Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
-20V	5Ω @ V_{GS} = -4.5V	-200mA
	7Ω @ V_{GS} = -2.5V	-170mA
	10Ω @ V_{GS} = -1.8V	-140mA
	15Ω @ 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

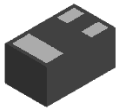
- P-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(TH)}$
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surfaced Mount Package
- Ultra-Low Package Profile, 0.4mm Maximum Package Height
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

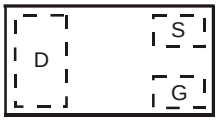
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

X2-DFN1006-3

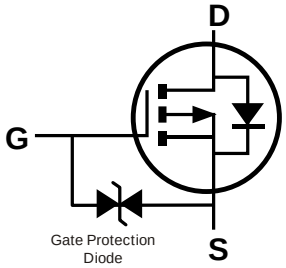
ESD protected



Bottom View



Top View
Internal Schematic



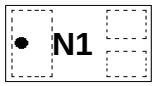
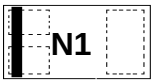
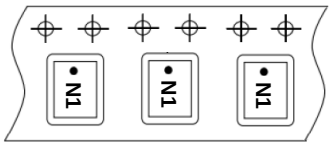
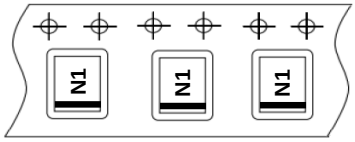
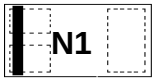
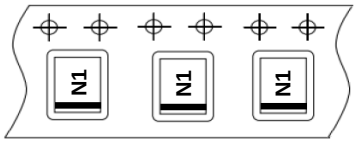
Equivalent Circuit

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) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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

DMP210DUFB4-7	 Top View Dot Denotes Drain Side From date code 1527 (YYWW), this changes to:  Top View Bar Denotes Gate and Source Side  
DMP210DUFB4-7B	 Top View Bar Denotes Gate and Source Side N1 = Part Marking Code 

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

Characteristic			Symbol	Value	Unit
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 T_A = +70°C	I_D	-200 -160	mA
Continuous Drain Current (Note 5) 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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	350	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	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 6)							
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 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)	@T_J = 0°C	$V_{GS(TH)}$	-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: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

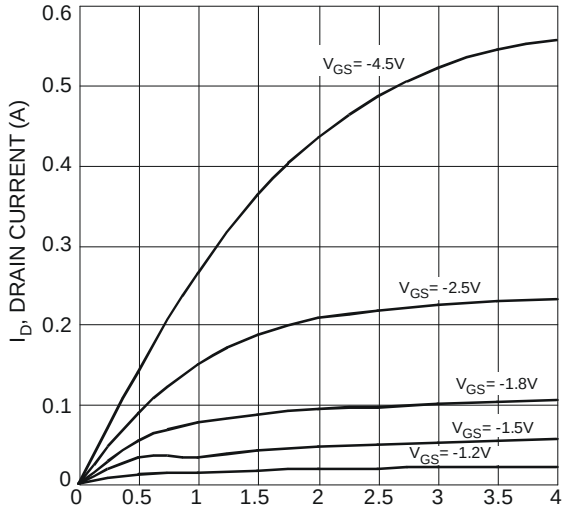


Fig. 1 Typical Output Characteristics

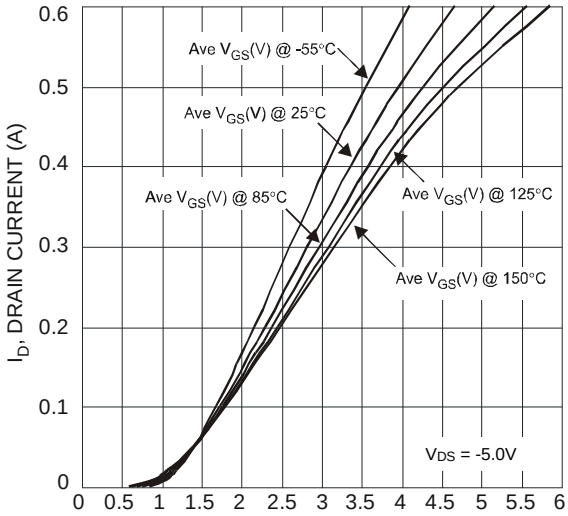


Fig. 2 Typical Transfer Characteristics

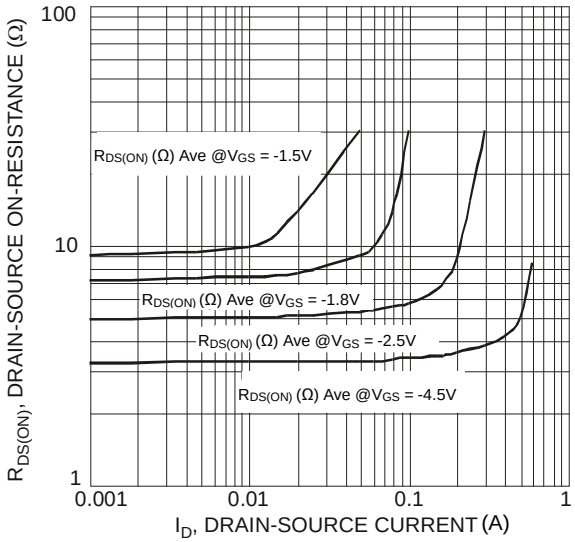


Fig. 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

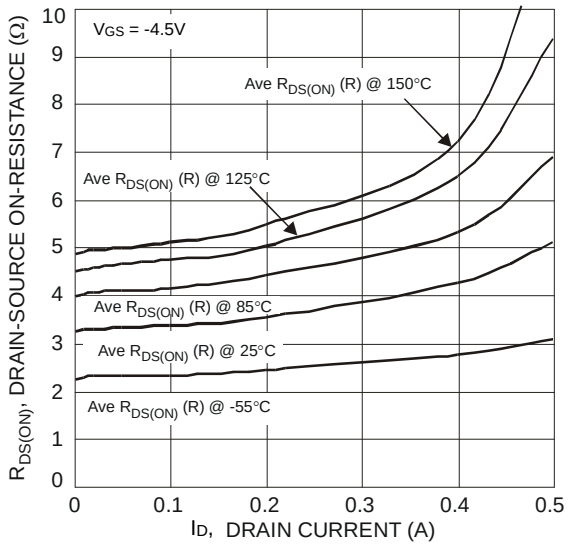


Fig. 4 Typical On-Resistance vs.
Drain Current and Temperature

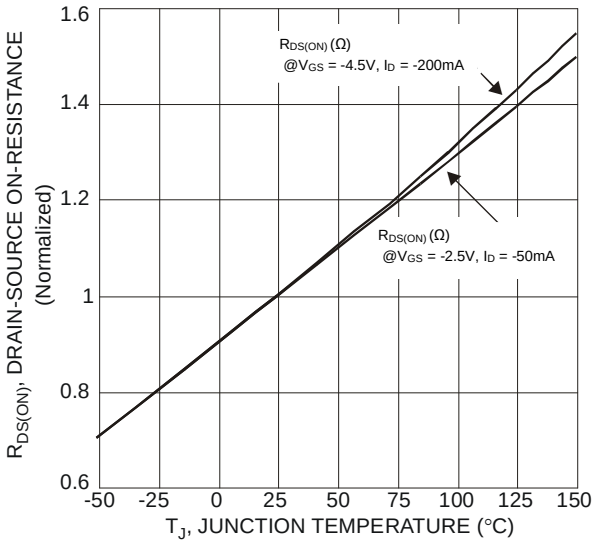


Fig. 5 On-Resisitance Variation with Temperature

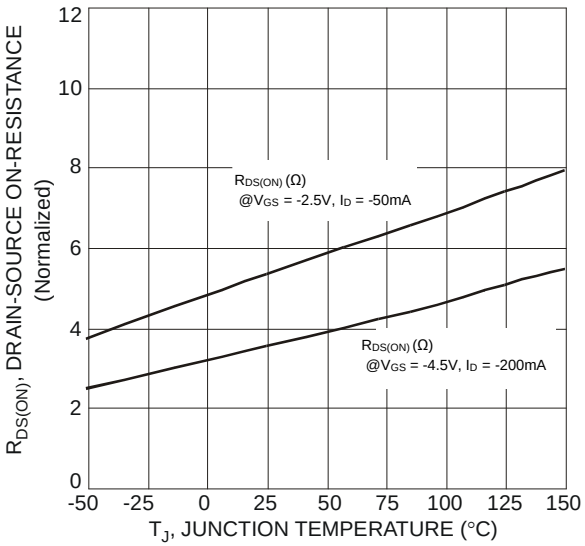


Fig. 6 On-Resisitance vs.Temperature

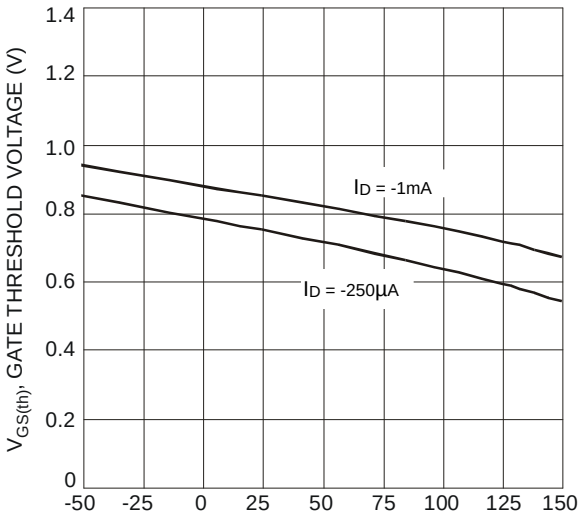


Fig. 7 Gate Threshold Variation vs. Junction Temperature

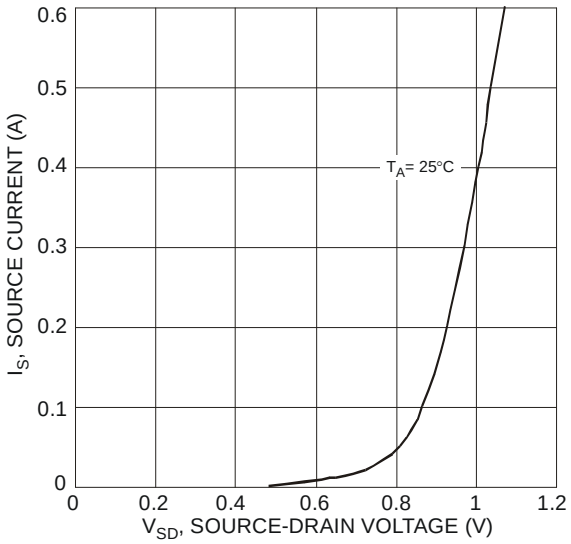


Fig. 8 Diode Forward Voltage vs. Current

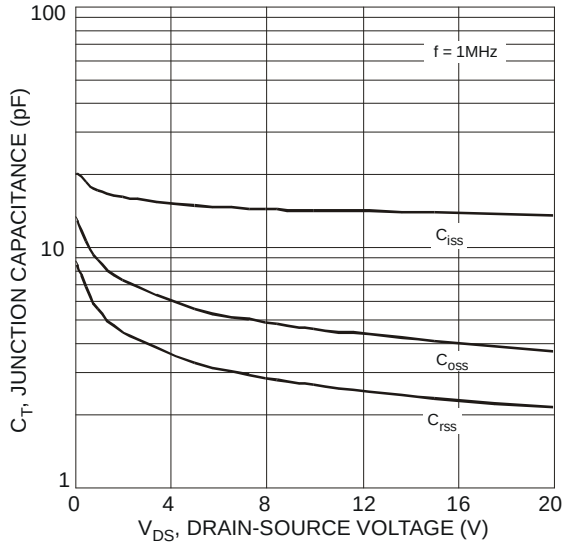


Fig. 9 Typical Junction Capacitance

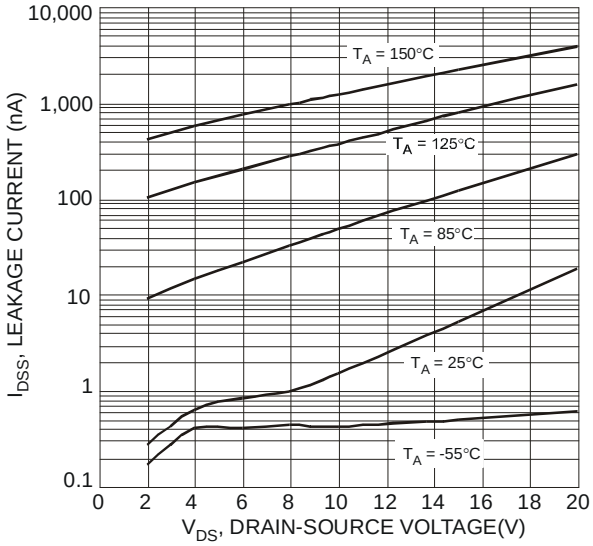


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

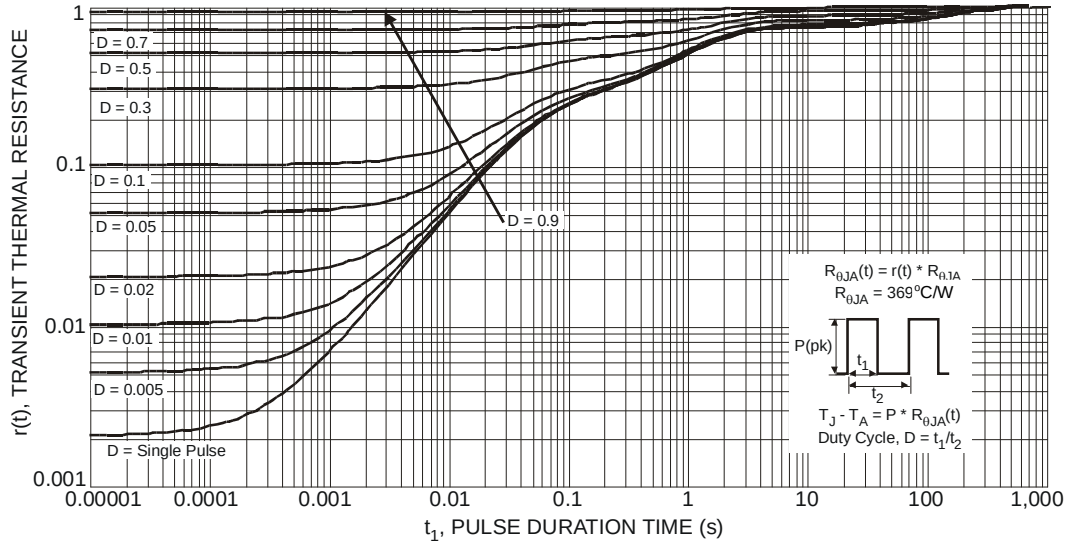
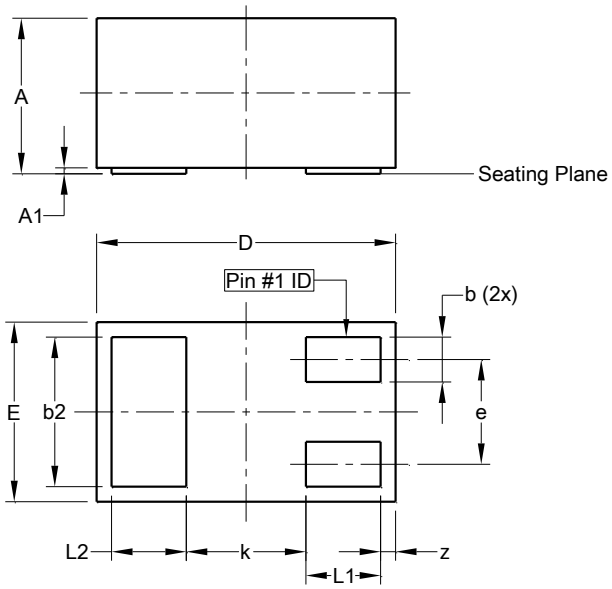


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

X2-DFN1006-3

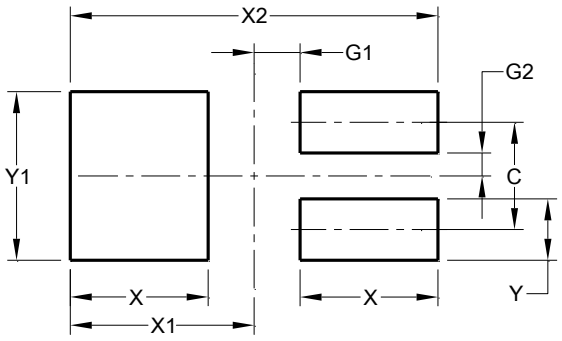


X2-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
k	—	—	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1006-3



Dimensions	Value (in mm)
C	0.350
G1	0.150
G2	0.075
X	0.450
X1	0.600
X2	1.200
Y	0.200
Y1	0.550

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