

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = 25^\circ\text{C}$
20V	$0.99\Omega @ V_{GS} = 4.5\text{V}$	510mA
	$1.2\Omega @ V_{GS} = 2.5\text{V}$	470mA
	$1.8\Omega @ V_{GS} = 1.8\text{V}$	380mA
	$2.4\Omega @ V_{GS} = 1.5\text{V}$	330mA

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.

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

Features and Benefits

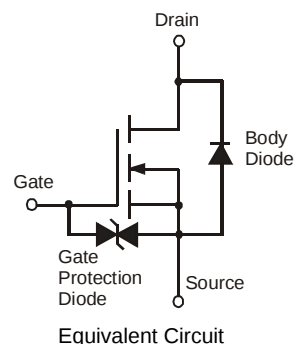
- Low Package Profile, 0.4mm Maximum Package height
- 0.48mm² package footprint, 16 times smaller than SOT23
- Low On-Resistance
- Very low Gate Threshold Voltage, 1.0V max
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 standards for High Reliability**

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
- Weight: 0.001 grams (approximate)



Top View
Package Pin Configuration



Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2990UFA-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> 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>.

Marking Information

DMN2990UFA-7B



Top View
Bar Denotes Gate
and Source Side

NW = Product Type Marking Code

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = 25°C T _A = 70°C	I _D	510 410	mA
	t<10s	T _A = 25°C T _A = 70°C	I _D	610 490	mA
Continuous Drain Current (Note 5) V _{GS} = 1.8V	Steady State	T _A = 25°C T _A = 70°C	I _D	380 300	mA
	t<10s	T _A = 25°C T _A = 70°C	I _D	450 360	mA
Pulsed Drain Current (Note 6)			I _{DM}	800	mA

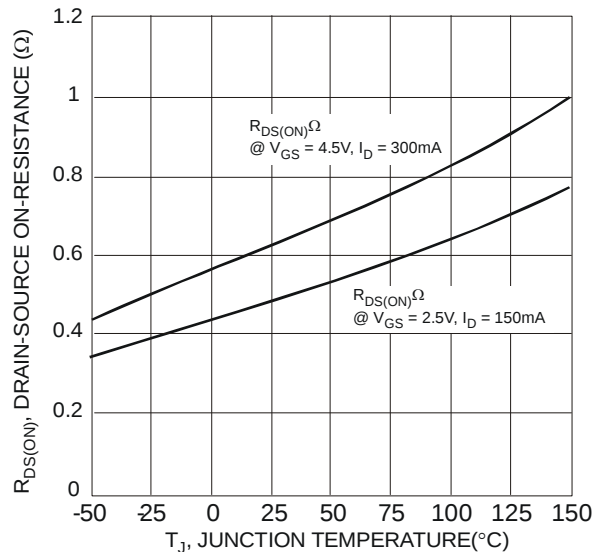
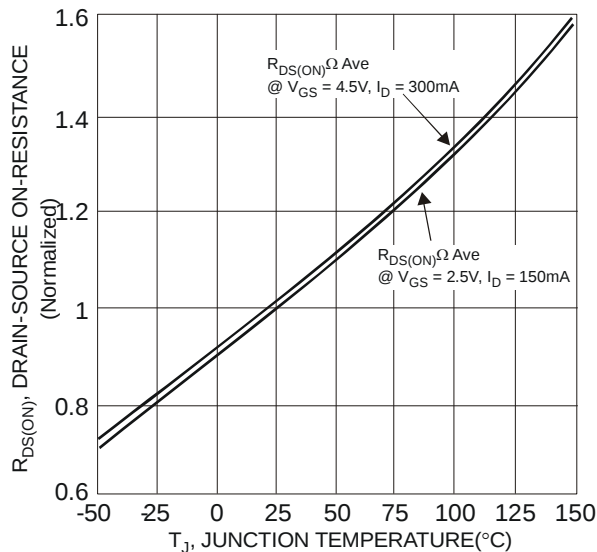
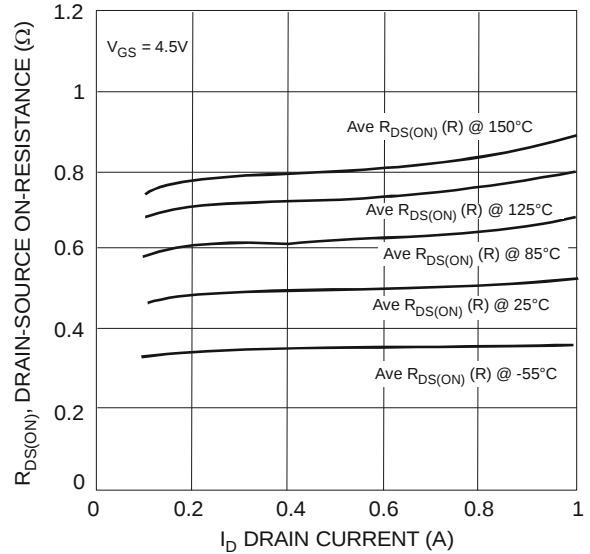
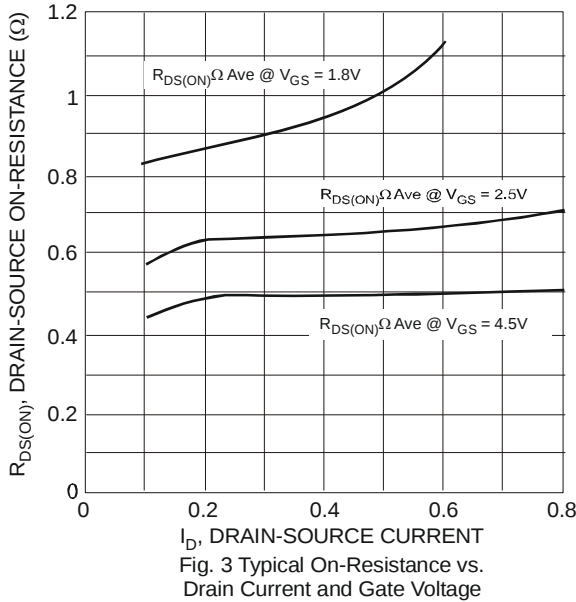
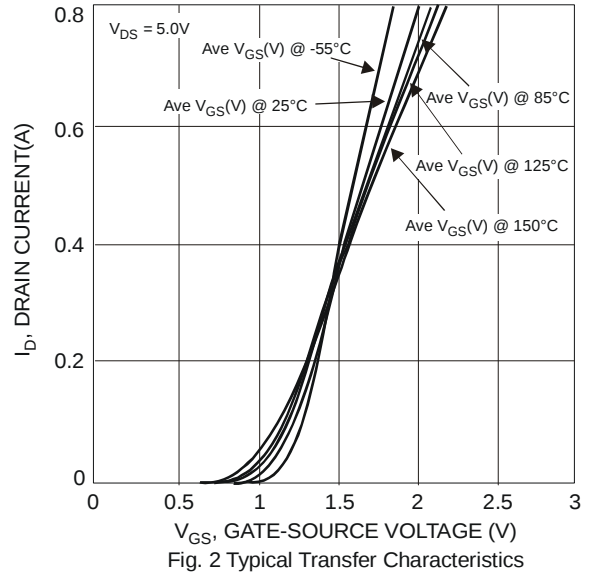
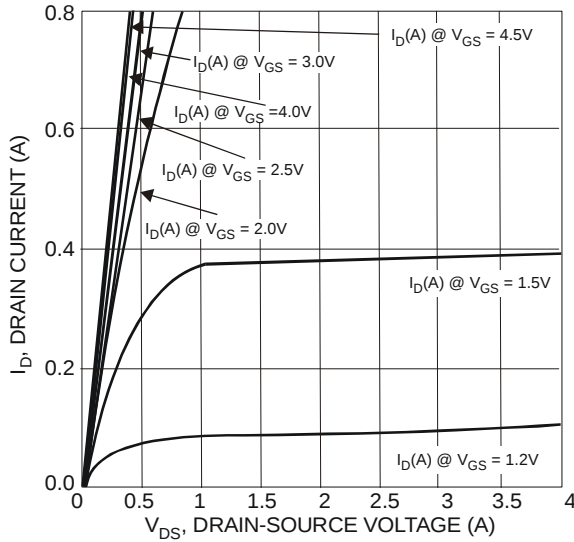
Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	Steady state	P _D	400	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	310	°C/W
	t<10s		220	°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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current @T _C = 25°C	I _{DSS}	-	-	100	nA	V _{DS} = 16V, V _{GS} = 0V
		-	-	50	nA	V _{DS} = 5V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	0.4	-	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	0.60	0.99	Ω	V _{GS} = 4.5V, I _D = 100mA
		-	0.75	1.2		V _{GS} = 2.5V, I _D = 50mA
		-	0.90	1.8		V _{GS} = 1.8V, I _D = 20mA
		-	1.2	2.4		V _{GS} = 1.5V, I _D = 10mA
		-	2.0	-		V _{GS} = 1.2V, I _D = 1mA
Forward Transfer Admittance	Y _{fs}	180	-	-	mS	V _{DS} = 10V, I _D = 400mA
Diode Forward Voltage	V _{SD}	-	0.6	1.0	V	V _{GS} = 0V, I _S = 150mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	-	27.6	-	pF	V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	4.0	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	2.8	-	pF	
Total Gate Charge	Q _g	-	0.5	-	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	-	0.07	-	nC	
Gate-Drain Charge	Q _{gd}	-	0.07	-	nC	
Turn-On Delay Time	t _{D(on)}	-	4.0	-	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA
Turn-On Rise Time	t _r	-	3.3	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	19.0	-	ns	
Turn-Off Fall Time	t _f	-	6.4	-	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.
8. Guaranteed by design. Not subject to product testing.



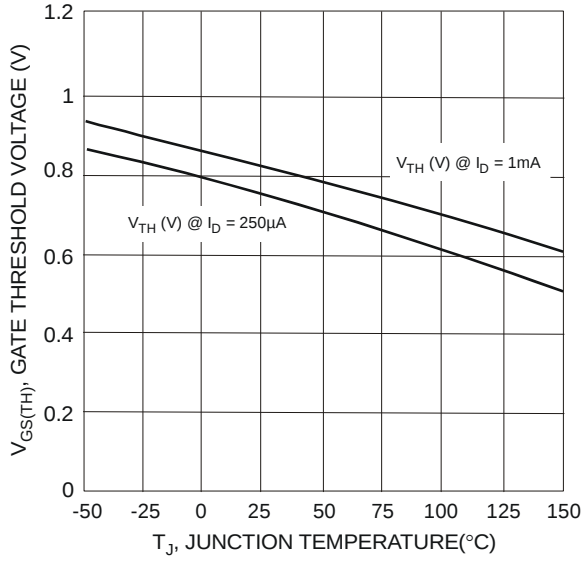


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

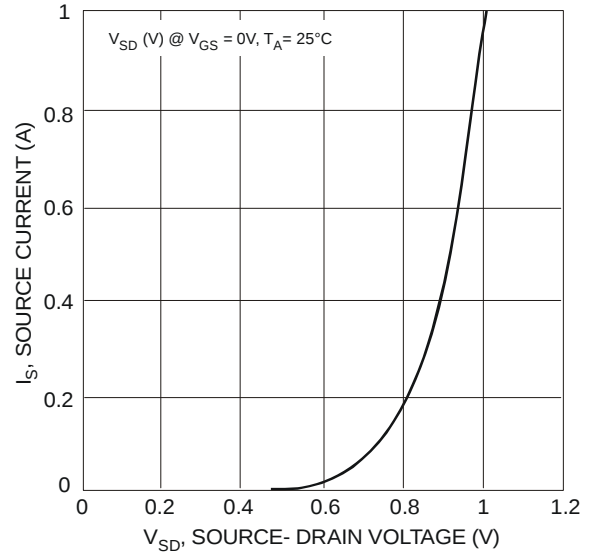


Fig. 8 Diodes Forward Voltage vs. Current

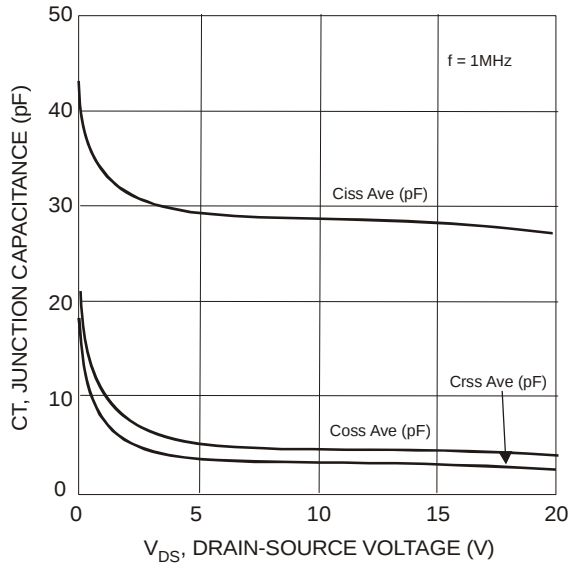


Fig. 9 Typical Junction Capacitance

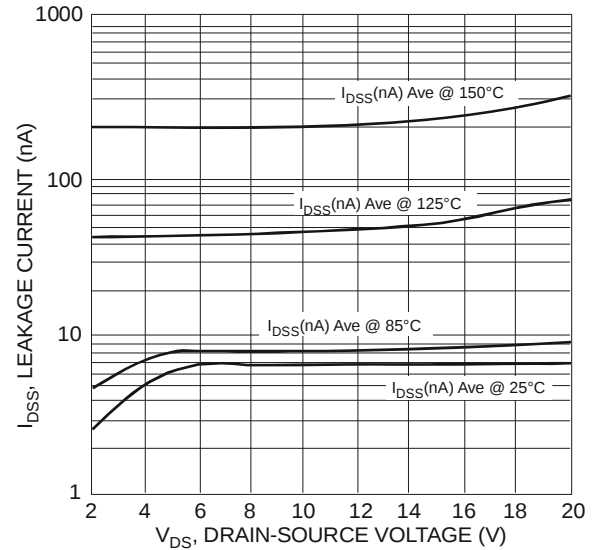


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

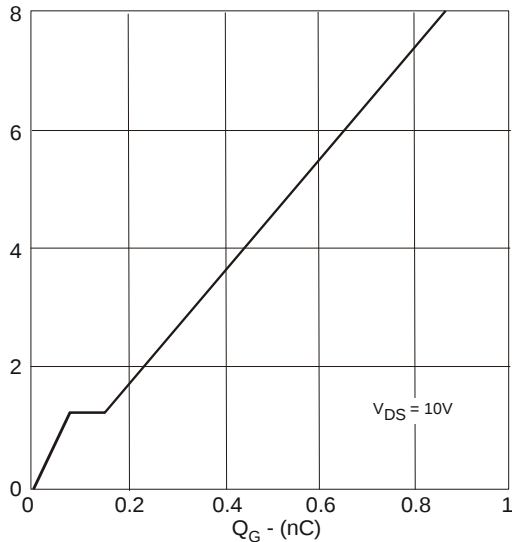
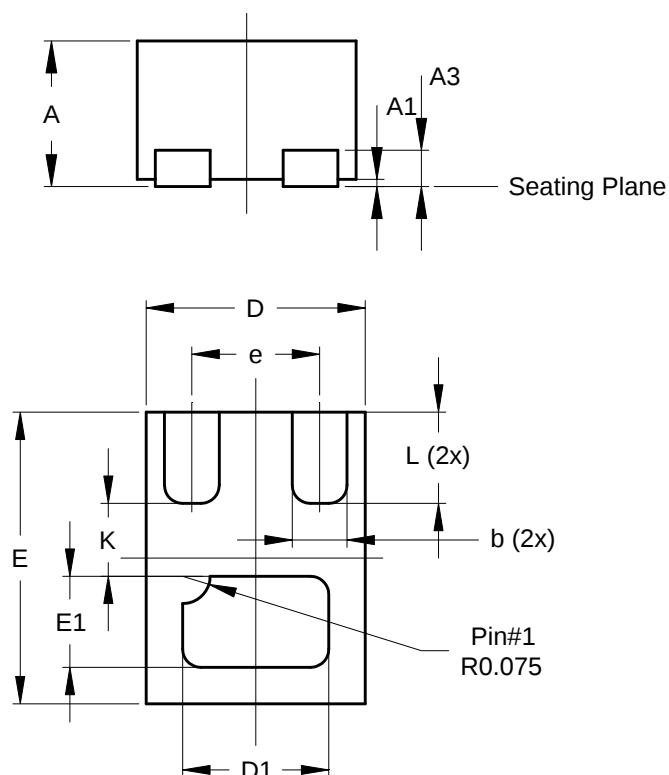


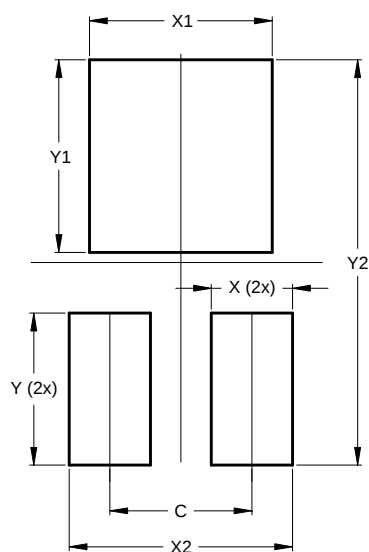
Fig. 11 Gate Charge Characteristics

Package Outline Dimensions



X2-DFN0806-3			
Dim	Min	Max	Typ
A	0.375	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.10
b	0.10	0.20	0.15
D	0.55	0.65	0.60
D1	0.35	0.45	0.40
E	0.75	0.85	0.80
E1	0.20	0.30	0.25
e	-	-	0.35
K	-	-	0.20
L	0.20	0.30	0.25
All Dimensions in mm			

Suggested Pad Layout



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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