



N-Channel 60-V (D-S) 175 °C MOSFET

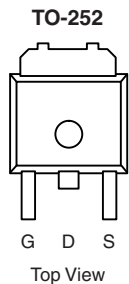
PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^c	Q _g (Typ)
60	0.0078 at V _{GS} = 10 V	93	94

FEATURES

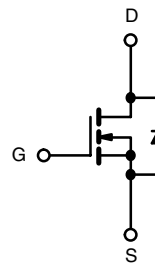
- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g Tested
- High Threshold at High Temperature



RoHS COMPLIANT



Drain Connected to Tab



N-Channel MOSFET

Ordering Information: SUD50N06-08H0-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	60	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 175 °C) ^b	I _D	T _C = 25 °C	93 ^c	
		T _C = 125 °C	54 ^c	
Pulsed Drain Current	I _{DM}	100	A	
Continuous Source Current (Diode Conduction)	I _S	91 ^c		
Avalanche Current, Single Pulse	I _{AS}	50		
Avalanche Energy	E _{AS}	L = 0.1 mH	125	mJ
Maximum Power Dissipation		T _C = 25 °C	136 ^b	
		T _A = 25 °C	3 ^a	W
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 ^a	R _{thJA}	t ≤ 10 sec	15	18	°C/W
		Steady State	40	50	
Junction-to-Case	R _{thJC}	0.85	1.1		

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

b. See SOA curve for voltage derating.

c. Calculate continuous current based on maximum allowable junction temperature when using infinite heat sink. Package limitation current is 50 A.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	3.4		4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0065	0.0078	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.013	
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.0156	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		25		S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, F = 1\text{ MHz}$		7000		μF
Output Capacitance	C_{oss}			450		
Reverse Transfer Capacitance	C_{rss}			240		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.75	1.5	2.3	Ω
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		94	145	nC
Gate-Source Charge ^c	Q_{gs}			35		
Gate-Drain Charge ^c	Q_{gd}			20		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \equiv 50\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		28	45	ns
Rise Time ^c	t_r			13	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			50	75	
Fall Time ^c	t_f			10	15	
Source-Drain Diode Ratings and Characteristics ($T_C = 25\text{ }^\circ\text{C}$)						
Pulsed Current	I_{SM}				100	A
Diode Forward Voltage ^b	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45	70	ns

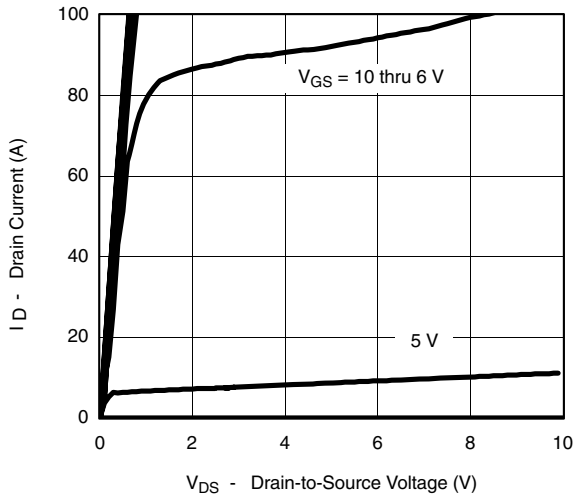
Notes:

- 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.

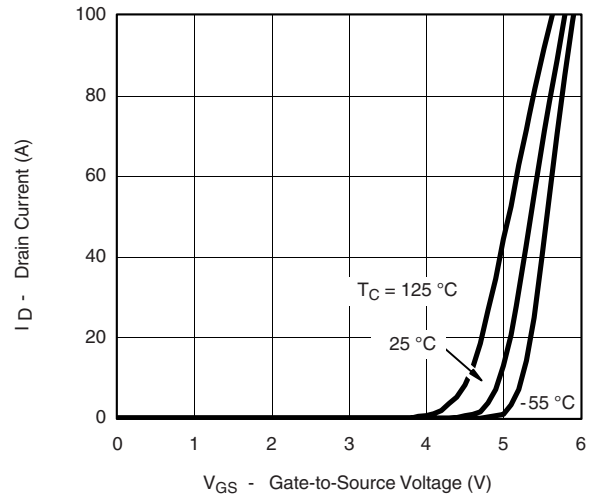
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



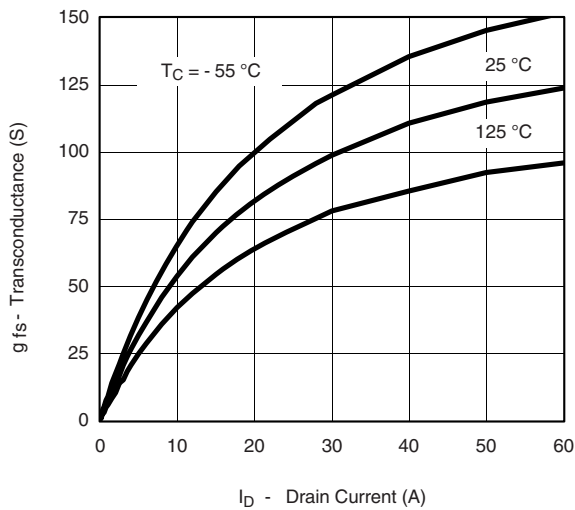
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



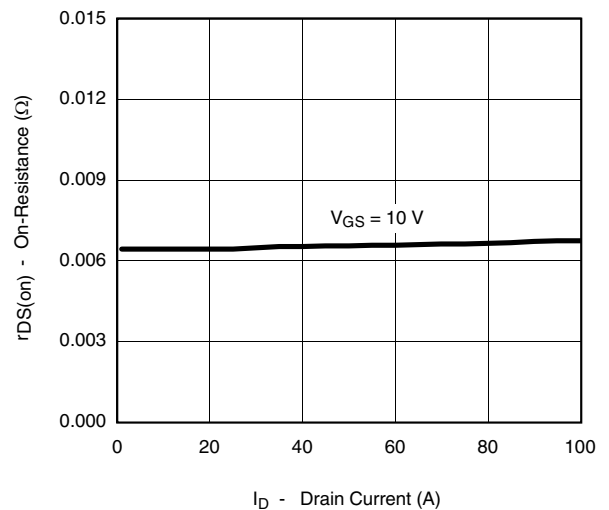
Output Characteristics



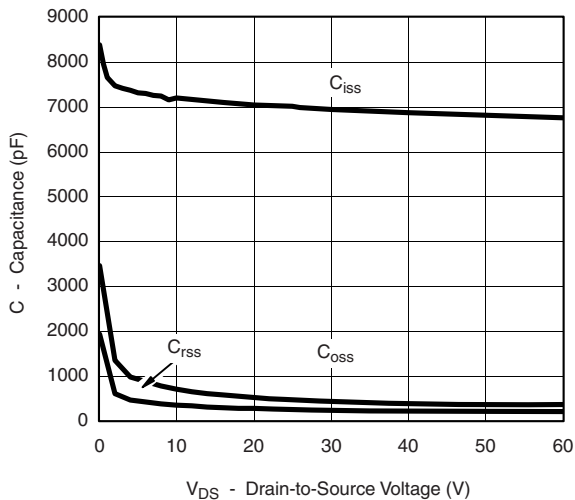
Transfer Characteristics



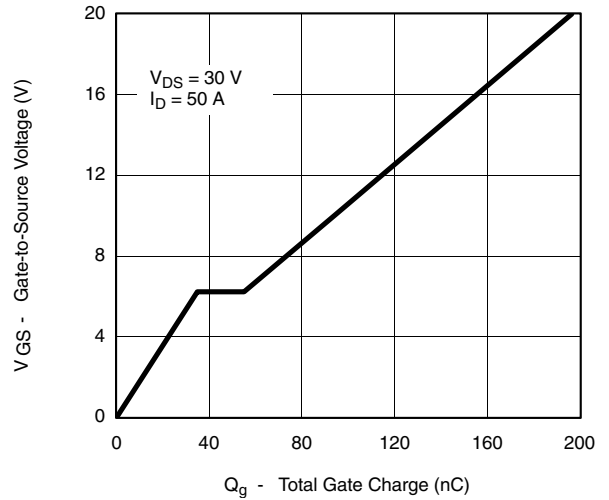
Transconductance



On-Resistance vs. Drain Current



Capacitance



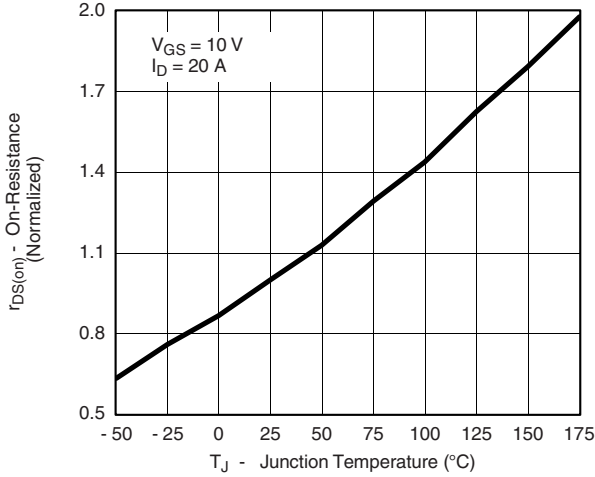
Gate Charge

SUD50N06-08H

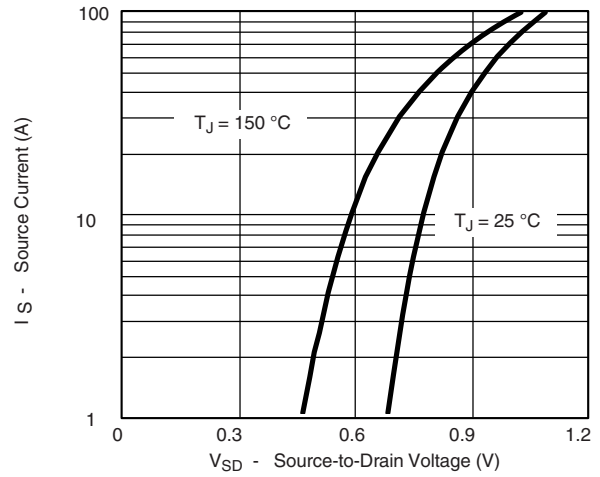


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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

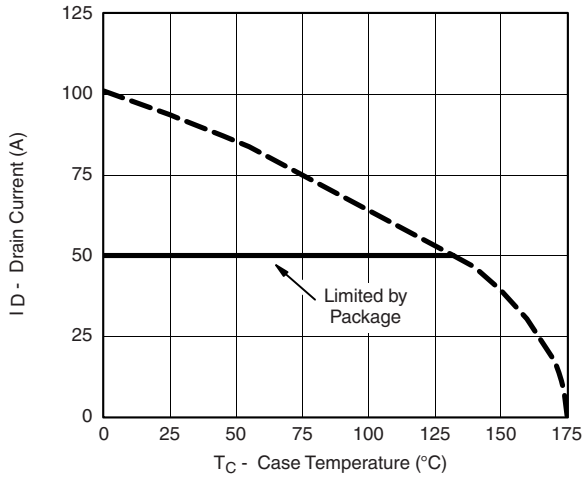


On-Resistance vs. Junction Temperature

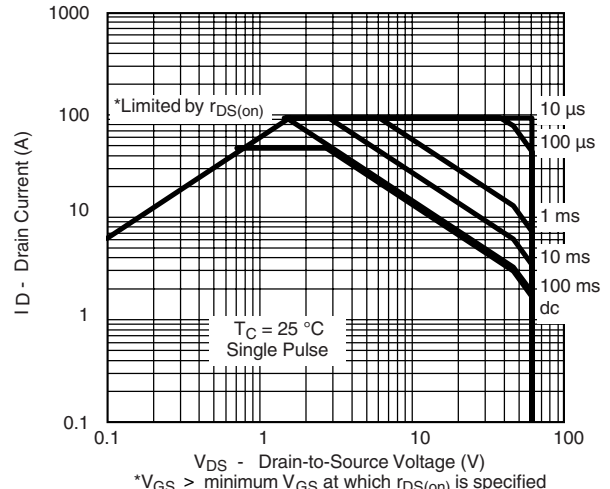


Source-Drain Diode Forward Voltage

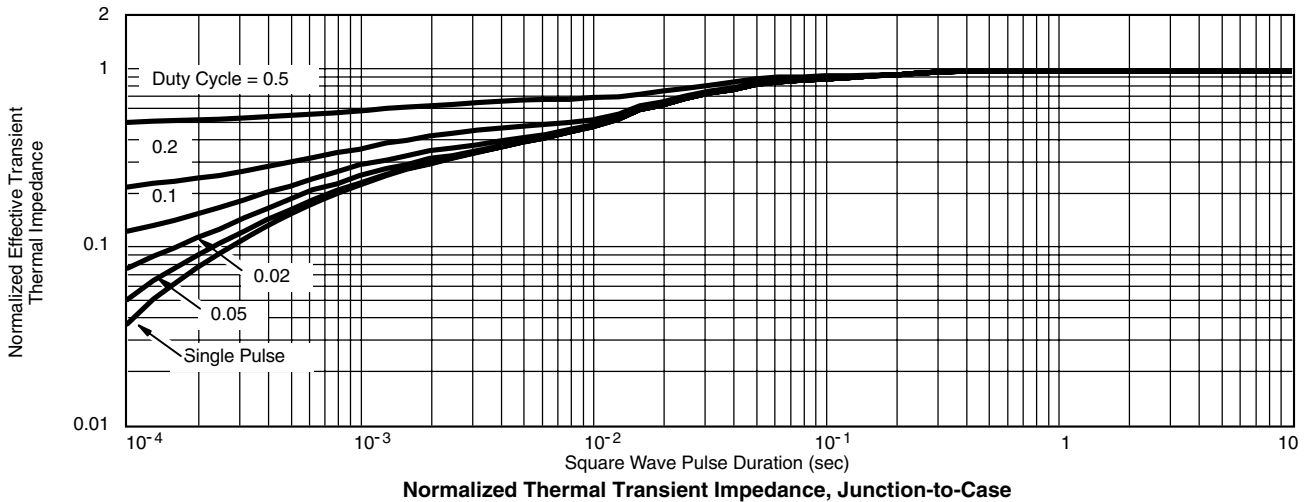
THERMAL RATINGS



Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Impedance, Junction-to-Case

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