

MOSFET – Power, Single N-Channel, STD Gate, SO8FL

80 V, 1.43 mΩ, 253 A

NVMFWS1D5N08X

Features

- Low Q_{RR} , Soft Recovery Body Diode
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- AEC Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen-Free/BFR-Free and are RoHS Compliant

Applications

- Synchronous Rectification (SR) in DC-DC and AC-DC
- Primary Switch in Isolated DC-DC Converter
- Motor Drives
- Automotive 48 V System

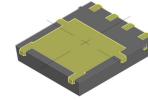
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V _{DSS}	Drain-to-Source Voltage		80	V
V _{GS}	Gate-to-Source Voltage		±20	V
I _D	Continuous Drain Current (Note 1)	T _C = 25 °C	253	A
		T _C = 100 °C	179	
P _D	Power Dissipation (Note 1)	T _C = 25 °C	194	W
I _{DM}	Pulsed Drain Current	T _C = 25 °C, t _p = 100 μs	1071	A
I _{SM}	Pulsed Source Current (Body Diode)		1071	
T _J , T _{stg}	Operating Junction and Storage Temperature Range		-55 to +175	°C
I _S	Source Current (Body Diode)		303	A
E _{AS}	Single Pulse Avalanche Energy (I _{PK} = 67 A) (Note 3)		225	mJ
T _L	Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		260	°C

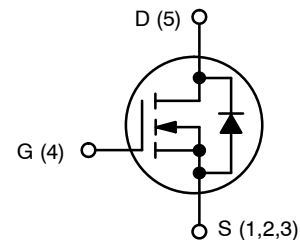
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. The entire application environment impacts the thermal resistance values shown. They are not constants and are only valid for the particular conditions noted.
2. Actual continuous current will be limited by thermal & electromechanical application board design.
3. E_{AS} of 225 mJ is based on started $T_J = 25^\circ\text{C}$, $I_{AS} = 67\text{ A}$, $V_{DD} = 64\text{ V}$, $V_{GS} = 10\text{ V}$, 100% avalanche tested

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
80 V	1.43 mΩ @ 10 V	253 A

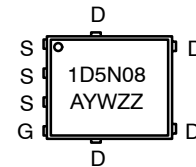


DFNW5
(SO8FL WF)
CASE 507BA



N-CHANNEL MOSFET

MARKING DIAGRAM



1D5N08 = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 5 of this data sheet.

NVMFWS1D5N08X

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.77	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Notes 4, 5)	39	

4. Surface-mounted on FR4 board using a 1 in², 1 oz. Cu pad.

5. $R_{\theta JA}$ is determined by the user's board design.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
--------	-----------	----------------	-----	-----	-----	------

OFF CHARACTERISTICS

$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	80			V
$\Delta V_{(BR)DSS}/\Delta T_J$	Drain-to-Source Breakdown Voltage Temperature Coefficient	$I_D = 1\text{ mA}$, Referenced to 25°C		17.8		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}, T_J = 25^\circ\text{C}$			1	μA
		$V_{DS} = 80\text{ V}, T_J = 125^\circ\text{C}$			250	
I_{GSS}	Gate-to-Source Leakage Current	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA

ON CHARACTERISTICS

$R_{DS(on)}$	Drain-to-Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		1.24	1.43	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 330\text{ }\mu\text{A}$	2.4		3.6	V
$\Delta V_{GS(TH)}/\Delta T_J$	Gate Threshold Voltage Temperature Coefficient	$V_{GS} = V_{DS}, I_D = 330\text{ }\mu\text{A}$		-7.32		mV/°C
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 50\text{ A}$		176		S

CHARGES, CAPACITANCES & GATE RESISTANCE

C_{ISS}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}, f = 1\text{ MHz}$		5880		pF
C_{OSS}	Output Capacitance			1690		
C_{RSS}	Reverse Transfer Capacitance			25		
Q_{OSS}	Output Charge	$V_{GS} = 6\text{ V}, V_{DD} = 40\text{ V}; I_D = 50\text{ A}$ $V_{GS} = 10\text{ V}, V_{DD} = 40\text{ V}; I_D = 50\text{ A}$		121		nC
$Q_{G(TOT)}$	Total Gate Charge			51		
$Q_{G(TH)}$	Threshold Gate Charge			83		
Q_{GS}	Gate-to-Source Charge			18		
Q_{GD}	Gate-to-Drain Charge			27		
Q_{GP}	Gate Plateau Voltage			13		
V_{GP}	Gate Plateau Voltage			4.6		
R_G	Gate Resistance			0.6		

SWITCHING CHARACTERISTICS

$t_{d(ON)}$	Turn-On Delay Time	Resistive Load, $V_{GS} = 0/10\text{ V}, V_{DD} = 64\text{ V},$ $I_D = 50\text{ A}, R_G = 2.5\text{ }\Omega$		24		ns
t_r	Rise Time			10		
$t_{d(OFF)}$	Turn-Off Delay Time			45		
t_f	Fall Time			9		

SOURCE-TO-DRAIN DIODE CHARACTERISTICS

V_{SD}	Forward Diode Voltage	$V_{GS} = 0\text{ V}, I_S = 50\text{ A}, T_J = 25^\circ\text{C}$		0.81	1.2	V
		$V_{GS} = 0\text{ V}, I_S = 50\text{ A}, T_J = 125^\circ\text{C}$		0.66		
t_{RR}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_S = 50\text{ A},$ $di/dt = 1000\text{ A}/\mu\text{s}, V_{DD} = 64\text{ V}$		36		ns
t_a	Charge Time			19		
t_b	Discharge Time			18		
Q_{RR}	Reverse Recovery Charge			290		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



TYPICAL CHARACTERISTICS

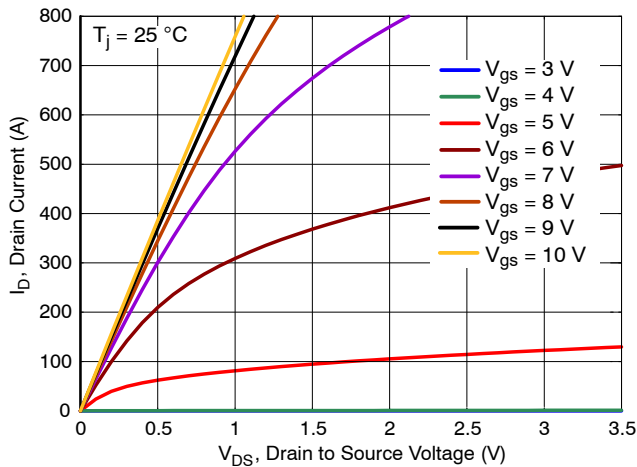


Figure 1. On-Region Characteristics

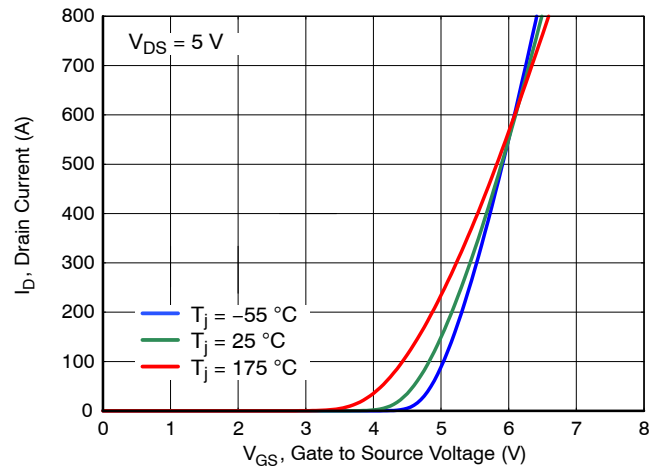


Figure 2. Transfer Characteristics

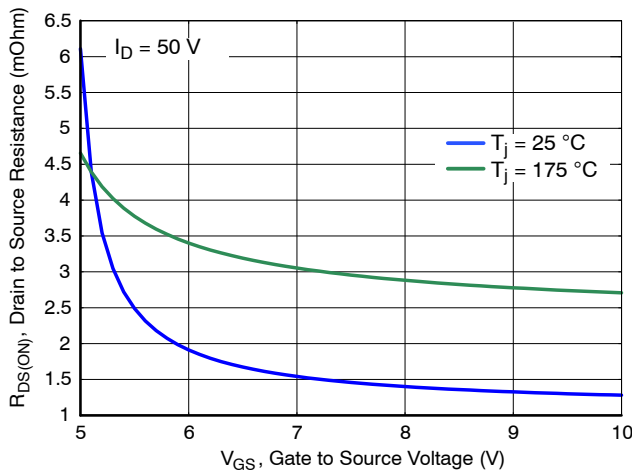


Figure 3. On-Resistance vs. Gate Voltage

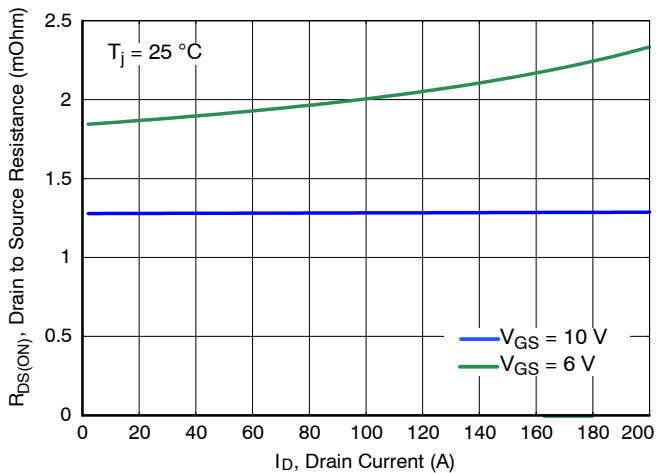


Figure 4. On-Resistance vs. Drain Current

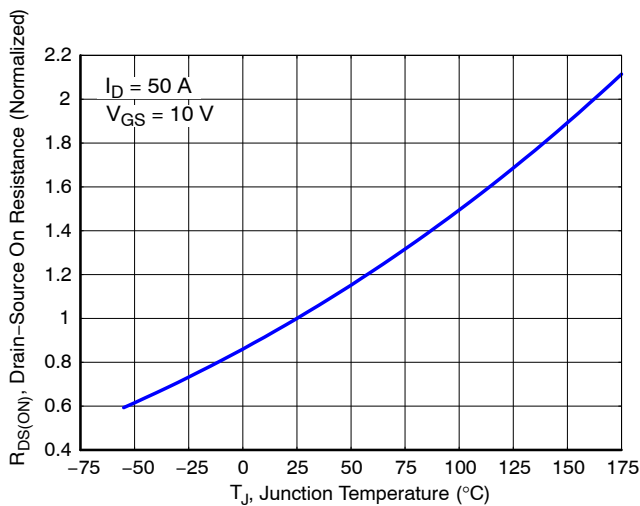


Figure 5. Normalized On-Resistance vs. Junction Temperature

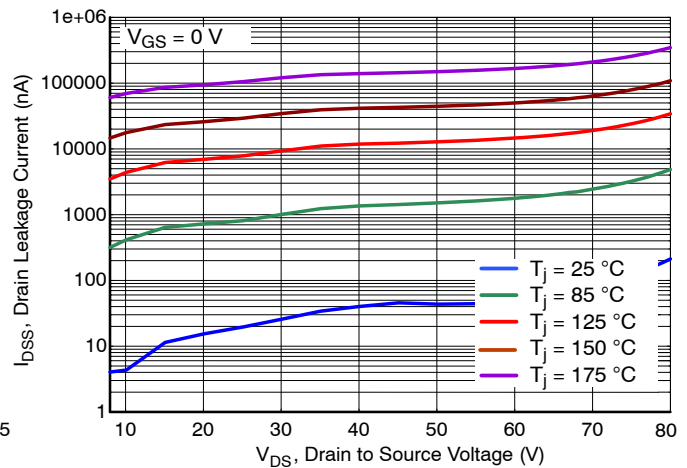


Figure 6. Drain Leakage Current vs. Drain Voltage

TYPICAL CHARACTERISTICS

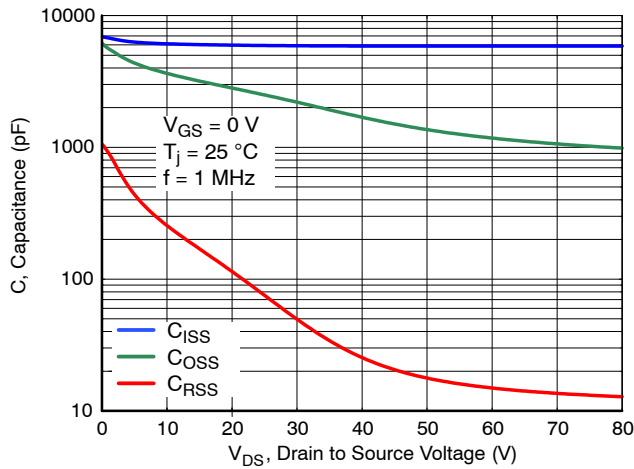


Figure 7. Capacitance Characteristics

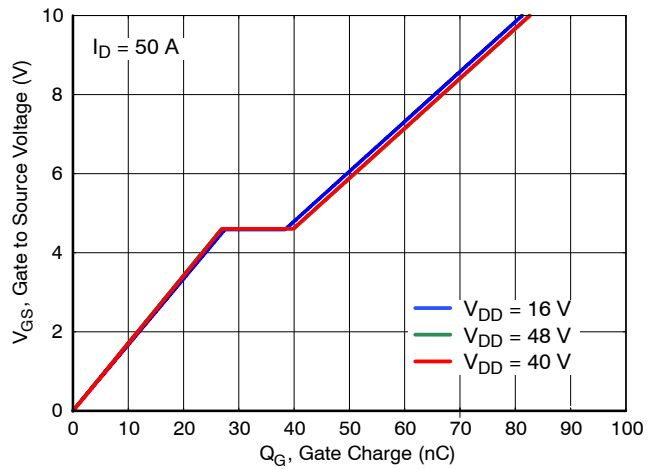


Figure 8. Gate Charge Characteristics

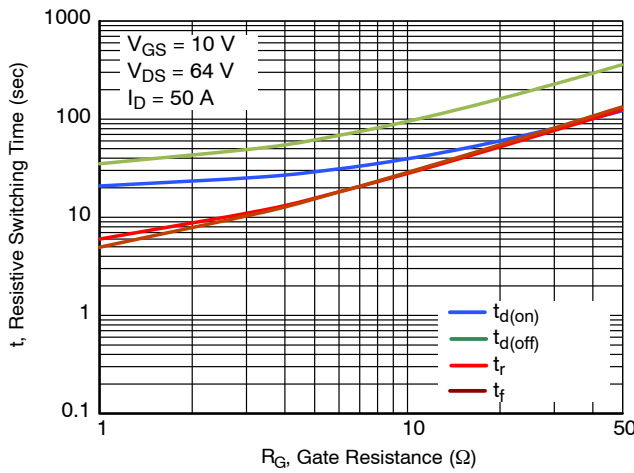


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

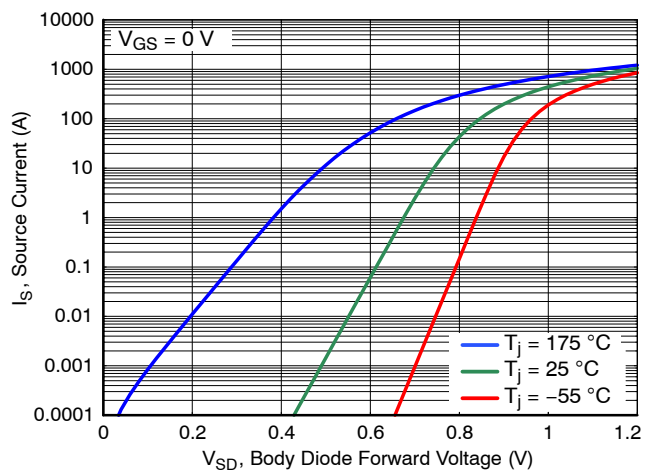


Figure 10. Diode Forward Characteristics

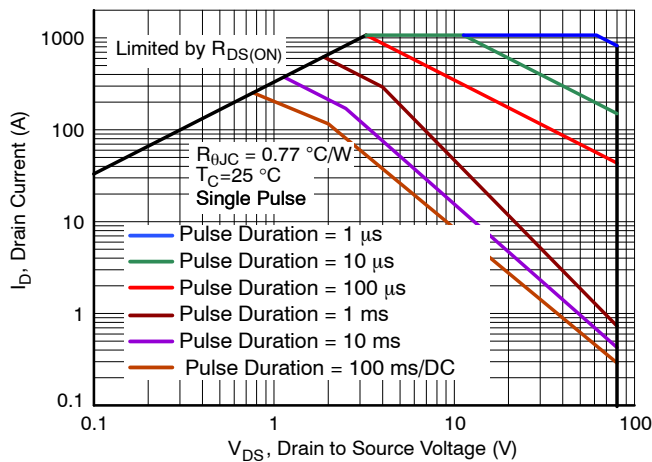


Figure 11. Safe Operating Area (SOA)

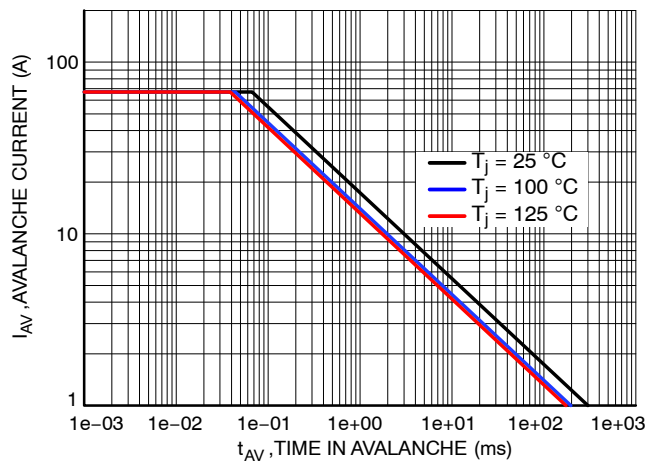


Figure 12. Avalanche Current vs. Pulse Time (UIS)

NVMFWS1D5N08X

TYPICAL CHARACTERISTICS

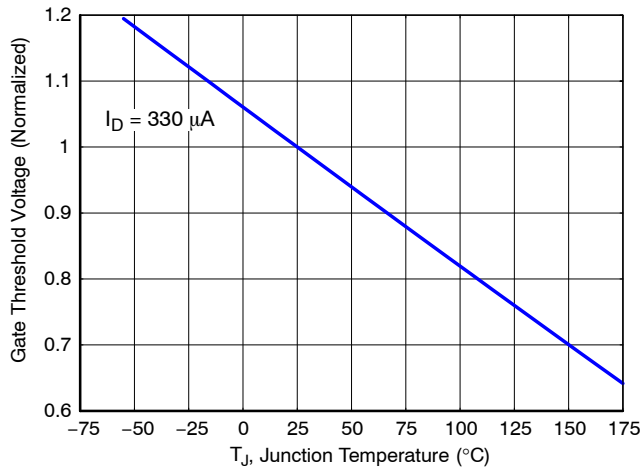


Figure 13. Gate Threshold Voltage vs. Junction Temperature

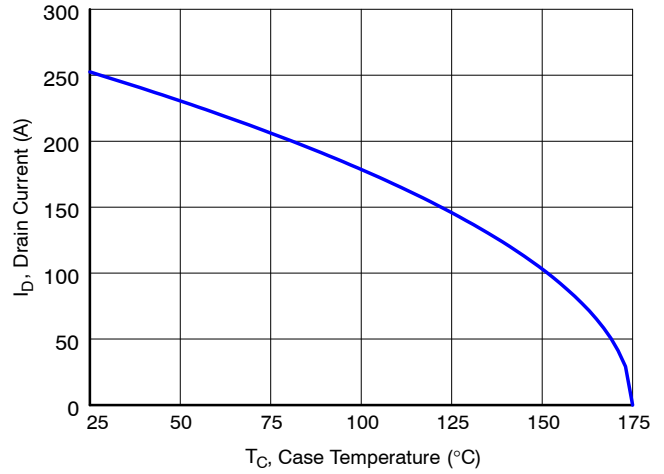


Figure 14. Maximum Current vs. Case Temperature

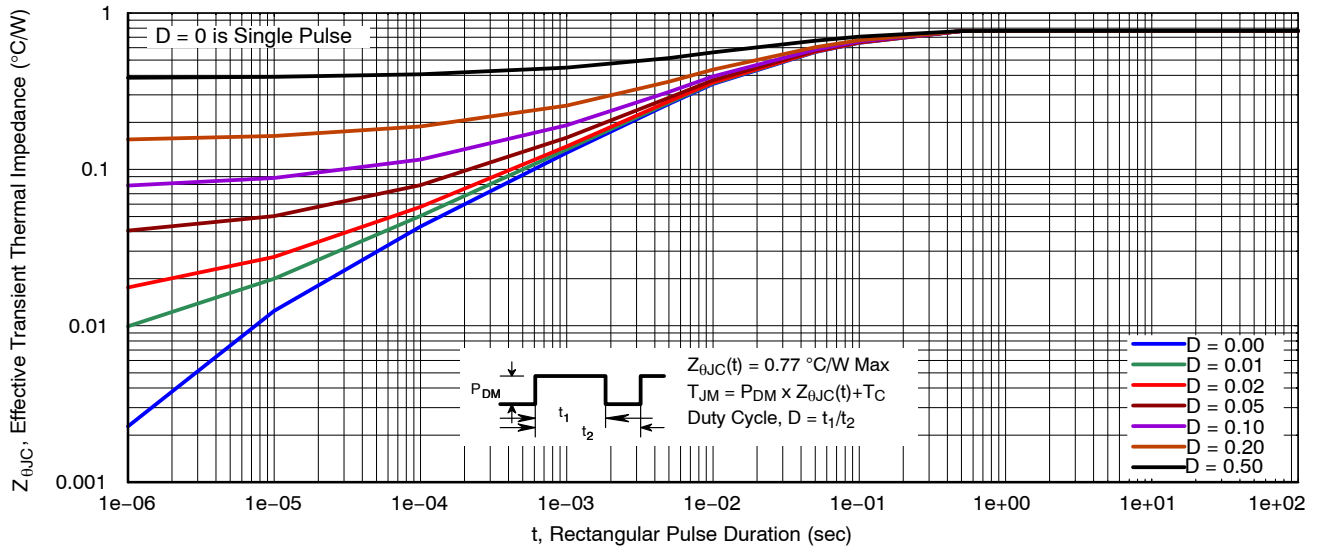


Figure 15. Transient Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NVMFWS1D5N08XT1G	1D5N08	DFNW5 (Pb-Free)	1,500 / Tape & Reel
NVMFWS1D5N08XET1G	1D5N08	DFNW5 (Pb-Free)	1,500 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

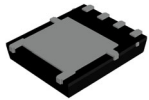


NVMFWS1D5N08X

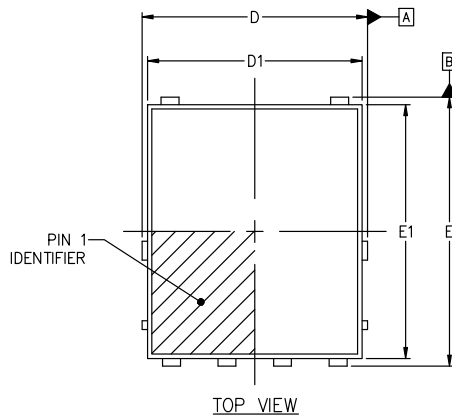
REVISION HISTORY

Revision	Description of Changes	Date
0	Would like to request to reuse back the industrial part version of NTMFWS1D5N08XT1G Datasheet attached here with just revising the OPN, switching part value using 80% of VDS (already Strikethrough) and its curve (Figure 9) generated from Fit request#18313 particularly for Auto version one NVMFWS1D5N08XT1G. Based off of the NTMFWS1D5N08X/D.	4/21/2023
1	Addition of NVMFWS1D5N08XET1G OPN in the data sheet.	3/3/2026

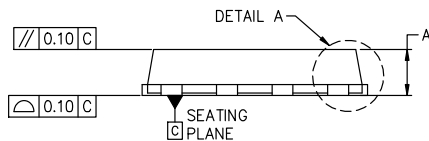



DFNW5 4.90x5.90x1.00, 1.27P
CASE 507BA
ISSUE C

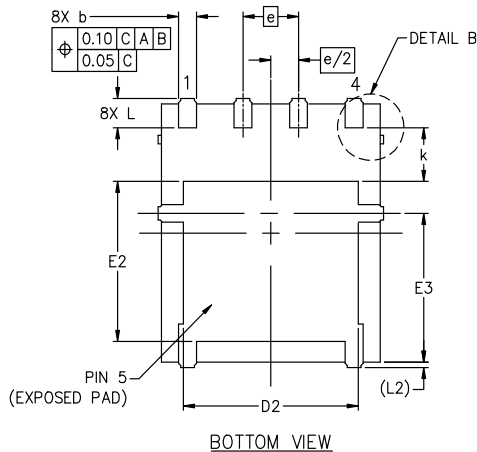
DATE 19 SEP 2024



TOP VIEW



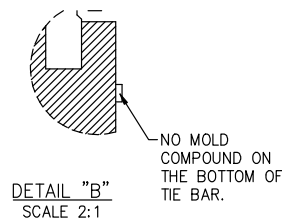
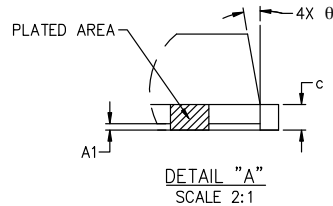
SIDE VIEW



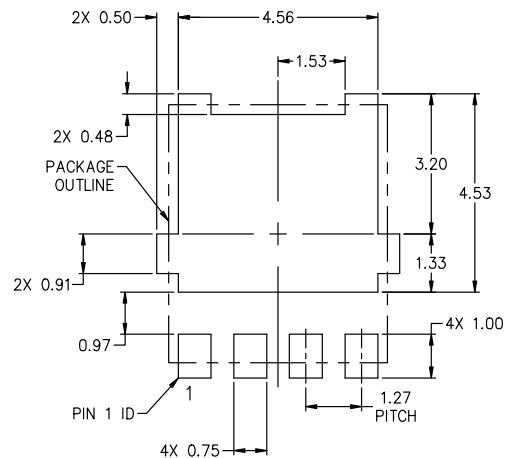
BOTTOM VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
4. THIS PACKAGE CONTAINS WETTABLE FLANK DESIGN FEATURES TO AID IN FILLET FORMATION ON THE LEADS DURING MOUNTING.



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
E3	3.00	3.40	3.80
e	1.27 BSC		
k	1.20	1.35	1.50
L	0.51	0.57	0.71
L2	0.15 REF.		
θ	0°	6°	12°



RECOMMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

GENERIC MARKING DIAGRAM*


XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON26450H	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	DFNW5 4.90x5.90x1.00, 1.27P	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales