

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	I_D $T_A = +25^\circ\text{C}$
20V	0.4Ω @ $V_{GS} = 4.5\text{V}$	1A
	0.7 Ω @ $V_{GS} = 1.8\text{V}$	0.8A

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(TH)}$, 1.0V Max.
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surfaced Mount Package
- Ultra-Low Package Profile, 0.4mm Maximum Package Height
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

This new generation MOSFET is 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.

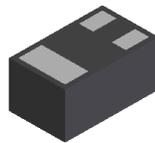
- DC-DC Converters
- Power Management Functions

Mechanical Data

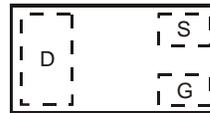
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208(e4)
- Weight: 0.001 grams (Approximate)



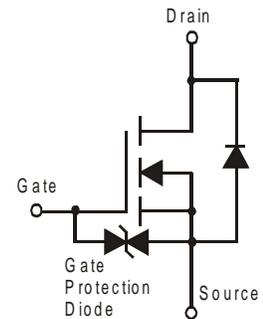
X2-DFN1006-3



Bottom View



Top View
Internal Schematic



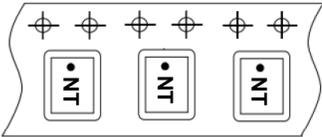
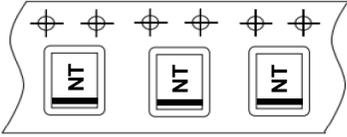
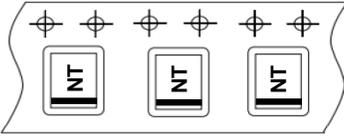
EQUIVALENT CIRCUIT

Ordering Information (Note 3)

Part Number	Case	Packaging
DMN2500UFB4-7	X2-DFN1006-3	3,000/Tape & Reel
DMN2500UFB4-7B	X2-DFN1006-3	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

<p>DMN2500UFB4-7</p>	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Top View Dot Denotes Drain Side</p> </div> <div style="text-align: center;"> <p>From date code 1527 (YYWW), this changes to:</p>  <p>Top View Bar Denotes Gate and Source Side</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>
<p>DMN2500UFB4-7B</p>	<div style="text-align: center;">  <p>Top View Bar Denotes Gate and Source Side</p> </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="text-align: right; margin-top: 10px;"> <p>NT = Part Marking Code</p> </div>

Maximum Ratings (@T_A = +25°C unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±6	V
Continuous Drain Current (Note 4) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	810 640	mA
	t < 10s	T _A = +25°C T _A = +70°C	I _D	950 750	mA
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	1000 800	mA
	t < 10s	T _A = +25°C T _A = +70°C	I _D	1200 1000	mA
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	4	A
Maximum Body Diode continuous Current			I _S	850	mA

Thermal Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)	T _A = +25°C	P _D	0.46	W
	T _A = +70°C		0.29	
Thermal Resistance, Junction to Ambient (Note 4)	Steady State	R _{θJA}	279	°C/W
	t < 10s		210	°C/W
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.95	W
	T _A = +70°C		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	134	°C/W
	t < 10s		100	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	100	nA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±1.0	µA	V _{GS} = ±4.5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(th)}	0.5	-	1.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	-	0.3	0.4	Ω	V _{GS} = 4.5V, I _D = 600mA
			0.4	0.5		V _{GS} = 2.5V, I _D = 500mA
			0.5	0.7		V _{GS} = 1.8V, I _D = 350mA
Forward Transfer Admittance	Y _{fs}	-	1.4	-	S	V _{DS} = 10V, I _D = 400mA
Diode Forward Voltage	V _{SD}	-	0.7	1.2	V	V _{GS} = 0V, I _S = 150mA
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	-	60.67	-	pF	V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	9.68	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	5.37	-	pF	
Gate resistance	R _g	-	93	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	-	736.6	-	pC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	-	93.6	-	pC	
Gate-Drain Charge	Q _{gd}	-	116.6	-	pC	
Turn-On Delay Time	t _{D(on)}	-	5.1	-	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA
Turn-On Rise Time	t _r	-	7.4	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	26.7	-	ns	
Turn-Off Fall Time	t _f	-	12.3	-	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 1-inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

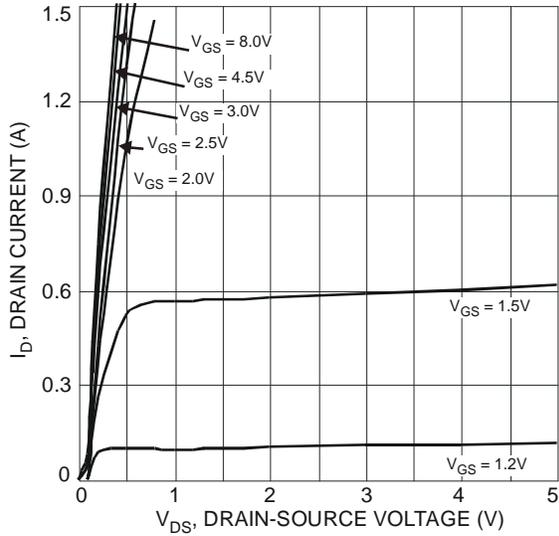


Fig. 1 Typical Output Characteristics

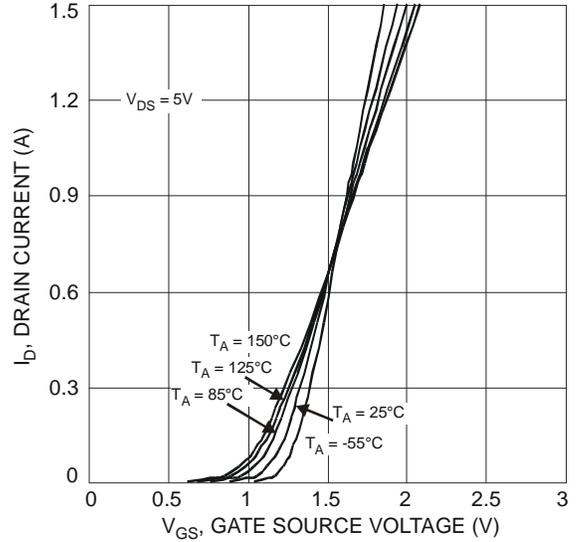


Fig. 2 Typical Transfer Characteristics

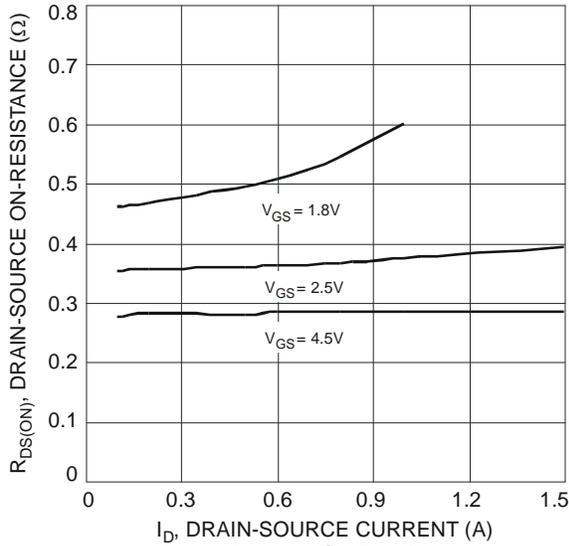


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

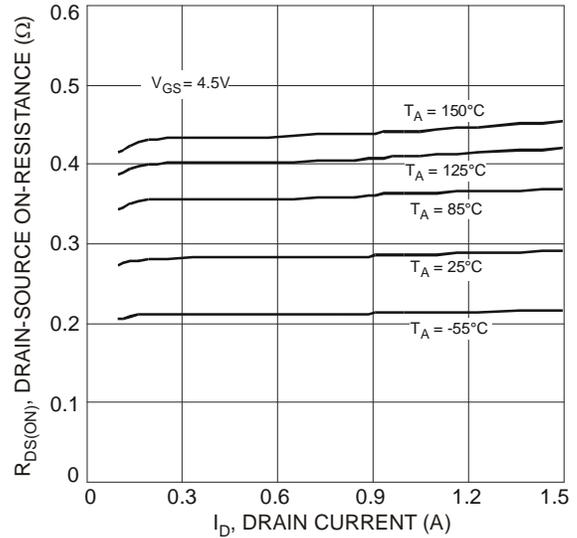


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

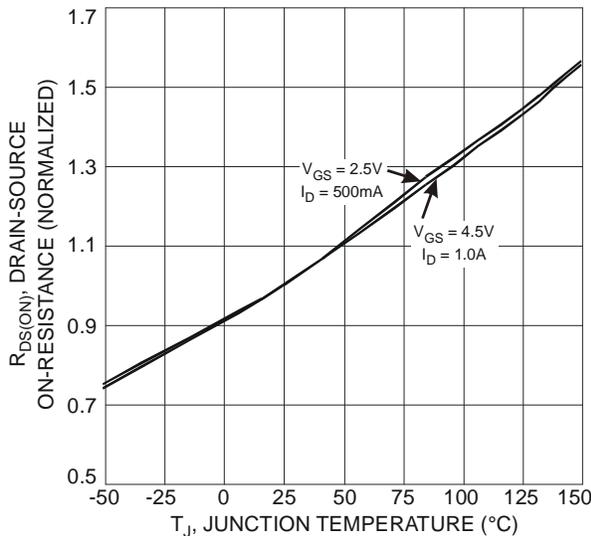


Fig. 5 On-Resistance Variation with Temperature

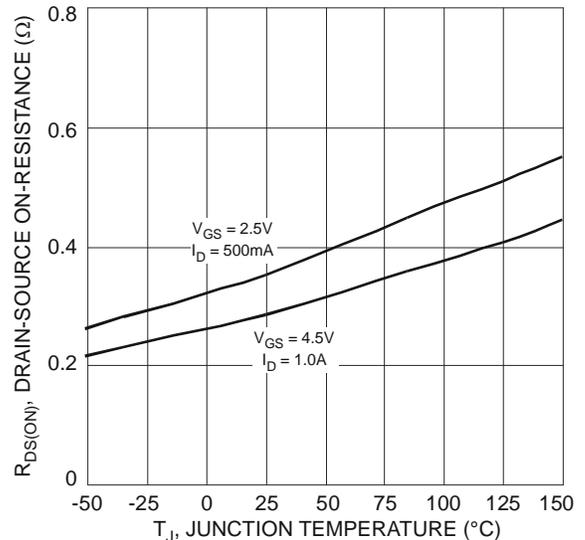


Fig. 6 On-Resistance Variation with Temperature

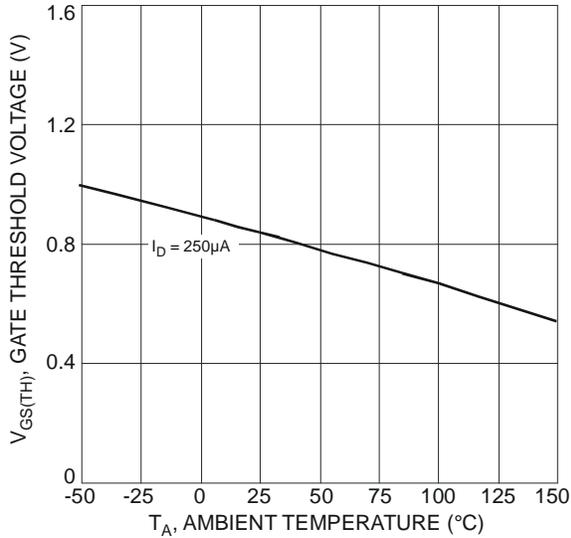


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

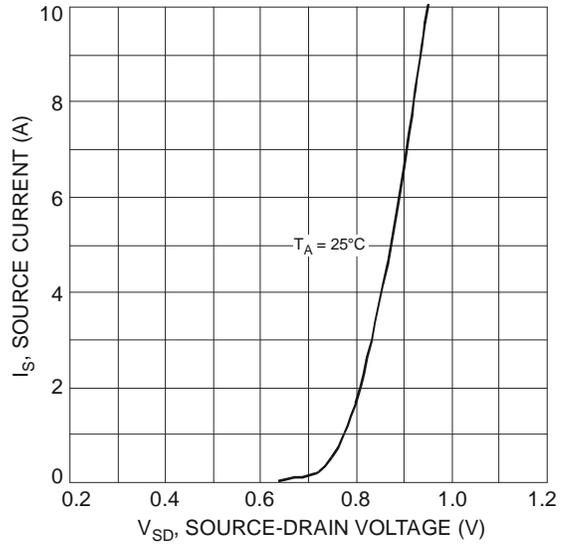


Fig. 8 Diode Forward Voltage vs. Current

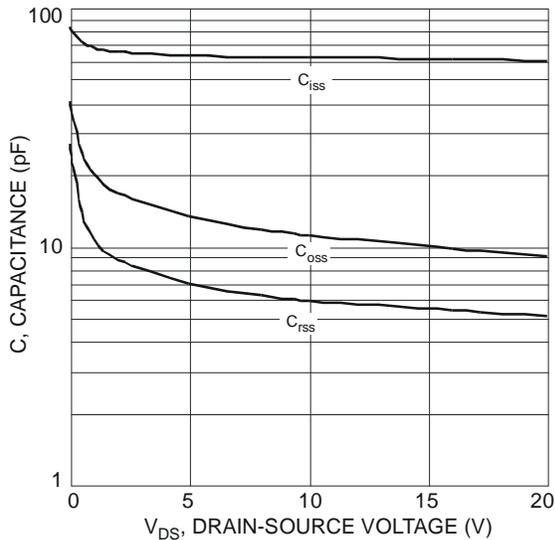


Fig. 9 Typical Capacitance

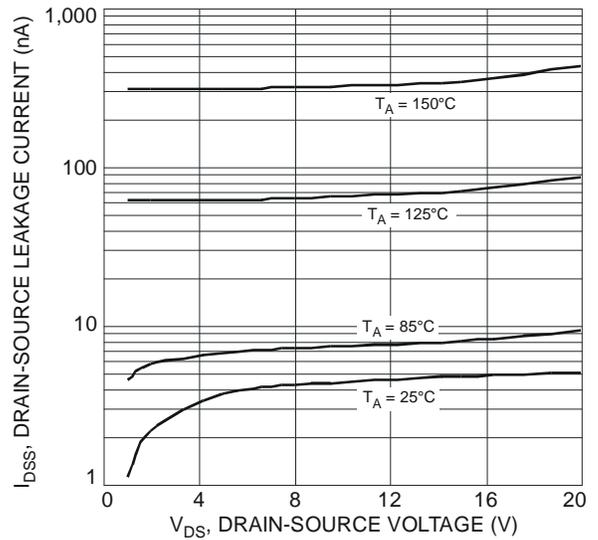
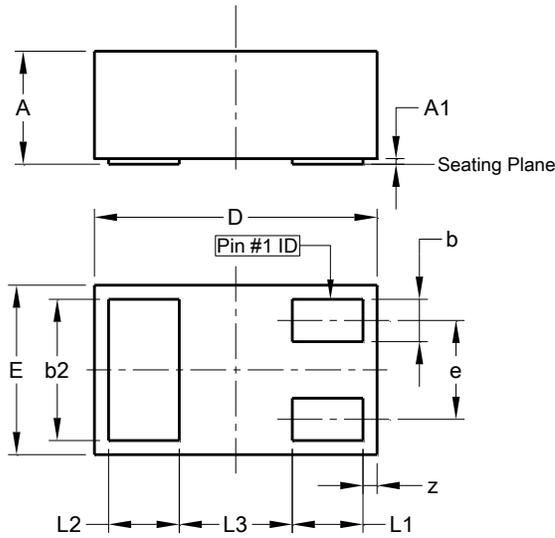


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

Package Outline Dimensions

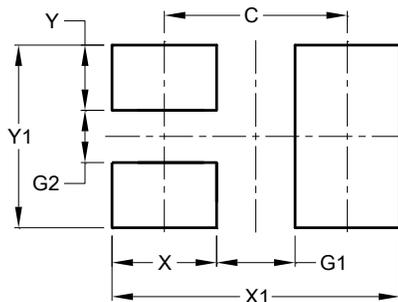
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



X2-DFN1006-3			
Dim	Min	Max	Typ
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

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