

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = 25^\circ\text{C}$
-20V	1.9Ω @ $V_{GS} = -4.5\text{V}$	-330mA
	2.4Ω @ $V_{GS} = -2.5\text{V}$	-300mA
	3.4Ω @ $V_{GS} = -1.8\text{V}$	-250mA
	5Ω @ $V_{GS} = -1.5\text{V}$	-200mA

## 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
- 0.48mm<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)**
- **Qualified to AEC-Q101 standards for High Reliability**

## Mechanical Data

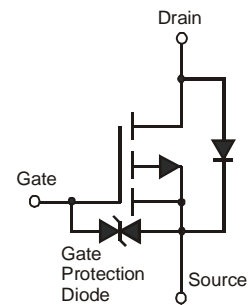
- Case: X2-DFN0806-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)



Bottom View



Top View  
Package Pin Configuration



Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP22D4UFA-7B	DFN0806H4-3	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> 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

DMP22D4UFA-7B



Top View  
Bar Denotes Gate  
and Source Side

PW = Product Type Marking Code

**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	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	-330 -260	mA
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	-400 -310	mA
Continuous Drain Current (Note 5) $V_{GS} = -1.8\text{V}$	Steady State	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	-250 -200	mA
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	-310 -240	mA
Pulsed Drain Current (Note 6)			$I_{DM}$	-800	mA

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  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	$R_{\theta JA}$	310	$^\circ\text{C/W}$
	$t < 10\text{s}$		220	$^\circ\text{C/W}$
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 @ $T_c = 25^\circ\text{C}$	$I_{DSS}$	-	-	100	nA	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
		-	-	50		$V_{DS} = -5\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 5\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	-	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	1.2	1.9	$\Omega$	$V_{GS} = -4.5\text{V}, I_D = -100\text{mA}$
		-	1.5	2.4		$V_{GS} = -2.5\text{V}, I_D = -50\text{mA}$
		-	2.1	3.4		$V_{GS} = -1.8\text{V}, I_D = -20\text{mA}$
		-	2.5	5		$V_{GS} = -1.5\text{V}, I_D = -10\text{mA}$
		-	4.0	-		$V_{GS} = -1.2\text{V}, I_D = -1\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	100	450	-	mS	$V_{DS} = -5\text{V}, I_D = -125\text{mA}$
Diode Forward Voltage	$V_{SD}$	-	-0.6	-1.0	V	$V_{GS} = 0\text{V}, I_S = -10\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	-	28.7	-	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	4.2	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	2.9	-	pF	
Gate Resistance	$R_G$	-	0.4	-	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	$Q_g$	-	0.4	-	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}, I_D = -250\text{mA}$
Gate-Source Charge	$Q_{gs}$	-	0.08	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	0.06	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	5.8	-	ns	$V_{DD} = -15\text{V}, V_{GS} = -4.5\text{V}, R_G = 2\Omega, I_D = -200\text{mA}$
Turn-On Rise Time	$t_r$	-	5.7	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	31.1	-	ns	
Turn-Off Fall Time	$t_f$	-	16.4	-	ns	

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

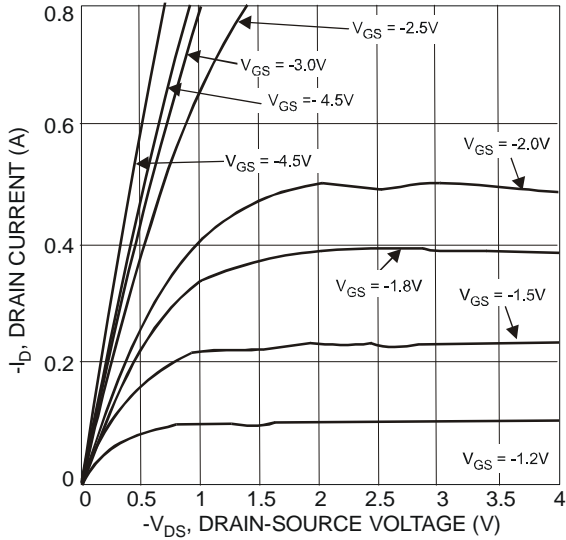


Fig. 1 Typical Output Characteristics

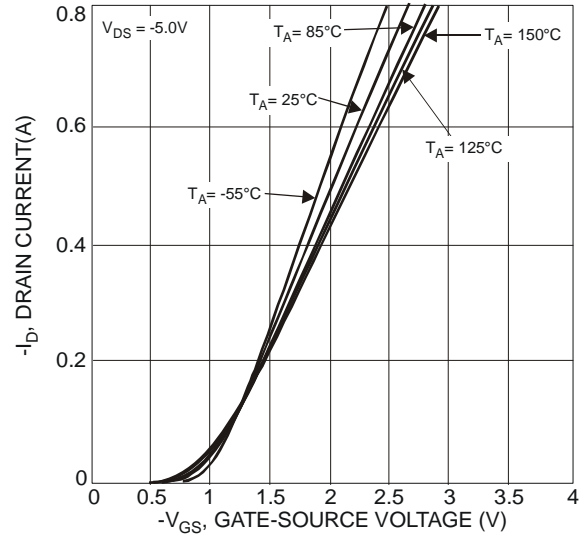


Fig. 2 Typical Transfer Characteristics

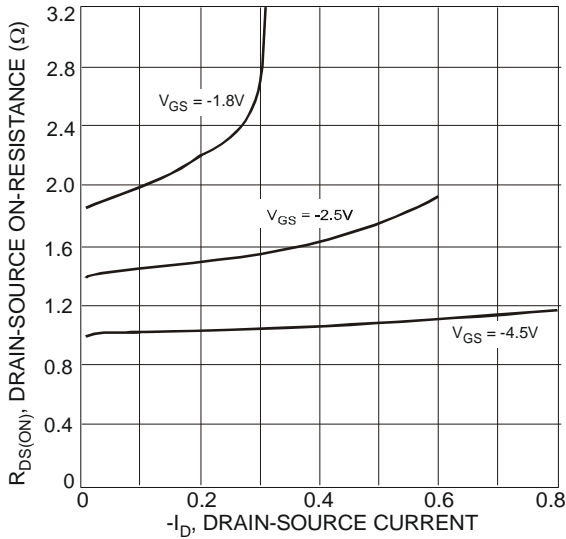


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

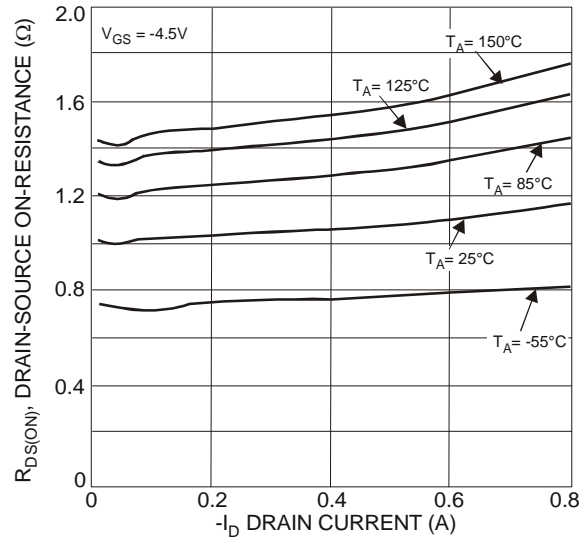


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

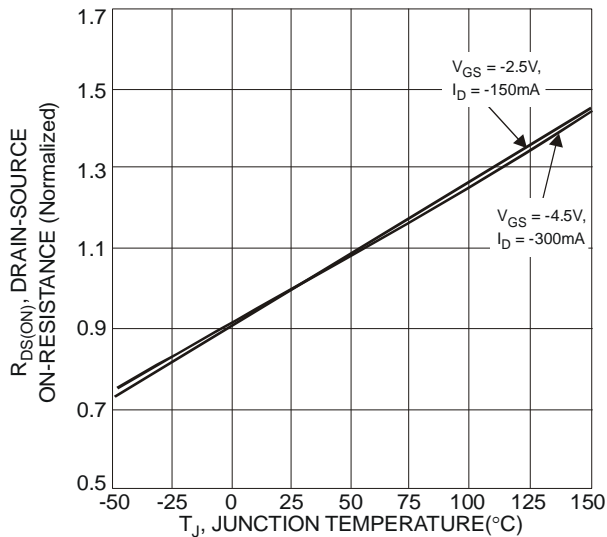


Fig. 5 On-Resistance Variation with Temperature

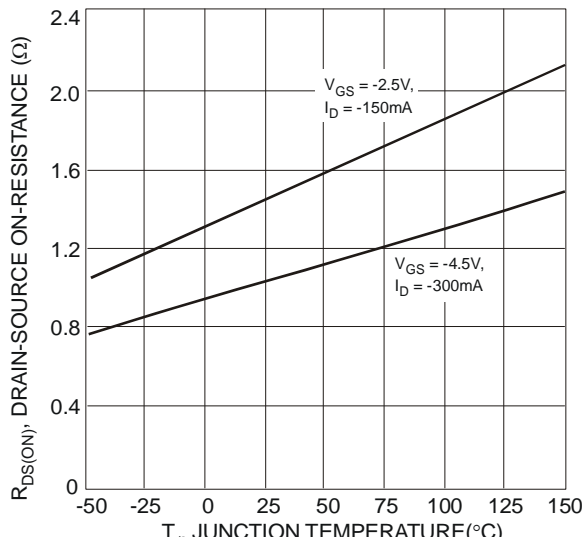


Fig. 6 On-Resistance Variation with Temperature

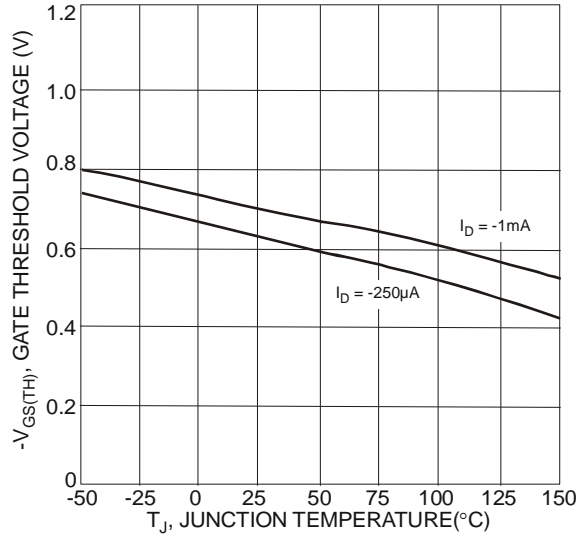


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

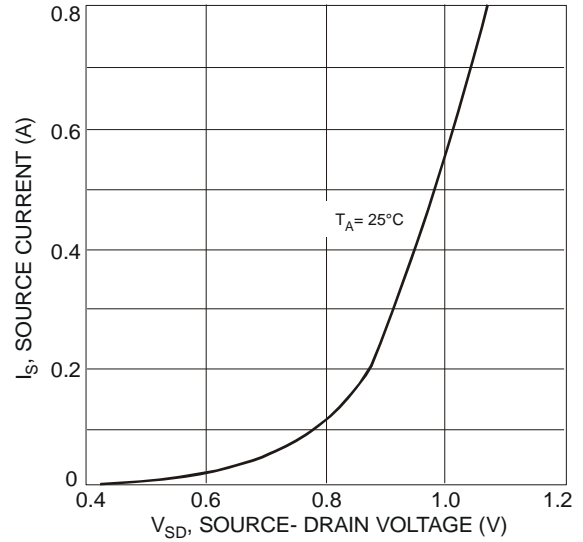


Fig. 8 Diodes Forward Voltage vs. Current

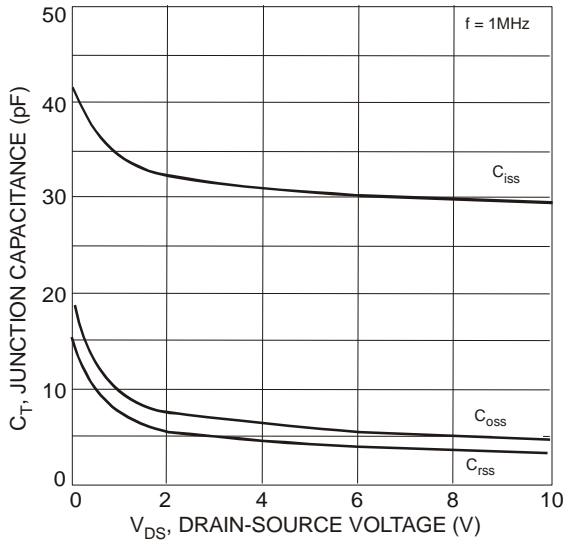


Fig. 9 Typical Junction Capacitance

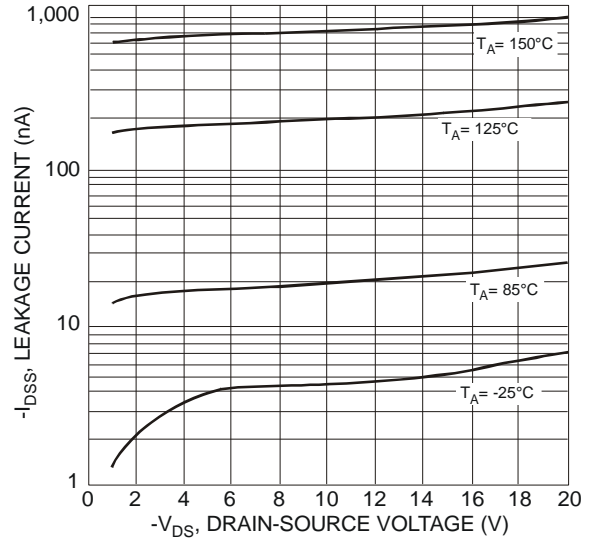


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

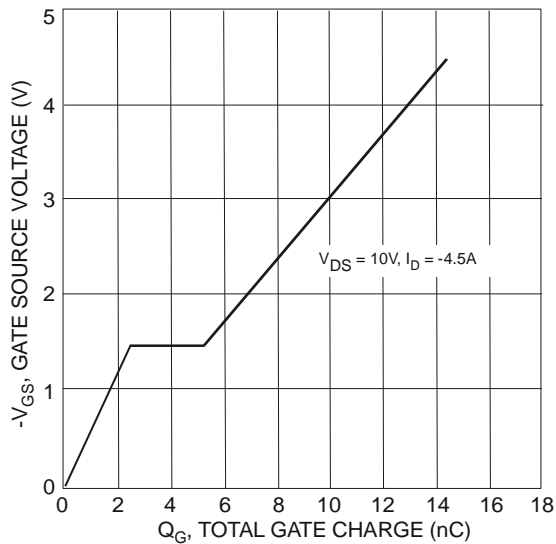
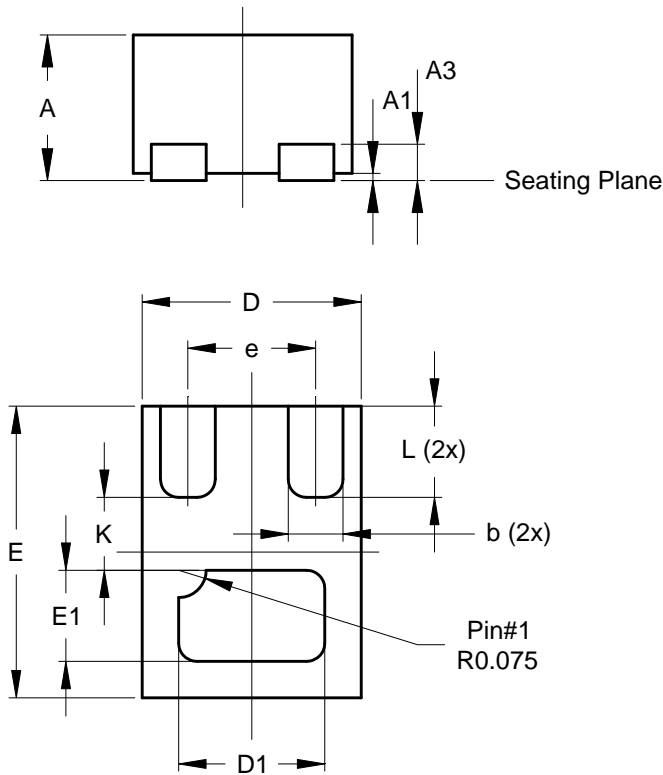


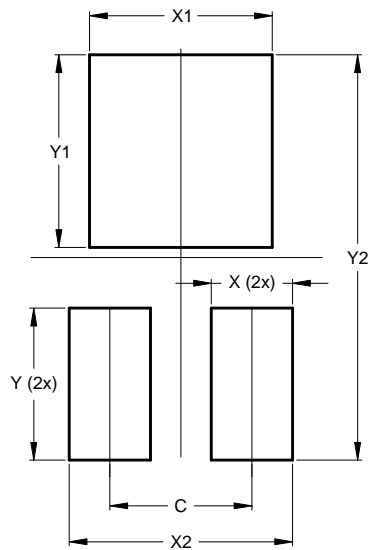
Fig. 11 Gate Charge Characteristics

**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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