

NTTFS4823N

Power MOSFET 30 V, 50 A, Single N-Channel, μ 8FL

Features

- Small Footprint (3.3 x 3.3 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- DC-DC Converters
- High Side Switching

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	30	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JA}$ (Note 1)	I_D	12.6	A
		9.1	
Power Dissipation $R_{\theta JA}$ (Note 1)	P_D	2.1	W
Continuous Drain Current $R_{\theta JA} \leq 10$ s (Note 1)	I_D	17.5	A
		12.6	
Power Dissipation $R_{\theta JA} \leq 10$ s (Note 1)	P_D	4.0	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)	I_D	7.1	A
		5.1	
Power Dissipation $R_{\theta JA}$ (Note 2)	P_D	0.66	W
Continuous Drain Current $R_{\theta JC}$ (Note 1)	I_D	50	A
		36	
Power Dissipation $R_{\theta JC}$ (Note 1)	P_D	32.9	W
Pulsed Drain Current	$T_A = 25^\circ\text{C}, t_p = 10 \mu\text{s}$	I_{DM}	A
Operating Junction and Storage Temperature		T_J, T_{stg}	$^\circ\text{C}$
Source Current (Body Diode)		I_S	A
Drain to Source dV/dt		dV/dt	V/ns
Single Pulse Drain-to-Source Avalanche Energy ($T_J = 25^\circ\text{C}, V_{DD} = 50$ V, $V_{GS} = 10$ V, $I_L = 25$ A _{pk} , $L = 0.1$ mH, $R_G = 25$ Ω)		E_{AS}	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.
2. Surface-mounted on FR4 board using the minimum recommended pad size.

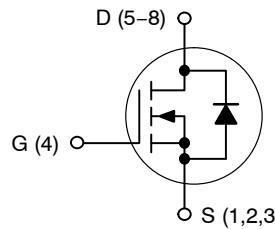


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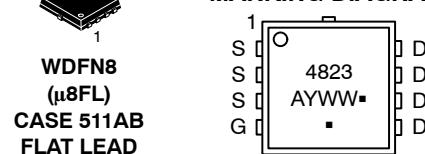
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
30 V	10.5 m Ω @ 10 V	
	17.5 m Ω @ 4.5 V	50 A

N-Channel MOSFET



MARKING DIAGRAM



4823 = 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 [†]
NTTFS4823NTAG	WDFN8 (Pb-Free)	1500/Tape & Reel
NTTFS4823NTWG	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 Specification Brochure, BRD8011/D.

NTTFS4823N

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	3.8	°C/W
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	59.4	
Junction-to-Ambient – Steady State (Note 4)	$R_{\theta JA}$	190.2	
Junction-to-Ambient – (t ≤ 10 s) (Note 3)	$R_{\theta JA}$	31.1	

3. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.
 4. Surface-mounted on FR4 board using the minimum recommended pad size.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			25		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 24 \text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 125^\circ\text{C}$		10	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			±100	nA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = 250 \mu\text{A}$	1.5	1.9	2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			6		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10 \text{ V to } 11.5 \text{ V}$	$I_D = 20 \text{ A}$		8.1	10.5
			$I_D = 10 \text{ A}$		8.0	
		$V_{GS} = 4.5 \text{ V}$	$I_D = 20 \text{ A}$		13.5	17.5
			$I_D = 10 \text{ A}$		13	
Forward Transconductance	g_{FS}	$V_{DS} = 1.5 \text{ V}$, $I_D = 20 \text{ A}$		34		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $f = 1.0 \text{ MHz}$, $V_{DS} = 12 \text{ V}$		750	1013	pF
Output Capacitance	C_{oss}			175	237	
Reverse Transfer Capacitance	C_{rss}			100	150	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5 \text{ V}$, $V_{DS} = 15 \text{ V}$, $I_D = 20 \text{ A}$		6.5	9.0	nC
	$Q_{G(TH)}$			0.8		
	Q_{GS}			2.5		
	Q_{GD}			2.9		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 11.5 \text{ V}$, $V_{DS} = 15 \text{ V}$, $I_D = 20 \text{ A}$		15		nC

SWITCHING CHARACTERISTICS (Note 6)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5 \text{ V}$, $V_{DS} = 15 \text{ V}$, $I_D = 15 \text{ A}$, $R_G = 3.0 \Omega$		12		ns
Rise Time	t_r			22		
Turn-Off Delay Time	$t_{d(off)}$			14		
Fall Time	t_f			4		

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

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS (Note 6)						
Turn-On Delay Time	t _{d(on)}	V _{GS} = 11.5 V, V _{DS} = 15 V, I _D = 15 A, R _G = 3.0 Ω	7.0			ns
Rise Time	t _r		18			
Turn-Off Delay Time	t _{d(off)}		20			
Fall Time	t _f		2.0			

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 20 A	T _J = 25°C		0.93	1.1	V
			T _J = 125°C		0.83		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 20 A		13			ns
Charge Time	t _a			7.5			
Discharge Time	t _b			5.5			
Reverse Recovery Charge	Q _{RR}			4.0		nC	

PACKAGE PARASITIC VALUES

Source Inductance	L _S	T _A = 25°C		0.38		nH
Drain Inductance	L _D			0.054		
Gate Inductance	L _G			1.3		
Gate Resistance	R _G			0.65	2.0	Ω

5. Pulse Test: pulse width = 300 μs, duty cycle ≤ 2%.

6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

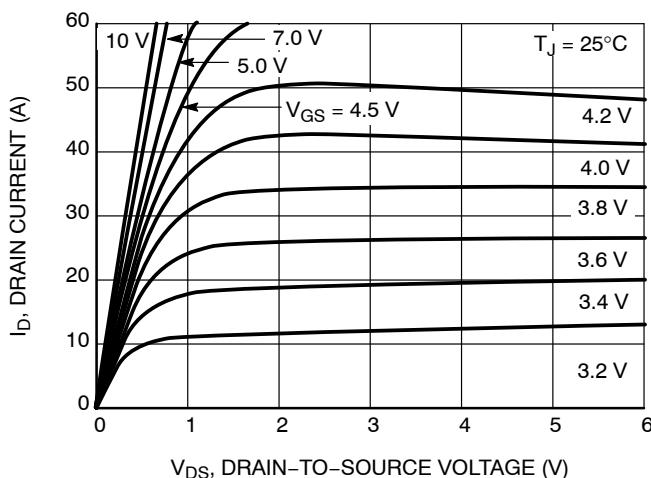


Figure 1. On-Region Characteristics

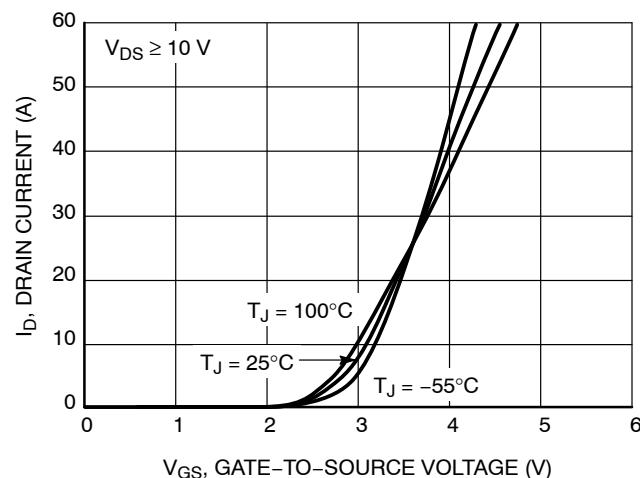


Figure 2. Transfer Characteristics

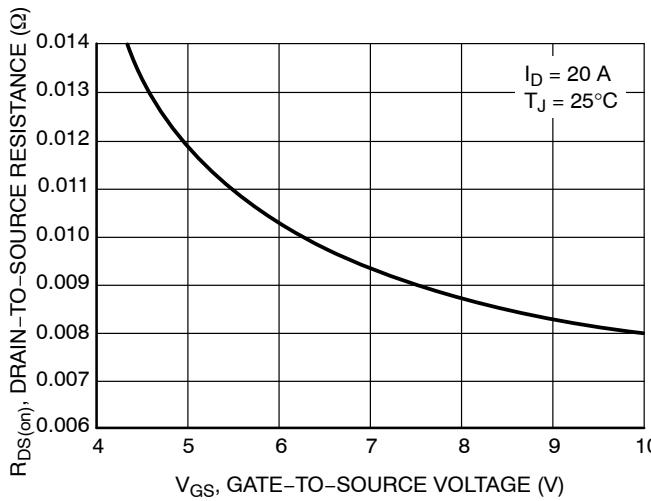


Figure 3. On-Resistance vs. Gate-to-Source Voltage

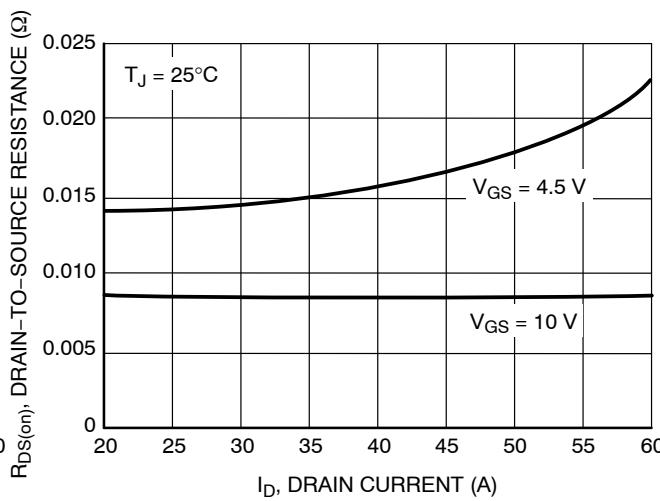


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

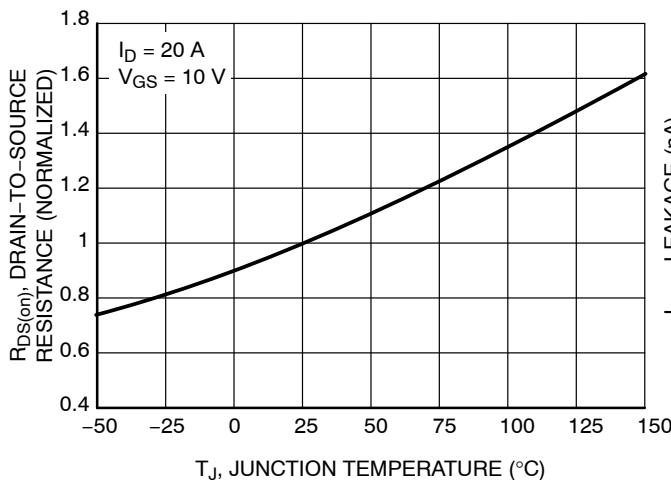


Figure 5. On-Resistance Variation with Temperature

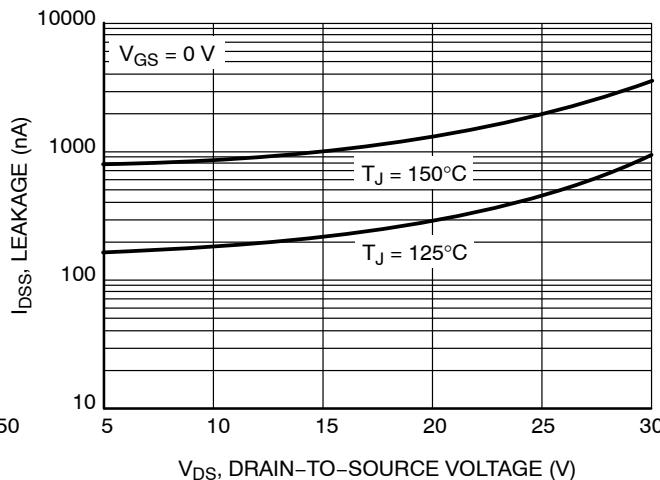


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

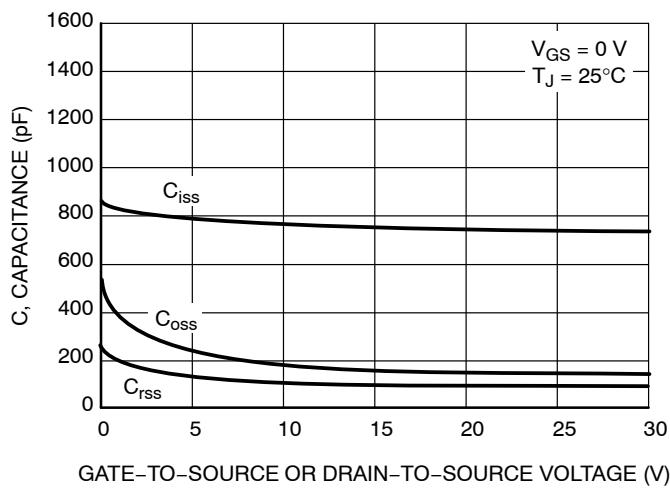


Figure 7. Capacitance Variation

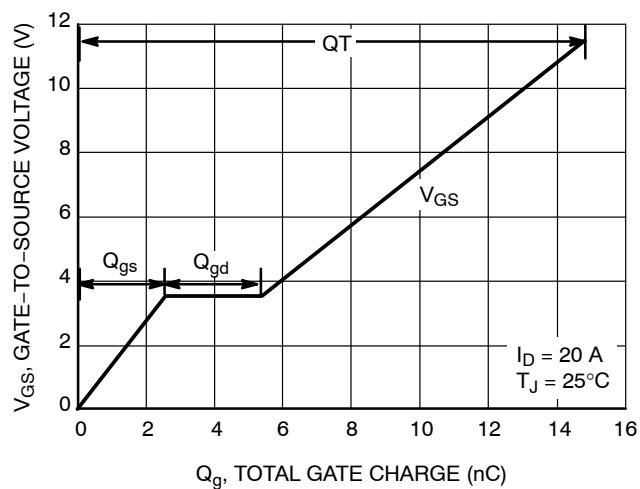


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

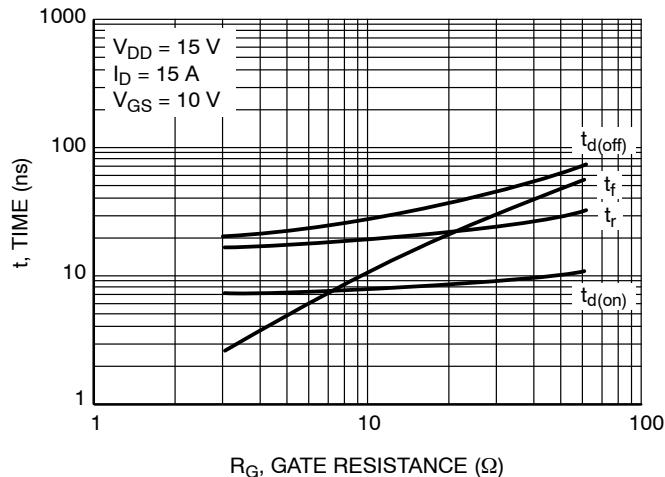


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

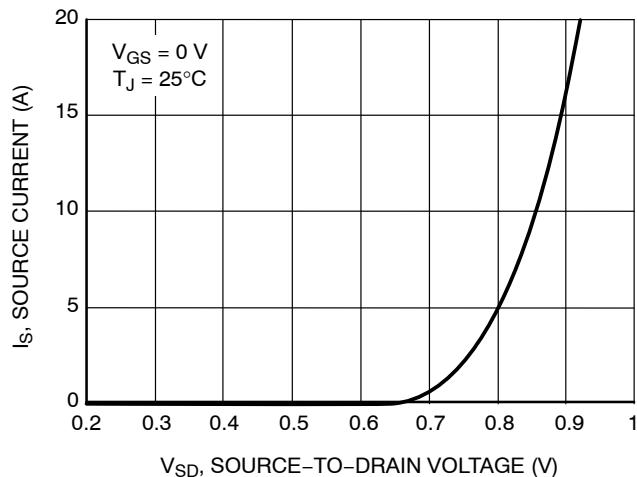


Figure 10. Diode Forward Voltage vs. Current

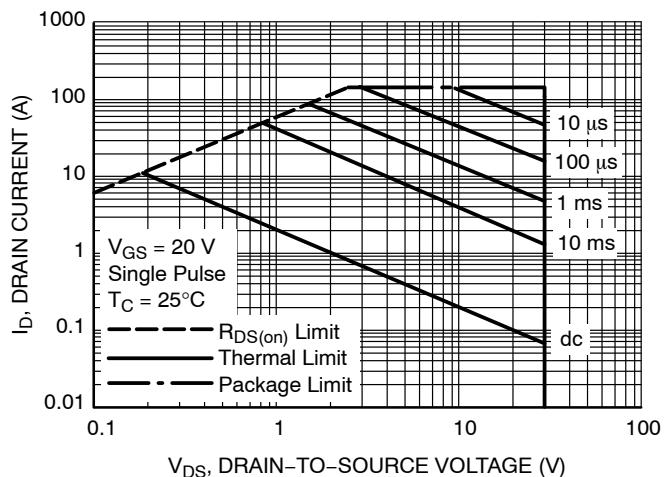


Figure 11. Maximum Rated Forward Biased Safe Operating Area

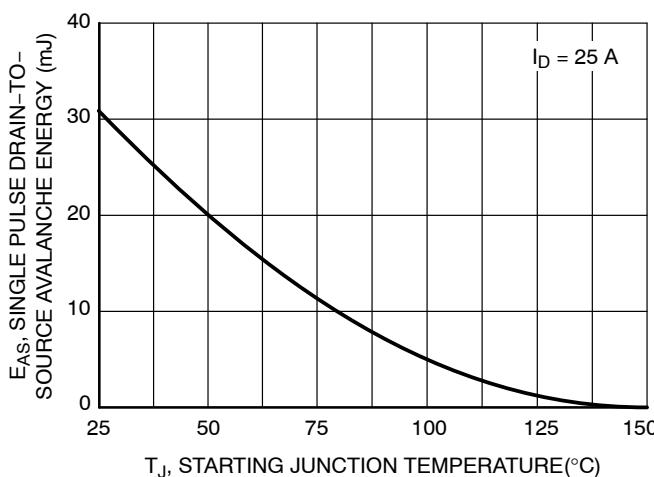


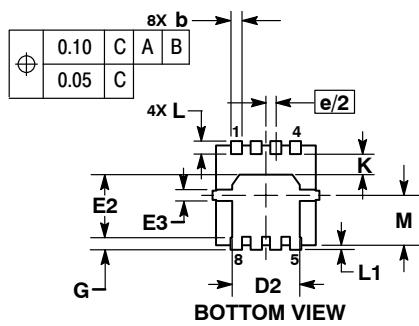
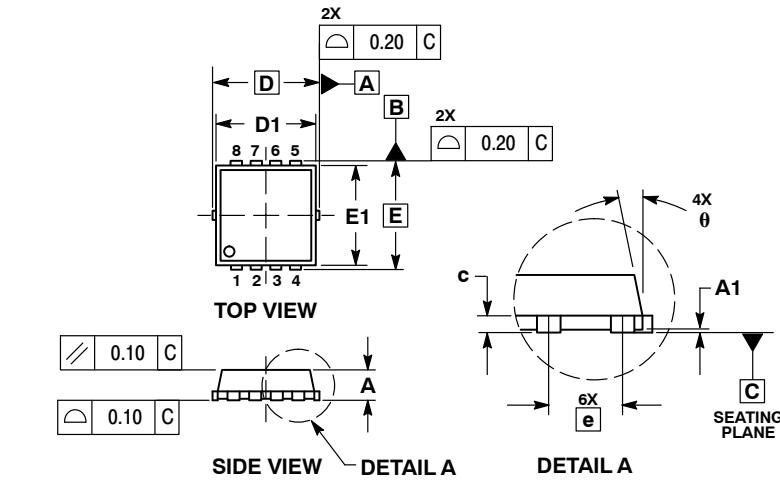
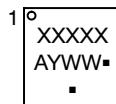
Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature



SCALE 2:1

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

DATE 23 APR 2012

GENERIC
MARKING DIAGRAM*

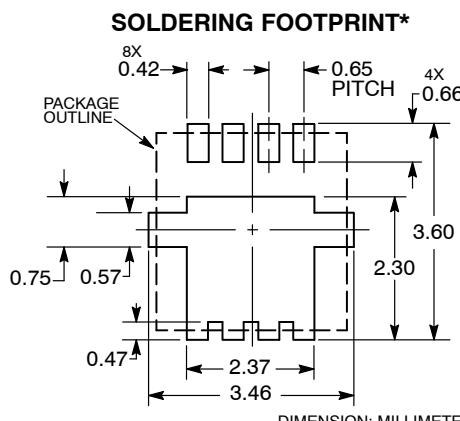
XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
■ = Pb-Free Package

*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.

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.

DIM	MILLIMETERS			INCHES		
	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	3.30	0.130	BSC	0.130
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	3.30	0.130	BSC	0.130
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	0.65	0.026	BSC	0.026
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



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

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DESCRIPTION:	WDFN8 3.3X3.3, 0.65P	PAGE 1 OF 1

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