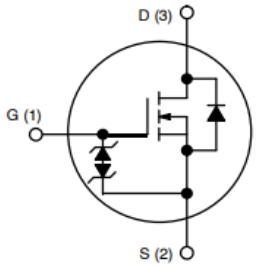
MOSFET – Power, N-Channel With ESD Protection
30 V, 3.3 A
NVNJWS200N031L

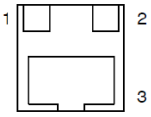
$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D Max
30 V	200 mΩ @ 4.5 V	3.3 A
	250 mΩ @ 3 V	

Features
- Low $R_{DS(on)}$ and Low Gate Threshold
- Low Input Capacitance
- ESD Protected Gate
- Wettable Flank for Enhanced Optical Inspection
- AEC−Q101 Qualified and PPAP Capable
- This is a Pb−Free Device

Applications
- Low Side Load Switch
- DC−DC Converters (Buck and Boost Circuits)

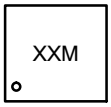
N−CHANNEL MOSFET





XDFNW3
CASE 521AC

MARKING DIAGRAM



XX = Specific Device Code
M = Month Code

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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	30	V
Gate−to−Source Voltage			V_{GS}	±8	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	2.2	A
		T_A = 100°C		1.5	
Continuous Drain Current $R_{\theta JC}$ (Note 1)		T_C = 25°C		3.3	
		T_C = 100°C		2.3	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	1.8	W
		T_A = 100°C		0.9	
Power Dissipation $R_{\theta JC}$ (Note 1)		T_C = 25°C		4.1	
		T_C = 100°C		2.0	
Pulsed Drain Current	t_p = 10 μs		I_{DM}	25	A
Operating Junction and Storage Temperature Range			T_J, T_{STG}	−55 to +175	°C
Source Current (Body Diode)			I_S	3.4	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.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Ambient – Steady State	$R_{\theta JA}$	83.6	°C/W
Junction−to−Case – Steady State	$R_{\theta JC}$	36.8	

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

ORDERING INFORMATION
See detailed ordering and shipping information on page 5 of this data sheet.

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA		30			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, ref to 25°C			27.4		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 24 V	T_J = 25°C			1.0	μA
			T_J = 85°C			10	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V				±10	μA
ON CHARACTERISTICS (Note 2)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		0.4		1.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				−3.2		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 1.5 A			153	200	mΩ
		V_{GS} = 3 V, I_D = 0.5 A			185	250	
Forward Transconductance	g_{FS}	V_{DS} = 4 V, I_D = 0.15 A			1.28		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 15 V			89		pF
Output Capacitance	C_{OSS}				15		
Reverse Transfer Capacitance	C_{RSS}				8.3		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, I_D = 1.5 A			1.4		nC
Threshold Gate Charge	$Q_{G(TH)}$				0.2		
Gate−to−Source Charge	Q_{GS}				0.4		
Gate−to−Drain Charge	Q_{GD}				0.3		
SWITCHING CHARACTERISTICS (Note 3)							
Turn−On Delay Time	$t_{d(on)}$	V_{GS} = 4.5 V, V_{DD} = 15 V, I_D = 1 A, R_G = 6 Ω			5.2		ns
Rise Time	t_r				2.6		
Turn−Off Delay Time	$t_{d(off)}$				10.2		
Fall Time	t_f				2.2		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1 A	T_J = 25°C		0.8	1.2	V
			T_J = 85°C		0.7		

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.

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

TYPICAL CHARACTERISTICS

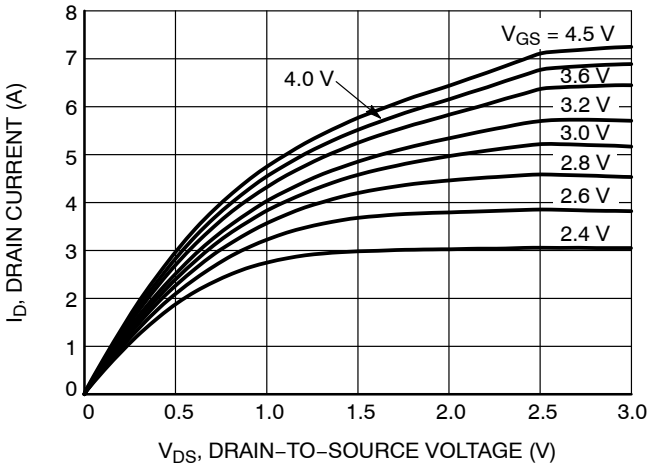


Figure 1. On−Region Characteristics

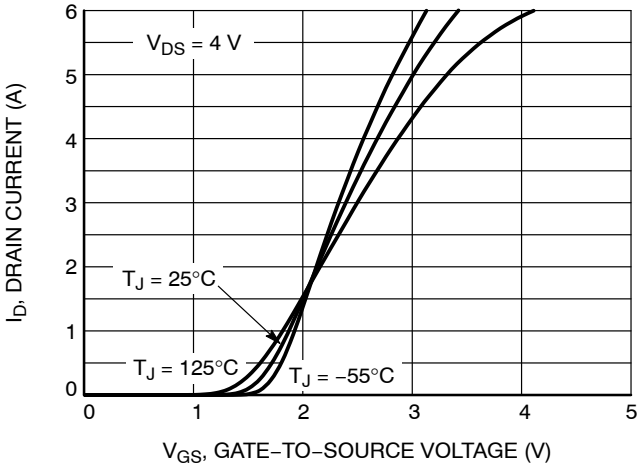


Figure 2. Transfer Characteristics

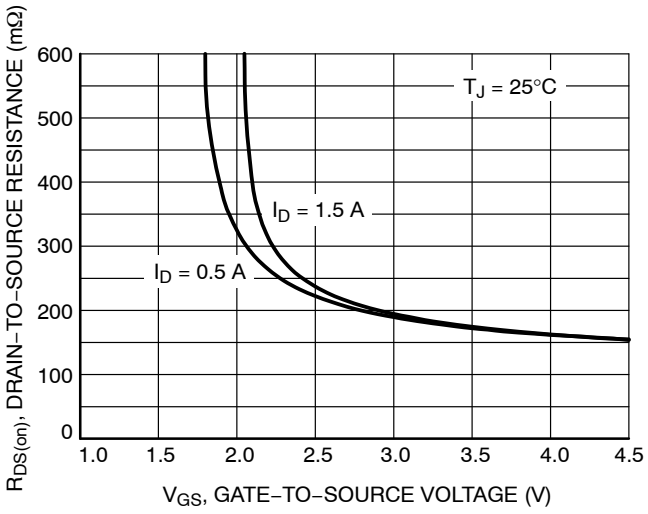


Figure 3. On−Resistance vs. Gate−to−Source Voltage

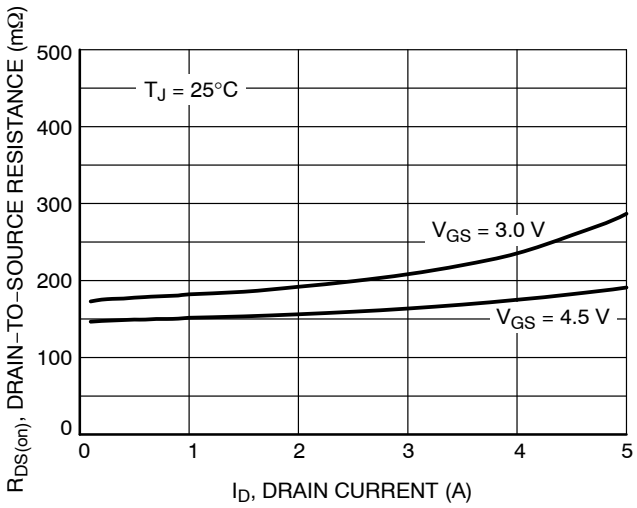


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

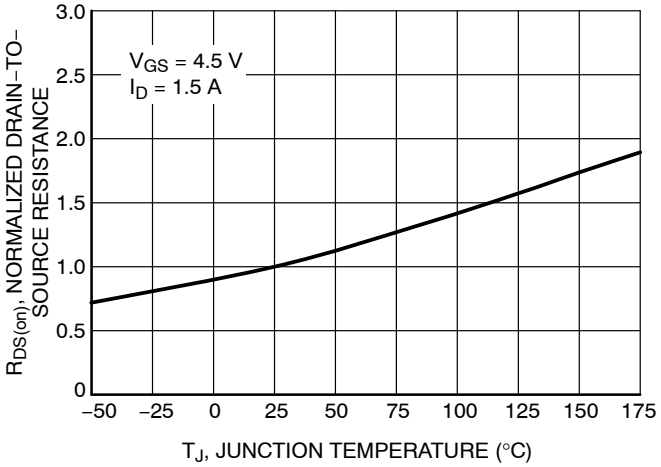


Figure 5. On−Resistance Variation with Temperature

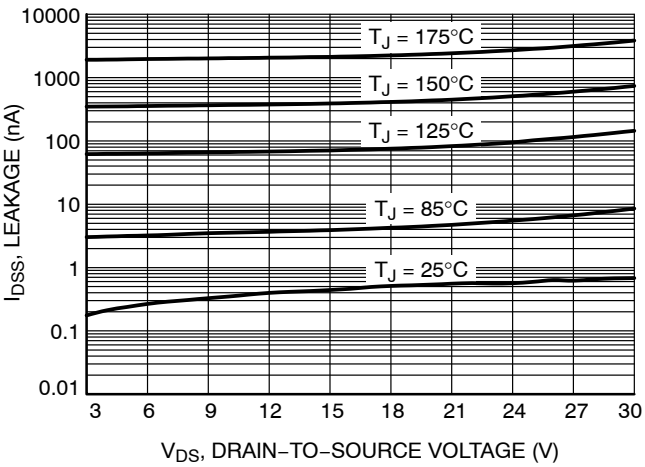


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

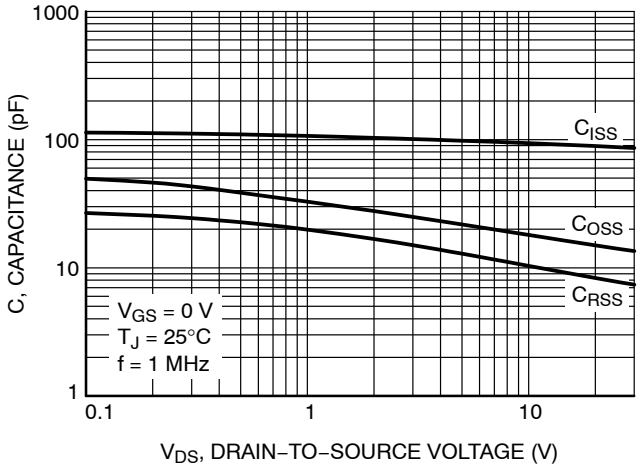


Figure 7. Capacitance Variation

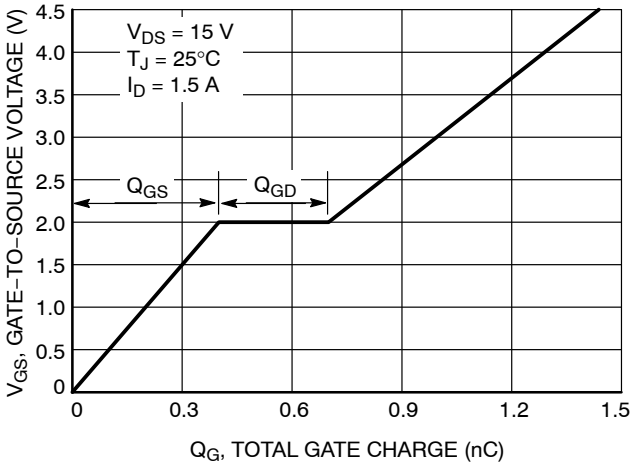


Figure 8. Gate−to−Source Voltage vs. Total Charge

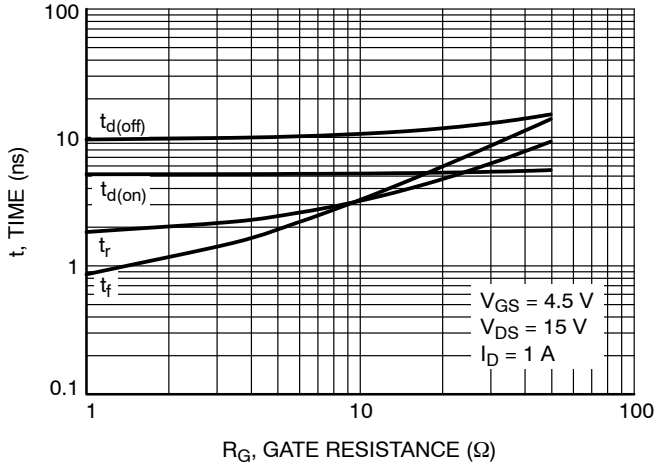


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

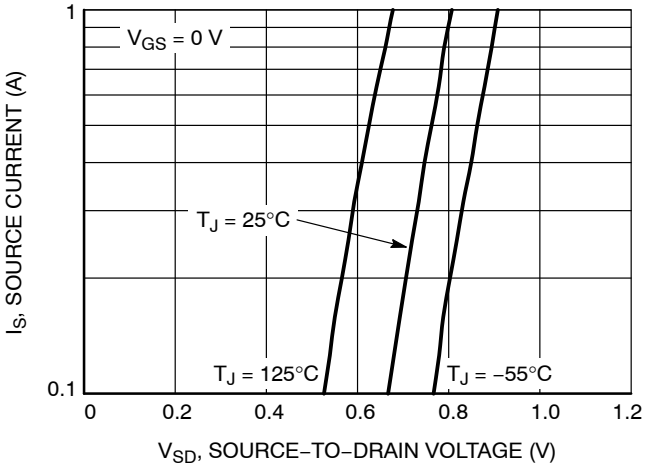


Figure 10. Diode Forward Voltage vs. Current

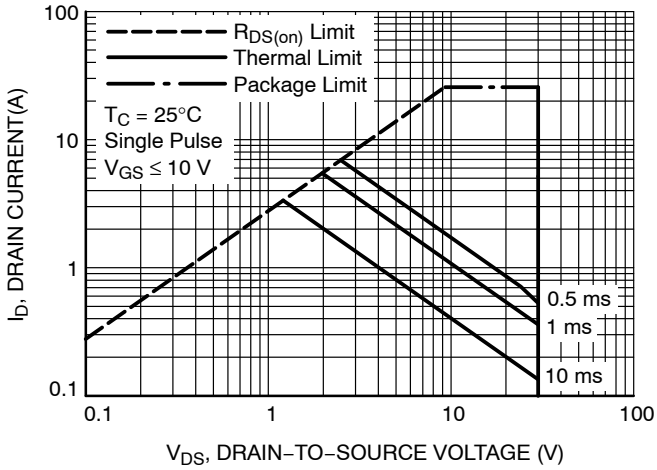


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL CHARACTERISTICS

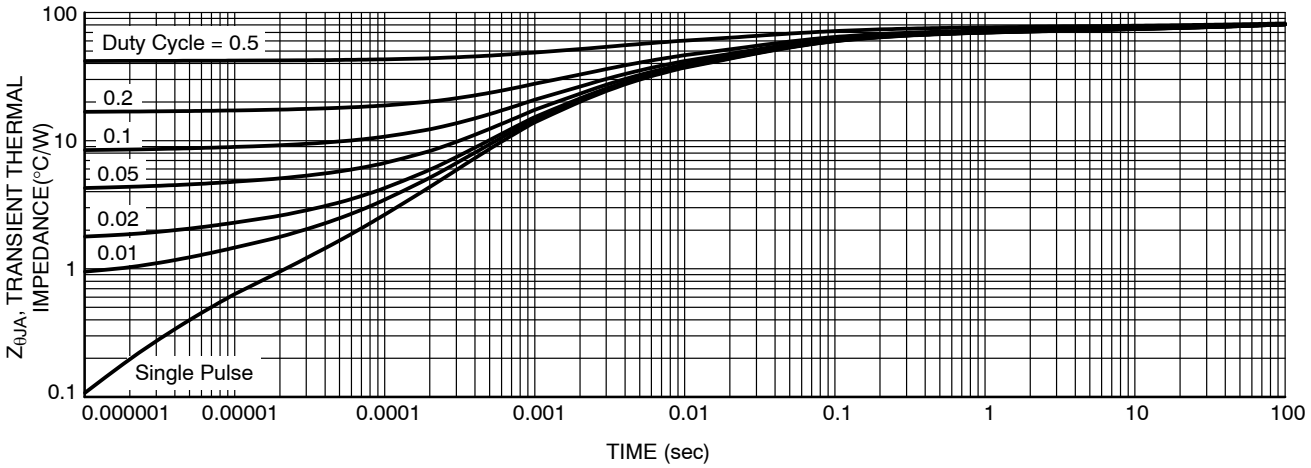


Figure 12. Thermal Response

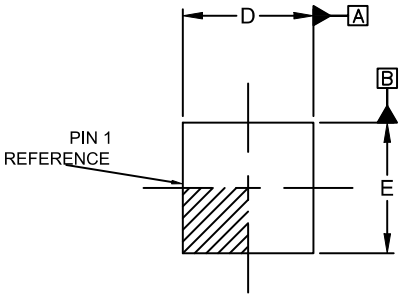
Table 1. ORDERING INFORMATION

Part Number	Marking	Package	Shipping†
NVNJWS200N031LTAG	2A	XDFNW3 (Pb−Free)	3000 / Tape & Reel

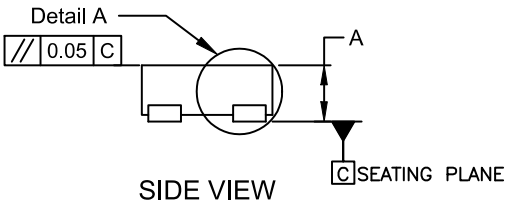
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

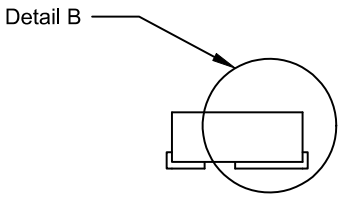
XDFNW3 1x1, 0.65P
CASE 521AC
ISSUE A



TOP VIEW



SIDE VIEW

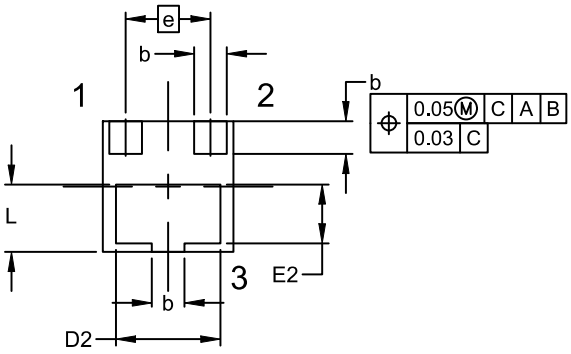


END VIEW

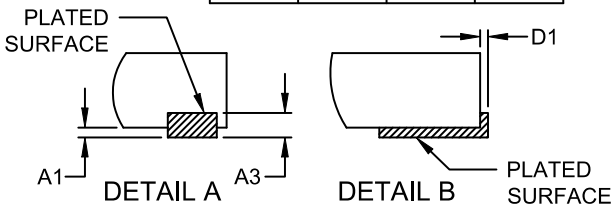
NOTES:

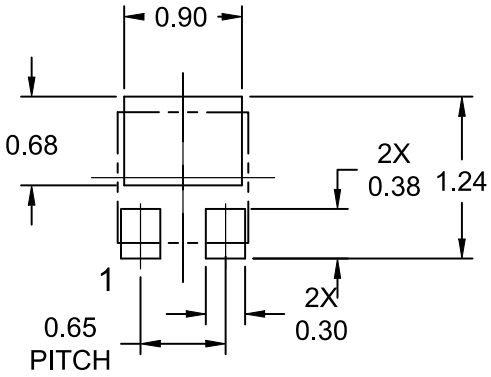
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.32	0.38	0.44
A1	0.00	---	0.04
A3	0.125 REF		
b	0.20	0.25	0.30
D	0.90	1.00	1.10
D1	0.00	---	0.04
D2	0.75	0.80	0.85
E	0.90	1.00	1.10
E2	0.40	0.45	0.50
e	0.65 BSC		
L	0.465	0.515	0.565



BOTTOM VIEW





RECOMMENDED
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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