

NTTFS5820NL

MOSFET – Power

60 V, 37 A, 11.5 mΩ



Features

- Low $R_{DS(on)}$
- Low Capacitance
- Optimized Gate Charge
- These Devices are Pb-Free and are RoHS Compliant

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JA}$ (Note 1)	I_D	11	A
		7	
Power Dissipation $R_{\theta JA}$ (Note 1)	P_D	2.7	W
		1.1	
Continuous Drain Current $R_{\theta JC}$ (Note 1)	I_D	37	A
		24	
Power Dissipation $R_{\theta JC}$ (Note 1)	P_D	33	W
		13	
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	A
Operating Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°C
Source Current (Body Diode)	I_S	37	A
Single Pulse Drain-to-Source Avalanche Energy	E_{AS}	48	mJ
	I_{AS}	31	A
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.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 1)	$R_{\theta JC}$	3.8	°C/W
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	46.7	

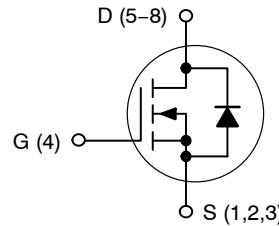
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces.

ON Semiconductor®

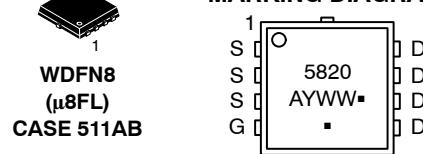
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on) \text{ MAX}}$	$I_D \text{ MAX}$
60 V	11.5 mΩ @ 10 V 15 mΩ @ 4.5 V	37 A

N-Channel MOSFET



MARKING DIAGRAM



5820 = 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 [†]
NTTFS5820NLTAG	WDFN8 (Pb-Free)	1500 / Tape & Reel
NTTFS5820NLTWG	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.

NTTFS5820NL

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 V, I _D = 250 μA		60		V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS/T_J}			57		mV/°C
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 2)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250 μA		1.5		2.3	V
Negative Threshold Temperature Coefficient	V _{GS(TH)/T_J}				6.2		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 8.7 A		10.1	11.5	mΩ
		V _{GS} = 4.5 V	I _D = 7.3 A		13.0	15	
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 10 A			24.6		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C _{iss}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V		1462		pF
Output Capacitance	C _{oss}			150		
Reverse Transfer Capacitance	C _{rss}			96		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 48 V, I _D = 10 A		28		nC
		V _{GS} = 4.5 V, V _{DS} = 48 V, I _D = 10 A		15		
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = 4.5 V, V _{DS} = 48 V, I _D = 10 A		1		nC
Gate-to-Source Charge	Q _{GS}			4		
Gate-to-Drain Charge	Q _{GD}			8		
Plateau Voltage	V _{GP}			3		V
Gate Resistance	R _G			0.62		Ω

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(on)}	V _{GS} = 4.5 V, V _{DS} = 48 V, I _D = 10 A, R _G = 2.5 Ω		10		ns
Rise Time	t _r			28		
Turn-Off Delay Time	t _{d(off)}			19		
Fall Time	t _f			22		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25°C		0.79	1.2	V
			T _J = 125°C		0.65		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, d _{IS} /dt = 100 A/μs, I _S = 10 A			19		ns
Charge Time	t _a				13		
Discharge Time	t _b				6		
Reverse Recovery Charge	Q _{RR}				15		nC

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

TYPICAL CHARACTERISTICS

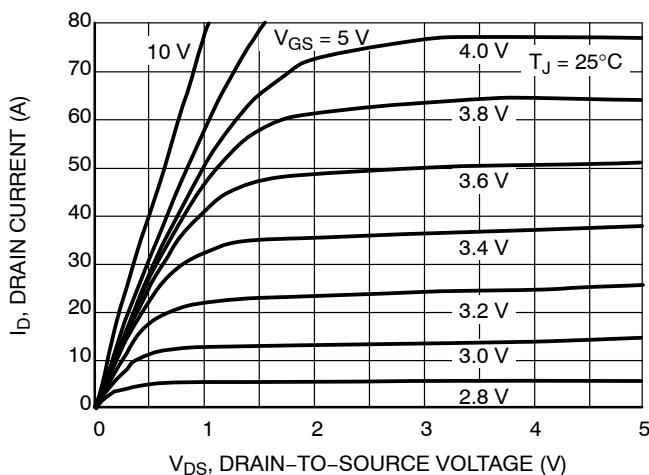


Figure 1. On-Region Characteristics

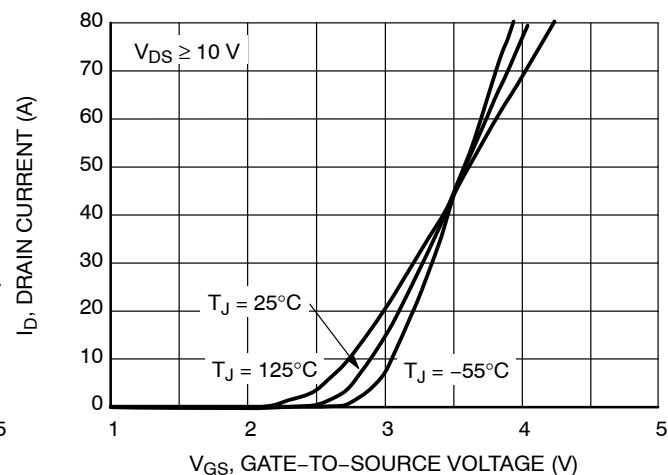


Figure 2. Transfer Characteristics

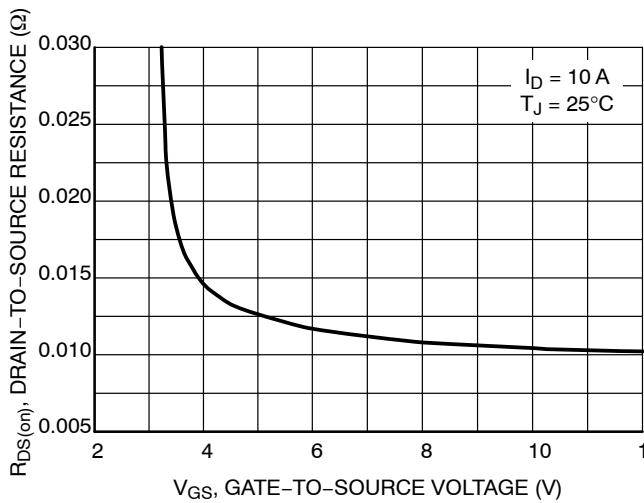


Figure 3. On-Resistance vs. Gate-to-Source Voltage

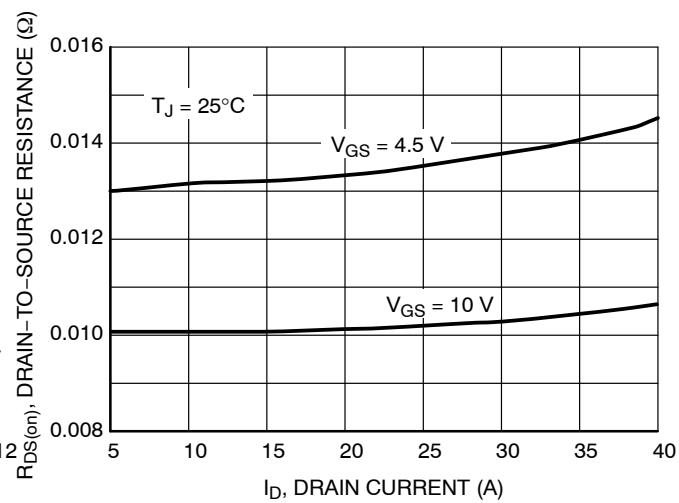


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

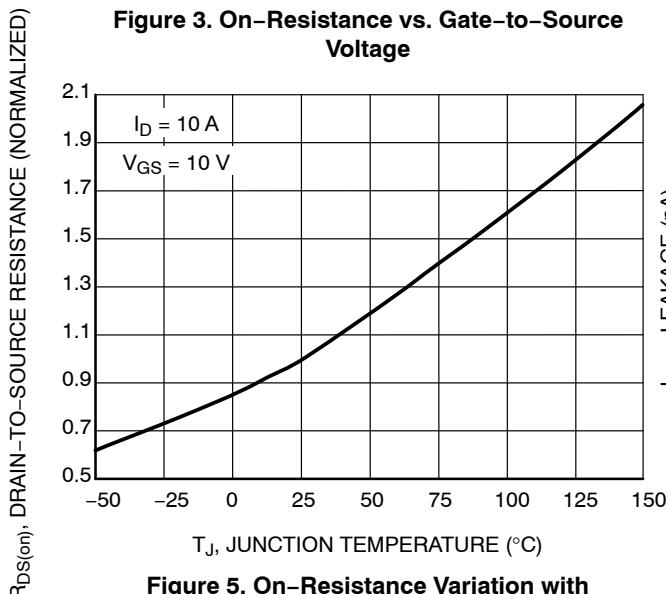


Figure 5. On-Resistance Variation with Temperature

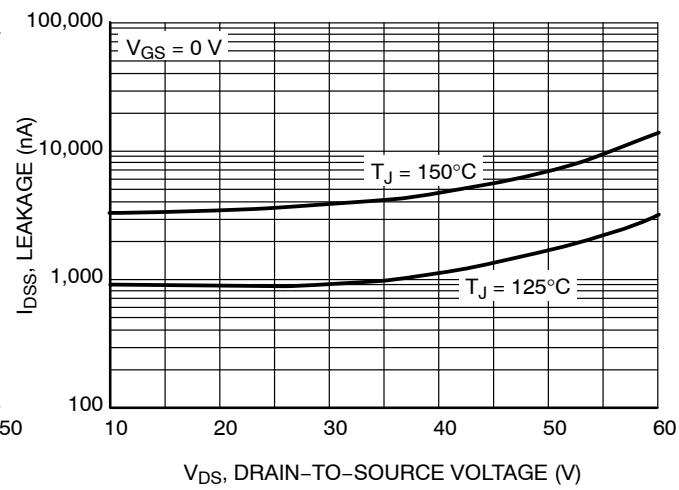
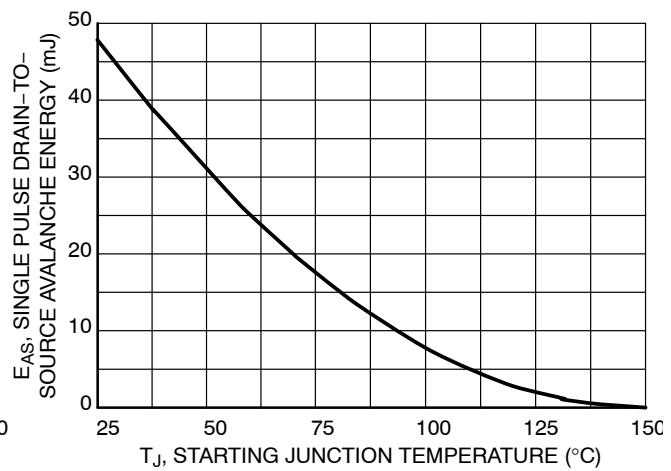
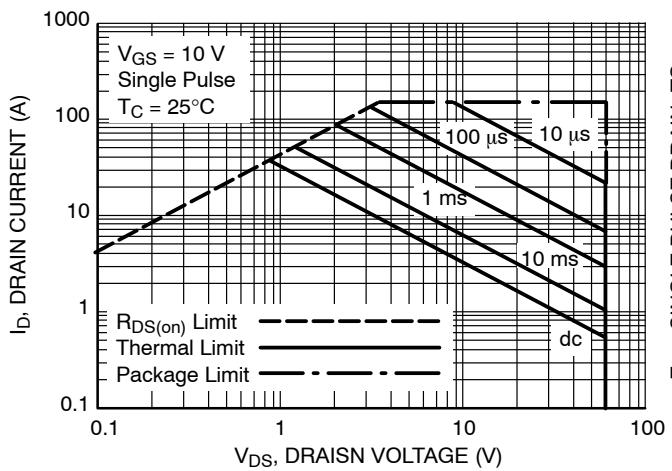
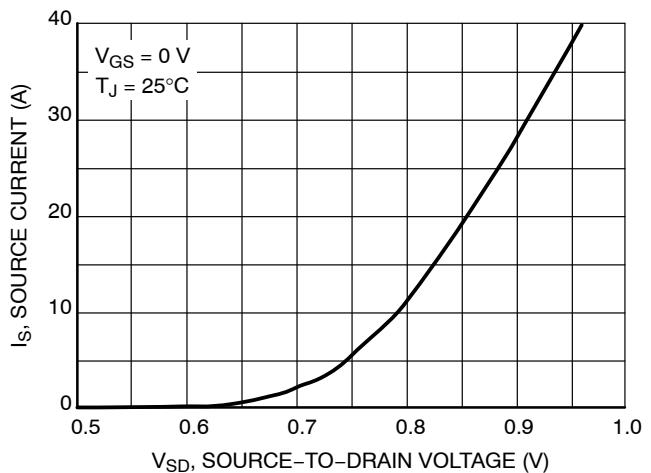
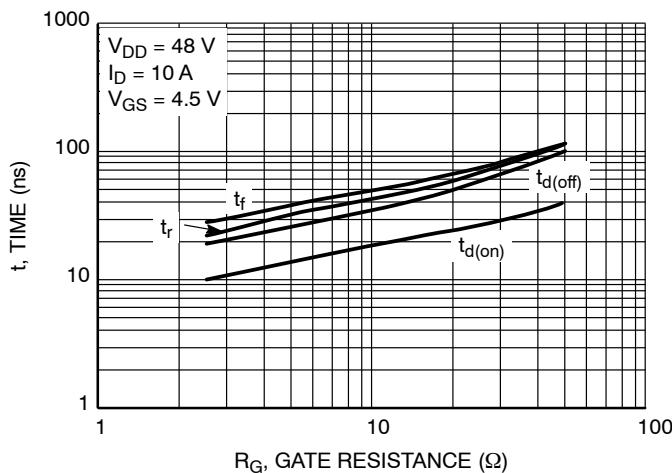
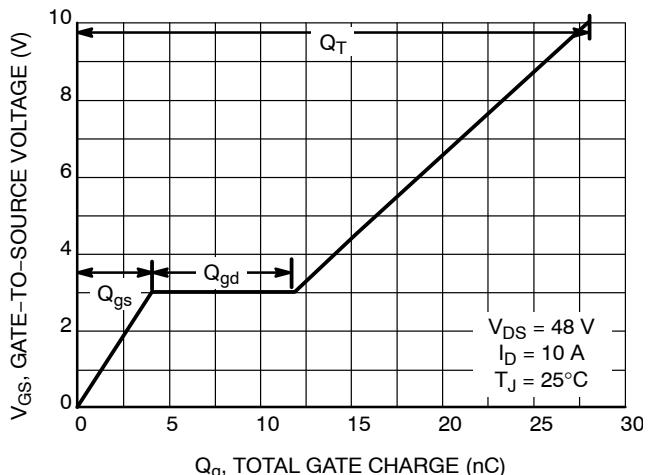
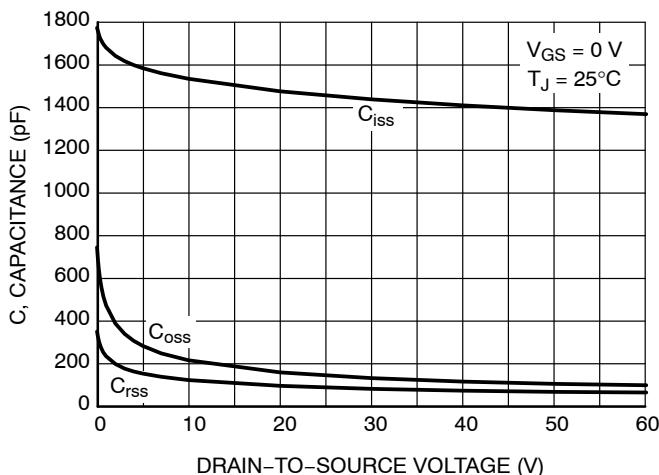


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS



NTTFS5820NL

TYPICAL CHARACTERISTICS

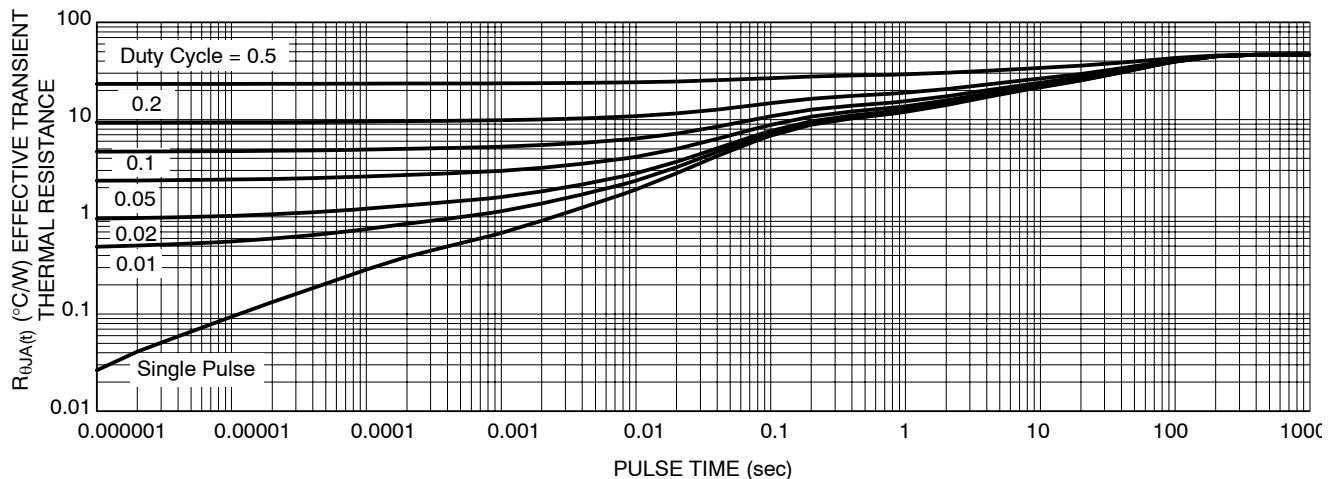


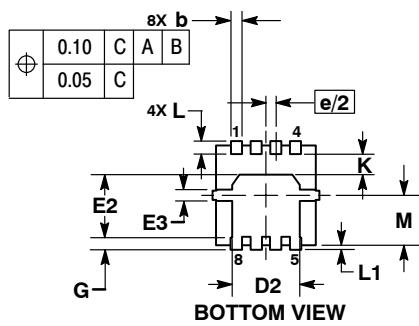
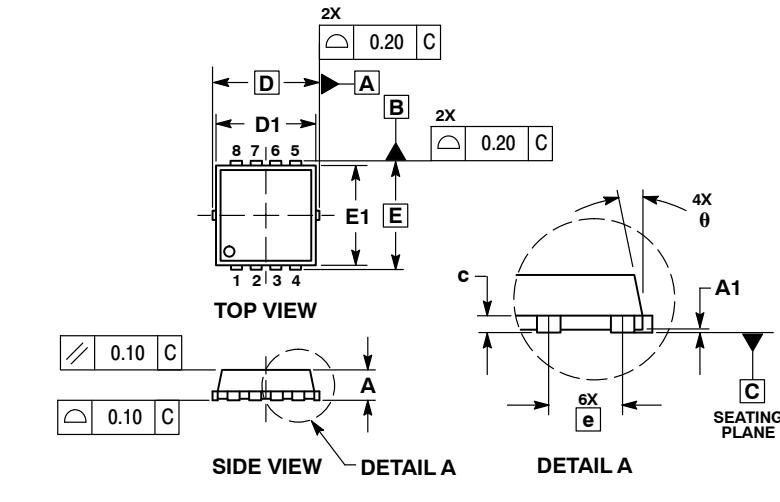
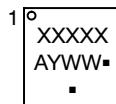
Figure 13. Thermal Response



SCALE 2:1

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

DATE 23 APR 2012

GENERIC
MARKING DIAGRAM*

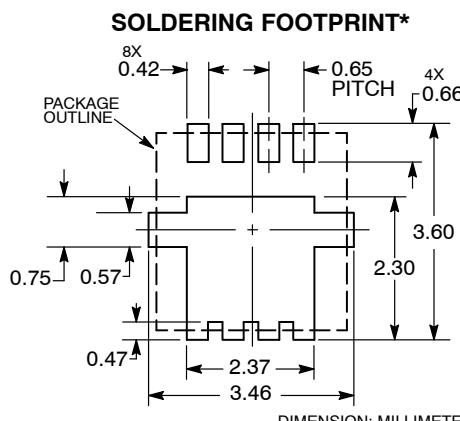
XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
■ = Pb-Free Package

*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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