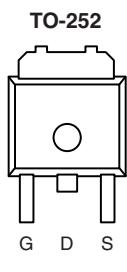


P-Channel 100-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
- 100	0.043 at $V_{GS} = - 10$ V	- 37	54 nC
	0.048 at $V_{GS} = - 4.5$ V	- 35	

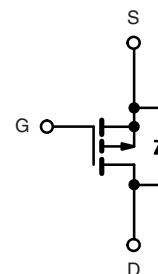
FEATURES

- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT


Drain Connected to Tab

Top View



Ordering Information: SUD50P10-43L-E3 (Lead (Pb)-free)

P-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	- 37.1 ^a	
	$T_C = 125$ °C		- 31 ^a	
	$T_A = 25$ °C		- 9.2 ^{b, c}	
	$T_A = 125$ °C		- 7.7 ^{b, c}	
Pulsed Drain Current		I_{DM}	- 40	A
Continuous Source Current (Diode Conduction)	$T_C = 25$ °C	I_S	- 50 ^a	
	$T_A = 25$ °C		- 6.9 ^{b, c}	
Avalanche Current		I_{AS}	- 35	
Single Pulse Avalanche Energy	$L = 0.1$ mH	E_{AS}	61	mJ
Maximum Power Dissipation	$T_C = 25$ °C	P_D	136	W
	$T_C = 70$ °C		95	
	$T_A = 25$ °C		8.3 ^{b, c}	
	$T_A = 70$ °C		5.8 ^{b, 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 ^a	$t \le 10$ s	R_{thJA}	15	18	°C/W
	Steady State		40	50	
Junction-to-Case (Drain)		R_{thJC}	0.85	1.1	

Notes:

- Package limited.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under Steady State conditions is 40 °C/W.

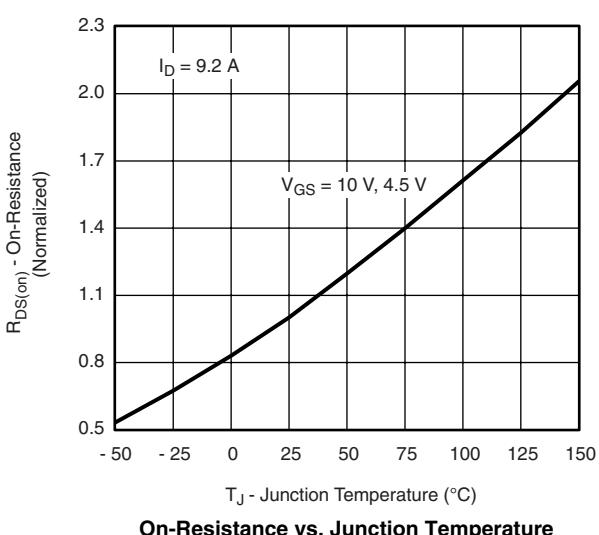
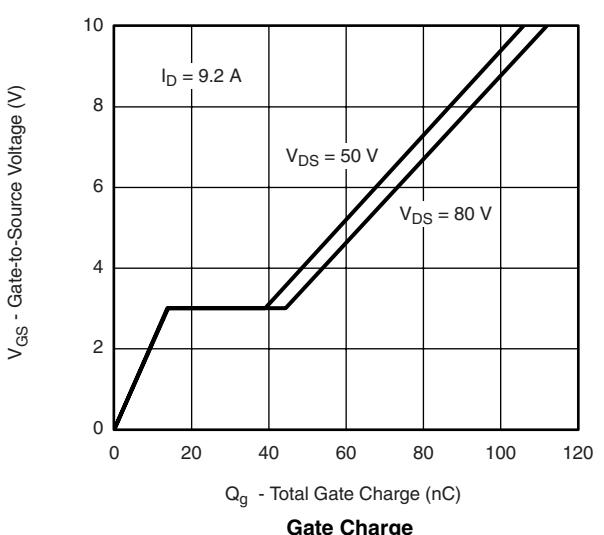
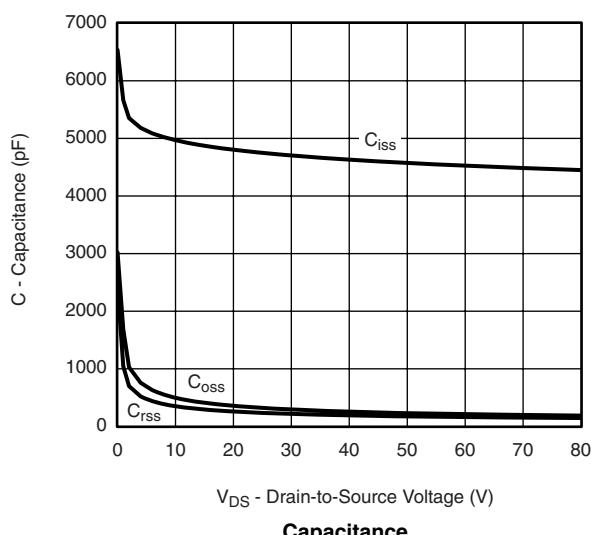
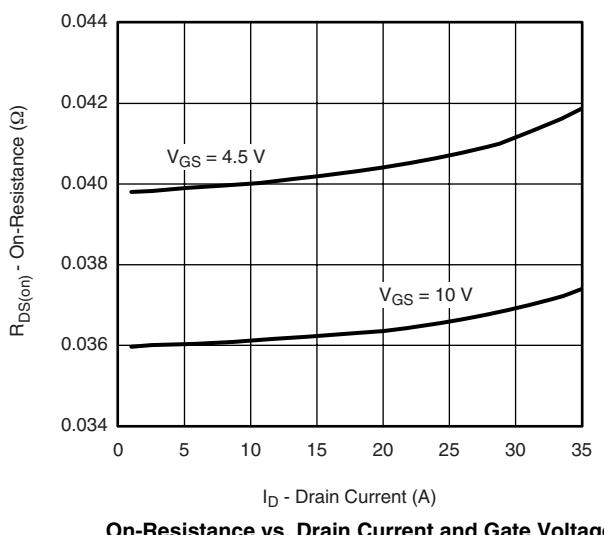
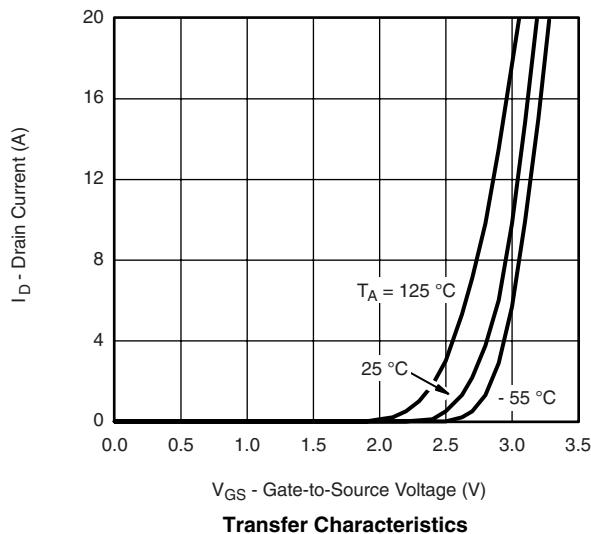
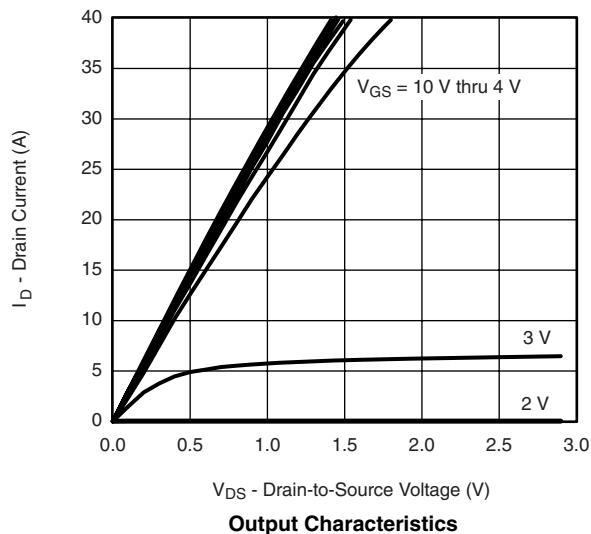
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = -250 \mu\text{A}$	-100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250 \mu\text{A}$		-109		$\text{mV/}^\circ\text{C}$
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			5.9		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	-1		-3	V
Gate-Source 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
		$V_{DS} = -100 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = -10 \text{ V}$	-40			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}$, $I_D = -9.2 \text{ A}$		0.036	0.043	Ω
		$V_{GS} = -4.5 \text{ V}$, $I_D = -7.7 \text{ A}$		0.040	0.048	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}$, $I_D = -9.2 \text{ A}$		38		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -50 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		4600		pF
Output Capacitance	C_{oss}			230		
Reverse Transfer Capacitance	C_{rss}			175		
Total Gate Charge	Q_g	$V_{DS} = -50 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -9.2 \text{ A}$		106	160	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = -50 \text{ V}$, $V_{GS} = -4.5 \text{ V}$, $I_D = -9.2 \text{ A}$		54	81	
Gate-Drain Charge	Q_{gd}			14		
Gate Resistance	R_g		$f = 1 \text{ MHz}$	26		
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = -50 \text{ V}$, $R_L = 6.5 \Omega$ $I_D \equiv -7.7 \text{ A}$, $V_{GEN} = -10 \text{ V}$, $R_g = 1 \Omega$		4		Ω
Rise Time	t_r			15	25	ns
Turn-Off Delay Time	$t_{d(\text{off})}$			20	30	
Fall Time	t_f			110	165	
Turn-On Delay Time	$t_{d(\text{on})}$			100	150	ns
Rise Time	t_r			42	65	
Turn-Off Delay Time	$t_{d(\text{off})}$			160	240	
Fall Time	t_f			100	150	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			-50	A
Pulse Diode Forward Current ^a	I_{SM}				-40	
Body Diode Voltage	V_{SD}	$I_S = -7.7 \text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -7.7 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		60	90	ns
Body Diode Reverse Recovery Charge	Q_{rr}			150	225	nC
Reverse Recovery Fall Time	t_a			46		ns
Reverse Recovery Rise Time	t_b			14		

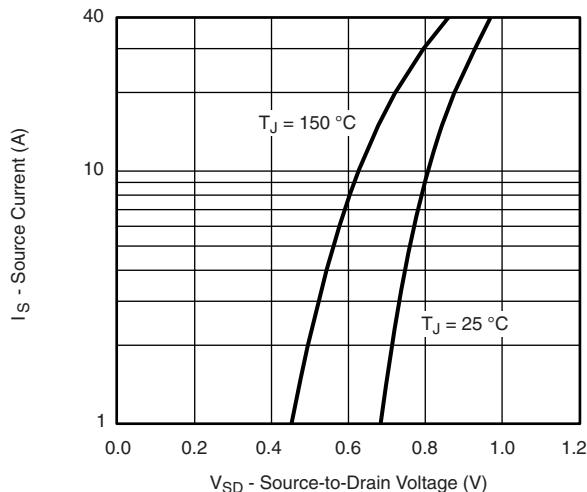
Notes:

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

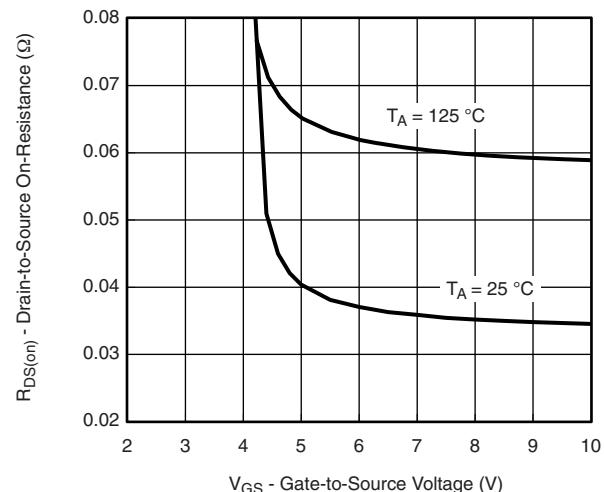
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


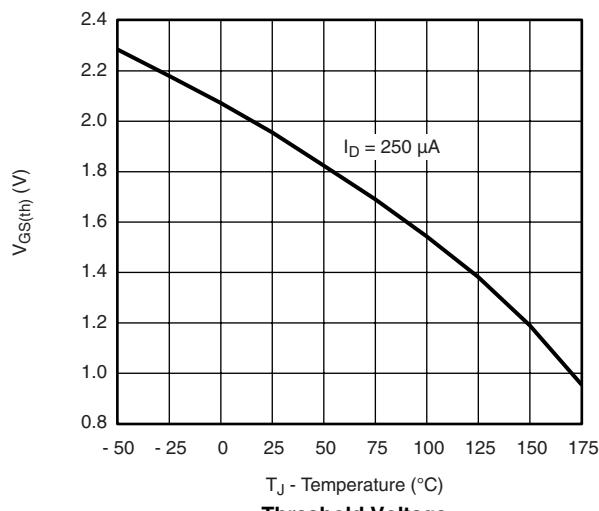
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



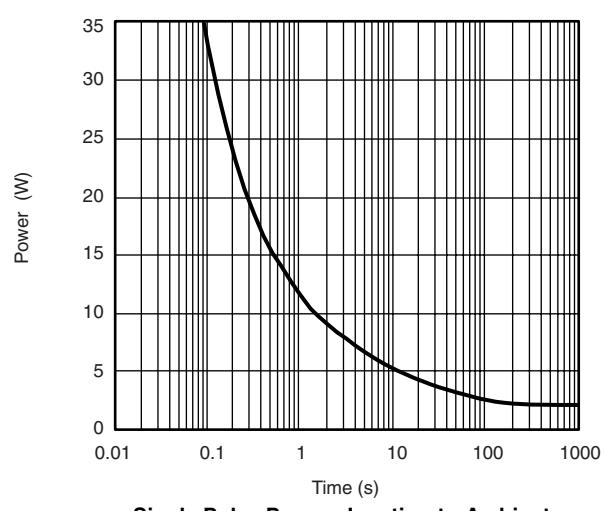
Source-Drain Diode Forward Voltage



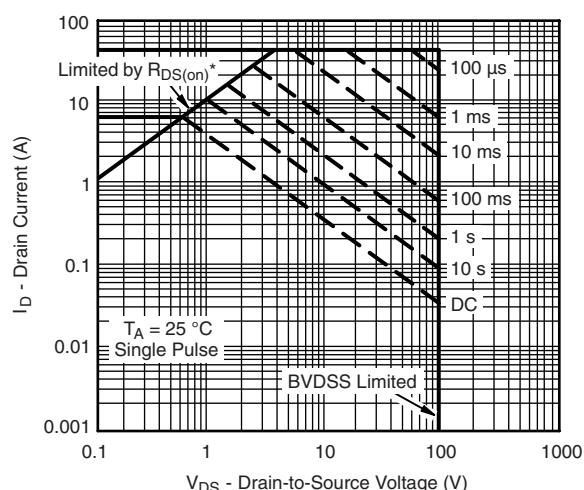
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

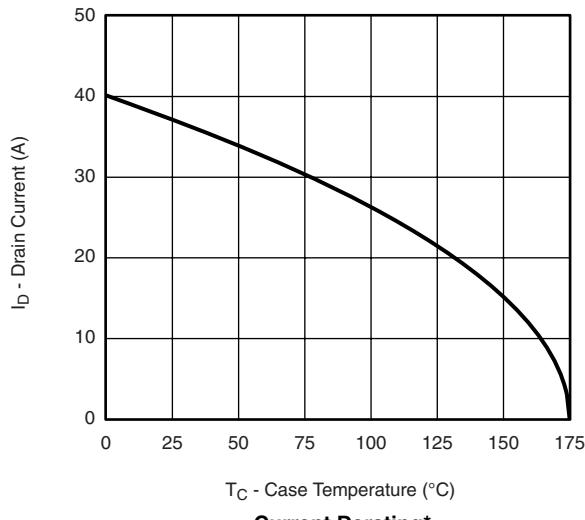
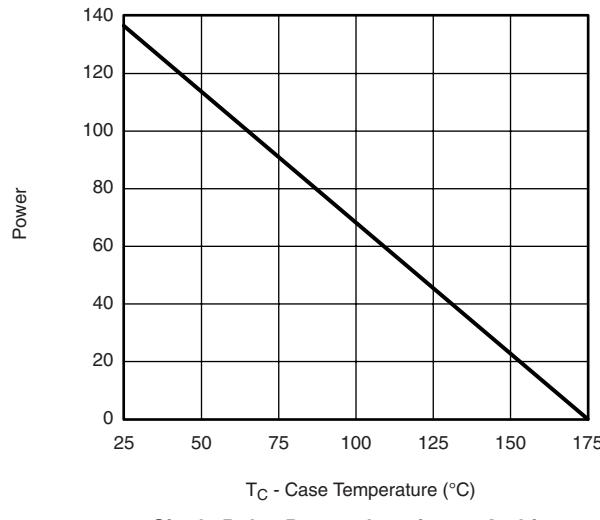
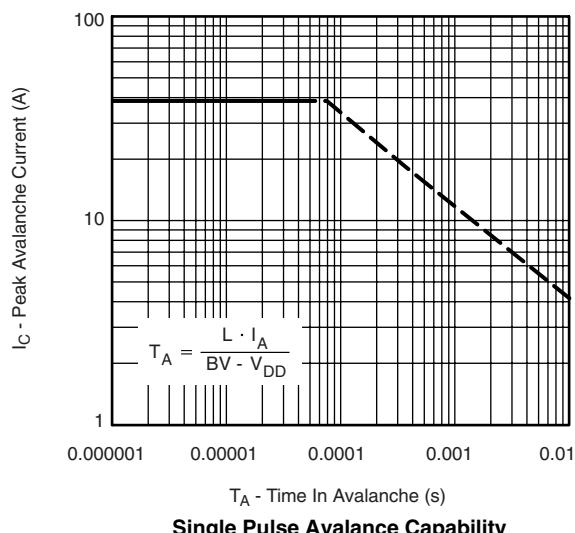


Single Pulse Power, Junction-to-Ambient

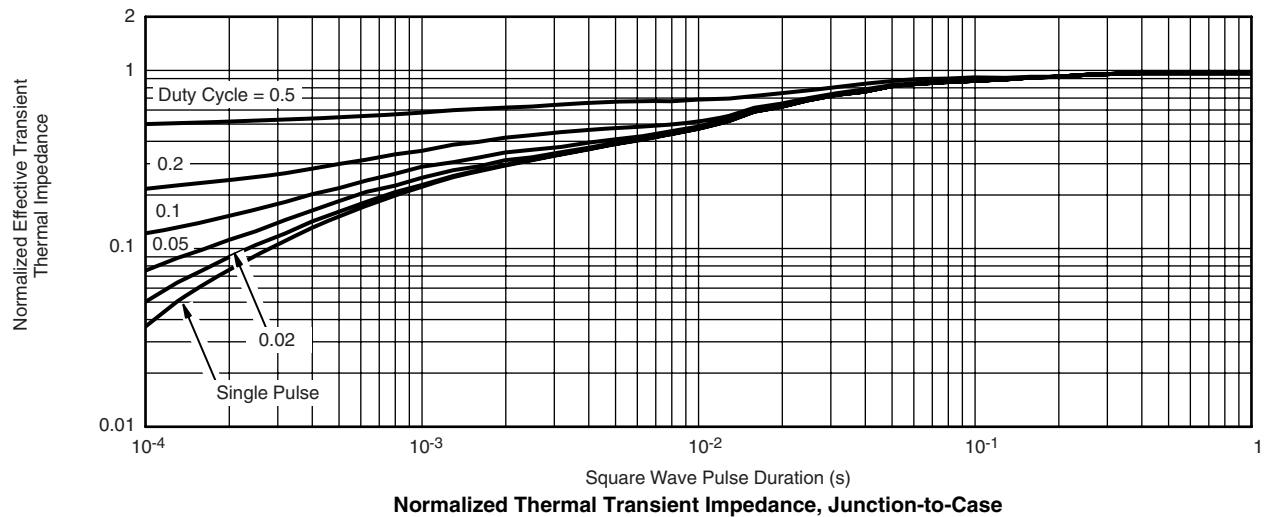
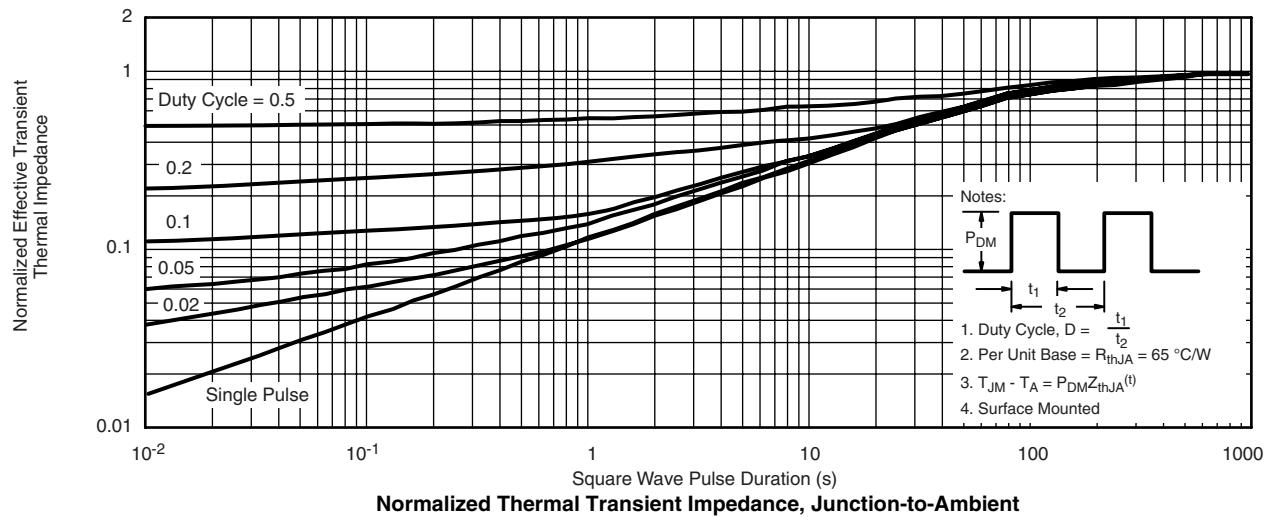


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

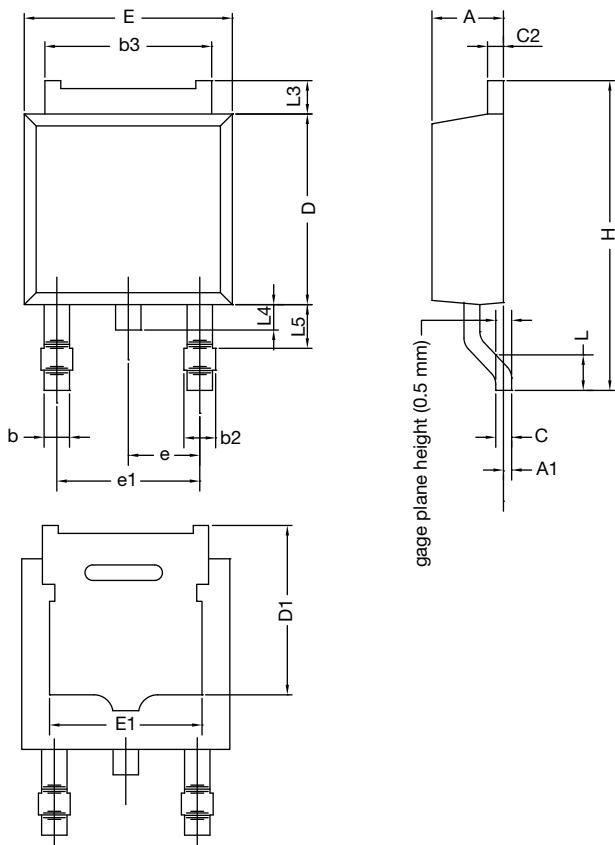
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Current Derating*

Single Pulse Power, Junction-to-Ambient

Single Pulse Avalanche Capability

* The power dissipation P_D is based on T_{J(max)} = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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 www.vishay.com/ppg?73444.

TO-252AA CASE OUTLINE



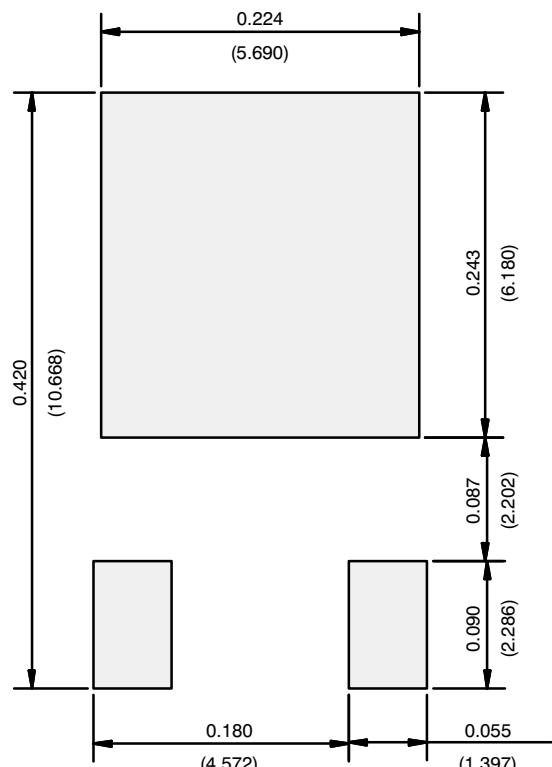
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060

ECN: X12-0247-Rev. M, 24-Dec-12
DWG: 5347

Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



**Recommended Minimum Pads
Dimensions in Inches/(mm)**

[Return to Index](#)

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.