

DMN3730UFB
30V N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

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

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.

- Load Switch
- Portable Applications
- Power Management Functions

Features and Benefits

- 0.5mm ultra low profile package for thin application
- 0.6mm² 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

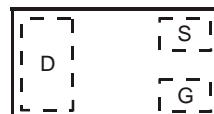
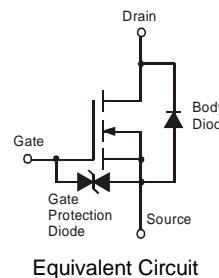
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208^(e4)
- Weight: 0.001 grams (Approximate)



X1-DFN1006-3



Bottom View

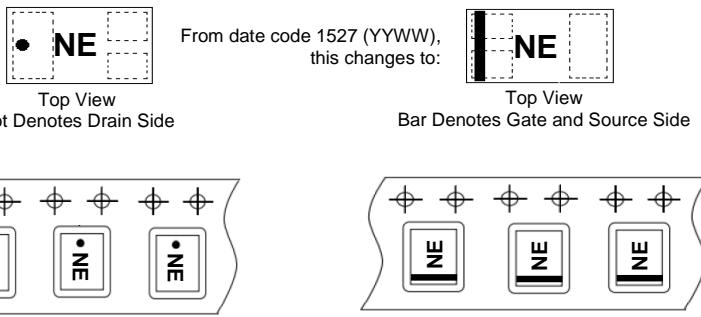
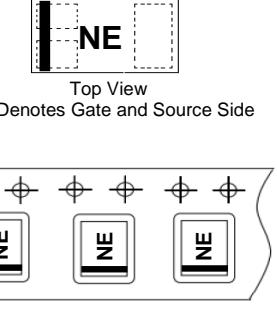

Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN3730UFB-7	NE	7	8	3,000
DMN3730UFB-7B	NE	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 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

DMN3730UFB-7	 <p>From date code 1527 (YYWW), this changes to:</p> <p>Top View Dot Denotes Drain Side</p> <p>Top View Bar Denotes Gate and Source Side</p>
DMN3730UFB-7B	 <p>Top View Bar Denotes Gate and Source Side</p> <p>NE = Part Marking Code</p> <p>Top View Bar Denotes Gate and Source Side</p>

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}	± 8	
Continuous Drain Current	$V_{GS} = 4.5\text{V}$	(Note 6)	I_D	0.91	A
		$T_A = +70^\circ\text{C}$ (Note 6)		0.73	
		(Note 5)		0.75	
Pulsed Drain Current			I_{DM}	3	A

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

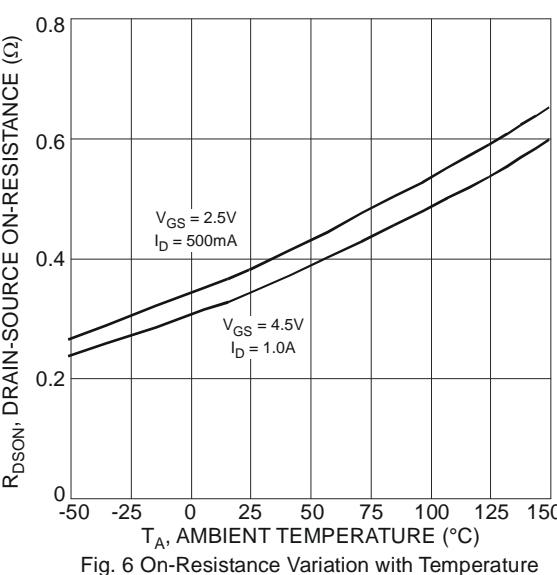
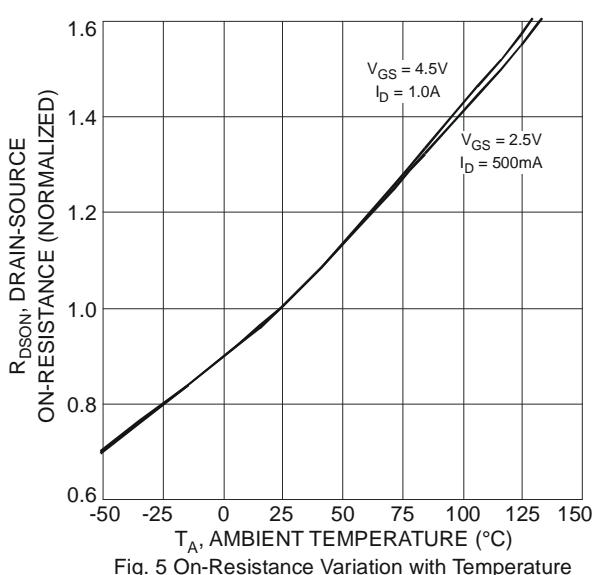
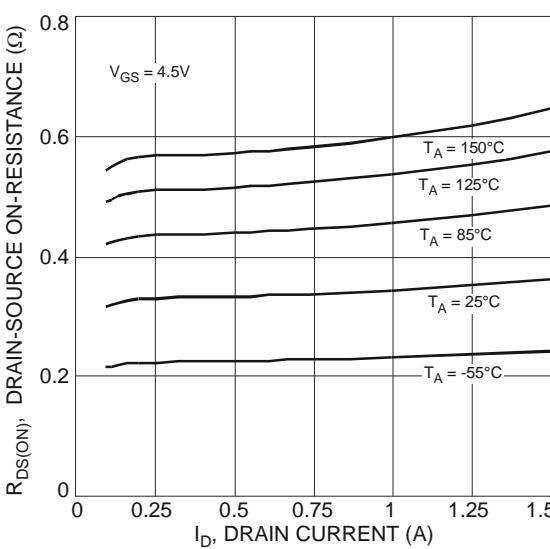
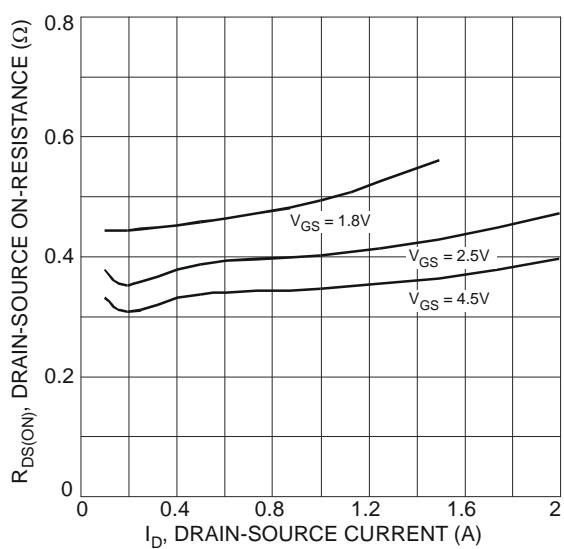
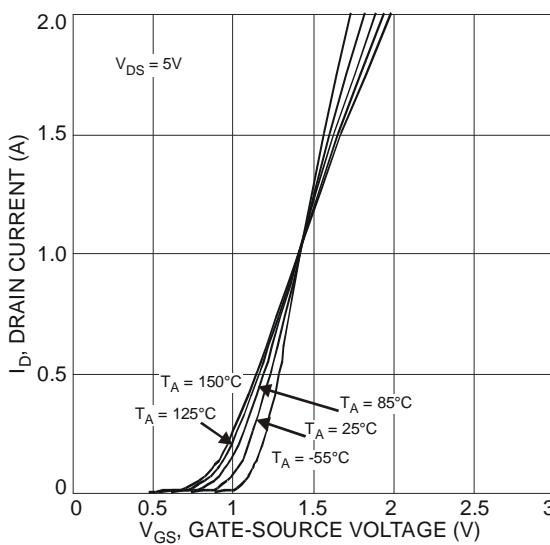
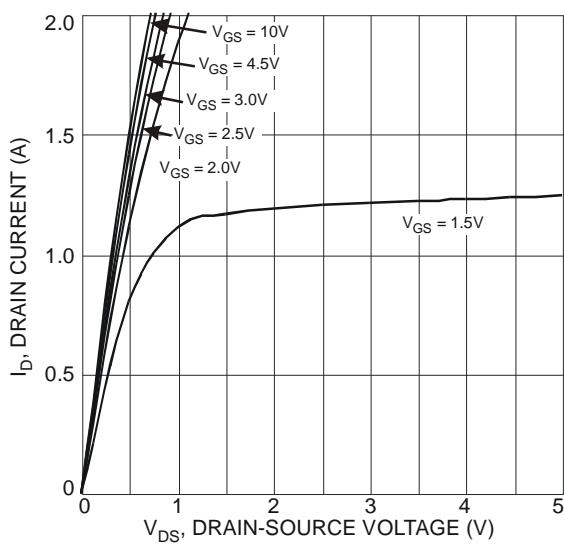
Characteristic			Symbol	Value	Unit
Power Dissipation			P_D	0.69	W
				0.47	
Thermal Resistance, Junction to Ambient			$R_{\theta JA}$	180	°C/W
				258	
Operating and Storage Temperature Range			T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	$V_{GS} = 0\text{V}, I_D = 10\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	-	-	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	-	-	3	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
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)	$R_{DS(\text{ON})}$	-	-	460	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$
				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	$V_{GS} = 0\text{V}, I_S = 300\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	64.3	-	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
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	$t_{D(\text{on})}$	-	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	$t_{D(\text{off})}$	-	38	-	ns	
Turn-Off Fall Time	t_f	-	13	-	ns	$V_{GS} = 10\text{V}, R_G = 6\Omega$

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 5, except the device measured at $t \leq 10$ seconds.
- 7. Same as Note 5, except the device is pulsed at duty cycle of 1% for a pulse width of 10 μs .
- 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.



DMN3730UFB

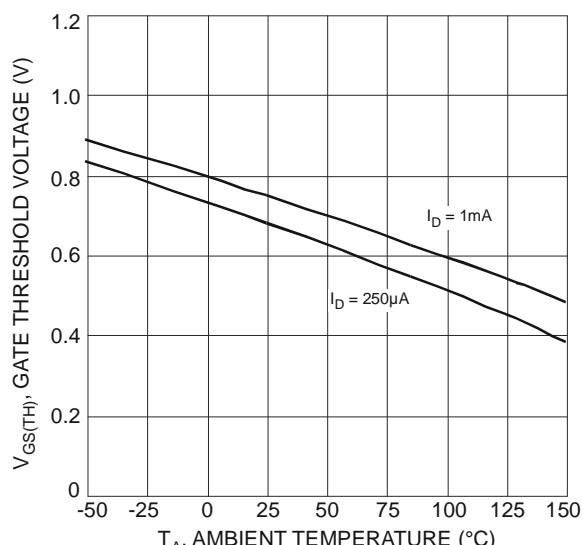


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

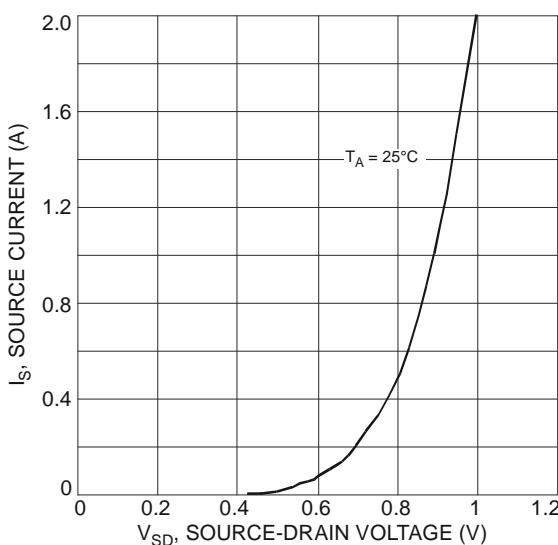


Fig. 8 Diode Forward Voltage vs. Current

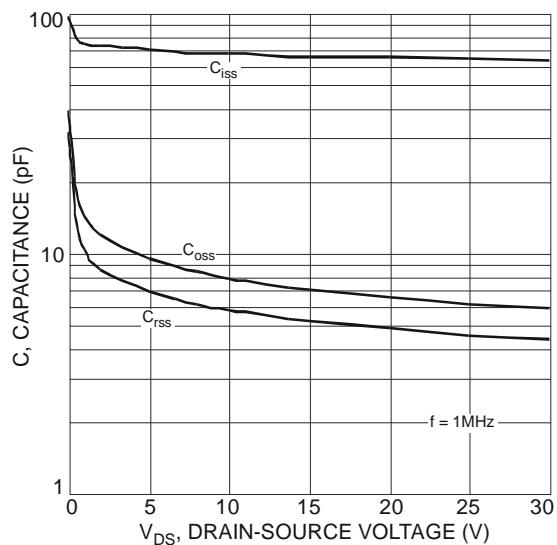


Fig. 9 Typical Total Capacitance

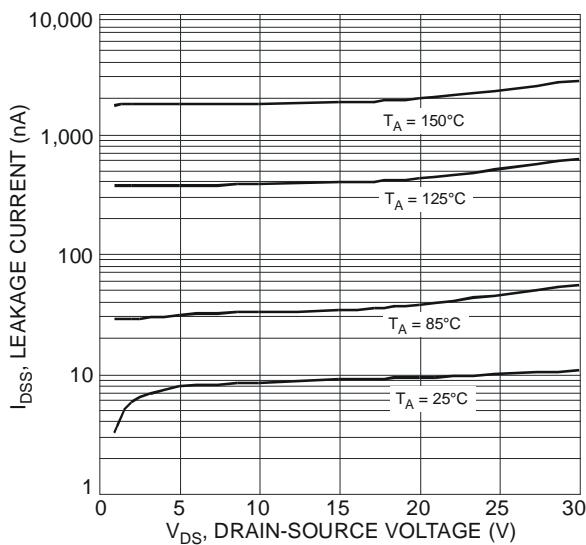


Fig. 10 Typical Leakage Current
vs. Drain-Source Voltage

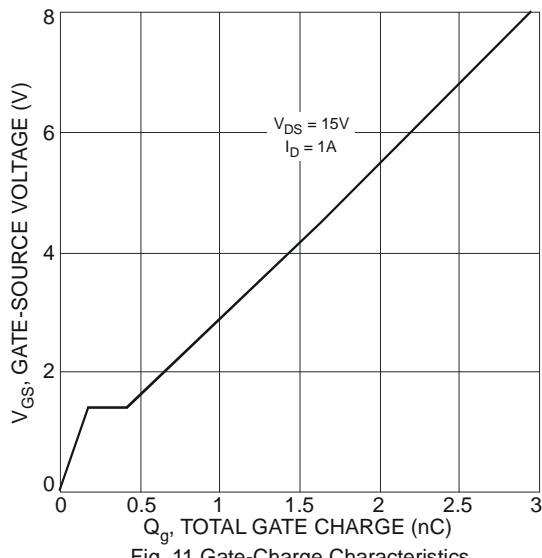


Fig. 11 Gate-Charge Characteristics

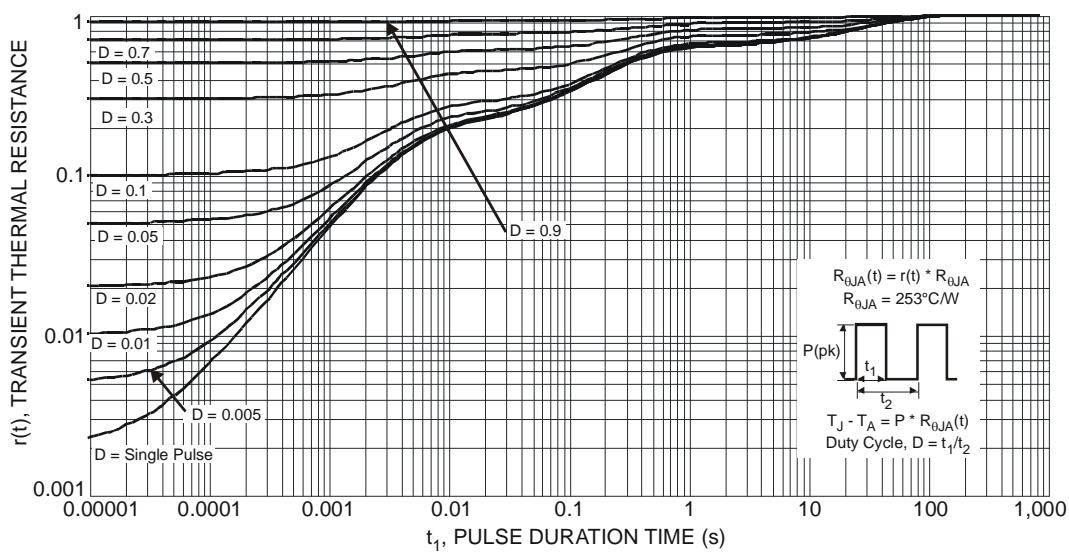
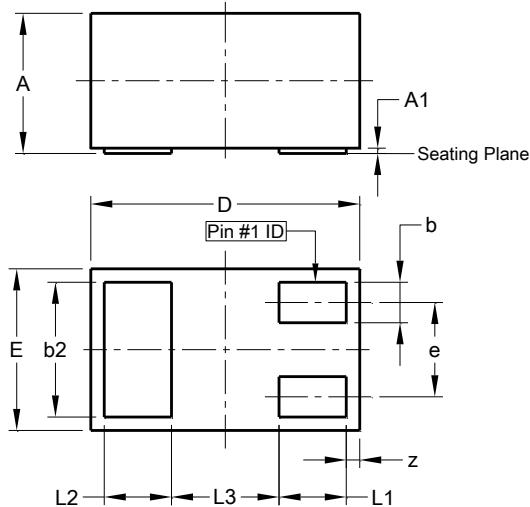


Fig. 12 Transient Thermal Response

Package Outline Dimensions

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

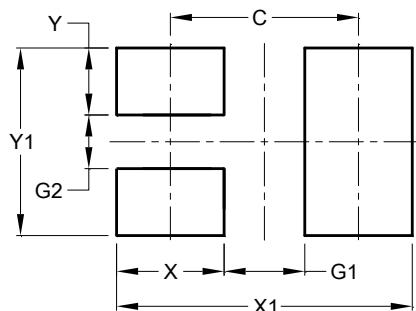


X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05

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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