Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
20V	0.55Ω @ V_{GS} = 4.5V	0.75A
	0.75Ω @ V_{GS} = 2.5V	0.63A

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **ESD Protected up to 1.5kV**
- **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 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.

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

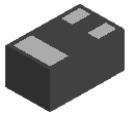
Mechanical Data

- Case: X1-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 Indicator: Collector Dot
- Terminals: Finish — NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

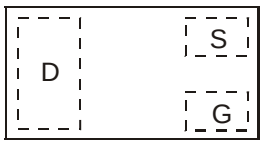


ESD PROTECTED TO 1.5kV

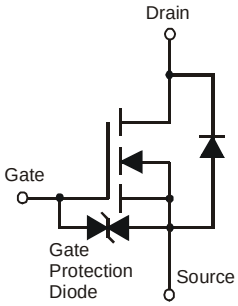
X1-DFN1006-3



Bottom View



Top View
Package Pin Configuration



Equivalent Circuit

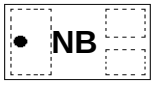
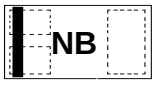
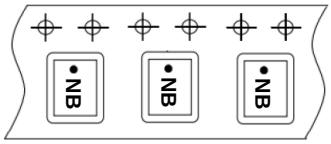
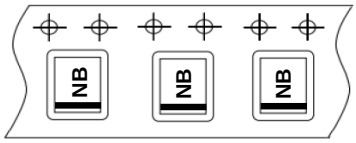
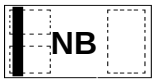
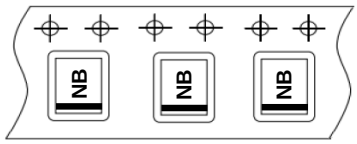
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2400UFB-7	X1-DFN1006-3	3,000/Tape & Reel
DMN2400UFB-7B	X1-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.

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Marking Information

DMN2400UFB-7	 Top View Dot Denotes Drain Side From date code 1527 (YYWW), this changes to:  Top View Bar Denotes Gate and Source Side  
DMN2400UFB-7B	 Top View Bar Denotes Gate and Source Side  NB = Part Marking Code

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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}	±12	V
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +85°C	I_D	0.75 0.55	A
Continuous Drain Current (Note 5) V_{GS} = 2.5V	Steady State	T_A = +25°C T_A = +85°C	I_D	0.63 0.45	A
Pulsed Drain Current (Note 6)			I_{DM}	3	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.47	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	258	°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 7)						
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
Gate-Source Leakage	I_{GSS}	-	-	±50	µA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	-	0.9	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	-	0.55	Ω	V_{GS} = 4.5V, I_D = 600mA
		-	-	0.75		V_{GS} = 2.5V, I_D = 500mA
		-	-	0.9		V_{GS} = 1.8V, I_D = 350mA
Forward Transfer Admittance	$\|Y_{fs}\|$	-	1.0	-	S	V_{DS} = 10V, I_D = 400mA
Diode Forward Voltage (Note 7)	V_{SD}		0.7	1.2	V	V_{GS} = 0V, I_S = 150mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	36.0	-	pF	V_{DS} = 16V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	5.7	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	4.2	-	pF	
Total Gate Charge	Q_g	-	0.5	-	nC	V_{GS} =4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	-	0.07	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.1	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	4.11	-	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47Ω, R_G = 10Ω, I_D = 200mA
Turn-On Rise Time	t_r	-	3.82	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	14.8	-	ns	
Turn-Off Fall Time	t_f	-	9.6	-	ns	

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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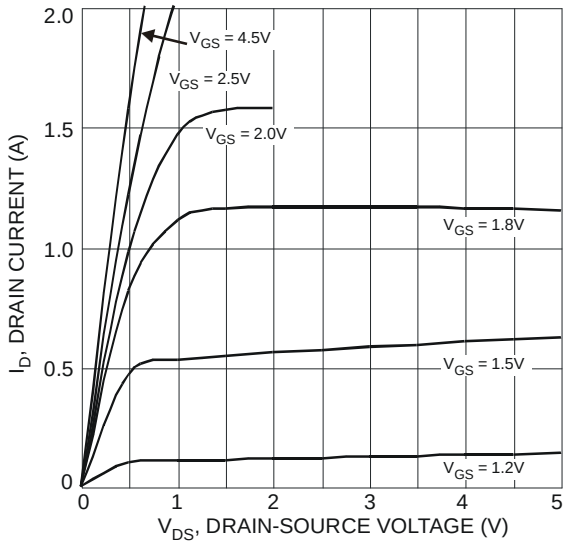


Fig. 1 Typical Output Characteristics

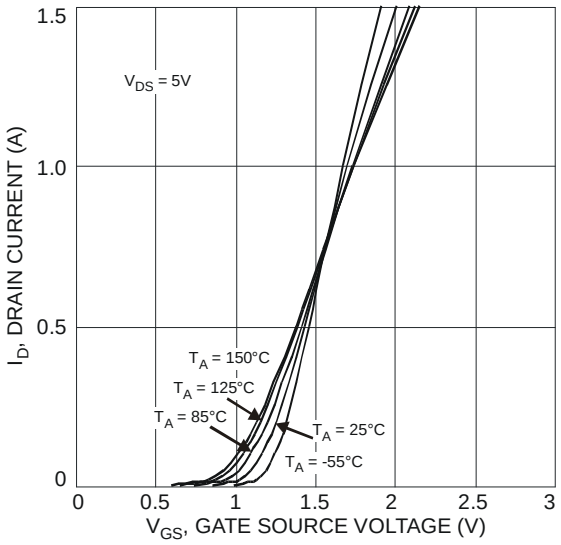


Fig. 2 Typical Transfer Characteristics

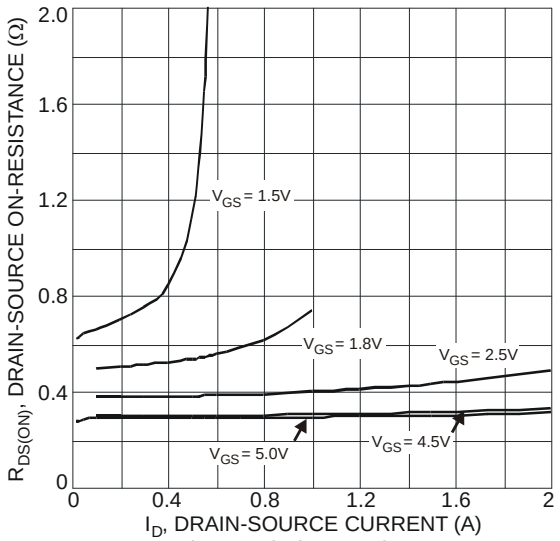


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

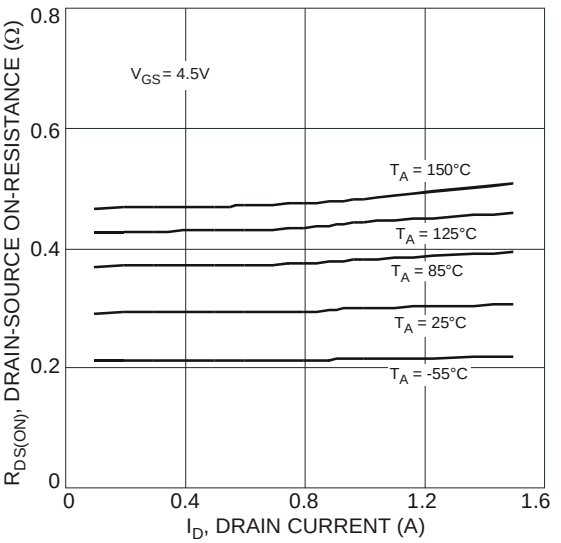


Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

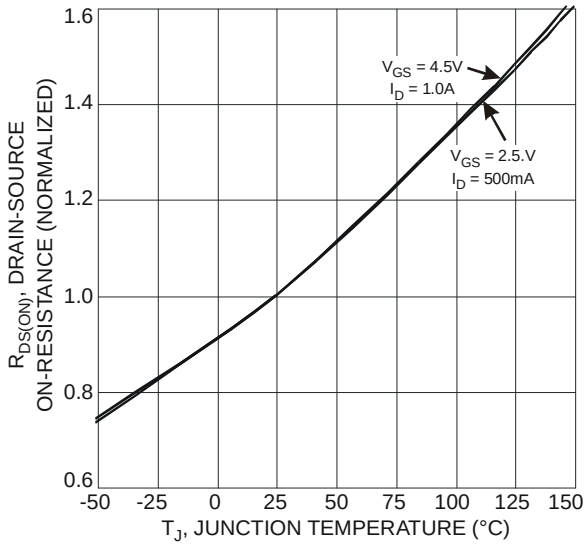


Fig. 5 On-Resistance Variation with Temperature

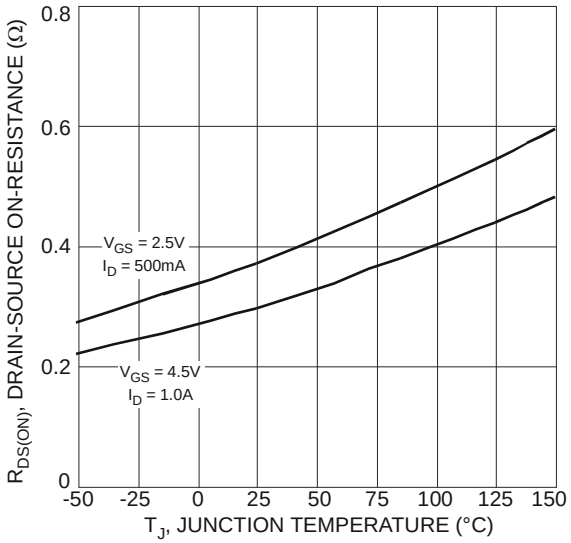


Fig. 6 On-Resistance Variation with Temperature

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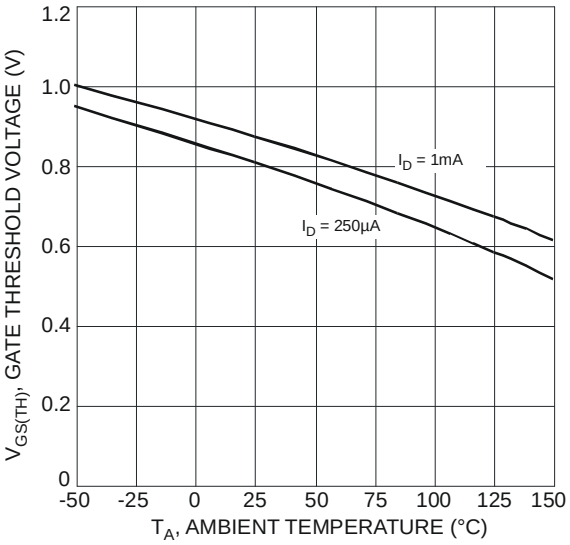


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

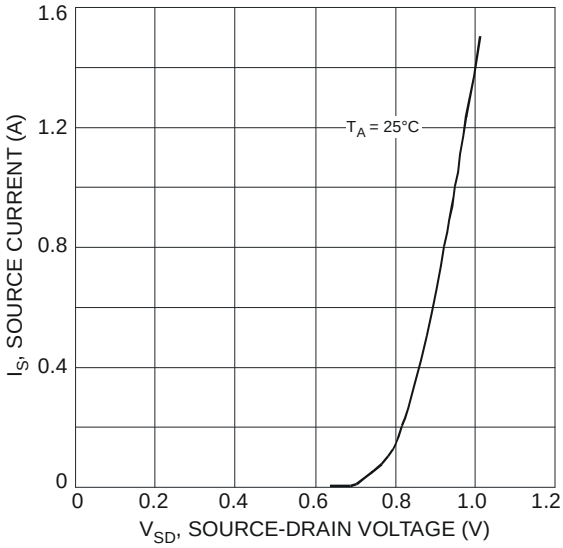


Fig. 8 Diode Forward Voltage vs. Current

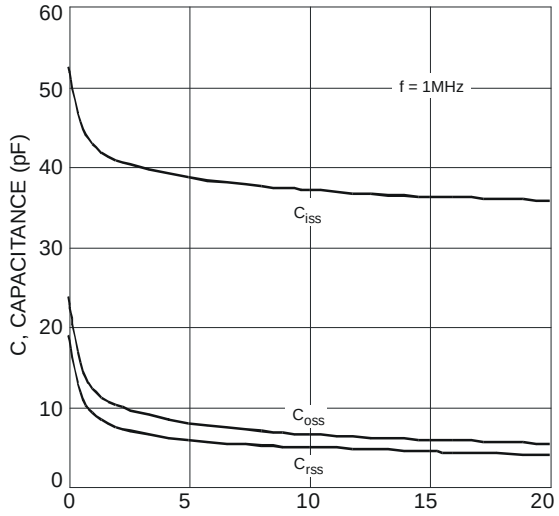


Fig. 9 Typical Capacitance

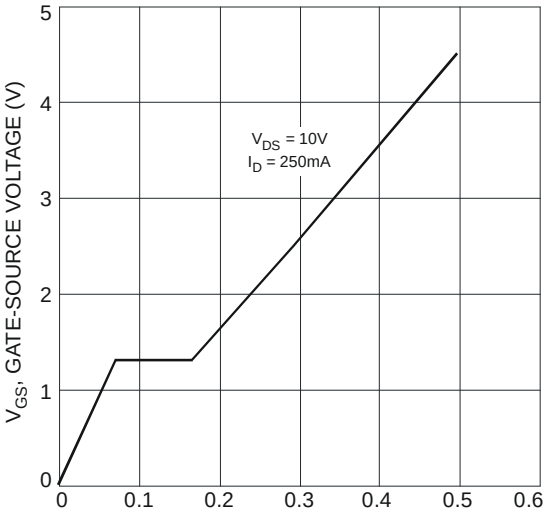


Fig. 10 Gate-Charge Characteristics

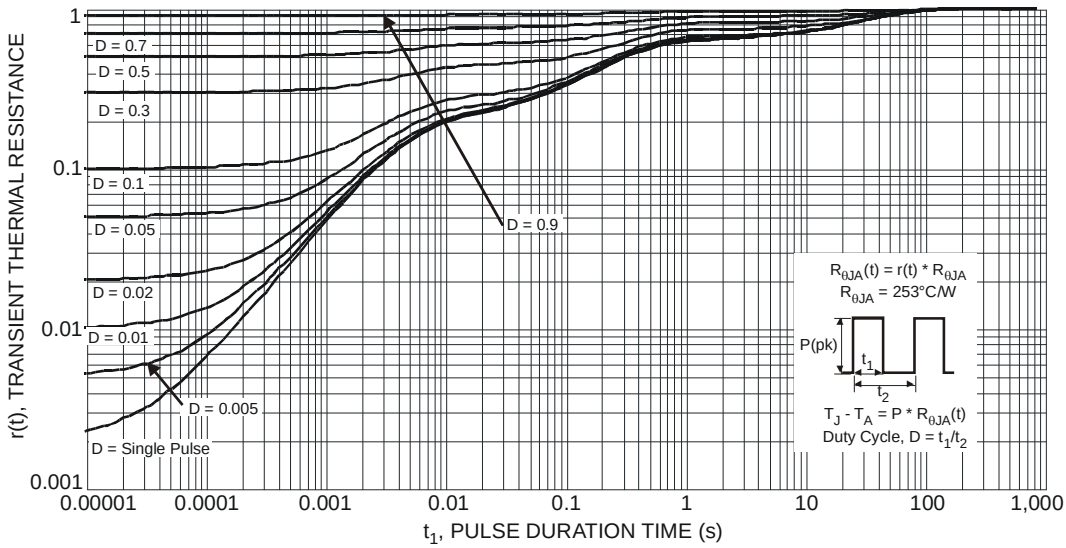
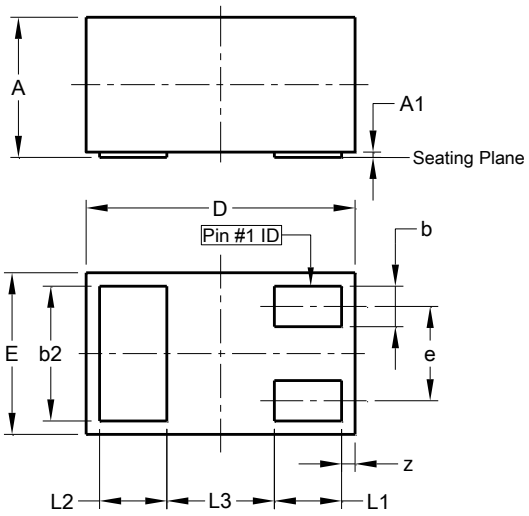


Fig. 11 Transient Thermal Response

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Package Outline Dimensions

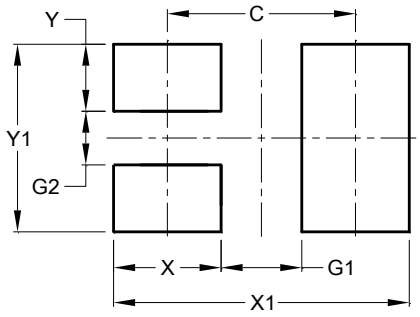
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	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
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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