

Product Summary

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

Description

This new generation 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

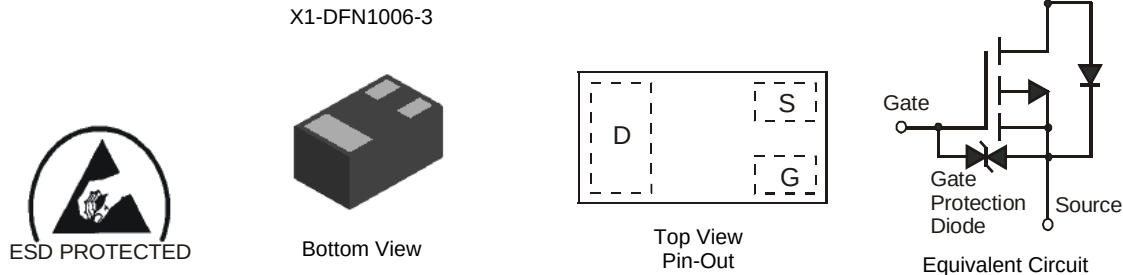
- DC-DC Converters
- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

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)

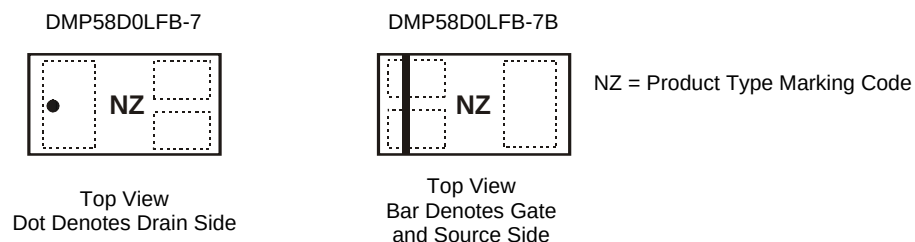


Ordering Information (Note 4)

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> 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



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 4) V _{GS} = -5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-180 -150	mA
Continuous Drain Current (Note 5) V _{GS} = -5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-310 -250	mA
Pulsed Drain Current (Note 6)			I _{DM}	-500	mA

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 4)	P _D	0.47	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 4)	R _{θJA}	258	°C/W
Power Dissipation (Note 5)	P _D	1.22	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	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 7)						
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 7)						
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 8)						
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:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

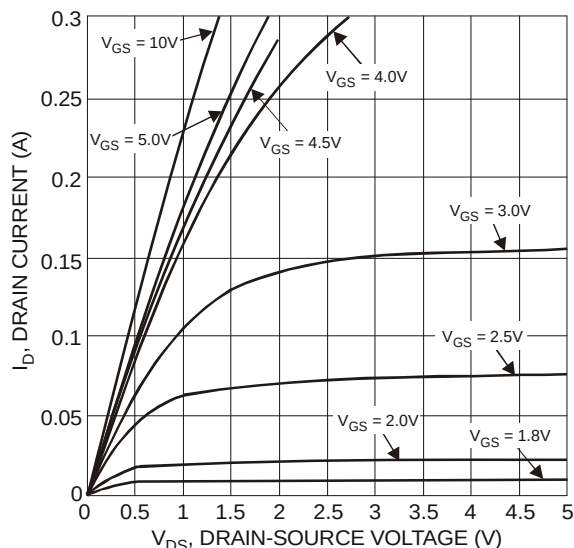


Fig. 1 Typical Output Characteristics

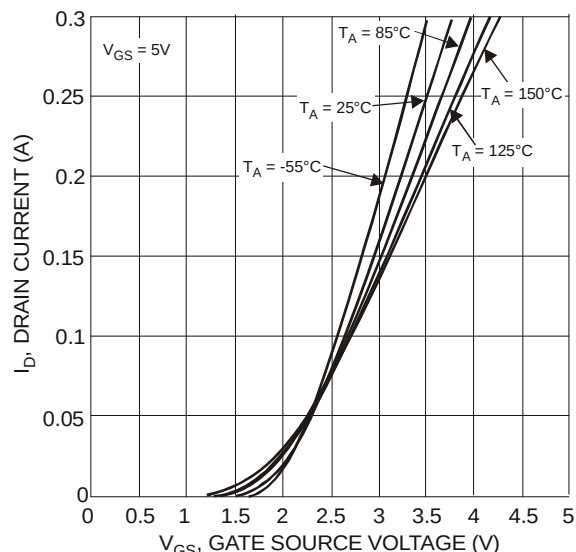


Fig. 2 Typical Transfer Characteristics

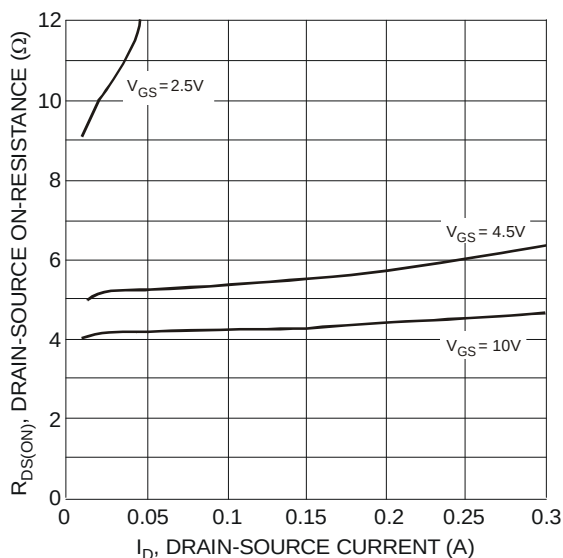


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

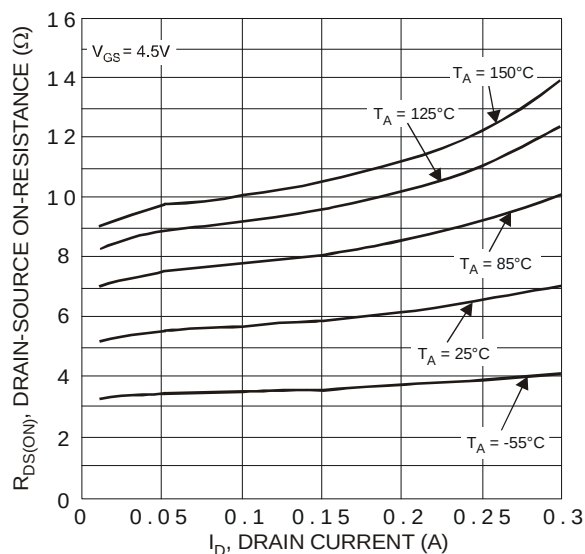


Fig. 4 On-Resistance vs. Drain Current and Temperature

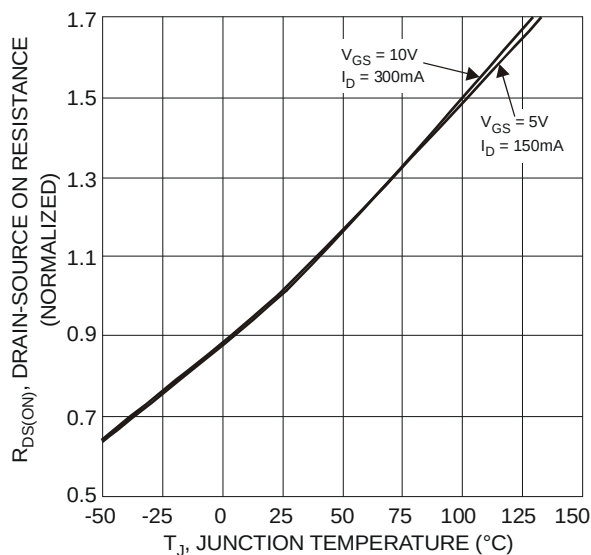


Fig. 5 On-Resistance Variation with Temperature

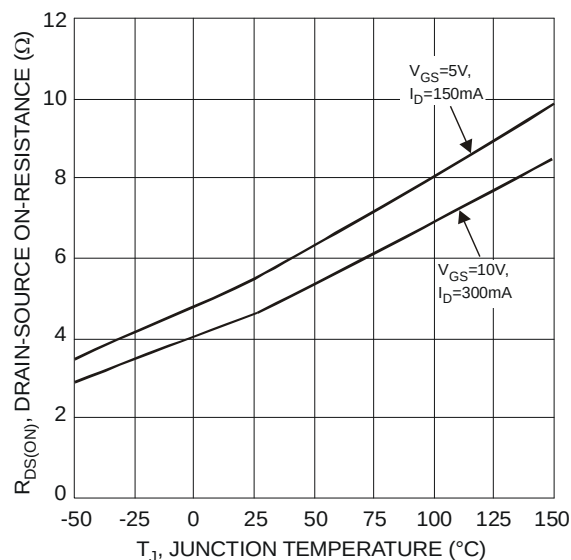


Fig. 6 On-Resistance vs. Temperature

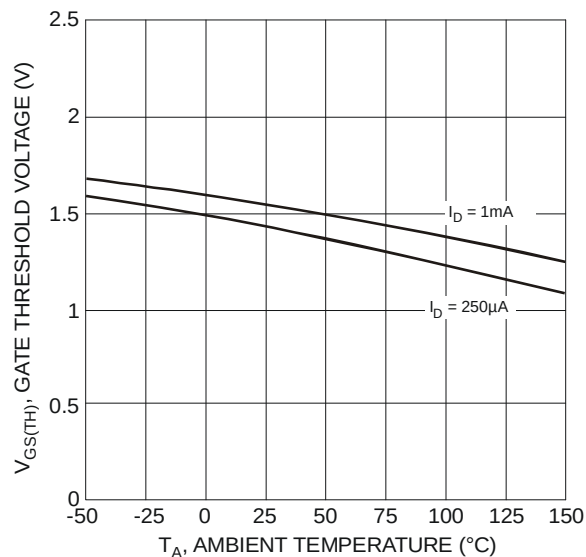


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

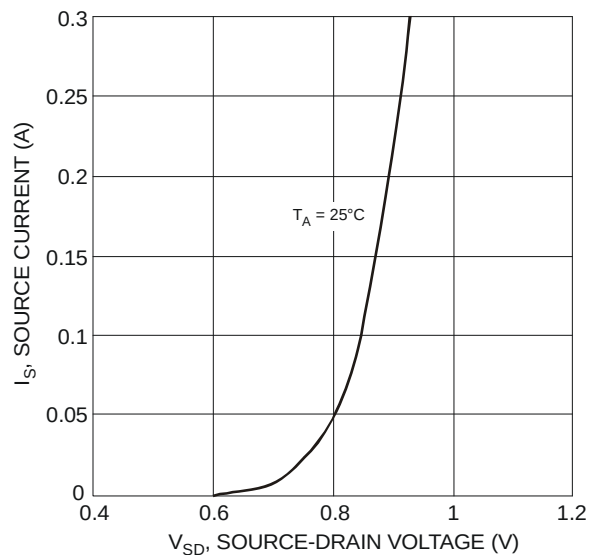


Fig. 8 Diode Forward Voltage vs. Current

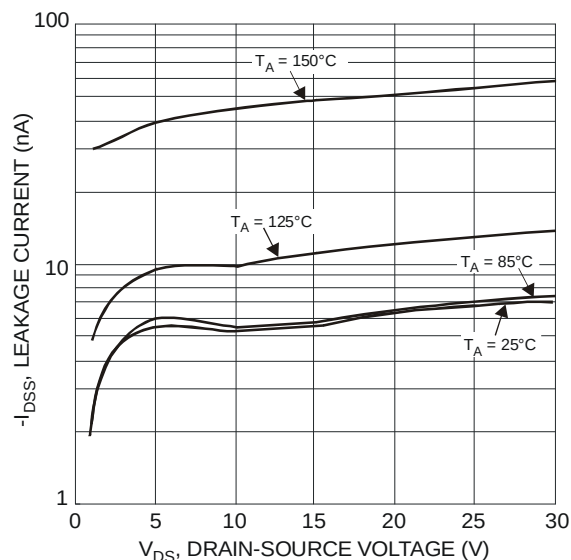


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

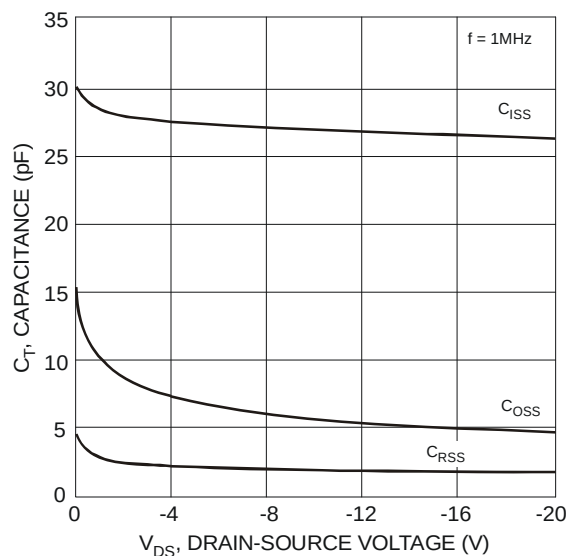


Fig. 10 Typical Junction Capacitance

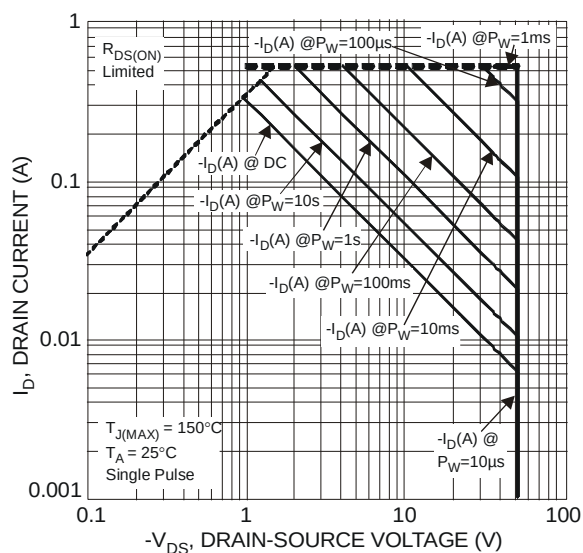
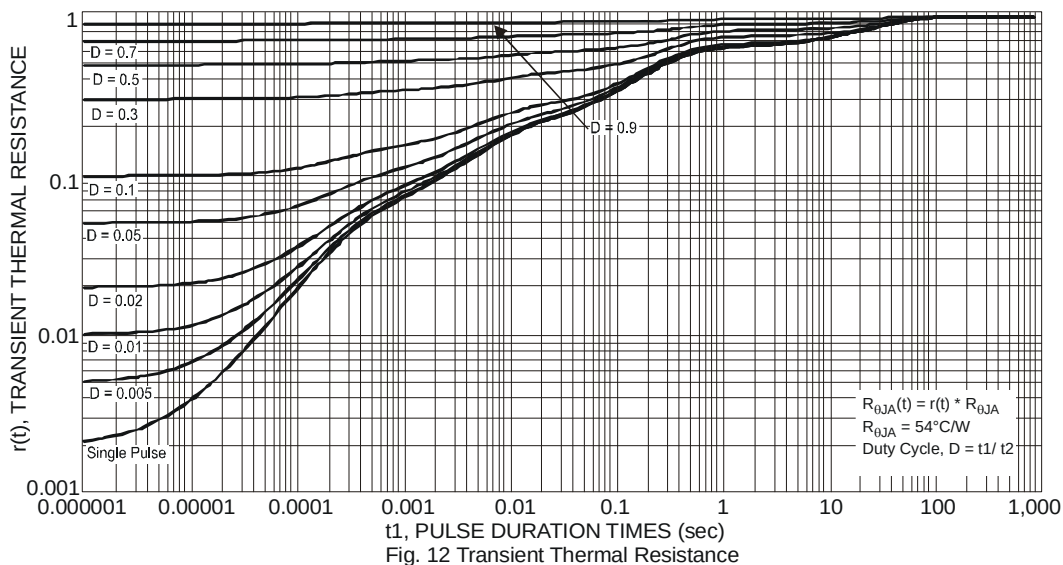
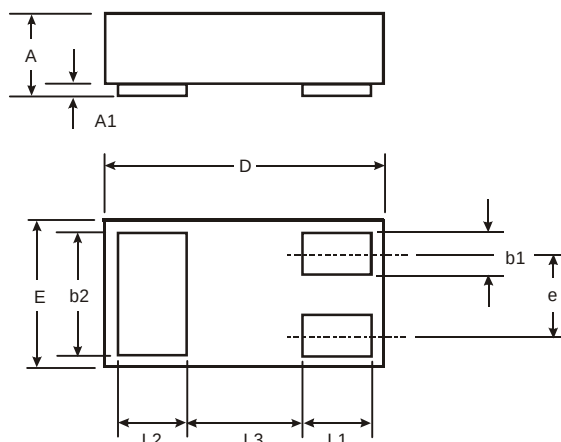


Fig. 11 SOA, Safe Operation Area



Package Outline Dimensions

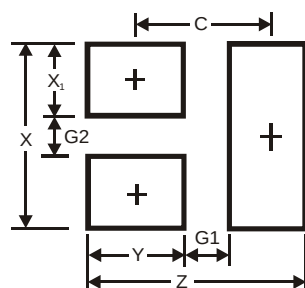
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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