

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D T _A = +25°C
-20V	1.0Ω @ V _{GS} = -4.5V	-600mA
	1.5Ω @ V _{GS} = -2.5V	-500mA
	2.0Ω @ V _{GS} = -1.8V	-400mA
	3.0Ω @ V _{GS} = -1.5V	-250mA

Description

This new generation MOSFET is 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

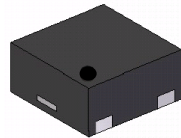
- DC-DC Converters
- Power Management Functions

Features

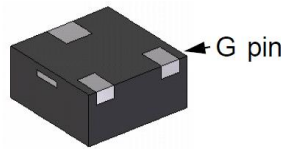
- Low On-Resistance
- Very Low Gate Threshold Voltage V_{GS(TH)}, -1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

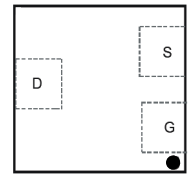
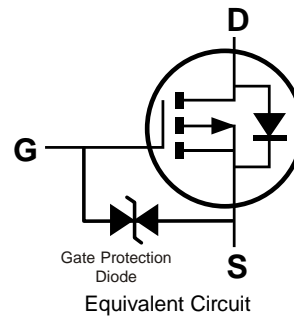
- Case: X1-DFN1212-3
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e4)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)



Top View



Bottom View



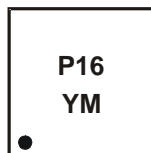
Pin-out Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP21D6UFD-7	X1-DFN1212-3	3000/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> 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



P16 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	E	F	G	H	I	J	K	L	M	N

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	± 8	V
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-600 -500	mA
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	-2	A
Maximum Body Diode Continuous Current			I_S	-800	mA

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P_D	0.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		$R_{\theta JA}$	280	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)			P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		$R_{\theta JA}$	140	$^\circ\text{C/W}$
Operating and Storage Temperature Range			T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

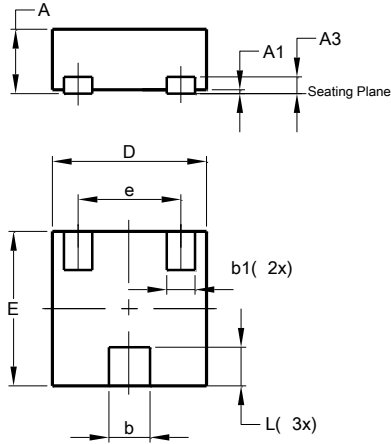
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -1\text{mA}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-100	nA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.5	—	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.7	1.0	Ω	$V_{GS} = -4.5\text{V}, I_D = -100\text{mA}$
		—	0.9	1.5		$V_{GS} = -2.5\text{V}, I_D = -80\text{mA}$
		—	1.2	2.0		$V_{GS} = -1.8\text{V}, I_D = -40\text{mA}$
		—	1.5	3.0		$V_{GS} = -1.5\text{V}, I_D = -30\text{mA}$
		—	5	—		$V_{GS} = -1.2\text{V}, I_D = -1\text{mA}$
Diode Forward Voltage	V_{SD}	—	-0.75	-1.2	V	$V_{GS} = 0\text{V}, I_S = -330\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	46.1	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	7.2	—		
Reverse Transfer Capacitance	C_{rss}	—	4.9	—		
Total Gate Charge $V_{GS} = -4.5\text{V}$	Q_g	—	0.5	—	nC	$V_{DS} = -10\text{V}, I_D = -250\text{mA}$
Total Gate Charge $V_{GS} = -8\text{V}$	Q_g	—	0.8	—		
Gate-Source Charge	Q_{gs}	—	0.1	—		
Gate-Drain Charge	Q_{gd}	—	0.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	8.5	—	ns	$V_{DD} = -3\text{V}, V_{GS} = -2.5\text{V}, R_L = 300\Omega, R_G = 25\Omega, I_D = -100\text{mA}$
Turn-On Rise Time	t_R	—	4.3	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	20.2	—		
Turn-Off Fall Time	t_F	—	19.2	—		

- 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 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

Package Outline Dimensions

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

X1-DFN1212-3

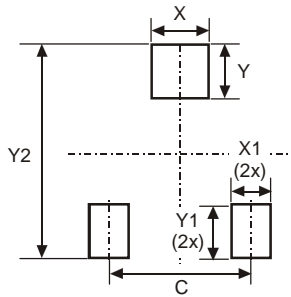


X1-DFN1212-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.02
A3	-	-	0.13
b	0.27	0.37	0.32
b1	0.17	0.27	0.22
D	1.15	1.25	1.20
E	1.15	1.25	1.20
e	-	-	0.80
L	0.25	0.35	0.30
All Dimensions in mm			

Suggested Pad Layout

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

X1-DFN1212-3



Dimensions	Value (in mm)
C	0.80
X	0.42
X1	0.32
Y	0.50
Y1	0.50
Y2	1.50

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