

Vishay Siliconix

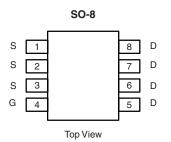
# P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY				
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)		
- 20	0.025 at V <sub>GS</sub> = - 4.5 V	- 7.1		
	0.033 at V <sub>GS</sub> = - 2.5 V	- 6.1		

#### FEATURES

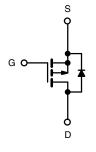
- Halogen-free According to IEC 61249-2-21
  Definition
- TrenchFET<sup>®</sup> Power MOSFET
- Compliant to RoHS Directive 2002/95/EC





Ordering Information: Si9424BDY-T1-E3 (Lead (Pb)-free)

Si9424BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T	<sub>A</sub> = 25 °C, unle	ss otherwise n	oted			
Parameter		Symbol	10 s	Steady State	Unit	
Drain-Source Voltage		V <sub>DS</sub>	- 20		V	
Gate-Source Voltage		V <sub>GS</sub>	± 9			
Continuous Drain Current (T 150 °C) <sup>8</sup>	T <sub>A</sub> = 25 °C	- I <sub>D</sub>	- 7.1	- 5.6		
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 70 °C		- 5.6	- 4.5	٨	
Pulsed Drain Current		I <sub>DM</sub>	- 30		A	
Continuous Source Current (Diode Conduction) <sup>a</sup>		۱ <sub>S</sub>	- 1.7	- 1.0		
	T <sub>A</sub> = 25 °C	– P <sub>D</sub>	2.0	1.25	W	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 70 °C		1.3	0.8	vv	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
	t ≤ 10 s	- R <sub>thJA</sub>	50	62.5	
Maximum Junction-to-Ambient <sup>a</sup>	Steady State		80	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	30	40	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

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Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static			•				
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	- 0.45		- 0.85	V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 9 V$			± 100	nA	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS} = -20 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1	μА	
		$V_{DS}$ = - 20 V, $V_{GS}$ = 0 V, $T_{J}$ = 55 °C			- 5		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \leq$ - 5 V, $V_{GS}$ = - 4.5 V	- 30			А	
Drain-Source On-State Resistance <sup>a</sup>	Р	V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 7.1 A		0.014	0.025		
	R <sub>DS(on)</sub>	$V_{GS}$ = - 2.5 V, I <sub>D</sub> = - 6.6 A		0.019	0.033	Ω	
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	$V_{DS} = -10$ V, $I_{D} = -7.7$ A		25		S	
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_{S} = -2.3 \text{ A}, V_{GS} = 0 \text{ V}$		- 0.7	- 1.2	V	
Dynamic <sup>b</sup>			•		•		
Total Gate Charge	Qg			24	40		
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS}$ = - 6 V, $V_{GS}$ = - 4.5 V, $I_D$ = - 7.1 A		3.5		nC	
Gate-Drain Charge	Q <sub>gd</sub>			5.8			
Turn-On Delay Time	t <sub>d(on)</sub>			30	45		
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 6 V, $R_L$ = 6 $\Omega$		40	60		
Turn-Off Delay Time	t <sub>d(off)</sub>	$\text{I}_\text{D}\cong$ - 1 A, $\text{V}_\text{GEN}$ = - 4.5 V, $\text{R}_\text{g}$ = 6 $\Omega$		130	200	ns	
Fall Time	t <sub>f</sub>			70	105		
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 2.3 A, dl/dt = 100 A/μs		50	100		

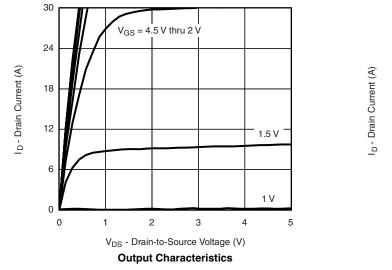
Notes:

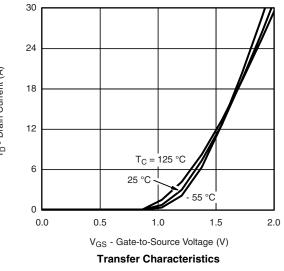
a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

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

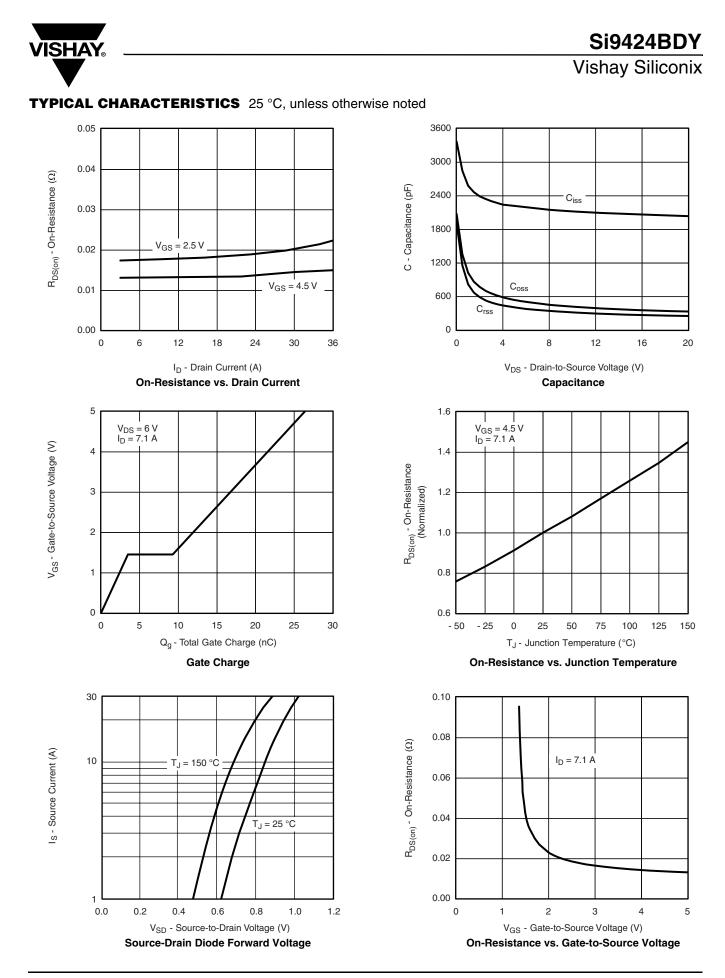
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





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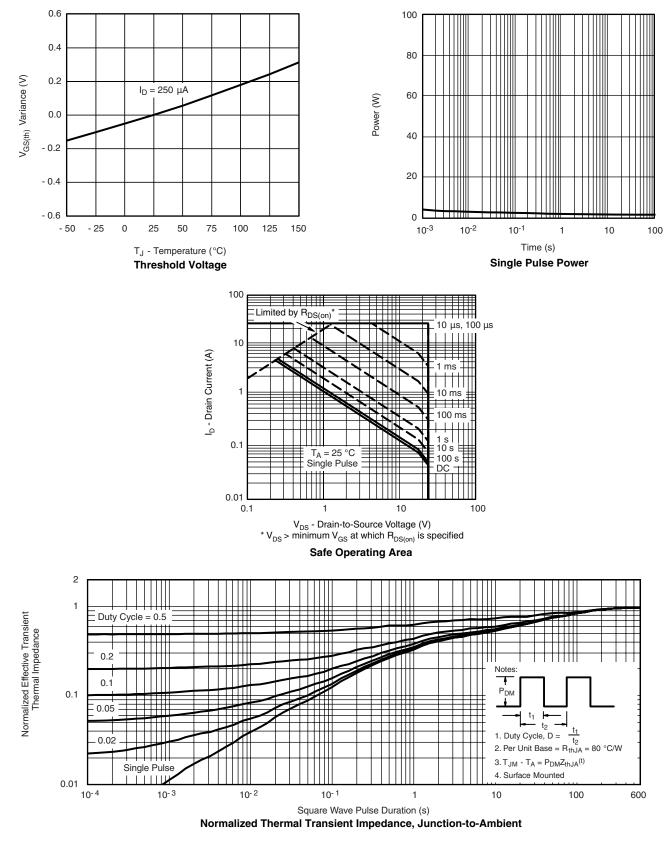


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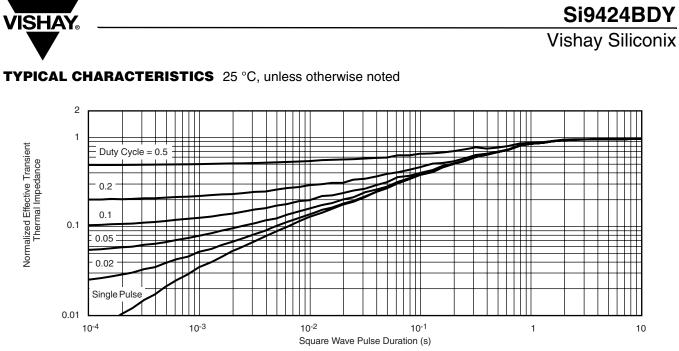
# Si9424BDY

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### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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Normalized Thermal Transient Impedance, Junction-to-Foot

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 <a href="http://www.vishay.com/ppg772015">www.vishay.com/ppg772015</a>.



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