

Vishay Siliconix

N-Channel 100-V (D-S) MOSFET

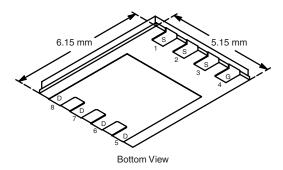
PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a	Q _g (Typ.)		
100	0.0306 at V _{GS} = 10 V	28.4	15.5 nC		
	0.0327 at V _{GS} = 7.5 V	27.5	13.5110		

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



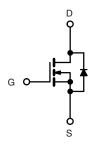
PowerPAK SO-8



Ordering Information: SiR432DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

APPLICATIONS

Primary Side Switch



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS	S T _A = 25 °C, unle	ss otherwise not	ed		
Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V_{DS}	100	V	
Gate-Source Voltage		V_{GS}	± 20]	
	T _C = 25 °C		28.4		
Continuous Drain Current (T _{.I} = 150 °C)	T _C = 70 °C		22.7		
Continuous Diam Current (1) = 130 C)	T _A = 25 °C	I _D	8.6 ^{b, c}		
	T _A = 70 °C		6.9 ^{b, c}		
Pulsed Drain Current		I _{DM}	40	A	
Continuous Course Prain Diade Current	T _C = 25 °C	I-	40 ^g		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	4.2 ^{b, c}		
Avalanche Current	L = 0.1 mH	I _{AS}	17	mJ	
Single-Pulse Avalanche Energy	L=0.1 mn	E _{AS}	14.5		
	T _C = 25 °C		54		
Maximum Power Dissipation	T _C = 70 °C	P _D	34.7	w	
Maximum Power Dissipation	T _A = 25 °C	' b	5.0 ^{b, c}		
	T _A = 70 °C		3.2 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C	
Soldering Recommendations (Peak Temperature) ^{d, e}			260		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, f}	t ≤ 10 s	R_{thJA}	20	25	°C/W	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.8	2.3	- C/VV	

Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. t = 10 s.
- d. See Solder Profile (www.vishay.com/ppg?73257). The PowerPAK SO-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- e. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
- f. Maximum under Steady State conditions is 65 °C/W.

SiR432DP

Vishay Siliconix



SPECIFICATIONS $T_J = 25 ^{\circ}C_1$, unless oth	nerwise noted					
Parameter	Symbol	Test Conditions	Min.	Тур.	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 μA		100		mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	ι _D = 250 μΑ		- 8.6			
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2		4	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
Zovo Coto Voltago Desig Occurrent	I	V _{DS} = 100 V, V _{GS} = 0 V			1	μА	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V, T _J = 55 °C			10		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le 5 \text{ V}, V_{GS} = 10 \text{ V}$	40			Α	
	D.	$V_{GS} = 10 \text{ V}, I_D = 8.6 \text{ A}$		0.0255	0.0306	Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 7.5 \text{ V}, I_D = 8.3 \text{ A}$		0.0272	0.0327		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 8.6 A		38		S	
Dynamic ^b				•	l .		
Input Capacitance	C _{iss}			1170		pF	
Output Capacitance	C _{oss}	$V_{DS} = 50 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		115			
Reverse Transfer Capacitance	C _{rss}			45			
Total Gate Charge	Q_g $V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 8.6 \text{ A}$ $V_{DS} = 50 \text{ V}, V_{GS} = 7.5 \text{ V}, I_D = 8.6 \text{ A}$	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 8.6 \text{ A}$		21	32	nC	
Total date offarge				15.5	24		
Gate-Source Charge			5.9		nC		
Gate-Drain Charge	Q_{gd}			5.4			
Gate Resistance	R_g	f = 1 MHz	0.2	0.9	1.8	Ω	
Turn-On Delay Time	t _{d(on)}			12	20	ns	
Rise Time	t _r	$V_{DD} = 50 \text{ V, } R_L = 7.2 \Omega$ $I_D \cong 6.9 \text{ A, } V_{GEN} = 10 \text{ V, } R_g = 1 \Omega$		10	20		
Turn-Off Delay Time	t _{d(off)}			20	30		
Fall Time	t _f			8	16		
Turn-On Delay Time	t _{d(on)}			14	21		
Rise Time	t _r	V_{DD} = 50 V, R_L = 7.2 Ω		9	18		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 6.9 \text{ A}, V_{GEN} = 7.5 \text{ V}, R_g = 1 \Omega$		18	27		
Fall Time	t _f			8	16		
Drain-Source Body Diode Characterist	ics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			40	A	
Pulse Diode Forward Current ^a	I _{SM}				40		
Body Diode Voltage	V_{SD}	I _S = 6.9 A		8.0	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			43	65	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 6.9 A, dl/dt = 100 A/μs, T _{.I} = 25 °C		80	120	nC	
	t _a	1 _F = 0.0 Λ, αι/αι = 100 Λ/μο, 1 _J = 20 0		33		no	
Reverse Recovery Fall Time	¹а			00	<u></u>	ns	

Notes:

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.

a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

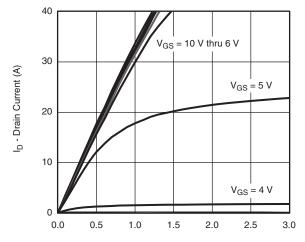
b. Guaranteed by design, not subject to production testing.

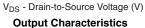


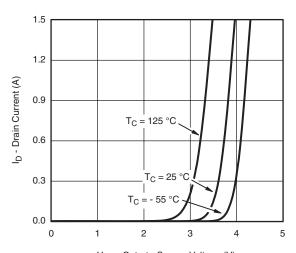




TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

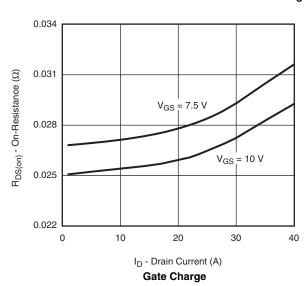


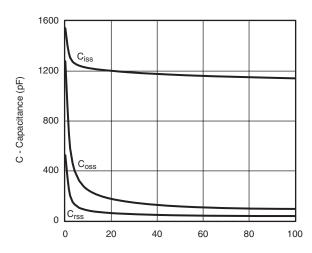




V_{GS} - Gate-to-Source Voltage (V)

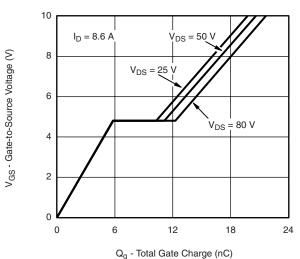
On-Resistance vs. Drain Current and Gate Voltage



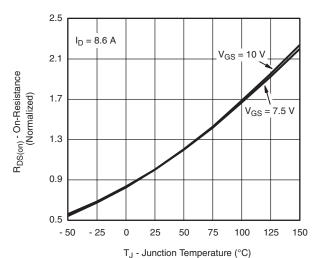


V_{DS} - Drain-to-Source Voltage (V)





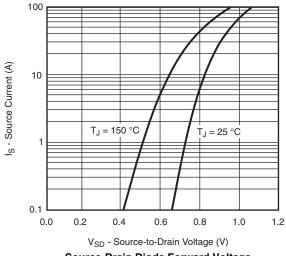
Capacitance

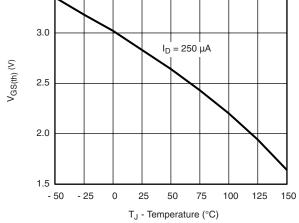


On-Resistance vs. Junction Temperature

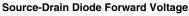
Vishay Siliconix

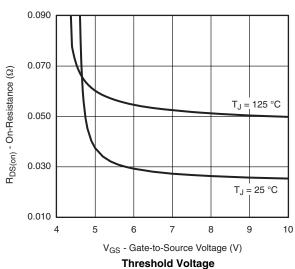
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



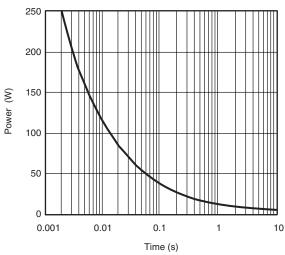


3.5

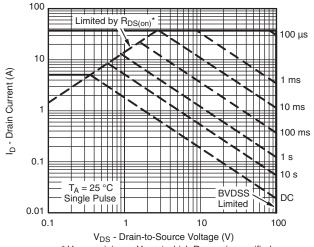




On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

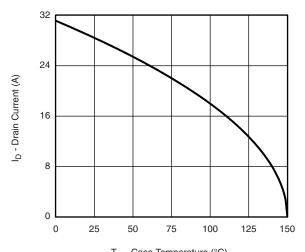


* $V_{GS} > \mbox{ minimum } V_{GS}$ at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

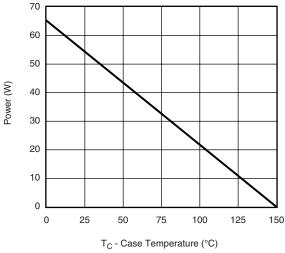


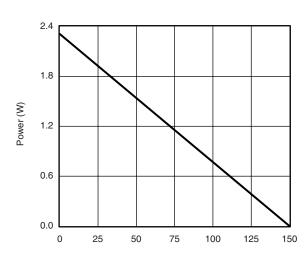
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



 $T_{\mbox{\scriptsize C}}$ - Case Temperature (°C)

Current Derating*





T_A - Ambient Temperature (°C)

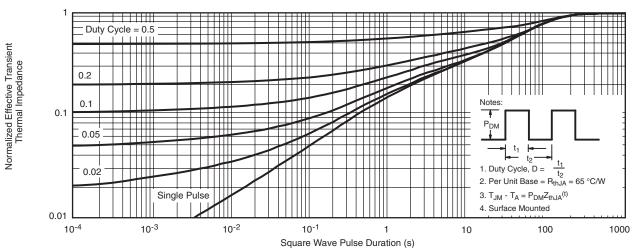
Power Derating Power Derating

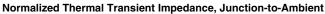
^{*} The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

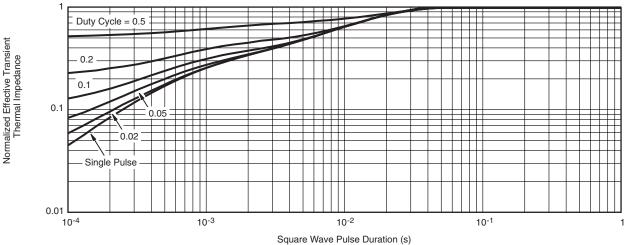
Vishay Siliconix



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted







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 www.vishay.com/ppg265163.



Legal Disclaimer Notice

Vishay

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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.