

12V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
	14.8m Ω @ V _{GS} = -4.5V	-9.5A
-12V	$19m\Omega @ V_{GS} = -2.5V$	-8.5A
-12V	26mΩ @ V _{GS} = -1.8V	-7.2A
	32mΩ @ V _{GS} = -1.5V	-6.6A

Features

- 0.6mm Profile Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- 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)
- 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 <u>contact us</u> or your local Diodes representative. https://www.diodes.com/quality/product-definitions/

Description

This MOSFET is designed specifically for use in battery management applications.

Mechanical Data

Case: U-DFN2020-6

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- 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 4

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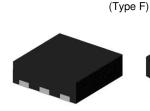
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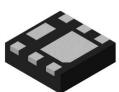
Weight: 0.0065 grams (Approximate)





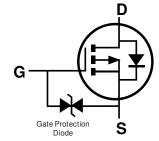
Top View

U-DFN2020-6



Bottom View





Internal Schematic

Pin Out Bottom View

Name and the same		
Part Number	Case	Packaging
DMP1022UFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMP1022UFDF-13	U-DFN2020-6 (Type F)	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/.

Ordering Information (Note 4)



Marking Information

Site 1



PU = Product Type Marking Code YM = Date Code Marking Y = Year (ex: H = 2020) M = Month (ex: 9 = September)

Date Code Key

Year	2013		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	Α		Н	I	J	K	L	М	N	0	Р	R
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Site 2



PU = Product Type Marking Code YWX = Date Code Marking Y = Year (ex: 0 = 2020) W = Week (ex: a = Week 27; z Represents Week 52 and 53) X = Internal Code (ex: U = Monday)

Date Code Key

Date Code Key												
Year	2013		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	3		0	1	2	3	4	5	6	7	8	9
Week	k 1-26				27	-52		53				
Code		Α	ı-Z			а	-Z			2	2	
Internal Code	Sun	1	Mon		Tue	W	ed	Thu		Fri		Sat
Code	Т		U		V	V	٧	Х		Υ		Z



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

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	V _{DSS}	-12	V		
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note C) V 45V	T _A = +25°C T _A = +70°C	l _D	-9.5 -7.6	А	
Continuous Drain Current (Note 6) V _{GS} = -4.5V	T _A = +25°C T _A = +70°C	l _D	-11.0 -8.8	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%	5)		I _{DM}	-90	Α
Continuous Source-Drain Diode Current	$T_A = +25$ °C $T_C = +25$ °C	Is	-2.5 -7.1	А	
Pulsed Source-Drain Diode Current (10µs Pulse, Du	uty Cycle = 1%)		lsм	-50	Α

Thermal Characteristics

Characteristic	Symbol	Value	Unit		
Total Bower Dissination (Note 5)	$T_A = +25^{\circ}C$	P _D	0.73	W	
Total Power Dissipation (Note 5)	T _A = +70°C	PD	0.47	VV	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	Reja	172	°C/W	
Thermal Resistance, Junction to Ambient (Note 3)	t<5s	ΠθJA	128		
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	P_{D}	2.1	W	
Total Fower Dissipation (Note o)	$T_A = +70^{\circ}C$	FD	1.3		
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	Rела	59		
Themai hesistance, Junction to Ambient (Note 6)	⊓⊎JA	45	°C/W		
Thermal Resistance, Junction to Case (Note 6)	Rejc	5.1			
Operating and Storage Temperature Range		$T_{J_i}T_{STG}$	-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)		1	1	1	ľ		
Drain-Source Breakdown Voltage	BV _{DSS}	-12	_	_	V	$V_{GS} = 0V, I_{D} = -250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	IDSS	_	_	-200	nA	$V_{DS} = -12V$, $V_{GS} = 0V$	
Zero Gate Voltage Drain Current T _J = +55°C (Note 8)	IDSS	_	_	-2	μΑ	$V_{DS} = -12V$, $V_{GS} = 0V$	
Gate-Source Leakage	Igss	_	_	±10	μΑ	$V_{GS} = \pm 8V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	-0.35	_	-0.8	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
			12	14.8		V _G S = -4.5V, I _D = -4A	
Static Drain-Source On-Resistance	_		15	19	mΩ	$V_{GS} = -2.5V, I_{D} = -4A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	20	26	mΩ	Vgs = -1.8V, ID = -4A	
			23	32		Vgs = -1.5V, ID = -2A	
Diode Forward Voltage	V_{SD}	_	-0.8	-1.2	V	$V_{GS} = 0V, I_{S} = -8A$	
DYNAMIC CHARACTERISTICS (Note 8)	•	•		•			
Input Capacitance	Ciss	_	2,712	_		101111	
Output Capacitance	Coss	_	514	_	pF	$V_{DS} = -10V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	Crss	_	467	_		I = I.OIVINZ	
Gate Resistance	Rg	_	8.6	18	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Qg	_	48.3	_		$V_{GS} = -8V$, $V_{DS} = -6V$, $I_{D} = -10A$	
Total Gate Charge	Qg	_	28.6	_	nC		
Gate-Source Charge	Qgs	_	4.2	_	IIC	$V_{GS} = -4.5V, V_{DS} = -6V,$ $I_{D} = -10A$	
Gate-Drain Charge	Qgd	_	7.0	_		ID = -10A	
Turn-On Delay Time	t _{D(ON)}	_	25.1	_			
Turn-On Rise Time	tR	_	39.8	_		$V_{DS} = -6V, V_{GS} = -4.5V,$	
Turn-Off Delay Time	tD(OFF)	_	141	_	ns	$R_G = 1\Omega$, $I_D = -8A$	
Turn-Off Fall Time	tF	_	147	_			

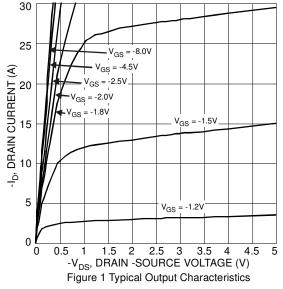
Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.

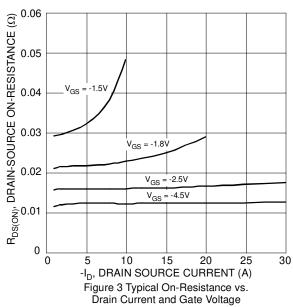
^{6.} Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.

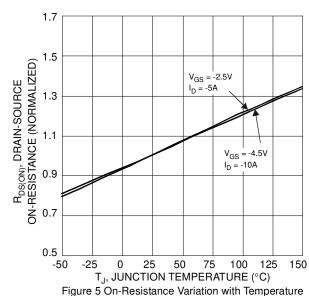
^{7.} Short duration pulse test used to minimize self-heating effect.

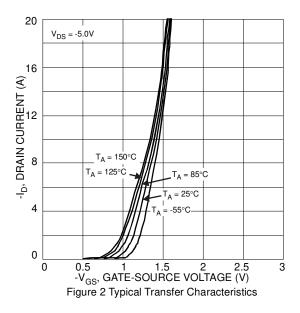
^{8.} Guaranteed by design. Not subject to production testing.

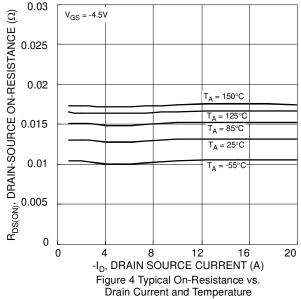












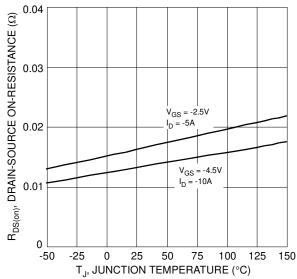


Figure 6 On-Resistance Variation with Temperature



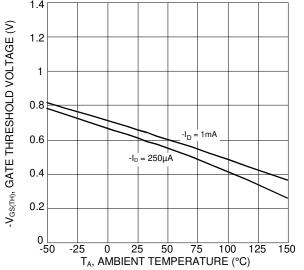
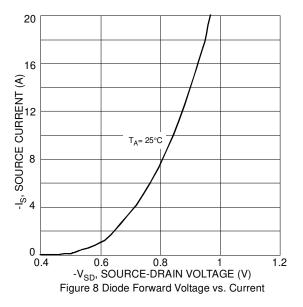
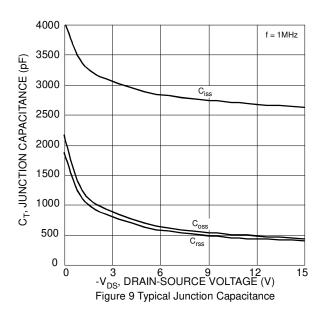
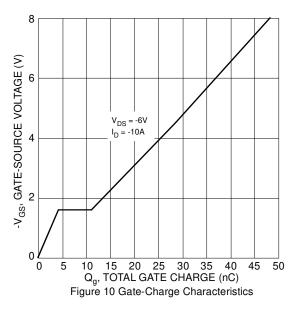


Figure 7 Gate Threshold Variation vs. Ambient Temperature







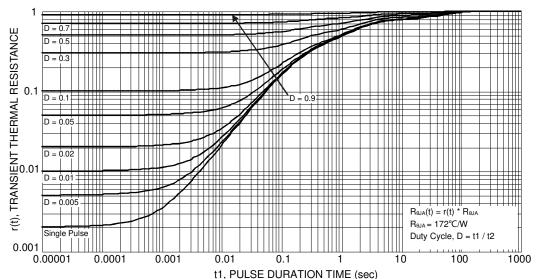


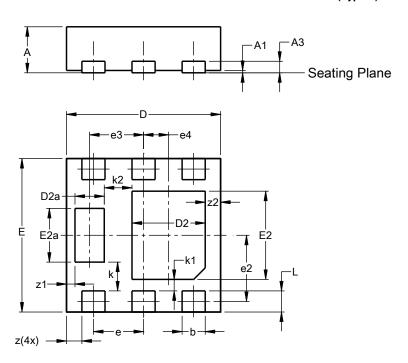
Figure 11 Transient Thermal Resistance



Package Outline Dimensions

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

U-DFN2020-6 (Type F)

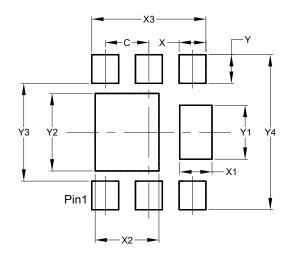


U-DFN2020-6 (Type F)								
Dim			T					
	Min	Max	Тур					
Α	0.57 0.63 0.60							
A 1	0.00	0.00 0.05 0.03						
А3	-	-	0.15					
b	0.25	0.35	0.30					
D	1.95	2.05	2.00					
D2	0.85	1.05	0.95					
D2a	0.33	0.43	0.38					
Е	1.95	2.05	2.00					
E2	1.05	1.25	1.15					
E2a	0.65	0.75	0.70					
е		0.65 BS	С					
e2	C).863 BS	SC					
е3		0.70 BS	С					
e4	C).325 BS	SC					
k		0.37 BS	С					
k1		0.15 BS	С					
k2		0.36 BS	С					
L	0.225	0.325	0.275					
Z		0.20 BS	С					
z1	C).110 BS	SC					
z2		0.20 BS	С					
All C	imens	ions in	mm					

Suggested Pad Layout

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

U-DFN2020-6 (Type F)



Dimensions	Value				
Difficitsions	(in mm)				
С	0.650				
Х	0.400				
X1	0.480				
X2	0.950				
Х3	1.700				
Υ	0.425				
Y1	0.800				
Y2	1.150				
Y3	1.450				
Y4	2.300				



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