

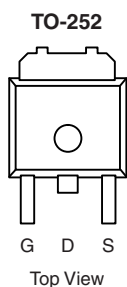
N-Channel 60-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^c
60	0.0074 at $V_{GS} = 10$ V	96
	0.0088 at $V_{GS} = 4.5$ V	88

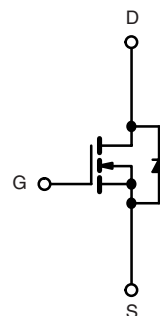
FEATURES

- TrenchFET[®] Power MOSFETS
- 175 °C Junction Temperature


RoHS
COMPLIANT


Drain Connected to Tab

Ordering Information: SUD50N06-07L-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)	I_D	96 ^c	A
		67 ^c	
Pulsed Drain Current	I_{DM}	100	
Single Pulse Avalanche Current	I_{AS}	45	
Single Pulse Repetitive Avalanche Energy ^a	E_{AS}	101	mJ
Power Dissipation	P_D	136	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 ^b	R_{thJA}	15	18	°C/W
		40	50	
Junction-to-Case	R_{thJC}	0.85	1.1	

Notes:

a. Duty cycle ≤ 1 %.

b. Surface Mounted on 1" FR4 board.

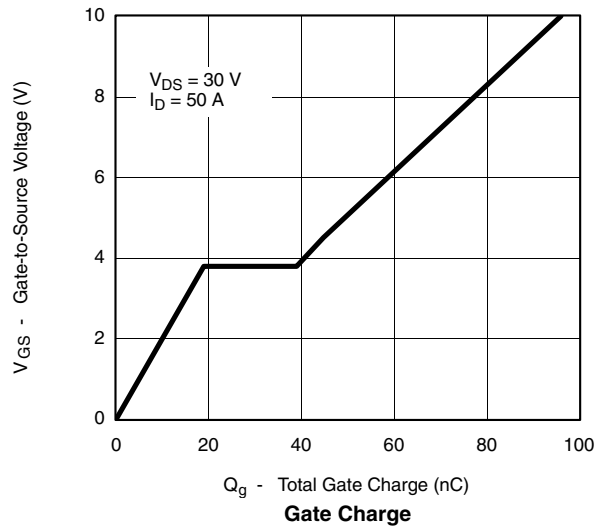
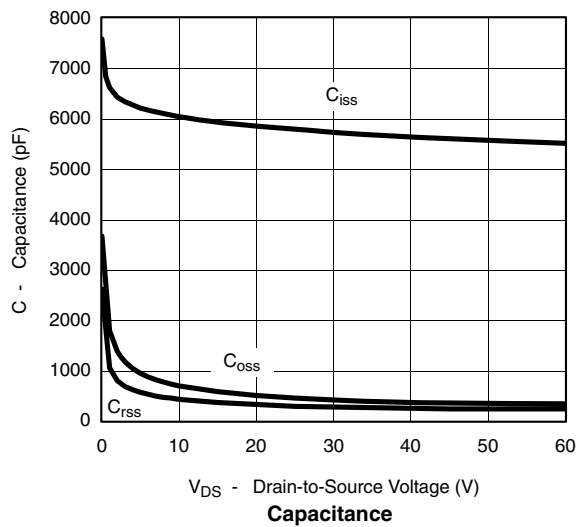
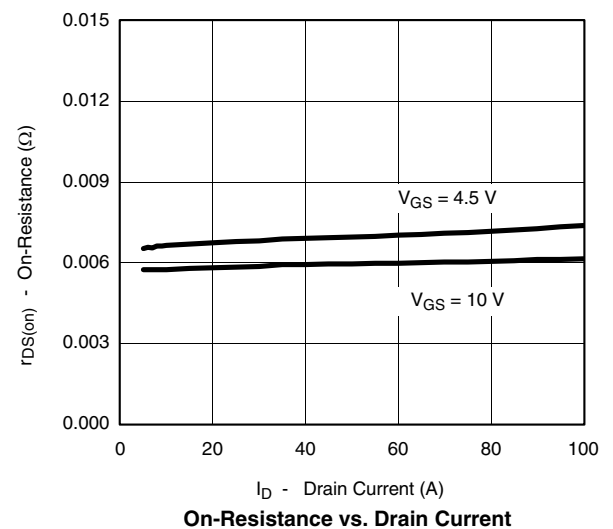
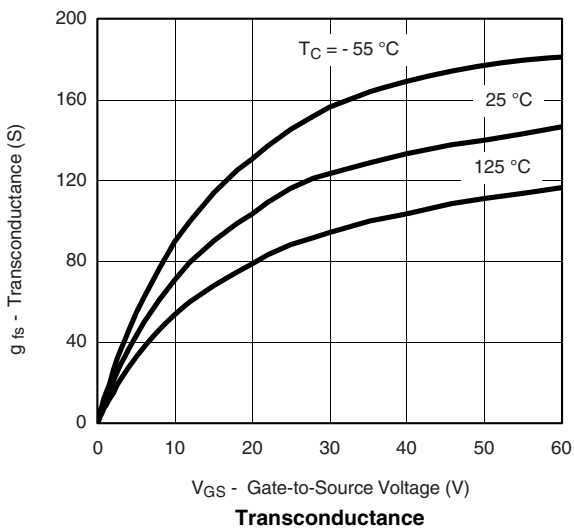
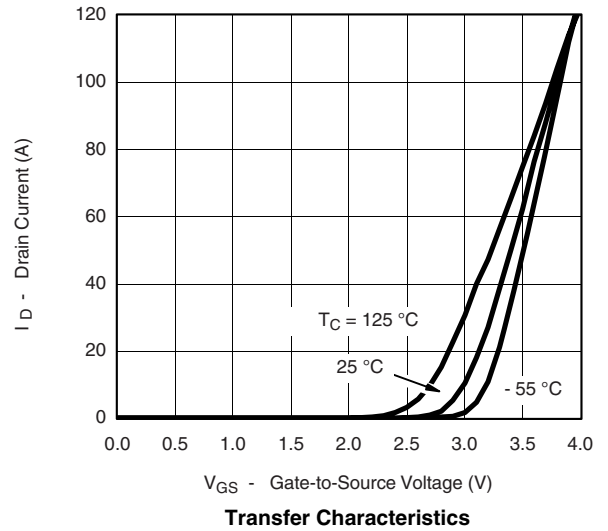
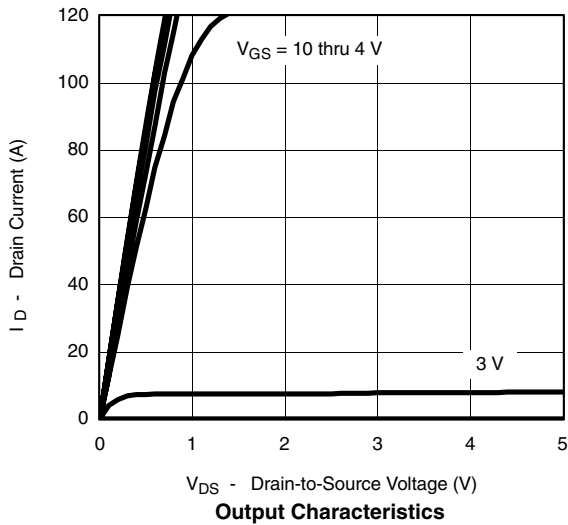
c. Based on maximum allowable Junction Temperature. Package limitation current is 50 A.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	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	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1		3	
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	
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 175\text{ }^{\circ}\text{C}$			150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$		0.0061	0.0074	Ω
		$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$			0.0122	
		$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$, $T_J = 175\text{ }^{\circ}\text{C}$			0.0148	
		$V_{GS} = 4.5\text{ V}$, $I_D = 20\text{ A}$		0.0071	0.0088	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 15\text{ A}$	20	80		S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		5800		pF
Output Capacitance	C_{oss}			450		
Reversen Transfer Capacitance	C_{rss}			300		
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 50\text{ A}$		96	144	nC
Gate-Source Charge ^c	Q_{gs}			19		
Gate-Drain Charge ^c	Q_{gd}			20		
Gate Resistance	R_g			1.5		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 0.6\text{ }\Omega$ $I_D \equiv 50\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 2.5\text{ }\Omega$		15	25	ns
Rise Time ^c	t_r			13	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			62	95	
Fall Time ^c	t_f			14	25	
Source-Drain Diode Ratings and Characteristics $(T_C = 25\text{ }^{\circ}\text{C})^b$						
Continuous Current	I_S				50	A
Pulsed Current	I_{SM}				100	
Forward Voltage ^a	V_{SD}	$I_F = 30\text{ A}$, $V_{GS} = 0\text{ V}$		0.90	1.50	V
Reverse Recovery Time	t_{rr}	$I_F = 30\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		37	55	ns

Notes:

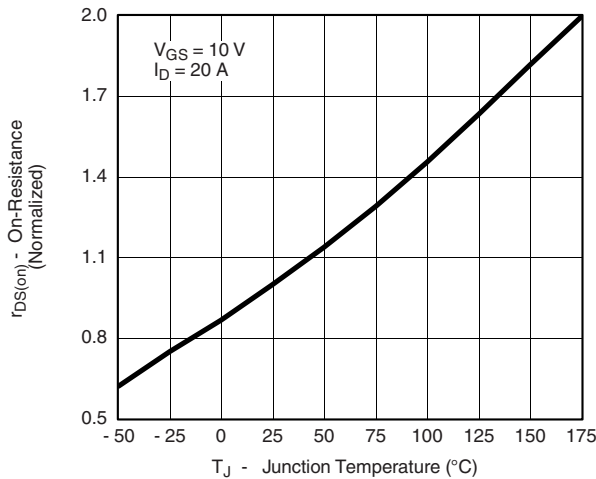
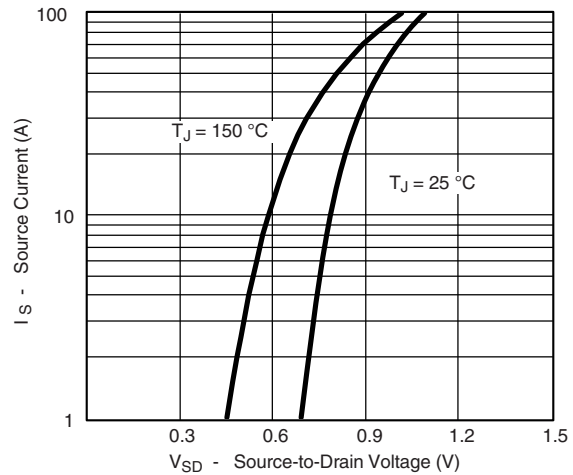
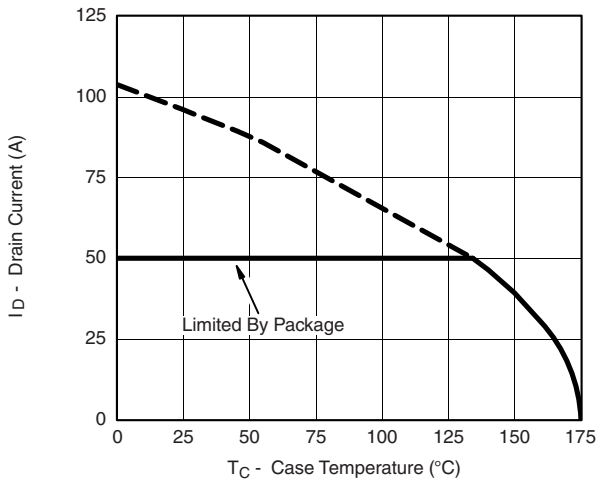
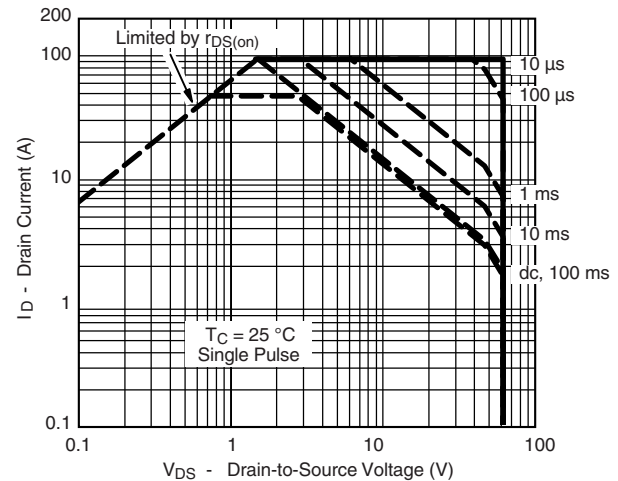
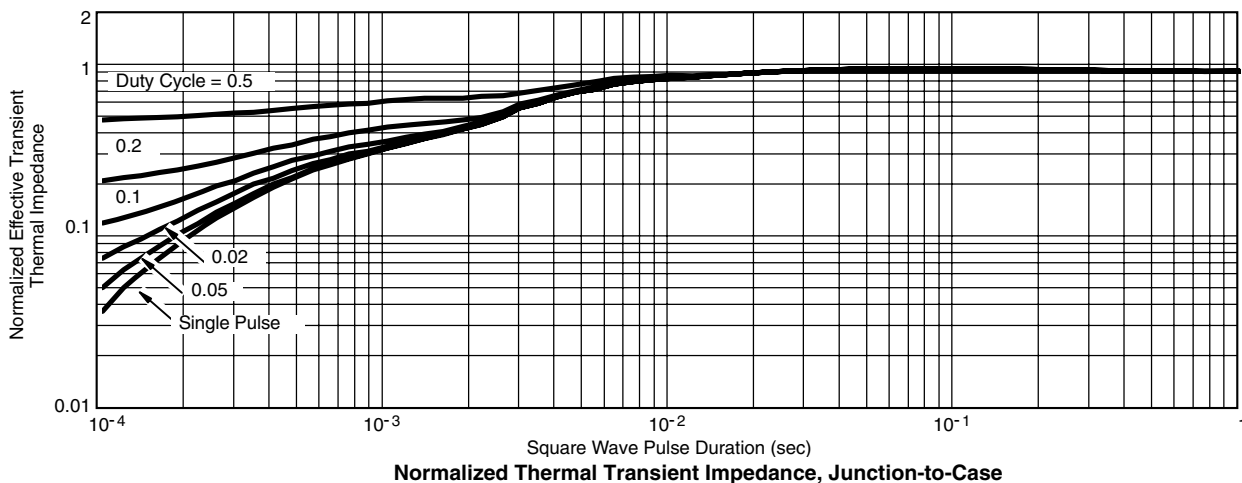
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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

SUD50N06-07L

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**TYPICAL CHARACTERISTICS** 25 °C unless noted**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****THERMAL RATINGS****Maximum Avalanche and Drain Current vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**

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