

# NVLJD4007NZ

## MOSFET – Dual, N-Channel, Small Signal, Gate ESD Protection, 2x2 WDFN

30 V, 245 mA

### Features

- Optimized Layout for Excellent High Speed Signal Integrity
- Low Gate Charge for Fast Switching
- Small 2 x 2 mm Footprint
- ESD Protected Gate
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DS}$	30	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 10$	V
Continuous Drain Current (Note 1)	$I_D$	245	mA
Power Dissipation (Note 1)	$P_D$	755	mW
Pulsed Drain Current	$I_{DM}$	1.2	A
Operating Junction and Storage Temperature	$T_J, T_{STG}$	$-55$ to $150$	$^\circ\text{C}$
Continuous Source Current (Body Diode)	$I_{SD}$	245	mA
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.

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	166	$^\circ\text{C/W}$

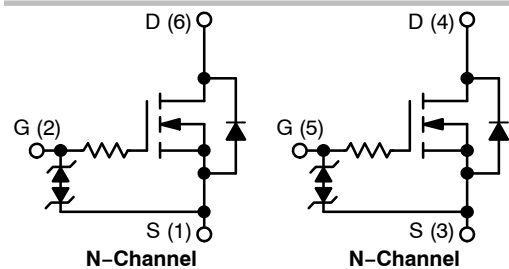
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).



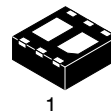
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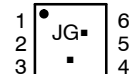
$V_{(BR)DSS}$	$R_{DS(on)}$ Typ @ $V_{GS}$	$I_D$ MAX (Note 1)
30 V	1.4 $\Omega$ @ 4.5 V	245 mA
	2.3 $\Omega$ @ 2.5 V	



### MARKING DIAGRAM



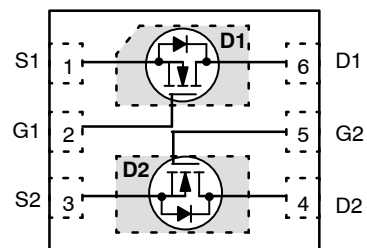
WDFN6  
CASE 506AN



JG = 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†
NVLJD4007NZTAG	WDFN6 (Pb-Free)	3000/Tape & Reel
NVLJD4007NZTBG	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 Specification Brochure, BRD8011/D.

# NVLJD4007NZ

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

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> = 100 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>	Reference to 25°C, I <sub>D</sub> = 100 μA		27		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V			1.0	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 20 V, T = 85 °C			1.0	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±10 V			±25	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5 V			±1.0	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5 V, T = 85 °C			±1.0	μA

### ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 100 μA	0.5	1.0	1.5	V
Threshold Temperature Coefficient	V <sub>GS(TH)</sub> /T <sub>J</sub>	Reference to 25°C, I <sub>D</sub> = 100 μA		-2.5		mV/°C
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 125 mA		1.4	7.0	Ω
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 125 mA		2.3	7.5	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 125 mA		80		mS

### CAPACITANCES & GATE CHARGE

Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 5.0 V, f = 1 MHz, V <sub>GS</sub> = 0 V		12.2	20	pF
Output Capacitance	C <sub>OSS</sub>			10	15	
Reverse Transfer Capacitance	C <sub>RSS</sub>			3.3	6.0	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 24 V, I <sub>D</sub> = 100 mA, V <sub>GS</sub> = 4.5 V		0.75		nC
Gate-to-Source Charge	Q <sub>gs</sub>			0.20		
Gate-to-Drain Charge	Q <sub>gd</sub>			0.20		
Plateau Voltage	V <sub>GP</sub>			1.57		V

### SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 24 V, I <sub>D</sub> = 125 mA, R <sub>G</sub> = 10 Ω		9		ns
Rise Time	t <sub>r</sub>			41		ns
Turn-Off Delay Time	t <sub>d(OFF)</sub>			96		
Fall Time	t <sub>f</sub>			72		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 125 mA		0.79	0.9	V
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2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

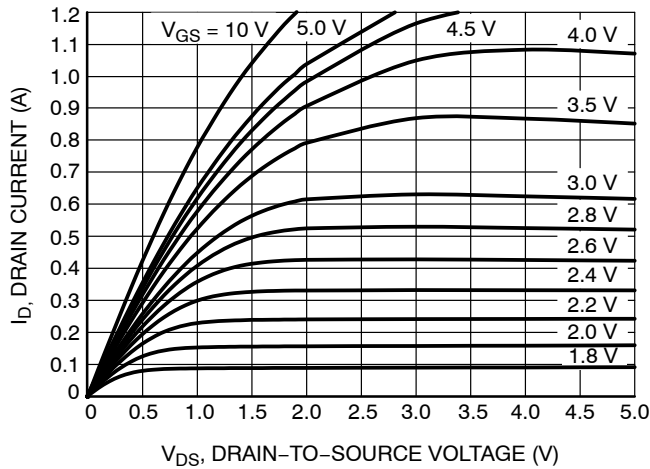


Figure 1. On-Region Characteristics

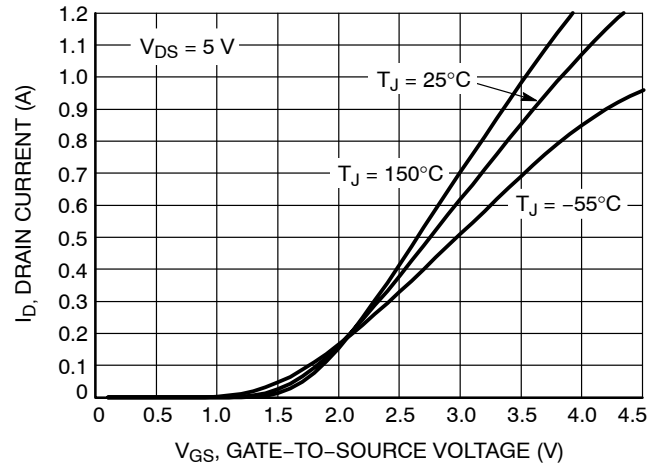


Figure 2. Transfer Characteristics

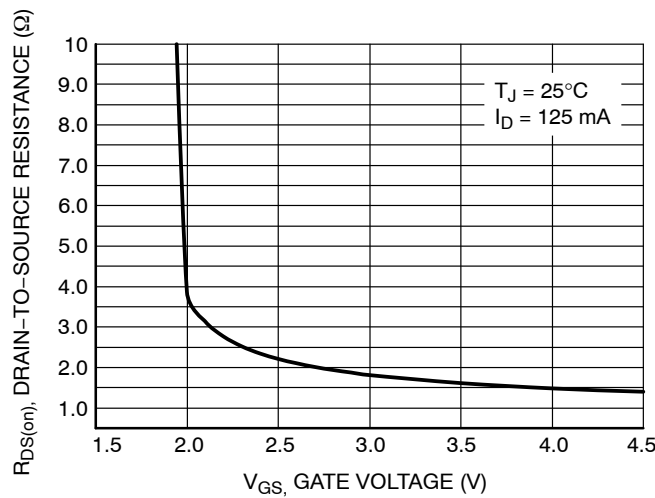


Figure 3. On-Resistance vs. Gate-to-Source Voltage

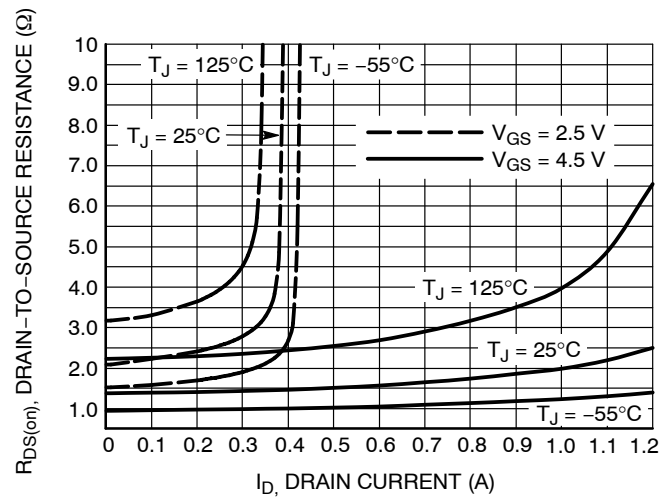


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

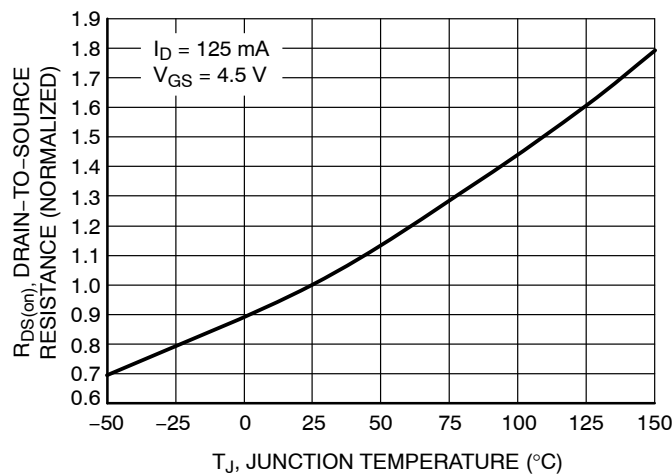


Figure 5. On-Resistance Variation with Temperature

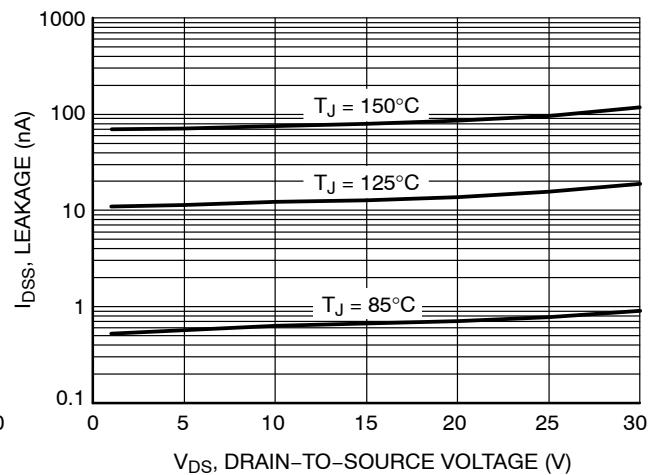


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

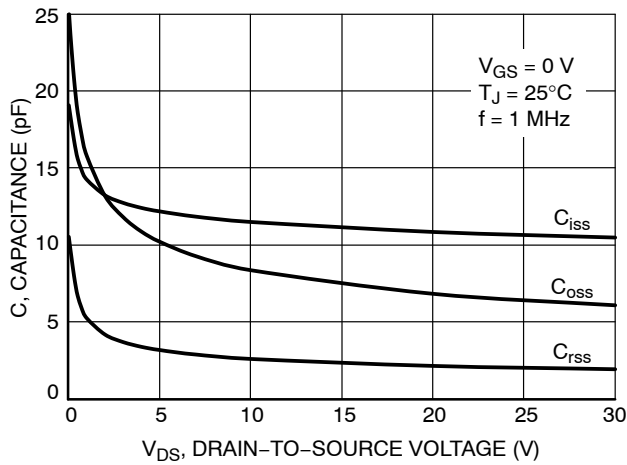


Figure 7. Capacitance Variation

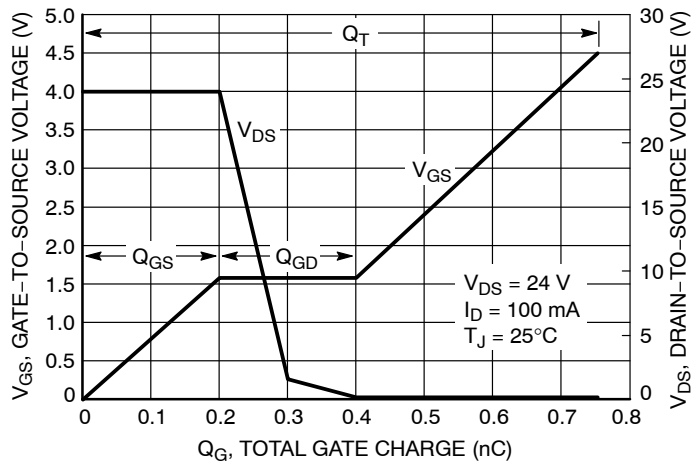


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

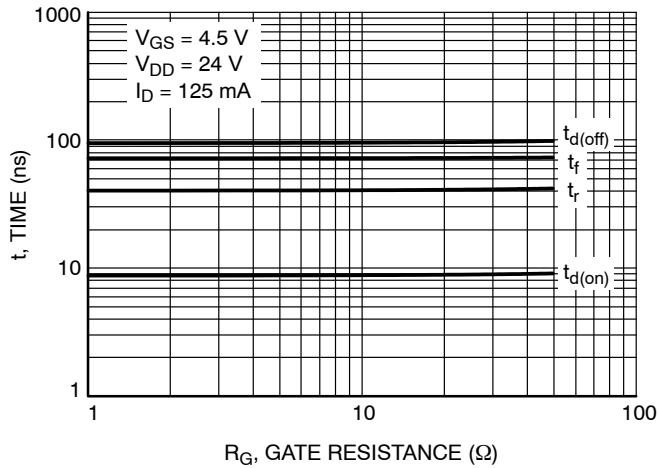


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

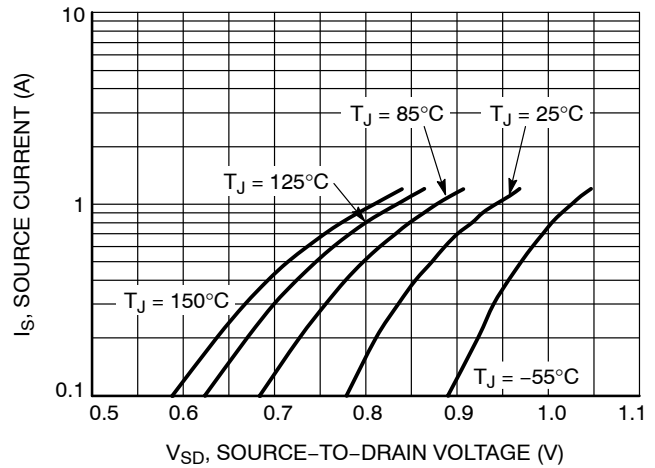


Figure 10. Diode Forward Voltage vs. Current

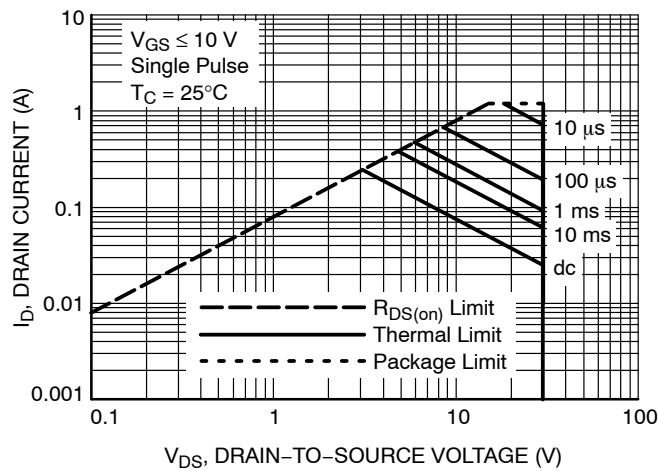


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL PERFORMANCE CURVES

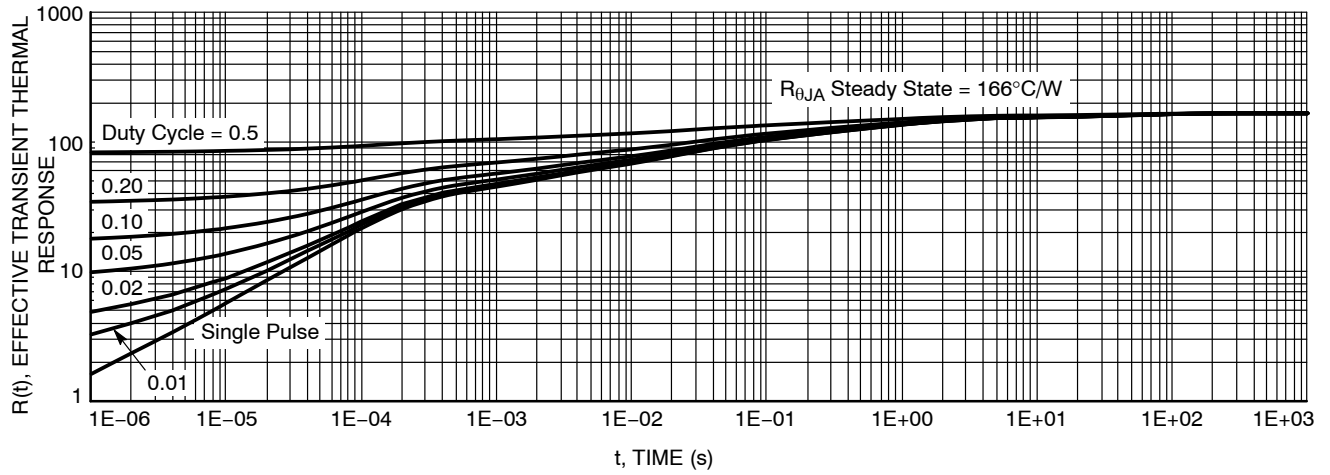


Figure 12. Thermal Impedance (Junction-to-Ambient)



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