

N-Channel MOSFET



# **Dual N-Channel 30-V (D-S) MOSFET**

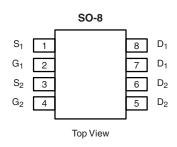
PRODUCT SUMMARY				
V <sub>DS</sub> (V)	$R_{DS(on)}\left(\Omega\right)$	I <sub>D</sub> (A)		
30	0.035 at V <sub>GS</sub> = 10 V	6.0		
	0.052 at V <sub>GS</sub> = 4.5 V	4.9		

#### **FEATURES**

- Halogen-free According to IEC 61249-2-21 Definition
- Compliant to RoHS Directive 2002/95/EC

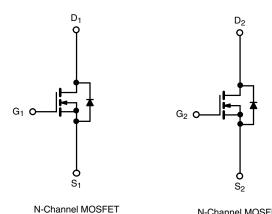






Ordering Information: Si9936BDY-T1-E3 (Lead (Pb)-free)

Si9936BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)



<b>ABSOLUTE MAXIMUM RATINGS</b> T <sub>A</sub> = 25 °C, unless otherwise noted						
Parameter		Symbol	10 s	Steady State	Unit	
Drain-Source Voltage		V <sub>DS</sub>	30		V	
Gate-Source Voltage		V <sub>GS</sub>	± 20			
Continuous Dunin Comment /T 150 90\8	T <sub>A</sub> = 25 °C	- I <sub>D</sub>	6.0	4.5	٨	
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 70 °C		4.8	3.6		
Pulsed Drain Current		I <sub>DM</sub>	40		Α	
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	1.7	0.9		
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	- P <sub>D</sub>	2.0	1.1	W	
	T <sub>A</sub> = 70 °C		1.3	0.7		
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
Mariana haratina ta Ambinata	t ≤ 10 s	- R <sub>thJA</sub>	53	62.5	
Maximum Junction-to-Ambient <sup>a</sup>	Steady State		92	110	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	$R_{thJF}$	30	40	

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

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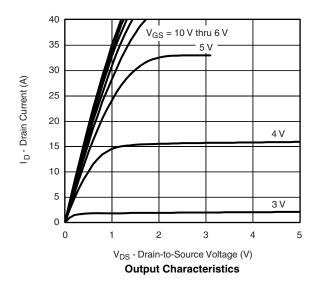
Parameter	Symbol	ymbol Test Conditions		Тур.	Max.	Unit
Static				•		
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \mu A$ 1.0		3.0	V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			1	
		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$	5		5	- μΑ
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	40			Α
Drain-Source On-State Resistance <sup>a</sup>		$V_{GS} = 10 \text{ V}, I_D = 6 \text{ A}$		0.028 0.035		
	R <sub>DS(on)</sub>	$V_{GS} = 4.5 \text{ V}, I_D = 4.9 \text{ A}$		0.041	0.052	Ω
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	$V_{DS} = 15 \text{ V}, I_{D} = 6 \text{ A}$		12		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	I <sub>S</sub> = 1.7 A, V <sub>GS</sub> = 0 V		0.8	1.2	V
Dynamic <sup>b</sup>	<u>'</u>		<u>'</u>	•		
Total Gate Charge	$Q_g$			8.6	13	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 6 \text{ A}$		1.8		nC
Gate-Drain Charge	Q <sub>gd</sub>			1.5		
Gate Resistance	$R_g$	f = 1 MHz		2.8		Ω
Turn-On Delay Time	t <sub>d(on)</sub>			10	15	
Rise Time	t <sub>r</sub>	$t_r$ $V_{DD} = 15 \text{ V}, R_L = 15 \Omega$		15	25	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			25	40	
Fall Time	t <sub>f</sub>			10	15	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 1.7 A, dI/dt = 100 A/μs		20	40	

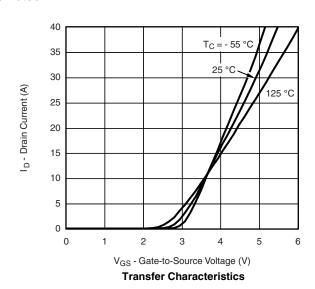
#### Notes:

- a. Pulse test; pulse width  $\leq$  300  $\mu$ 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

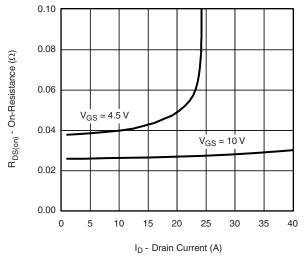




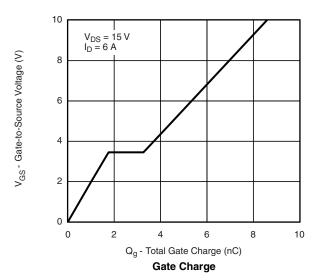


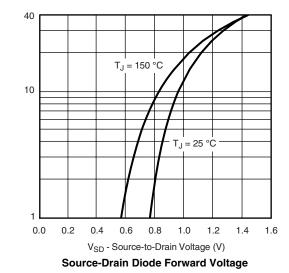


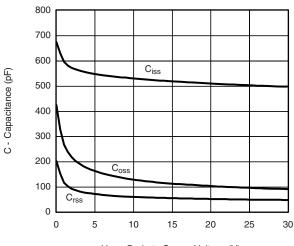
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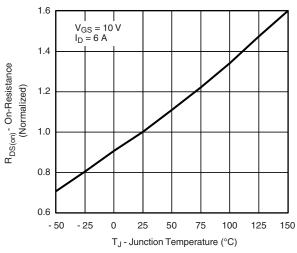
On-Resistance vs. Drain Current



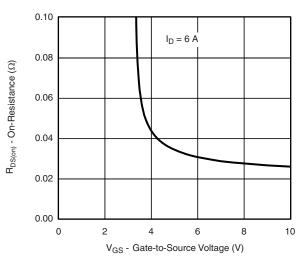




V<sub>DS</sub> - Drain-to-Source Voltage (V) **Capacitance** 



On-Resistance vs. Junction Temperature



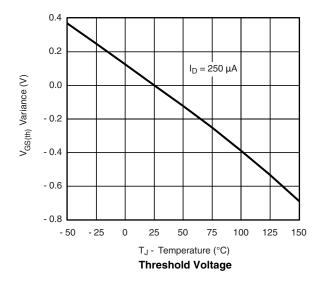
On-Resistance vs. Gate-to-Source Voltage

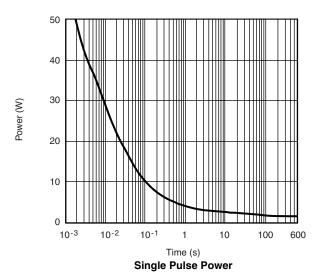
Is - Source Current (A)

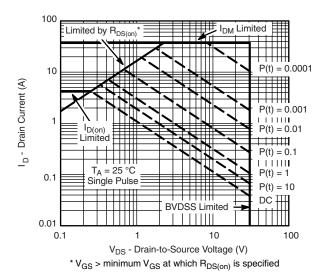
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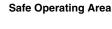
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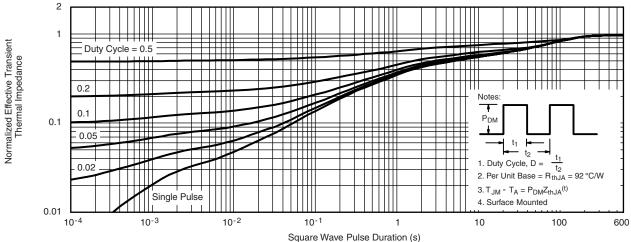
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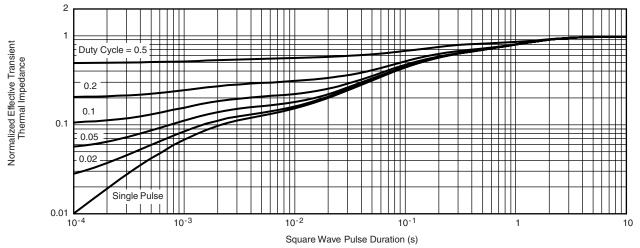








## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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="https://www.vishay.com/ppg?72521">www.vishay.com/ppg?72521</a>.



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