

**30V N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ C$
30V	460m $\Omega$ @ $V_{GS} = 4.5V$	0.9A
	560m $\Omega$ @ $V_{GS} = 2.5V$	0.7A

**Description**

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.

**Applications**

- Load Switch
- Portable Applications
- Power Management Functions

**Features and Benefits**

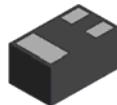
- 0.4mm ultra low profile package for thin application
- 0.6mm<sup>2</sup> package footprint, 10 times smaller than SOT23
- Low  $V_{GS(th)}$ , can be driven directly from a battery
- Low  $R_{DS(on)}$
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected Gate 2kV**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

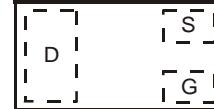
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.001 grams (approximate)



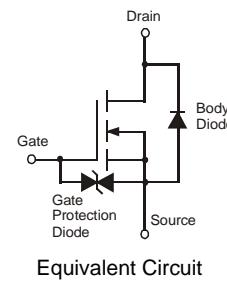
X2-DFN1006-3



Bottom View



Top View



Equivalent Circuit

**Ordering Information (Note 4)**

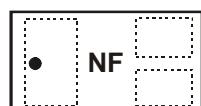
Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN3730UFB4-7	NF	7	8	3000
DMN3730UFB4-7B	NF	7	8	10,000

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](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>.

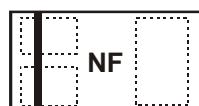
**Marking Information**

DMN3730UFB4-7



Top View  
 Dot Denotes  
 Drain Side

DMN3730UFB4-7B



Top View  
 Bar Denotes Gate  
 and Source Side

NF = Product Type Marking Code

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		$V_{DSS}$	30	V
Gate-Source Voltage		$V_{GSS}$	$\pm 8$	
Continuous Drain Current	$V_{GS} = 4.5\text{V}$	(Note 6)	$I_D$	0.91
		$T_A = +70^\circ\text{C}$ (Note 6)		0.73
		(Note 5)		0.75
Pulsed Drain Current		(Note 7)	$I_{DM}$	3

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

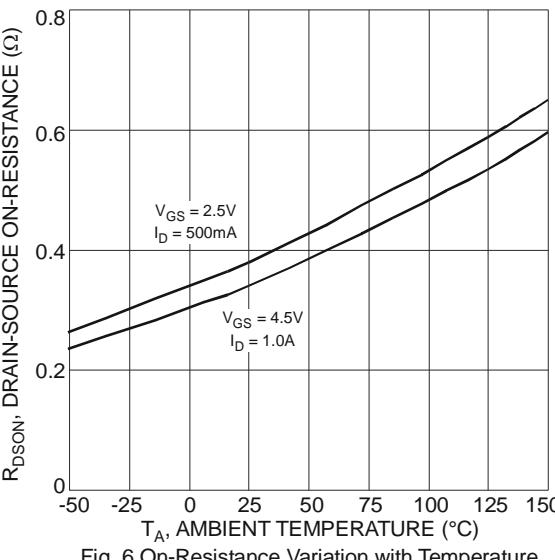
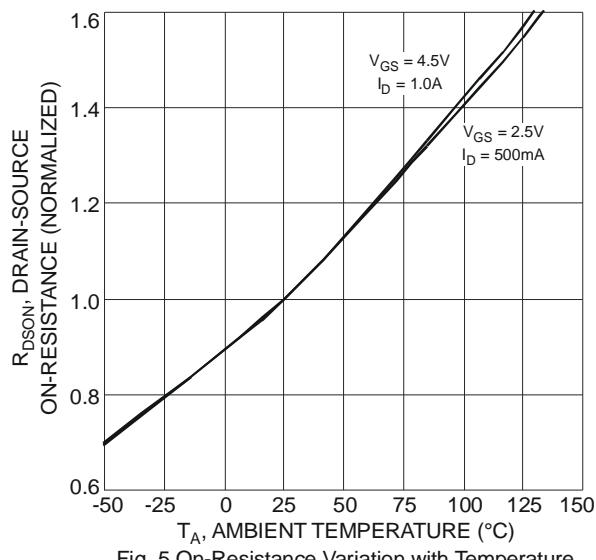
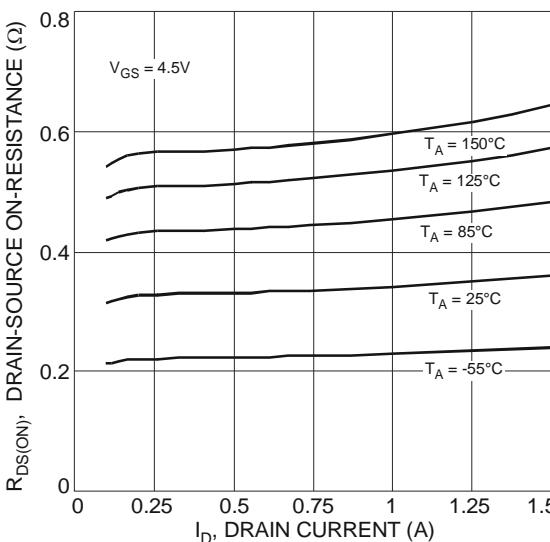
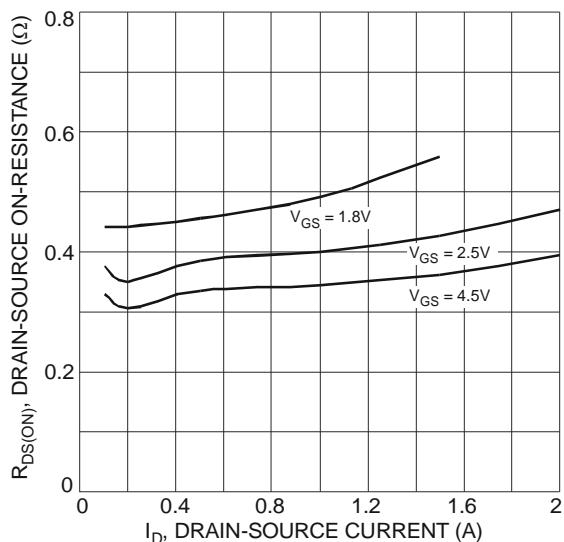
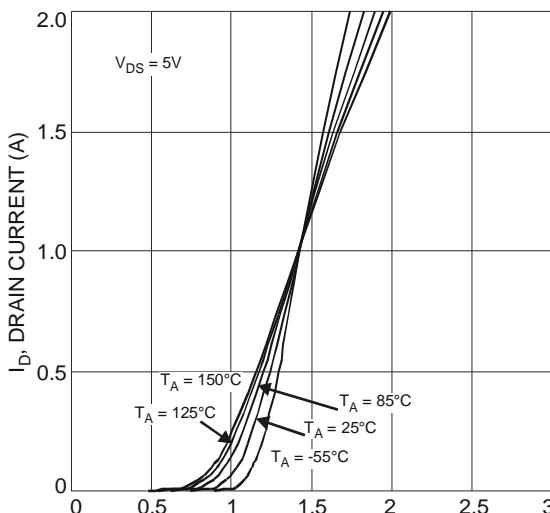
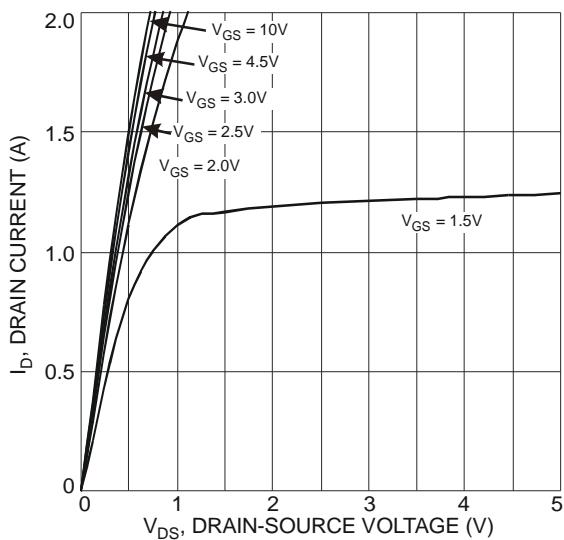
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	$P_D$	0.69	W
	(Note 5)		0.47	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	180	°C/W
	(Note 5)		258	
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 10\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	3	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	—	0.95	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	—	460	mΩ	$V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$
		—	—	560		$V_{GS} = 2.5\text{V}, I_D = 100\text{mA}$
		—	—	730		$V_{GS} = 1.8\text{V}, I_D = 75\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	40	—	—	mS	$V_{DS} = 3\text{V}, I_D = 10\text{mA}$
Diode Forward Voltage (Note 8)	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 300\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	64.3	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	6.1	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	4.5	—	pF	
Gate Resistance	$R_g$	—	70	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	—	1.6	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 15\text{V}, I_D = 1\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.2	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.2	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	3.5	—	ns	$V_{DS} = 10\text{V}, I_D = 1\text{A}$
Turn-On Rise Time	$t_r$	—	2.8	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	38	—	ns	
Turn-Off Fall Time	$t_f$	—	13	—	ns	

Notes:

5. For a device surface mounted on a minimum recommended pad layout of an FR4 PCB, in still air conditions; the device is measured when operating in steady-state condition.
6. Same as note 4, except the device measured at  $t \leq 10\text{ sec}$ .
7. Same as note 4, except the device is pulsed at duty cycle of 1% for a pulse width of  $10\mu\text{s}$ .
8. Measured under pulsed conditions to minimize self-heating effect. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$
9. For design aid only, not subject to production testing.



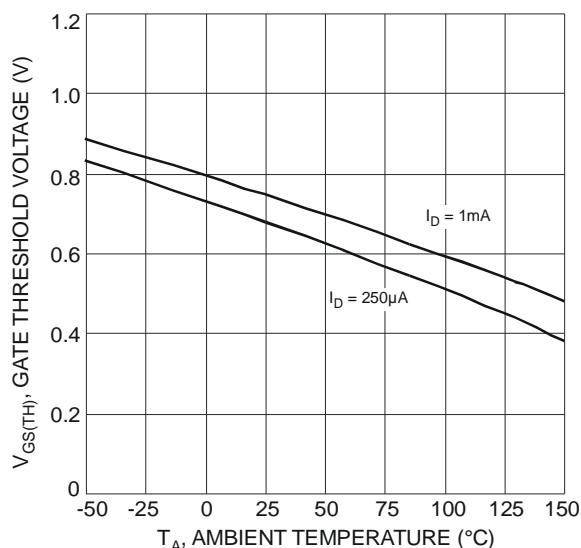


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

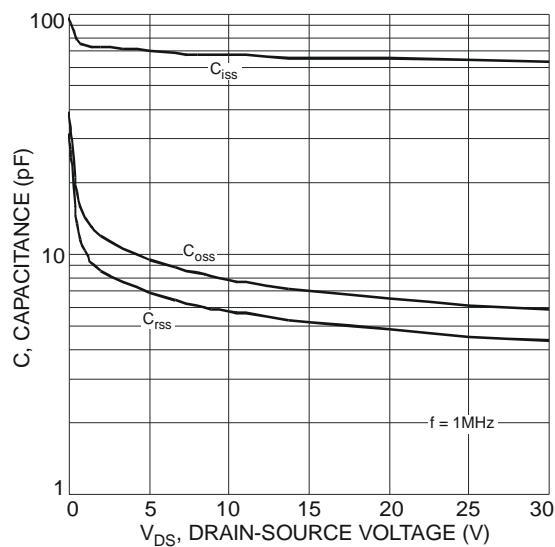


Fig. 9 Typical Total Capacitance

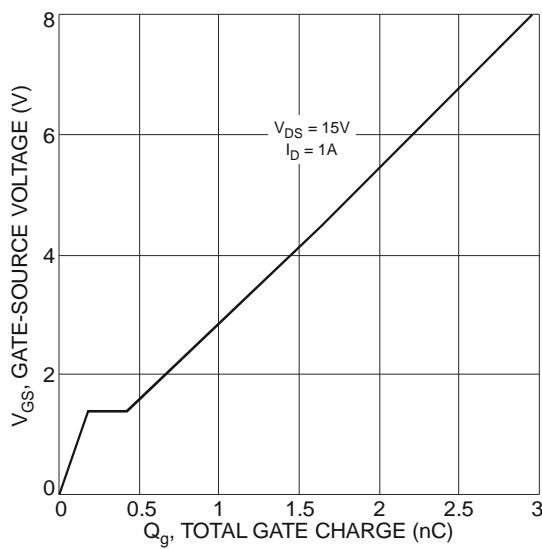


Fig. 11 Gate-Charge Characteristics

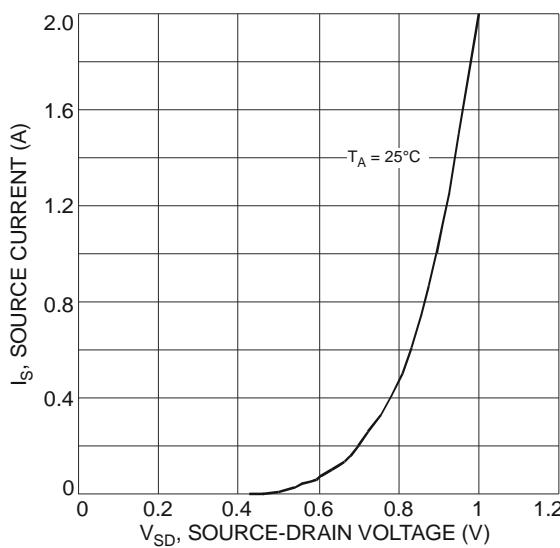


Fig. 8 Diode Forward Voltage vs. Current

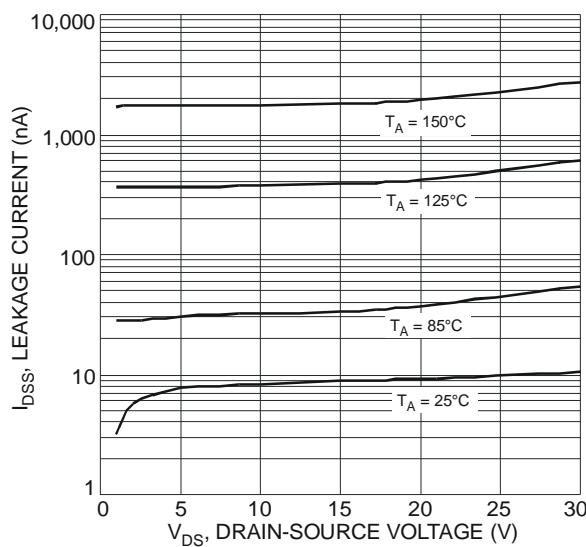


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

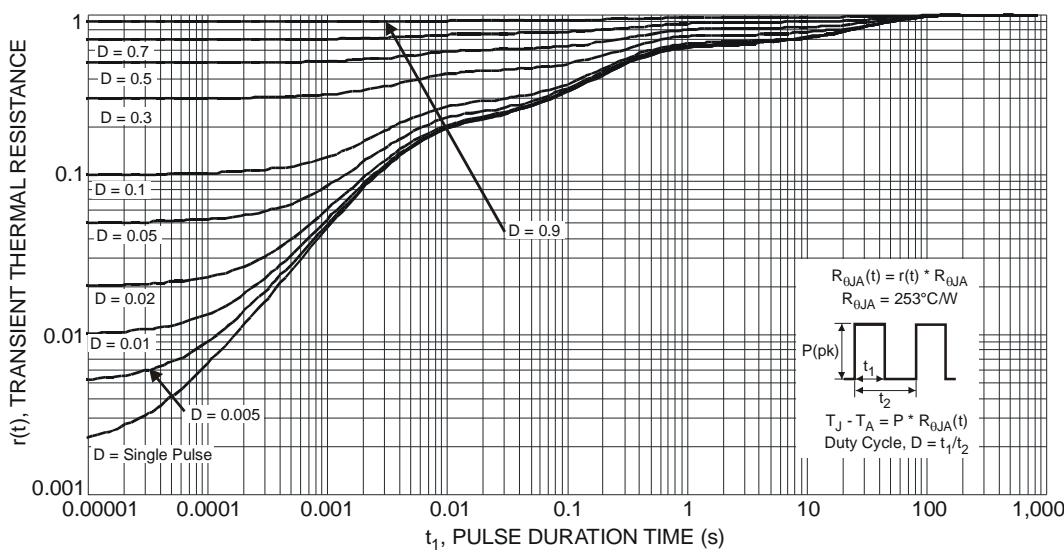
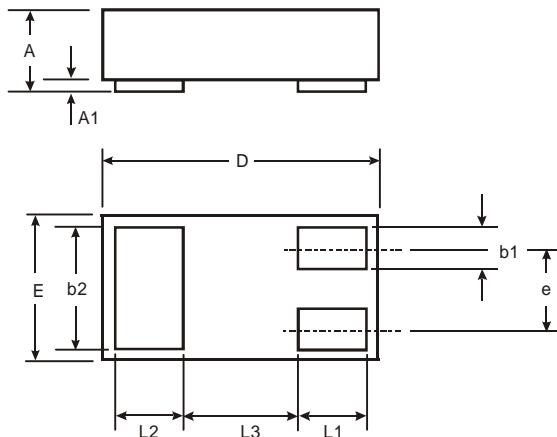


Fig. 12 Transient Thermal Response

## Package Outline Dimensions

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

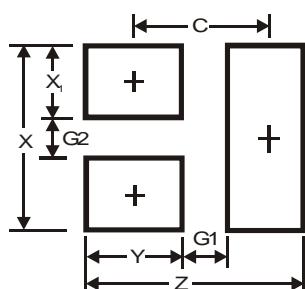


X2-DFN1006-3			
Dim	Min	Max	Typ
A	—	0.40	—
A1	0	0.05	0.02
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40

All Dimensions in mm

## Suggested Pad Layout

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



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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