# **Small Signal MOSFET**

30 V, 245 mA, Dual, N–Channel, Gate ESD Protection, 2x2 WDFN Package

## 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

Parame	eter	Symbol	Value	Unit
Drain-to-Source Voltage		V <sub>DSS</sub>	30	V
Gate-to-Source Voltage		V <sub>GS</sub>	±10	V
Continuous Drain Current (Note 1)	Steady State = 25°C	۱ <sub>D</sub>	245	mA
Power Dissipation (Note 1)	Steady State = 25°C	PD	755	mW
Pulsed Drain Current	t <sub>P</sub> ≤ 10 μs	I <sub>DM</sub>	1.2	А
Operating Junction and Si	Operating Junction and Storage Temperature			°C
Continuous Source Current (Body Diode)		I <sub>SD</sub>	245	mA
Lead Temperature for Sol (1/8" from case for 10 s)	ΤL	260	°C	

### MAXIMUM RATINGS (T, I = 25°C unless otherwise noted)

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	°C/W

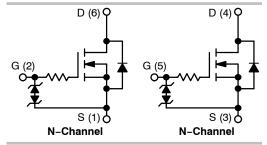
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).

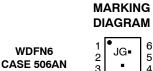


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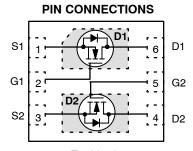








(Note: Microdot may be in either location)



(Top View)

## **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
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.

### **ELECTRICAL CHARACTERISTICS** (T<sub>J</sub> = $25^{\circ}$ C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Тур	Max	Unit
OFF CHARACTERISTICS	•					
Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	$V_{GS}$ = 0 V, $I_D$ = 100 $\mu$ A	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>	Reference to 25°C, $I_D$ = 100 $\mu$ A		27		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{GS}$ = 0 V, $V_{DS}$ = 30 V			1.0	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$\label{eq:VGS} \begin{array}{l} V_{GS} = 0 \ V, \ V_{DS} = 20 \ V, \\ T = 85 \ ^{\circ}C \end{array}$			1.0	μΑ
Gate-to-Source Leakage Current	I <sub>GSS</sub>	$V_{DS}$ = 0 V, $V_{GS}$ = ±10 V			±25	μΑ
Gate-to-Source Leakage Current	I <sub>GSS</sub>	$V_{DS}$ = 0 V, $V_{GS}$ = ±5 V			±1.0	μΑ
Gate-to-Source Leakage Current	I <sub>GSS</sub>	$\begin{array}{l} V_{DS} = 0 \; V,  V_{GS} = \pm 5 \; V \\ T = 85 \; ^{\circ}C \end{array}$			±1.0	μΑ
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	$V_{DS}$ = $V_{GS}$ , $I_D$ = 100 $\mu$ A	0.5	1.0	1.5	V
Threshold Temperature Coefficient	V <sub>GS(TH)</sub> /T <sub>J</sub>	Reference to 25°C, $I_D$ = 100 $\mu$ A		-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	0
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 125 mA		2.3	7.5	Ω
Forward Transconductance	9 <sub>FS</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 125 mA		80		mS

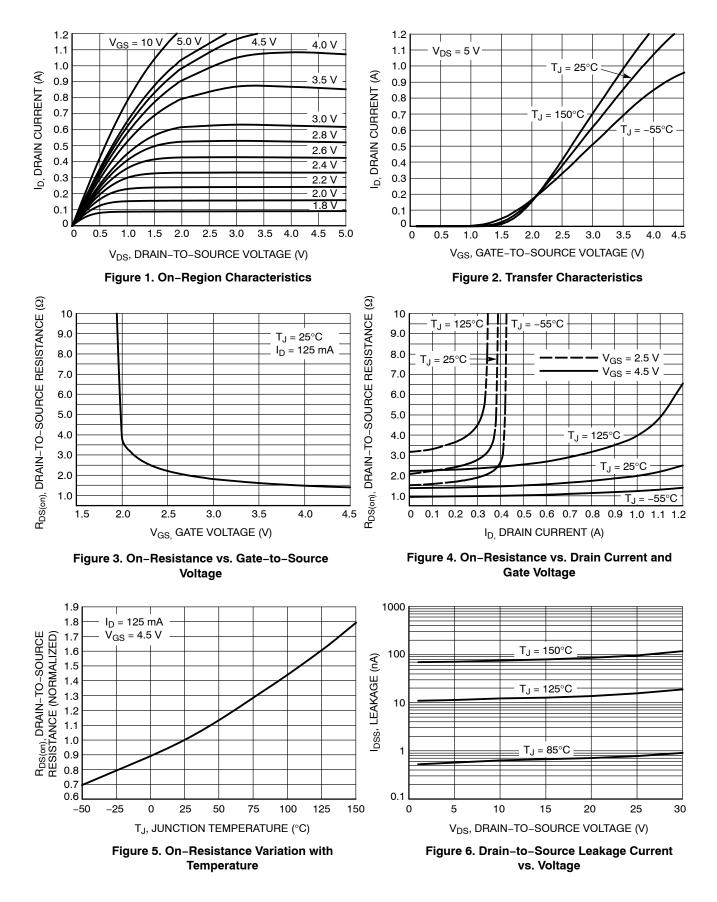
Input Capacitance	C <sub>ISS</sub>		12.2	20	
Output Capacitance	C <sub>OSS</sub>	V <sub>DS</sub> = 5.0 V, f = 1 MHz, V <sub>GS</sub> = 0 V	10	15	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>	40	3.3	6.0	
Total Gate Charge	Qg		0.75		
Gate-to-Source Charge	Q <sub>gs</sub>	$V_{DS}$ = 24 V, I <sub>D</sub> = 100 mA, $V_{GS}$ = 4.5 V	0.20		nC
Gate-to-Drain Charge	Q <sub>gd</sub>		0.20		
Plateau Voltage	V <sub>GP</sub>		1.57		V

#### SWITCHING CHARACTERISTICS (Note 3)

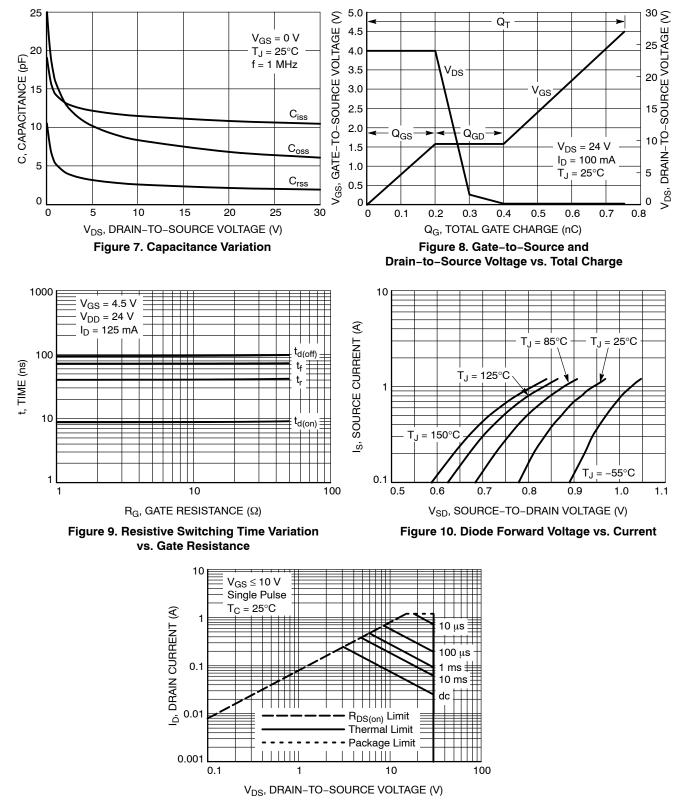
Turn-On Delay Time	t <sub>d(ON)</sub>	$V_{GS}$ = 4.5 V, $V_{DS}$ = 24 V, I <sub>D</sub> = 125 mA, R <sub>G</sub> = 10 $\Omega$		9		ns	
Rise Time	t <sub>r</sub>			41		ns	
Turn-Off Delay Time	t <sub>d(OFF)</sub>			96			
Fall Time	t <sub>f</sub>			72			
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	$V_{SD}$	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 125 mA		0.79	0.9	V	

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

## **TYPICAL PERFORMANCE CURVES**



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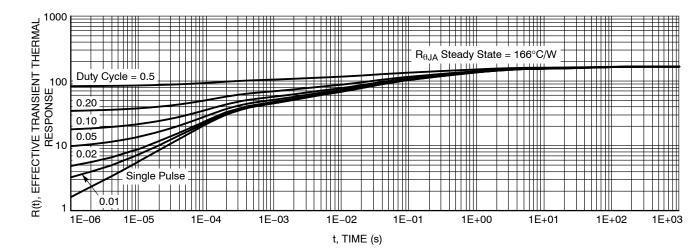
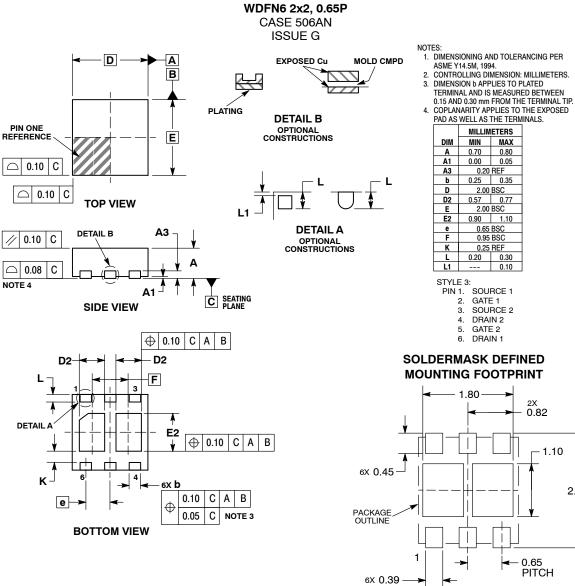


Figure 12. Thermal Impedance (Junction-to-Ambient)

#### PACKAGE DIMENSIONS



DIMENSIONS: MILLIMETERS

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