

RoHS

COMPLIANT HALOGEN

Available

Vishay Siliconix

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

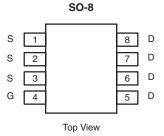
PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>d</sup>	Q <sub>g</sub> (Typ.)			
100	0.063 at V <sub>GS</sub> = 10 V	6.8	9 nC			
	0.084 at V <sub>GS</sub> = 6 V	5.8	9110			

#### FEATURES

- Halogen-free According to IEC 61249-2-21
  Available
- TrenchFET<sup>®</sup> Power MOSFET
- 100 % UIS Tested

#### **APPLICATIONS**

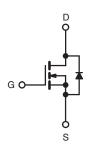
- High Frequency Boost Converter
- LED Backlight for LCD TV



Ordering Information: Si4100DY-T1-E3 (Lead (Pb)-free)

Top View

Si4100DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V <sub>DS</sub>	100	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20		
	T <sub>C</sub> = 25 °C		6.8		
Continuous Drain Current (T <sub>.I</sub> = 150 °C)	T <sub>C</sub> = 70 °C		5.4		
Continuous Drain Current $(1_j = 150^{\circ} C)$	T <sub>A</sub> = 25 °C		4.4 <sup>a, b</sup>		
	T <sub>A</sub> = 70 °C		3.5 <sup>a, b</sup>	A	
Pulsed Drain Current		I <sub>DM</sub>	20	A	
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	I <sub>S</sub>	5		
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	'S	2.1 <sup>a, b</sup>		
Single Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	19		
Single Avalanche Energy	L = 0.1 mm	E <sub>AS</sub>	18	mJ	
	T <sub>C</sub> = 25 °C		6		
Maximum Bowar Discinction	T <sub>C</sub> = 70 °C	P <sub>D</sub>	3.8	w	
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	'D	2.5 <sup>a, b</sup>	vv	
	T <sub>A</sub> = 70 °C		1.6 <sup>a, b</sup>		
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stq</sub>	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient <sup>b, c</sup>	t ≤ 10 s	R <sub>thJA</sub>	37	50	°C/W		
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	17	21	0/11		

Notes:

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

b. t = 10 s.

c. Maximum under Steady State conditions is 85  $^{\circ}\text{C/W}.$ 

d.  $T_C = 25 \ ^{\circ}C.$ 

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Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static	1 - 1		Ι			1	
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \mu\text{A}$	100			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	L 050 ··· A		120		mV/°C	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I <sub>D</sub> = 250 μA		- 9			
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_D = 250 \ \mu A$	2		4.5	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
	I <sub>DSS</sub>	$V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$ $V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 ^{\circ}\text{C}$			1	μΑ	
Zero Gate Voltage Drain Current					10		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			Α	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.4 A		0.051	0.063	<u> </u>	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	$V_{GS} = 6 V, I_D = 3.8 A$		0.069	0.084	Ω	
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	$V_{DS} = 15 \text{ V}, \text{ I}_{D} = 4.4 \text{ A}$		10		S	
Dynamic <sup>b</sup>	-10						
Input Capacitance	C <sub>iss</sub>			600		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1 MHz		90			
Reverse Transfer Capacitance	C <sub>rss</sub>			50			
Total Gate Charge	Qg	$V_{DS} = 50$ V, $V_{GS} = 10$ V, $I_{D} = 4.4$ A		13.5 2	20	nC	
				9	13.5		
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS} = 50$ V, $V_{GS} = 6$ V, $I_{D} = 4.4$ A		3			
Gate-Drain Charge	Q <sub>gd</sub>			4.6			
Gate Resistance	Rg	f = 1 MHz		1		Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			15	25	ns	
Rise Time	t <sub>r</sub>	$V_{DD}$ = 50 V, $R_{L}$ = 14.3 $\Omega$		12	20		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 3.5 \text{ A}, V_{GEN} = 6 \text{ V}, \text{ R}_g = 1 \Omega$		12	20		
Fall Time	t <sub>f</sub>			10	15		
Turn-On Delay Time	t <sub>d(on)</sub>			10	15		
Rise Time	t <sub>r</sub>	$V_{DD}$ = 50 V, $R_{L}$ = 14.3 $\Omega$		12	20		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 3.5 \text{ A}, V_{GEN} = 10 \text{ V}, \text{ R}_g = 1 \Omega$		15	25		
Fall Time	t <sub>f</sub>			10	15		
Drain-Source Body Diode Characteristi	cs					1	
Continuous Source-Drain Diode Current	ا <sub>S</sub>	T <sub>C</sub> = 25 °C			5		
Pulse Diode Forward Current	I <sub>SM</sub>				20	A	
Body Diode Voltage	V <sub>SD</sub>	$I_{S} = 3.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			45	70	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			80	120	nC	
Reverse Recovery Fall Time	t <sub>a</sub>	$I_F = 3.5 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, \text{ T}_J = 25 ^\circ\text{C}$		33			
Reverse Recovery Rise Time	t <sub>b</sub>			12		ns	

Notes:

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

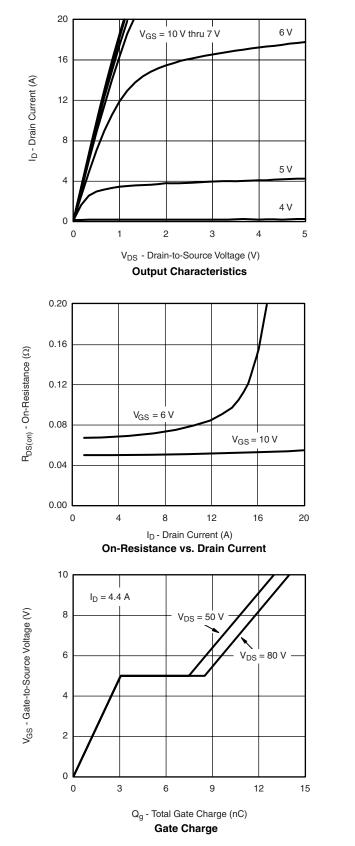
b. Guaranteed by design, not subject to production testing.

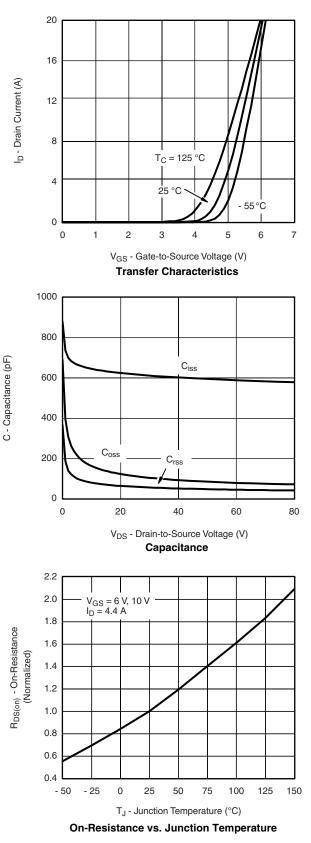
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



## Si4100DY Vishay Siliconix

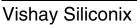
#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





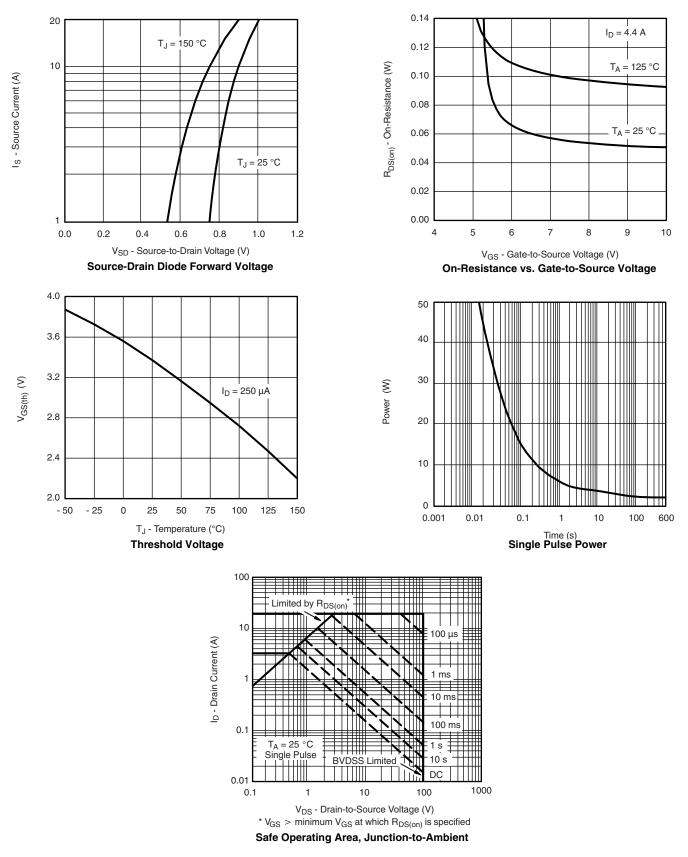
Document Number: 69251 S09-0220-Rev. B, 09-Feb-09

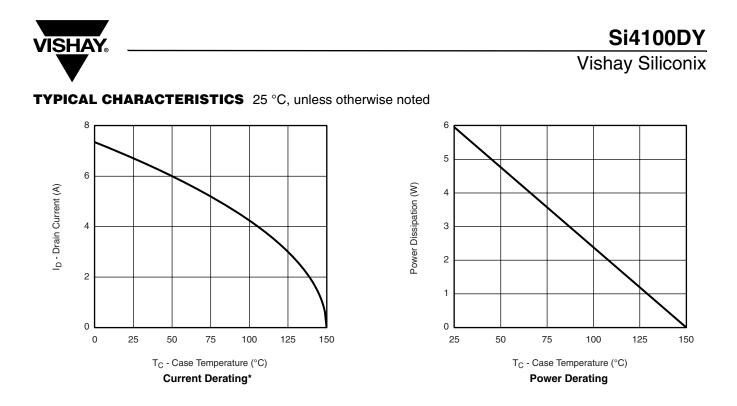
# Si4100DY





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



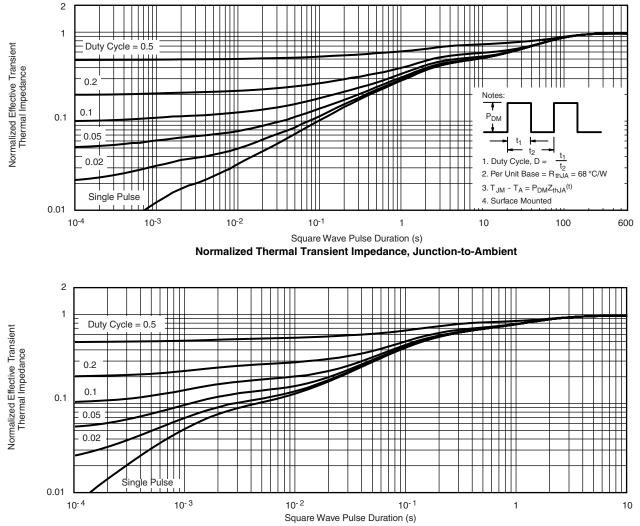


\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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

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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 <u>www.vishay.com/ppg?69251</u>.



# Package Information

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# SOIC (NARROW): 8-LEAD JEDEC Part Number: MS-012





	MILLIM	IETERS	INCHES		
DIM	Min	Мах	Min	Max	
A	1.35	1.75	0.053	0.069	
A <sub>1</sub>	0.10	0.20	0.004	0.008	
В	0.35	0.51	0.014	0.020	
С	0.19	0.25	0.0075	0.010	
D	4.80	5.00	0.189	0.196	
E	3.80	4.00	0.150	0.157	
е	1.27	BSC	0.050 BSC		
н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.020	
L	0.50	0.93	0.020	0.037	
q	0°	8°	0°	8°	
S	0.44	0.64	0.018	0.026	
ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498					

# **Application Note 826**

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**RECOMMENDED MINIMUM PADS FOR SO-8** 



Recommended Minimum Pads Dimensions in Inches/(mm)

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