



20V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C	
-20V	1.0Ω @ V _{GS} = -4.5V	-0.58A	
	1.5Ω @ V _{GS} = -2.5V	-0.48A	
	2.0Ω @ V _{GS} = -1.8V	-0.41A	

Description and Applications

This 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.

Portable Electronics

Features and Benefits

- Footprint of just 0.6mm² 13 Times Smaller Than SOT23
- 0.4mm Profile Ideal for Low Profile Applications
- Low Gate Threshold Voltage
- · Fast Switching Speed
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Mechanical Data

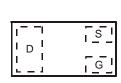
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (Approximate)



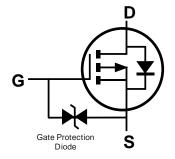




Bottom View



Top View Internal Schematic



Equivalent Circuit

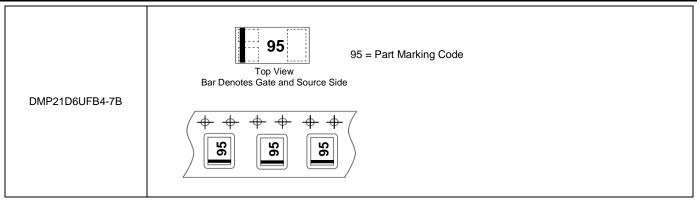
Ordering Information (Note 4)

Ī	Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Tape Pitch (mm)	Quantity per Reel
	DMP21D6UFB4-7B	95	7	8	2	10,000

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





Maximum Ratings (@ $T_A = +25^{\circ}C$, unless otherwise specified.)

Characteri		Symbol	Value	Unit	
Drain-Source Voltage		V_{DSS}	-20	V	
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current $V_{GS} = -4.5V$ $Steady State$ $T_A = +25^{\circ}C \text{ (Note 5)}$ $T_A = +70^{\circ}C \text{ (Note 5)}$ $T_A = +25^{\circ}C \text{ (Note 6)}$		ID	-0.58 -0.47 -0.81	А	
Maximum Body Diode Forward Current (Note 6)			Is	-0.8	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	-5.0	A

Thermal Characteristics (@ $T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.51	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{0JA}	240	°C/W
Power Dissipation (Note 6)	P _D	0.98	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{0JA}	128	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

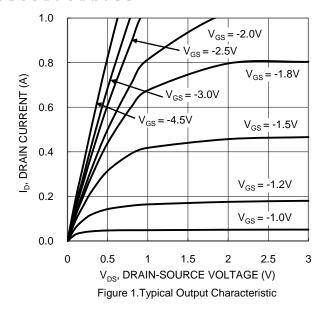
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	-20	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}		_	-1	μA	$V_{DS} = -20V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}		_	±10	μΑ	$V_{GS} = \pm 8V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	-0.5	_	-1.0	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
			0.67	1.0		$V_{GS} = -4.5V$, $I_{D} = -100mA$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	0.85	1.5	Ω	$V_{GS} = -2.5V$, $I_{D} = -80mA$	
			1.0	2.0		$V_{GS} = -1.8V, I_D = -40mA$	
Diode Forward Voltage	V_{SD}		-1.0	-1.2	V	$V_{GS} = 0V, I_{S} = -300mA$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	_	46.1	_	pF		
Output Capacitance	Coss	_	7.2	_	pF	$V_{DS} = -10V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	4.9	_	pF		
Gate Resistance	Rg	_	350	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = -4.5V)	Q_G	_	0.5	_	nC		
Total Gate Charge (V _{GS} = -8V)	Q_G	_	0.8	_	nC	\/ 40\/ L 250**A	
Gate-Source Charge	Q_{GS}		0.1	_	nC	$V_{DS} = -10V, I_{D} = -250mA$	
Gate-Drain Charge	Q_{GD}		0.1	_	nC		
Turn-On Delay Time	t _{D(ON)}		8.5	_	ns	V 2V V 2.5V	
Turn-On Rise Time	t _R		4.3	_	ns	$V_{DD} = -3V$, $V_{GS} = -2.5V$, $R_L = 300\Omega$, $R_G = 25\Omega$, $I_D = -100$ mA	
Turn-Off Delay Time	t _{D(OFF)}	_	20.2	_	ns		
Turn-Off Fall Time	t _F		19.2	_	ns		

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. Short duration pulse test used to minimize self-heating effect.

 8. Guaranteed by design. Not subject to product testing.





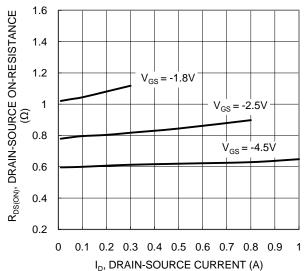


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

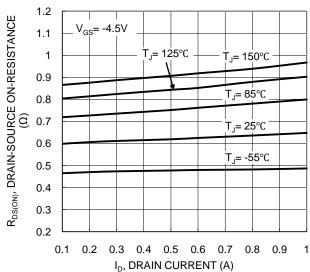
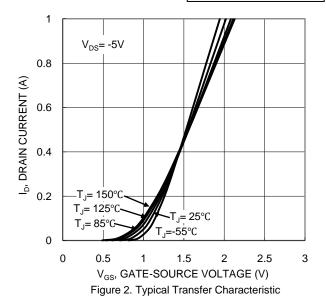
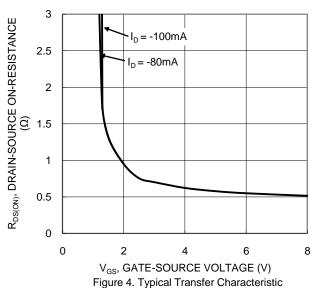
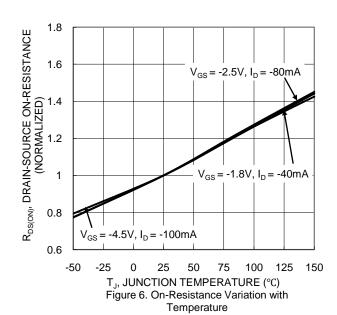


Figure 5. Typical On-Resistance vs. Drain Current and Temperature









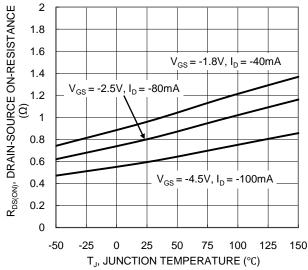
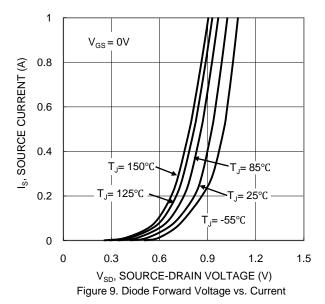
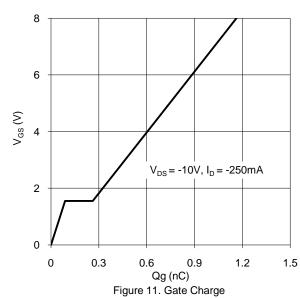


Figure 7. On-Resistance Variation with Temperature





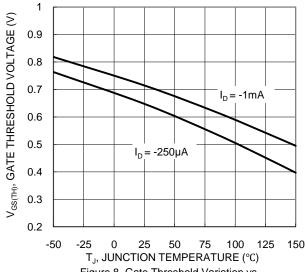
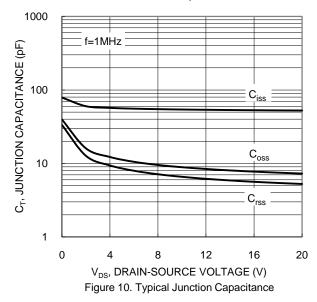


Figure 8. Gate Threshold Variation vs. JunctionTemperature



10 R_{DS(ON)} LIMITED $P_W=100\mu s$ ID, DRAIN CURRENT (A) 1 P_w=10ms $T_{\text{J(MAX)}}$ =150°C T_{C} =25°C Single Pulse 0.1 _w=10s DUT on 1*MRP board DC V_{GS}=-4.5V 0.01 0.1 10 100 V_{DS}, DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



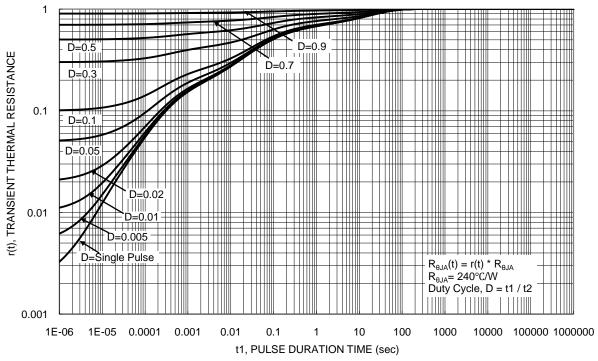


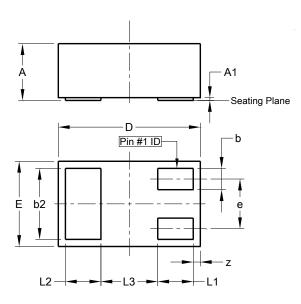
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

X2-DFN1006-3

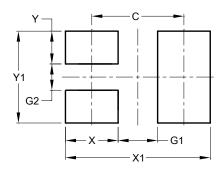


X2-DFN1006-3					
Dim	Min	Max	Тур		
Α		0.40	_		
A1	0.00	0.05	0.03		
b	0.10	0.20	0.15		
b2	0.45	0.55	0.50		
D	0.95	1.05	1.00		
Е	0.55	0.65	0.60		
e	1	1	0.35		
L1	0.20	0.30	0.25		
L2	0.20	0.30	0.25		
L3	1	1	0.40		
Z	0.02	0.08	0.05		
All Dimensions in mm					

Suggested Pad Layout

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

X2-DFN1006-3



Dimensions	Value (in mm)
С	0.70
G1	0.30
G2	0.20
Х	0.40
X1	1.10
Y	0.25
Y1	0.70



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