

NTLJF1103P

Product Preview

Power MOSFET and Schottky Diode

-8 V, -4.3 A, 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 ($T_J = 25^\circ\text{C}$ 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	$T_A = 25^\circ\text{C}$	I_D	-3.5	A
				$T_A = 85^\circ\text{C}$	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	-4.3		
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	1.5	W
				$t \leq 5$ s	
Continuous Drain Current (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-2.4	A
		$T_A = 85^\circ\text{C}$		-1.7	
Power Dissipation (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	P_D	0.7	W
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	-17	A	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	-1.9	A	
Single Pulse Drain-to-Source Avalanche Energy ($V_{DD} = V, V_G = V, I_{PK} = A, R_G = \Omega$)		E_{AS}	TBD	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$	

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 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.

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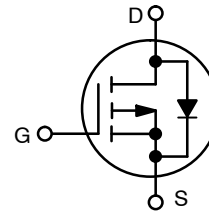
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MOSFET

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

SCHOTTKY DIODE

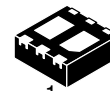
V_R Max	V_F Typ	I_F Max
20 V	0.37 V	2.0 A



P-CHANNEL MOSFET

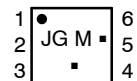


SCHOTTKY DIODE



WDFN6
CASE 506AN

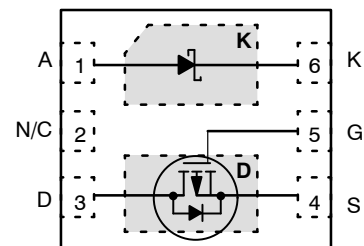
MARKING DIAGRAM



- 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 on page 3 of this data sheet.

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SCHOTTKY DIODE MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ 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 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.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	83	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 5$ 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 ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-8			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = -250\ \mu\text{A}$, Ref to 25°C		TBD		$\text{mV}/^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -6\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
					TBD	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5.0\text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\ \mu\text{A}$	-0.4	TBD	-1.0	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			TBD		$\text{mV}/^\circ\text{C}$
Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.0\text{ A}$			90	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -3.5\text{ A}$			120	
		$V_{GS} = 1.8\text{ V}, I_D = -3.0\text{ A}$			150	
		$V_{GS} = 1.5\text{ V}, I_D = -3.0\text{ A}$			170	
Forward Transconductance	g_{FS}	$V_{DS} = -6\text{ V}, I_D = -1.0\text{ A}$		TBD		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -8\text{ V}$		TBD		pF
Output Capacitance	C_{OSS}			TBD		
Reverse Transfer Capacitance	C_{RSS}			TBD		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -5\text{ V}, I_D = -2.5\text{ A}$		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	$t_{d(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DD} = -8\text{ V}, I_D = -2.0\text{ A}, R_G = 2\ \Omega$		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}	$V_{GS} = 0\text{ V}, I_S = -1.9\text{ A}$	$T_J = 25^\circ\text{C}$		TBD	-1.2	V
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, d_{ISD}/d_t = 100\text{ A}/\mu\text{s}, I_S = -1.9\text{ A}$			TBD		ns

5. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

6. Switching characteristics are independent of operating junction temperatures.

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SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

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

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS ($T_J = 85^\circ\text{C}$ unless otherwise noted)

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

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS ($T_J = 125^\circ\text{C}$ unless otherwise noted)

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

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

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

ORDERING INFORMATION

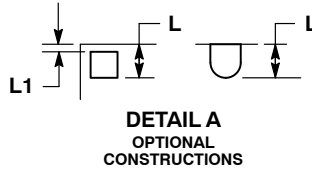
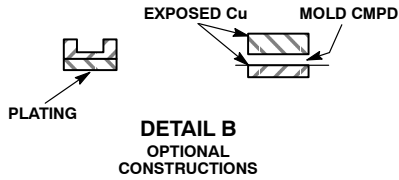
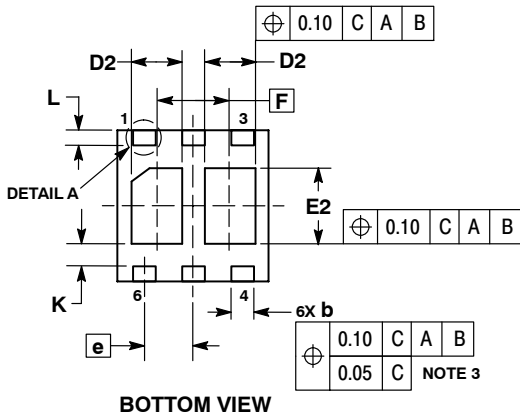
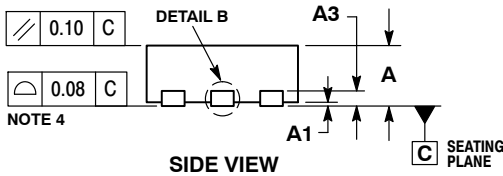
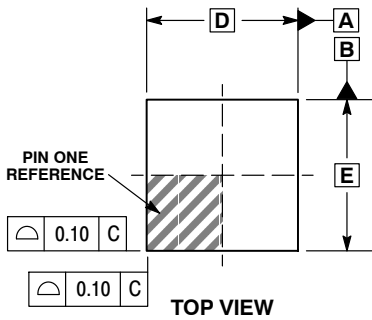
Device	Package	Shipping [†]
NTLJF1103PT1G	WDFN6 (Pb-Free)	3000 / Tape & Reel

[†]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.

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PACKAGE DIMENSIONS

WDFN6 2x2, 0.65P
CASE 506AN
ISSUE G

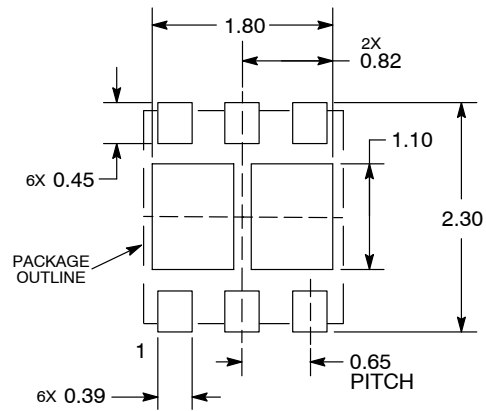


NOTES:

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 0.30 mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	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	
F	0.95 BSC	
K	0.25 REF	
L	0.20	0.30
L1	---	0.10

SOLDERMASK DEFINED MOUNTING FOOTPRINT



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

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