Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = 25°C
20V	5.5Ω @ V_{GS} = -4.5V	-200mA
	11.5Ω @ V_{GS} = -1.8V	-140mA

Description and Applications

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.

- DC-DC Converters
- Power management functions

Features and Benefits

- P-Channel MOSFET
- Low On-Resistance
  - 5.5Ω @ -4.5V
  - 7.5Ω @ -2.5V
  - 11.5Ω @ -1.8V
  - 17.5Ω @ -1.5V
- Very Low Gate Threshold Voltage $V_{GS(TH)}$, 1.15V max
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surfaced Mount Package
- Ultra-low package profile, 0.4mm maximum package height
- **ESD Protected Gate**
- **Lead, Halogen, and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

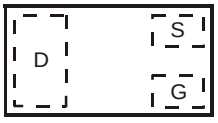
Mechanical Data

- 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
- Weight: 0.001 grams (approximate)

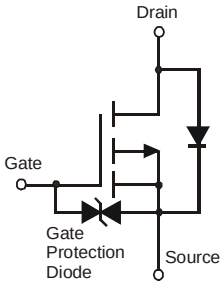
ESD protected

X2-DFN1006-3

Bottom View



Top View
Internal Schematic



Equivalent Circuit

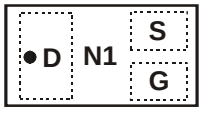
Ordering Information (Note 3)

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 purposefully added lead. Halogen and Antimony Free.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

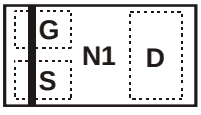
Marking Information

DMP210DUFB4-7



Top View
Dot Denotes
Drain Side

DMP210DUFB4-7B



Top View
Bar Denotes Gate
and Source Side

N1 = Product Type Marking Code

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 4) V_{GS} = -4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	-200 -160	mA
Continuous Drain Current (Note 4) V_{GS} = -1.8V	Steady State	T_A = 25°C T_A = 70°C	I_D	-140 -110	mA
Pulsed Drain Current	T_P = 10µs		I_{DM}	-600	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 4)	P_D	350	mW
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	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 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	— —	— —	-100 -50	nA nA	V_{DS} = -16V, V_{GS} = 0V V_{DS} = -5.0V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100 ±1 ±10	nA µA µA	V_{GS} = ±5.0V, V_{DS} = 0V V_{GS} = ±8.0V, V_{DS} = 0V V_{GS} = ±10.0V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.45	—	-1.15	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— — — — —	— — — — 20	5.5 7.5 11.5 17.5 —	Ω	V_{GS} = -4.5V, I_D = -100mA V_{GS} = -2.5V, I_D = -50mA V_{GS} = -1.8V, I_D = -20mA V_{GS} = -1.5V, I_D = -10mA V_{GS} = -1.2V, I_D = -10mA
Forward Transfer Admittance	$\|Y_{fs}\|$	150	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 6)						
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 6)						
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: 4. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
5. Short duration pulse test used to minimize self-heating effect.
6. Guaranteed by design. Not subject to production testing.

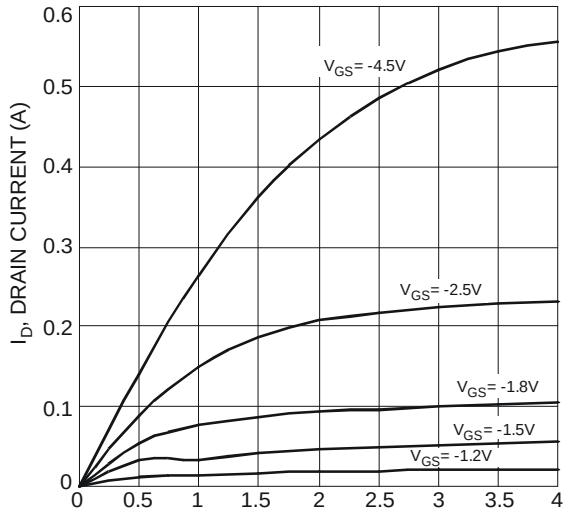


Fig. 1 Typical Output Characteristics

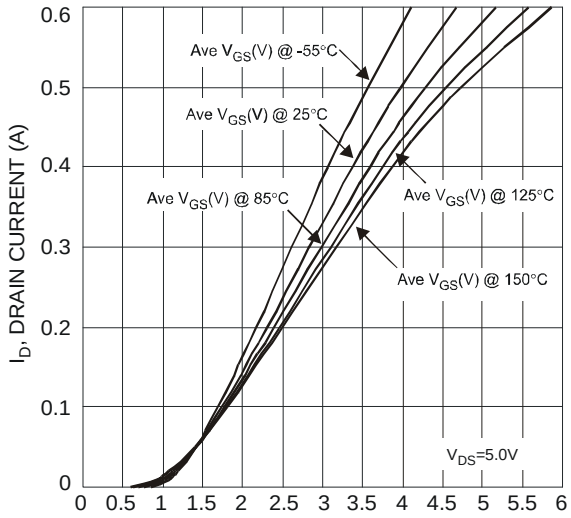


Fig. 2 Typical Transfer Characteristics

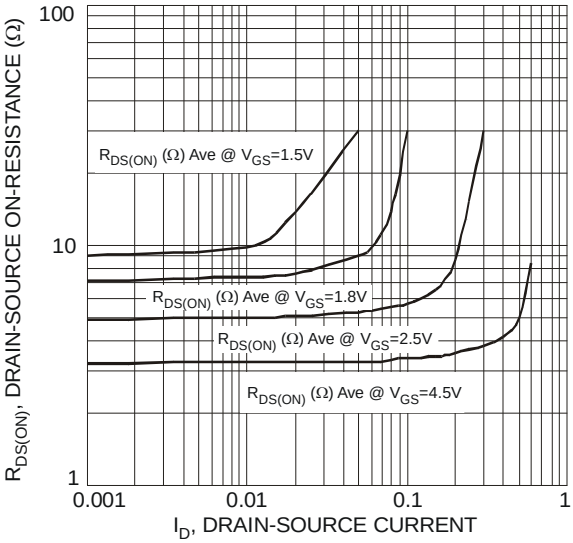


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

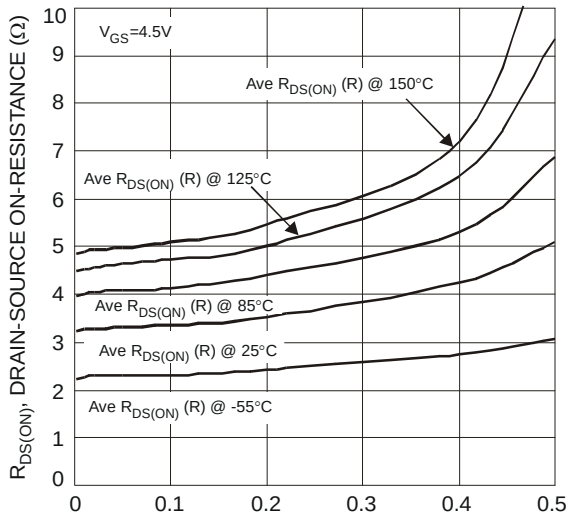


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

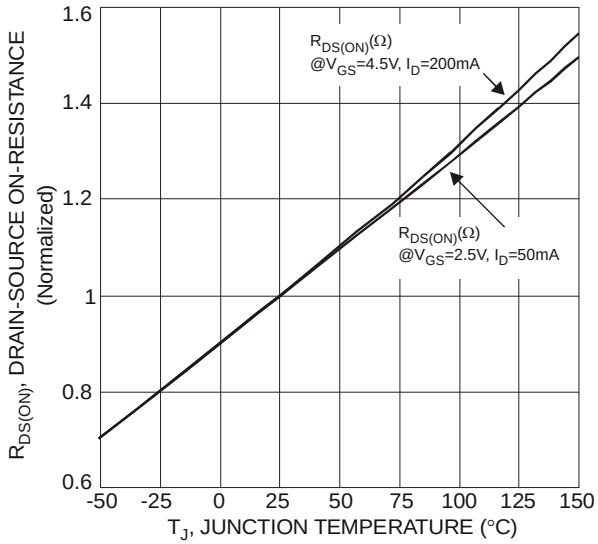


Fig. 5 On-Resisitance Variation with Temperature

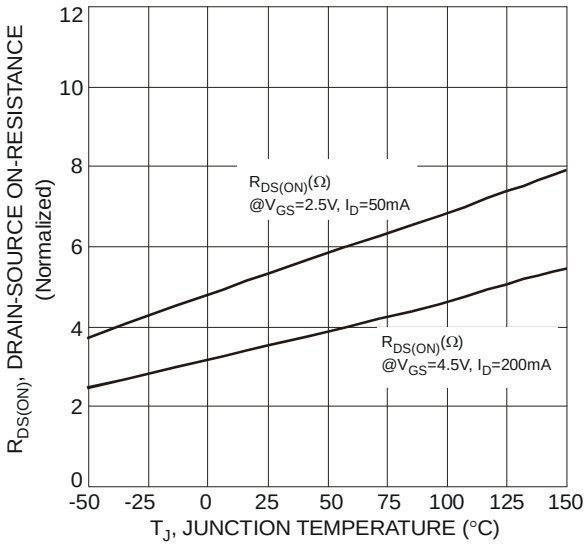


Fig. 6 On-Resisitance vs.Temperature

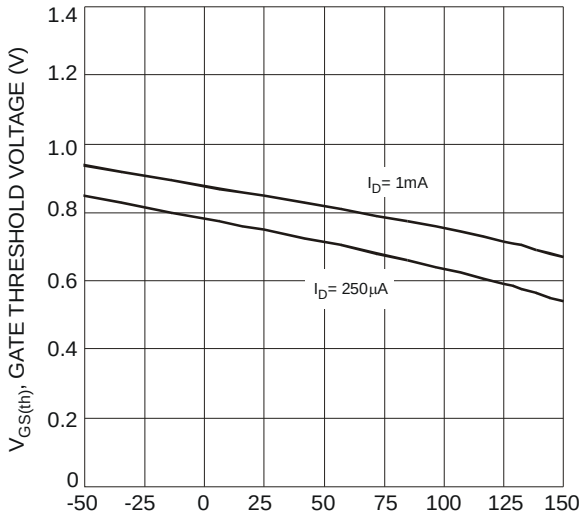


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

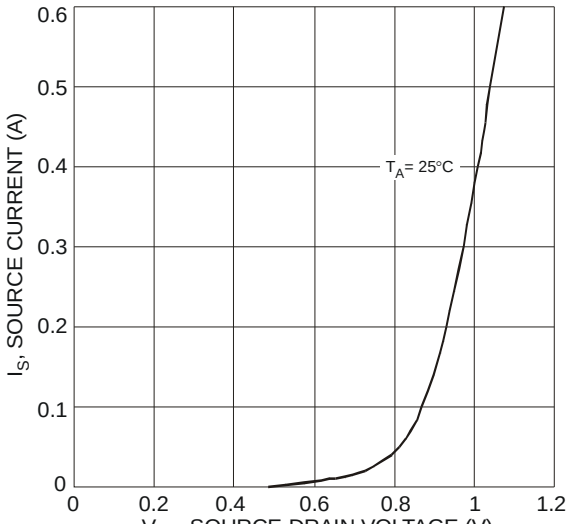


Fig. 8 Diode Forward Voltage vs. Current

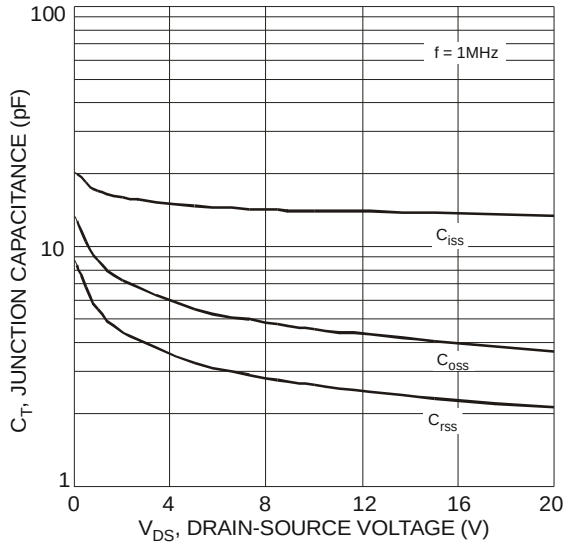


Fig. 9 Typical Junction Capacitance

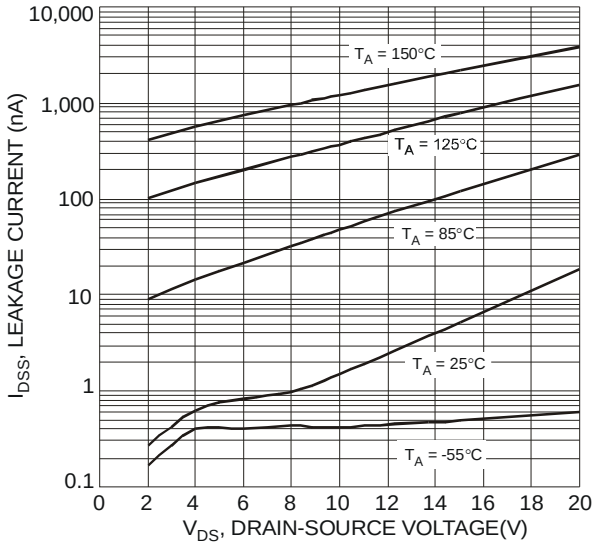


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

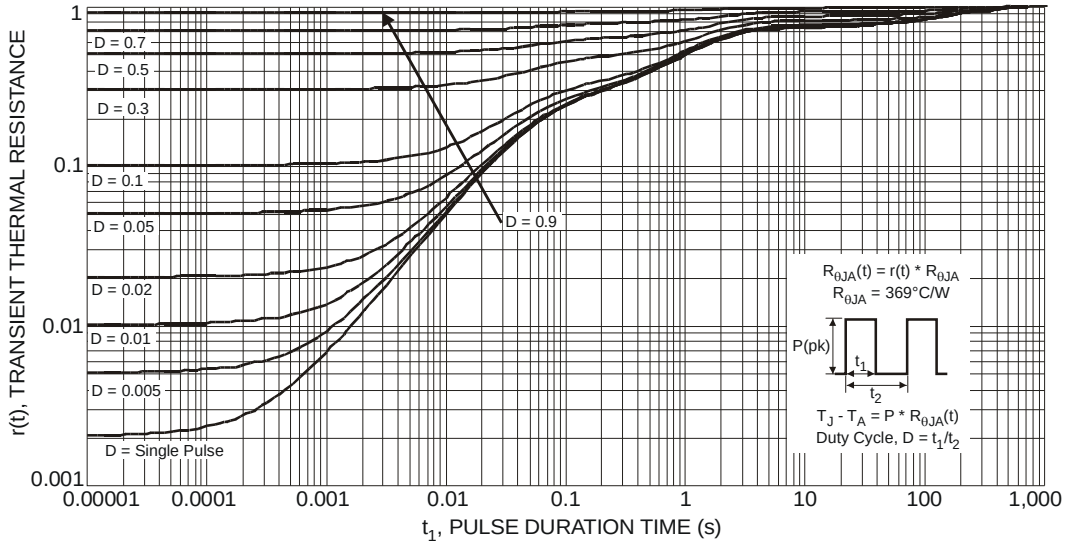
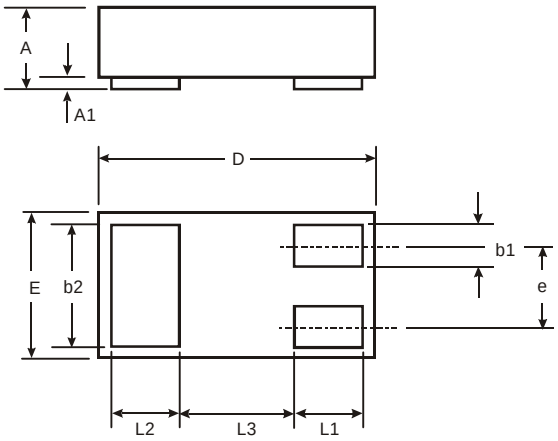


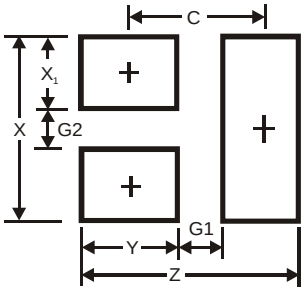
Fig. 11 Transient Thermal Response

Package Outline Dimensions



X2-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	—
A1	0	0.05	0.03
b1	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
All Dimensions in mm			

Suggested Pad Layout



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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