Lead-free Green

DMN3730UFB

30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = 25°C$
30V	460mΩ @ V_{GS}= 4.5V	0.9A
	560mΩ @ V_{GS}= 2.5V	0.7A

Features and Benefits

- 0.5mm ultra low profile package for thin application
- 0.6mm^2 package footprint, 10 times smaller than SOT23
- Low $V_{GS(th)}$, can be driven directly from a battery
- Low $R_{DS(on)}$
- **"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**

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
- Portable applications
- Power Management Functions

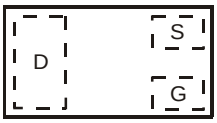
Mechanical Data

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

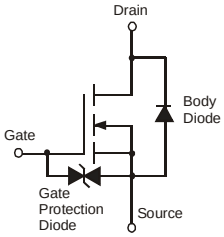
ESD PROTECTED TO 2kV

DFN1006-3

Bottom View



Top View
Internal Schematic



Equivalent Circuit

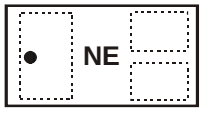
Ordering Information (Note 3)

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 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.

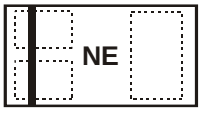
Marking Information

DMN3730UFB-7



Top View
Dot Denotes
Drain Side

DMN3730UFB-7B



Top View
Bar Denotes Gate
and Source Side

NE = Product Type Marking Code

Maximum Ratings @T_A = 25°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} = 4.5V	(Note 5)	I_D	0.91	A
		T_A =70°C (Note 5)		0.73	
		(Note 4)		0.75	
Pulsed Drain Current		(Note 6)	I_{DM}	3	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.69	W
	(Note 4)		0.47	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	180	°C/W
	(Note 4)		258	
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						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 10µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1	µA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	3	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	-	0.95	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 7)	$R_{DS\ (ON)}$	-	-	460	mΩ	V_{GS} = 4.5V, I_D = 200mA
				560		V_{GS} = 2.5V, I_D = 100mA
				730		V_{GS} = 1.8V, I_D = 75mA
Forward Transfer Admittance	$\|Y_{fs}\|$	40	-	-	mS	V_{DS} = 3V, I_D = 10mA
Diode Forward Voltage (Note 7)	V_{SD}	-	0.7	1.2	V	V_{GS} = 0V, I_S = 300mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	64.3	-	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	6.1	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	4.5	-	pF	
Gate Resistance	R_g	-	70	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	-	1.6	-	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A
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} = 10V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω
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:
4. 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.
5. Same as note 4, except the device measured at t ≤ 10 sec.
6. Same as note 4, except the device is pulsed at duty cycle of 1% for a pulse width of 10µs.
7. Measured under pulsed conditions to minimize self-heating effect. Pulse width ≤ 300µs; duty cycle ≤ 2%
8. For design aid only, not subject to production testing.

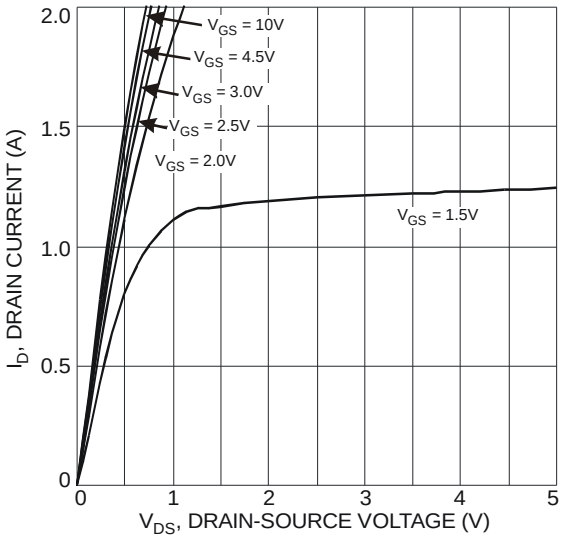


Fig. 1 Typical Output Characteristic

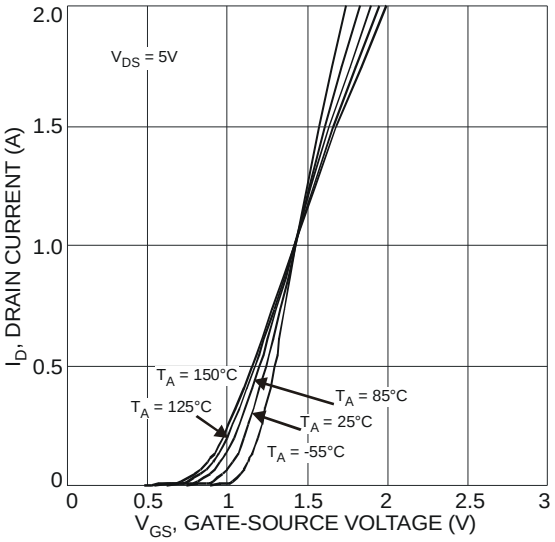


Fig. 2 Typical Transfer Characteristic

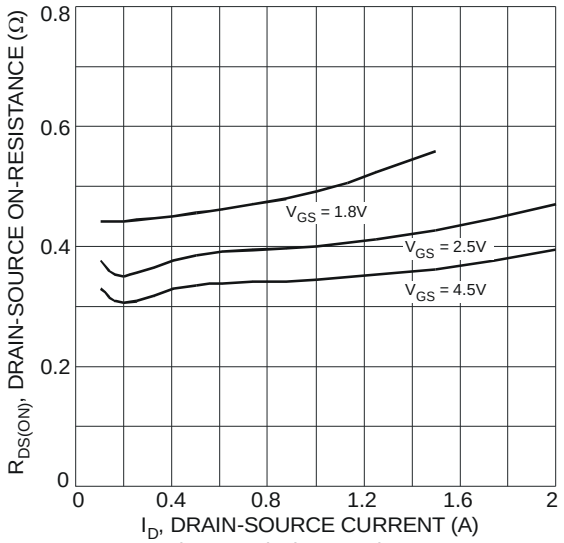


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

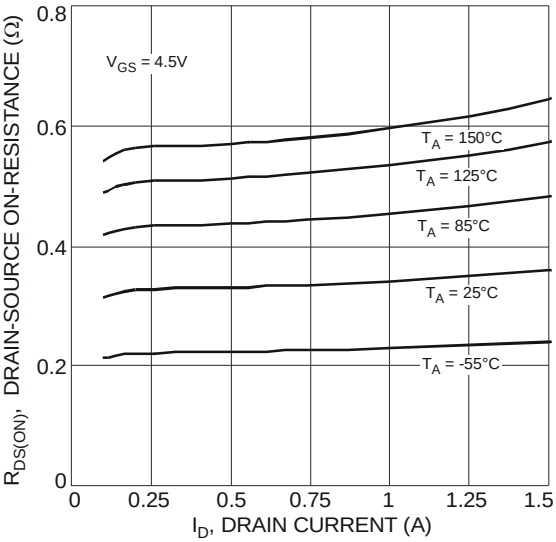


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

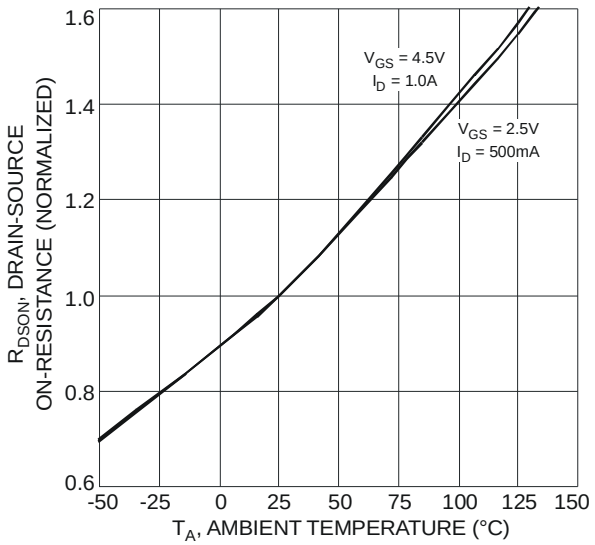


Fig. 5 On-Resistance Variation with Temperature

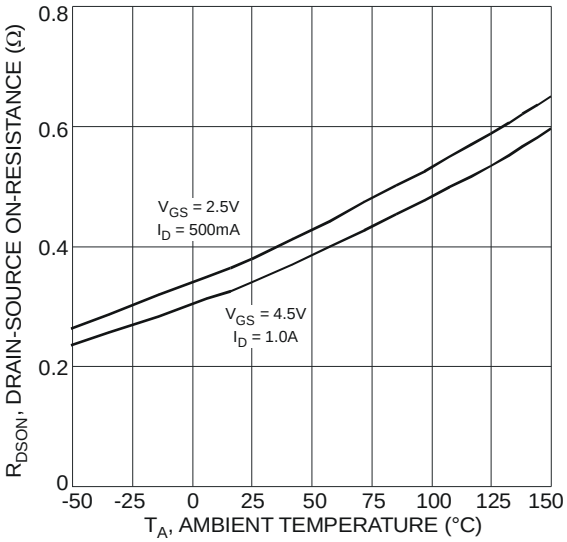


Fig. 6 On-Resistance Variation with Temperature

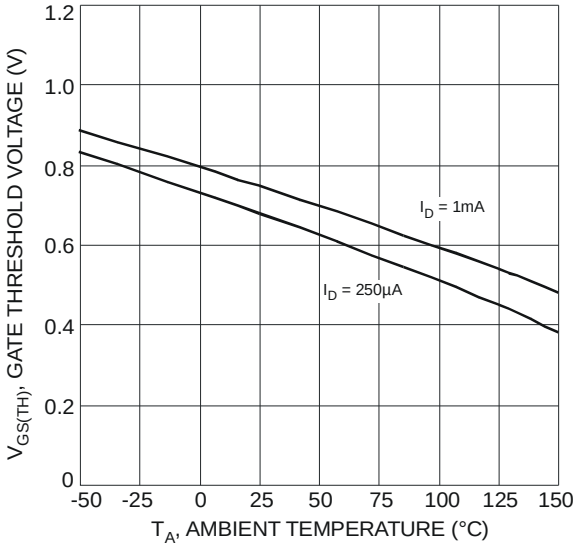


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

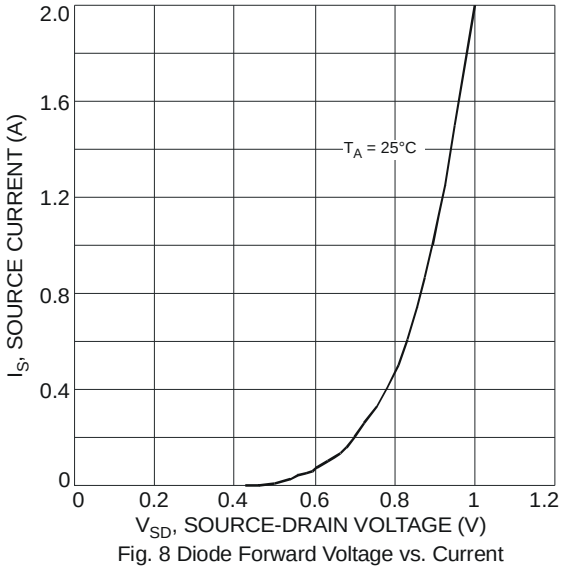


Fig. 8 Diode Forward Voltage vs. Current

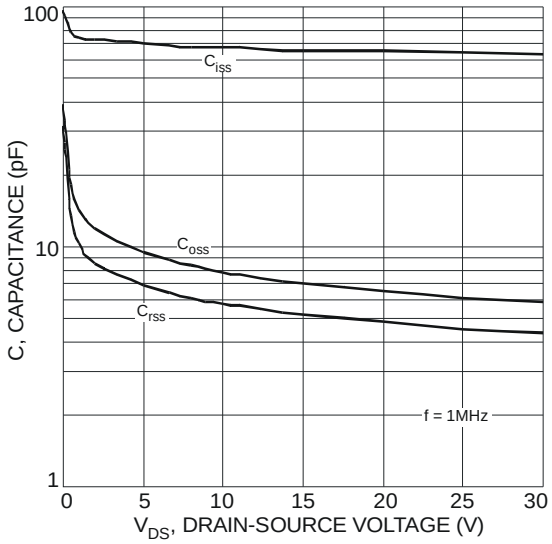


Fig. 9 Typical Total Capacitance

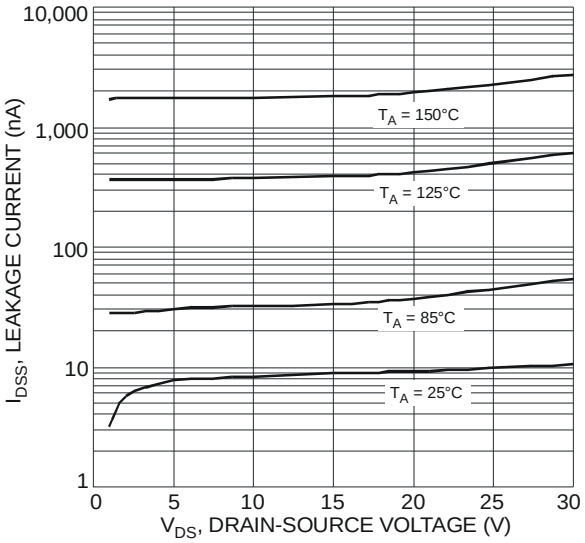


Fig. 10 Typical Leakage Current
vs. Drain-Source Voltage

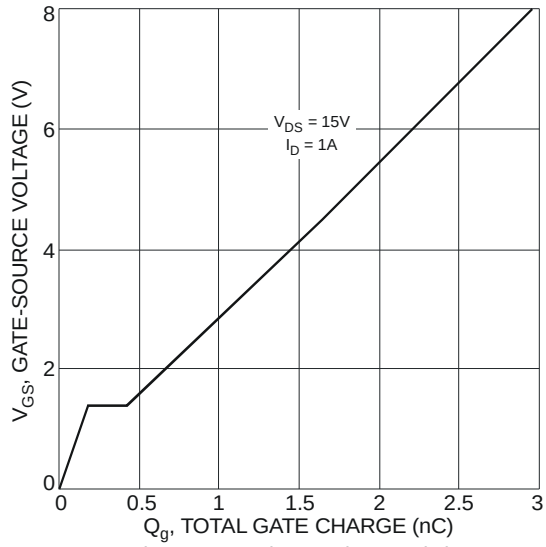


Fig. 11 Gate-Charge Characteristics

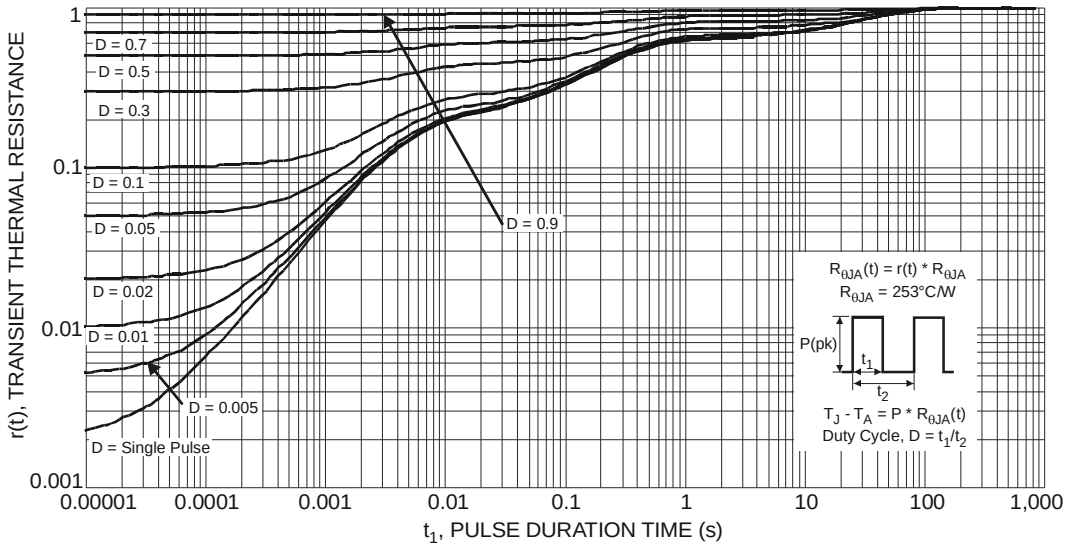
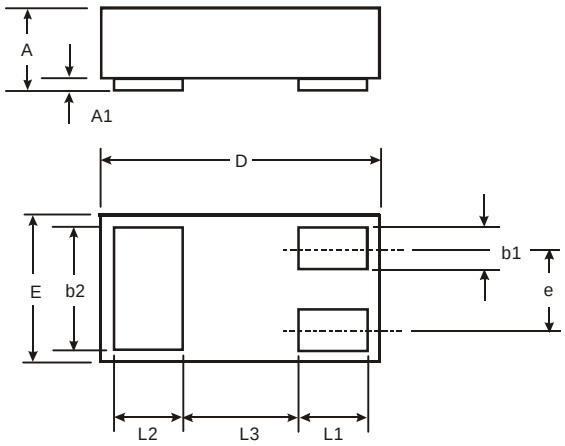


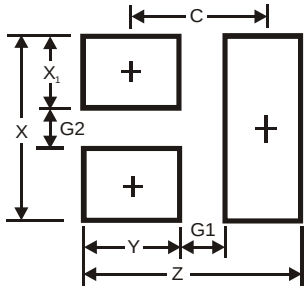
Fig. 12 Transient Thermal Response

Package Outline Dimensions



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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