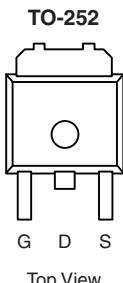


PRODUCT SUMMARY		
V_{DS} (V)	R_{DS(on)} (Ω)	I_D (A)
100	0.025 at V _{GS} = 10 V	40
	0.028 at V _{GS} = 4.5 V	38

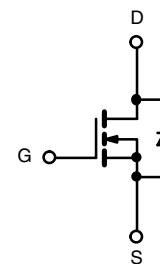
FEATURES

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



Drain Connected to Tab

Top View


 Ordering Information: SUD40N10-25
 SUD40N10-25-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}	100	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C) ^b	T _C = 25 °C	I _D	A
	T _C = 125 °C	23	
Pulsed Drain Current	I _{DM}	70	A
Continuous Source Current (Diode Conduction)	I _S	40	
Avalanche Current	I _{AS}	40	mJ
Single Pulse Avalanche Energy (Duty Cycle ≤ 1 %)	E _{AS}	80	
Maximum Power Dissipation	T _C = 25 °C	P _D	W
	T _A = 25 °C	136 ^b	
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}	15	18	°C/W	
		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.

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

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_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	100			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1.0		3.0	
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}	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0 \text{ V}$		1		μA
		$V_{DS} = 100 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$		50		
		$V_{DS} = 100 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$		250		
On-State Drain Current ^b	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	70			A
Drain-Source On-State Resistance ^b	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$		0.02	0.025	Ω
		$V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$, $T_J = 125^\circ\text{C}$			0.05	
		$V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$, $T_J = 175^\circ\text{C}$			0.063	
		$V_{GS} = 4.5 \text{ V}$, $I_D = 20 \text{ A}$		0.022	0.028	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 40 \text{ A}$		70		S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 25 \text{ V}$, $F = 1 \text{ MHz}$		2400		pF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{rss}			120		
Total Gate Charge ^c	Q_g	$V_{DS} = 50 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 40 \text{ A}$		40	60	nC
Gate-Source Charge ^c	Q_{gs}			11		
Gate-Drain Charge ^c	Q_{gd}			9		
Gate Resistance	R_g		1		3.5	Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}$, $R_L = 1.25 \Omega$ $I_D \geq 40 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 2.5 \Omega$		8	13	ns
Rise Time ^c	t_r			40	60	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			15	25	
Fall Time ^c	t_f			80	120	
Source-Drain Diode Ratings and Characteristics $T_C = 25^\circ\text{C}$						
Pulsed Current	I_{SM}				70	A
Diode Forward Voltage ^b	V_{SD}	$I_F = 40 \text{ A}$, $V_{GS} = 0 \text{ V}$		1.0	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 40 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$		75	120	ns

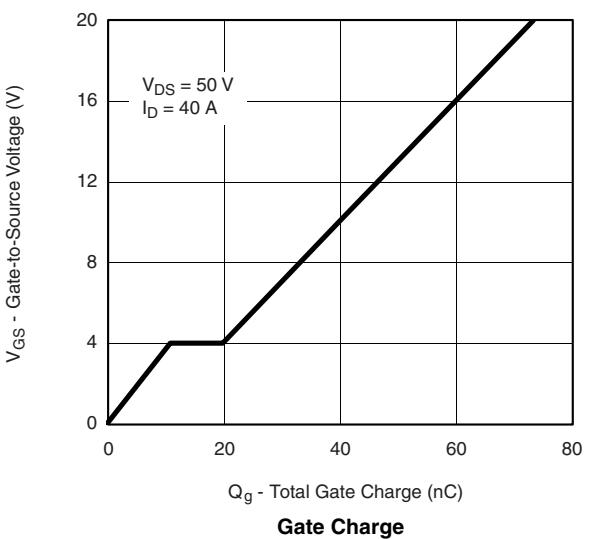
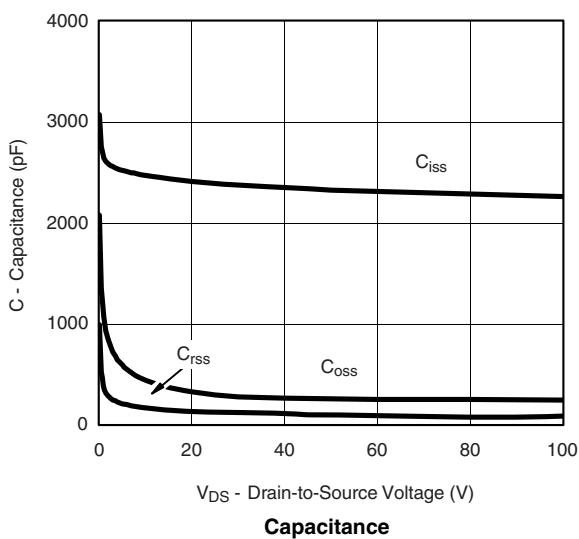
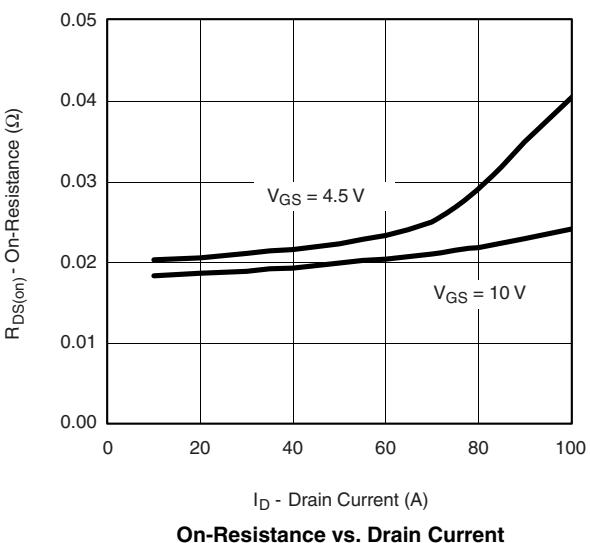
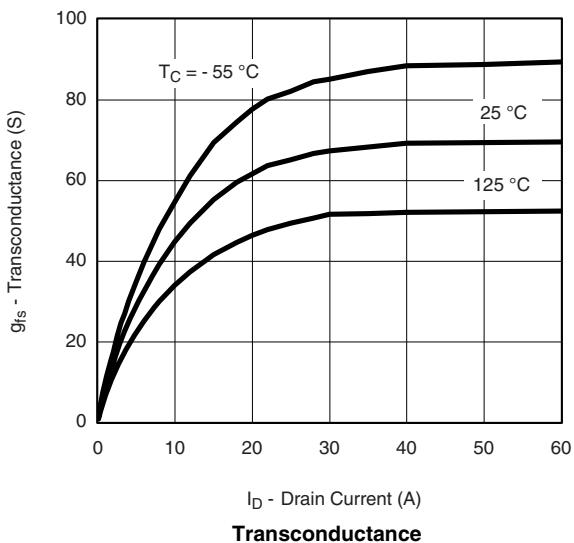
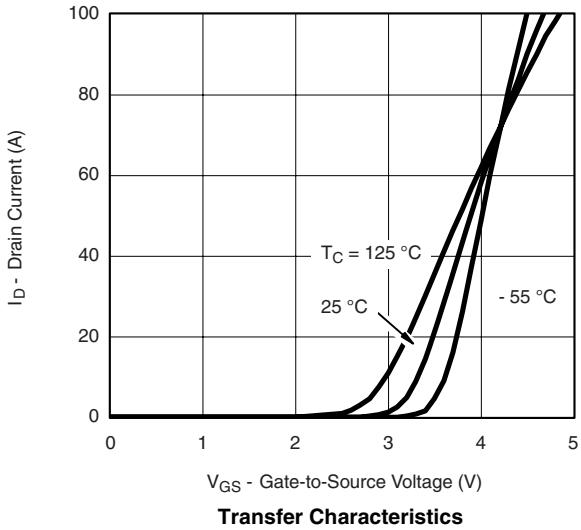
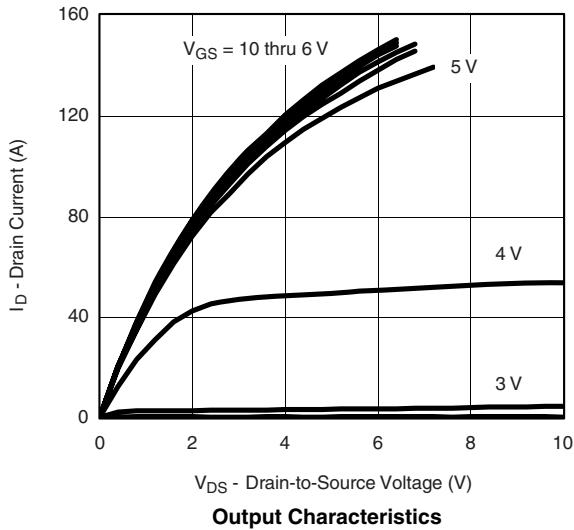
Notes:

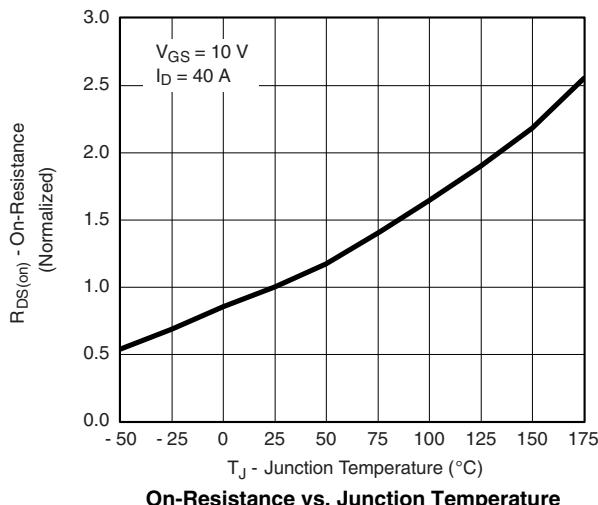
a. Guaranteed by design, not subject to production testing.

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

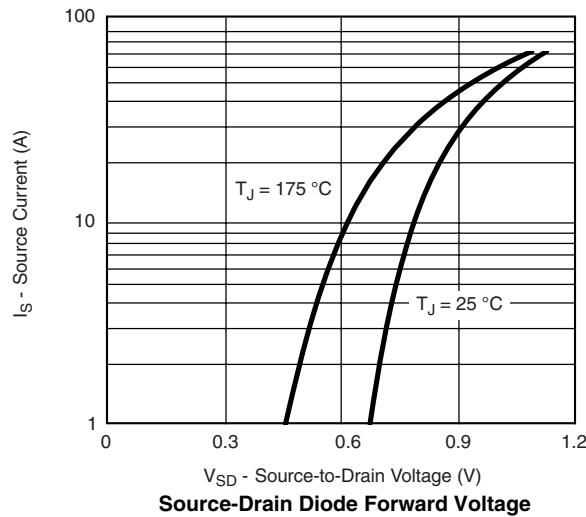
c. Independent of operating temperature.

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.

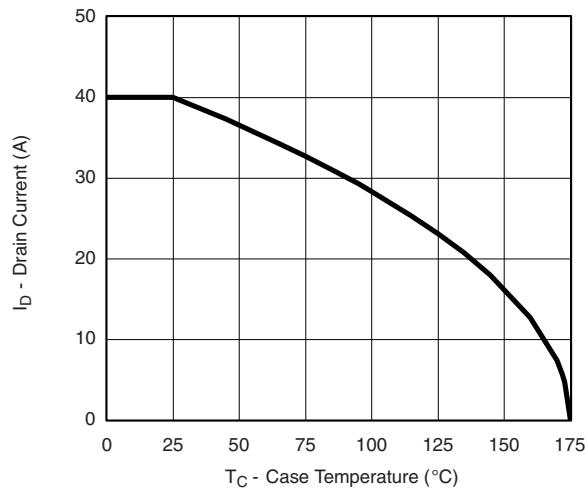
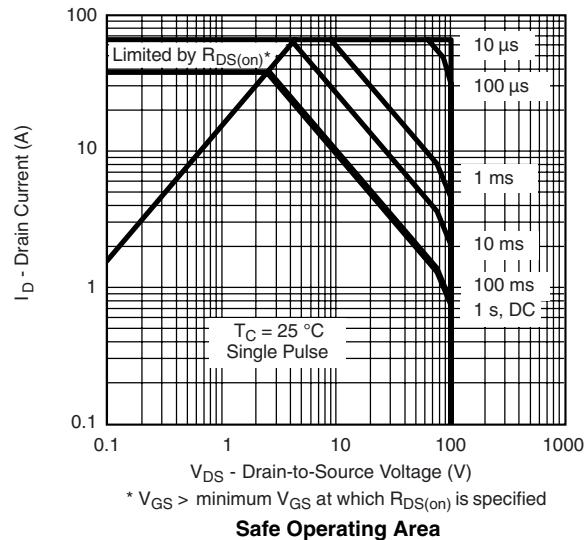
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


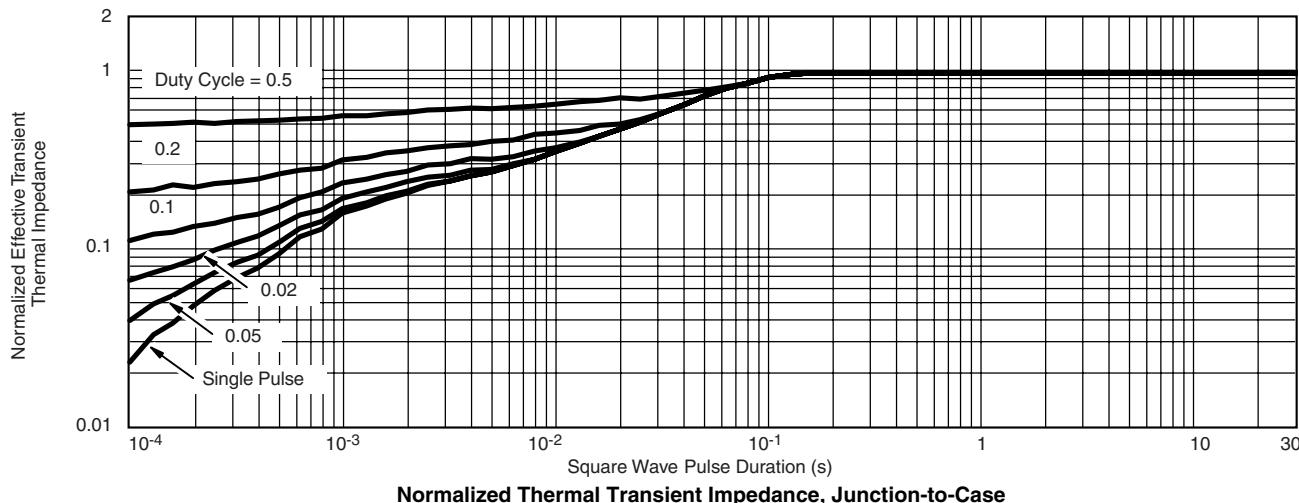
On-Resistance vs. Junction Temperature



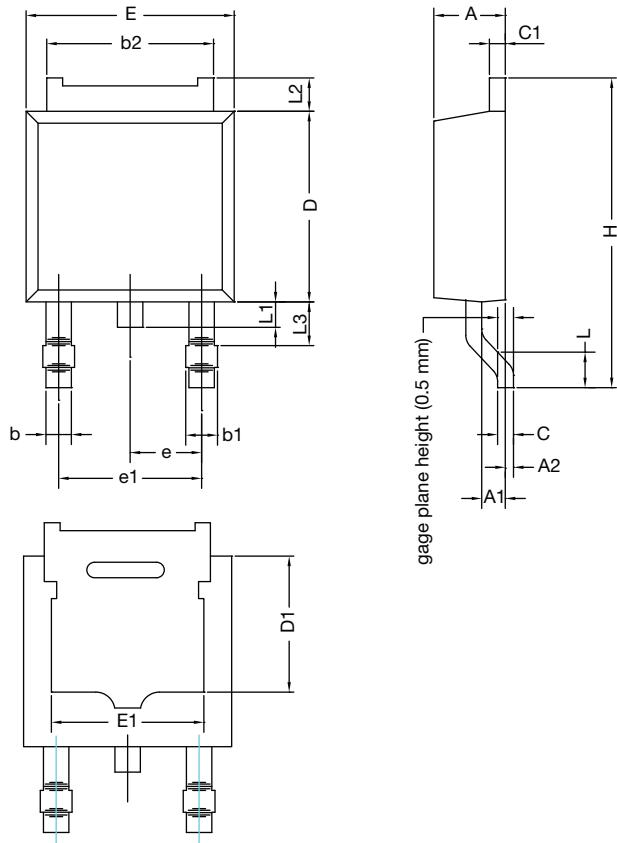
Source-Drain Diode Forward Voltage

THERMAL RATINGS

 Maximum Avalanche Drain Current
 vs. Case Temperature


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA CASE OUTLINE


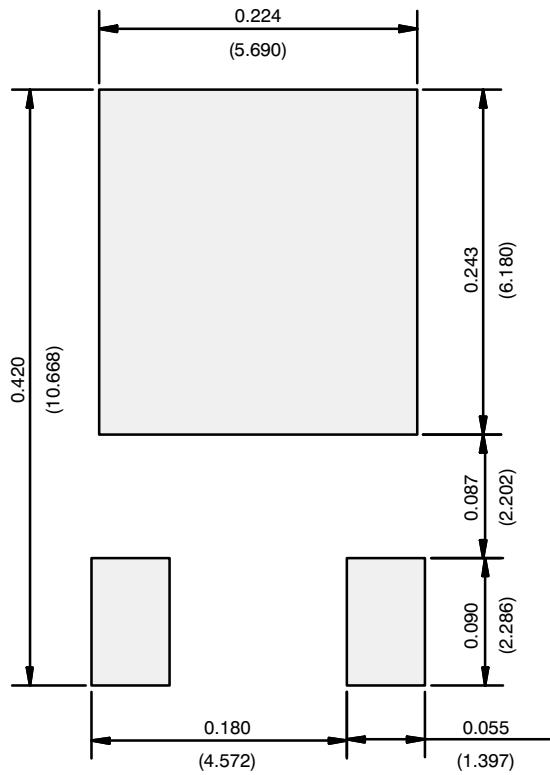
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.21	2.38	0.087	0.094
A1	0.89	1.14	0.035	0.045
A2	0.030	0.127	0.001	0.005
b	0.71	0.88	0.028	0.035
b1	0.76	1.14	0.030	0.045
b2	5.23	5.44	0.206	0.214
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.10	4.45	0.161	0.175
E	6.48	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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