

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ max $T_A = 25^\circ\text{C}$ (Note 4)
20V	175m $\Omega$ @ $V_{GS} = 4.5\text{V}$	1.30A
	240m $\Omega$ @ $V_{GS} = 2.5\text{V}$	1.11A
	360m $\Omega$ @ $V_{GS} = 1.8\text{V}$	0.91A

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load switch

## Features and Benefits

- Footprint of just 0.6mm<sup>2</sup> – thirteen times smaller than SOT23
- 0.5mm profile – ideal for low profile applications
- On resistance <200m $\Omega$  @  $V_{GS} = 4.5\text{V}$
- Low Gate Threshold Voltage
- Fast Switching Speed
- “Lead Free”, RoHS Compliant (Note 1)
- Halogen and Antimony Free. “Green” Device (Note 2)
- ESD Protected Gate 2KV
- Qualified to AEC-Q101 Standards for High Reliability

## Mechanical Data

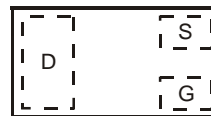
- Case: DFN1006-3
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)



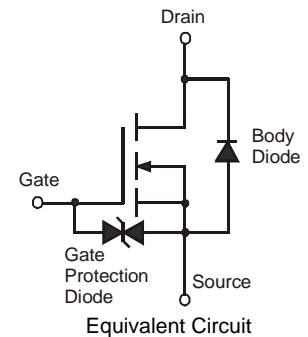
DFN1006-3



Bottom View



Top View  
Internal Schematic



## Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN2300UFB-7	NI	7	8	3,000
DMN2300UFB-7B	NI	7	8	10,000

- Notes:
1. No purposefully added lead
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information

DMN2300UFB-7



Top View  
Dot Denotes  
Drain Side

DMN2300UFB-7B



Top View  
Bar Denotes Gate  
and Source Side

NI = Product Type Marking Code

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current	Steady State	T <sub>A</sub> = 25°C (Note 4)	I <sub>D</sub>	1.32	A
		T <sub>A</sub> = 85°C (Note 4)		0.94	
		T <sub>A</sub> = 25°C (Note 5)		1.78	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	8	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	0.468	W
Power Dissipation (Note 5)	P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 4)	R <sub>θJA</sub>	267	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	104	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA
Zero Gate Voltage Drain Current T <sub>J</sub> = 25°C	I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	10	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.45	-	0.95	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	-	175	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 300mA
		-	-	240		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 250mA
		-	-	360		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 100mA
Forward Transfer Admittance	Y <sub>fs</sub>	40	-	-	mS	V <sub>DS</sub> = 3V, I <sub>D</sub> = 30mA
Diode Forward Voltage	V <sub>SD</sub>	-	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 300mA
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	-	67.62	-	pF	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	9.74	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	7.58	-	pF	
Gate Resistance	R <sub>g</sub>	-	68.51	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	-	0.89	-	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 1A
Gate-Source Charge	Q <sub>gs</sub>	-	0.14	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	0.16	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	4.92	-	ns	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1A V <sub>GS</sub> = 4.5V, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	-	6.93	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	21.71	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	10.62	-	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 25mm X 25mm square copper plate
  - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
  - Short duration pulse test used to minimize self-heating effect.

**DMN2300UFB**

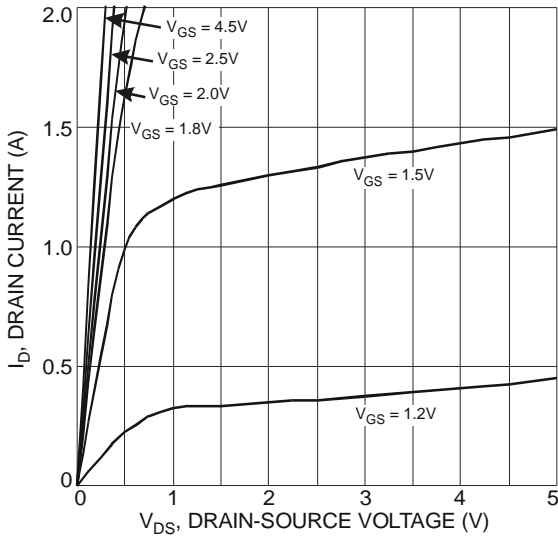


Fig. 1 Typical Output Characteristic

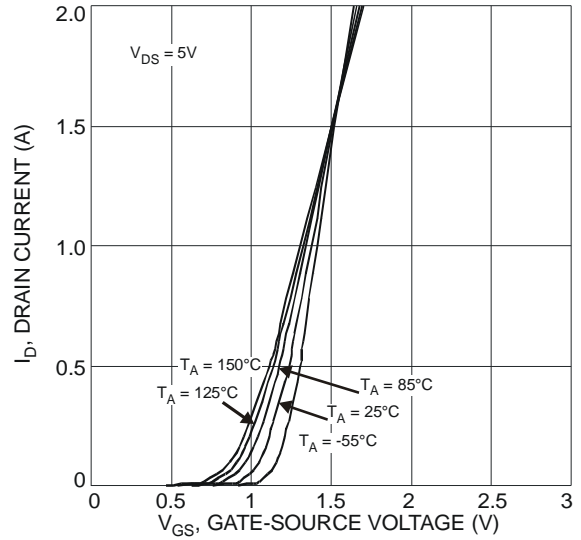


Fig. 2 Typical Transfer Characteristic

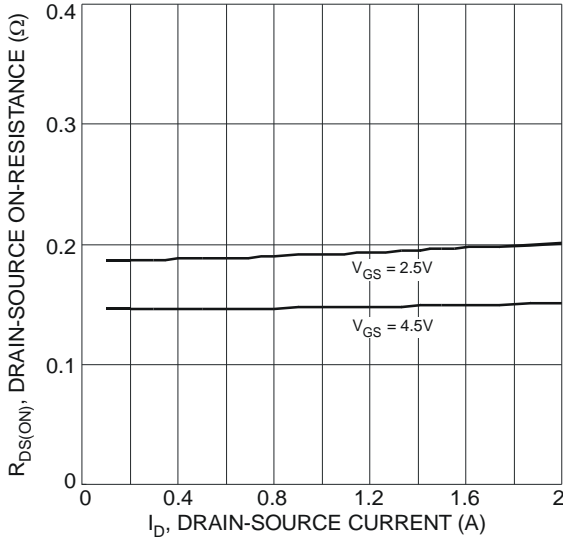


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

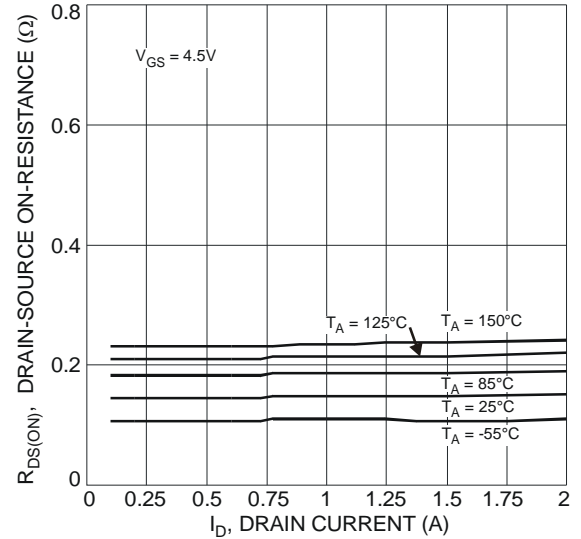


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

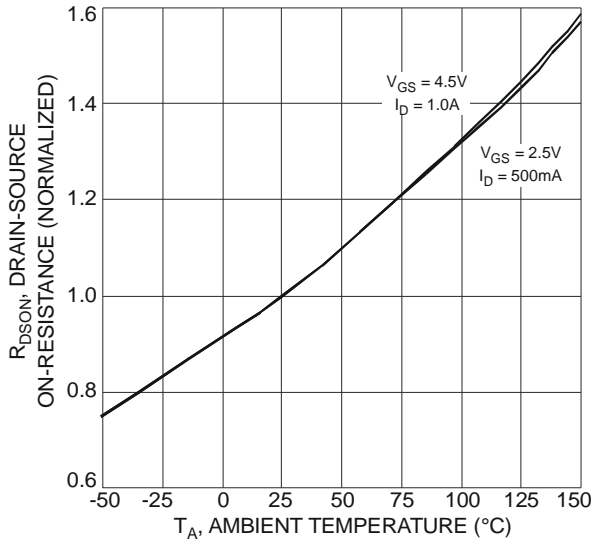


Fig. 5 On-Resistance Variation with Temperature

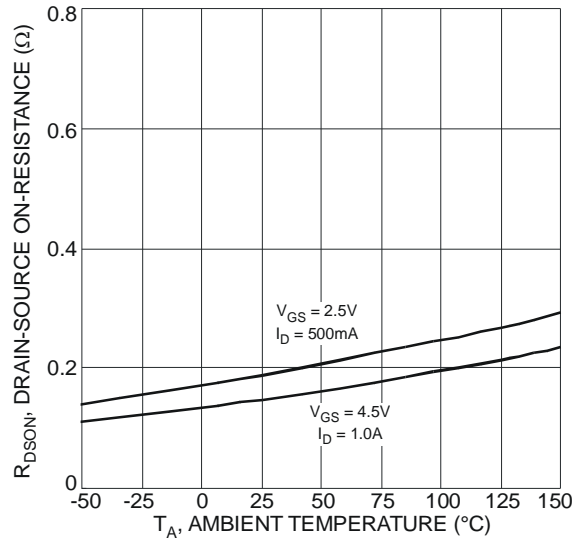


Fig. 6 On-Resistance Variation with Temperature

**DMN2300UFB**

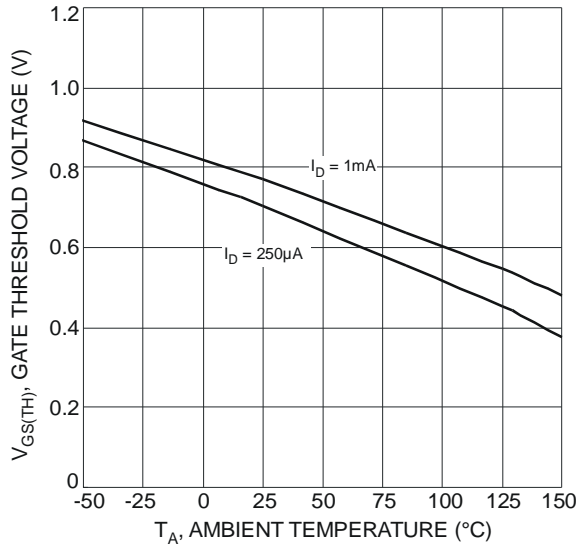


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

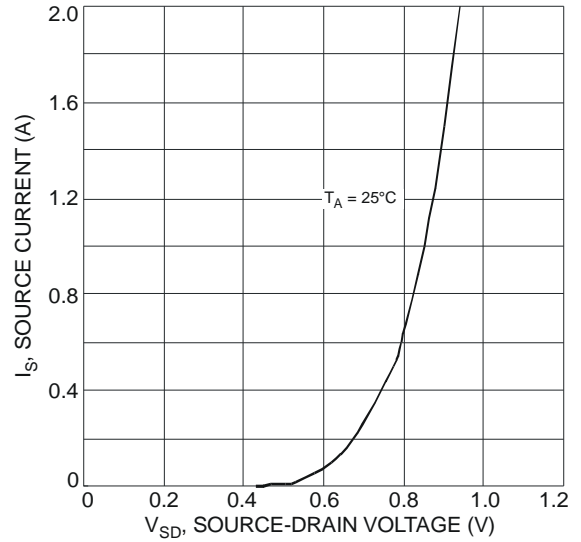


Fig. 8 Diode Forward Voltage vs. Current

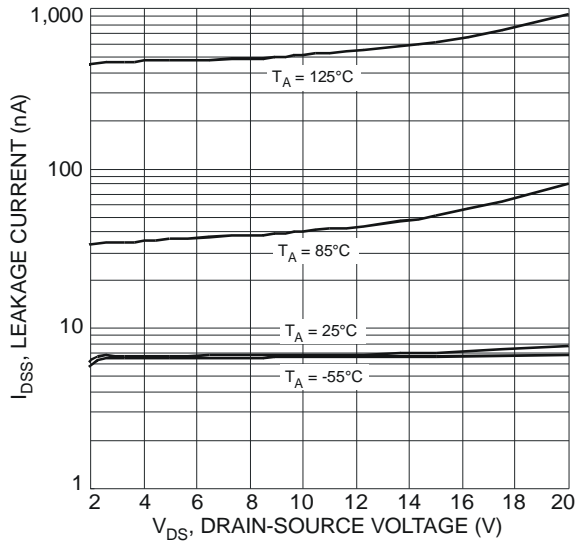


Fig. 9 Typical Leakage Current vs. Drain-Source Voltage

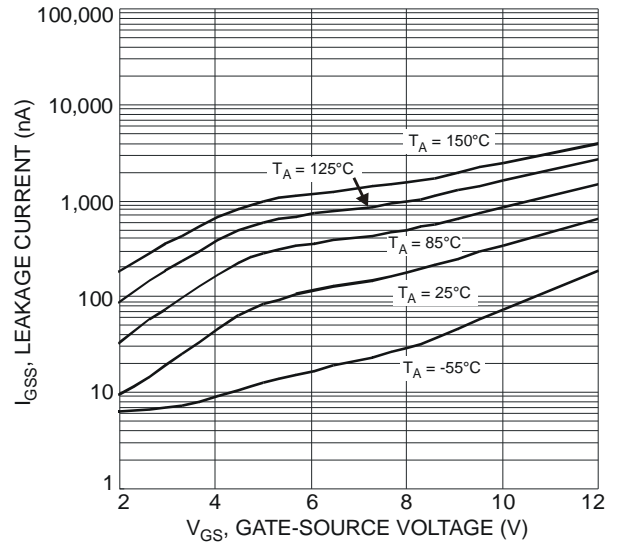


Fig.10 Leakage Current vs. Gate-Source Voltage

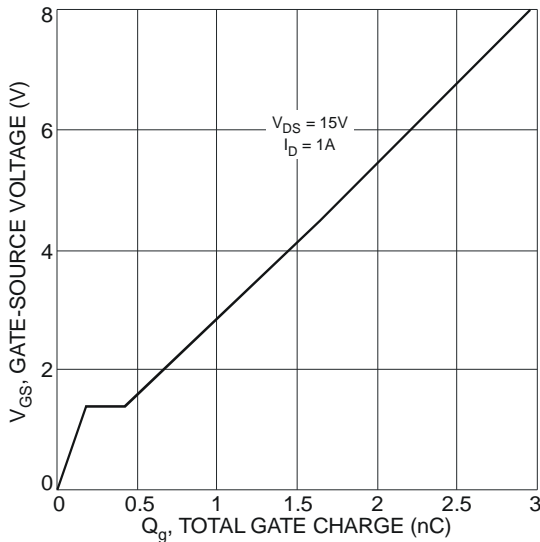


Fig. 11 Gate-Charge Characteristics

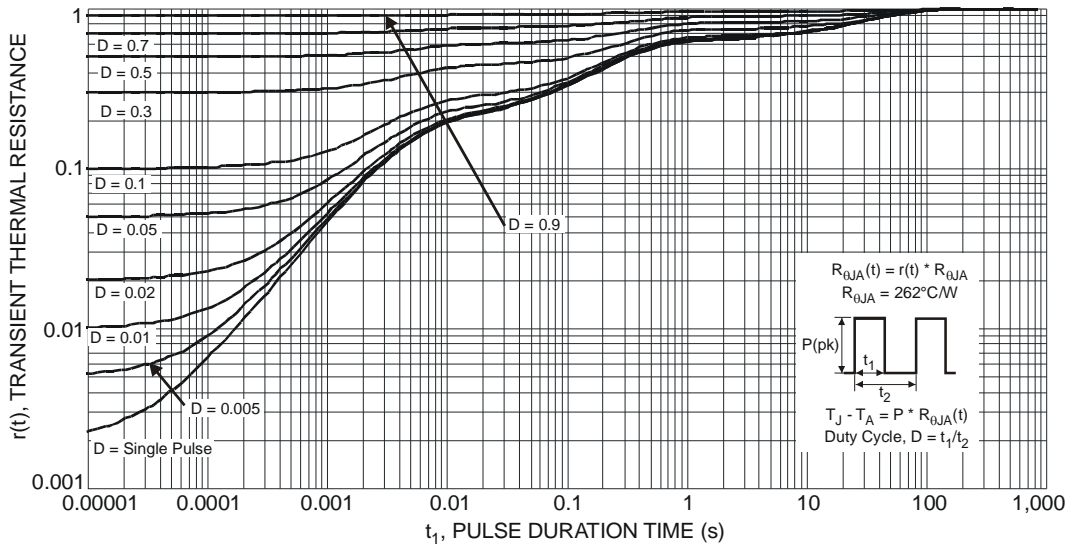
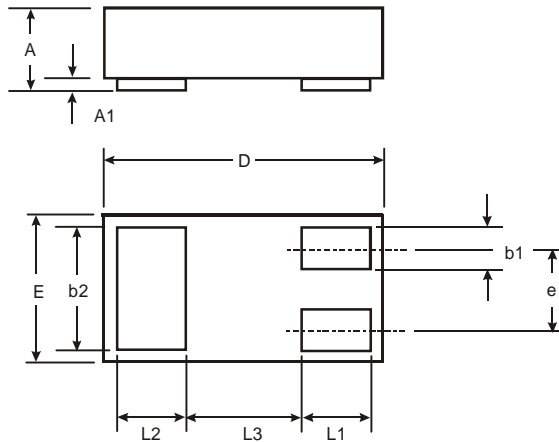


Fig. 12 Transient Thermal Response

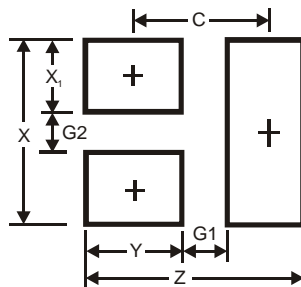
**Package Outline Dimensions**



DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40

All Dimensions in mm

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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