

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	$I_D$ $T_A = +25^\circ C$
-50V	8Ω @ $V_{GS} = -5V$	X1-DFN1006-3	-310mA

## Description

This new generation 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

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

## Features

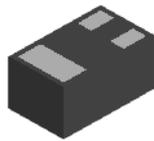
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected 1kV**
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

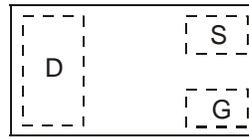
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.001 grams (Approximate)



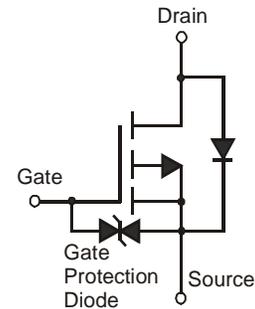
X1-DFN1006-3



Bottom View



Top View  
Pin-Out



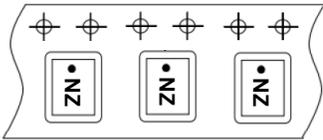
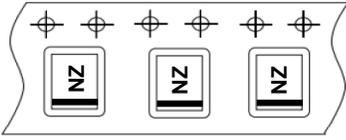
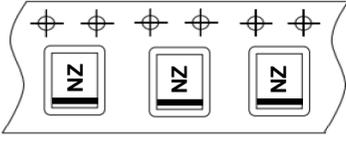
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP58D0LFB-7	X1-DFN1006-3	3,000 / Tape & Reel
DMP58D0LFB-7B	X1-DFN1006-3	10,000 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  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

<b>DMP58D0LFB-7</b>	 <p>Top View Dot Denotes Drain Side</p>	<p>From date code 1527 (YYWW), this changes to:</p>  <p>Top View Bar Denotes Gate and Source Side</p>
		
<b>DMP58D0LFB-7B</b>	 <p>Top View Bar Denotes Gate and Source Side</p>	<p>NZ = Part Marking Code</p>
		

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-50	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = -5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-180	mA
		T <sub>A</sub> = +70°C		-150	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-310	mA
		T <sub>A</sub> = +70°C		-250	
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	-500	mA

## Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	0.47	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	258	°C/W
Power Dissipation (Note 6)	P <sub>D</sub>	1.22	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 6)	R <sub>θJA</sub>	105	°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	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-50	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±5	μA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.8	—	-2.1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	6	8	Ω	V <sub>GS</sub> = -5V, I <sub>D</sub> = -100mA
		—	12	18	Ω	V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -10mA
Forward Transfer Admittance	Y <sub>fs</sub>	0.05	—	—	S	V <sub>DS</sub> = -25V, I <sub>D</sub> = -100mA
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	27	—	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	4.0	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	1.4	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	30.7	—	ns	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -30V, R <sub>G</sub> = 50Ω, I <sub>D</sub> = -10mA
Turn-On Rise Time	t <sub>r</sub>	—	84.1	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	201.8	—		
Turn-Off Fall Time	t <sub>f</sub>	—	32.2	—		

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
  7. Repetitive rating, pulse width limited by junction temperature.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing.

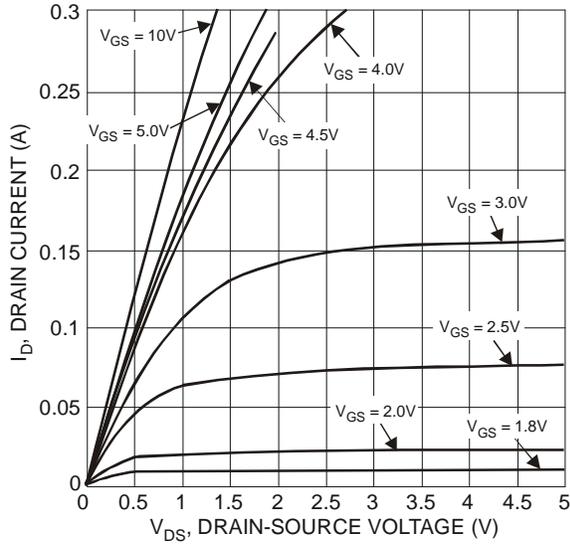


Fig. 1 Typical Output Characteristics

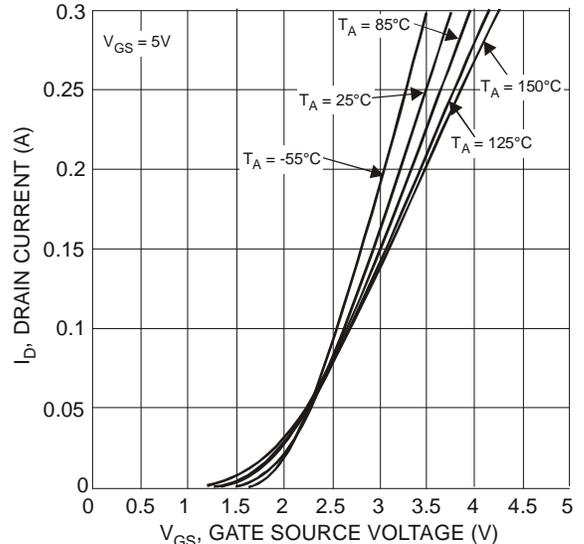


Fig. 2 Typical Transfer Characteristics

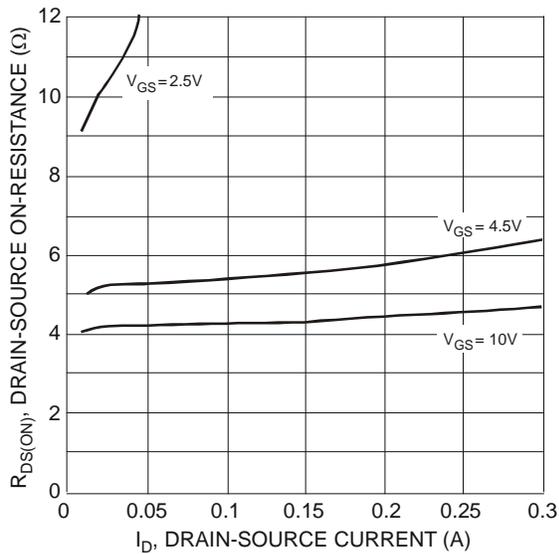


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

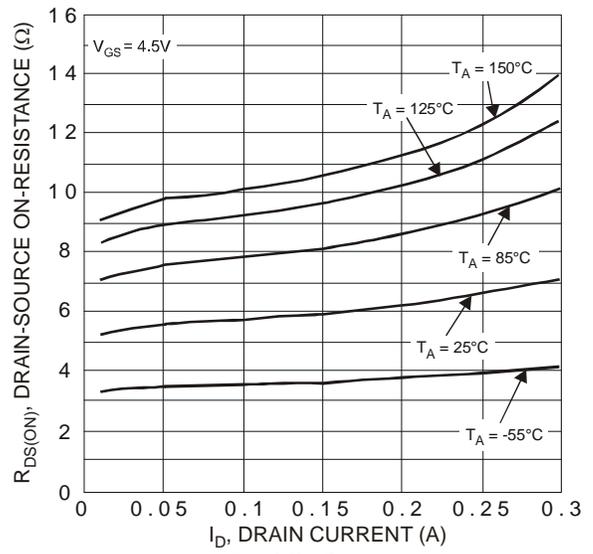


Fig. 4 On-Resistance vs. Drain Current and Temperature

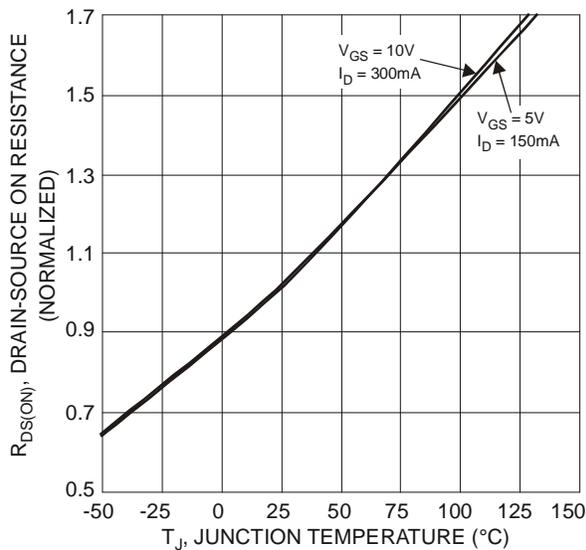


Fig. 5 On-Resistance Variation with Temperature

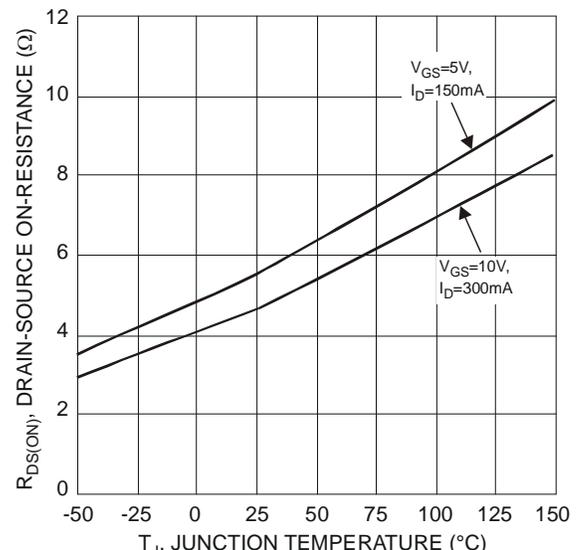


Fig. 6 On-Resistance vs. Temperature

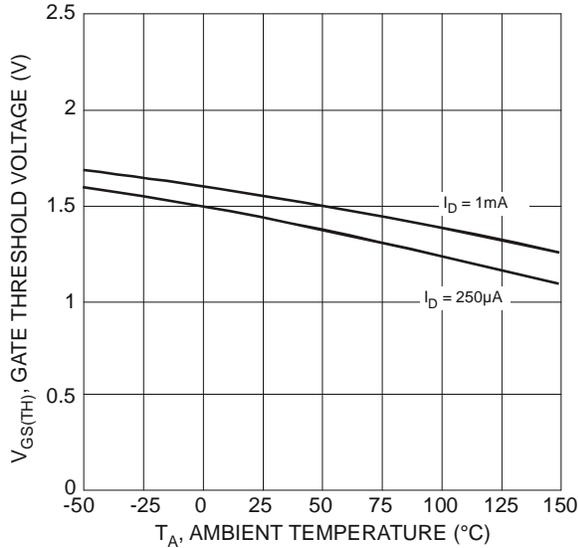


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

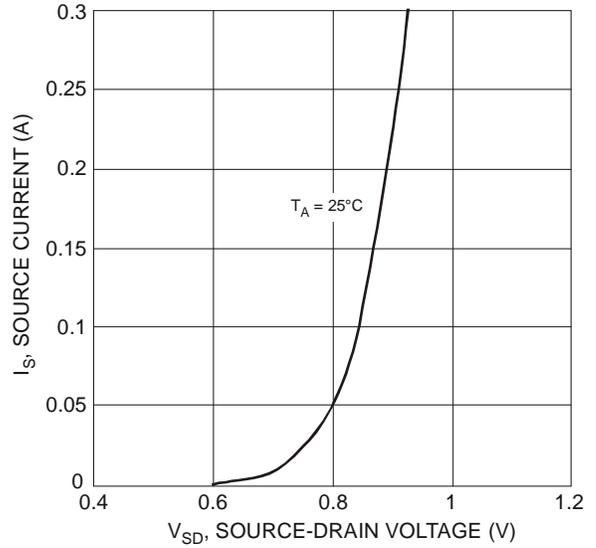


Fig. 8 Diode Forward Voltage vs. Current

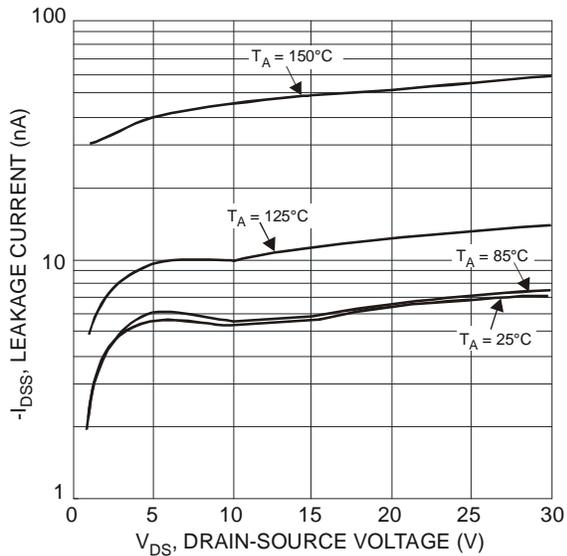


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

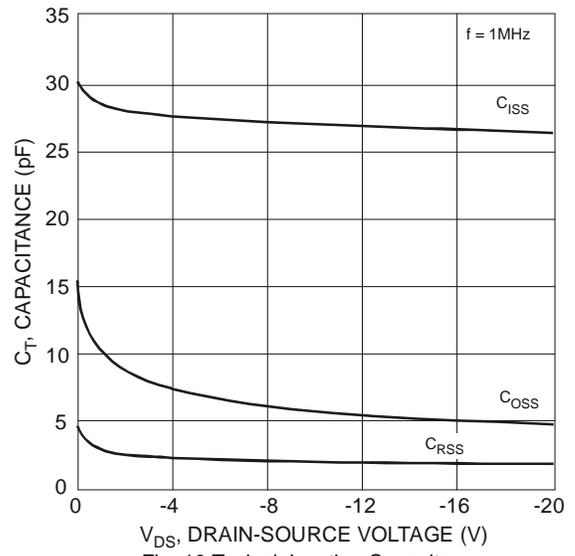


Fig. 10 Typical Junction Capacitance

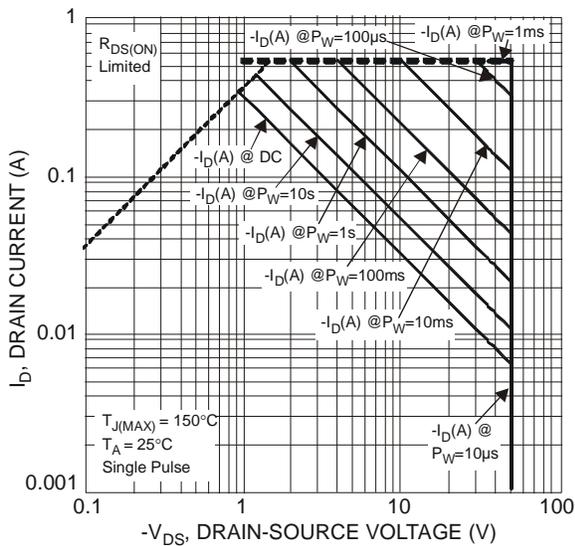


Fig. 11 SOA, Safe Operation Area

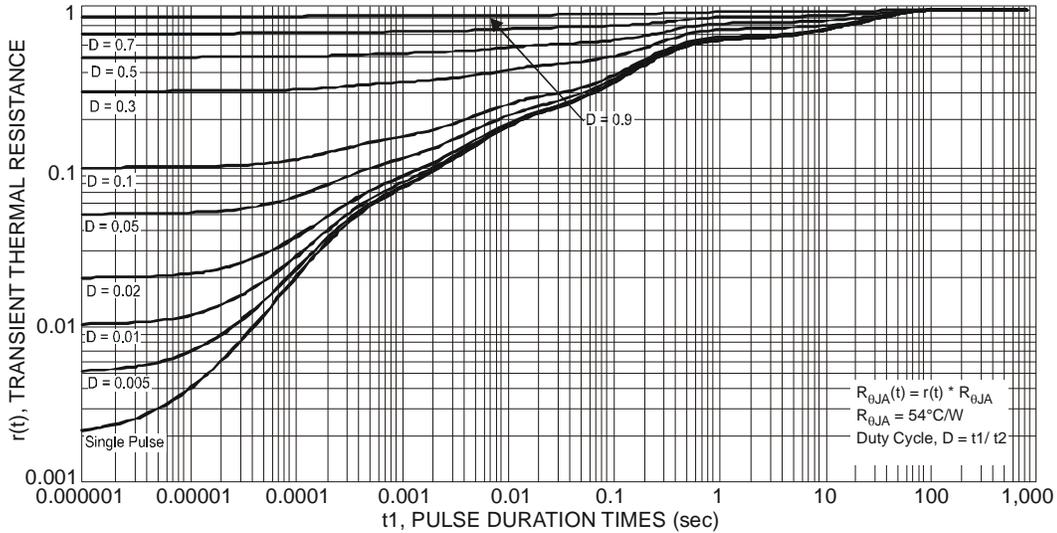
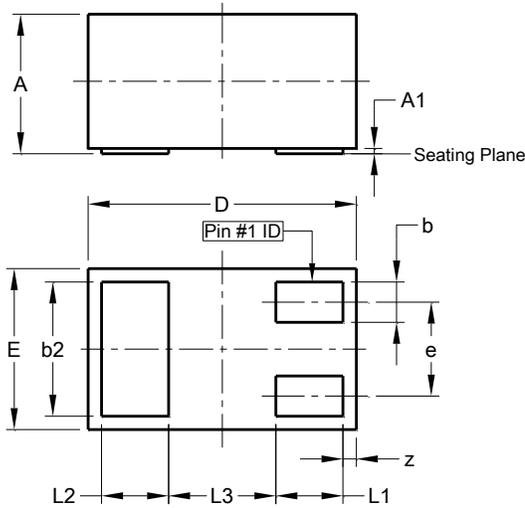


Fig. 12 Transient Thermal Resistance

**Package Outline Dimensions**

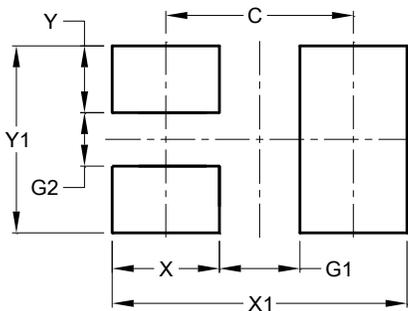
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	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
z	0.02	0.08	0.05
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	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

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