



### 20V N-CHANNEL ENHANCEMENT MODE MOSFET

### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
20V	0.45 Ω @ V <sub>GS</sub> = 4.5V	
	0.55 Ω @ V <sub>GS</sub> = 2.5V	0.6 A
	0.75 Ω @ V <sub>GS</sub> = 1.8V	0.0 A
	1.0 Ω @ V <sub>GS</sub> = 1.5V	

### Description

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.

### **Applications**

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

# **Features and Benefits**

- Low Package Profile, 0.4mm Maximum Package Height
- 0.48mm<sup>2</sup> Package Footprint, 16 Times Smaller than SOT23
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

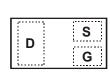
### **Mechanical Data**

- Case: X2-DFN0806-3
- 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@4
- Weight: 0.001 grams (Approximate)

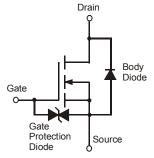




**Bottom View** 



Top View Package Pin Configuration



**Equivalent Circuit** 

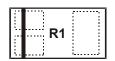
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2550UFA-7B	X2-DFN0806-3	10K/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 Bar Denotes Gate and Source Side

R1 = Product Type Marking Code



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Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage	V <sub>GSS</sub>	±8	V		
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	0.6 0.5	Α
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	1.5	Α

# Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	Steady State	$P_{D}$	360	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{ heta JA}$	353	°C/W
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C

# **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	_	_	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	100	nA	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±10	μA	$V_{GS} = \pm 8V$ , $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.4	_	1.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
		_	0.28	0.45	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 200mA	
Static Drain-Source On-Resistance	_	_	0.33	0.55		$V_{GS} = 2.5V, I_D = 100mA$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	0.4	0.75		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 50mA	
		_	0.5	1.0		V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 10mA	
Diode Forward Voltage	V <sub>SD</sub>	_	_	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 10mA	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C <sub>iss</sub>	_	52.5	_	pF		
Output Capacitance	Coss	_	6.3	_	pF	$V_{DS} = 16V, V_{GS} = 0V,$ -f = 1.0MHz	
Reverse Transfer Capacitance	Crss	_	5.2	_	pF	1 - 1.0WII IZ	
Total Gate Charge	Qg	_	0.88	_	nC	45777	
Gate-Source Charge	Q <sub>gs</sub>	_	0.11	_	nC	$V_{GS} = 4.5V, V_{DS} = 10V,$ $-I_{D} = 250 \text{mA}$	
Gate-Drain Charge	$Q_{gd}$	_	0.10	_	nC	1D - 23011IA	
Turn-On Delay Time	t <sub>D(on)</sub>	_	7.1	_	ns		
Turn-On Rise Time	t <sub>r</sub>	_	11	_	ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V,	
Turn-Off Delay Time	t <sub>D(off)</sub>	_	105	_	ns	$R_L = 47\Omega$ , $R_G = 10\Omega$	
Turn-Off Fall Time	t <sub>f</sub>	_	36	_	ns	7	

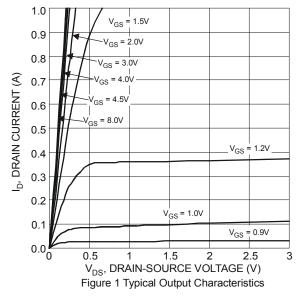
5. Device mounted on FR-4 PCB, with minimum recommended pad layout. Notes:

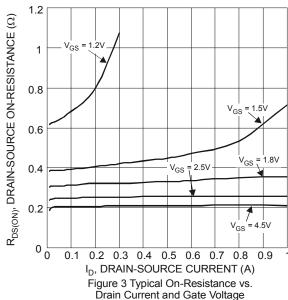
<sup>6.</sup> Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

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









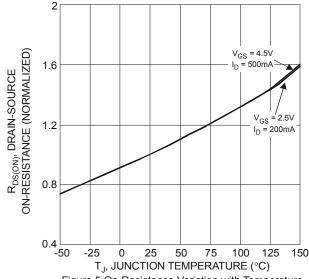
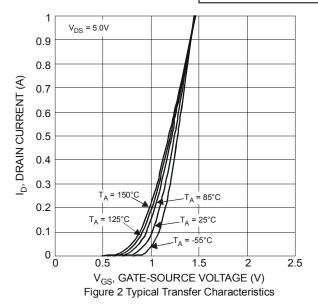


Figure 5 On-Resistance Variation with Temperature



0.4

V<sub>GS</sub> = 4.5V

T<sub>A</sub> = 150°C

T<sub>A</sub> = 150°C

T<sub>A</sub> = 85°C

T<sub>A</sub> = 25°C

T<sub>A</sub> = -55°C

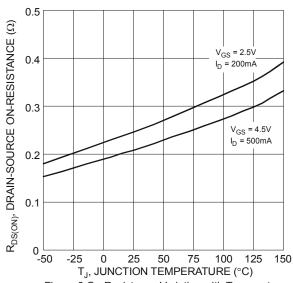


Figure 6 On-Resistance Variation with Temperature





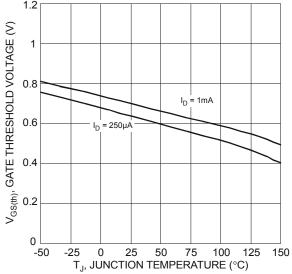
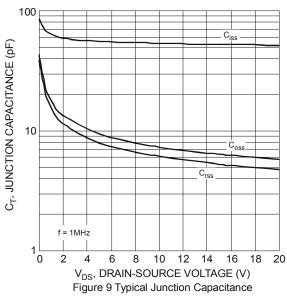
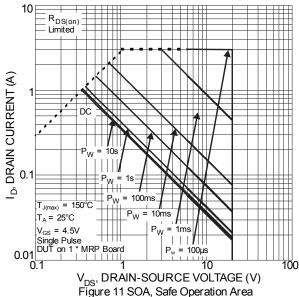
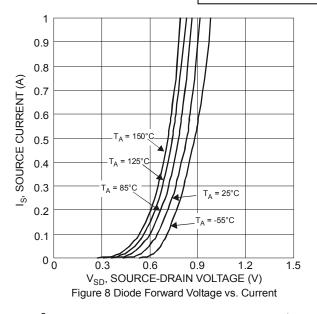
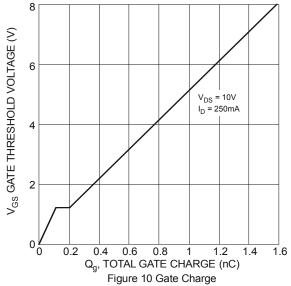


Figure 7 Gate Threshold Variation vs. Ambient Temperature

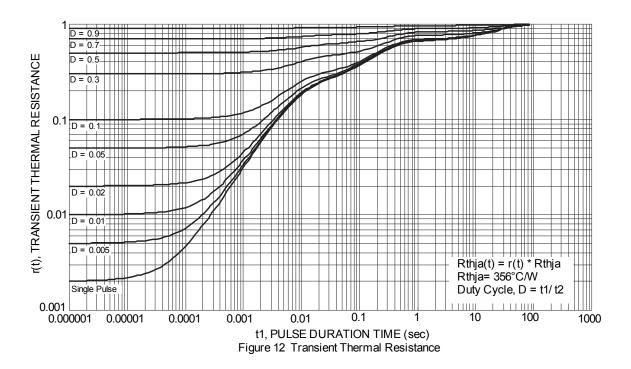






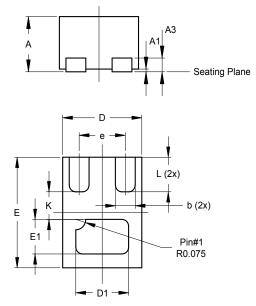






# **Package Outline Dimensions**

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

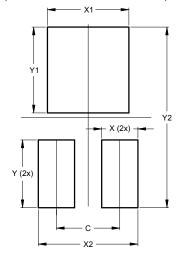


X2-DFN0806-3					
Dim	Min	Max	Тур		
Α	0.375	0.40	0.39		
A1	0	0.05	0.02		
A3	-	ı	0.10		
b	0.10	0.20	0.15		
D	0.55	0.65	0.60		
D1	0.35	0.45	0.40		
Е	0.75	0.85	0.80		
E1	0.20	0.30	0.25		
е	-	-	0.35		
K	-	1	0.20		
L	0.20	0.30	0.25		
All Dimensions in mm					



## Suggested Pad Layout

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



Dimensions	Value (in mm)			
С	0.350			
Х	0.200			
X1	0.450			
X2	0.550			
Y	0.375			
Y1	0.475			
Y2	1.000			

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