MOSFET - Power, N-Channel, Shielded Gate

80 V, 8.3 mΩ, 61 A

NVTFS8D1N08H

Features

- Small Footprint (3x3 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- NVTFWS8D1N08H − Wettable Flank Option for Enhanced Optical Inspection
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

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

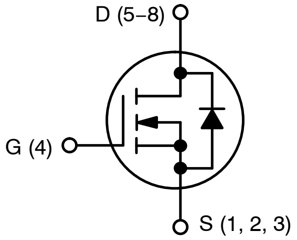
Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	80	V
Gate−to−Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 1, 3)	Steady State	T_C = 25°C	I_D	61	A
		T_C = 100°C		43	
Power Dissipation $R_{\theta JC}$ (Note 1)	Steady State	T_C = 25°C	P_D	75	W
		T_C = 100°C		38	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	T_A = 25°C	I_D	14	A
		T_A = 25°C		10	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	P_D	3.8	W
		T_A = 25°C		1.9	
Pulsed Drain Current	T_A = 25°C, t_p = 100 μs		I_{DM}	216	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	−55 to +175	°C
Source Current (Body Diode)			I_S	61	A
Single Pulse Drain−to−Source Avalanche Energy			E_{AS}	113	mJ
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	260	°C

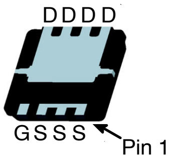
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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. Surface−mounted on FR4 board using a 650 mm^2, 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

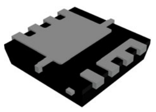
$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	8.3 mΩ @ 10 V	61 A

N−Channel



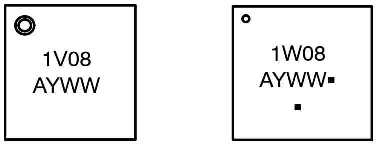


WDFN8
(3.3x3.3, 0.65 P)
CASE 511DY



WDFNW8
(3.3x3.3, 0.65 P)
CASE 515AP

MARKING DIAGRAMS



1V08/1W08 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Microdot may be in either location)

ORDERING INFORMATION

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

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Case − Steady State (Note 4)	$R_{\theta JC}$	2	°C/W
Junction−to−Ambient − Steady State (Note 4)	$R_{\theta JA}$	39	

4. Surface−mounted on FR4 board using a 650 mm^2, 2 oz. Cu pad.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA	80	–	–	V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$		–	52	–	mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 64 V T_J = 25°C	–	–	10	μA
		T_J = 125°C	–	–	250	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 20 V	–	–	100	nA
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 270 μA	2.0	2.8	4.0	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$		–	−7.2	–	mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 16 A	–	6.4	8.3	mΩ
		V_{GS} = 6 V, I_D = 13 A	–	9	12.6	
CHARGES, CAPACITANCES & GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, V_{DS} = 40 V, f = 1 MHz	–	1450	–	pF
Output Capacitance	C_{OSS}		–	776	–	
Reverse Transfer Capacitance	C_{RSS}		–	46	–	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 6 V, V_{DS} = 40 V; I_D = 16 A	–	9	–	nC
		V_{GS} = 10 V, V_{DS} = 40 V; I_D = 16 A	–	23	–	
Threshold Gate Charge	$Q_{G(TH)}$	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 16 A	–	9	–	nC
Gate−to−Source Charge	Q_{GS}		–	7.2	–	
Gate−to−Drain Charge	Q_{GD}		–	4.2	–	
Plateau Voltage	V_{GP}		–	4.6	–	V
SWITCHING CHARACTERISTICS (Note 6)						
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 40 V, I_D = 16 A, R_G = 2.5 Ω	–	9.1	–	ns
Rise Time	t_r		–	13	–	
Turn−Off Delay Time	$t_{d(OFF)}$		–	23.8	–	
Fall Time	t_f		–	2.5	–	
DRAIN−SOURCE DIODE CHARACTERISTICS						
Source−to−Drain Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 16 A	–	0.81	1.2	V
Reverse Recovery Time	t_{RR}	I_F = 16 A, di/dt = 100 A/μs	–	40.5	–	ns
Reverse Recovery Charge	Q_{RR}		–	46.8	–	nC
Charge Time	t_a		–	22.6	–	ns
Discharge Time	t_b		–	17.9	–	ns

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.

5. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

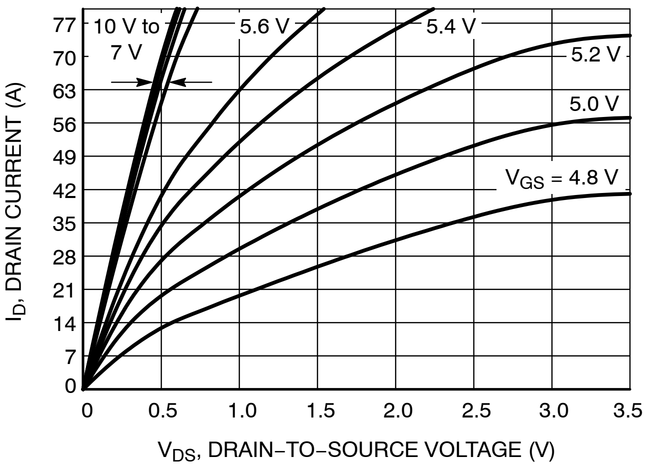


Figure 1. On−Region Characteristics

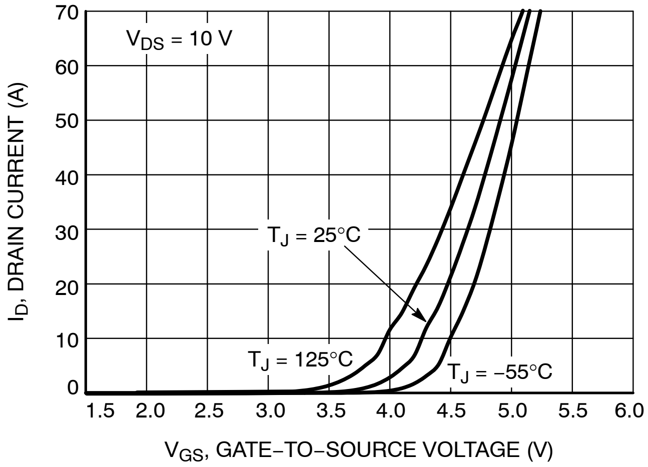


Figure 2. Transfer Characteristics

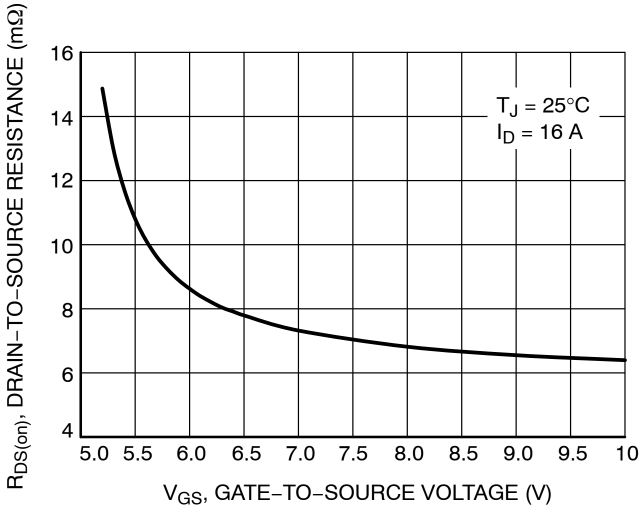


Figure 3. On−Resistance vs. Gate−to−Source Voltage

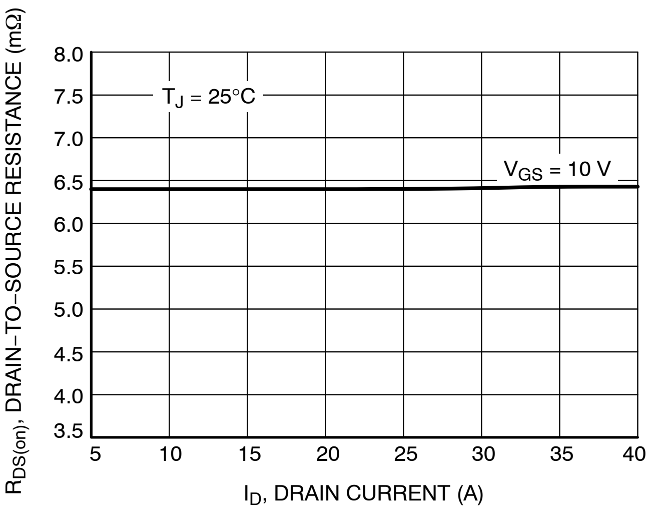


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

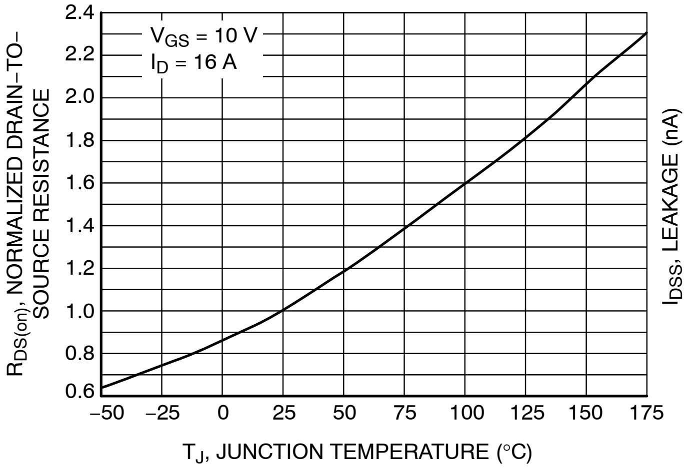


Figure 5. On−Resistance Variation with Temperature

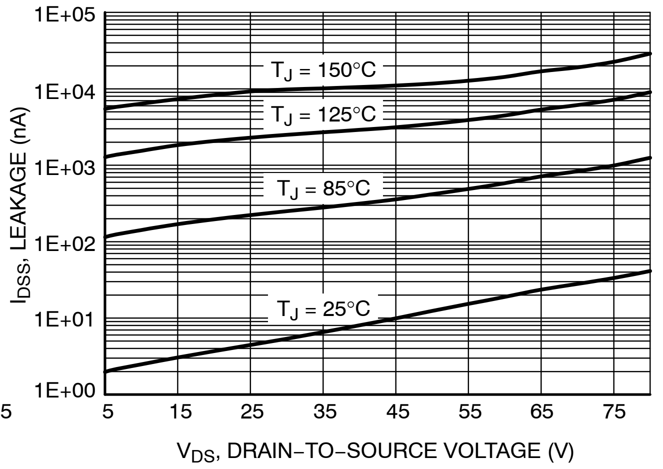


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

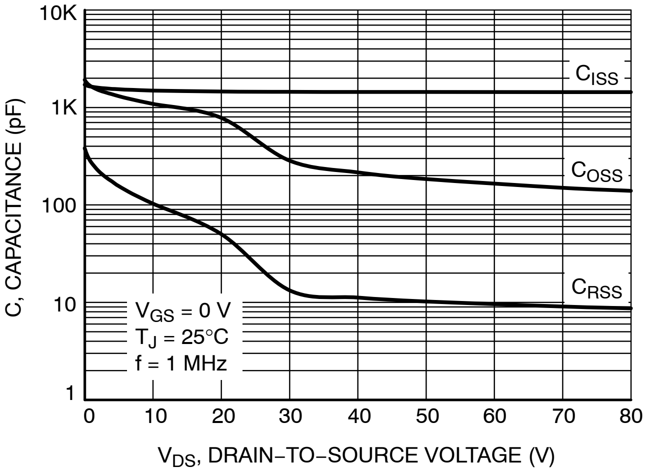


Figure 7. Capacitance Variation

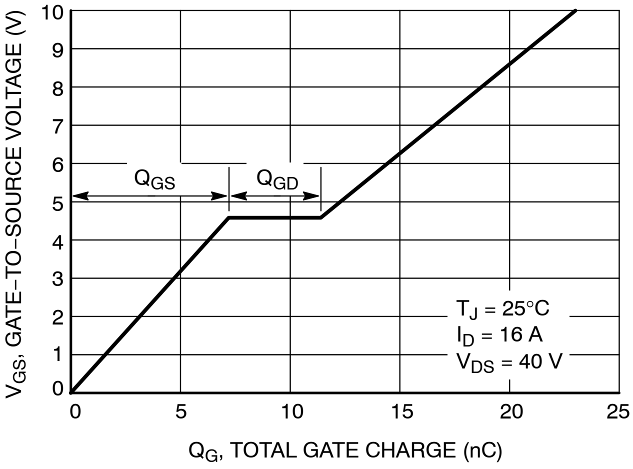


Figure 8. Gate−to−Source Voltage vs. Total Charge

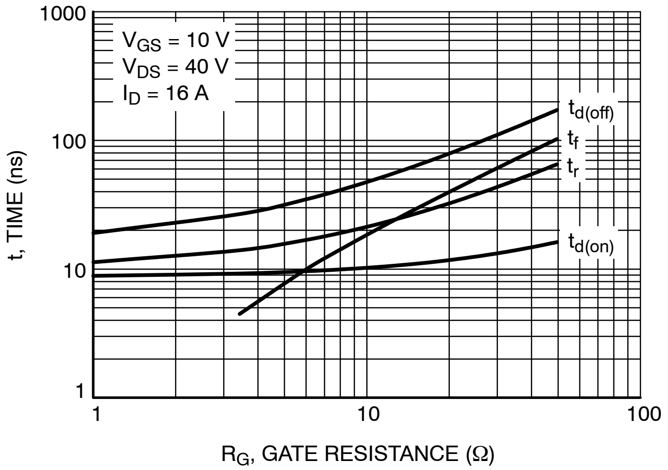


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

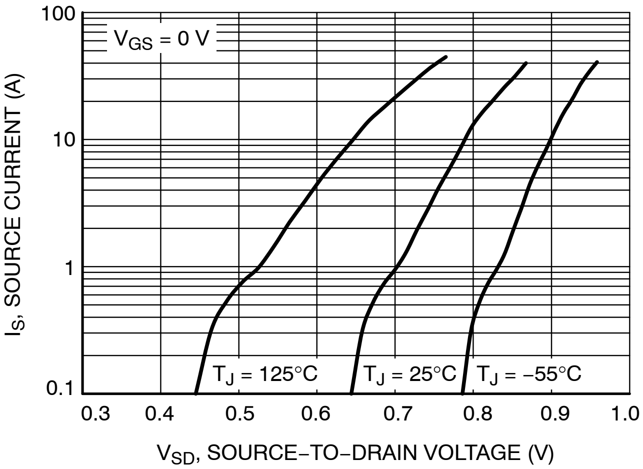


Figure 10. Diode Forward Voltage vs. Current

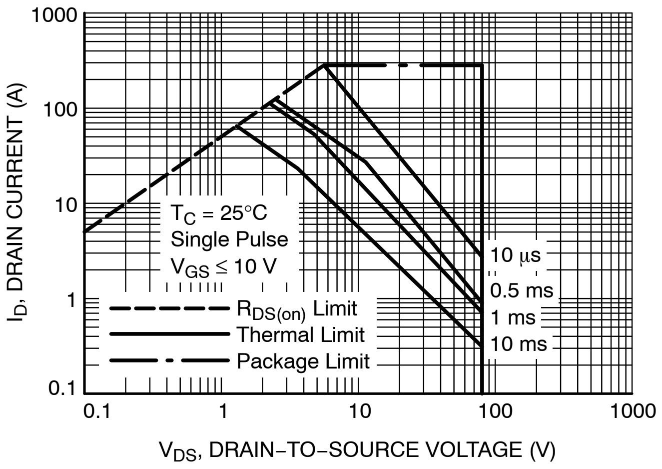


Figure 11. Maximum Rated Forward Biased Safe Operating Area

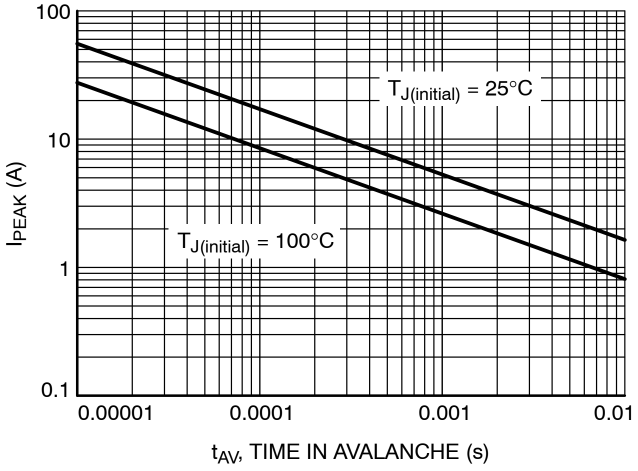


Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

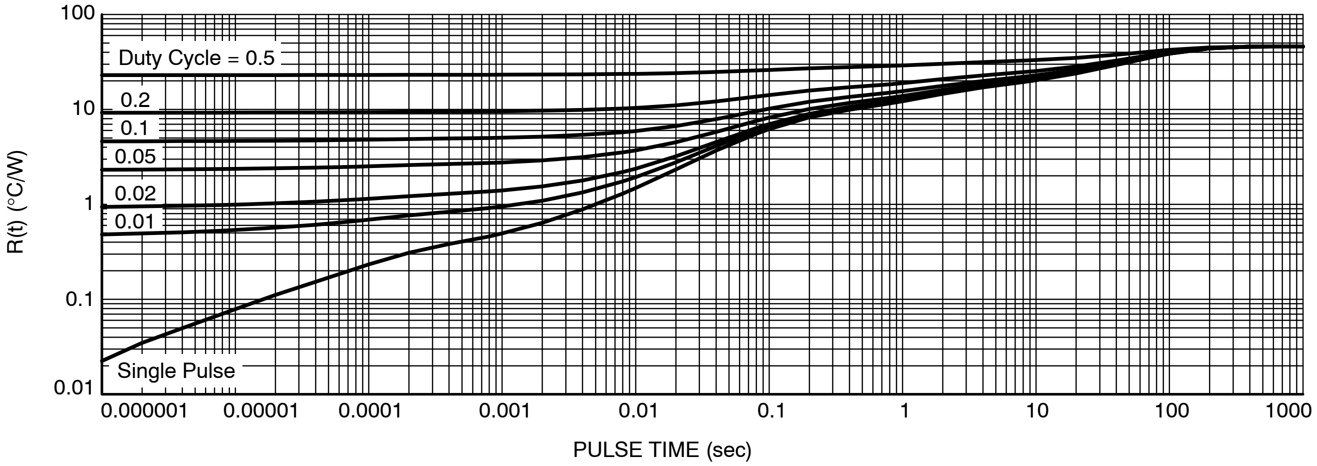


Figure 13. Transient Thermal Impedance

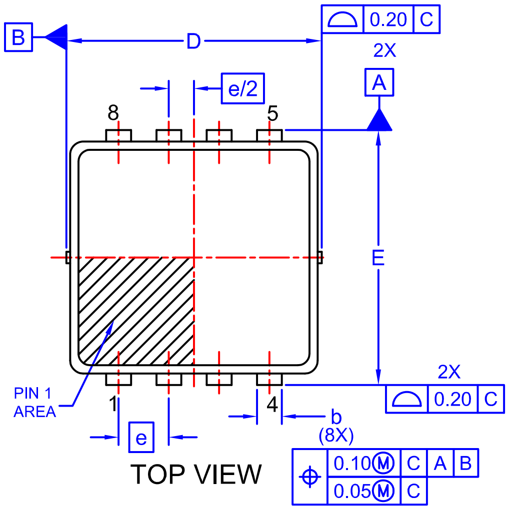
DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NVTFS8D1N08HTAG	1V08	WDFN8 (Pb−Free)	1500 / Tape & Reel
NVTFWS8D1N08HTAG	1W08	WDFNW8 (Pb−Free, Wettable Flanks)	1500 / Tape & Reel

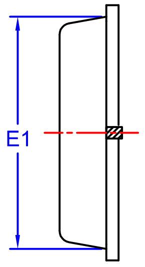
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

WDFN8 3.3x3.3, 0.65P
CASE 511DY
ISSUE A

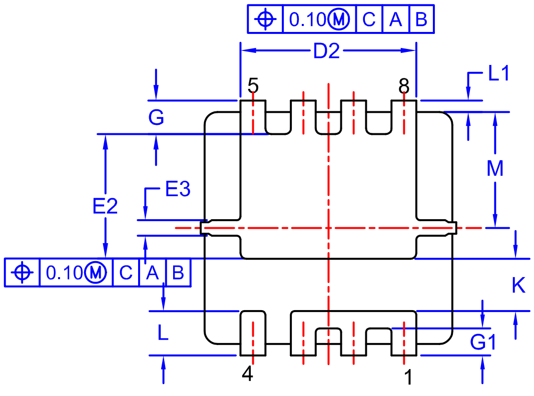
DATE 21 AUG 2018



TOP VIEW

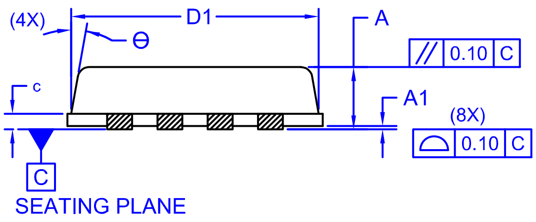


SIDE VIEW



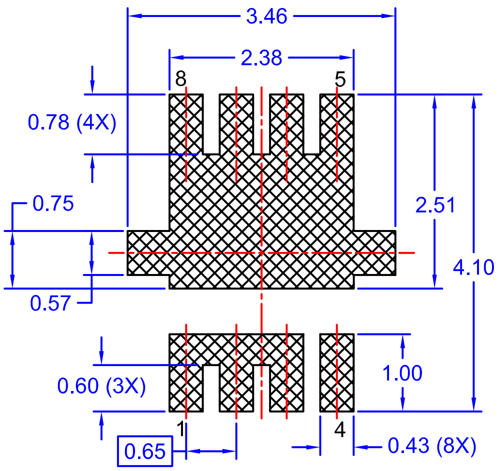
BOTTOM VIEW

NOTES:
1. CONTROLLING DIMENSION: MILLIMETERS
2. DIMENSIONS D1 & E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS NOR GATE BURRS.



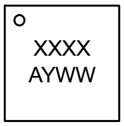
END VIEW

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	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
M	1.35	1.50	1.60
θ	0	-	12



RECOMMENDED LAND PATTERN

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year Code
WW = Work Week Code

*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.

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DESCRIPTION:	**WDFN8 3.3x3.3, 0.65P**	**PAGE 1 OF 1**

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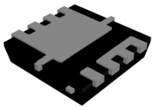
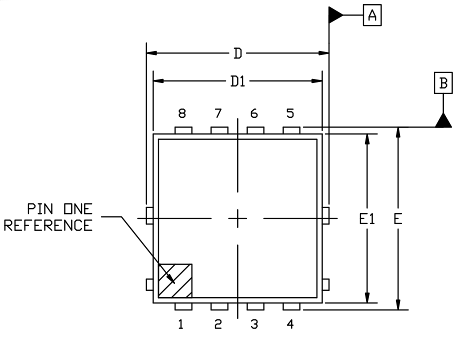
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



WDFNW8 3.30x3.30x0.75, 0.65P
CASE 515AP
ISSUE A

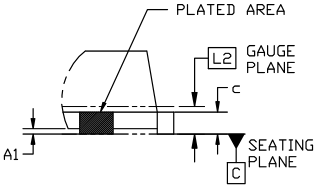
DATE 07 NOV 2023



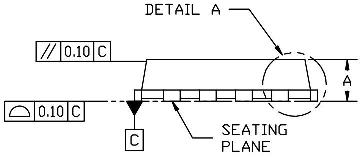
TOP VIEW

NOTES:

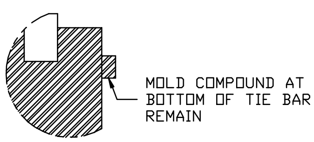
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
4. FULL-CUT u8FL FUSED WF.



DETAIL "A"
SCALE 2:1

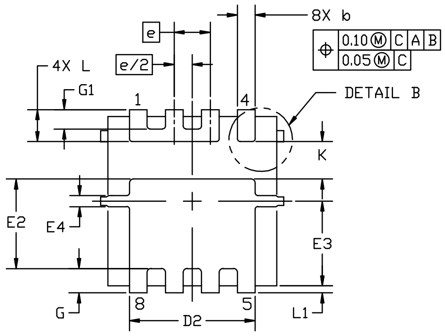


SIDE VIEW

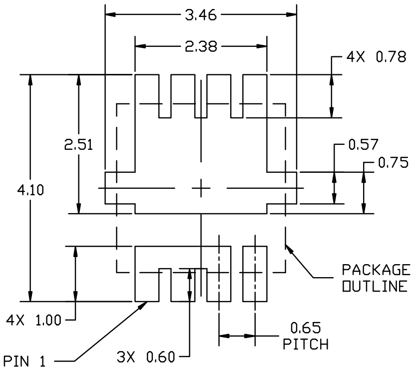


DETAIL "B"
SCALE 2:1

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		



BOTTOM VIEW



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, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

XXXX
AYWW▪
▪

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package
(Note: Microdot may be in either location)

*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.

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DESCRIPTION:	**WDFNW8 3.30x3.30x0.75, 0.65P**	**PAGE 1 OF 1**

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