

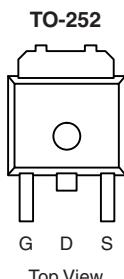


N-Channel 60-V (D-S) 175 °C MOSFET

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

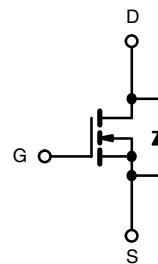
FEATURES

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



Drain Connected to Tab

Top View



Ordering Information: SUD50N06-08H0-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}	60	V	
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current ($T_J = 175$ °C) ^b	I_D	93 ^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}	125	mJ	
Maximum Power Dissipation	P_D	136 ^b	W	
		3 ^a		
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	$t \leq 10$ 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.

SUD50N06-08H

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**SPECIFICATIONS** $T_J = 25^\circ\text{C}$, unless otherwise noted

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

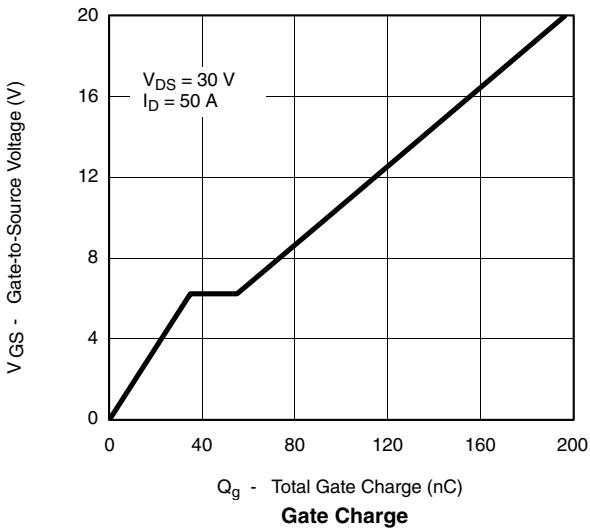
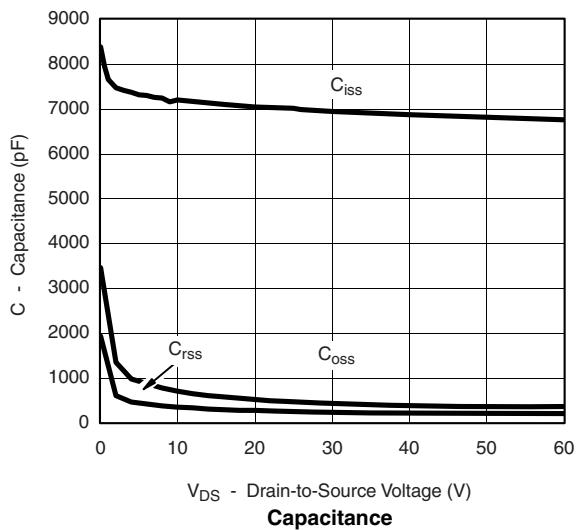
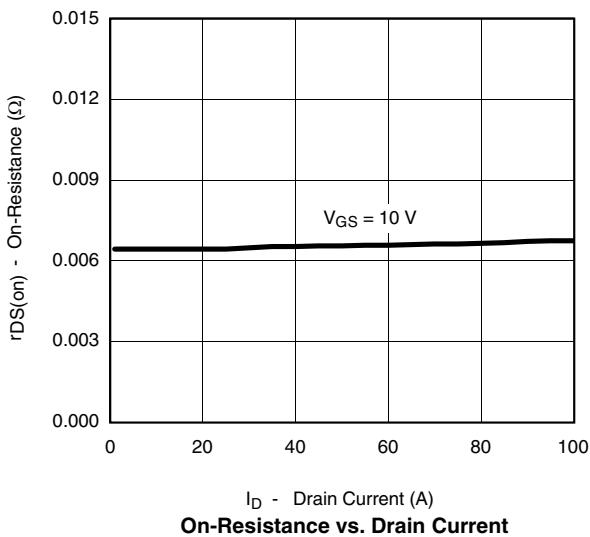
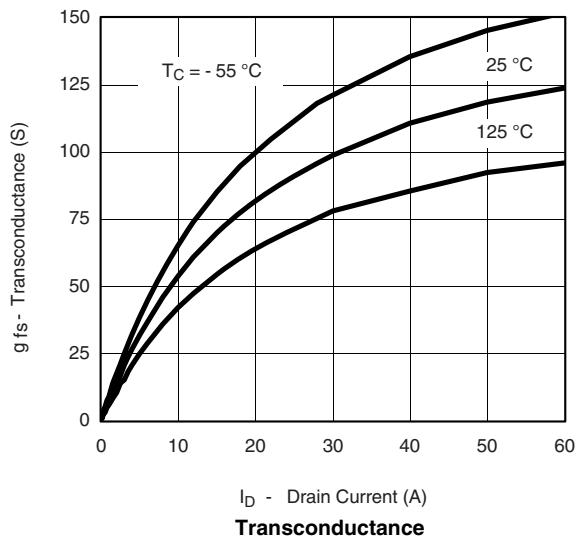
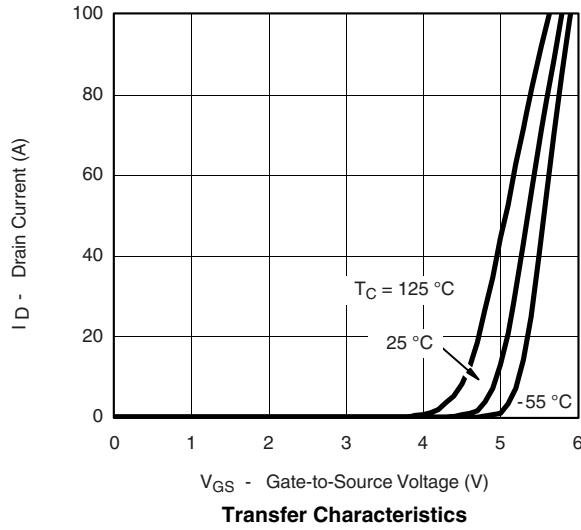
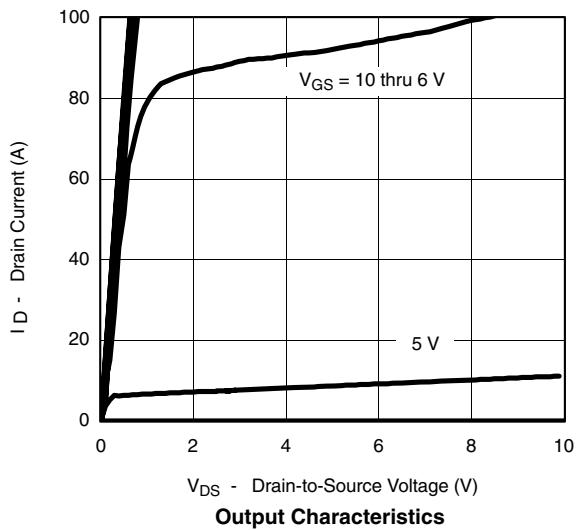
Notes:

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

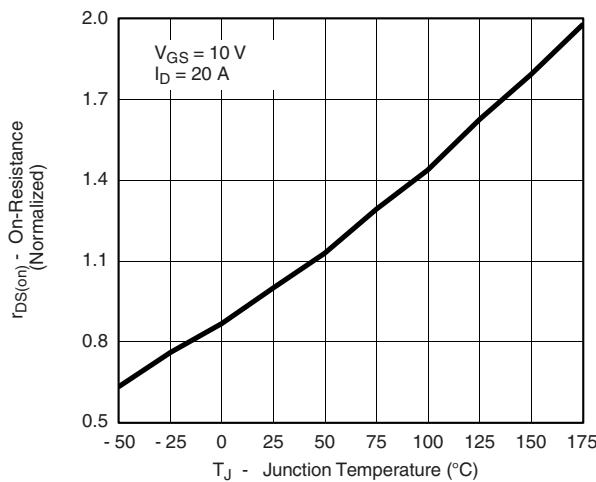
c. Independent of operating temperature.

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.

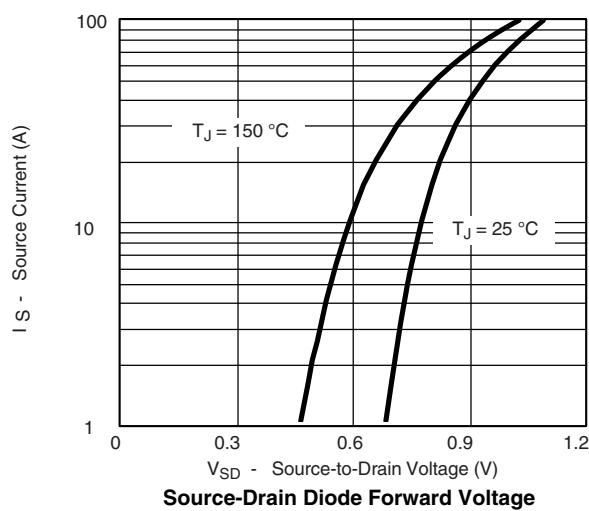
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


SUD50N06-08H

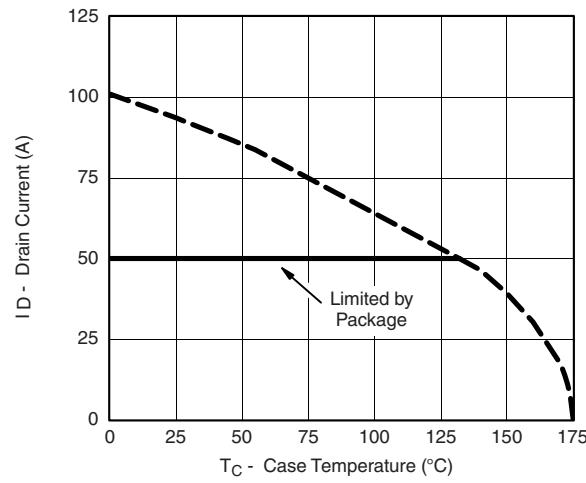
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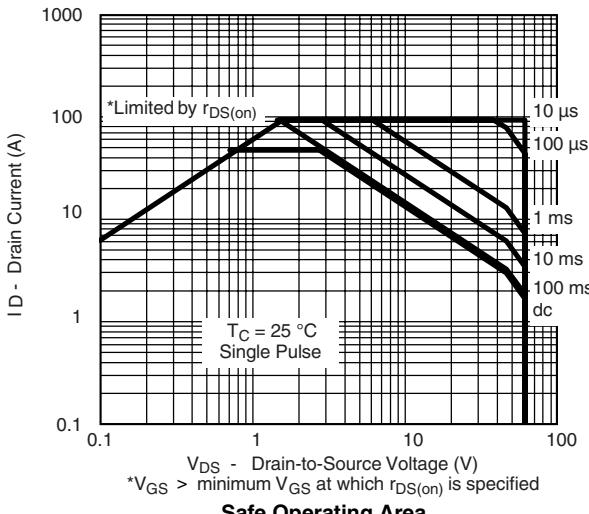
On-Resistance vs. Junction Temperature



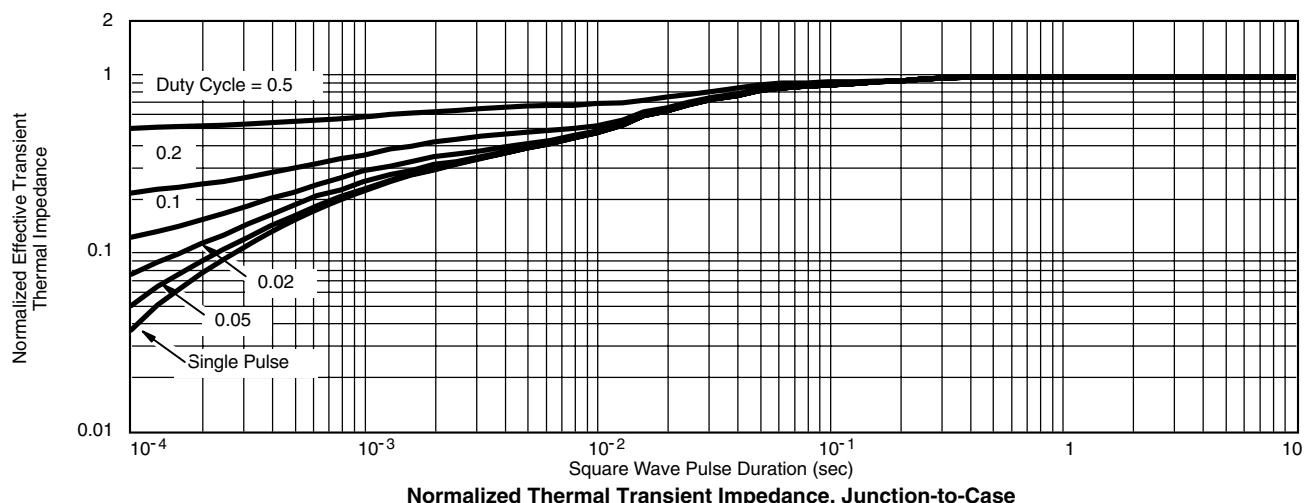
Source-Drain Diode Forward Voltage

 THERMAL RATINGS

Maximum Avalanche Drain Current vs. Case Temperature

* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?73160>.

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