NTTFS4821N

[MOSFET](#) – Power, Single, N-Channel, µ8FL
30 V, 57 A

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

ON Semiconductor®

http://onsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
30 V	7.0 mΩ @ 10 V	57 A
	10.8 mΩ @ 4.5 V	

N−Channel MOSFET

D (5–8)

G (4)

S (1,2,3)

MARKING DIAGRAM

WDFN8
(µ8FL)
CASE 511AB
FLAT LEAD

1		
S		D
S	4821	D
S	AYWW∎	D
G	∎	D

4821 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
∎ = Pb−Free Package

(Note: Microdot may be in either location)

MAXIMUM RATINGS (T_J = 25°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)	Steady State	T_A = 25°C	I_D	13.5	A
		T_A = 85°C		9.7	
Power Dissipation $R_{\theta JA}$ (Note 1)		T_A = 25°C	P_D	2.1	W
Continuous Drain Current $R_{\theta JA} \leq 10$ s (Note 1)		T_A = 25°C	I_D	18.6	A
		T_A = 85°C		13.4	
Power Dissipation $R_{\theta JA} \leq 10$ s (Note 1)		T_A = 25°C	P_D	4.1	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)		T_C = 25°C	I_D	7.5	A
		T_C = 85°C		5.4	
Power Dissipation $R_{\theta JA}$ (Note 2)		T_C = 25°C	P_D	0.66	W
Continuous Drain Current $R_{\theta JC}$ (Note 1)		T_C = 25°C	I_D	57	A
		T_C = 85°C		41	
Power Dissipation $R_{\theta JC}$ (Note 1)		T_C = 25°C	P_D	38.5	W
Pulsed Drain Current	T_A = 25°C, t_p = 10 µs		I_{DM}	171	A
Operating Junction and Storage Temperature			T_J, T_{stg}	−55 to +150	°C
Source Current (Body Diode)			I_S	38.5	A
Drain to Source dV/dt			dV/dt	6.0	V/ns
Single Pulse Drain−to−Source Avalanche Energy (T_J = 25°C, V_{DD} = 50 V, V_{GS} = 10 V, I_L = 33 A_{pk}, L = 0.1 mH, R_G = 25 Ω)			E_{AS}	55	mJ
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	260	°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.
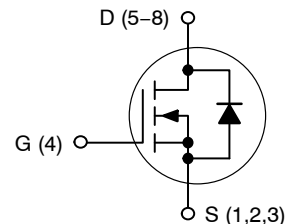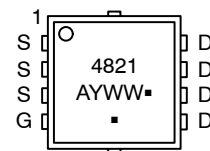1. Surface−mounted on FR4 board using 1 sq−in pad, 1 oz Cu.

ORDERING INFORMATION

Device	Package	Shipping†
NTTFS4821NTAG	WDFN8 (Pb−Free)	1500/Tape & Reel
NTTFS4821NTWG	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.

2. Surface−mounted on FR4 board using the minimum recommended pad size.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Case (Drain)	$R_{\theta JC}$	3.25	°C/W
Junction−to−Ambient − Steady State (Note 3)	$R_{\theta JA}$	58.3	
Junction−to−Ambient − Steady State (Note 4)	$R_{\theta JA}$	188.4	
Junction−to−Ambient − (t ≤ 10 s) (Note 3)	$R_{\theta JA}$	30.6	

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
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA		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 V, V_{DS} = 24 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	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 V to 11.5 V	I_D = 20 A		5.8	7.0	mΩ
			I_D = 10 A		5.7		
		V_{GS} = 4.5 V	I_D = 20 A		8.8	10.8	
			I_D = 10 A		8.6		
Forward Transconductance	g_{FS}	V_{DS} = 15 V, I_D = 30 A			53		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{iss}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 12 V			1300	1755	pF
Output Capacitance	C_{oss}				300	405	
Reverse Transfer Capacitance	C_{rss}				150	233	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, I_D = 30 A			10.5	15	nC
Threshold Gate Charge	$Q_{G(TH)}$				1.3		
Gate−to−Source Charge	Q_{GS}				3.9		
Gate−to−Drain Charge	Q_{GD}				4.5		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 11.5 V, V_{DS} = 15 V, I_D = 20 A			24		nC
SWITCHING CHARACTERISTICS (Note 6)							
Turn−On Delay Time	$t_{d(on)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, I_D = 15 A, R_G = 3.0 Ω			12		ns
Rise Time	t_r				22		
Turn−Off Delay Time	$t_{d(off)}$				16		
Fall Time	t_f				4.5		

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

NTTFS4821N

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			8.5		ns
Rise Time	t_r				20		
Turn−Off Delay Time	$t_{d(off)}$				23		
Fall Time	t_f				2.8		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 20 A	T_J = 25°C		0.9	1.0	V
			T_J = 125°C		0.78		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, d_{IS}/d_t = 100 A/μs, I_S = 20 A			9.0		ns
Charge Time	t_a				6.5		
Discharge Time	t_b				2.5		
Reverse Recovery Charge	Q_{RR}				1.7		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				0.6	2.0	Ω

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

NTTFS4821N

TYPICAL CHARACTERISTICS
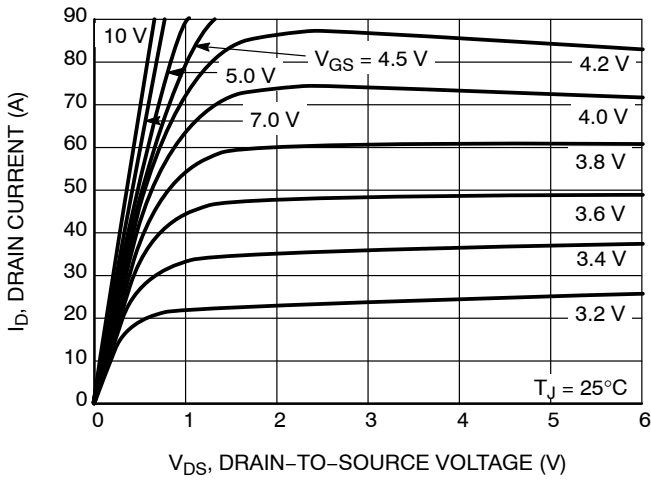
Figure 1. On−Region Characteristics
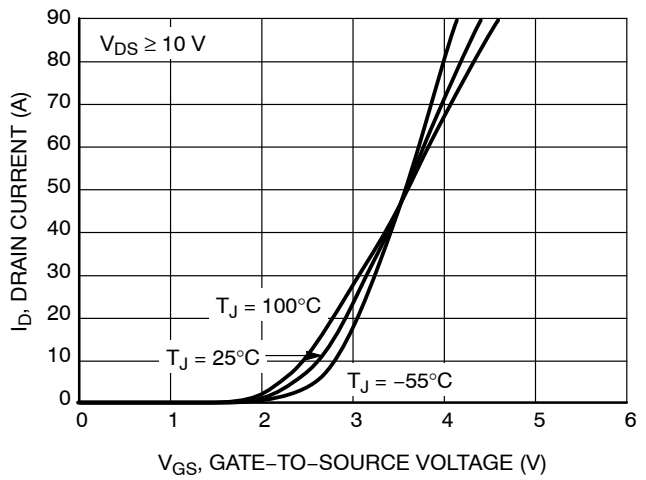
Figure 2. Transfer Characteristics
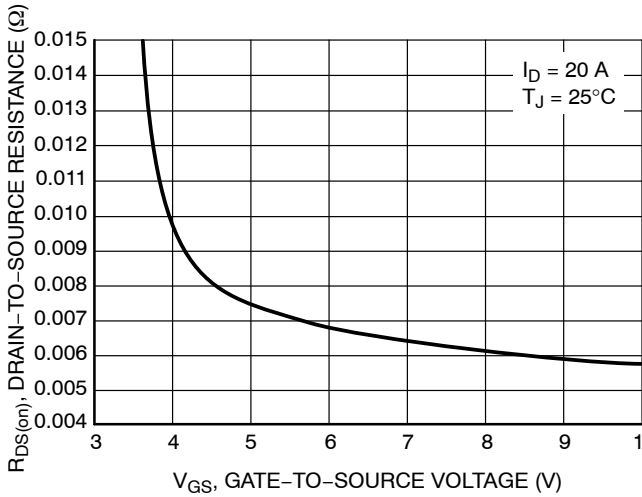
Figure 3. On−Resistance vs. Gate−to−Source
Voltage
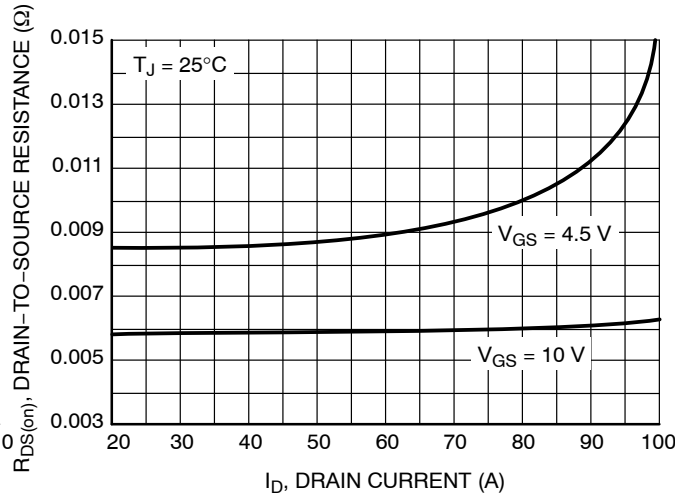
Figure 4. On−Resistance vs. Drain Current and
Gate Voltage
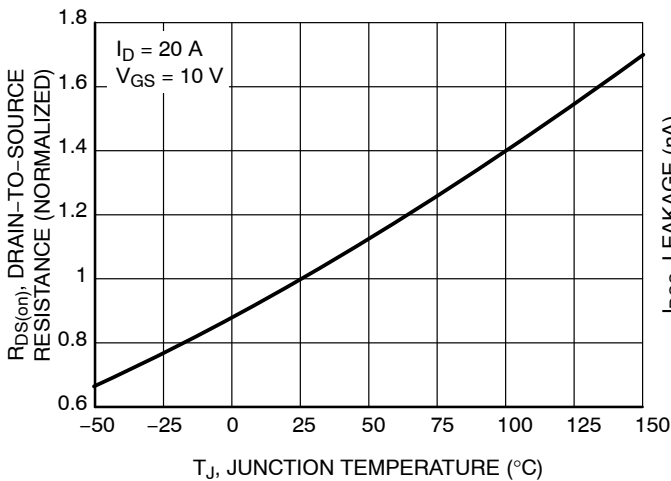
Figure 5. On−Resistance Variation with
Temperature
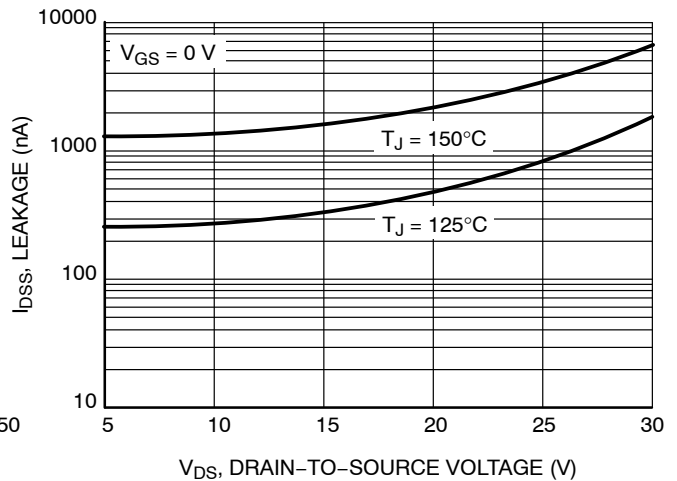
Figure 6. Drain−to−Source Leakage Current
vs. Voltage

TYPICAL CHARACTERISTICS
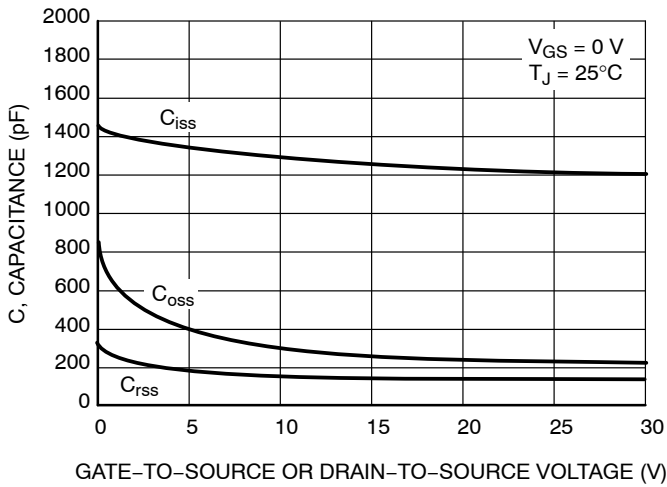
Figure 7. Capacitance Variation
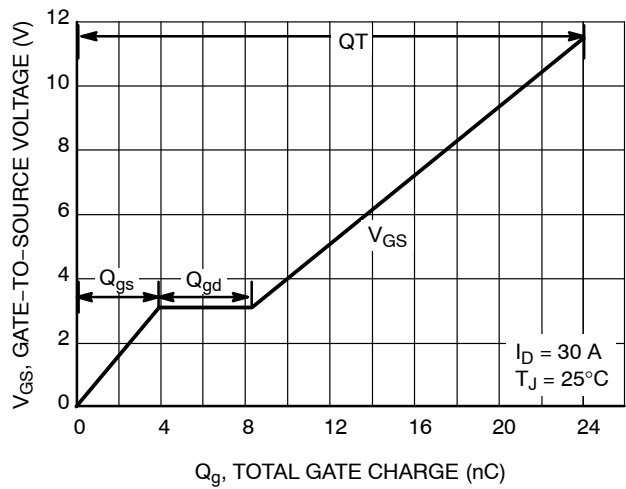
**Figure 8. Gate–to–Source and
Drain–to–Source Voltage vs. Total Charge**
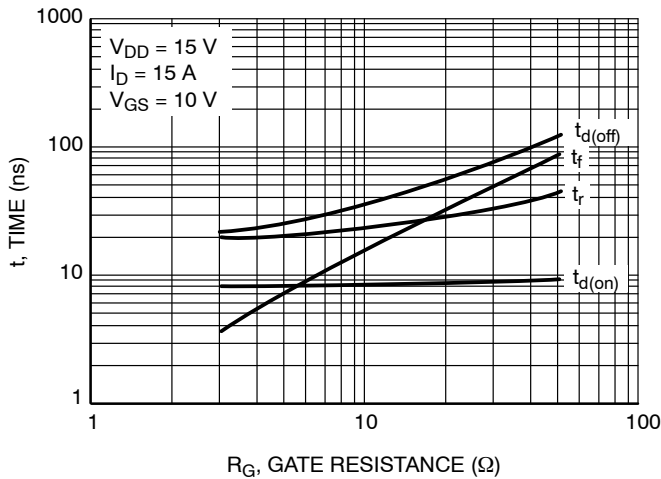
**Figure 9. Resistive Switching Time Variation
vs. Gate Resistance**
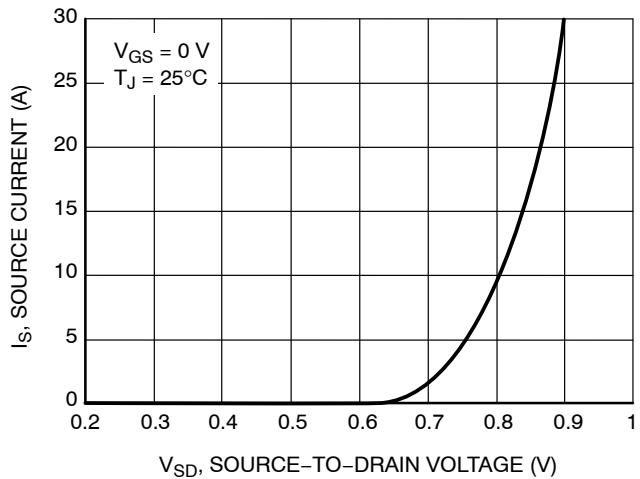
Figure 10. Diode Forward Voltage vs. Current
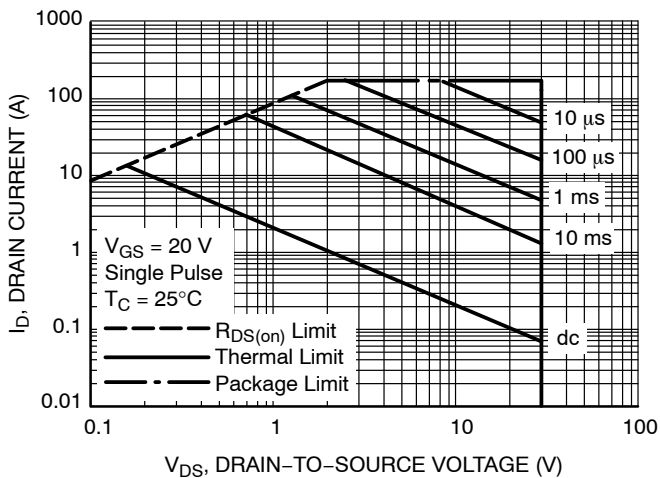
**Figure 11. Maximum Rated Forward Biased
Safe Operating Area**
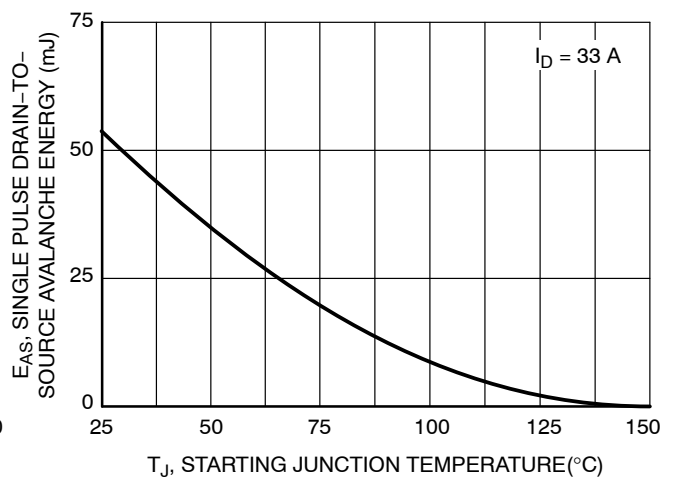
**Figure 12. Maximum Avalanche Energy vs.
Starting Junction Temperature**

onsemi

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

SCALE 2:1

DATE 23 APR 2012

TOP VIEW

SIDE VIEW

DETAIL A

DETAIL A

SEATING PLANE

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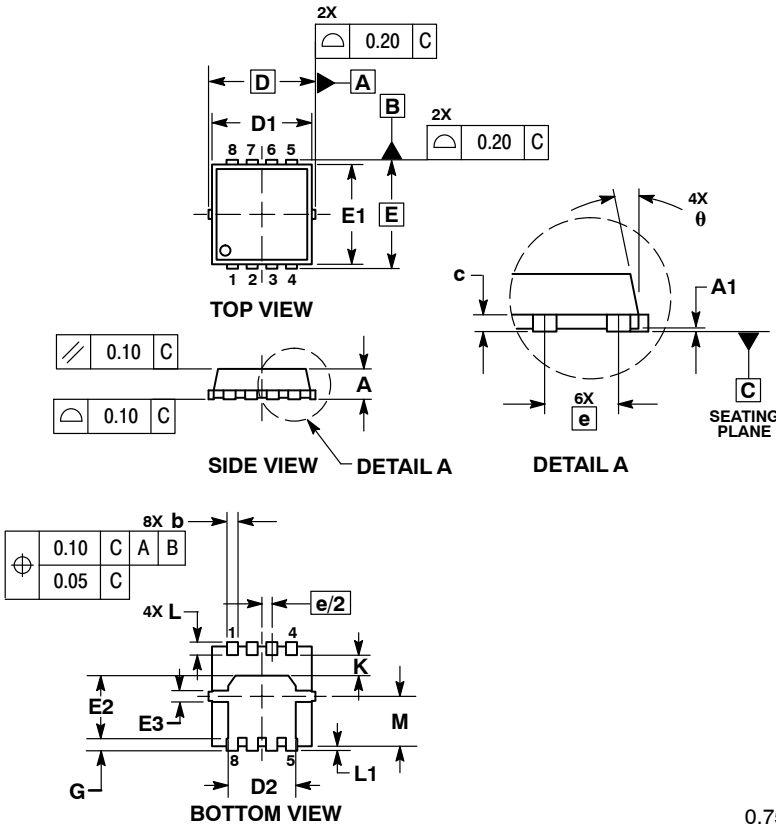
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

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			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
AYWW■

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

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

◊