NTLJS3A18PZ

Power MOSFET

−20 V, −8.2 A, Single P−Channel, 2.0x2.0x0.8 mm WDFN Package

Features

- WDFN Package with Exposed Drain Pads for Excellent Thermal Conduction
- Low Profile WDFN (2.0x2.0x0.8 mm) for Board Space Saving
- Ultra Low $R_{DS(on)}$
- ESD Diode−Protected Gate
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Optimized for Power Management Applications for Portable Products, such as Smart Phones, Media Tablets, PMP, DSC, GPS, and Others
- Battery Switch
- High Side Load Switch

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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	−20	V
Gate−to−Source Voltage			V_{GS}	±8.0	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	−8.2	A
		T_A = 85°C		−5.9	
	t ≤ 5 s	T_A = 25°C		−11.2	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	1.8	W
	t ≤ 5 s			3.4	
Continuous Drain Current (Note 2)	Steady State	T_A = 25°C	I_D	−5.0	A
		T_A = 85°C		−3.6	
Power Dissipation (Note 2)		T_A = 25°C	P_D	0.7	W
Pulsed Drain Current	t_p = 10 μs		I_{DM}	−40	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
ESD (HBM, JESD22−A114)			V_{ESD}	2000	V
Source Current (Body Diode) (Note 2)			I_S	−1.1	A
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	260	°C

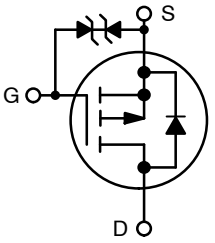
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
2. Surface Mounted on FR4 Board using the minimum recommended pad size, (30 mm^2, 2 oz Cu).

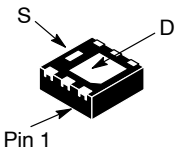
ON Semiconductor®

www.onsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
−20 V	18 mΩ @ −4.5 V	−8.2 A
	25 mΩ @ −2.5 V	
	50 mΩ @ −1.8 V	
	90 mΩ @ −1.5 V	

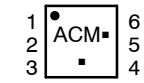


P−CHANNEL MOSFET



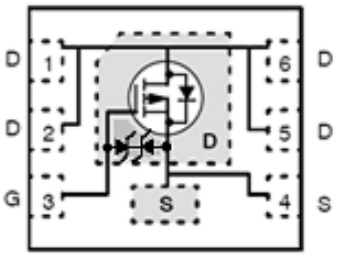
WDFN6
CASE 506AP

MARKING DIAGRAM



AC = Specific Device Code
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

Device	Package	Shipping†
NTLJS3A18PZTWG	WDFN6 (Pb−Free)	10000/Tape & Reel
NTLJS3A18PZTXG		

†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.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction−to−Ambient − Steady State (Note 1)	$R_{\theta JA}$	69	°C/W
Junction−to−Ambient − t ≤ 5 s (Note 1)	$R_{\theta JA}$	37	
Junction−to−Ambient − Steady State Min Pad (Note 2)	$R_{\theta JA}$	186	

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

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = −250 μA		−20			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = −250 μA, Ref to 25°C			11.5		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −16 V, V_{GS} = 0 V	T_J = 25°C			−1.0	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±5.0 V				±5.0	μA
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = −250 μA		−0.4		−1.0	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				3.9		mV/°C
Drain−to−Source On−Resistance	$R_{DS(on)}$	V_{GS} = −4.5 V, I_D = −7.0 A			14.6	18	mΩ
		V_{GS} = −2.5 V, I_D = −5.0 A			20	25	
		V_{GS} = −1.8 V, I_D = −3.0 A			25	50	
		V_{GS} = −1.5 V, I_D = −1.0 A			40	90	
Forward Transconductance	g_{FS}	V_{DS} = −15 V, I_D = −3.0 A			40		S
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = −15 V			2240		pF
Output Capacitance	C_{OSS}				240		
Reverse Transfer Capacitance	C_{RSS}				210		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −4.5 V, V_{DS} = −15 V, I_D = −4.0 A			28		nC
Threshold Gate Charge	$Q_{G(TH)}$				1.0		
Gate−to−Source Charge	Q_{GS}				2.9		
Gate−to−Drain Charge	Q_{GD}				8.8		
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = −4.5 V, V_{DD} = −15 V, I_D = −4.0 A, R_G = 1.0 Ω			8.6		ns
Rise Time	t_r				15		
Turn−Off Delay Time	$t_{d(OFF)}$				150		
Fall Time	t_f				88		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Recovery Voltage	V_{SD}	V_{GS} = 0 V, I_S = −1.0 A	T_J = 25°C		−0.63	−1.0	V
			T_J = 125°C		−0.50		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, d_{ISD}/d_t = 100 A/μs, I_S = −1.0 A			26.1		ns
Charge Time	t_a				10.2		
Discharge Time	t_b				15.9		
Reverse Recovery Time	Q_{RR}				12		nC

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

TYPICAL CHARACTERISTICS

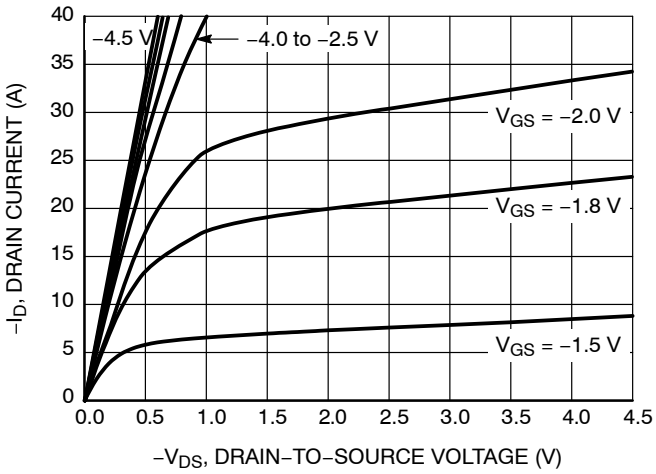


Figure 1. On−Region Characteristics

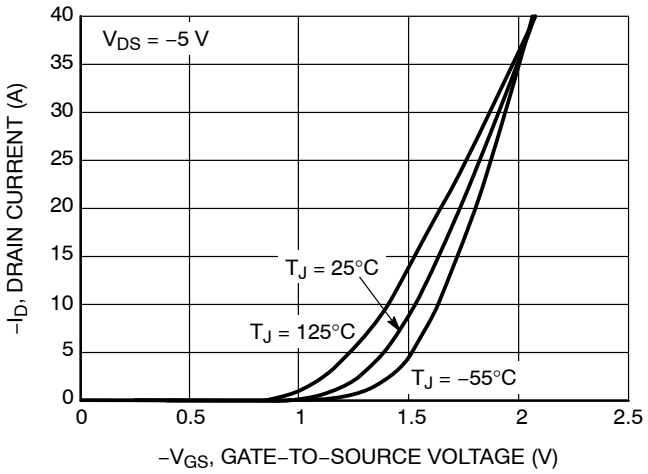


Figure 2. Transfer Characteristics

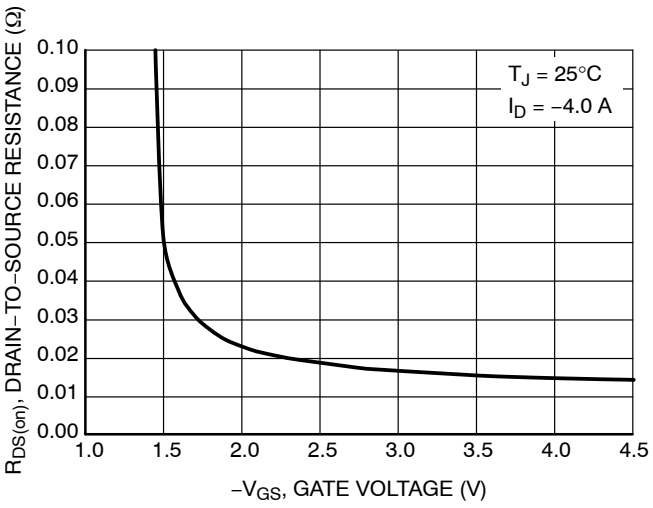


Figure 3. On−Resistance vs. Gate−to−Source Voltage

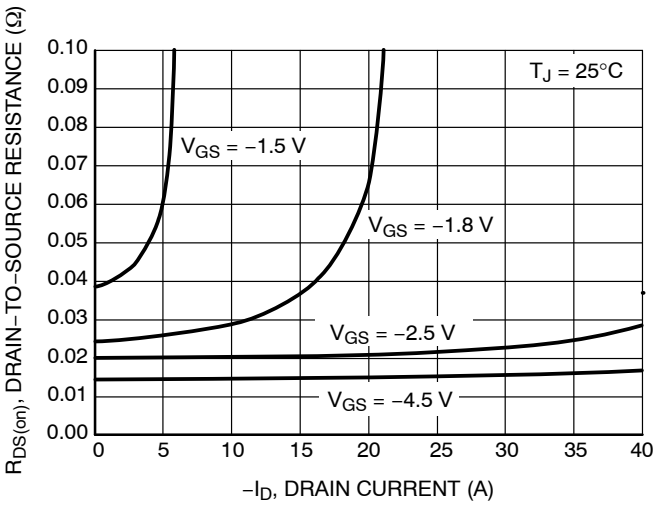


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

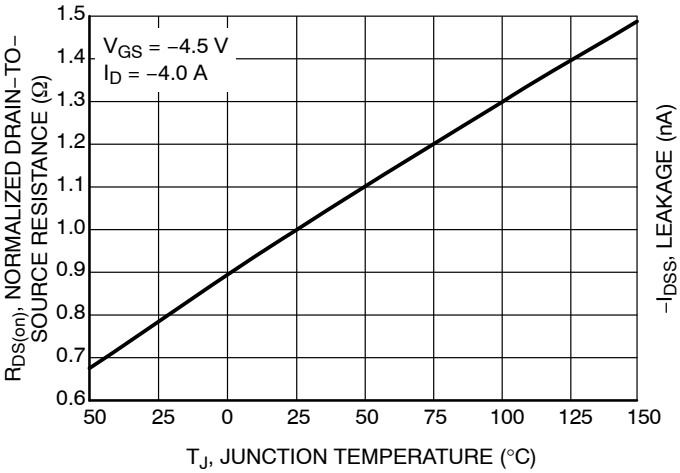


Figure 5. On−Resistance Variation with Temperature

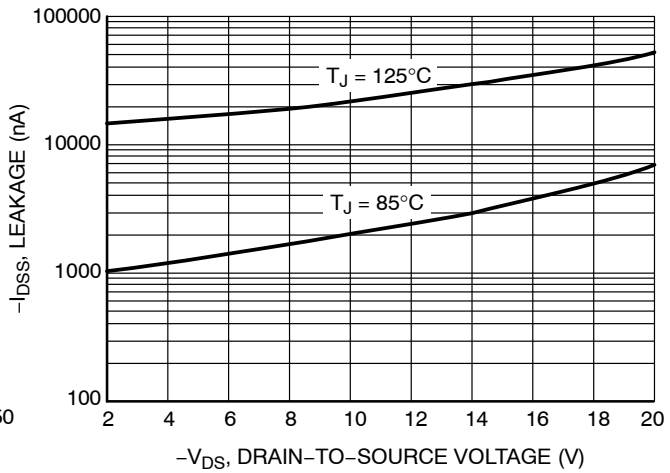


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

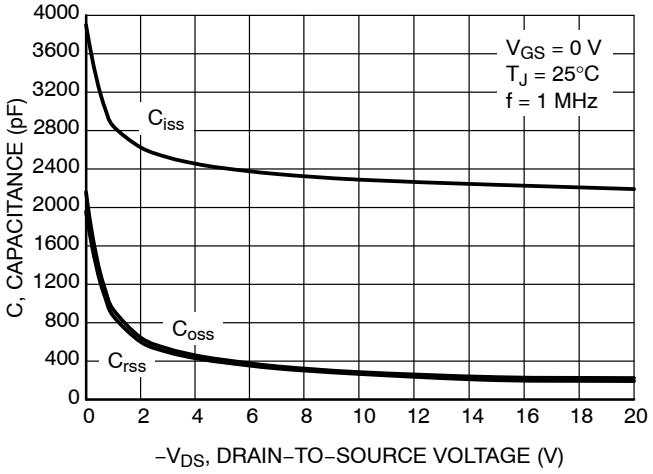


Figure 7. Capacitance Variation

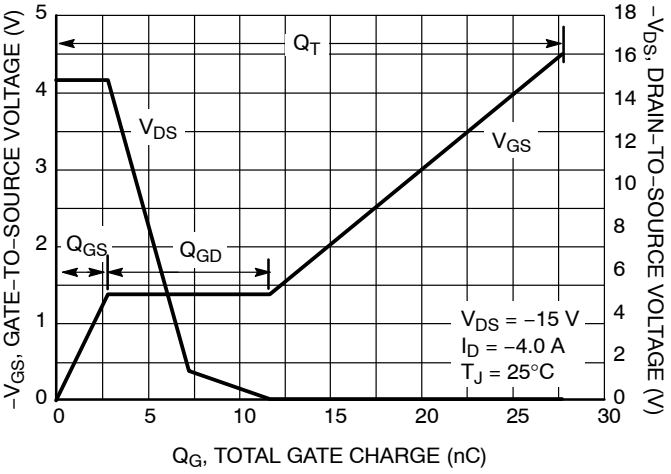


Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

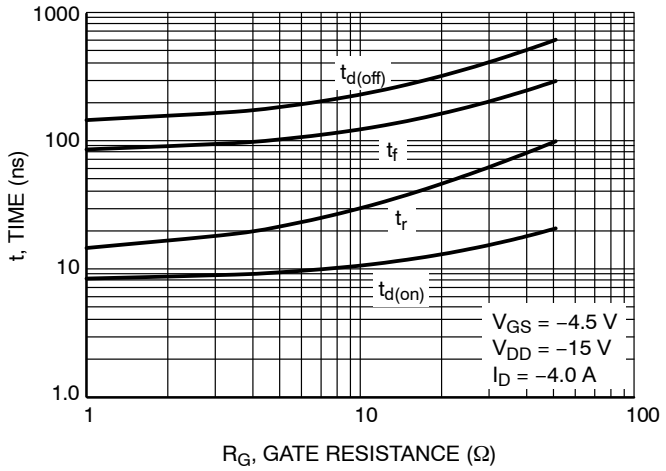


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

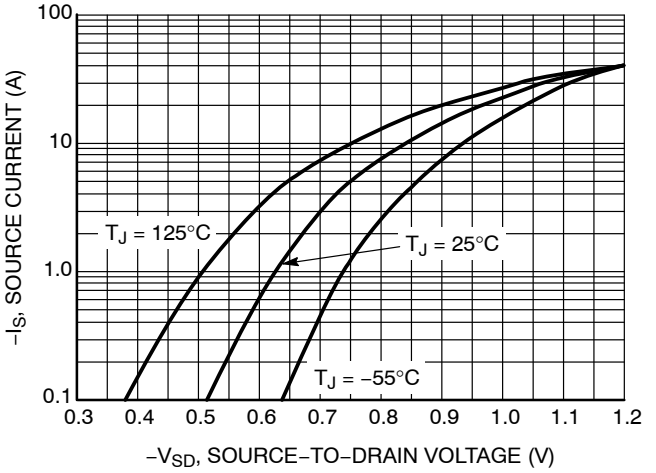


Figure 10. Diode Forward Voltage vs. Current

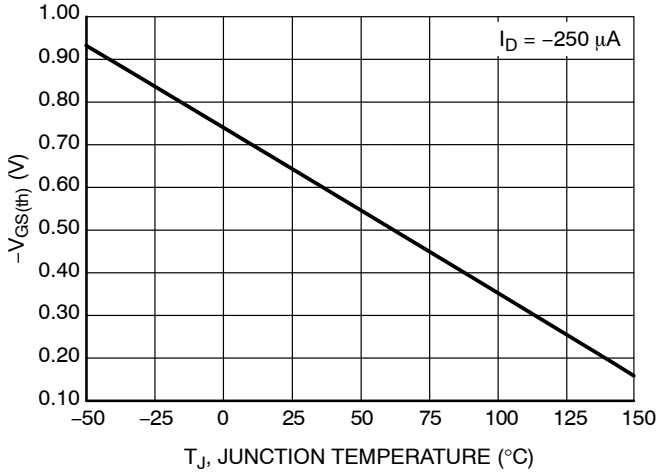


Figure 11. Threshold Voltage

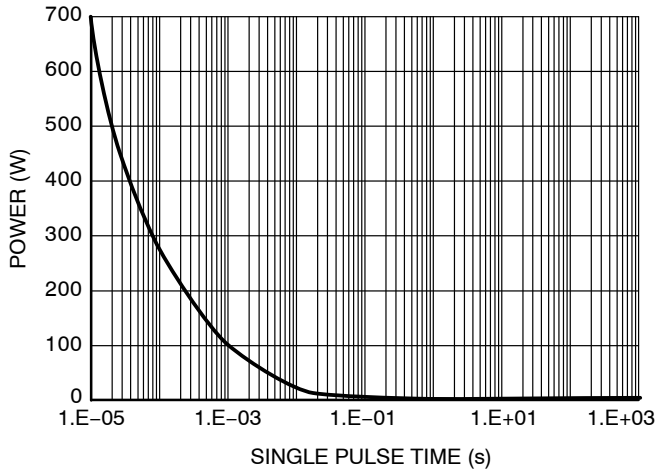


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS

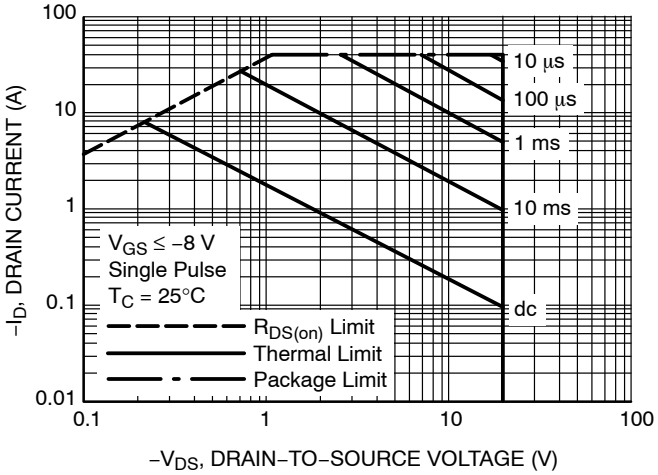


Figure 13. Maximum Rated Forward Biased Safe Operating Area

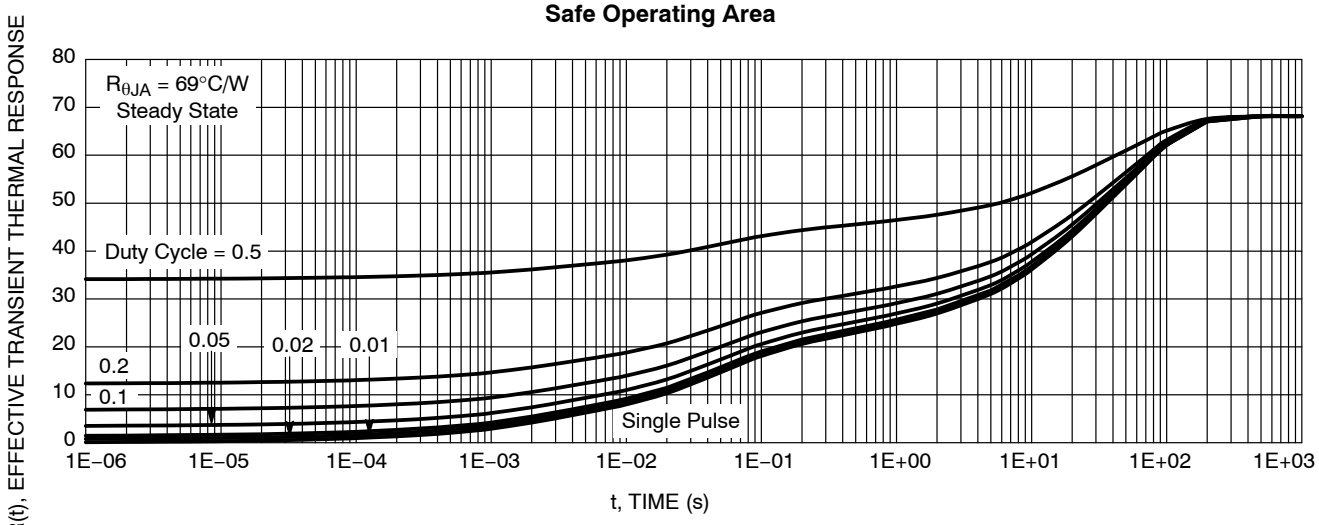


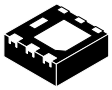
Figure 14. FET Thermal Response

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

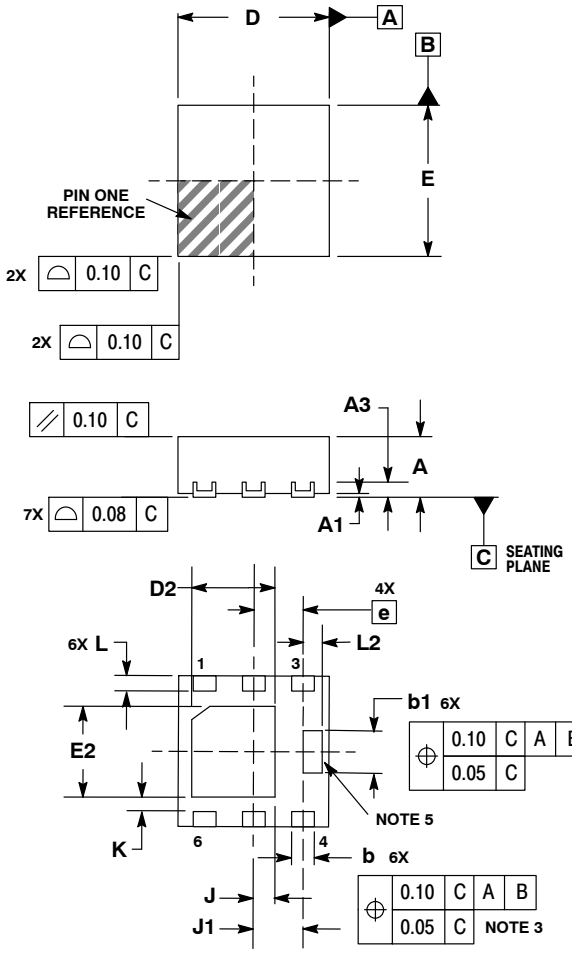
ON Semiconductor®

WDFN6 2x2
CASE 506AP−01
ISSUE B

DATE 26 APR 2006



SCALE 4:1



BOTTOM VIEW

STYLE 1:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 2:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
1. CENTER TERMINAL LEAD IS OPTIONAL. TERMINAL LEAD IS CONNECTED TO TERMINAL LEAD # 4.
2. PINS 1, 2, 5 AND 6 ARE TIED TO THE FLAG.

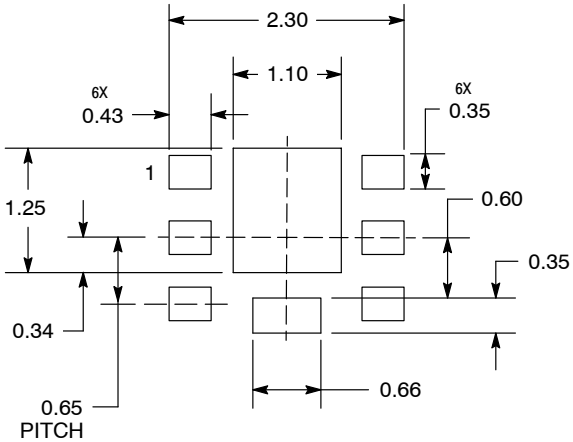
	MILLIMETERS	
DIM	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20 REF	
b	0.25	0.35
b1	0.51	0.61
D	2.00 BSC	
D2	1.00	1.20
E	2.00 BSC	
E2	1.10	1.30
e	0.65 BSC	
K	0.15 REF	
L	0.20	0.30
L2	0.20	0.30
J	0.27 REF	
J1	0.65 REF	

GENERIC MARKING DIAGRAM*

XX = Specific Device Code
M = Date 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.

SOLDERMASK DEFINED MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS

DOCUMENT NUMBER:	**98AON20860D**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**6 PIN WDFN 2X2, 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