

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
20V	0.45 $\Omega$ @ $V_{GS} = 4.5\text{V}$	0.6 A
	0.55 $\Omega$ @ $V_{GS} = 2.5\text{V}$	
	0.75 $\Omega$ @ $V_{GS} = 1.8\text{V}$	
	1.0 $\Omega$ @ $V_{GS} = 1.5\text{V}$	

## 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

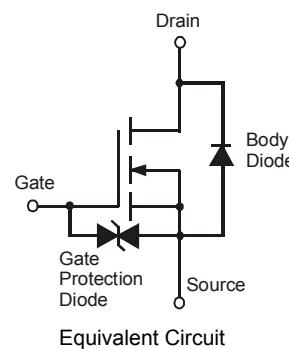
- Case: X2-DFN0806-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208<sup>(e4)</sup>
- Weight: 0.001 grams (Approximate)



Bottom View



Top View  
Package Pin Configuration



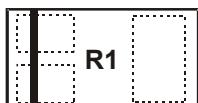
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2550UFA-7B	X2-DFN0806-3	10K/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



R1 = Product Type Marking Code

Top View  
Bar Denotes Gate  
and Source Side

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 8$	V
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	0.6 0.5	A
Pulsed Drain Current (Note 6)			$I_{DM}$	1.5	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , 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	$R_{\theta JA}$	353	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range			$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	100	nA	$V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	0.4	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	0.28	0.45	$\Omega$	$V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$
		—	0.33	0.55		$V_{GS} = 2.5\text{V}, I_D = 100\text{mA}$
		—	0.4	0.75		$V_{GS} = 1.8\text{V}, I_D = 50\text{mA}$
		—	0.5	1.0		$V_{GS} = 1.5\text{V}, I_D = 10\text{mA}$
Diode Forward Voltage	$V_{SD}$	—	—	1.0	V	$V_{GS} = 0\text{V}, I_S = 10\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	52.5	—	pF	$V_{DS} = 16\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	6.3	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	5.2	—	pF	
Total Gate Charge	$Q_g$	—	0.88	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 250\text{mA}$
Gate-Source Charge	$Q_{gs}$	—	0.11	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.10	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	7.1	—	ns	$V_{DD} = 10\text{V}, V_{GS} = 4.5\text{V}, R_L = 47\Omega, R_G = 10\Omega$
Turn-On Rise Time	$t_r$	—	11	—	ns	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	105	—	ns	
Turn-Off Fall Time	$t_f$	—	36	—	ns	

Notes:

5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Device mounted on minimum recommended pad layout test board, 10 $\mu\text{s}$  pulse duty cycle = 1%.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

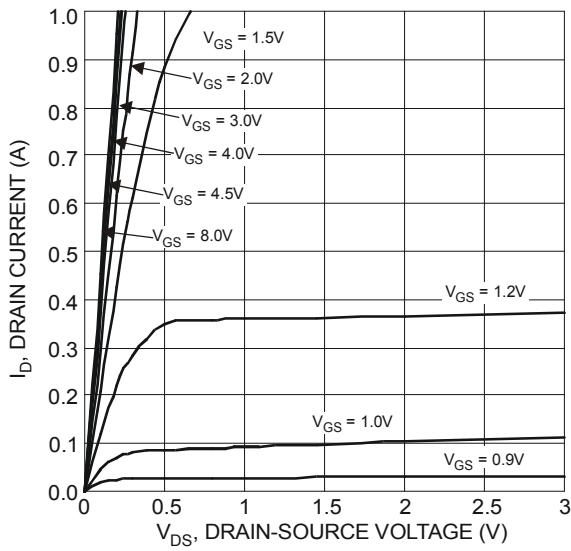


Figure 1 Typical Output Characteristics

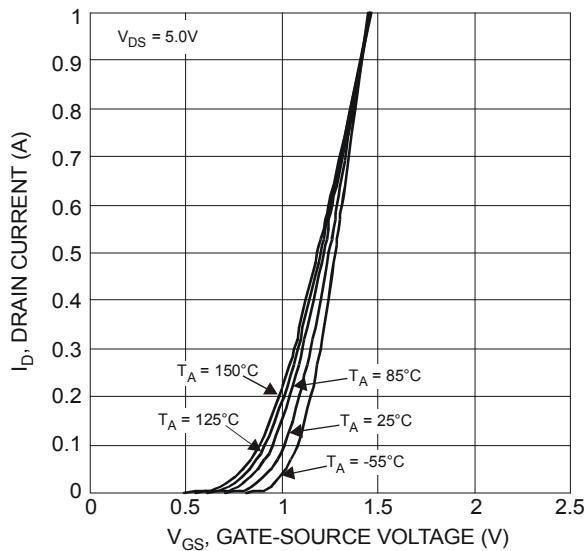


Figure 2 Typical Transfer Characteristics

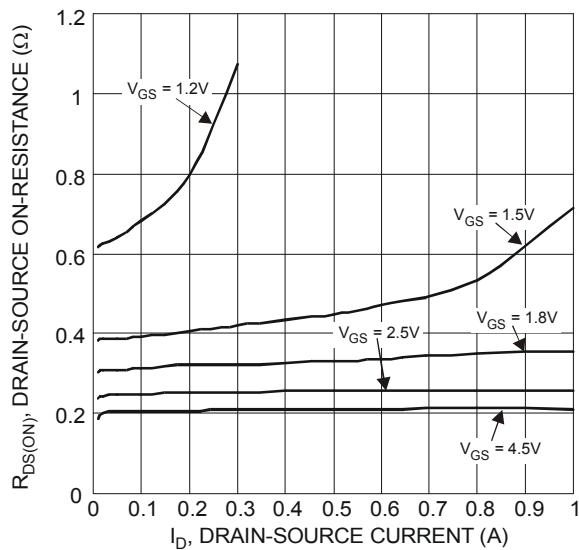


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

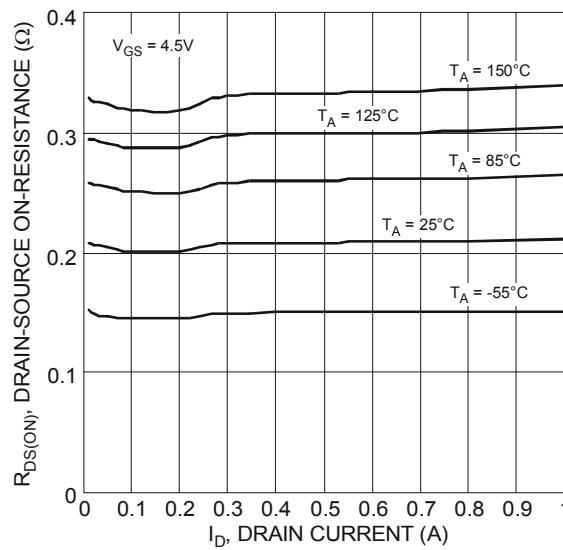


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

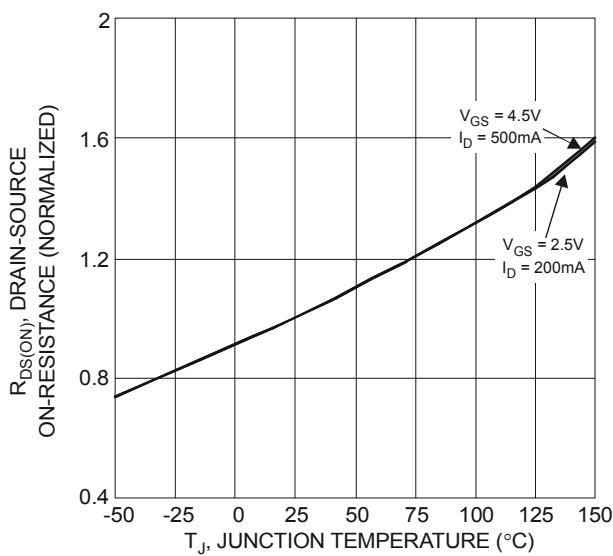


Figure 5 On-Resistance Variation with Temperature

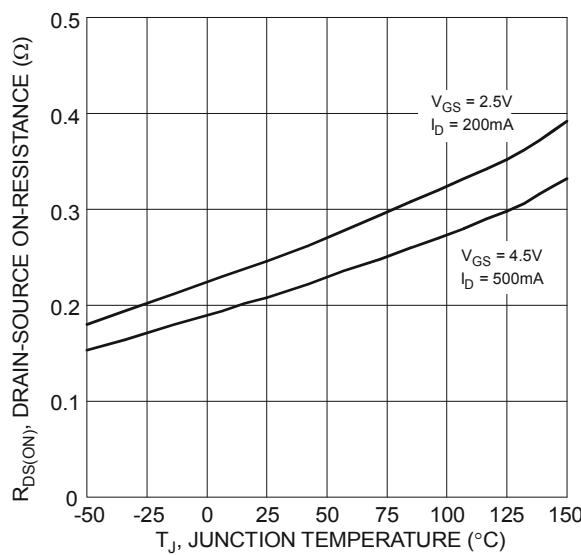


Figure 6 On-Resistance Variation with Temperature

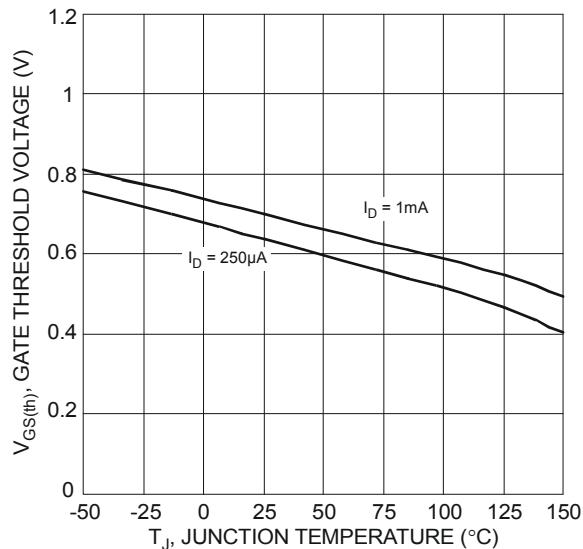


Figure 7 Gate Threshold Variation vs. Ambient Temperature

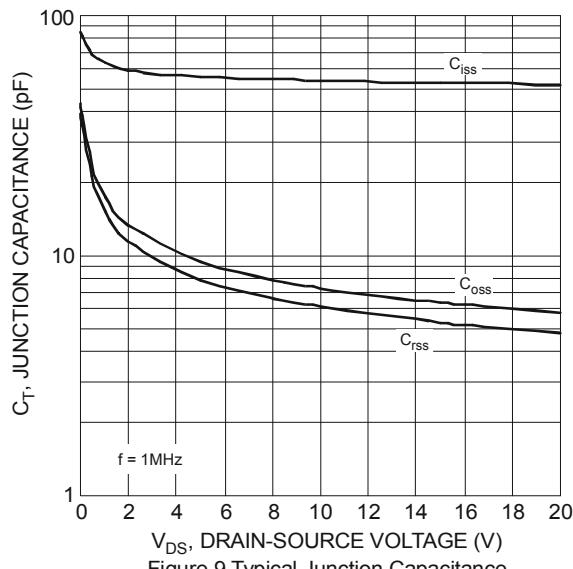


Figure 9 Typical Junction Capacitance

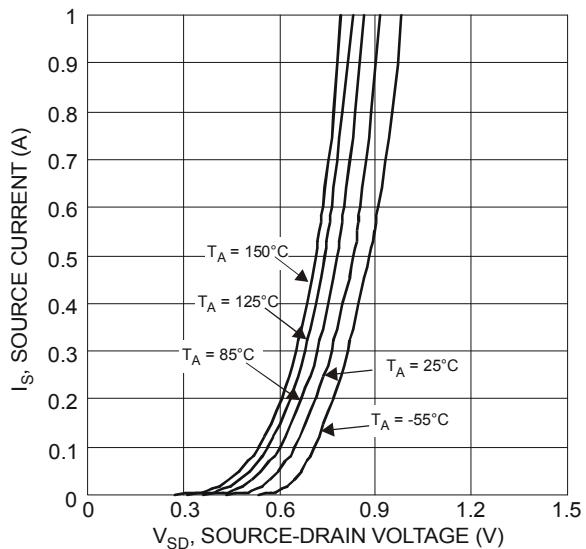


Figure 8 Diode Forward Voltage vs. Current

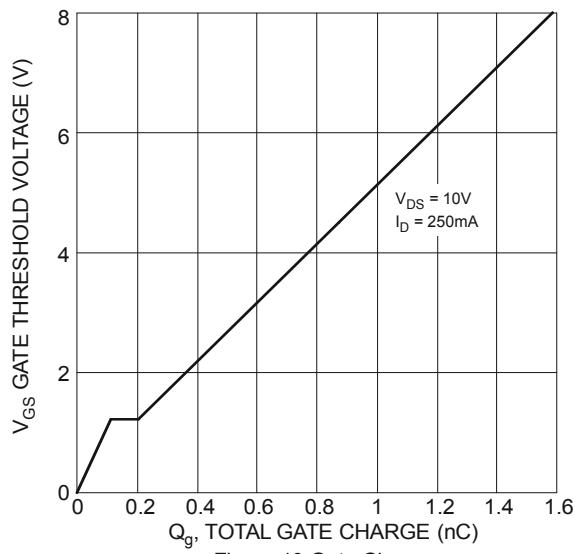


Figure 10 Gate Charge

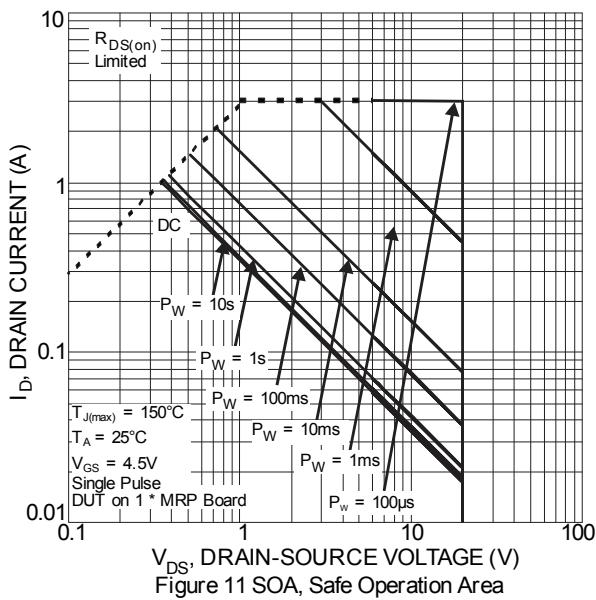
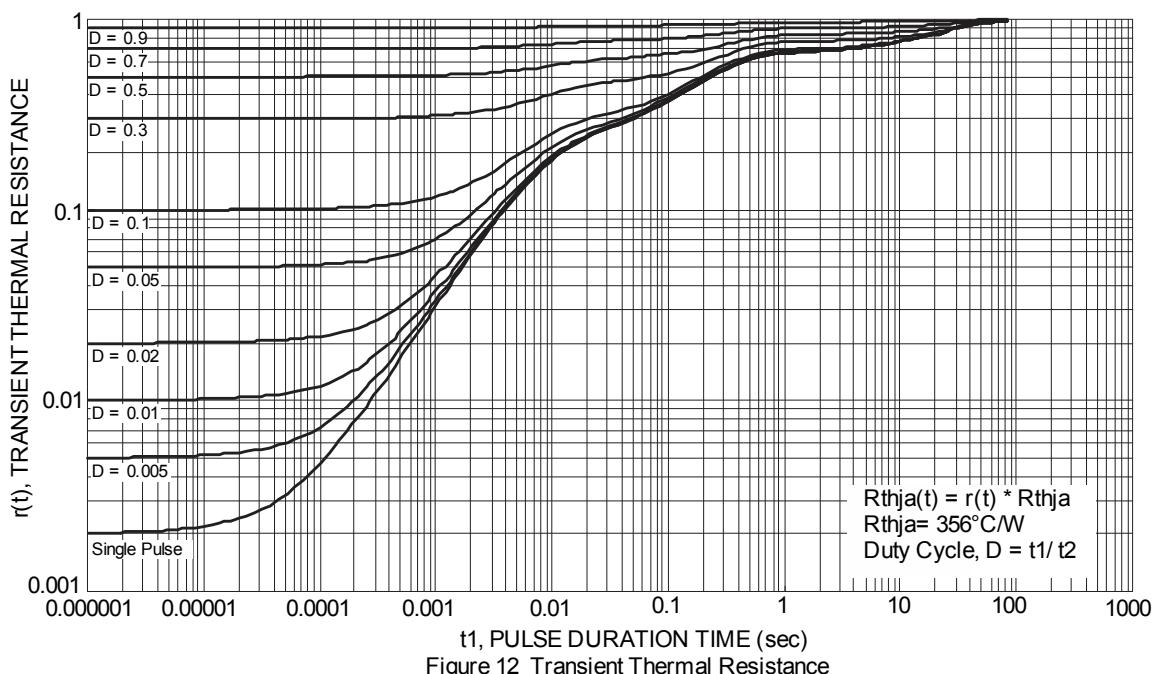
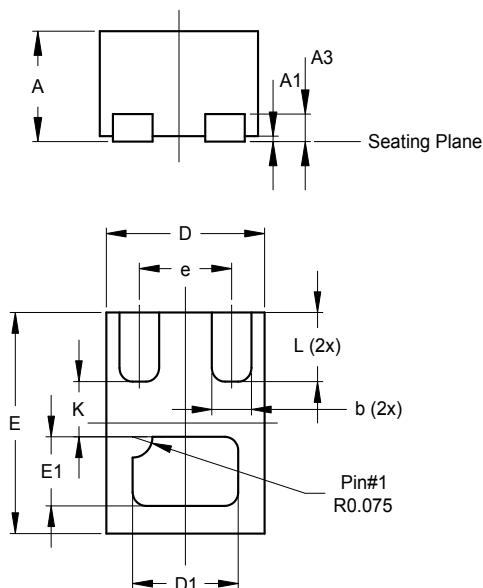


Figure 11 SOA, Safe Operation Area



## Package Outline Dimensions

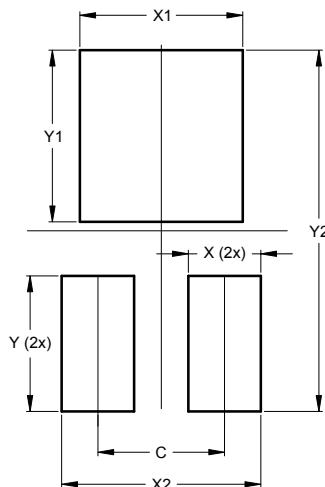
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



X2-DFN0806-3			
Dim	Min	Max	Typ
<b>A</b>	0.375	0.40	0.39
<b>A1</b>	0	0.05	0.02
<b>A3</b>	-	-	0.10
<b>b</b>	0.10	0.20	0.15
<b>D</b>	0.55	0.65	0.60
<b>D1</b>	0.35	0.45	0.40
<b>E</b>	0.75	0.85	0.80
<b>E1</b>	0.20	0.30	0.25
<b>e</b>	-	-	0.35
<b>K</b>	-	-	0.20
<b>L</b>	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)
C	0.350
X	0.200
X1	0.450
X2	0.550
Y	0.375
Y1	0.475
Y2	1.000

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