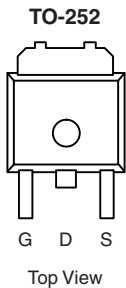


PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a
30	0.011 at V _{GS} = 10 V	50
	0.017 at V _{GS} = 4.5 V	43

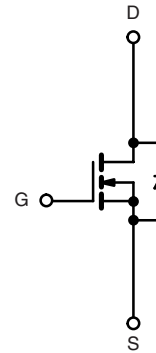
FEATURES

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



Drain Connected to Tab

Ordering Information: SUD50N03-11-E3 (Lead (Pb)-free)



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	I _D	T _C = 25 °C	A
		T _C = 100 °C	
Pulsed Drain Current	I _{DM}	100	
Continuous Source Current (Diode Conduction) ^a	I _S	50	
Maximum Power Dissipation	P _D	T _C = 25 °C	W
		T _A = 25 °C	
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}	t ≤ 10 s	17	20	°C/W
		Steady State	50	60	
Junction-to-Case	R _{thJC}	2	2.4		
Junction-to-Lead	R _{thJL}	4	4.8		

Notes:

- Package limited.
- Surface Mounted on 1" x 1" FR4 board, t ≤ 10 s.
- See SOA curve for voltage derating.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

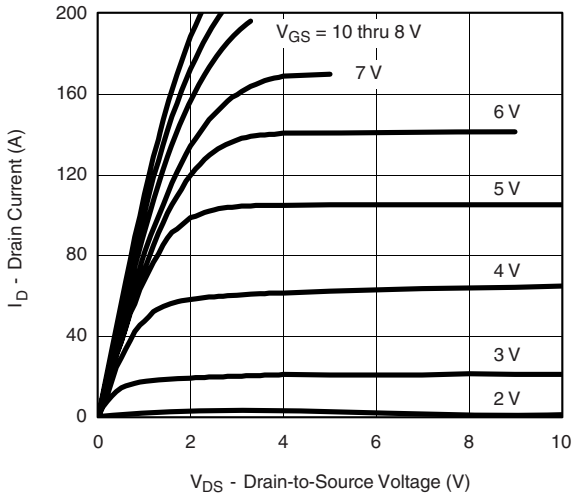
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.8			
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}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 5\text{ V}$	50			A
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		0.009	0.011	Ω
		$V_{GS} = 5\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.018	
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		0.014	0.017	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$	10			S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1130		μF
Output Capacitance	C_{oss}			400		
Reverse Transfer Capacitance	C_{rss}			175		
Total Gate Charge ^c	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 50\text{ A}$		12	20	nC
Gate-Source Charge ^c	Q_{gs}			4		
Gate-Drain Charge ^c	Q_{gd}			4.5		
Gate Resistance	R_g		0.5		3.4	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.3\text{ }\Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\text{ }\Omega$		8	12	ns
Rise Time ^c	t_r			10	15	
Turn-Off Delay Time ^c	$t_{d(off)}$			18	30	
Fall Time ^c	t_f			6	9	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$						
Continuous Current	I_S				50	A
Pulsed Current	I_{SM}				80	
Diode Forward Voltage ^b	V_{SD}	$I_F = 100\text{ A}, V_{GS} = 0\text{ V}$			1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		30	50	ns

Notes:

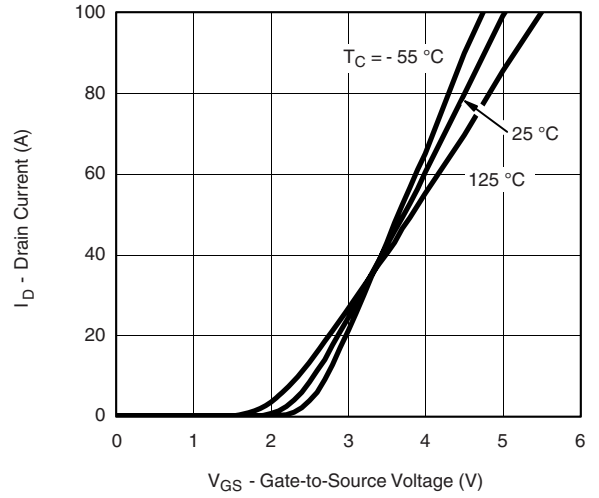
- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Independent of operating temperature.

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.

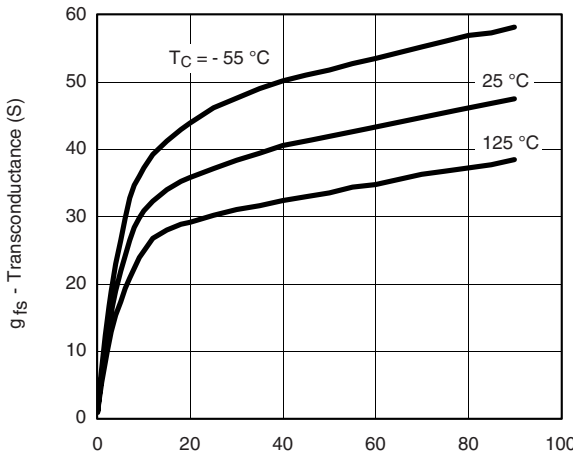
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



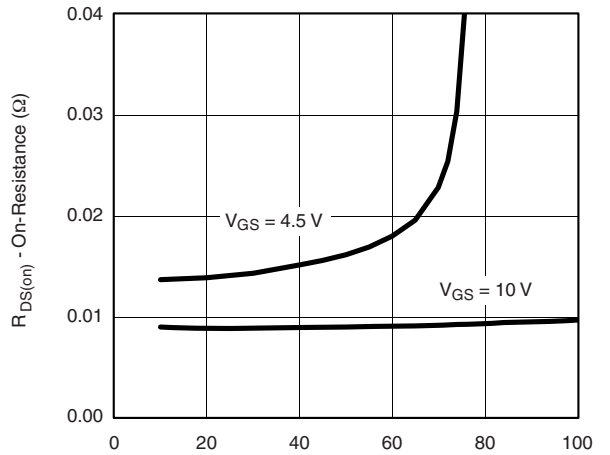
Output Characteristics



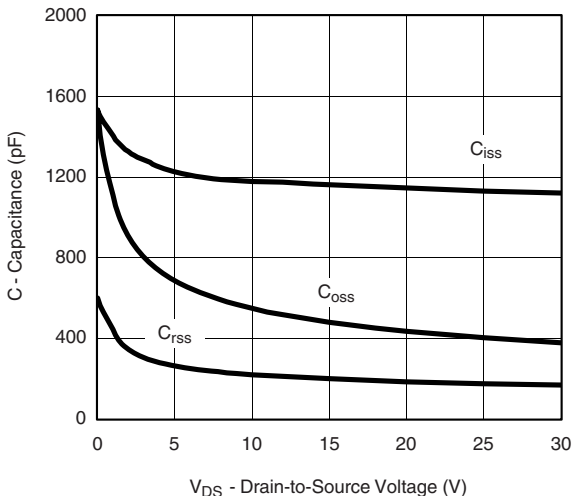
Transfer Characteristics



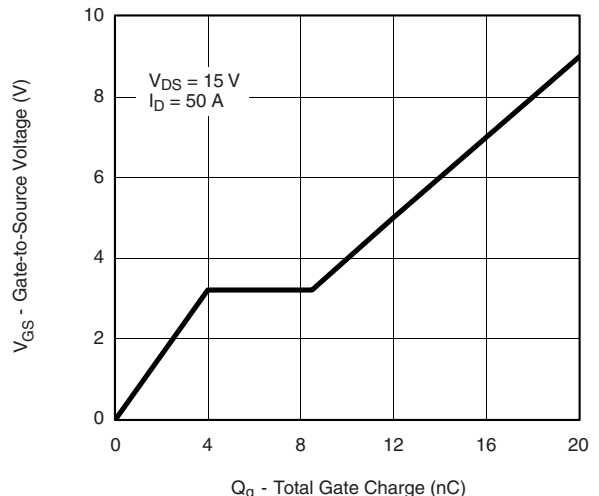
Transconductance



On-Resistance vs. Drain Current

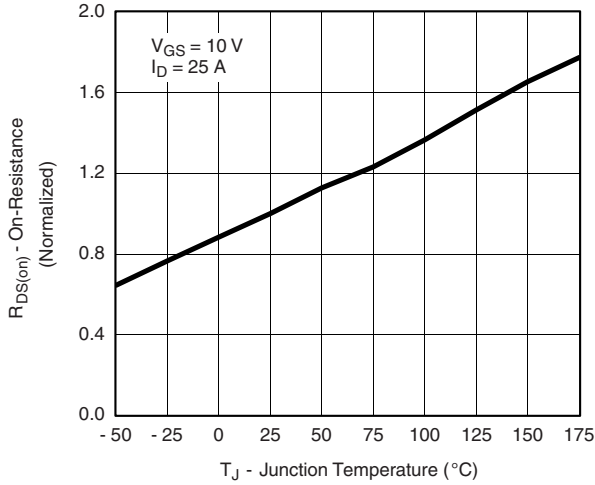


Capacitance

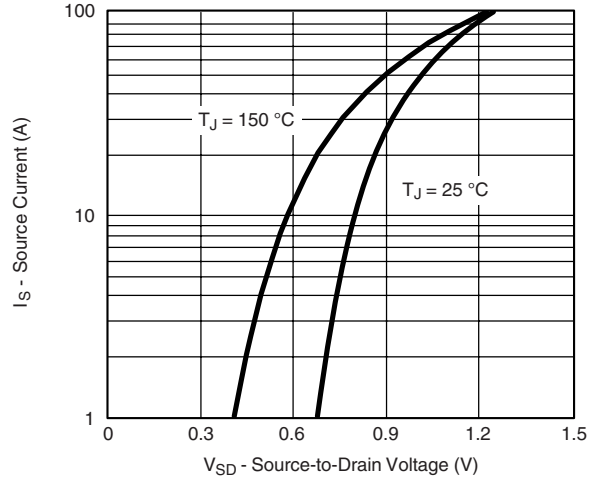


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

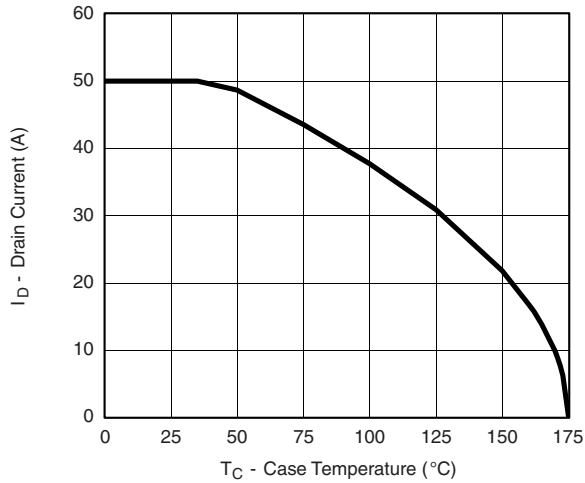


On-Resistance vs. Junction Temperature

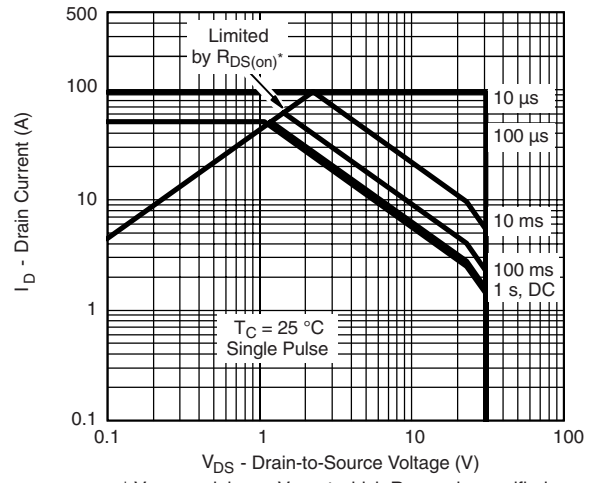


Source-Drain Diode Forward Voltage

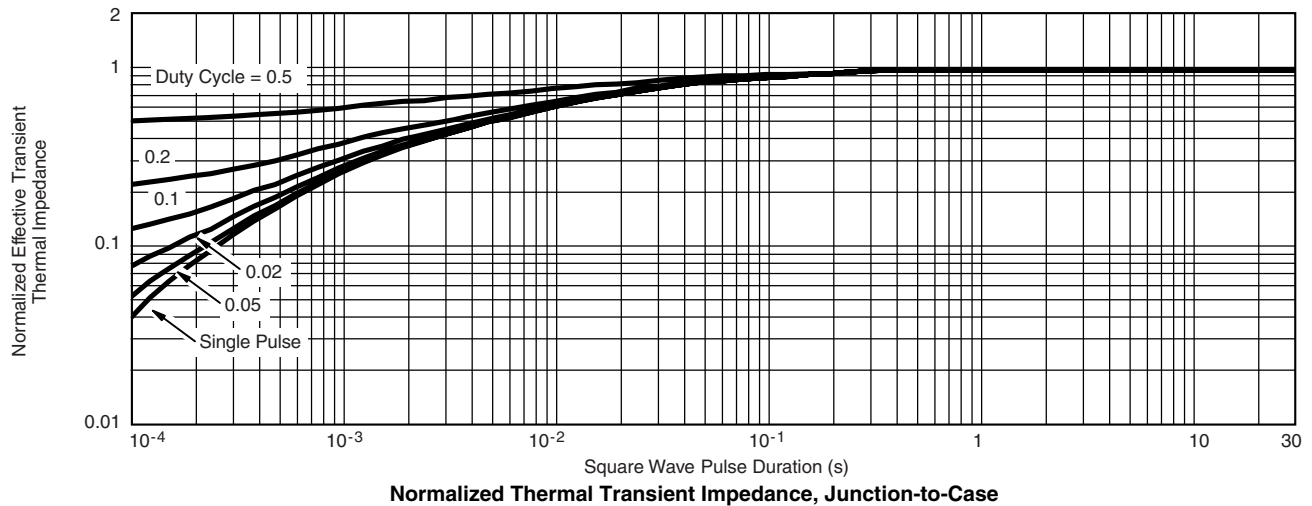
THERMAL RATINGS



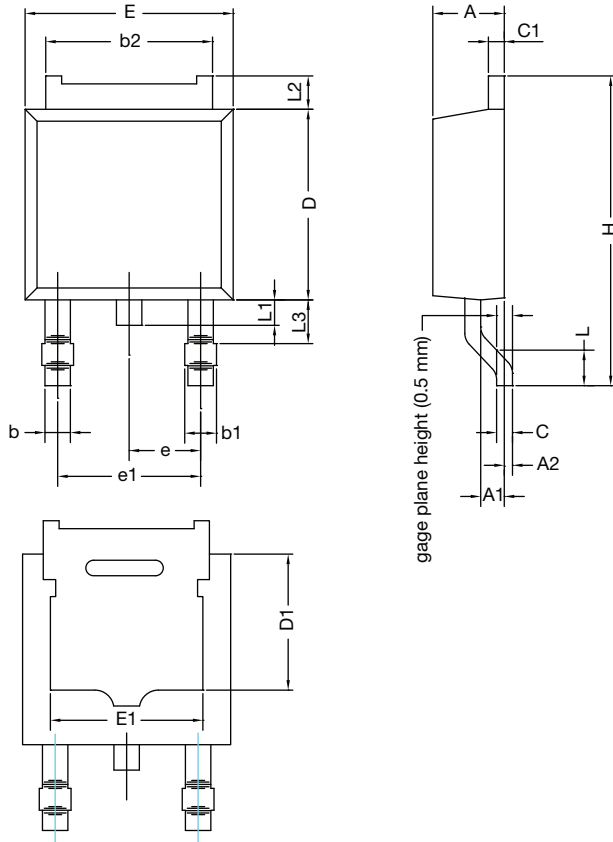
Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



TO-252AA CASE OUTLINE



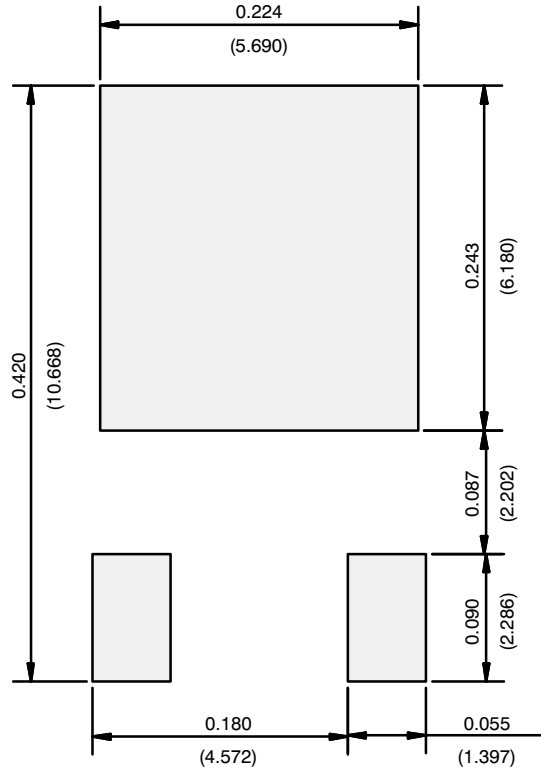
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.21	2.38	0.087	0.094
A1	0.89	1.14	0.035	0.045
A2	0.030	0.127	0.001	0.005
b	0.71	0.88	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.44	0.206	0.214
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.10	4.45	0.161	0.175
E	6.48	6.73	0.255	0.265
E1	4.49	5.50	0.177	0.217
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	1.15	1.52	0.040	0.060

ECN: T11-0110-Rev. L, 18-Apr-11
DWG: 5347

Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

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