N-Channel 60-V (D-S), 175°C MOSFET, Logic Level

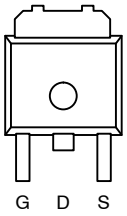
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]
60	0.022 @ V_{GS} = 10 V	30
	0.025 @ V_{GS} = 4.5 V	30

FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100% R_g Tested

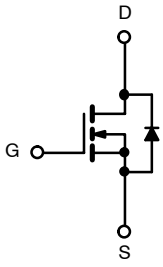
Pb-free Available

TO-252



Drain Connected to Tab

Top View



N-Channel MOSFET

Ordering Information: SUD40N06-25L
SUD40N06-25L—E3 (Lead (Pb)-Free)

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J = 175°C)[b]	T_C = 25°C	I_D	30	A
	T_C = 100°C		30	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	34	
Avalanche Current		I_{AR}	34	
Repetitive Avalanche Energy (Duty Cycle ≤ 1%)	L = 0.1 mH	E_{AR}	58	mJ
Maximum Power Dissipation	T_C = 25°C	P_D	75	W
	T_A = 25°C		1.4[b], 2.5[c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Limit	Unit
Maximum Junction-to-Ambient	Free Air, FR4 Board Mount	R_{thJA}	60	°C/W
	Free Air, Vertical Mount		110	
Maximum Junction-to-Case		R_{thJC}	2.0	

Notes:
a. Package limited.
b. Free air, vertical mount.
c. Surface mounted on 1" x 1" FR4 Board, t ≤ 10 sec.

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

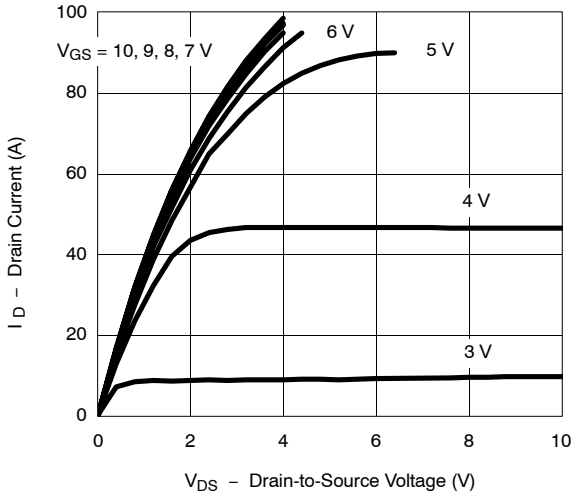
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ[a]**	**Max**	**Unit**
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	μA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125°C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 175°C			150	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A			0.022	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125°C			0.043	
		V_{GS} = 10 V, I_D = 20 A, T_J = 175°C			0.053	
		V_{GS} = 4.5 V, I_D = 20 A			0.025	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 20 A				S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1800		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			100		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 40 A		40	60	nC
Gate-Source Charge[c]	Q_{gs}			9		
Gate-Drain Charge[c]	Q_{gd}			10		
Gate Resistance	R_g		1		3.5	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.9 Ω I_D ≅ 20 A, V_{GEN} = 10 V, R_g = 2.5 Ω		10	20	ns
Rise Time[c]	t_r			9	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			28	50	
Fall Time[c]	t_f			7	15	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)						
Pulsed Current	I_{SM}				20	A
Diode Forward Voltage	V_{SD}	I_F = 20 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 20 A, di/dt = 100 A/μs		48	100	ns

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

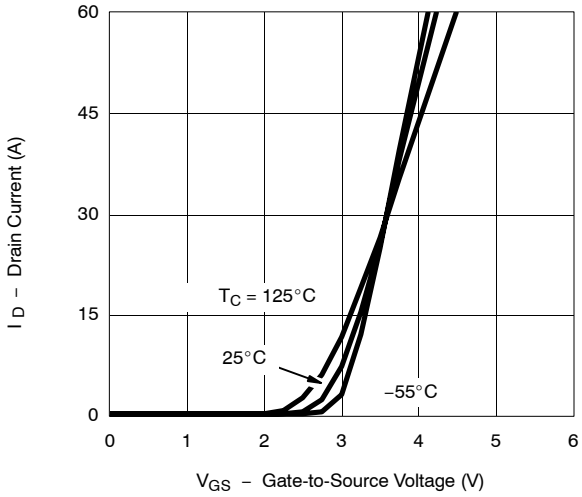
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

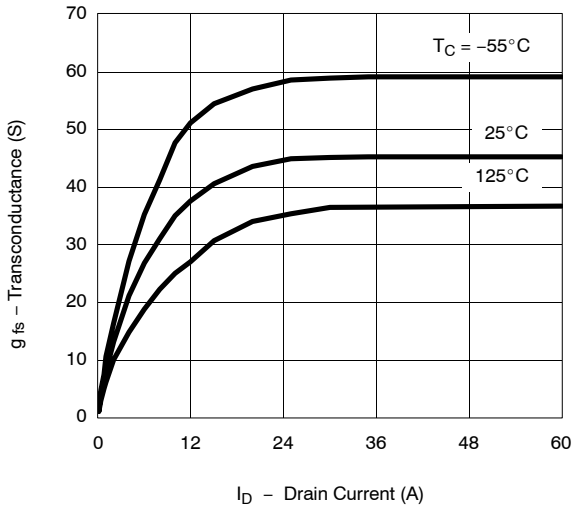
Output Characteristics



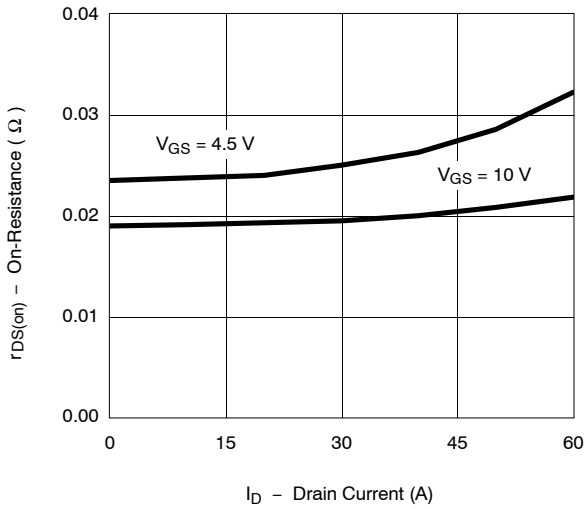
Transfer Characteristics



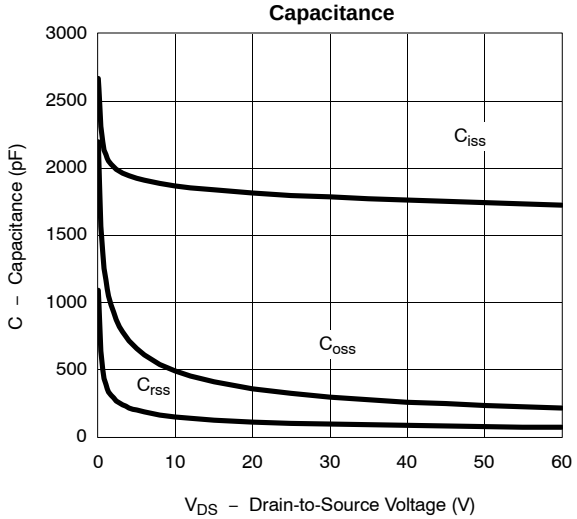
Transconductance



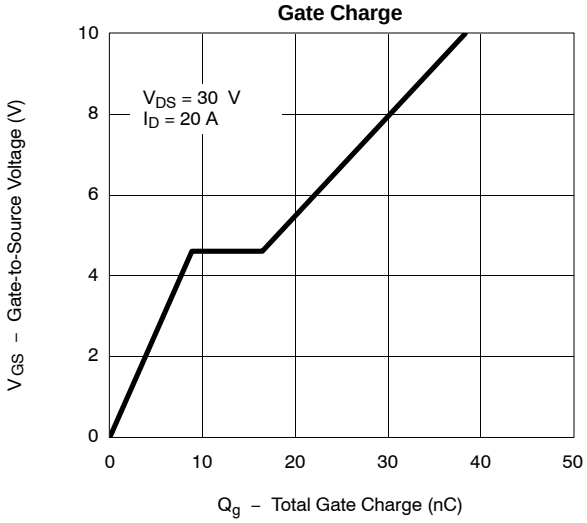
On-Resistance vs. Drain Current



Capacitance

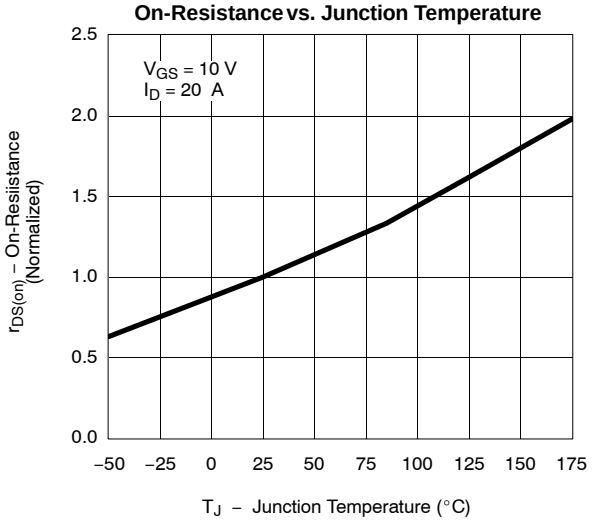


Gate Charge

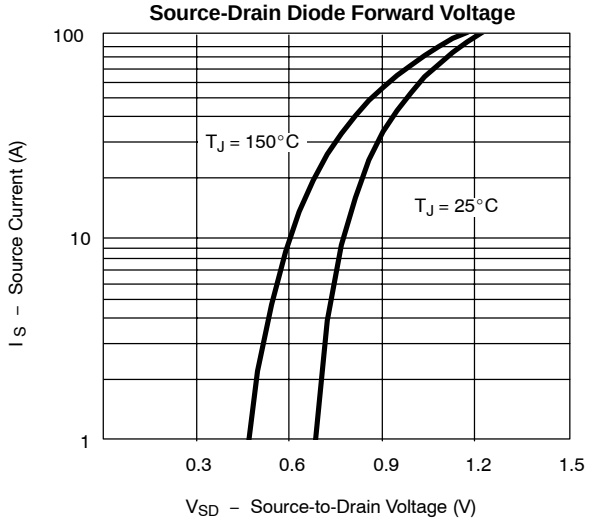


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

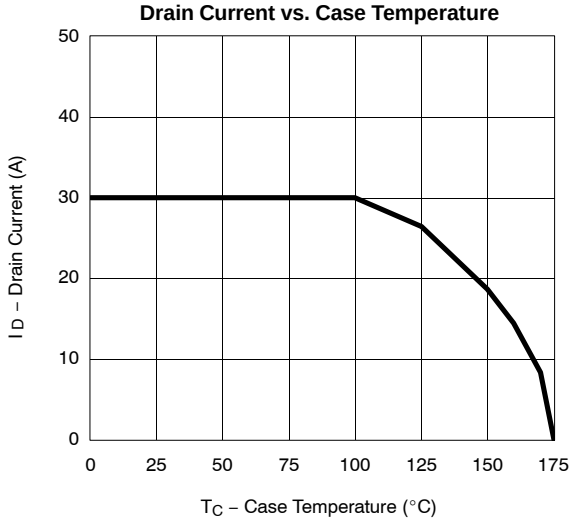


Source-Drain Diode Forward Voltage

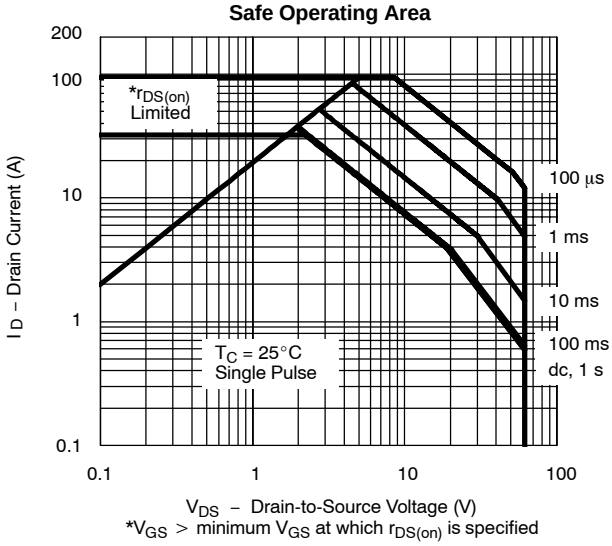


THERMAL RATINGS

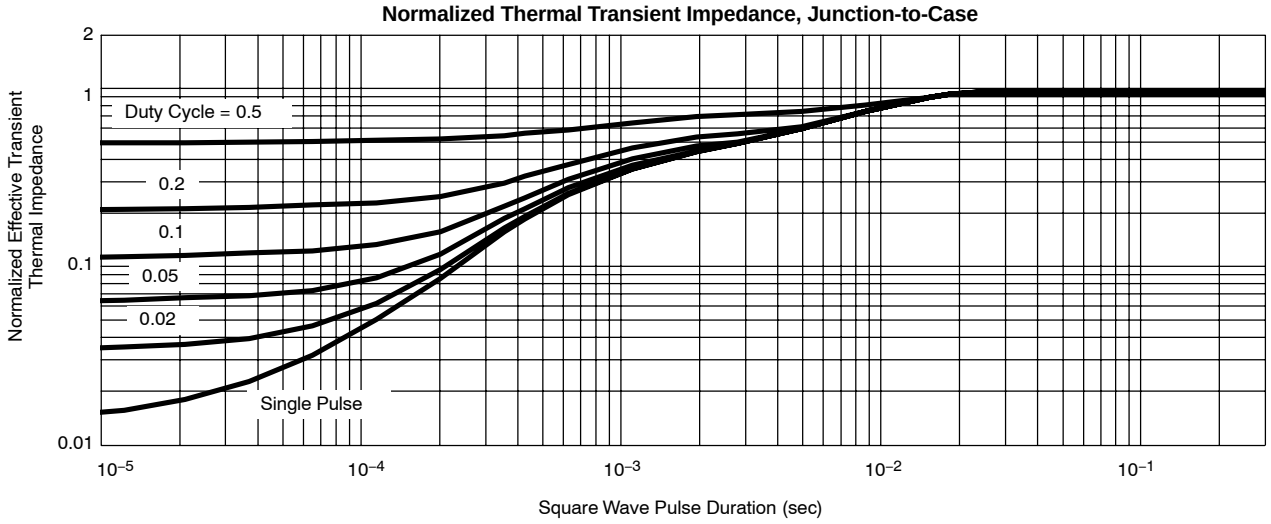
Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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