

MOSFET - Power, Single N-Channel, Logic Level, μ 8FL

80 V, 5.3 m Ω , 79 A

NVTFWWS005N08XL

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-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

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

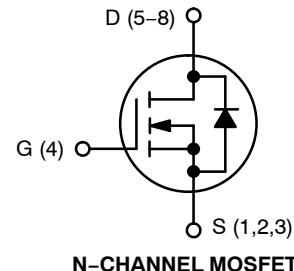
MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	80	V
Gate-to-Source Voltage	V _{GS}	± 20	V
Continuous Drain Current (Note 1)	I _D	79	A
T _C = 100°C	56		
Power Dissipation (Note 1)	P _D	82	W
T _C = 100°C	41		
Pulsed Drain Current	I _{DM}	290	A
Pulsed Source Current (Body Diode)	I _{SM}	290	
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C
Source Current (Body Diode)	I _S	118	A
Single Pulse Avalanche Energy (I _{PK} = 34 A) (Note 3)	E _{AS}	57	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T _L	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.

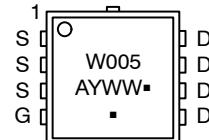
1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Actual continuous current will be limited by thermal & electromechanical application board design.
3. Surface mounted on FR4 board using a 1 in², 1 oz. Cu pad.
4. R_{θJA} is determined by the users board design.

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
80 V	5.3 m Ω @ 10 V	79 A
	8.4 m Ω @ 4.5 V	



WDFN8
(μ 8FL)
CASE 515AP

MARKING DIAGRAM



W005 = Specific Device Code
 A = Assembly Location
 Y = Year
 WW = Work Week
 ■ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping [†]
NVTFWWS005N08XLTAG	WDFN8 (μ 8FL)	1500 / Tape & Reel

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

NVTFWS005N08XL

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta,JC}$	1.8	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient (Notes 5, 6)	$R_{\theta,JA}$	46	

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

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = 1 \text{ mA}$	80			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	$I_D = 1 \text{ mA}$. Referenced to 25°C		31		$\text{mV}/^{\circ}\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 80 \text{ V}$		1		μA
		$V_{\text{DS}} = 80 \text{ V}, T_J = 125^{\circ}\text{C}$		250		
Gate-to-Source Leakage Current	I_{GSS}	$V_{\text{GS}} = 20 \text{ V}, V_{\text{DS}} = 0 \text{ V}$		100		nA

ON CHARACTERISTICS

Drain-to-Source On Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10 \text{ V}, I_D = 17 \text{ A}$		4.3	5.3	$\text{m}\Omega$
		$V_{\text{GS}} = 4.5 \text{ V}, I_D = 14 \text{ A}$		5.7	8.4	
Gate Threshold Voltage	$V_{\text{GS}(\text{TH})}$	$V_{\text{GS}} = V_{\text{DS}}, I_D = 85 \mu\text{A}$	1.5		2.1	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{\text{GS}(\text{TH})}/\Delta T_J$	$V_{\text{GS}} = V_{\text{DS}}, I_D = 85 \mu\text{A}$		-6.4		$\text{mV}/^{\circ}\text{C}$
Forward Transconductance	g_{FS}	$V_{\text{DS}} = 5 \text{ V}, I_D = 17 \text{ A}$		113		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 40 \text{ V}, f = 1 \text{ MHz}$		1800		pF
Output Capacitance	C_{OSS}			450		
Reverse Transfer Capacitance	C_{RSS}			14		
Output Charge	Q_{OSS}			33		nC
Total Gate Charge	$Q_{\text{G}(\text{TOT})}$	$V_{\text{GS}} = 4.5 \text{ V}, V_{\text{DD}} = 40 \text{ V}; I_D = 17 \text{ A}$		14		
Total Gate Charge	$Q_{\text{G}(\text{TOT})}$			28		
Threshold Gate Charge	$Q_{\text{G}(\text{TH})}$			3		
Gate-to-Source Charge	Q_{GS}			5		
Gate-to-Drain Charge	Q_{GD}			4		
Gate Plateau Voltage	V_{GP}			2.7		V
Gate Resistance	R_{G}		$f = 1 \text{ MHz}$	0.6		Ω

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$t_{\text{d}(\text{ON})}$	Resistive Load, $V_{\text{GS}} = 0/10 \text{ V}, V_{\text{DD}} = 64 \text{ V},$ $I_D = 17 \text{ A}, R_{\text{G}} = 2.5 \Omega$		10		ns
Rise Time	t_r			4		
Turn-Off Delay Time	$t_{\text{d}(\text{OFF})}$			25		
Fall Time	t_f			3		

SOURCE-TO-DRAIN DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{\text{GS}} = 0 \text{ V}, I_S = 17 \text{ A}$		0.8	1.2	V
		$V_{\text{GS}} = 0 \text{ V}, I_S = 17 \text{ A}, T_J = 125^{\circ}\text{C}$		0.7		
Reverse Recovery Time	t_{RR}	$V_{\text{GS}} = 0 \text{ V}, dI/dt = 1000 \text{ A}/\mu\text{s},$ $I_S = 17 \text{ A}, V_{\text{DD}} = 64 \text{ V}$		19		ns
Charge Time	t_a			11		
Discharge Time	t_b			9		
Reverse Recovery Charge	Q_{RR}			105		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

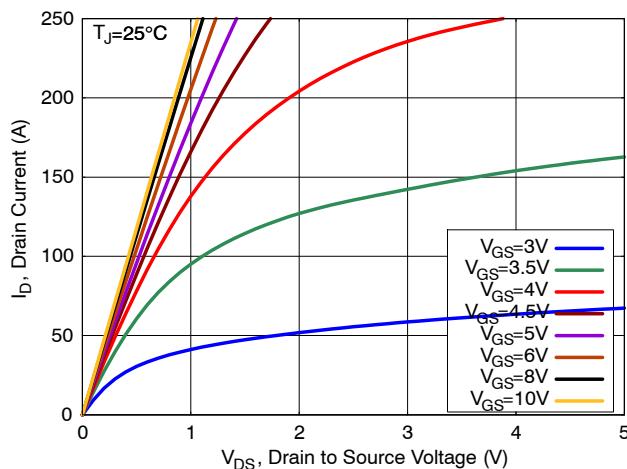


Figure 1. On-Region Characteristics

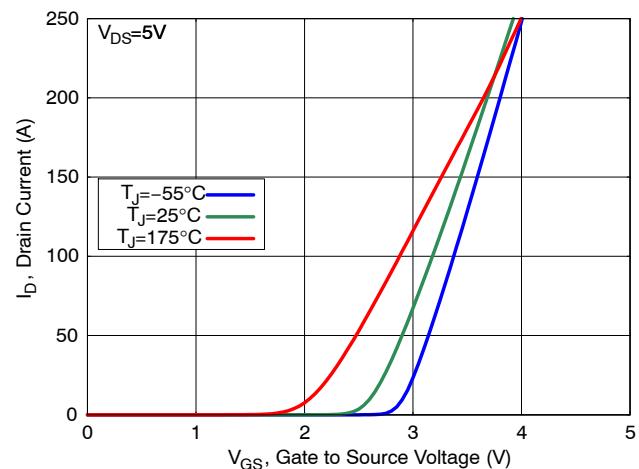


Figure 2. Transfer Characteristics

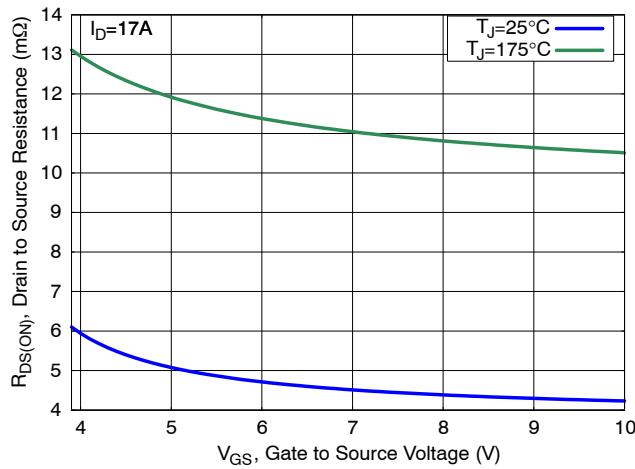


Figure 3. On-Resistance vs. Gate Voltage

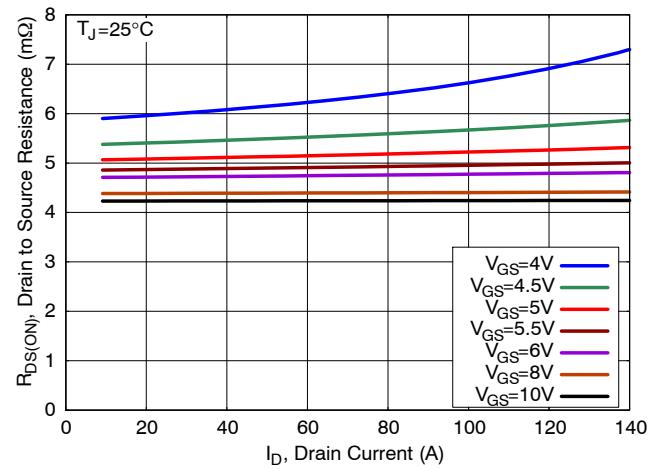


Figure 4. On-Resistance vs. Drain Current

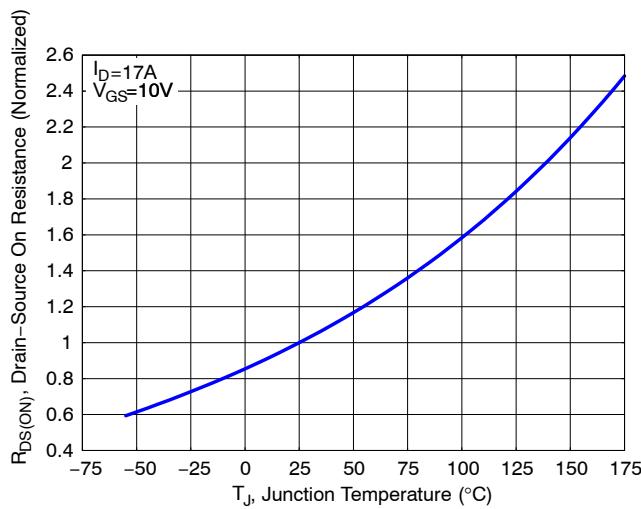


Figure 5. Normalized ON Resistance vs. Junction Temperature

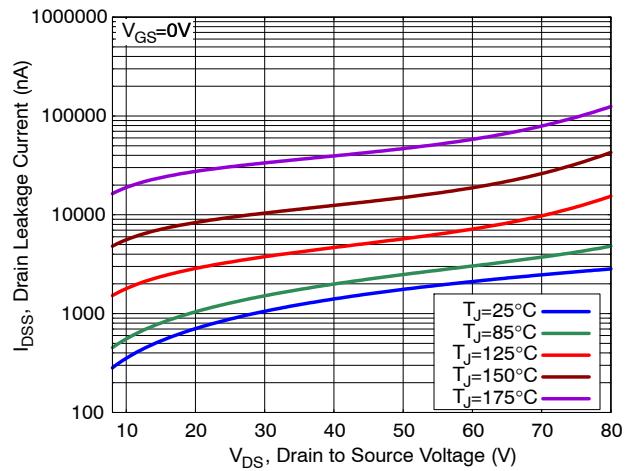


Figure 6. Drain Leakage Current vs. Drain Voltage

TYPICAL CHARACTERISTICS

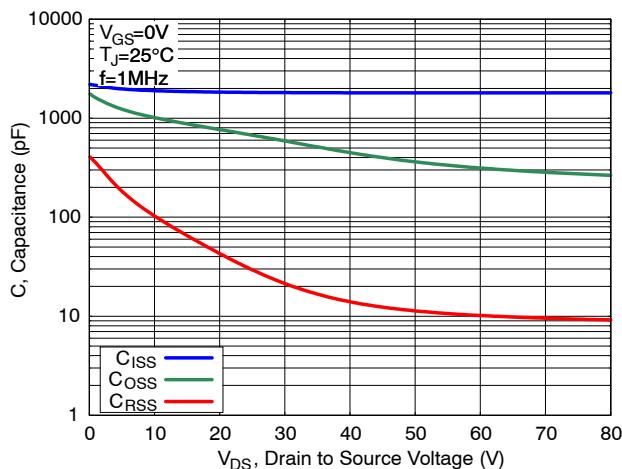


Figure 7. Capacitance Characteristics

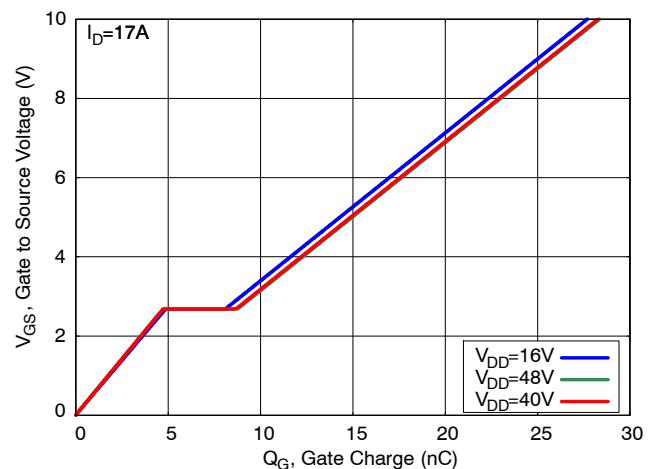


Figure 8. Gate Charge Characteristics

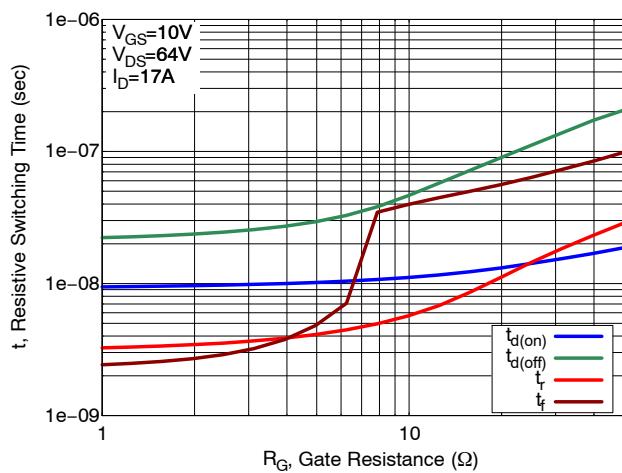


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

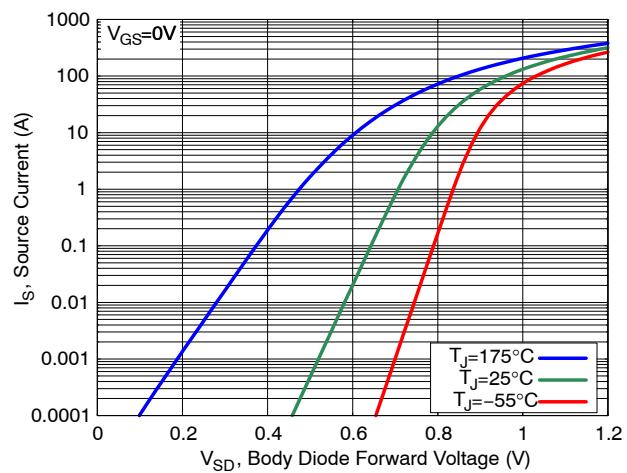


Figure 10. Diode Forward Characteristics

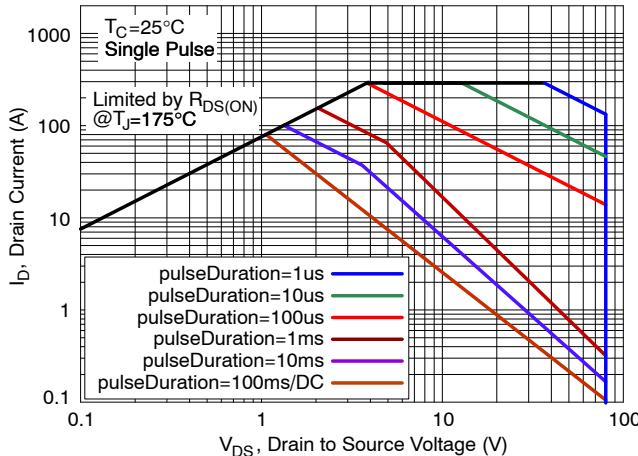


Figure 11. Safe Operating Area (SOA)

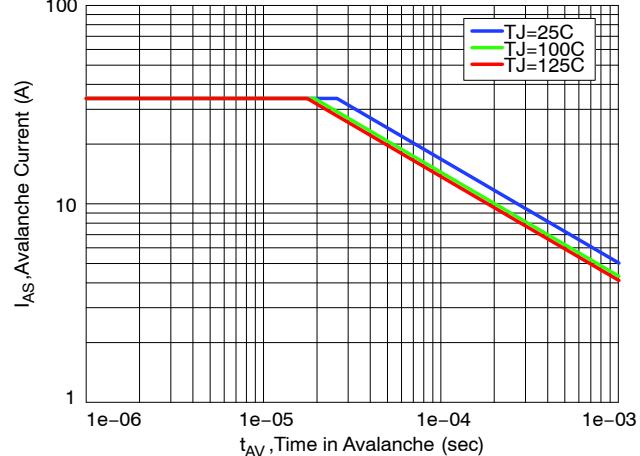


Figure 12. Avalanche Current vs. Pulse Time (UIS)

TYPICAL CHARACTERISTICS

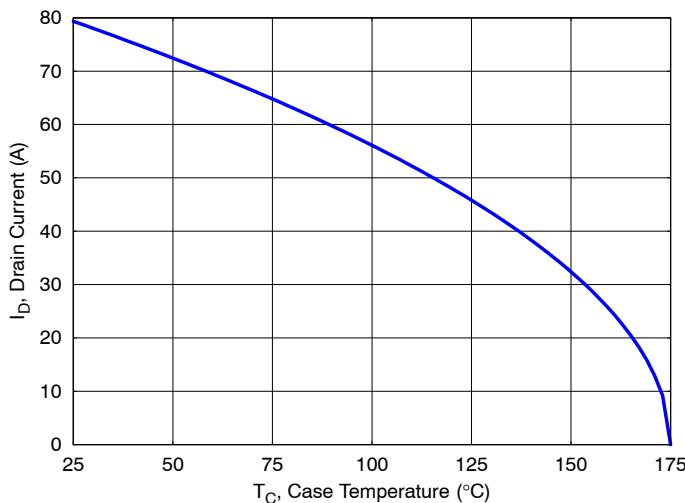


Figure 13. Maximum Current vs. Case Temperature

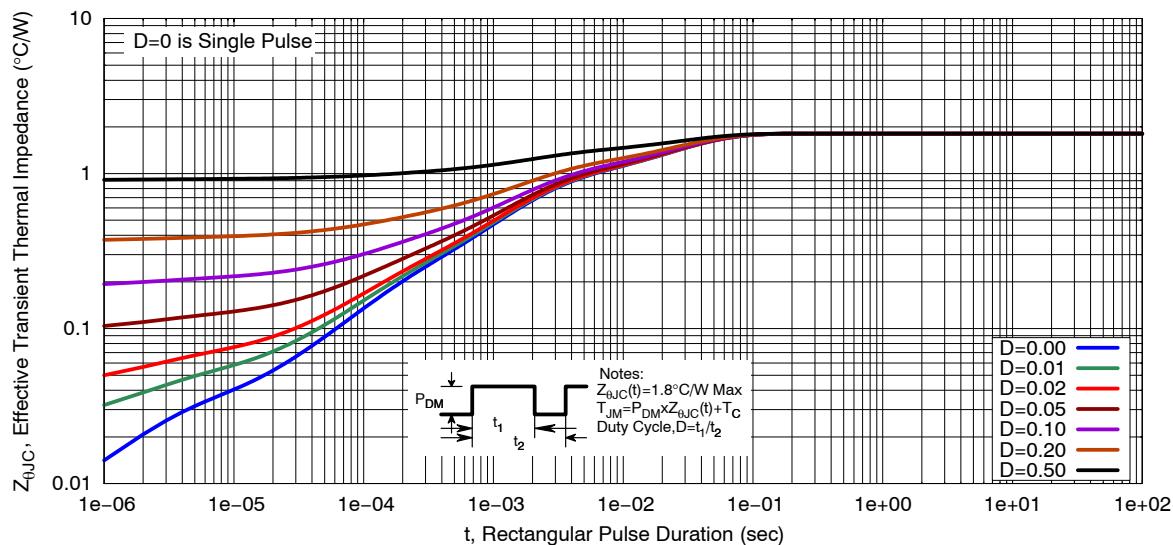


Figure 14. Transient Thermal Response

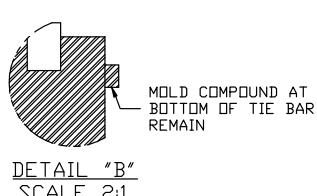
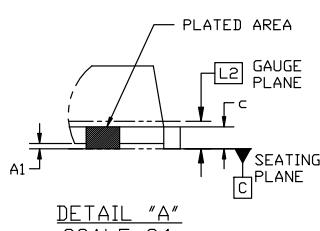
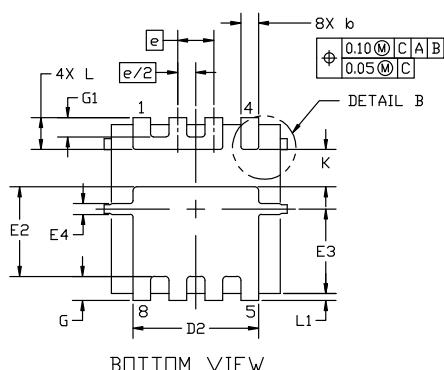
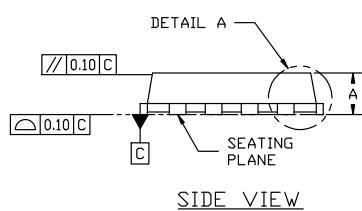
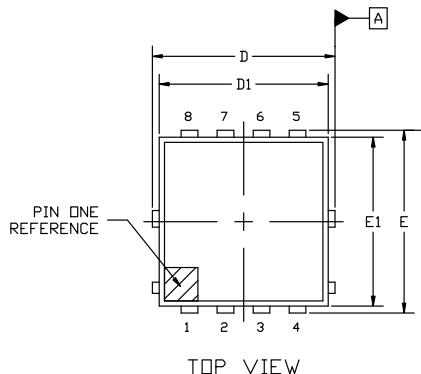
PACKAGE DIMENSIONS

WDFNW8 3.30x3.30x0.75, 0.65P

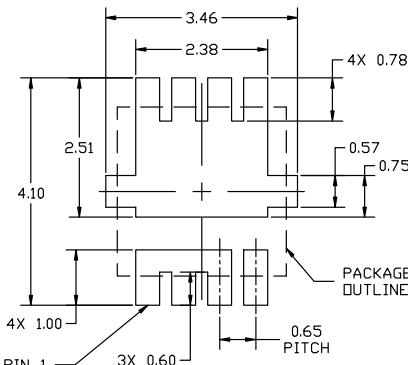
**CASE 515AP
ISSUE A**

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
4. FULL-CUT μ 8FL FUSED WF.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	----	0.05
b	0.23	0.33	0.43
c	0.15	0.20	0.25
D	3.20	3.30	3.40
D1	2.95	3.13	3.30
D2	1.98	2.20	2.40
E	3.20	3.30	3.40
E1	2.80	3.00	3.15
E2	1.40	1.60	1.80
E3	1.35	1.50	1.60
E4	0.15	0.25	0.40
e	0.65 BSC		
G	0.30	0.43	0.55
G1	0.25	0.35	0.45
K	0.55	0.75	0.95
L	0.35	0.52	0.65
L1	0.06	0.15	0.30
L2	0.25 BSC		



RECOMMENDED MOUNTING FOOTPRINT*

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

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