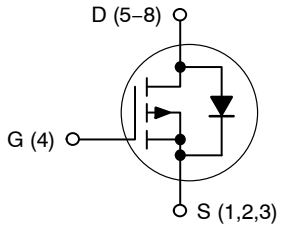
MOSFET - Power, Single P-Channel
-60 V, -6 A, 260 mΩ
NVTFS5124PL

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
−60 V	260 mΩ @ −10 V	−6 A
	380 mΩ @ −4.5 V	

Features

- Small Footprint (3.3 x 3.3 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- NVTFS5124PLWF – Wettable Flanks Product
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

P-Channel MOSFET



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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	−60	V
Gate-to-Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\Psi J\text{-}mb}$ (Notes 1, 2, 3, 4)	Steady State	T_{mb} = 25 °C	I_D	−6.0	A
		T_{mb} = 100 °C		−4.0	
Power Dissipation $R_{\Psi J\text{-}mb}$ (Notes 1, 2, 3)		T_{mb} = 25 °C	P_D	18	W
		T_{mb} = 100 °C		9.0	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 3, 4)	Steady State	T_A = 25 °C	I_D	−2.4	A
		T_A = 100 °C		−1.7	
Power Dissipation $R_{\theta JA}$ (Notes 1, 3)		T_A = 25 °C	P_D	3.0	W
		T_A = 100 °C		1.5	
Pulsed Drain Current	T_A = 25 °C, t_p = 10 μs		I_{DM}	−24	A
Operating Junction and Storage Temperature			T_J, T_{stg}	−55 to +175	°C
Source Current (Body Diode)			I_S	−18	A
Single Pulse Drain-to-Source Avalanche Energy (T_J = 25 °C, V_{DD} = −50 V, V_{GS} = −10 V, $I_{L(pk)}$ = −13 A, L = 0.1 mH, R_G = 25 Ω)			E_{AS}	8.5	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.

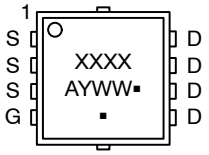
THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Mounting Board (top) – Steady State (Note 2 and 3)	$R_{\Psi J\text{-}mb}$	8.4	°C/W
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	49.2	

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. Psi (Ψ) is used as required per JESD51-12 for packages in which substantially less than 100% of the heat flows to single case surface.
3. Surface-mounted on FR4 board using a 650 mm^2, 2 oz. Cu pad.
4. Continuous DC current rating. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

WDFN8 (μ8FL) CASE 511AB

MARKING DIAGRAM



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

(Note: Microdot may be in either location)

ORDERING INFORMATION

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

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 5.

© Semiconductor Components Industries, LLC, 2013

Downloaded from Arrow.com.

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

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		−60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = −60 V	T_J = 25 °C			−1.0	μA
			T_J = 125 °C			−10	
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 = −250 μA		−1.5		−2.5	V
Drain-to-Source On Resistance	$R_{DS(on)}$	V_{GS} = −10 V, I_D = −3 A			200	260	mΩ
		V_{GS} = −4.5 V, I_D = −3 A			290	380	
Forward Transconductance	g_{FS}	V_{DS} = −15 V, I_D = −5 A		4			S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{iss}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = −25 V			250		pF
Output Capacitance	C_{oss}				27		
Reverse Transfer Capacitance	C_{rss}				17		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −4.5 V, V_{DS} = −48 V, I_D = −3 A			3.5		nC
Threshold Gate Charge	$Q_{G(TH)}$				0.4		
Gate-to-Source Charge	Q_{GS}				1.2		
Gate-to-Drain Charge	Q_{GD}				1.9		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −10 V, V_{DS} = −48 V, I_D = −3 A			6		
SWITCHING CHARACTERISTICS (Note 6)							
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = −4.5 V, V_{DS} = −48 V, I_D = −3 A, R_G = 2.5 Ω			7		ns
Rise Time	t_r				14		
Turn-Off Delay Time	$t_{d(off)}$				13		
Fall Time	t_f				10		
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = −3 A	T_J = 25 °C		−0.87	−1.0	V
			T_J = 125 °C		−0.74		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_S/dt = 100 A/μs, I_S = −3 A			17		ns
Charge Time	t_a				14		
Discharge Time	t_b				3		
Reverse Recovery Charge	Q_{RR}				19		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.

5. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
6. Switching characteristics are independent of operating junction temperatures.

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

TYPICAL CHARACTERISTICS

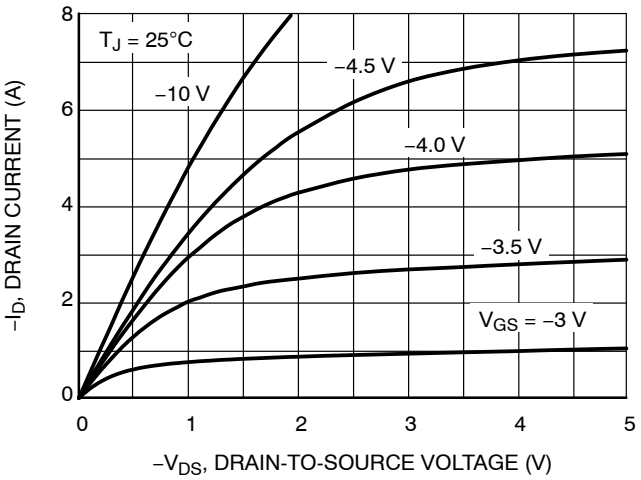


Figure 1. On-Region Characteristics

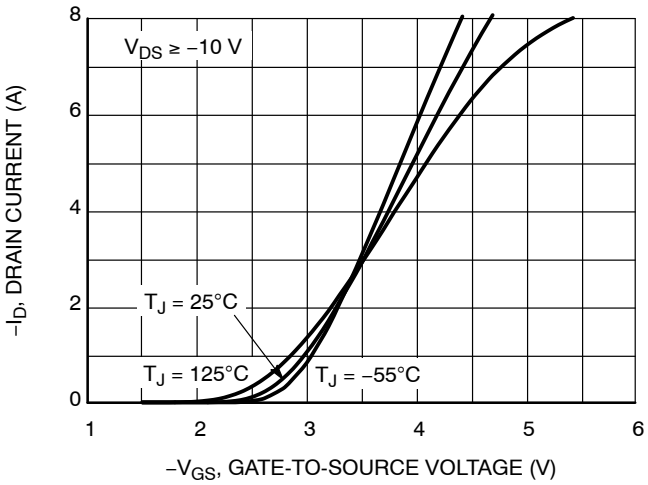


Figure 2. Transfer Characteristics

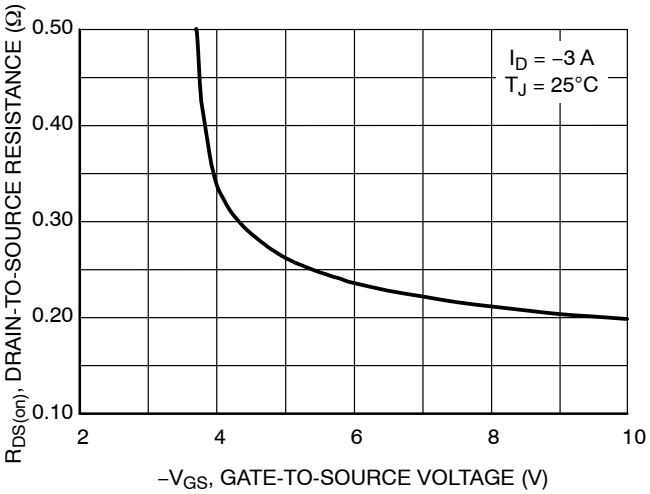


Figure 3. On-Resistance vs. Gate-to-Source Voltage

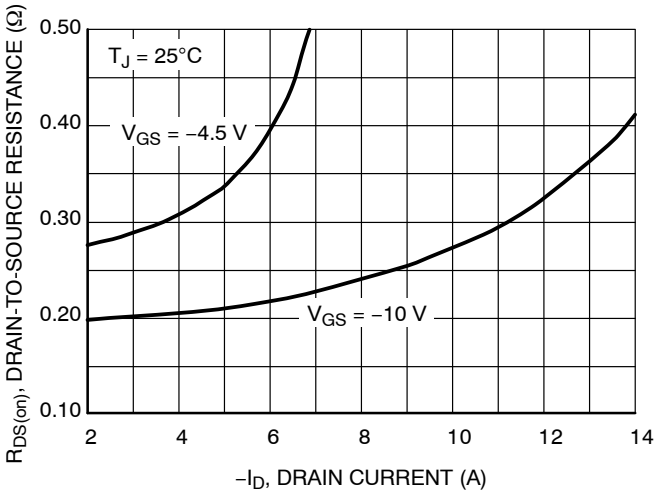


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

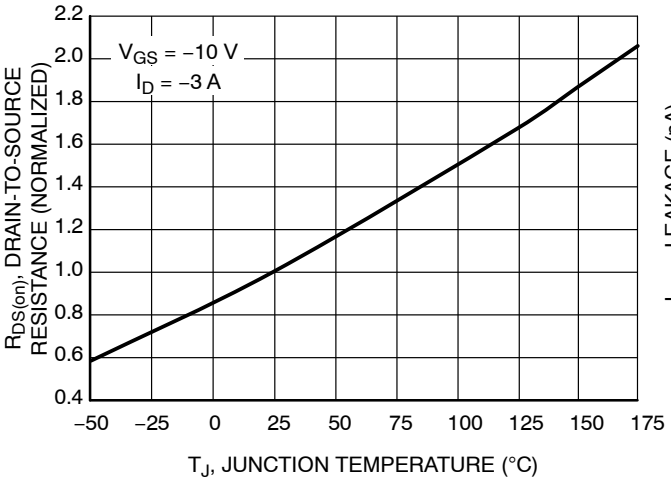


Figure 5. On-Resistance Variation with Temperature

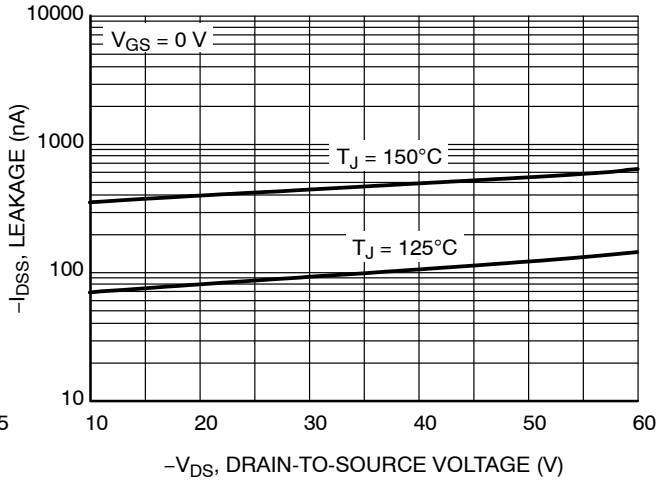


Figure 6. Drain-to-Source Leakage Current vs. Voltage

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

TYPICAL CHARACTERISTICS

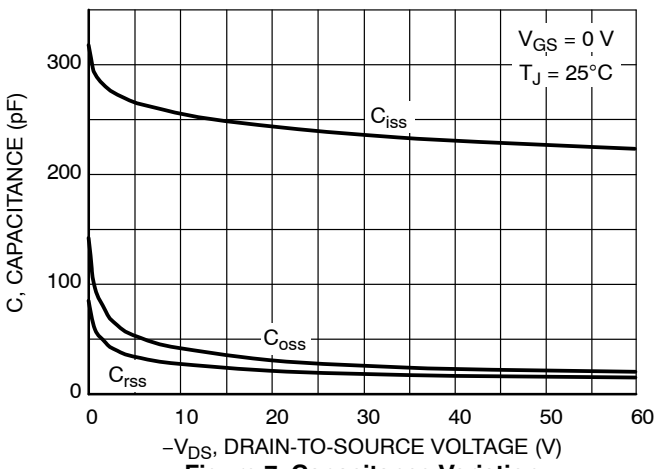


Figure 7. Capacitance Variation

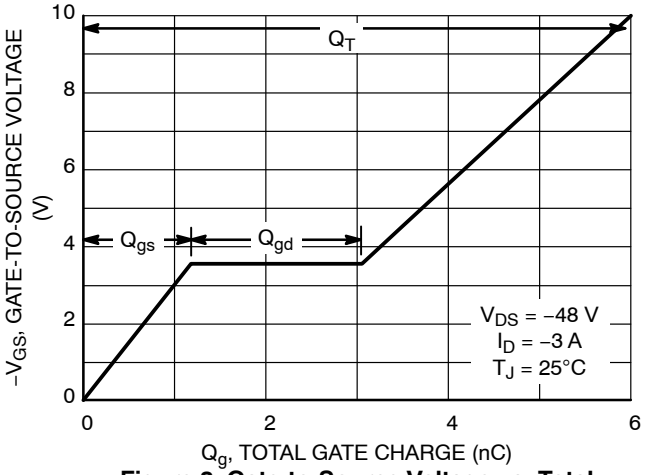


Figure 8. Gate-to-Source Voltage vs. Total Charge

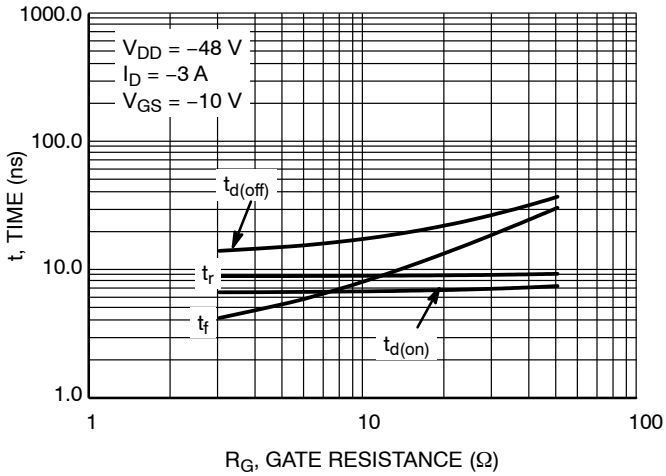


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

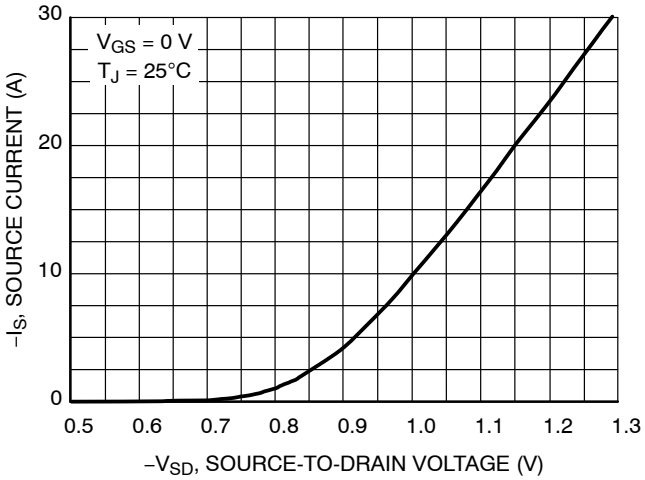


Figure 11. Diode Forward Voltage vs. Current

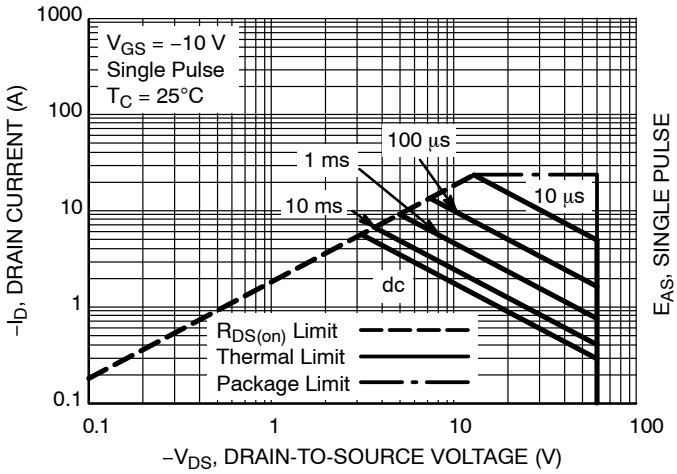


Figure 10. Maximum Rated Forward Biased Safe Operating Area

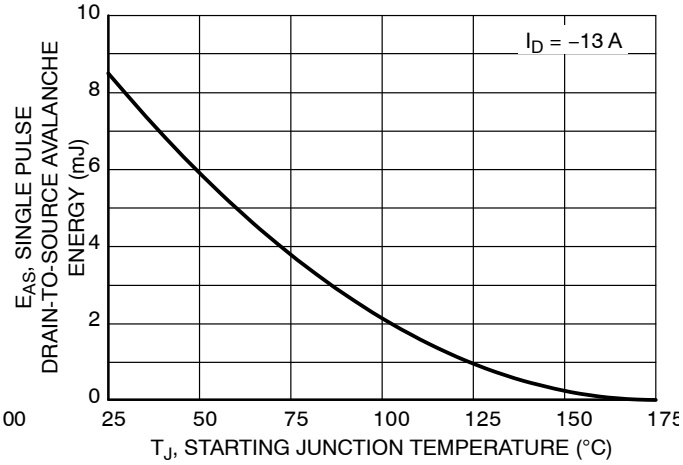


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

TYPICAL CHARACTERISTICS

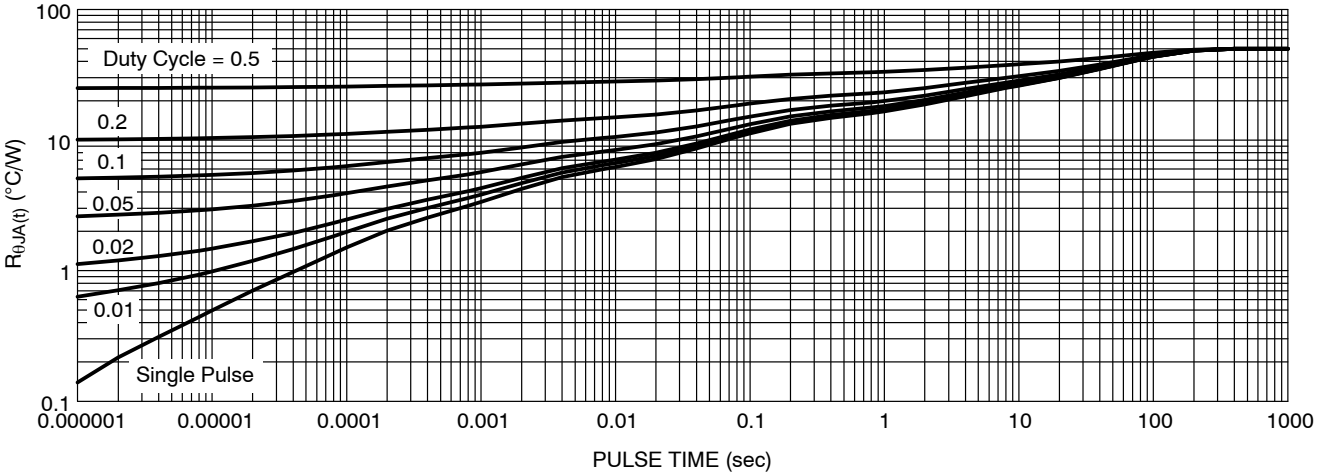


Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NVTFS5124PLTAG	5124	WDFN8 (Pb-Free)	1500 / Tape & Reel
NVTFS5124PLWFTAG	24LW	WDFN8 (Pb-Free)	1500 / Tape & Reel
NVTFS5124PLTWG	5124	WDFN8 (Pb-Free)	5000 / Tape & Reel

DISCONTINUED (Note 7)

NVTFS5124PLWFTWG	24LW	WDFN8 (Pb-Free)	5000 / 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.

7. **DISCONTINUED:** These devices are not available. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

REVISION HISTORY

Revision	Description of Changes	Date
3	Rebranded the Data Sheet to **onsemi** format. NVTFS5124PLWFTWG OPN Marked as Discontinued.	2/26/2026

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

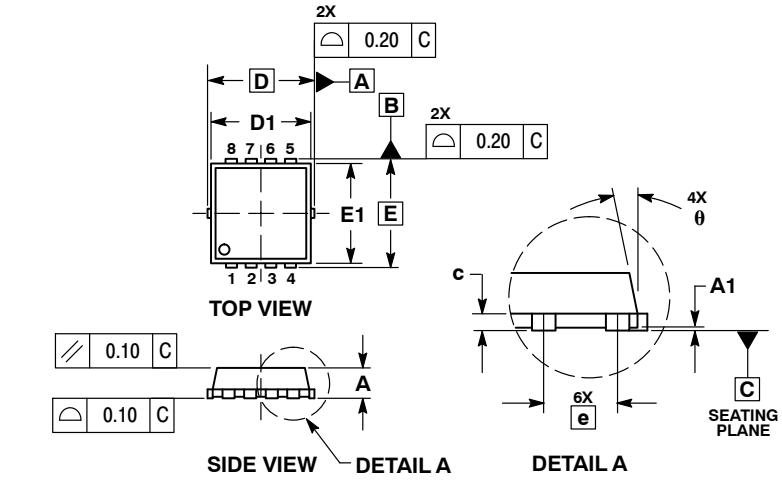
Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

SCALE 2:1

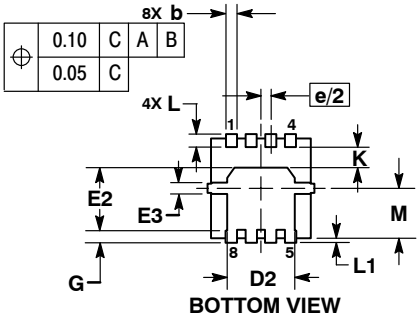
WDFN8 3.3x3.3, 0.65P
CASE 511AB
ISSUE D

DATE 23 APR 2012

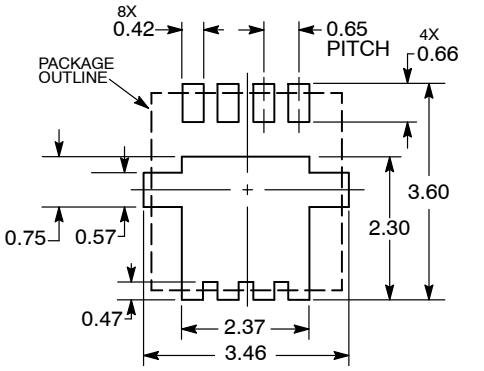


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	---	0.05	0.000	---	0.002
b	0.23	0.30	0.40	0.009	0.012	0.016
c	0.15	0.20	0.25	0.006	0.008	0.010
D	3.30 BSC			0.130 BSC		
D1	2.95	3.05	3.15	0.116	0.120	0.124
D2	1.98	2.11	2.24	0.078	0.083	0.088
E	3.30 BSC			0.130 BSC		
E1	2.95	3.05	3.15	0.116	0.120	0.124
E2	1.47	1.60	1.73	0.058	0.063	0.068
E3	0.23	0.30	0.40	0.009	0.012	0.016
e	0.65 BSC			0.026 BSC		
G	0.30	0.41	0.51	0.012	0.016	0.020
K	0.65	0.80	0.95	0.026	0.032	0.037
L	0.30	0.43	0.56	0.012	0.017	0.022
L1	0.06	0.13	0.20	0.002	0.005	0.008
M	1.40	1.50	1.60	0.055	0.059	0.063
θ	0 °	---	12 °	0 °	---	12 °



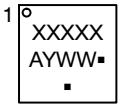
SOLDERING FOOTPRINT*



DIMENSION: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

*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:	98AON30561E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WDFN8 3.3X3.3, 0.65P	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.

Downloaded from Arrow.com.

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

Downloaded from Arrow.com.