Product Summary

BV_{DSS}	$R_{DS(ON)}$	Package	I_D T_A = +25°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

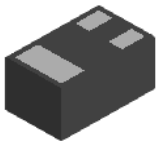
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected 1kV**
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

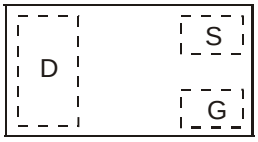
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

ESD PROTECTED

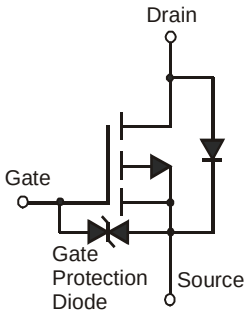
X1-DFN1006-3



Bottom View



Top View
Pin-Out



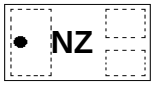
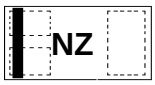
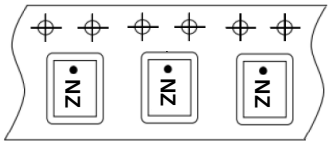
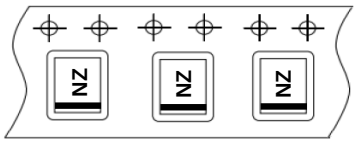
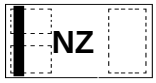
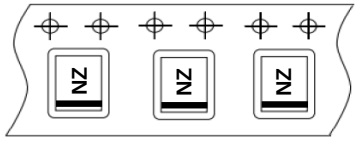
Equivalent Circuit

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 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

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

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-50	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = -5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-180 -150	mA
Continuous Drain Current (Note 6) V_{GS} = -5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-310 -250	mA
Pulsed Drain Current (Note 7)			I_{DM}	-500	mA

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	0.47	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	258	°C/W
Power Dissipation (Note 6)	P_D	1.22	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	105	°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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-50	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -50V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±5	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.8	—	-2.1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6	8	Ω	V_{GS} = -5V, I_D = -100mA
		—	12	18	Ω	V_{GS} = -2.5V, I_D = -10mA
Forward Transfer Admittance	$\|Y_{fs}\|$	0.05	—	—	S	V_{DS} = -25V, I_D = -100mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	27	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	4.0	—		
Reverse Transfer Capacitance	C_{rss}	—	1.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	30.7	—	ns	V_{GS} = -4.5V, V_{DS} = -30V, R_G = 50Ω, I_D = -10mA
Turn-On Rise Time	t_R	—	84.1	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	201.8	—		
Turn-Off Fall Time	t_F	—	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.

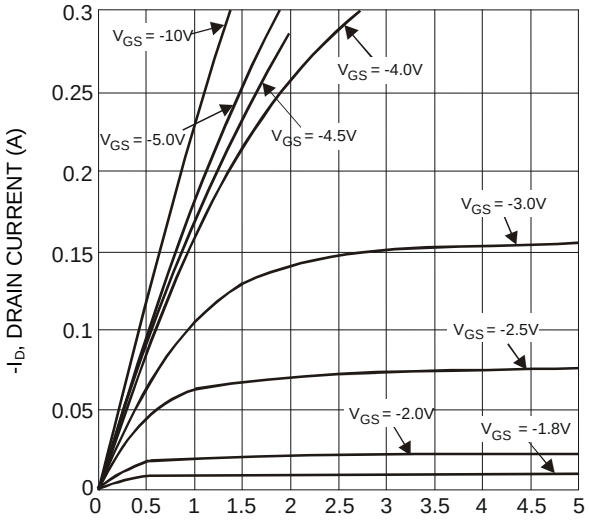


Fig. 1 Typical Output Characteristics

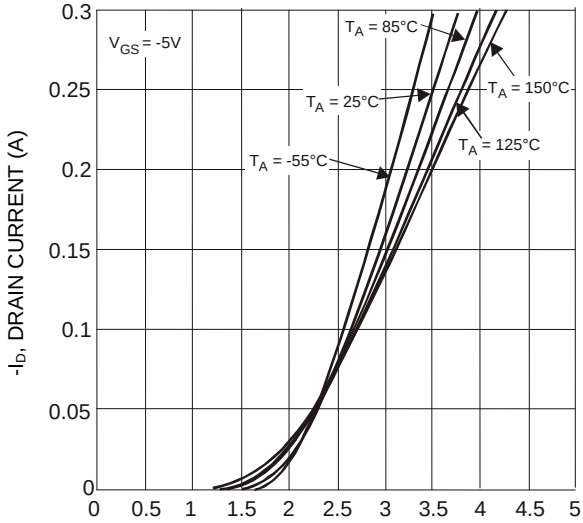


Fig. 2 Typical Transfer Characteristics

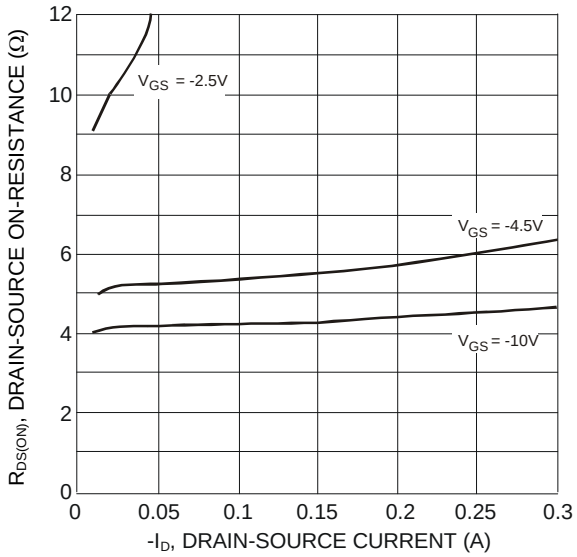


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

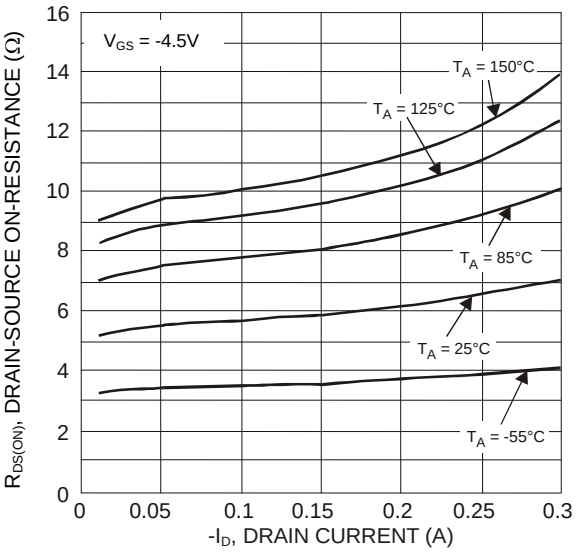


Fig. 4 On-Resistance
vs. Drain Current and Temperature

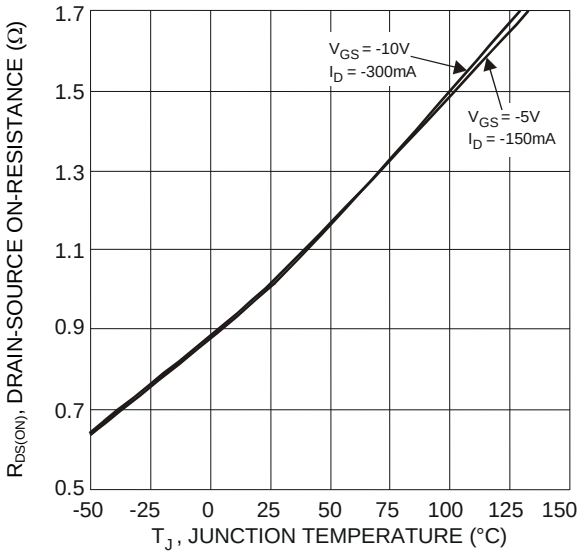


Fig. 5 On-Resistance Variation with Temperature

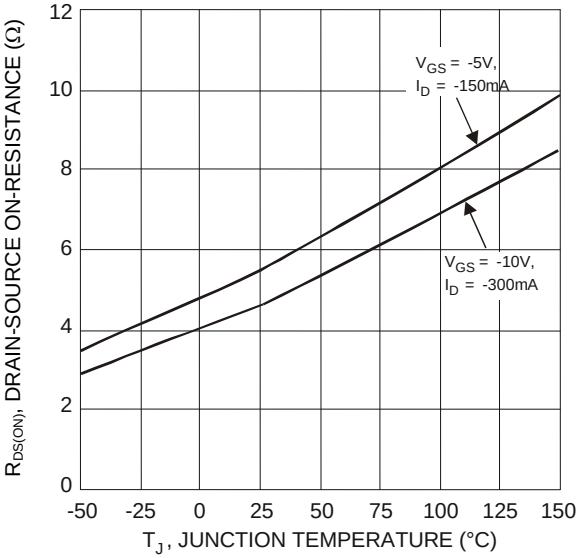


Fig. 6 On-Resistance vs. Temperature

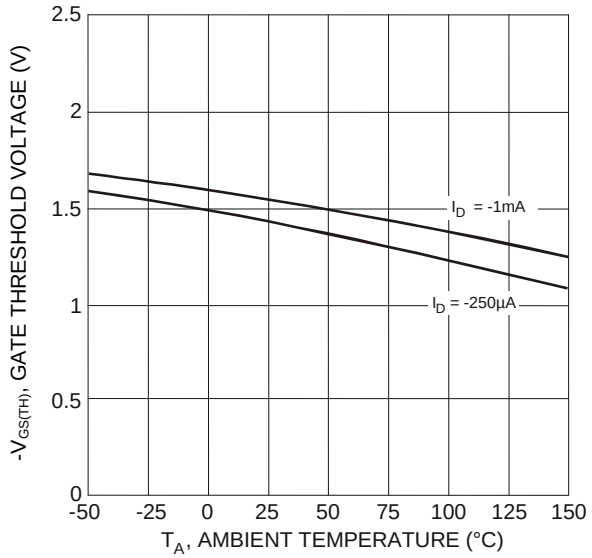


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

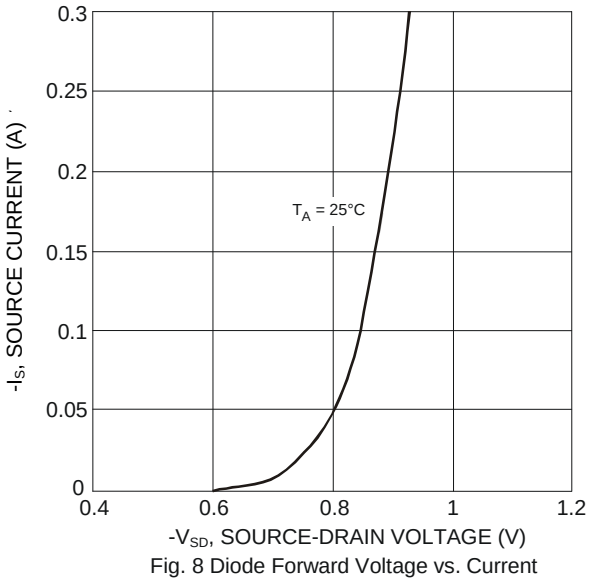


Fig. 8 Diode Forward Voltage vs. Current

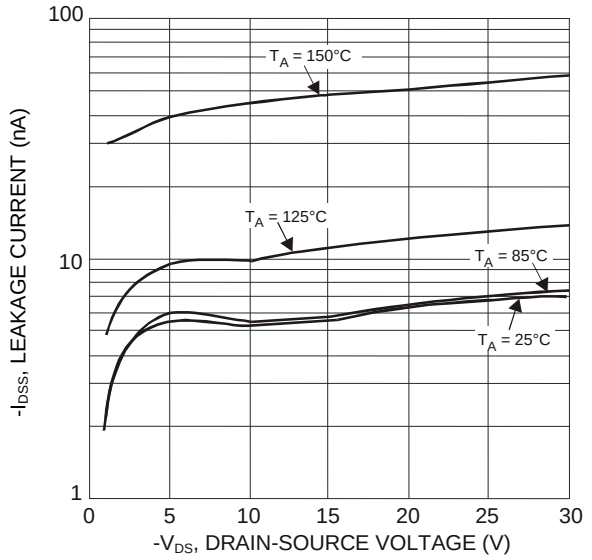


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

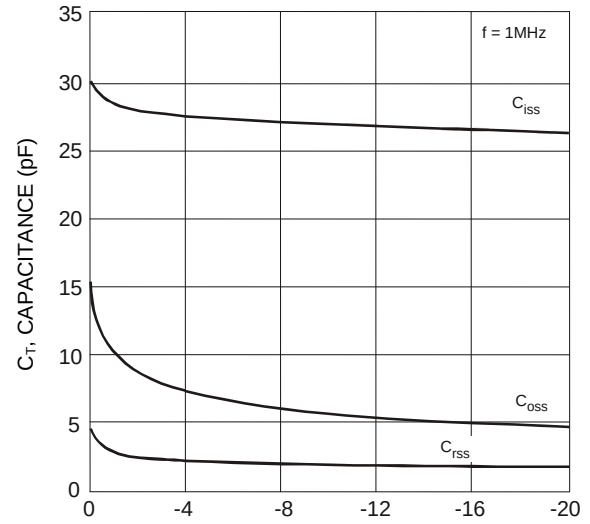


Fig. 10 Typical Junction Capacitance

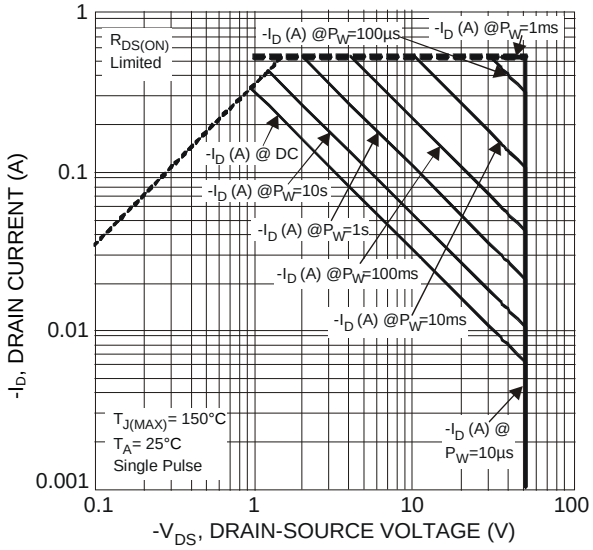


Fig. 11 SOA, Safe Operation Area

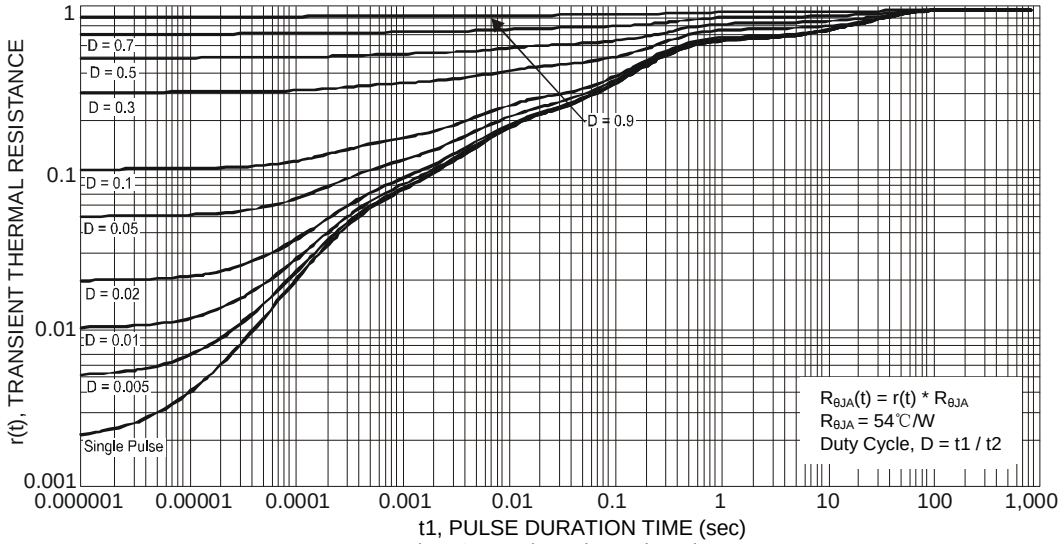
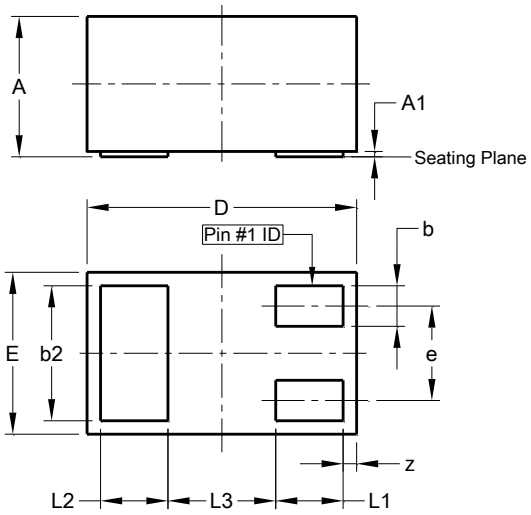


Fig. 12 Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1006-3

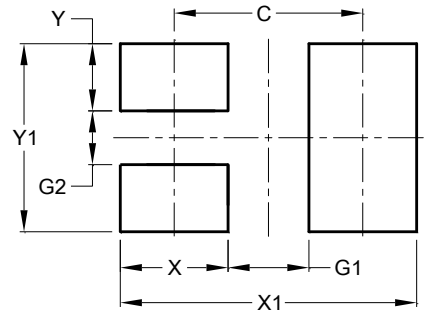


X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1006-3



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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