





20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)}	I _D T _A = +25°C (Note 5)
20V	175mΩ @ $V_{GS} = 4.5V$	1.30A
	240mΩ @ $V_{GS} = 2.5V$	1.11A
	360mΩ @ V _{GS} = 1.8V	0.91A
	500mΩ @ V _{GS} = 1.5V	0.82A

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

Features

- Footprint of just 0.6mm² thirteen times smaller than SOT23
- 0.4mm profile ideal for low profile applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- ESD Protected Gate 2KV
- 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

Mechanical Data

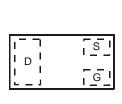
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)



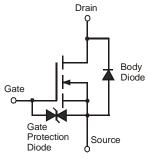




Bottom View



Top View Internal Schematic



Equivalent Circuit

Ordering Information (Note 4)

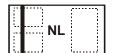
Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN2300UFB4-7B	NL	7	8	10,000

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 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.

Marking Information

DMN2300UFB4-7B



Top View Bar Denotes Gate and Source Side

NL = Product Type Marking Code





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

Characteri	stic		Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) Steady $T_A = +25^{\circ}C$ State $T_A = +85^{\circ}C$		I _D	1.30 0.96	А	
Pulsed Drain Current (Note 6)			I _{DM}	6	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_{D}	500	mW
Thermal Resistance, Junction to Ambient @T _A = +25°C	R _{0JA}	250	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

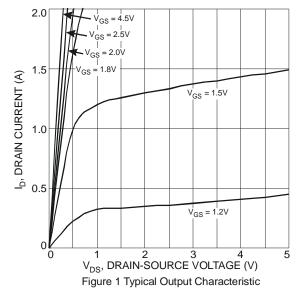
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

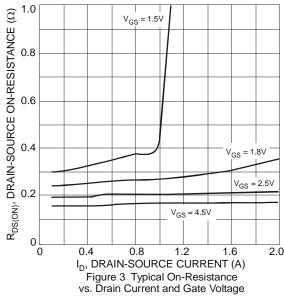
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	20	_	_	V	$V_{GS} = 0V, I_{D} = 10\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	1	μA	$V_{DS} = 20V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	10	μA	$V_{GS} = \pm 8V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(th)}	0.45	_	0.95	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
		_	_	175		$V_{GS} = 4.5V, I_{D} = 1A$	
Static Drain-Source On-Resistance		_	_	240	0	$V_{GS} = 2.5V, I_D = 750mA$	
Static Drain-Source On-Resistance	R _{DS (ON)}	_	_	360	mΩ	$V_{GS} = 1.8V, I_D = 500mA$	
		_	_	500		V _{GS} = 1.5V, I _D = 200mA	
Forward Transfer Admittance	Y _{fs}	40	_	_	mS	$V_{DS} = 3V, I_{D} = 30mA$	
Diode Forward Voltage	V _{SD}	_	0.7	1.2	V	$V_{GS} = 0V, I_{S} = 300mA$	
DYNAMIC CHARACTERISTICS					-		
Input Capacitance	C _{iss}	_	64.3	_	pF		
Output Capacitance	Coss	_	6.1	_	pF	$V_{DS} = 25V, V_{GS} = 0V,$ -f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	4.5	_	pF	1 = 1.0WH12	
Gate Resistance	Rg	_	70	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Qg	_	1.6	_	nC	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Gate-Source Charge	Q _{gs}	_	0.2	_	nC	$V_{GS} = 4.5V, V_{DS} = 15V,$ $I_{D} = 1A$	
Gate-Drain Charge	Q_{gd}	_	0.2	_	nC		
Turn-On Delay Time	t _{D(on)}	_	3.5	_	ns		
Turn-On Rise Time	tr	_	2.8	_	ns	V _{DS} = 10V, I _D = 1A	
Turn-Off Delay Time	t _{D(off)}	_	38	_	ns	$V_{GS} = 10V, R_G = 6\Omega$	
Turn-Off Fall Time	t _f	_	13	_	ns		

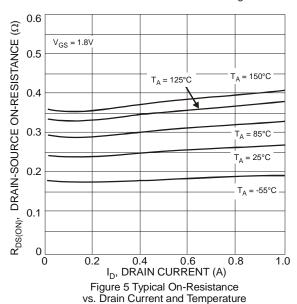
Notes:

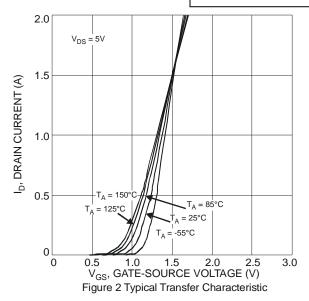
- 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
- 6. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.
 7. Short duration pulse test used to minimize self-heating effect.

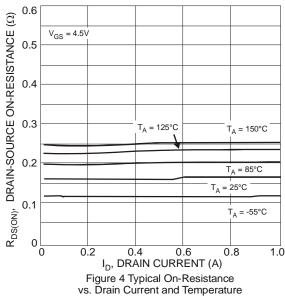


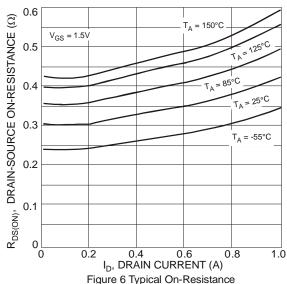














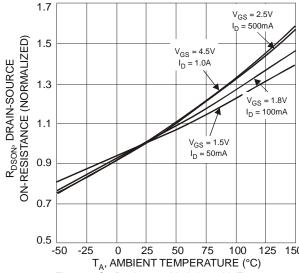


Figure 7 On-Resistance Variation with Temperature

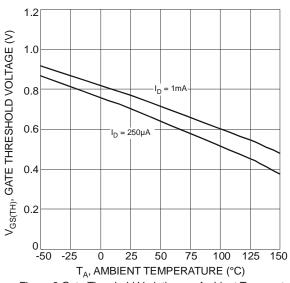
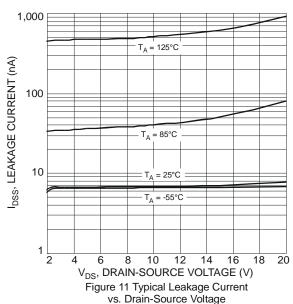


Figure 9 Gate Threshold Variation vs. Ambient Temperature



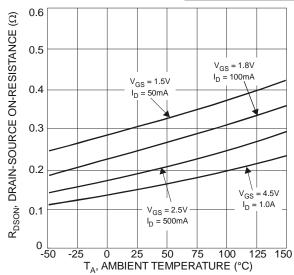
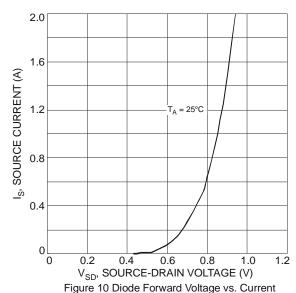


Figure 8 On-Resistance Variation with Temperature



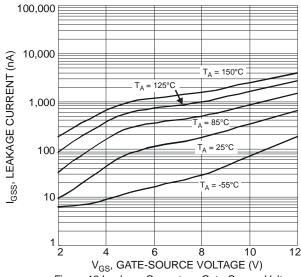
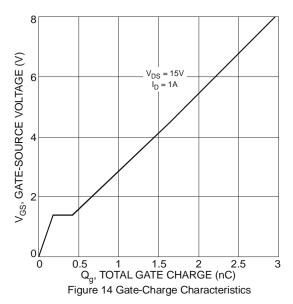


Figure 12 Leakage Current vs. Gate-Source Voltage





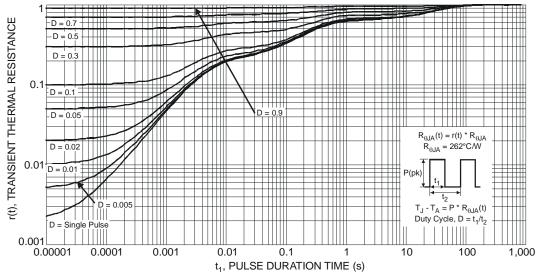
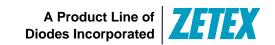


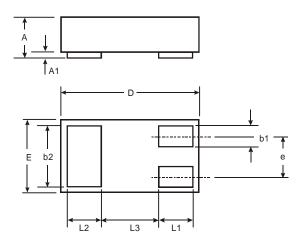
Figure 15 Transient Thermal Response





Package Outline Dimensions

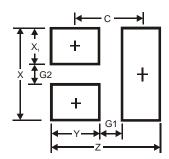
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



X2-DFN1006-3					
Dim	Min	Max	Тур		
Α		0.40	_		
A1	0	0.05	0.03		
b1	0.10	0.20	0.15		
b2	0.45	0.55	0.50		
D	0.95	1.05	1.00		
Е	0.55	0.65	0.60		
е		_	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 the latest version.



Dimensions	Value (in mm)		
Z	1.1		
G1	0.3		
G2	0.2		
Х	0.7		
X1	0.25		
Y	0.4		
С	0.7		





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