

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	$I_D$ Max @ $T_A = +25^\circ\text{C}$
-30V	2.4Ω @ $V_{GS} = -10\text{V}$	-400mA
	4Ω @ $V_{GS} = -4.5\text{V}$	-300mA
	16Ω @ $V_{GS} = -2.5\text{V}$	-50mA

## Description

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.

## Applications

- Load Switch
- Portable Applications
- Power Management Functions

## Features

- Low On-Resistance
- Ultra-Small Surfaced Mount Package
- **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**

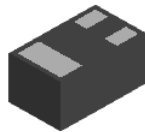
## Mechanical Data

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)

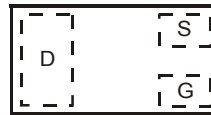


ESD PROTECTED

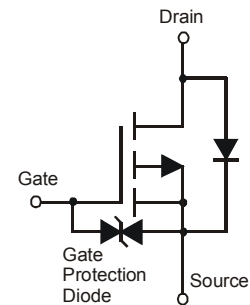
X1-DFN1006-3



Bottom View



Top View



Equivalent Circuit

## Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Quantity per reel
DMP32D4SFB-7B	XP	7	10,000

- 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](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



XP = Product Type Marking Code

Top View  
Bar Denotes Gate and Source Side

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5)	V <sub>GS</sub> = -10V	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-400 -300	mA
Continuous Drain Current (Note 6)	V <sub>GS</sub> = -10V	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-500 -400	mA
Pulsed Drain Current (Note 5)			I <sub>DM</sub>	-1	A
Maximum Body Diode continuous Current			I <sub>S</sub>	-800	mA

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

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P <sub>D</sub>	0.5	W
	(Note 6)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	273	°C/W
	(Note 6)		105	
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	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -1mA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	-	-	-1	µA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±10	µA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.3	-	-2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	-	2.4	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -200mA
				4		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -200mA
				16		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -10mA
Forward Transfer Admittance	Y <sub>fs</sub>	-	6	-	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -400mA
Diode Forward Voltage	V <sub>SD</sub>	-	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -300mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	51	-	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	11	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	9	-	pF	
Total Gate Charge	Q <sub>g</sub>	-	0.6	-	nC	V <sub>GS</sub> = -4.5V
Total Gate Charge	Q <sub>g</sub>	-	1.3	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	0.2	-	nC	V <sub>GS</sub> = -10V
Gate-Drain Charge	Q <sub>gd</sub>	-	0.2	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	3.6	-	ns	V <sub>DS</sub> = -10V, I <sub>D</sub> = -200mA
Turn-On Rise Time	t <sub>r</sub>	-	8.5	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	31.3	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	20.2	-	ns	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

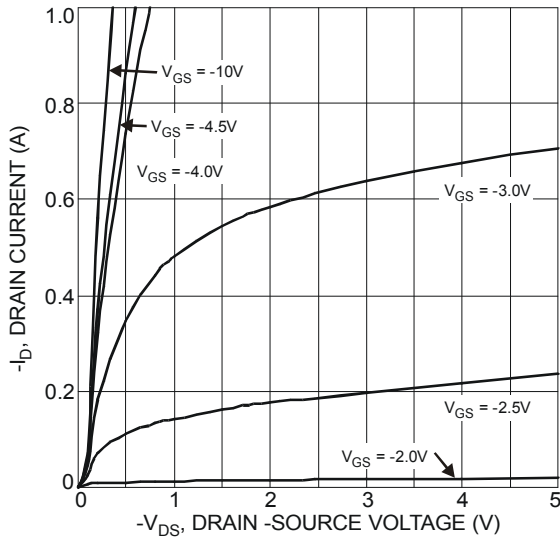


Figure 1 Typical Output Characteristics

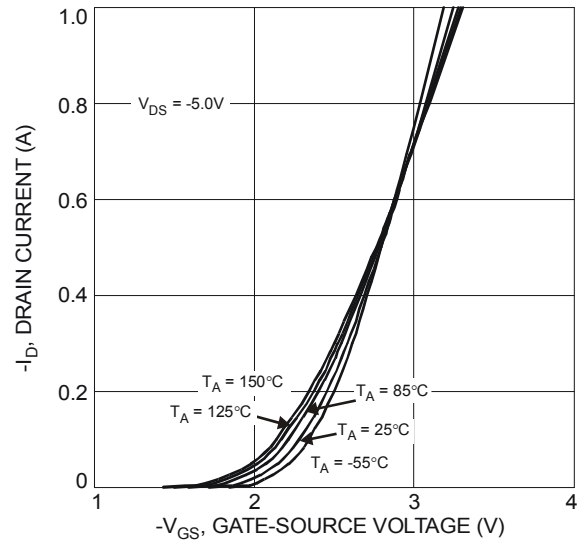


Figure 2 Typical Transfer Characteristics

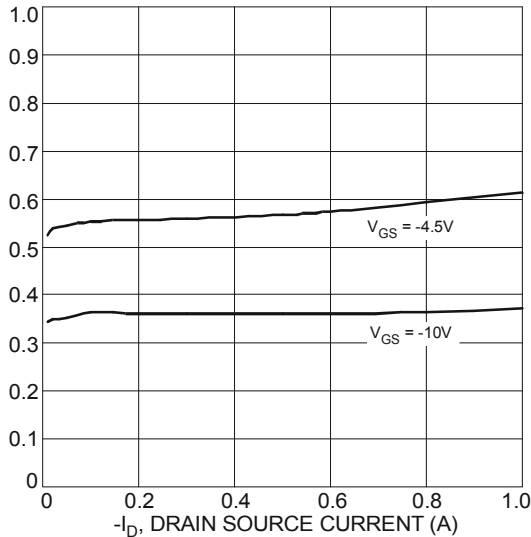


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

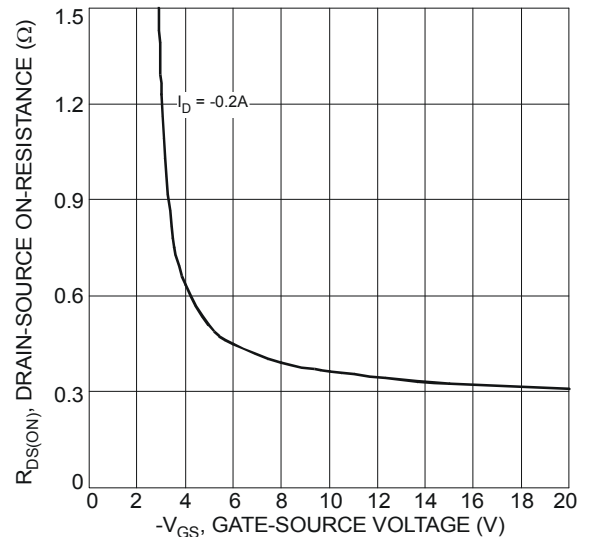


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

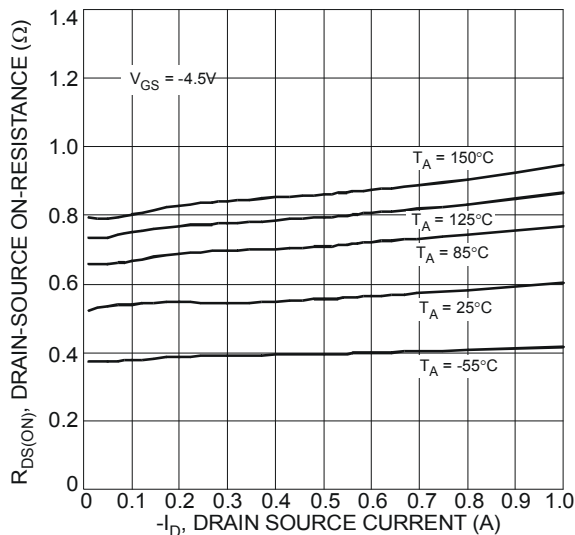


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

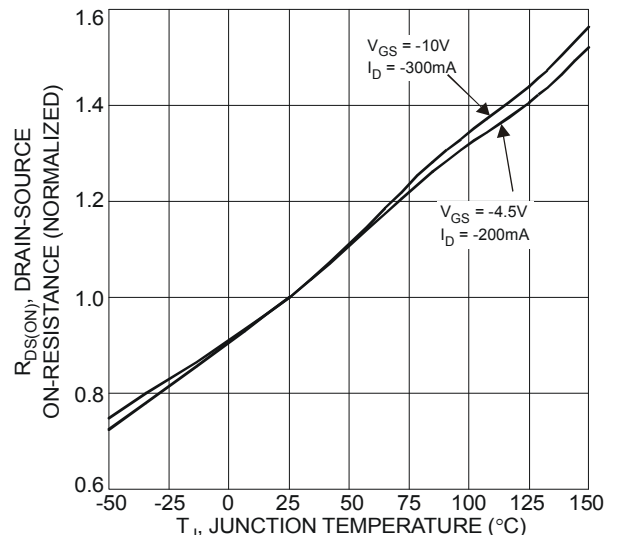


Figure 6 On-Resistance Variation with Temperature

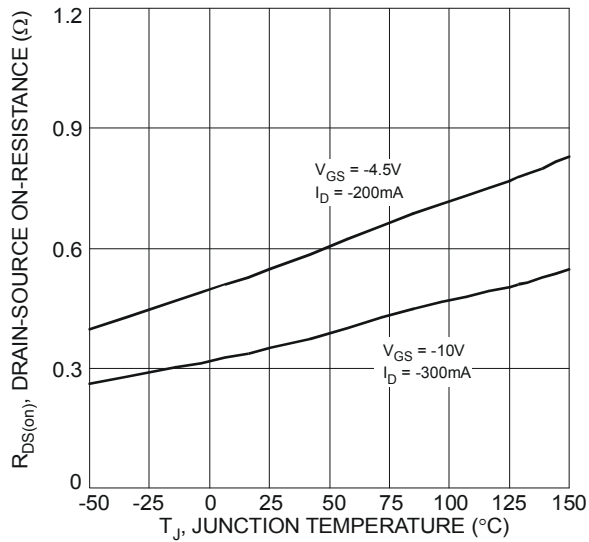


Figure 7 On-Resistance Variation with Temperature

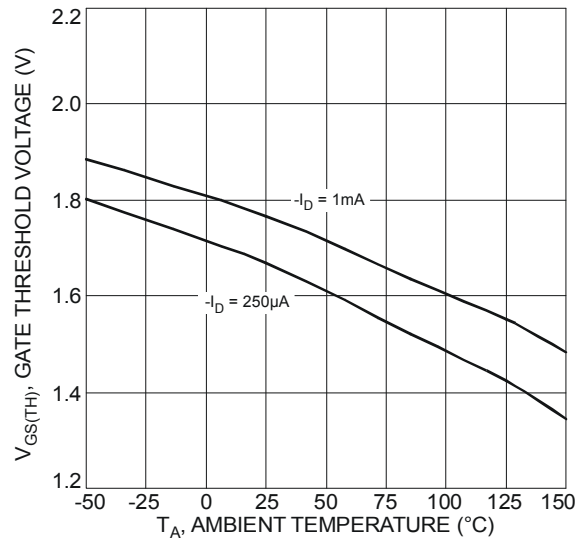


Figure 8 Gate Threshold Variation vs. Ambient Temperature

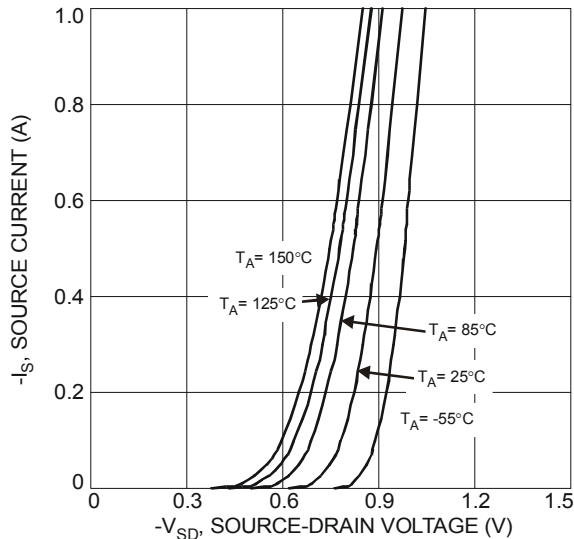


Figure 9 Diode Forward Voltage vs. Current

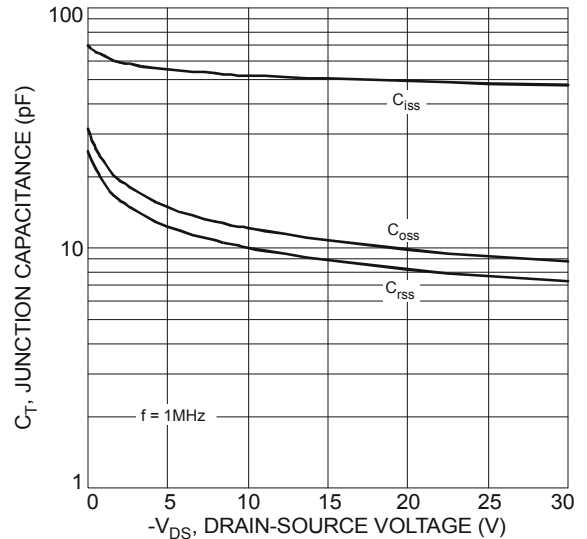


Figure 10 Typical Junction Capacitance

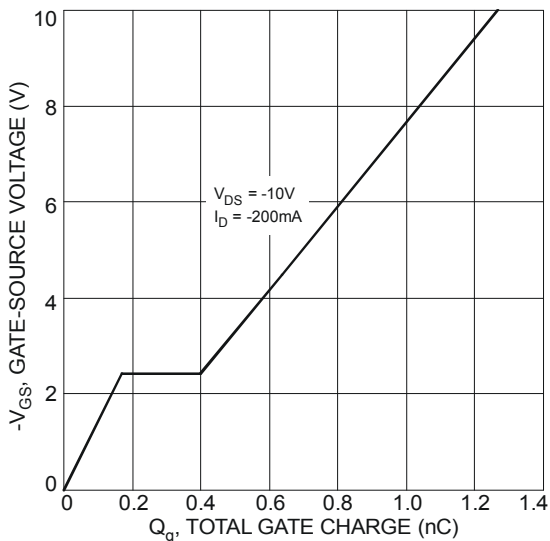
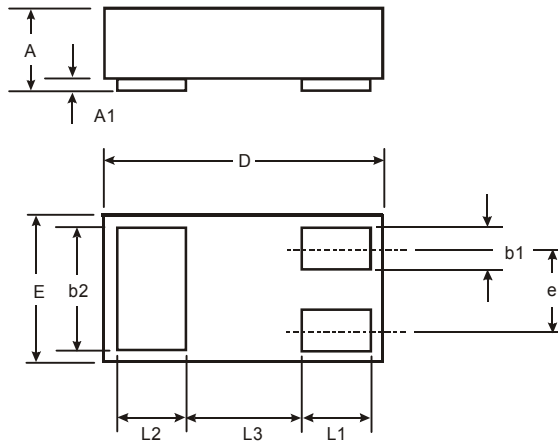


Figure 11 Gate-Charge Characteristics

## Package Outline Dimensions

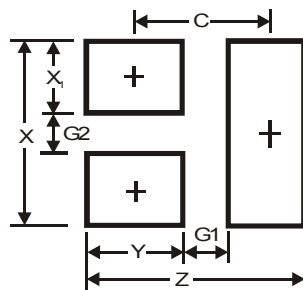
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40
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)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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