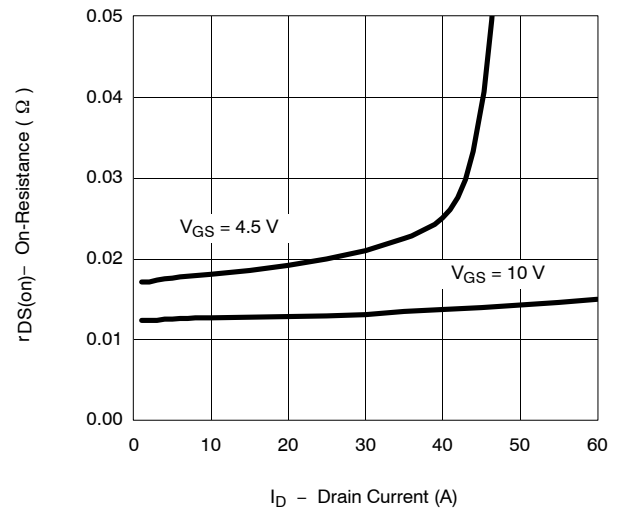
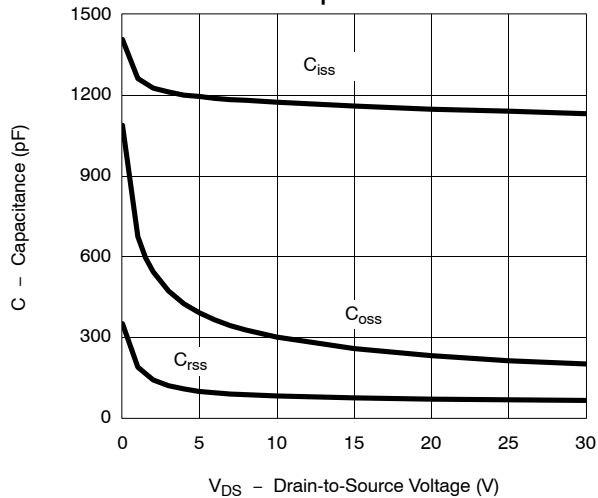
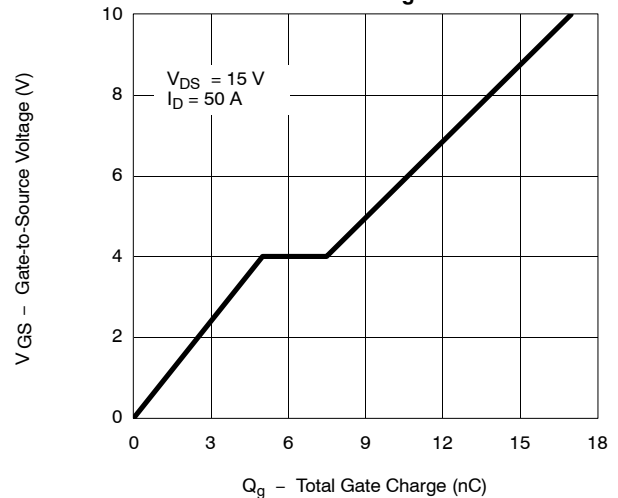
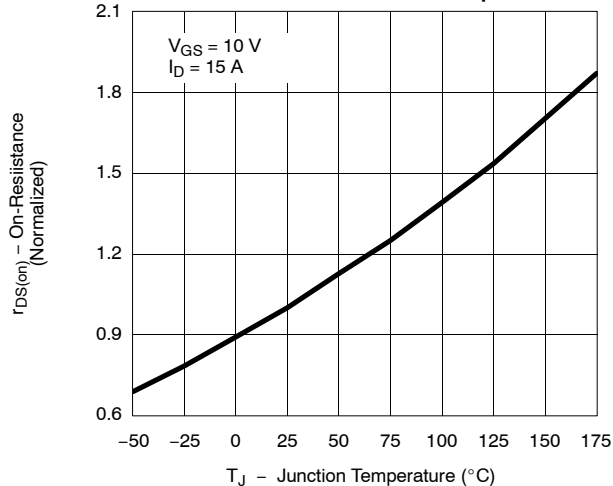
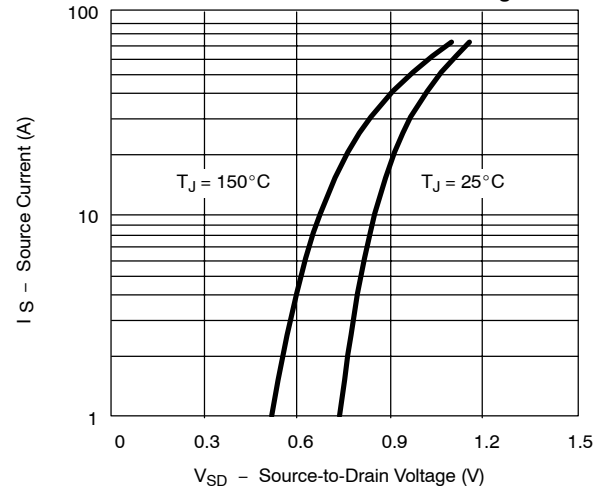
a. Surface Mounted on FR4 Board, $t \leq 10$ sec.

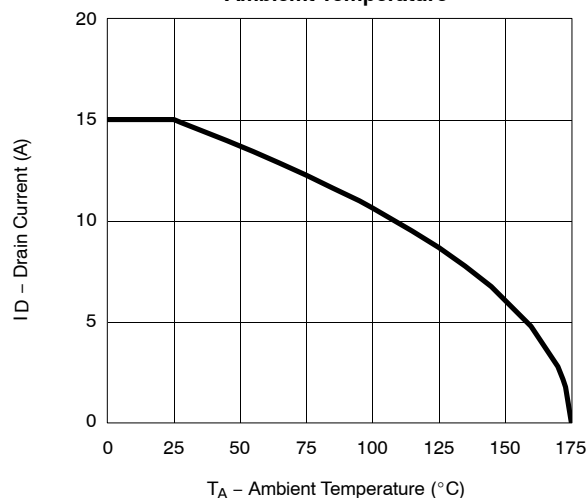
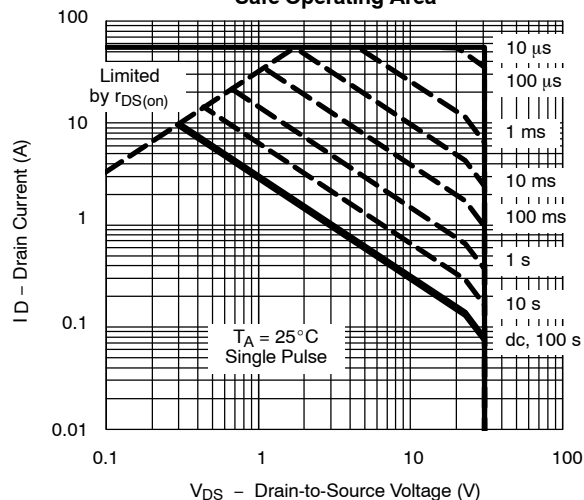
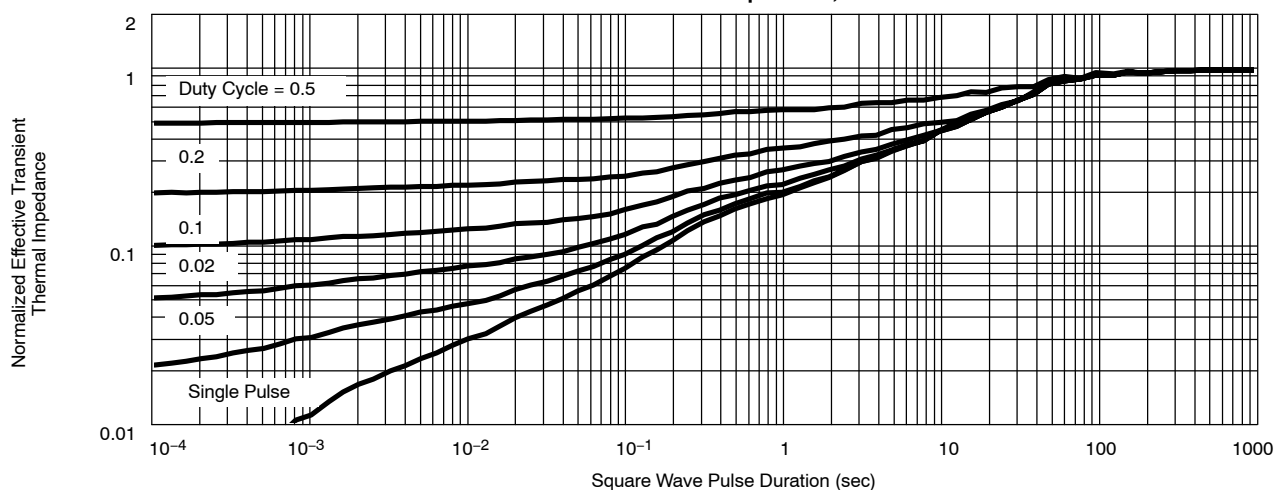
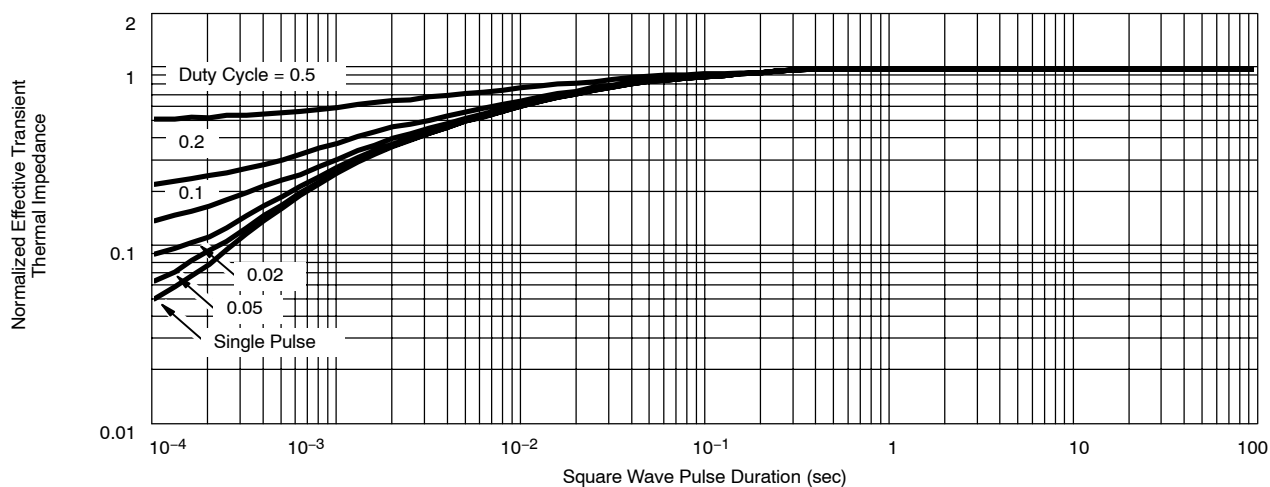
SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	30			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 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 = 15 A		0.0128	0.016	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.025	
		V _{GS} = 4.5 V, I _D = 10 A		0.019	0.024	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A	10			S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1150		pF
Output Capacitance	C _{oss}			215		
Reverse Transfer Capacitance	C _{rss}			70		
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 50 A		8.5	13	nC
Gate-Source Charge ^c	Q _{gs}			5		
Gate-Drain Charge ^c	Q _{gd}			2.5		
Gate Resistance	R _g		2.7	5.5	8.25	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		7	15	ns
Rise Time ^c	t _r			20	30	
Turn-Off Delay Time ^c	t _{d(off)}			25	40	
Fall Time ^c	t _f			12	20	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				40	A
Diode Forward Voltage ^b	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 40 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)

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage**

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**



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