

# NTLJS4D9N03H

## Product Preview

### Power MOSFET

#### 30 V, Single N-Channel, WDFN6

##### Features

- Small Footprint (4 mm<sup>2</sup>) for Compact Design
- Low R<sub>DS(on)</sub> to Minimize Conduction Losses
- Low Q<sub>G</sub> and Capacitance to Minimize Driver Losses
- These Devices are Pb-Free, Halogen-Free/BFR-Free and are RoHS Compliant

##### Applications

- DC-DC Converters
- Wireless Chargers
- Power Load Switch
- Power Management and Protection
- Battery Management

##### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	V <sub>DSS</sub>	30	V	
Gate-to-Source Voltage	V <sub>GS</sub>	±12	V	
Continuous Drain Current R <sub>θJA</sub> (Notes 1, 3)	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub> 15.9	A
		T <sub>A</sub> = 85°C	11.5	
Power Dissipation R <sub>θJA</sub> (Notes 1, 3)	Steady State	T <sub>A</sub> = 25°C	P <sub>D</sub> 2.40	W
		T <sub>A</sub> = 85°C	0.86	
Continuous Drain Current R <sub>θJA</sub> (Notes 2, 3)	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub> 9.5	A
		T <sub>A</sub> = 85°C	6.9	
Power Dissipation R <sub>θJA</sub> (Notes 2, 3)	Steady State	T <sub>A</sub> = 25°C	P <sub>D</sub> 0.86	W
		T <sub>A</sub> = 85°C	0.86	
Pulsed Drain Current	T <sub>A</sub> = 25°C, t <sub>p</sub> = 10 μs	I <sub>DM</sub>	TBD	A
Single Pulse Drain-to-Source Avalanche Energy (I <sub>L</sub> = TBD A <sub>pk</sub> , L = 0.1 mH) (Note 4)	E <sub>AS</sub>	TBD	mJ	
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T <sub>L</sub>	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.

##### THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Ambient – Steady State (Note 1)	R <sub>θJA</sub>	52	°C/W
Junction-to-Ambient – Steady State (Note 2)	R <sub>θJA</sub>	145	

1. Surface-mounted on FR4 board using 1 in<sup>2</sup> pad size, 2 oz. Cu pad.
2. Surface-mounted on FR4 board using minimum pad size, 2 oz. Cu pad.
3. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted. Actual continuous current will be limited by thermal & electro-mechanical application board design. R<sub>θCA</sub> is determined by the user's board design.
4. 100% UIS tested at L = 0.1 mH, I<sub>AS</sub> = TBD A.

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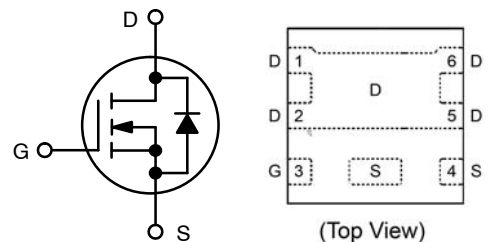


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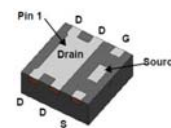
[www.onsemi.com](http://www.onsemi.com)

V <sub>(BR)DSS</sub>	R <sub>DS(on)</sub> MAX	I <sub>D</sub> MAX
30 V	6.1 mΩ @ 4.5 V	15.9 A

##### ELECTRICAL CONNECTION



N-CHANNEL MOSFET



WDFN6 (2.05x2.05)  
CASE 483AV

##### MARKING DIAGRAM



YW = Date Code  
ZZ = Assembly Lot Code  
A = Assembly Site Code  
XXX = Specific Device Code

##### ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 2 of this data sheet.

# NTLJS4D9N03H

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA, ref to 25°C		TBD		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 24 V	T <sub>J</sub> = 25°C		1	μA
			T <sub>J</sub> = 125°C		10	
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V			±100	μA

### ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	1.2		2.1	V
Threshold Temperature Coefficient	V <sub>GS</sub> /T <sub>J</sub>	I <sub>D</sub> = 250 μA, ref to 25°C		TBD		mV/°C
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 10 A		4.9	6.1	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 10 A		TBD		S
Gate Resistance	R <sub>G</sub>	T <sub>A</sub> = 25°C		3		Ω

### CHARGES AND CAPACITANCES

Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 15 V, f = 1.0 MHz		1088		pF
Output Capacitance	C <sub>oss</sub>			443		
Reverse Transfer Capacitance	C <sub>rss</sub>			22		
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 15 V, I <sub>D</sub> = 10 A		7.9		nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			TBD		
Gate-to-Source Charge	Q <sub>GS</sub>			1.7		
Gate-to-Drain Charge	Q <sub>GD</sub>			2.8		

### SWITCHING CHARACTERISTICS, V<sub>GS</sub> = 4.5 V (Note 6)

Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DD</sub> = 15 V, I <sub>D</sub> = 10 A, R <sub>G</sub> = 6 Ω		TBD		ns
Rise Time	t <sub>r</sub>			TBD		
Turn-Off Delay Time	t <sub>d(off)</sub>			TBD		
Fall Time	t <sub>f</sub>			TBD		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 10 A	T <sub>J</sub> = 25°C		TBD	TBD	V
			T <sub>J</sub> = 125°C		TBD		
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V, dI <sub>S</sub> /dt = 100 A/μs, I <sub>S</sub> = 10 A			TBD		ns
Reverse Recovery Charge	Q <sub>RR</sub>				TBD		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

6. Switching characteristics are independent of operating junction temperatures.

### DEVICE ORDERING INFORMATION

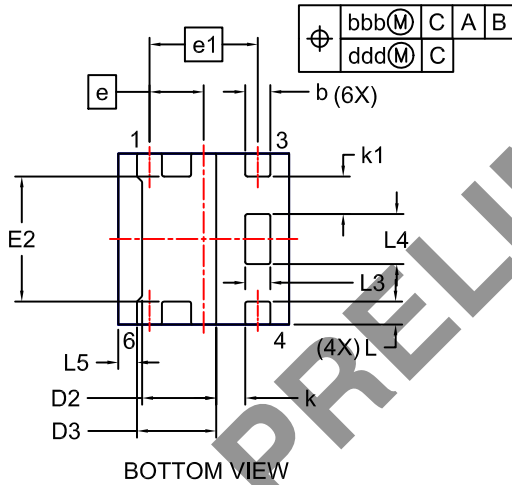
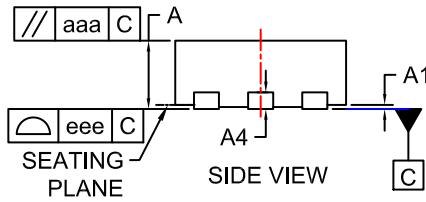
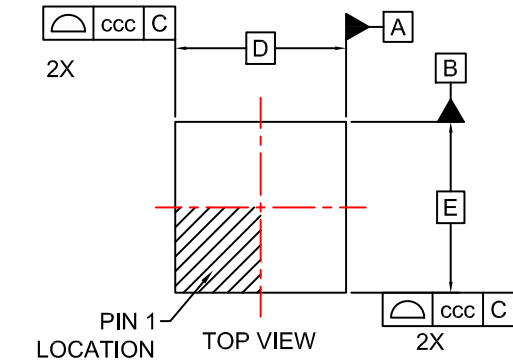
Device	Package	Shipping <sup>†</sup>
NTLJS4D9N03HTAG	WDFN6 (Pb-Free)	3000 / Tape & Reel

<sup>†</sup>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.

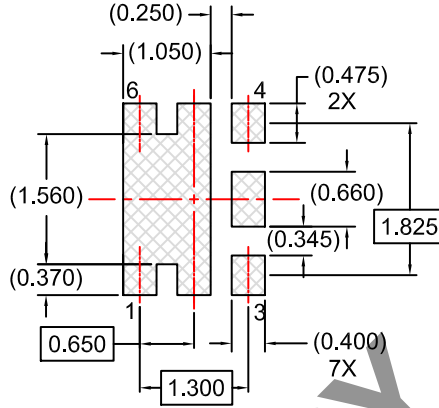
# NTLJS4D9N03H

## PACKAGE DIMENSIONS

WDFN6 2.05X2.05, 0.65P  
CASE 483AV  
ISSUE A



### LAND PATTERN RECOMMENDATION



### NOTES:

1. CONTROLLING DIMENSION: MILLIMETERS.
2. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.60	0.70	0.80
A1	0.00	-	0.05
A4	(0.20)		
b	0.25	0.30	0.35
D	1.95	2.05	2.15
D2	0.84	0.89	0.94
D3	(0.95)		
E	1.95	2.05	2.15
E2	1.45	1.50	1.55
e	0.65 BSC		
e1	1.30 BSC		
k	(0.35)		
k1	(0.45)		
L	0.18	0.28	0.38
L3	0.25	0.30	0.35
L4	0.55	0.60	0.65
L5	(0.23)		
aaa	0.10		
bbb	0.10		
ccc	0.05		
ddd	0.05		
eee	0.05		

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