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

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[b]
30	0.0095 at V_{GS} = 10 V	63[b]
	0.014 at V_{GS} = 4.5 V	52[b]

FEATURES

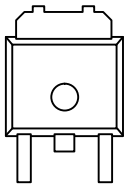
- TrenchFET® Power MOSFET
- Optimized for High- or Low-Side
- 100 % R_g Tested

Pb Available
RoHS* COMPLIANT

APPLICATIONS

- DC/DC Converters
- Synchronous Rectifiers

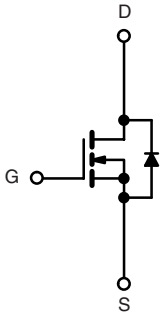
TO-252



Drain Connected to Tab

Top View

Ordering Information: SUD50N03-09P
SUD50N03-09P-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	63[b]	A
	T_C = 100 °C		44.5[b]	
Pulsed Drain Current		I_{DM}	50	
Continuous Source Current (Diode Conduction)[a]		I_S	5	
Avalanche Current	L = 0.1 mH	I_{AS}	35	
Single Pulse Avalanche Energy		E_{AS}	61	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	65.2	W
	T_A = 25 °C		7.5[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 ≤ 10 s	R_{thJA}	16	20	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.8	2.3	

Notes:

a. Surface Mounted on FR4 board, t ≤ 10 s.

b. Based on maximum allowable Junction Temperature, package limitation current is 50 A.

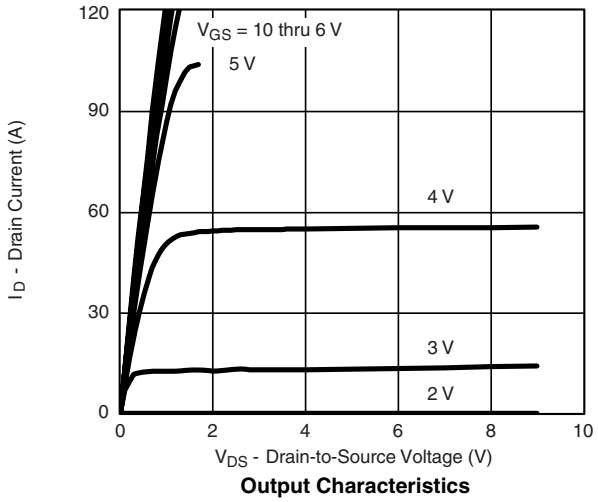
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**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		0.0076	0.0095	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C			0.015	
		V_{GS} = 4.5 V, I_D = 20 A		0.0115	0.014	
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		2200		pF
Output Capacitance	C_{oss}			410		
Reverse Transfer Capacitance	C_{rss}			180		
Total Gate Charge[c]	Q_g	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 50 A		11	16	nC
Gate-Source Charge[c]	Q_{gs}			7.5		
Gate-Drain Charge[c]	Q_{gd}			5.0		
Gate Resistance	R_g		0.5	1.5	2.1	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]	$t_{d(off)}$			22	35	
Fall Time[c]	t_f			8	12	
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		1.2	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 50 A, di/dt = 100 A/µs		35	70	ns

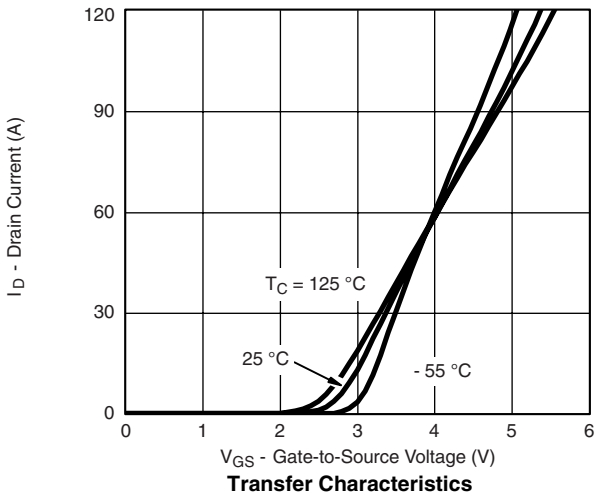
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

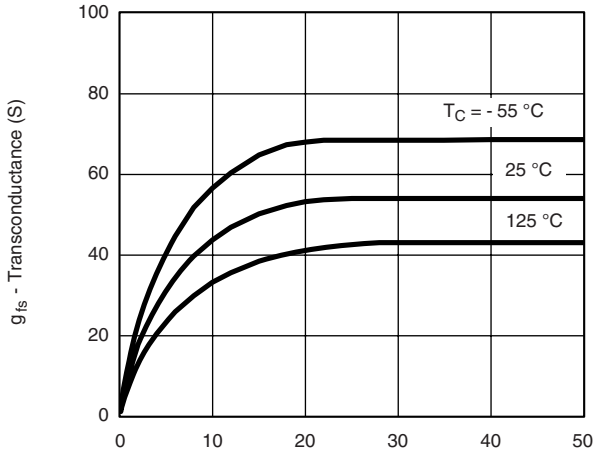


Output Characteristics

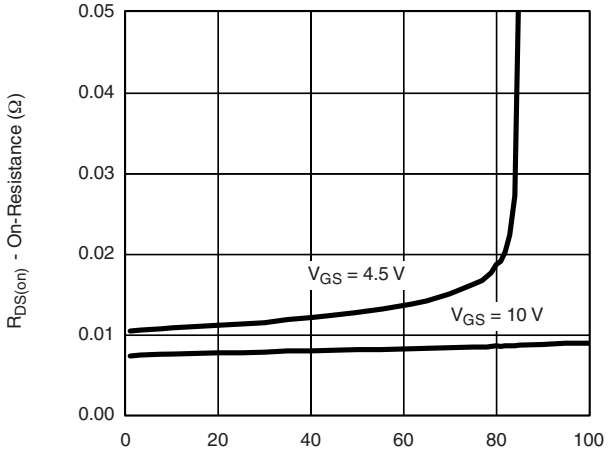


Transfer Characteristics

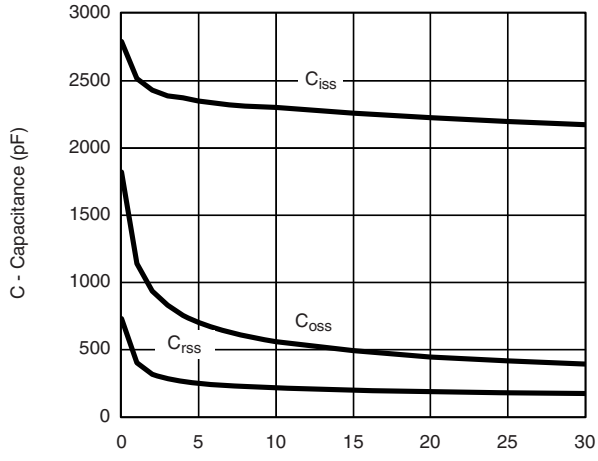
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



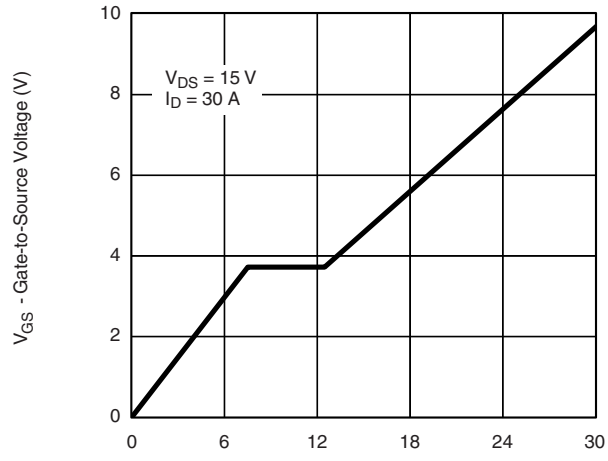
Transconductance



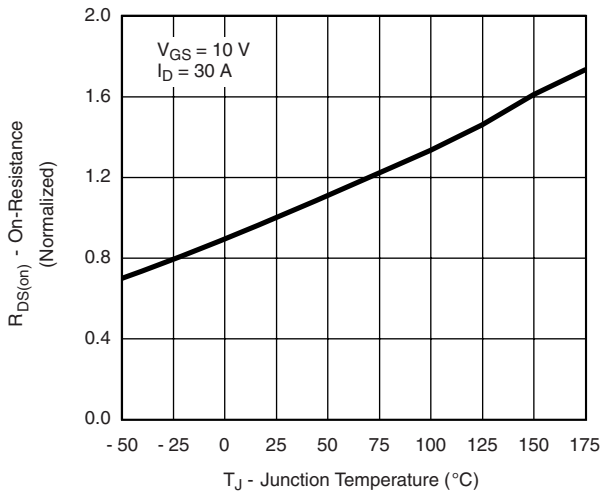
On-Resistance vs. Drain Current



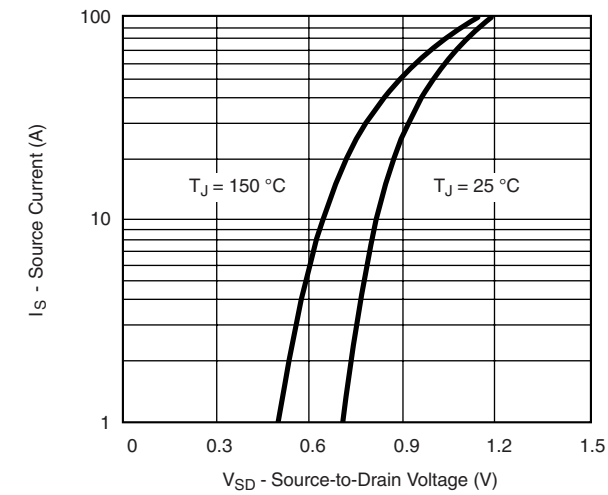
Capacitance



Gate Charge

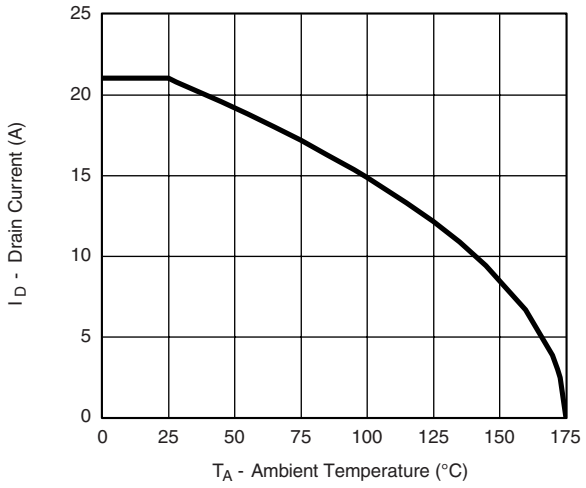


On-Resistance vs. Junction Temperature

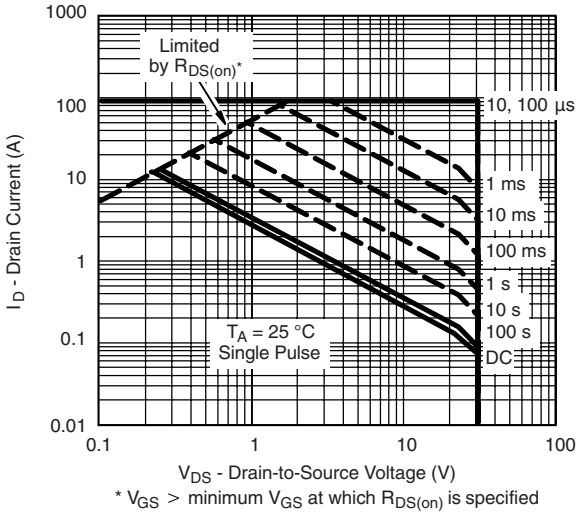


Source-Drain Diode Forward Voltage

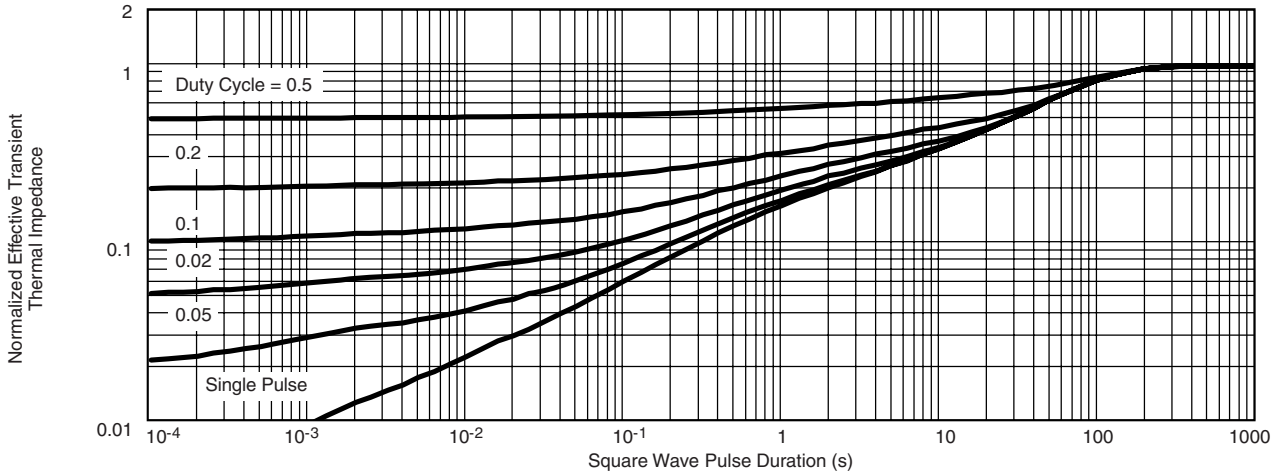
THERMAL RATINGS



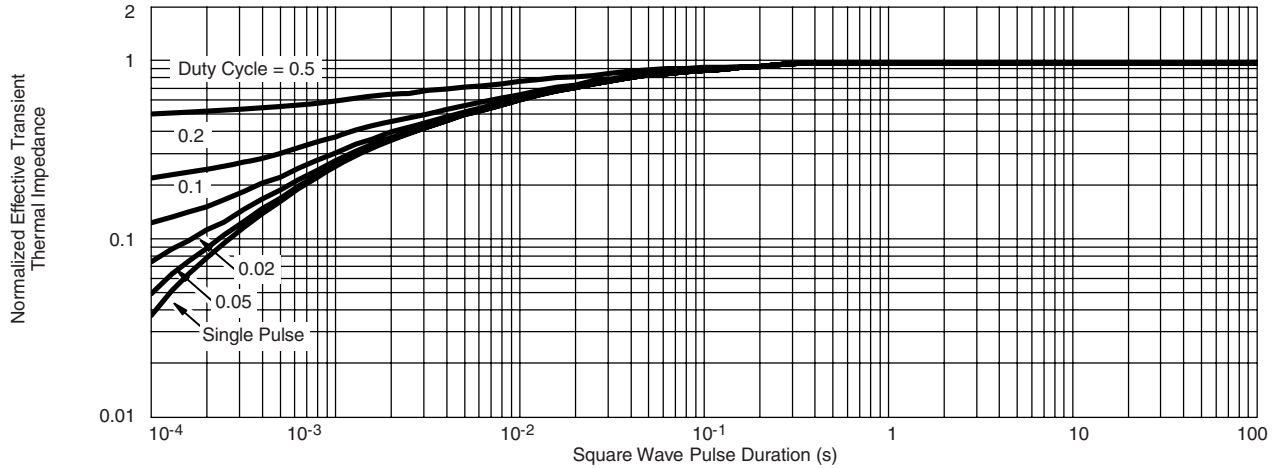
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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