NTLJF1103P

Product Preview

Power MOSFET and Schottky Diode

−8 V, −4.3 A, μCool™ P−Channel, with 2.0 A Schottky Barrier Diode, 2x2 mm, WDFN Package

Features

- WDFN 2x2 mm Package with Exposed Drain Pad for Excellent Thermal Conduction
- Footprint Same as SC−88 Package
- 1.5 V V_{GS} Rated $R_{DS(on)}$
- Low V_F, 2 A Schottky Diode
- Low Profile (< 0.8 mm) for Easy Fit in Thin Environment
- This is a Pb−Free Device

Applications

- DC−DC Buck Converter
- Low Voltage Hard Disk DC Power Source

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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	−8	V
Gate−to−Source Voltage			V_{GS}	± 6	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	−3.5	A
		T_A = 85°C		−2.5	
	t ≤ 5 s	T_A = 25°C		−4.3	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	1.5	W
	t ≤ 5 s			2.3	
Continuous Drain Current (Note 2)	Steady State	T_A = 25°C	I_D	−2.4	A
		T_A = 85°C		−1.7	
Power Dissipation (Note 2)		T_A = 25°C	P_D	0.7	W
Pulsed Drain Current	t_p = 10 μs		I_{DM}	−17	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
Source Current (Body Diode)			I_S	−1.9	A
Single Pulse Drain−to−Source Avalanche Energy (VDD = V, VG = V, IPK = A, RG = Ω)			E_{AS}	TBD	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 2 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.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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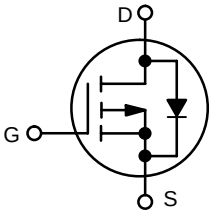
MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max (Note 1)
−8 V	90 mΩ @ −4.5 V	−4.3 A
	120 mΩ @ −2.5 V	
	150 mΩ @ −1.8 V	
	170 mΩ @ −1.5 V	

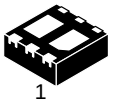
SCHOTTKY DIODE

V_R Max	V_F Typ	I_F Max
20 V	0.37 V	2.0 A



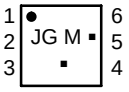
P−CHANNEL MOSFET

SCHOTTKY DIODE



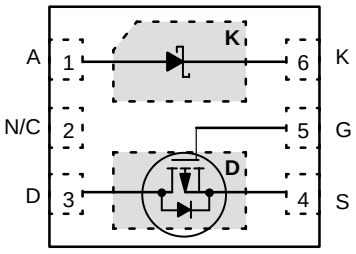
WDFN6
CASE 506AN

MARKING DIAGRAM



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

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

Parameter	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	20	V
DC Blocking Voltage	V_R	20	V
Average Rectified Forward Current	I_F	2.0	A

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 RATINGS

Parameter	Symbol	Max	Unit
Junction−to−Ambient – Steady State (Note 3)	$R_{\theta JA}$	83	°C/W
Junction−to−Ambient – t ≤ 5 s (Note 3)	$R_{\theta JA}$	54	
Junction−to−Ambient – Steady State Min Pad (Note 4)	$R_{\theta JA}$	177	

3. Surface Mounted on FR4 Board using 2 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
4. Surface Mounted on FR4 Board using the minimum recommended pad size.

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		−8			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = −250 μA, Ref to 25°C			TBD		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −6 V, V_{GS} = 0 V	T_J = 25°C			−1	μA
			T_J = 125°C			TBD	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±5.0 V				±100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = −250 μA		−0.4	TBD	−1.0	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				TBD		mV/°C
Drain−to−Source On−Resistance	$R_{DS(on)}$	V_{GS} = −4.5, I_D = −4.0 A				90	mΩ
		V_{GS} = −2.5, I_D = −3.5 A				120	
		V_{GS} = 1.8, I_D = −3.0 A				150	
		V_{GS} = 1.5, I_D = −3.0 A				170	
Forward Transconductance	g_{FS}	V_{DS} = −6 V, I_D = −1.0 A			TBD		S
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = −8 V			TBD		pF
Output Capacitance	C_{OSS}				TBD		
Reverse Transfer Capacitance	C_{RSS}				TBD		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −4.5 V, V_{DS} = −5 V, I_D = −2.5 A			4		nC
Threshold Gate Charge	$Q_{G(TH)}$				TBD		
Gate−to−Source Charge	Q_{GS}				1.5		
Gate−to−Drain Charge	Q_{GD}				1.8		
SWITCHING CHARACTERISTICS (Note 6)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = −4.5 V, V_{DD} = −8 V, I_D = −2.0 A, R_G = 2 Ω			TBD		ns
Rise Time	t_r				TBD		
Turn−Off Delay Time	$t_{d(OFF)}$				TBD		
Fall Time	t_f				TBD		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, IS = −1.9 A	T_J = 25°C		TBD	−1.2	V
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, d_{ISD}/d_t = 100 A/μs, I_S = −1.9 A			TBD		ns

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Instantaneous Forward Voltage	V_F	I_F = 0.1 A		0..26	TBD	V
		I_F = 1.0 A		0.37	TBD	
Maximum Instantaneous Reverse Current	I_R	V_R = 20 V		TBD	TBD	μA
		V_R = 10 V		TBD	TBD	

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS (T_J = 85°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Instantaneous Forward Voltage	V_F	I_F = 0.1 A		TBD	TBD	V
		I_F = 1.0 A		TBD	TBD	
Maximum Instantaneous Reverse Current	I_R	V_R = 20 V		TBD	TBD	mA
		V_R = 10 V		TBD	TBD	

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS (T_J = 125°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Instantaneous Forward Voltage	V_F	I_F = 0.1 A		0.13	TBD	V
		I_F = 1.0 A		0.27	TBD	
Maximum Instantaneous Reverse Current	I_R	V_R = 20 V		TBD	TBD	mA
		V_R = 10 V		TBD	TBD	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Capacitance	C	V_R = 5.0 V, f = 1.0 MHz		TBD		pF

ORDERING INFORMATION

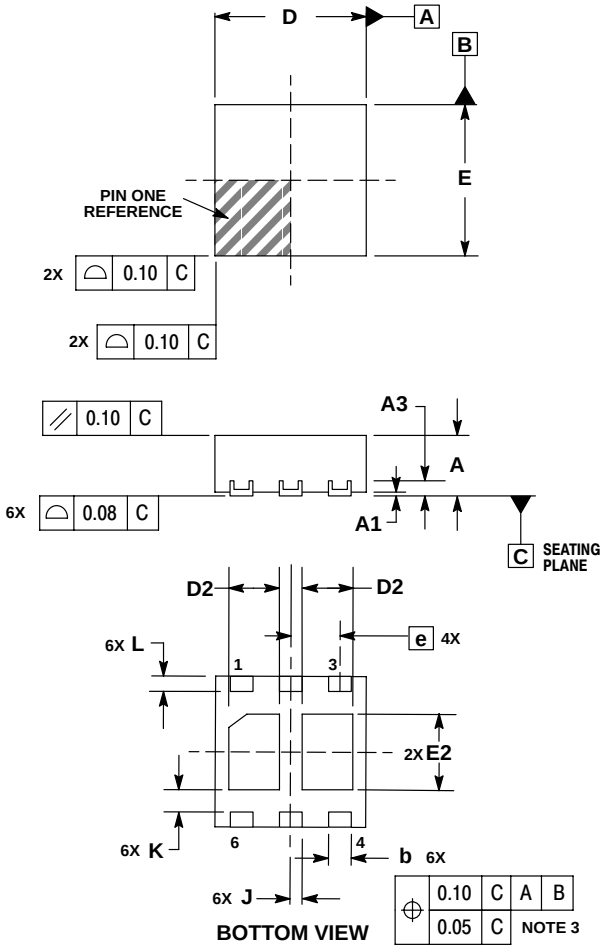
Device	Package	Shipping†
NTLJF1103PT1G	WDFN6 (Pb−Free)	3000 / Tape & Reel

†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.

NTLJF1103P

PACKAGE DIMENSIONS

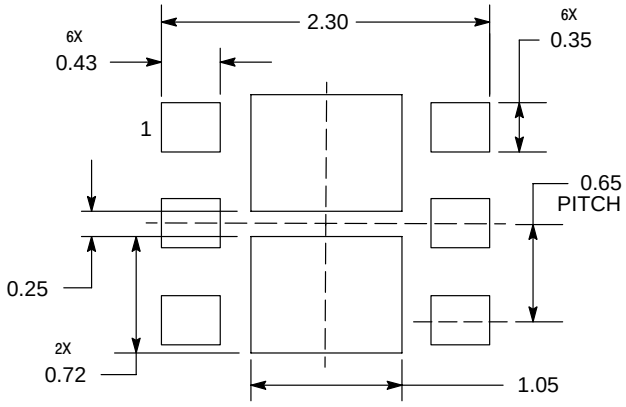
WDFN6 2x2
CASE 506AN−01
ISSUE B



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.

	MILLIMETERS	
DIM	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20 REF	
b	0.25	0.35
D	2.00 BSC	
D2	0.57	0.77
E	2.00 BSC	
E2	0.90	1.10
e	0.65 BSC	
K	0.25 REF	
L	0.20	0.30
J	0.15 REF	

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
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Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

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