



P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BVDSS	Rds(on) Max	I _D Max T _C = +25°C
-12V	$8.5 \text{m}\Omega$ @ V _{GS} = -4.5V	-26A
-120	12mΩ @ V _{GS} = -2.5V	-22A

Description and Applications

This MOSFET is designed to minimize on-state resistance (RDS(ON)) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- **Battery Management Application**
- **Power Management Functions**
- Load Switches

Features and Benefits

- 0.6mm Profile Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- ESD Protected up to 8kV
- 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/

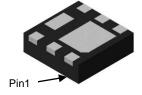
Mechanical Data

- Case: U-DFN2020-6
- 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
- Weight: 0.007 grams (Approximate)

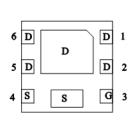
U-DFN2020-6 (Type F)



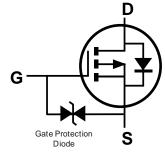




Top View **Bottom View**



Pin Out **Bottom View**



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1005UFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMP1005UFDF-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/



Marking Information

Site 1

U-DFN2020-6 (Type F)



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

Date Code Key

Year	2016		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	D		Н	- 1	J	K	L	М	N	0	Р	R
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Site 2



9P = 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

Year	2016	 2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	6	 0	1	2	3	4	5	6	7	8	9

Week	1-26	27-52	53
Code	A-Z	a-z	Z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	Т	U	V	W	X	Υ	Z



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

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage			VDSS	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6) V 4 FV	Steady State	T _A = +25°C T _A = +70°C	lo	-12.8 -10.3	А
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _C = +25°C T _C = +70°C	lo	-26 -21	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%))		I_{DM}	-70	Α
Continuous Source-Drain Diode Current (Note 6)	Is	-3.2	Α		
Avalanche Current (Note 7) L = 0.1mH	las	-20	A		
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	20	mJ

Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	P_{D}	0.9	W	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	р	145	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	92		
Total Power Dissipation (Note 6)	$T_A = +25$ °C	PD	2.1	W	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	59		
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	38	°C/W	
Thermal Resistance, Junction to Case (Note 6)	Steady State	$R_{\theta JC}$	14		
Operating and Storage Temperature Range		TJ, TSTG	-55 to +150	°C	

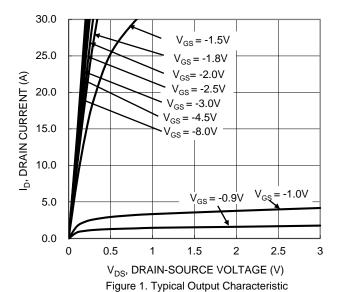
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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	_	_	-10	μΑ	V _{DS} = -9.6V, V _{GS} = 0V
Gate-Source Leakage	Igss	_	_	±10	μΑ	$V_{GS} = \pm 8V$, $V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	Vgs(TH)	-0.3		-1.0	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$
			5.8	8.5		$V_{GS} = -4.5V, I_{D} = -5A$
Static Drain-Source On-Resistance	RDS(ON)	_	7.3	12	mΩ	V _G S = -2.5V, I _D = -4A
			9.5	18.5		V _G S = -1.8V, I _D = -2A
Diode Forward Voltage	VsD	_	-0.8	-1.2	V	VGS = 0V, IS = -1.0A
DYNAMIC CHARACTERISTICS (Note 9)					•	
Input Capacitance	Ciss	_	2475	_		., ., ., .,
Output Capacitance	Coss	_	747	_	pF	$V_{DS} = -6V, V_{GS} = 0V,$ f = 1.0MHz
Reverse Transfer Capacitance	Crss	_	516	_		I = I.OVIAZ
Gate Resistance	Rg	_	20	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$
Total Gate Charge (V _{GS} = -4.5V)	Qg	_	28	_		
Total Gate Charge (V _{GS} = -8V)	Qg	_	47	_	nC	V 0V 1 74
Gate-Source Charge	Qgs	_	3.4	_	nC	$V_{DS} = -6V, I_{D} = -7A$
Gate-Drain Charge	Q _{gd}		7.5	_		
Turn-On Delay Time	tD(ON)		6.1	_		
Turn-On Rise Time	t _R	_	21	_		$V_{DS} = -6V, V_{GS} = -4.5V,$
Turn-Off Delay Time	tD(OFF)		140	_	ns	$R_g = 1\Omega$, $I_D = -7A$
Turn-Off Fall Time	tF		125	_		
Reverse Recovery Time	t _{RR}	_	115		ns	$I_F = -1.0A$, $di/dt = -100A/\mu s$
Reverse Recovery Charge	Qrr	_	75	_	nC	I _F = -1.0A, di/dt = -100A/μs

5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Device mounted on FR-4 substrate PC board, 202 copper, with minimum recommended particles.
Les mounted on FR-4 substrate PC board, 202 copper, with 1 inch square copper plate.
I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
Short duration pulse test used to minimize self-heating effect.
Guaranteed by design. Not subject to product testing.





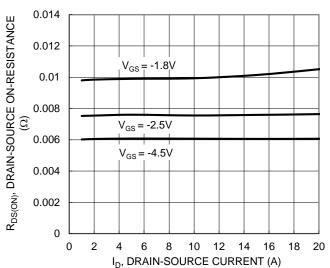


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

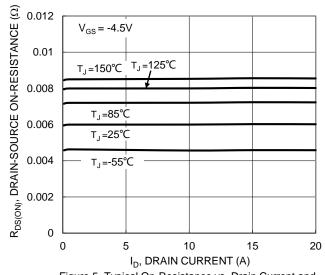


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

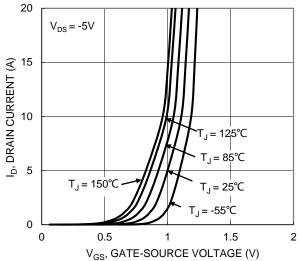


Figure 2. Typical Transfer Characteristic

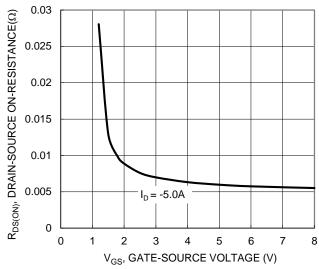


Figure 4. Typical Transfer Characteristic

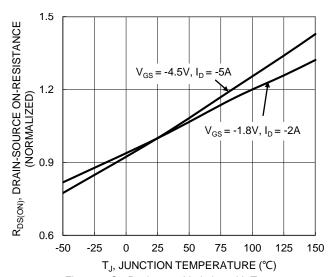


Figure 6. On-Resistance Variation with Temperature





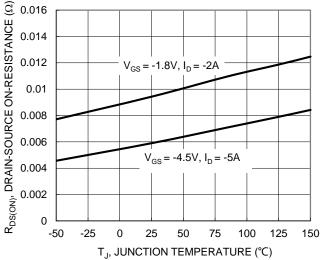


Figure 7. On-Resistance Variation with Temperature

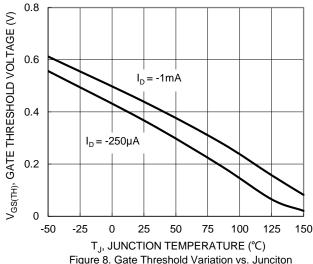


Figure 8. Gate Threshold Variation vs. Junciton Temperature

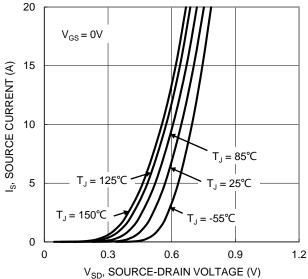
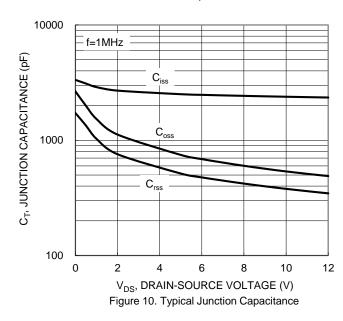


Figure 9. Diode Forward Voltage vs. Current





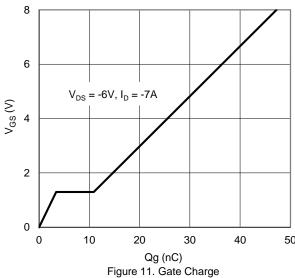


Figure 12. SOA, Safe Operation Area



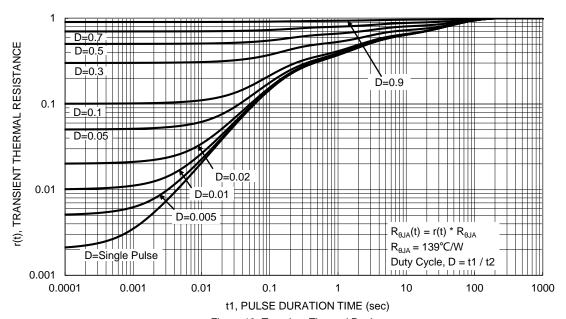


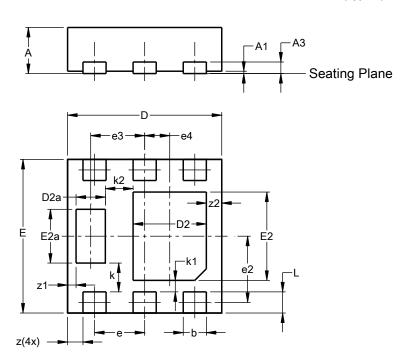
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

U-DFN2020-6 (Type F)

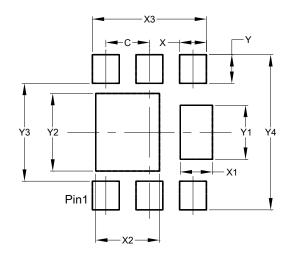


U-DFN2020-6									
(Type F)									
Dim	Min Max Typ								
Α	0.57	0.57 0.63 0.60							
A 1	0.00	0.05	0.03						
A3	-	-	0.15						
b	0.25	0.35	0.30						
D	1.95	2.05	2.00						
D2	0.85	1.05	0.95						
D2a	0.33	0.33 0.43 0.38							
Е	1.95	2.05	2.00						
E2	1.05	1.25	1.15						
E2a	0.65	0.75	0.70						
е		0.65 BS	С						
e2).863 BS							
е3		0.70 BS							
e4	().325 BS	SC						
k		0.37 BS							
k1		0.15 BS	С						
k2		0.36 BS	С						
L	0.225 0.325 0.275								
Z	0.20 BSC								
z 1	().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
Dillicitatoria	(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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