

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°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------------------------|------------|------|
| Drain-to-Source Voltage | V _{DSS} | 30 | V |
| Gate-to-Source Voltage | V _{GS} | ±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 | °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 | °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 _{θJA} | 166 | °C/W |

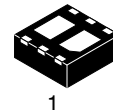
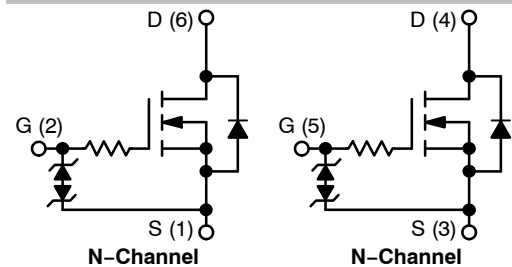
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).



ON Semiconductor®

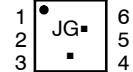
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| V _{(BR)DSS} | R _{DS(on)} Typ @ V _{GS} | I _D MAX (Note 1) |
|----------------------|---|-----------------------------|
| 30 V | 1.4 Ω @ 4.5 V | 245 mA |
| | 2.3 Ω @ 2.5 V | |



MARKING DIAGRAM

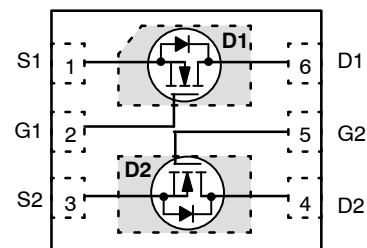
WDFN6
CASE 506AN



- 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_J = 25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|-----------|--------|----------------|-----|-----|-----|------|
|-----------|--------|----------------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | |
|---|--------------------------------------|--|----|----|------|-------|
| Drain-to-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 100 μA | 30 | | | V |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | V _{(BR)DSS} /T _J | Reference to 25°C, I _D = 100 μA | | 27 | | mV/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{GS} = 0 V, V _{DS} = 30 V | | | 1.0 | μA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{GS} = 0 V, V _{DS} = 20 V, T = 85 °C | | | 1.0 | μA |
| Gate-to-Source Leakage Current | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±10 V | | | ±25 | μA |
| Gate-to-Source Leakage Current | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±5 V | | | ±1.0 | μA |
| Gate-to-Source Leakage Current | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±5 V, T = 85 °C | | | ±1.0 | μA |

ON CHARACTERISTICS (Note 2)

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

CAPACITANCES & GATE CHARGE

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

SWITCHING CHARACTERISTICS (Note 3)

| | | | | | | |
|---------------------|---------------------|---|--|----|--|----|
| Turn-On Delay Time | t _{d(ON)} | V _{GS} = 4.5 V, V _{DS} = 24 V, I _D = 125 mA, R _G = 10 Ω | | 9 | | ns |
| Rise Time | t _r | | | 41 | | ns |
| Turn-Off Delay Time | t _{d(OFF)} | | | 96 | | |
| Fall Time | t _f | | | 72 | | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | |
|-----------------------|-----------------|--|--|------|-----|---|
| Forward Diode Voltage | V _{SD} | V _{GS} = 0 V, I _S = 125 mA | | 0.79 | 0.9 | V |
|-----------------------|-----------------|--|--|------|-----|---|

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

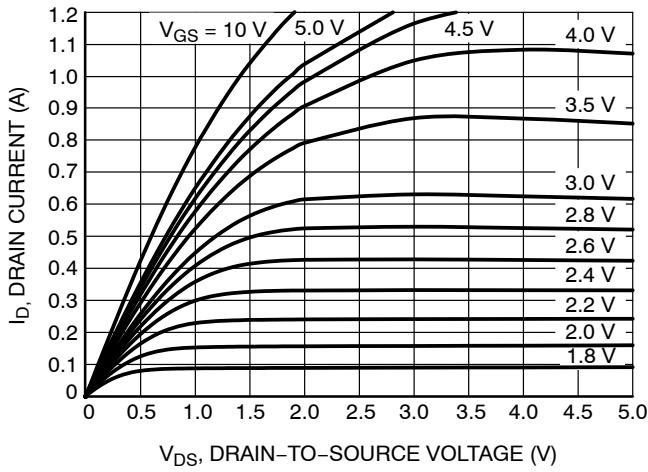


Figure 1. On-Region Characteristics

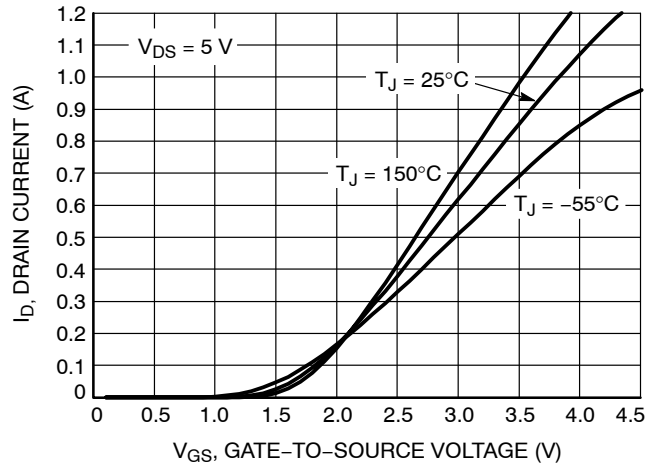


Figure 2. Transfer Characteristics

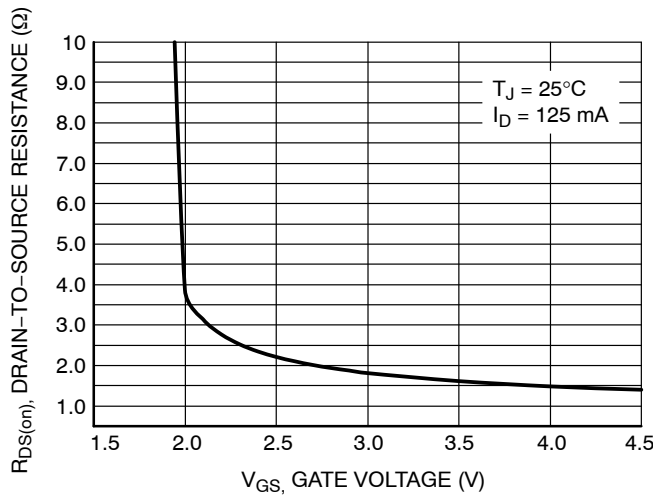


Figure 3. On-Resistance vs. Gate-to-Source Voltage

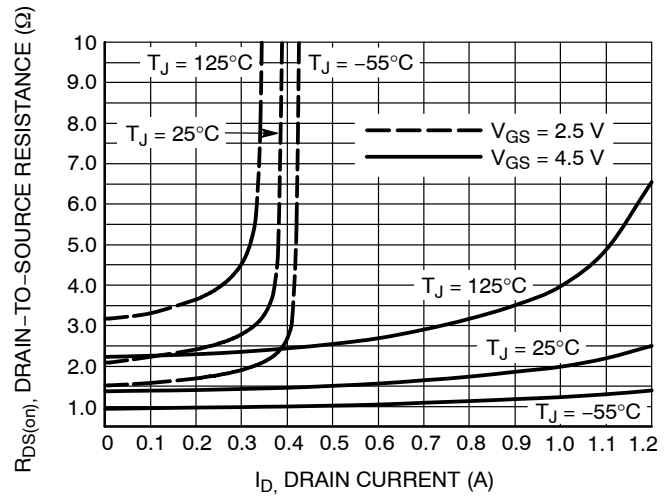


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

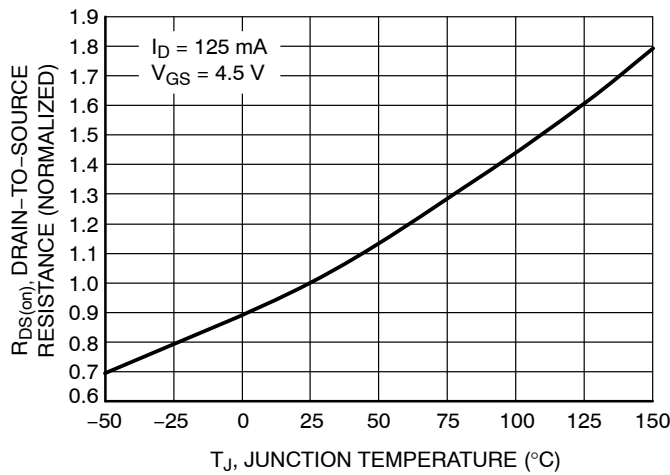


Figure 5. On-Resistance Variation with Temperature

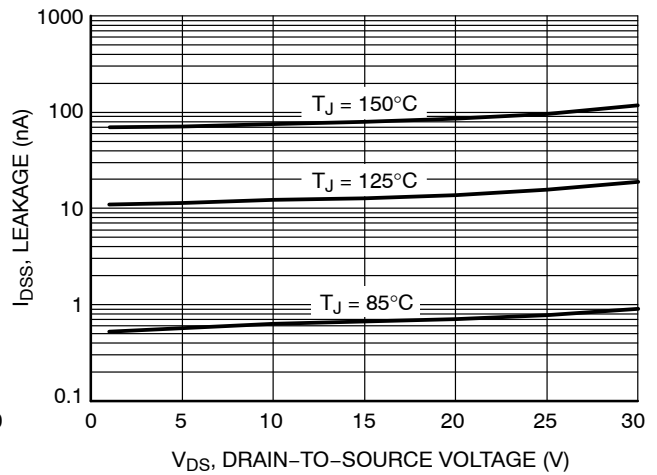


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

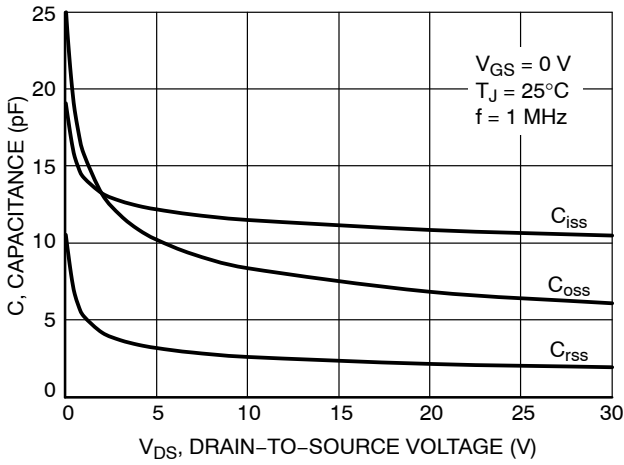


Figure 7. Capacitance Variation

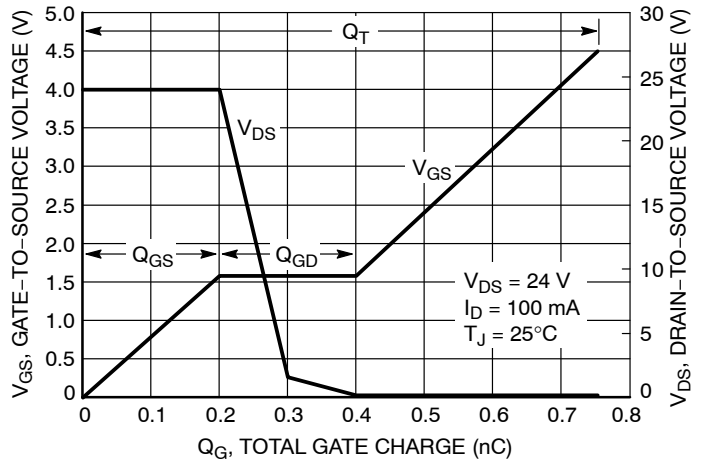


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

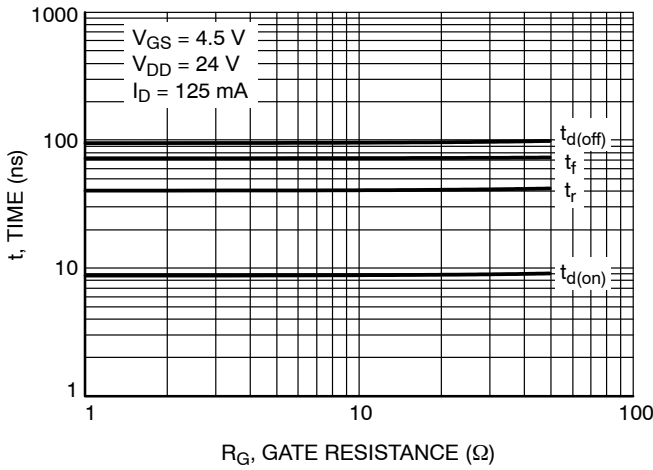


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

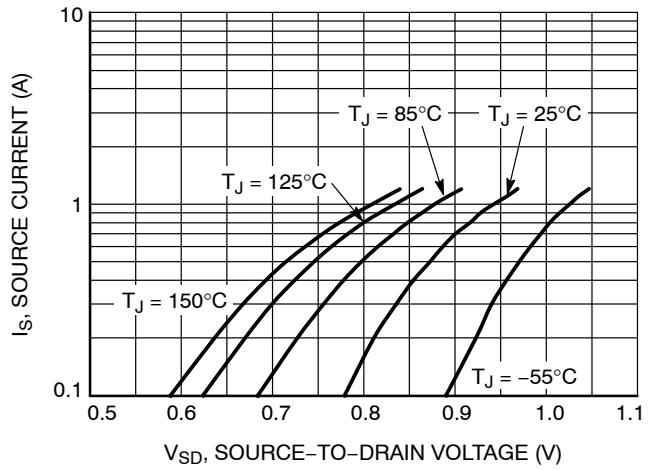


Figure 10. Diode Forward Voltage vs. Current

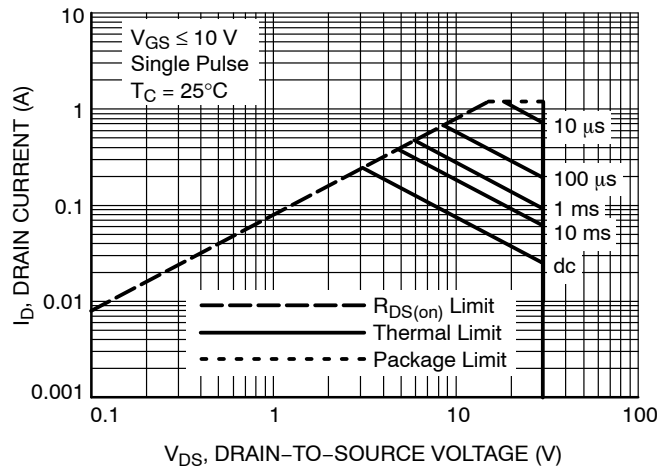


Figure 11. Maximum Rated Forward Biased Safe Operating Area

NVLJD4007NZ

TYPICAL PERFORMANCE CURVES

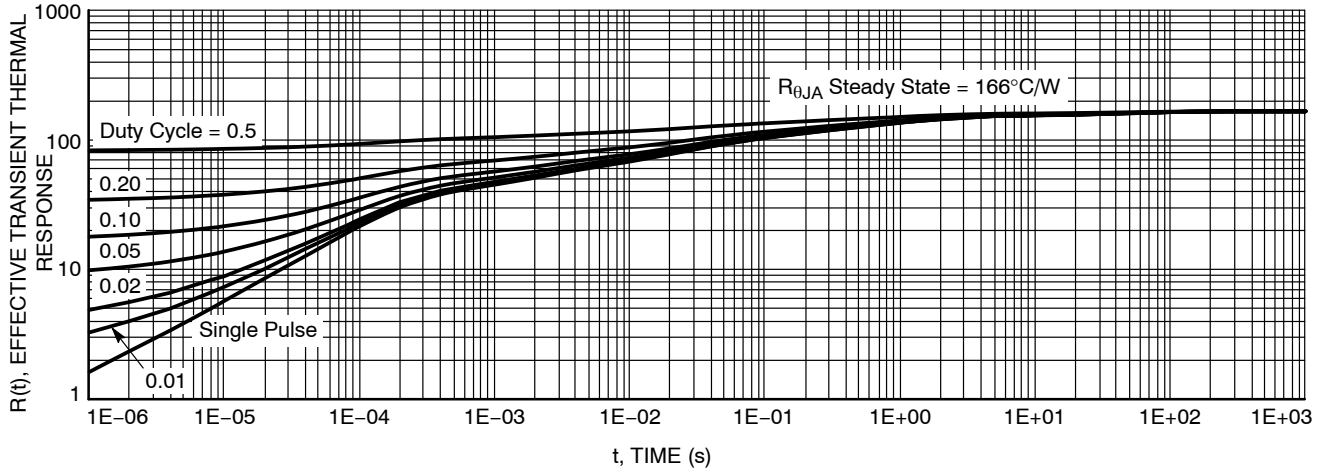


Figure 12. Thermal Impedance (Junction-to-Ambient)

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



WDFN6 2x2, 0.65P
CASE 506AN
ISSUE H

DATE 25 JAN 2022



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 PADS AS WELL AS THE TERMINALS.



| DIM | MILLIMETERS | |
|----------|-------------|------|
| | MIN. | MAX. |
| A | 0.70 | 0.80 |
| A1 | 0.00 | 0.05 |
| A3 | 0.20 REF | |
| <i>b</i> | 0.25 | 0.35 |
| D | 2.00 BSC | |
| D2 | 0.57 | 0.77 |
| E | 2.00 BSC | |
| E2 | 0.90 | 1.10 |
| <i>e</i> | 0.65 BSC | |
| F | 0.95 BSC | |
| <i>k</i> | 0.25 REF | |
| L | 0.20 | 0.30 |
| L1 | --- | 0.10 |

GENERIC MARKING DIAGRAM*



XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



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