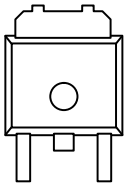
N-Channel 30-V (D-S), 175°C MOSFET

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.010 @ V_{GS} = 10 V	±15
	0.019 @ V_{GS} = 4.5 V	±12

175°C Rated
Maximum Junction Temperature
TrenchFET™
Power MOSFETs

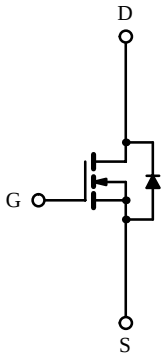
TO-252



Top View

Drain Connected to Tab

Order Number:
SUD50N03-10



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_A = 25°C	I_D	±15	A
	T_A = 100°C		±10	
Pulsed Drain Current		I_{DM}	±100	
Continuous Source Current (Diode Conduction)[a]		I_S	15	
Maximum Power Dissipation	T_C = 25°C	P_D	83	W
	T_A = 25°C		4[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]	R_{thJA}		30	°C/W
Maximum Junction-to-Case	R_{thJC}		1.8	

Notes
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70265.

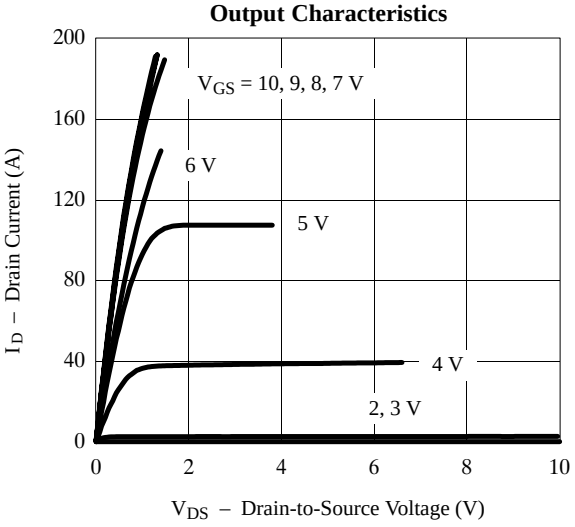
Specifications (T_J = 25°C Unless Otherwise Noted)

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	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} = 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 =15 A			0.010	Ω
		V_{GS} = 10 V, I_D =15 A, T_J = 125°C			0.018	
		V_{GS} = 4.5 V, I_D = 15 A			0.019	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 15 A	20			S
Dynamic[a]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, F = 1 MHz		3200	6000	pF
Output Capacitance	C_{oss}			800		
Reverse Transfer Capacitance	C_{rss}			150		
Total Gate Charge[c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 50 A		55	100	nC
Gate-Source Charge[c]	Q_{gs}			10		
Gate-Drain Charge[c]	Q_{gd}			9		
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		16	30	ns
Rise Time[c]	t_r			8	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			33	60	
Fall Time[c]	t_f			20	40	
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		55	100	ns

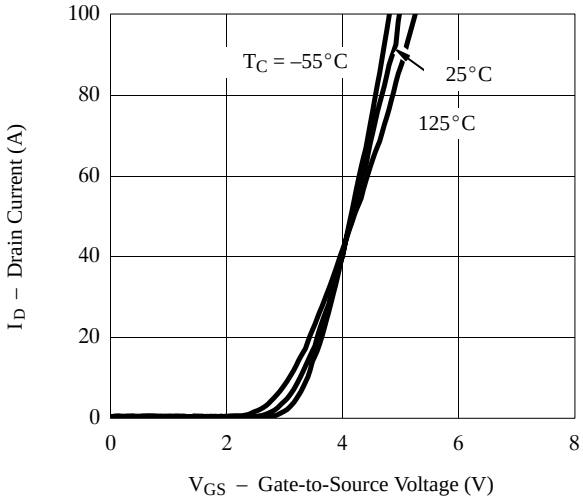
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

Typical Characteristics (25°C Unless Otherwise Noted)

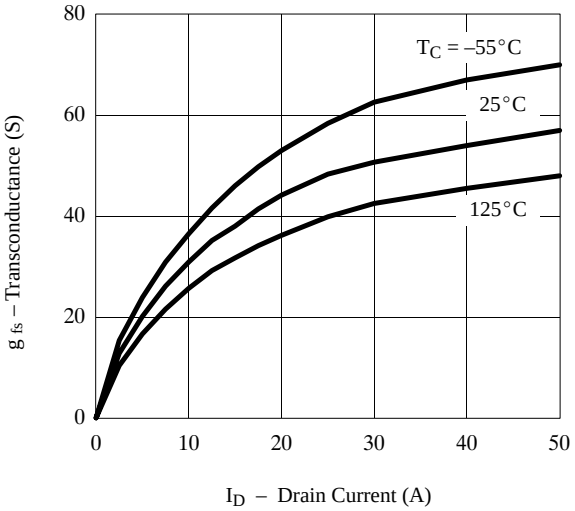
Output Characteristics



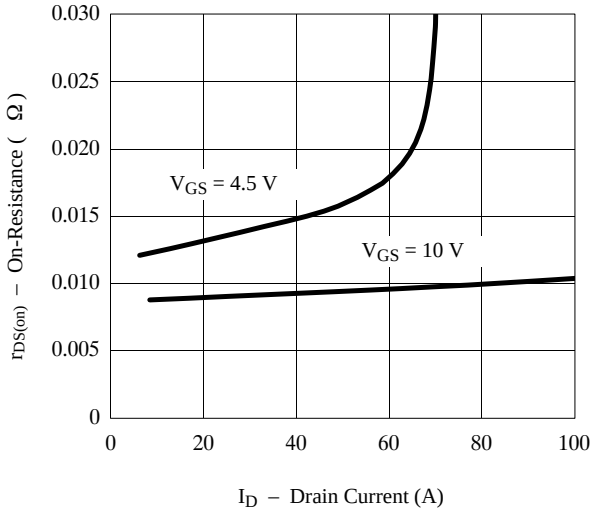
Transfer Characteristics



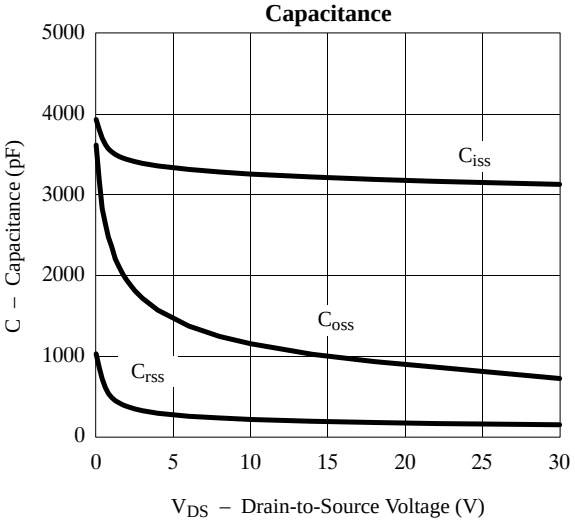
Transconductance



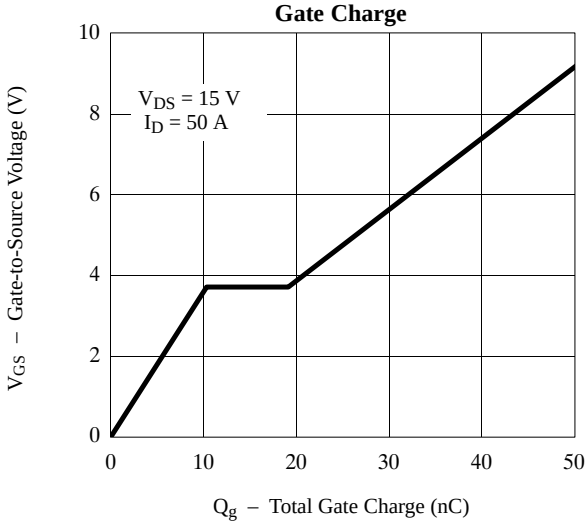
On-Resistance vs. Drain Current



Capacitance

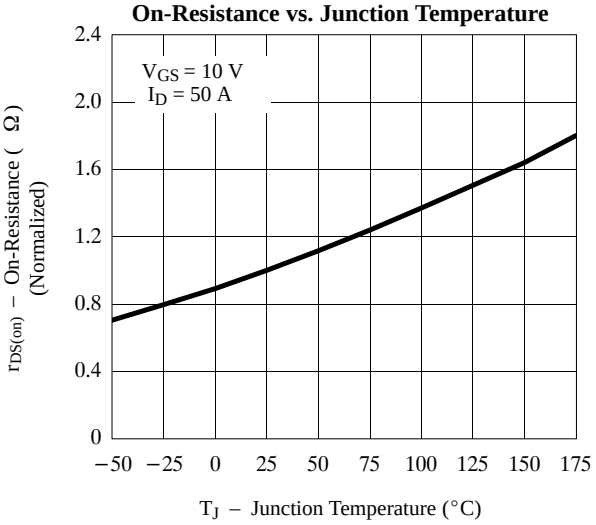


Gate Charge

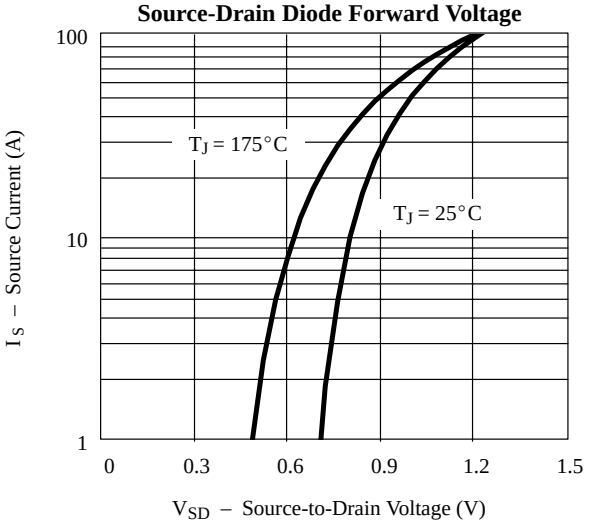


Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature

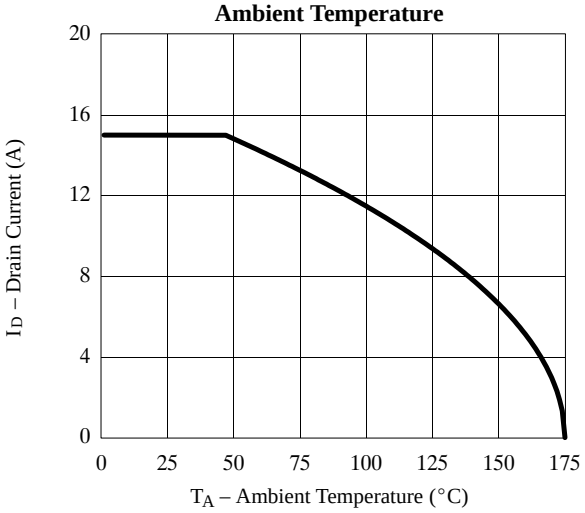


Source-Drain Diode Forward Voltage

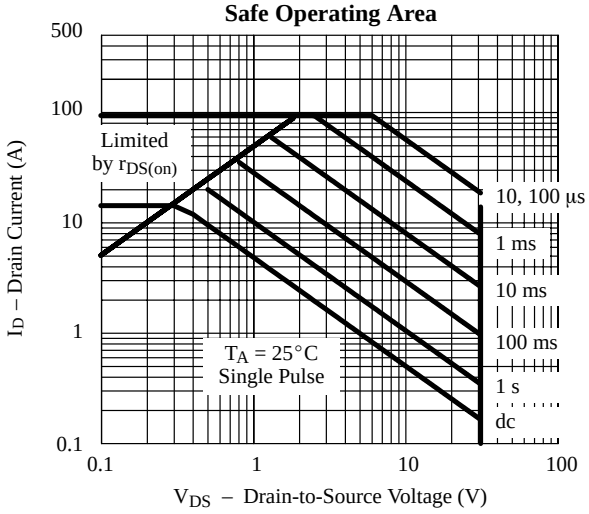


Thermal Ratings

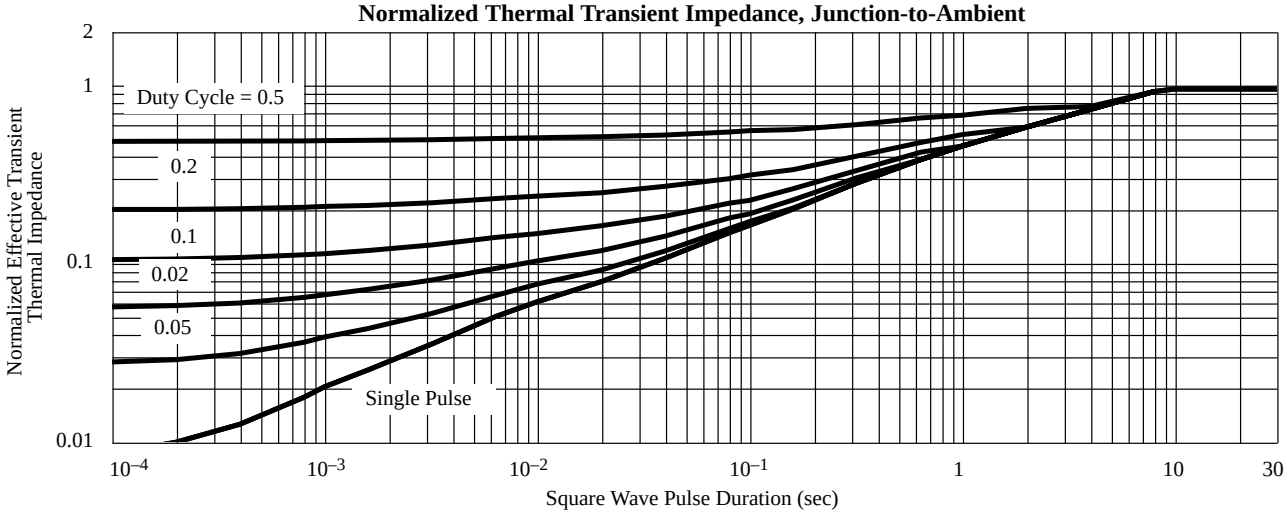
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



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