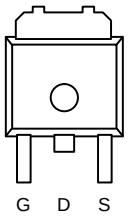
N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]
30	0.018 @ V_{GS} = 10 V	±40
	0.027 @ V_{GS} = 4.5 V	±34

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

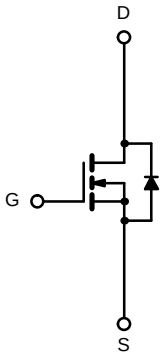
TO-252



Top View

Order Number:
SUD40N03-18P

Drain Connected to Tab



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 (T_J = 175°C)[b]	T_C = 25°C	I_D	±40	A
	T_C = 100°C		±28	
Pulsed Drain Current		I_{DM}	±100	
Continuous Source Current (Diode Conduction)[a]		I_S	40	
Maximum Power Dissipation	T_C = 25°C	P_D	62.5[c]	W
	T_A = 25°C		7.5[b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Junction-to-Ambient[b]	t ≤ 10 sec	R_{thJA}	17	20	°C/W
	Steady State		50	60	
Junction-to-Case		R_{thJC}	2	2.4	
Junction-to-Lead		R_{thJL}	4	4.8	°C/W

Notes
a. Package Limited.
b. Surface Mounted on 1" x1" FR4 Board, t ≤ 10 sec.
c. See SOA curve for voltage derating.

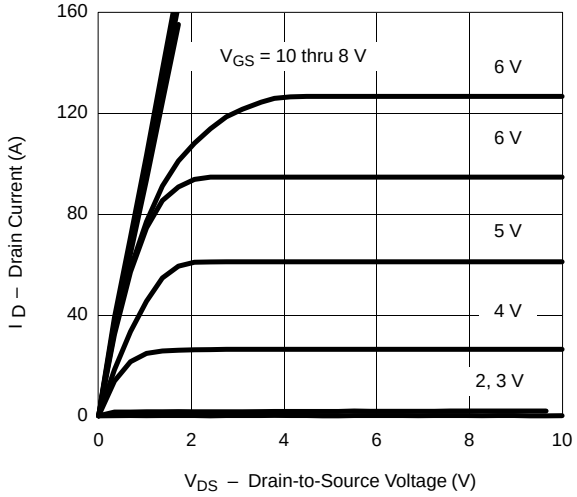
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

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			
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		0.014	0.018	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125°C			0.029	
		V_{GS} = 4.5 V, I_D = 10 A		0.021	0.027	
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		1300		pF
Output Capacitance	C_{oss}			340		
Reverse Transfer Capacitance	C_{rss}			95		
Total Gate Charge[c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 40 A		19	30	nC
Gate-Source Charge[c]	Q_{gs}			5		
Gate-Drain Charge[c]	Q_{gd}			3		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 15 V, R_L = 0.37 Ω I_D ≅ 40 A, V_{GEN} = 10 V, R_G = 2.5 Ω		8	12	ns
Rise Time[c]	t_r			8.5	13	
Turn-Off Delay Time[c]	$t_{d(off)}$			17	25	
Fall Time[c]	t_f			6	9	
Source-Drain Diode Ratings and Characteristic (T_C = 25°C)						
Continuous Current	I_S				40	A
Pulsed Current	I_{SM}				80	
Diode Forward Voltage[b]	V_{SD}	I_F = 100 A, V_{GS} = 0 V			1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 40 A, di/dt = 100 A/µs		30	50	ns

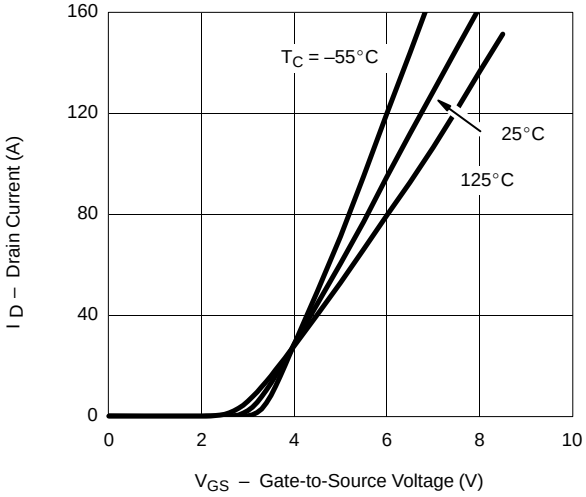
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

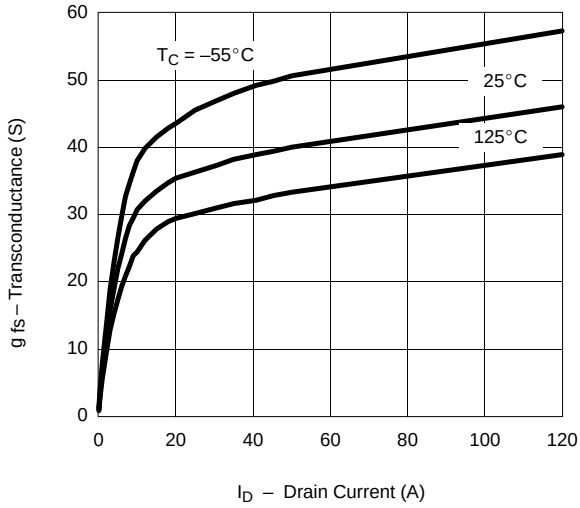
Output Characteristics



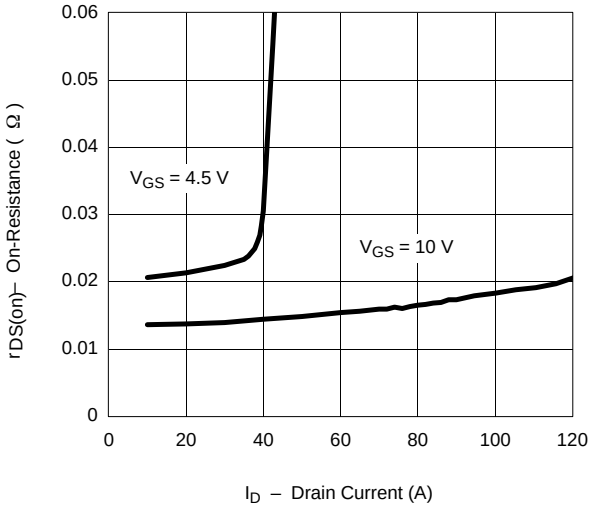
Transfer Characteristics



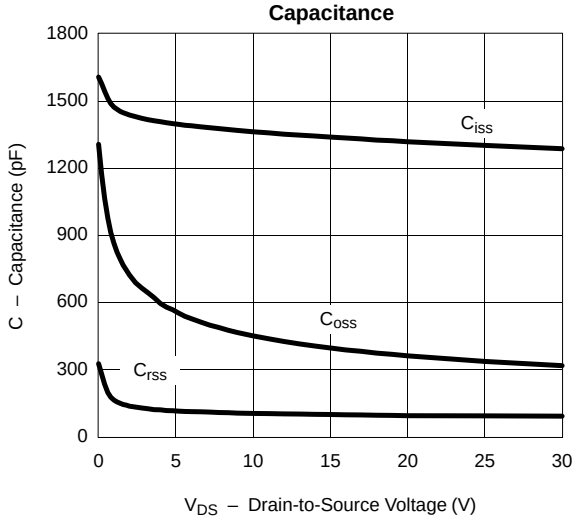
Transconductance



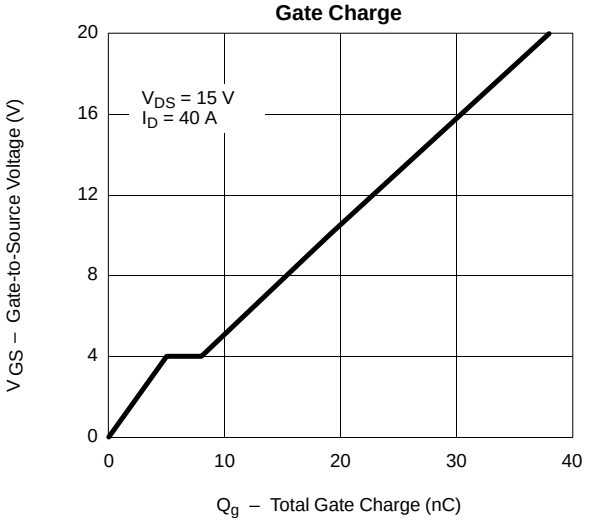
On-Resistance vs. Drain Current



Capacitance

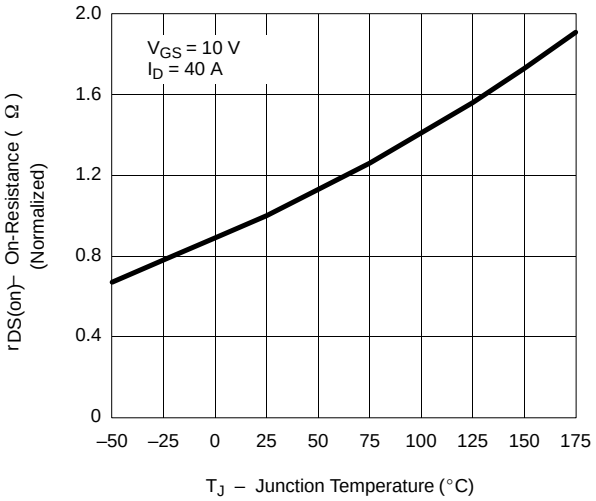


Gate Charge

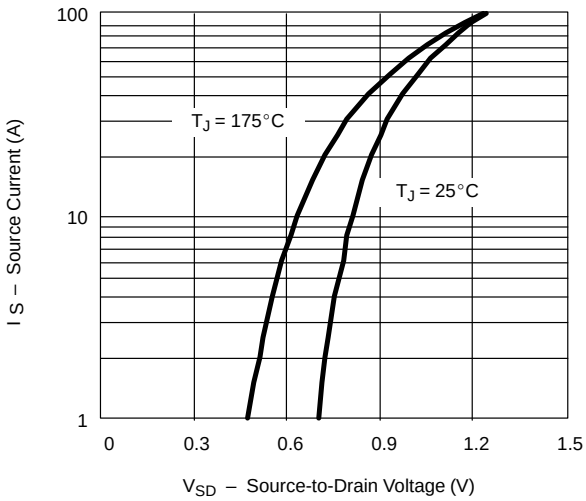


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

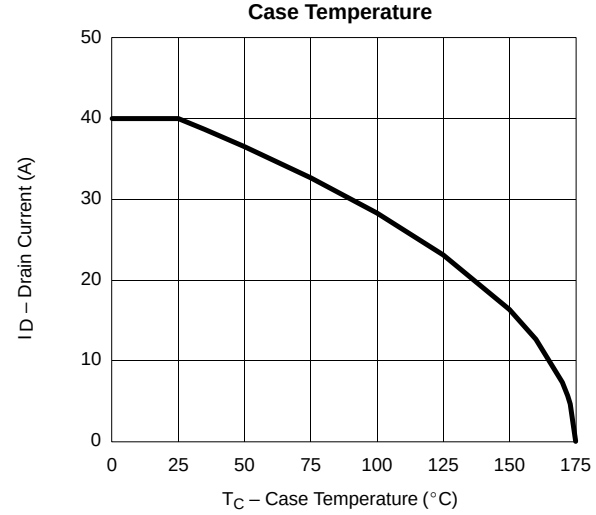


Source-Drain Diode Forward Voltage

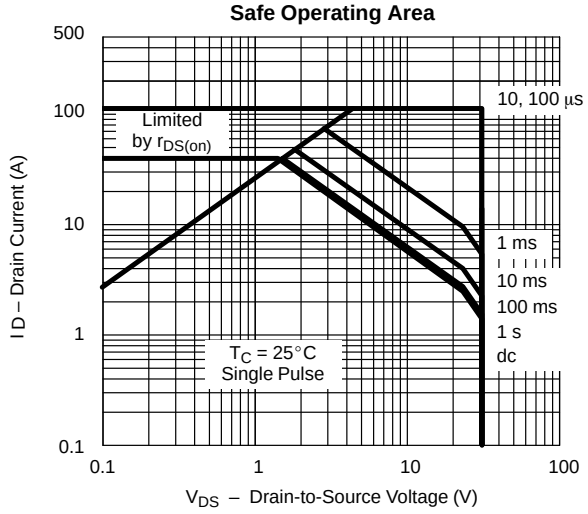


THERMAL RATINGS

Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case