

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ\text{C}$
-20V	$5\Omega @ V_{GS} = -4.5V$	-200mA
	$7\Omega @ V_{GS} = -2.5V$	-170mA
	$10\Omega @ V_{GS} = -1.8V$	-140mA
	$15\Omega @ V_{GS} = -1.5V$	-50mA

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management Functions

Features and Benefits

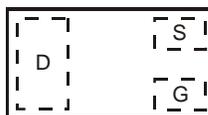
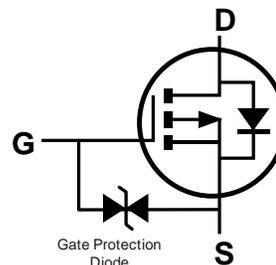
- P-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(TH)}$
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surfaced Mount Package
- Ultra-Low Package Profile, 0.4mm Maximum Package Height
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: X2-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 ⁽⁴⁾
- Weight: 0.001 grams (Approximate)

X2-DFN1006-3

ESD protected

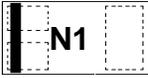
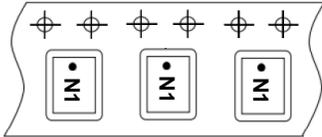
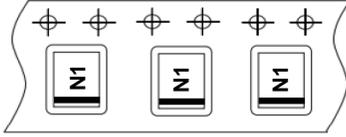
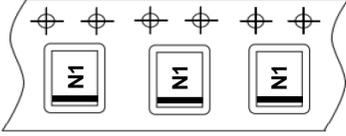
Bottom View

**Top View
Internal Schematic**

Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP210DUFB4-7	X2-DFN1006-3	3,000/Tape & Reel
DMP210DUFB4-7B	X2-DFN1006-3	10,000/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/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

<p>DMP210DUFB4-7</p>	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Top View Dot Denotes Drain Side</p> </div> <div style="text-align: center;"> <p>From date code 1527 (YYWW), this changes to:</p>  <p>Top View Bar Denotes Gate and Source Side</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;">   </div>
<p>DMP210DUFB4-7B</p>	<div style="text-align: center; margin-bottom: 20px;">  <p>Top View Bar Denotes Gate and Source Side</p> </div> <div style="display: flex; justify-content: space-between; align-items: center;">  <p>N1 = Part Marking Code</p> </div>

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±10	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-200	mA
		T _A = +70°C		-160	
Continuous Drain Current (Note 5) V _{GS} = -1.8V	Steady State	T _A = +25°C	I _D	-140	mA
		T _A = +70°C		-110	
Pulsed Drain Current T _P = 10μs			I _{DM}	-600	mA

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P _D	350	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	357	°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 6)							
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-100	nA	V _{DS} = -16V, V _{GS} = 0V	
		—	—	-50	nA	V _{DS} = -5.0V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±5.0V, V _{DS} = 0V	
		—	—	±1	μA	V _{GS} = ±8.0V, V _{DS} = 0V	
		—	—	±10	μA	V _{GS} = ±10.0V, V _{DS} = 0V	
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage @T _J = +25°C	V _{GS(th)}	-0.5	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA	
Gate Threshold Voltage (Note 7)	V _{GS(th)}	@T _J = 0°C	-0.55	—	-1.05	V	V _{DS} = V _{GS} , I _D = -250μA
		@T _J = +85°C	-0.40	—	-0.90		
		@T _J = +100°C	-0.35	—	-0.85		
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	5	Ω	V _{GS} = -4.5V, I _D = -100mA	
		—	—	7		V _{GS} = -2.5V, I _D = -50mA	
		—	—	10		V _{GS} = -1.8V, I _D = -20mA	
		—	—	15		V _{GS} = -1.5V, I _D = -10mA	
		—	20	—		V _{GS} = -1.2V, I _D = -1mA	
Forward Transfer Admittance	Y _{fs}	—	200	—	mS	V _{DS} = -10V, I _D = -200mA	
Diode Forward Voltage (Note 5)	V _{SD}	-0.5	—	-1.2	V	V _{GS} = 0V, I _S = -115mA	
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C _{ISS}	—	13.72	175	pF	V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz	
Output Capacitance	C _{OSS}	—	4.01	30	pF		
Reverse Transfer Capacitance	C _{RSS}	—	2.34	20	pF		
SWITCHING CHARACTERISTICS (Note 7)							
Turn-On Delay Time	t _{d(on)}	—	7.7	—	nS	V _{GS} = -4.5V, V _{DD} = -15V I _D = -180mA, R _G = 2.0Ω	
Rise Time	t _r	—	19.3	—			
Turn-Off Delay Time	t _{d(off)}	—	25.9	—			
Fall Time	t _f	—	31.5	—			

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

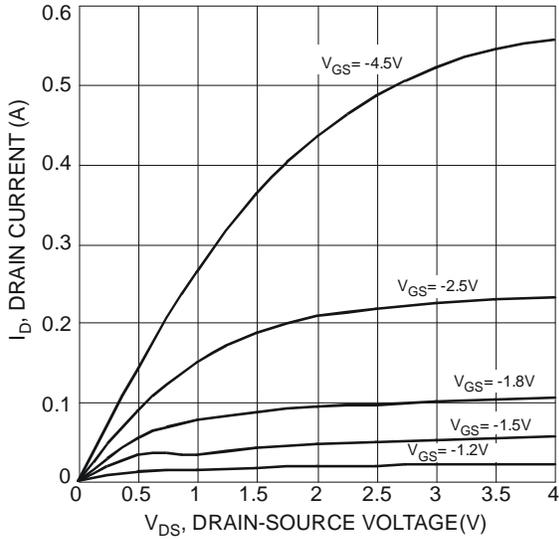


Fig. 1 Typical Output Characteristics

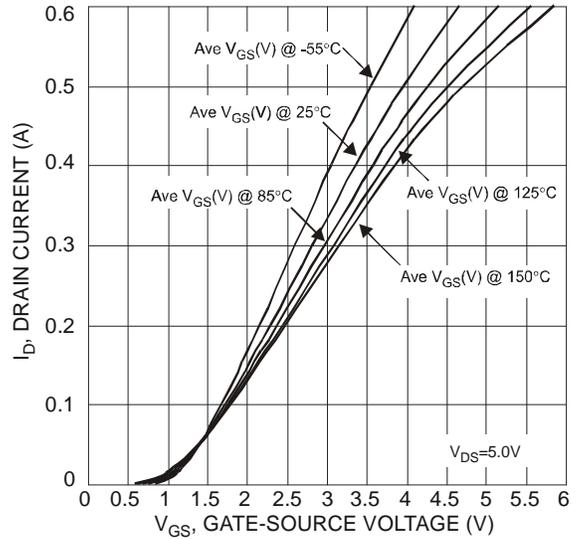


Fig. 2 Typical Transfer Characteristics

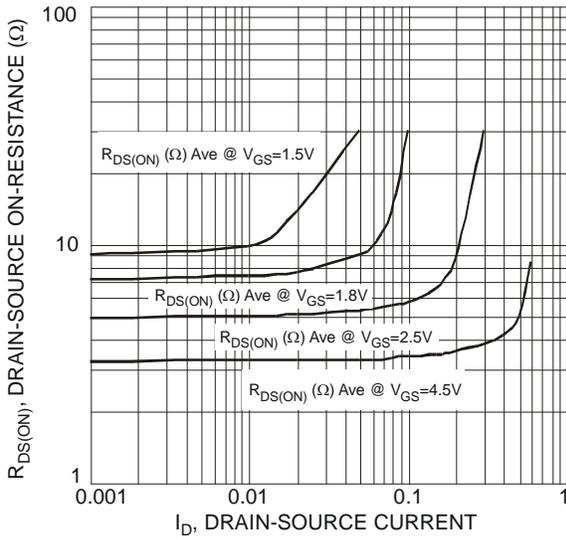


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

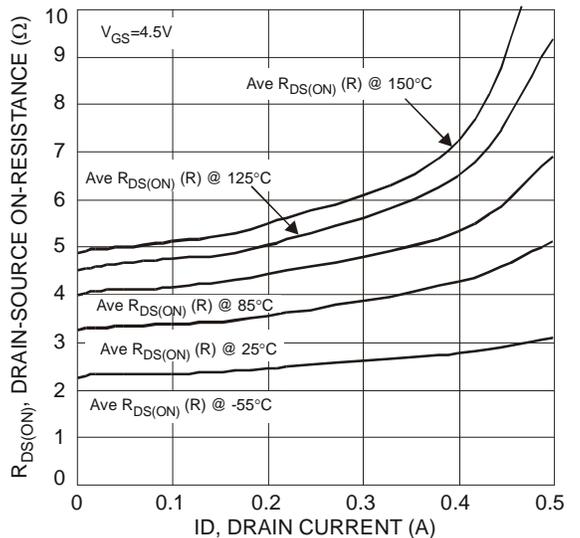


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

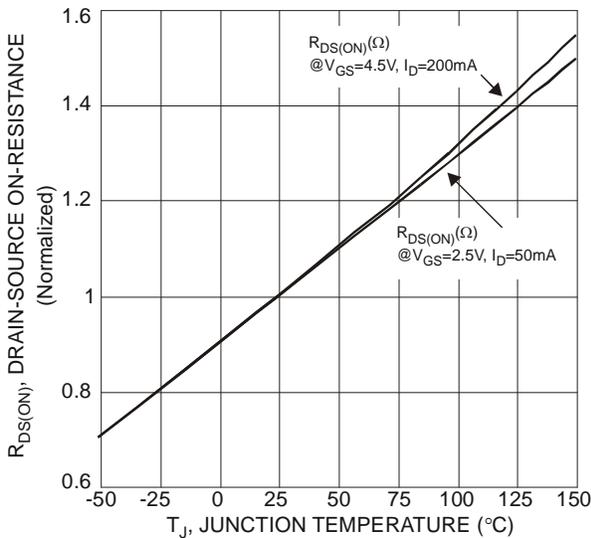


Fig. 5 On-Resistance Variation with Temperature

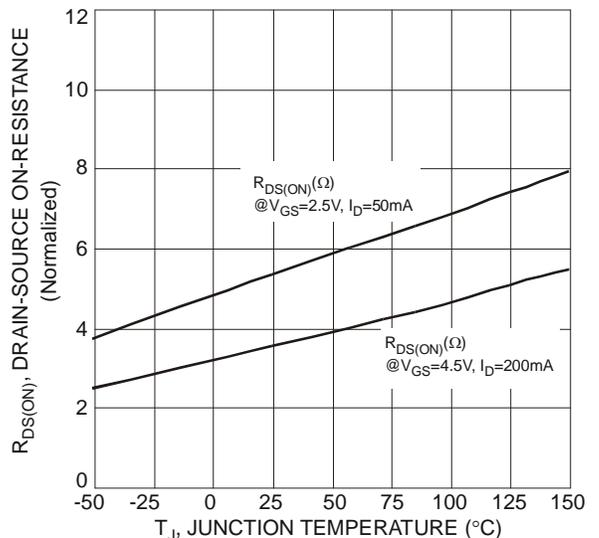


Fig. 6 On-Resistance vs. Temperature

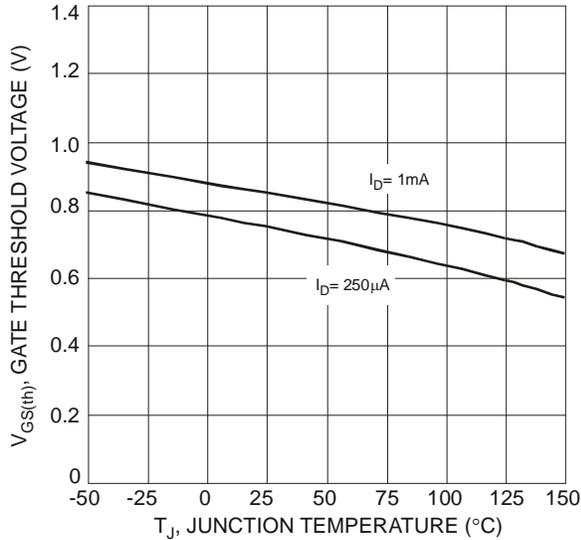


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

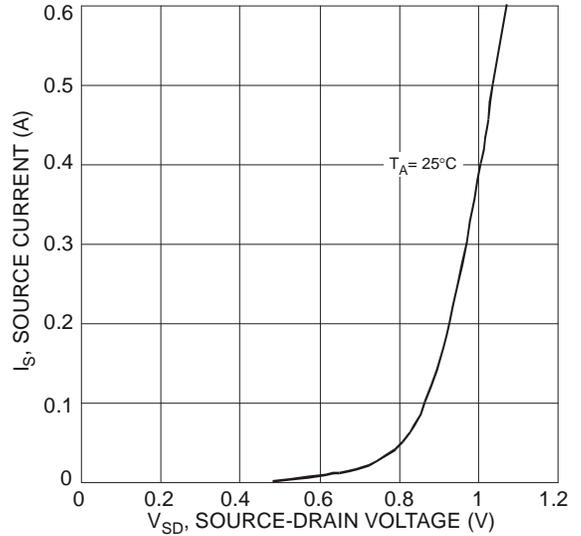


Fig. 8 Diode Forward Voltage vs. Current

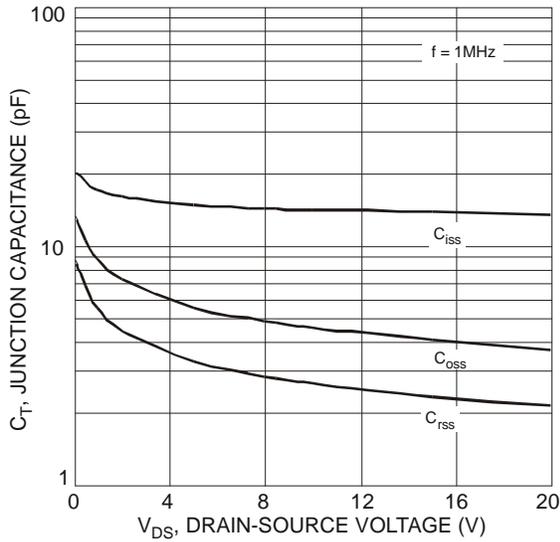


Fig. 9 Typical Junction Capacitance

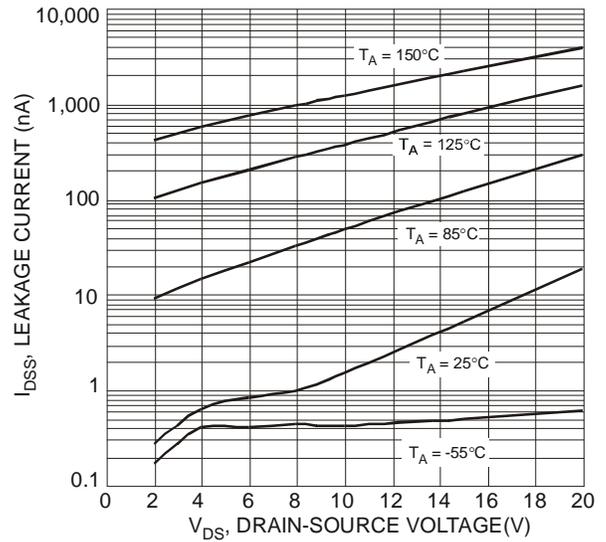


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

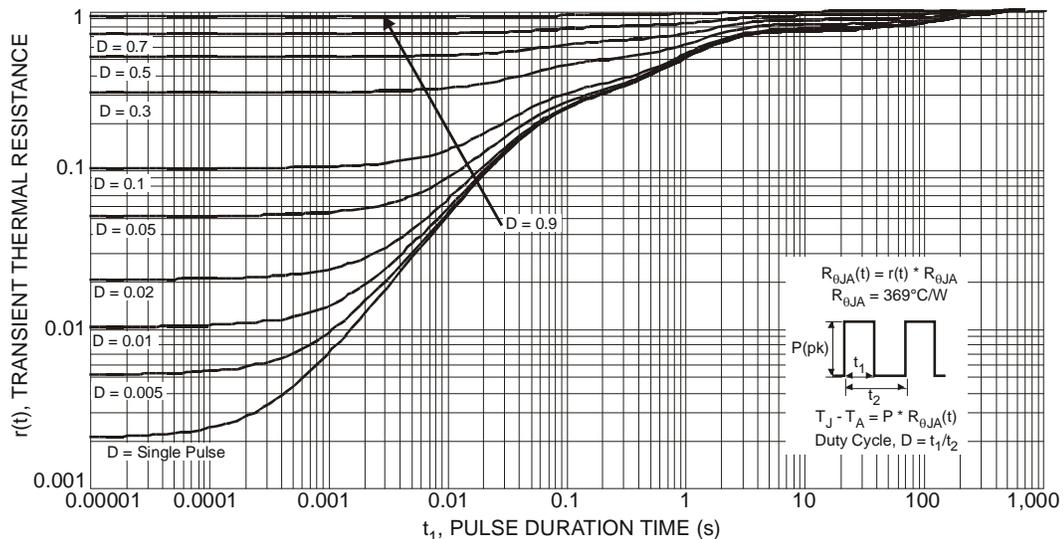
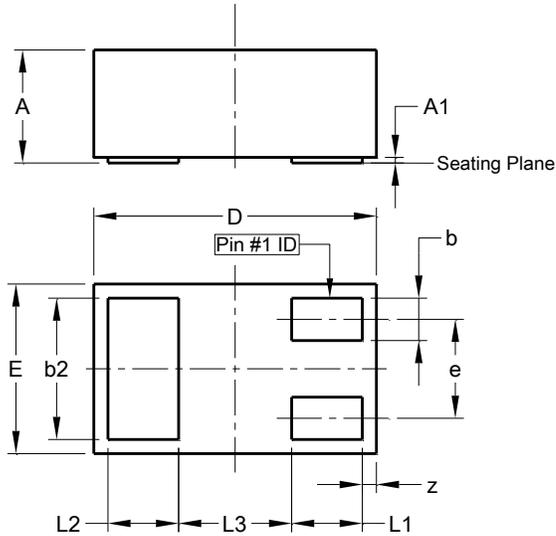


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

X2-DFN1006-3

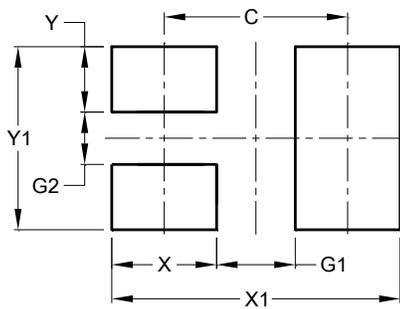


X2-DFN1006-3			
Dim	Min	Max	Typ
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

X2-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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