

S2

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

Device	BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
NMOS	20V	0.99Ω @ V _{GS} = 4.5V	455mA
		1.2Ω @ V _{GS} = 2.5V	414mA
		1.8Ω @ V _{GS} = 1.8V	338mA
		2.4Ω @ V _{GS} = 1.5V	292mA

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.

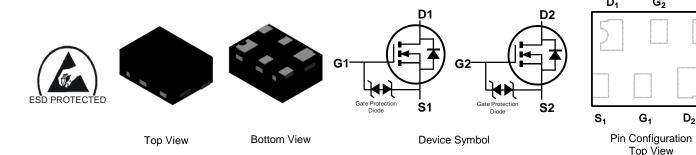
- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V max
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package 0.8mm x 0.6mm
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Mechanical Data

- Case: X2-DFN0806-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 <a>3
- Weight: 0.001 grams (Approximate)



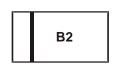
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN21D1UDA-7B	X2-DFN0806-6	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.

Marking Information



Top View

B2 = Product Type Marking Code



Maximum Ratings N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic			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 $T_A = +70^{\circ}C$		I _D	455 365	mA	
Pulsed Drain Current (Note 6)			I _{DM}	1500	mA

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	310	mW
Thermal Resistance, Junction to Ambient (Note 5) Steady State		$R_{\theta JA}$	405	°C/W
Operating and Storage Temperature Range		$T_{J,}T_{STG}$	-55 to +150	°C

Notes:

Electrical Characteristics N-CHANNEL (@TA = +25°C, unless otherwise specified.)

	1						
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	20	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	_	_	1	μA	$V_{DS} = 16V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±10	μΑ	$V_{GS} = \pm 5V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	0.4	0.75	1.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
		_	0.5	0.99		$V_{GS} = 4.5V, I_D = 100mA$	
		_	0.6	1.2	Ω	$V_{GS} = 2.5V, I_D = 50mA$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	0.8	1.8		$V_{GS} = 1.8V, I_D = 20mA$	
		_	1.0	2.4		$V_{GS} = 1.5V, I_D = 10mA$	
		_	2.0	_		$V_{GS} = 1.2V, I_D = 1mA$	
Diode Forward Voltage	V_{SD}	_	0.6	1.0	V	$V_{GS} = 0V, I_{S} = 10mA$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	_	31	_	pF	15)()(
Output Capacitance	Coss	_	3.6	_	pF	$V_{DS} = 15V, V_{GS} = 0V,$ - f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	2.6	_	pF	-1 = 1.∪IVIΠZ	
Gate Resistance	R _G	_	113	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge	Qg	_	0.41	_	nC	\\\ 4.5\\\\\ 40\\\	
Gate-Source Charge	Q _{gs}	_	0.06	_	nC	$V_{GS} = 4.5V, V_{DS} = 10V,$ $I_{D} = 250 \text{mA}$	
Gate-Drain Charge	Q_{gd}	_	0.05	_	nC	ID = 250IIIA	
Turn-On Delay Time	t _{D(ON)}	_	4.5	_	ns		
Turn-On Rise Time	t _R	_	3.4	_	ns	$V_{DD} = 15V, V_{GS} = 4.5V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	24	_	ns	$R_G = 2\Omega, I_D = 200 \text{mA}$	
Turn-Off Fall Time	t _F	_	12	_	ns		

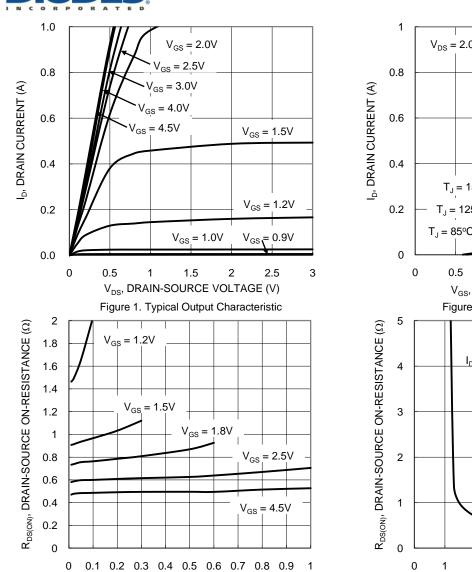
Notes:

- 7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to product testing.

^{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%.







I_D, DRAIN-SOURCE CURRENT (A) Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

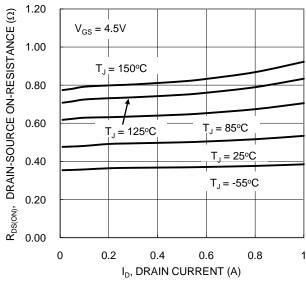


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

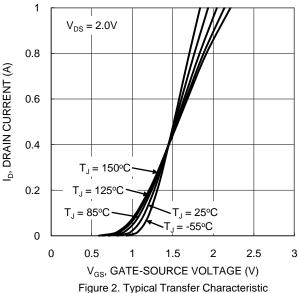


Figure 2. Typical Transfer Characteristic

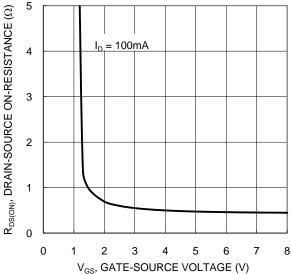


Figure 4. Typical Transfer Characteristic

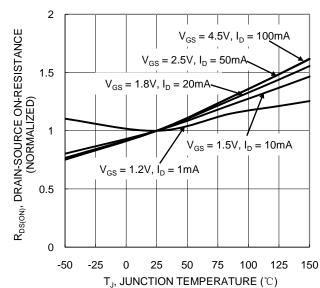
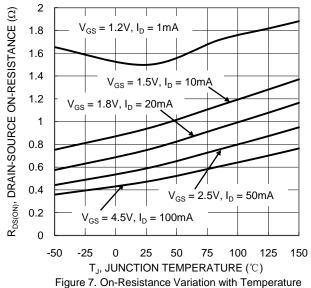
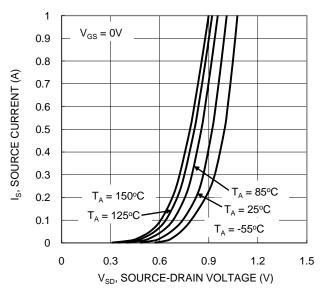


Figure 6. On-Resistance Variation with Temperature









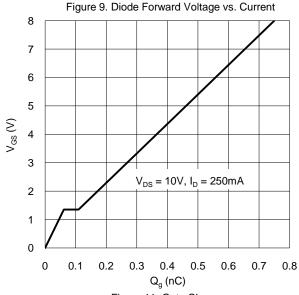


Figure 11. Gate Charge

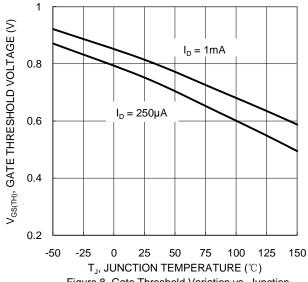


Figure 8. Gate Threshold Variation vs. Junction Temperature

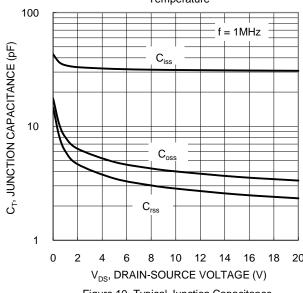


Figure 10. Typical Junction Capacitance

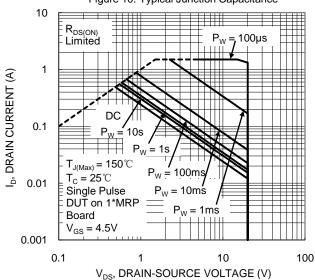


Figure 12. SOA, Safe Operation Area



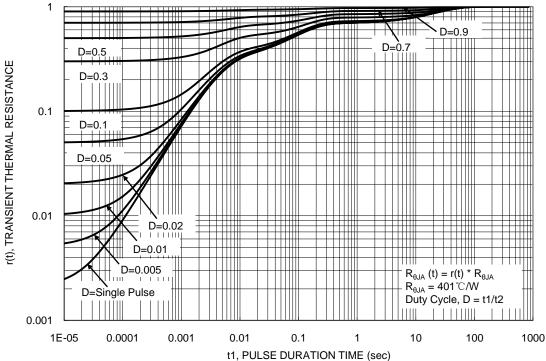


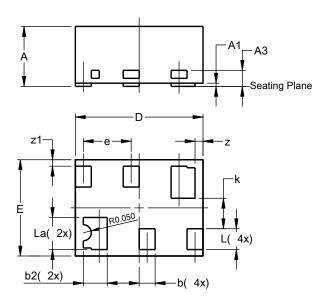
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN0806-6

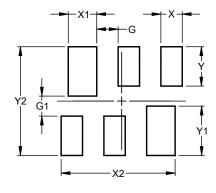


X2-DFN0806-6					
Dim	Min	Max	Тур		
Α		0.40	0.36		
A1	0.00	0.03	0.02		
A3			0.10		
b	0.07	0.15	0.10		
b2	0.10	0.20	0.15		
D	0.75	0.85	0.80		
Е	0.55	0.65	0.60		
е			0.30		
k			0.19		
L	0.10	0.18	0.13		
La	0.17	0.25	0.20		
Z			0.05		
z 1			0.04		
All Dimensions in mm					

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN0806-6



Dimensions	Value (in mm)			
G	0.150			
G1	0.140			
Х	0.150			
X1	0.200			
X2	0.800			
Y	0.275			
Y1	0.345			
Y2	0.760			



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