

N-Channel 30-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^b
30	0.0065 at $V_{GS} = 10$ V	84 ^b
	0.0095 at $V_{GS} = 4.5$ V	59 ^b

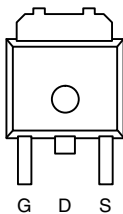
FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- Optimized for Low-Side Synchronous Rectifier Operation
- 100 % R_g Tested


RoHS*
COMPLIANT

APPLICATIONS

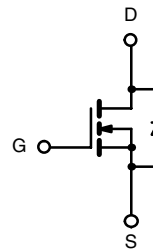
- DC/DC Converters
- Synchronous Rectifiers

TO-252


Top View

Drain Connected to Tab

Ordering Information:
SUD50N03-06P
SUD50N03-06P-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °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	$T_C = 25$ °C	I_D	84 ^b	A
	$T_C = 100$ °C		59 ^b	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a		I_S	25	
Single Pulse Avalanche Current	$L = 0.1$ mH	I_{AS}	45	mJ
		E_{AS}	101.25	
Maximum Power Dissipation	$T_C = 25$ °C	P_D	88	W
	$T_A = 25$ °C		8.3 ^a	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.4	1.7	

Notes

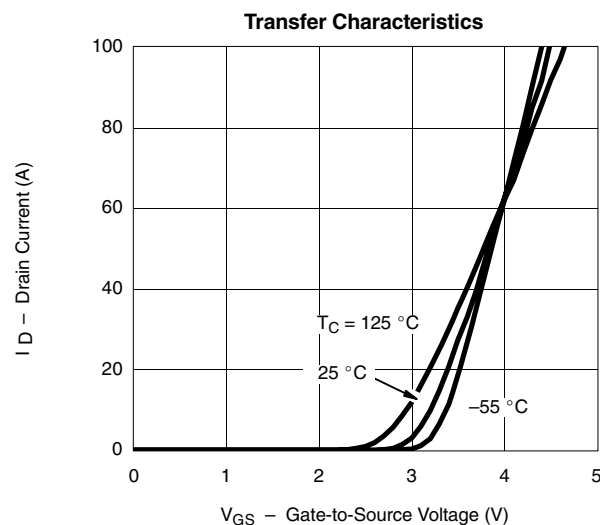
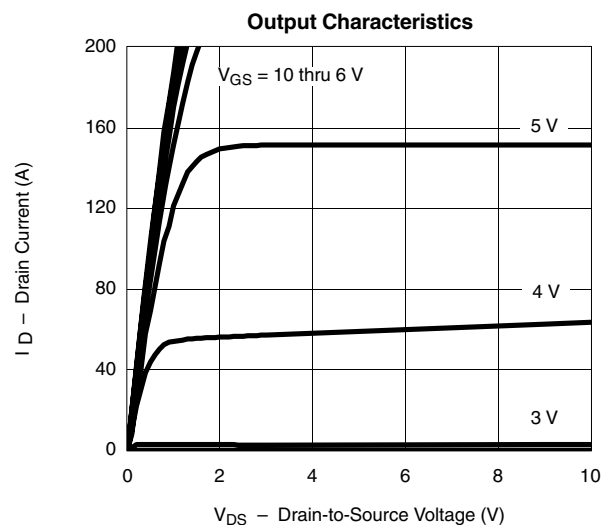
- a. Surface Mounted on FR4 Board, $t \leq 10$ sec.
b. Based on maximum allowable Junction Temperature, package limitation current is 50 A.

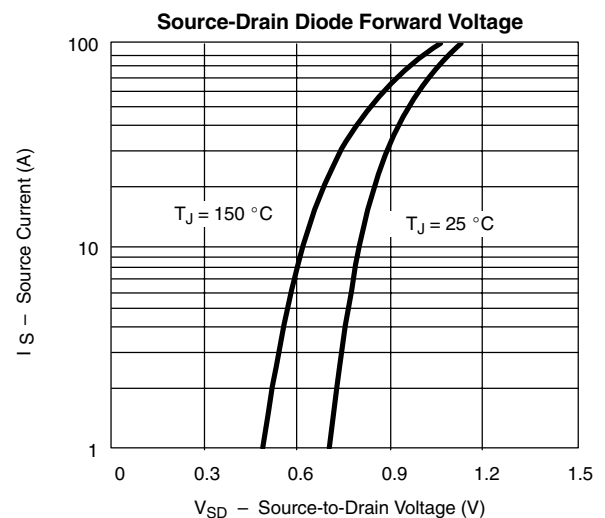
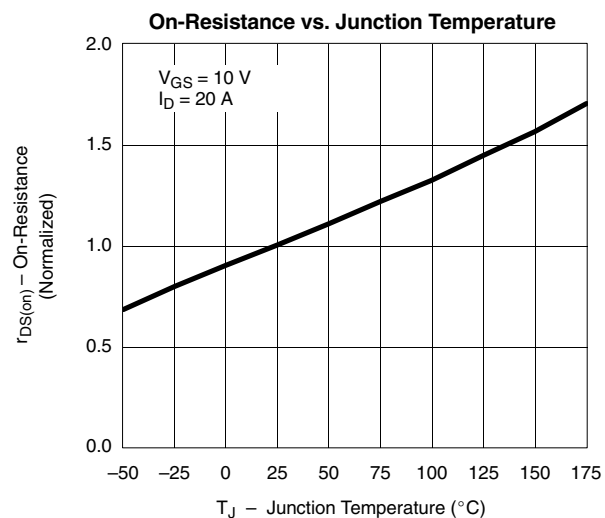
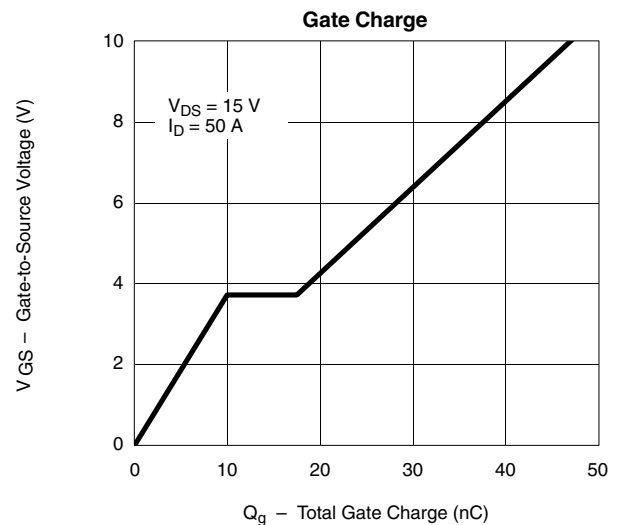
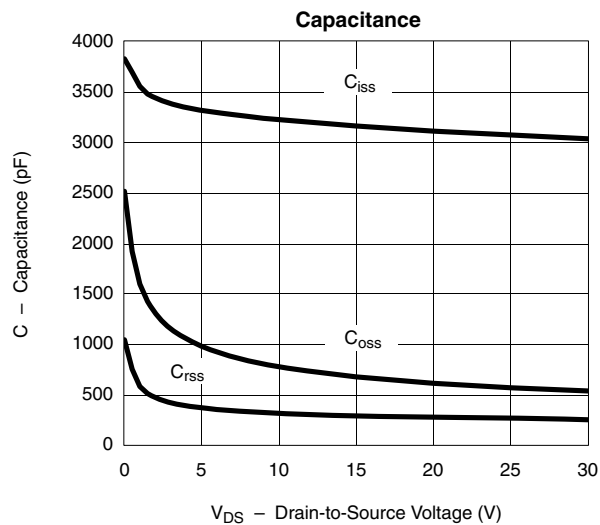
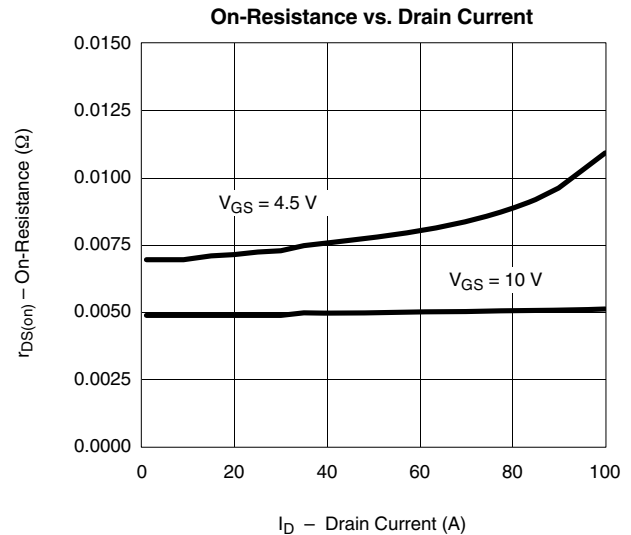
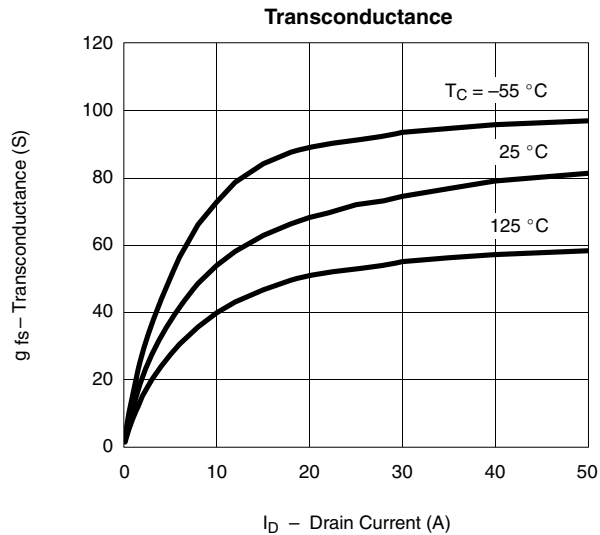
* Pb containing terminations are not RoHS compliant, exemptions may apply

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	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0053	0.0065	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.0105	
		V _{GS} = 4.5 V, I _D = 20 A		0.0078	0.0095	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A	20			S
Dynamic ^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		3100		pF
Output Capacitance	C _{oss}			565		
Reverse Transfer Capacitance	C _{rss}			255		
Gate Resistance	R _g		1	1.9	3.1	Ω
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 50 A		21	30	nC
Gate-Source Charge ^c	Q _{gs}			10		
Gate-Drain Charge ^c	Q _{gd}			7.5		
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		12	20	ns
Rise Time ^c	t _r			12	20	
Turn-Off Delay Time ^c	t _{d(off)}			30	45	
Fall Time ^c	t _f			10	15	
Source-Drain Diode Ratings and Characteristic (T _C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 100 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		35	70	ns

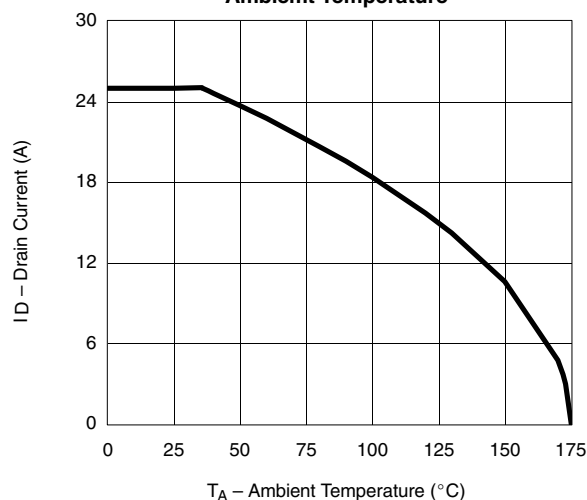
Notes

- 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.

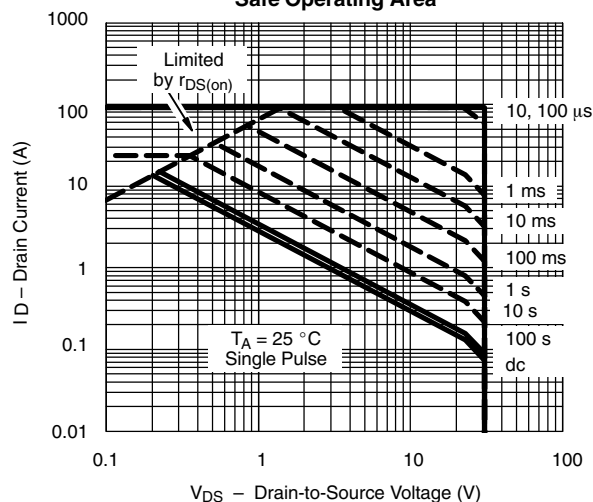
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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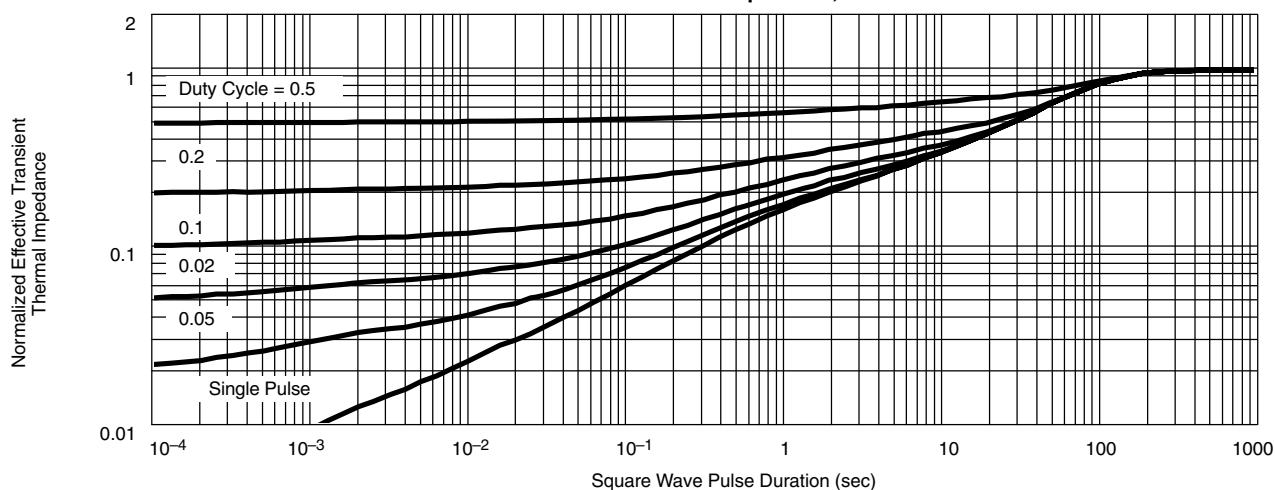
THERMAL RATINGS

Maximum Drain Current vs.
Ambient Temperature

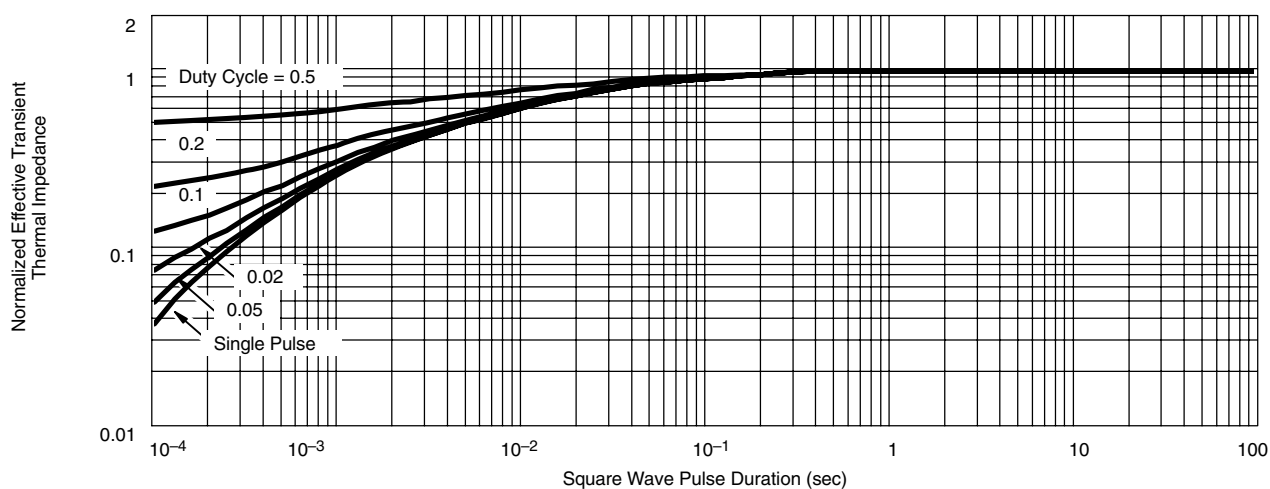
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case





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