

#### P-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
	29mΩ @ V <sub>GS</sub> = -4.5V	-6.9A
-20V	$39m\Omega$ @ $V_{GS} = -2.5V$	-5.9A

### **Features and Benefits**

- 0.6mm Profile Ideal for Low Profile Applications
- PCB Footprint of 4mm<sup>2</sup>
- Low Gate Threshold Voltage
- Low On-Resistance
- **ESD Protected Gate**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

## **Description and Applications**

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- **Battery Management Application**
- **Power Management Functions**
- **DC-DC Converters**

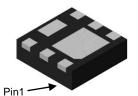
#### **Mechanical Data**

- Case: U-DFN2020-6 (Type F)
- 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: 0.0065 grams (Approximate)

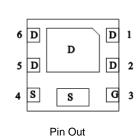
#### U-DFN2020-6 (Type F)



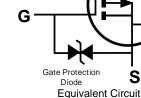




Top View **Bottom View** 



**Bottom View** 



S

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2035UFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMP2035UFDF-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) compliant.
- 2. See http://www.diodes.com/quality/lead\_free.html 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 http://www.diodes.com/products/packages.html.

## Marking Information



P8 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: D = 2016)M = Month (ex: 9 = September)

Date Code Key

Year	2016		2017	2018		2019	2020		2021	2022		2023
Code	D		Е	F		G	Н		ı	J		K
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



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

Characteristic	Symbol	Value	Units			
Drain-Source Voltage	$V_{DSS}$	-20	V			
Gate-Source Voltage	$V_{GSS}$	±8	V			
Continuous Drain Current (Note 6) V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	-6.9 -5.5	А	
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	-8.1 -6.5	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	-40	Α			
Continuous Source-Drain Diode Current (Note 6)	Is	-2.5	Α			
Avalanche Current (Note 7) L = 0.1mH	I <sub>AS</sub>	-21	Α			
Avalanche Energy (Note 7) L = 0.1mH	E <sub>AS</sub>	23	mJ			

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units	
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	0	0.66	W	
Total Power Dissipation (Note 5)	$T_A = +70^{\circ}C$	P <sub>D</sub>	0.42		
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	Do	180	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	135		
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	D-	2.03	w	
Total Fower Dissipation (Note o)	$T_A = +70^{\circ}C$	P <sub>D</sub>	1.31	VV	
Thermal Begistance, Junction to Ambient (Note 6)	Steady State	В	63		
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	43	°C/W	
Thermal Resistance, Junction to Case (Note 6)  Steady State		$R_{\theta JC}$	17.5		
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C	

## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
DFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	I	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	_		-1	μΑ	$V_{DS} = -16V, V_{GS} = 0V$	
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±10	μΑ	$V_{GS} = \pm 8V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	l	-1.0	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
			20	29		$V_{GS} = -4.5V$ , $I_{D} = -6.4A$	
Static Drain-Source On-Resistance	D		24	39	mΩ	$V_{GS} = -2.5V, I_D = -4.8A$	
Static Drain-Source On-Nesistance	R <sub>DS(ON)</sub>		31	60	11122	$V_{GS} = -1.8V$ , $I_D = -2.5A$	
			40	120		$V_{GS} = -1.5V, I_D = -1.5A$	
Diode Forward Voltage	V <sub>SD</sub>		-0.7	-1.2	V	$V_{GS} = 0V, I_{S} = -1.0A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C <sub>ISS</sub>		1,808	_		151/1/	
Output Capacitance	Coss		155	-	pF	$V_{DS} = -15V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C <sub>RSS</sub>	_	117	_		1 = 1:01VII 12	
Gate Resistance	R <sub>G</sub>	_	32	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge (V <sub>GS</sub> = -4.5V)	$Q_{G}$	_	20.5	_		101/11/	
Gate-Source Charge	Q <sub>GS</sub>	_	2.8	_	nC	$V_{DS} = -10V$ , $V_{GS} = -4.5V$ , $I_{D} = -4.0A$	
Gate-Drain Charge	$Q_{GD}$	_	4.1	_		I <sub>D</sub> = -4.0A	
Turn-On Delay Time	t <sub>D(ON)</sub>	_	9.1	_			
Turn-On Rise Time	t <sub>R</sub>	_	12.3	_		$V_{DS} = -10V, V_{GS} = -4.5V,$	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	120	_	ns	$R_G = 6\Omega, I_D = -1.0A$	
Turn-Off Fall Time	t <sub>F</sub>	_	54	_			
Reverse Recovery Time	t <sub>RR</sub>	_	23.1	_	ns	I <sub>F</sub> = -1.0A, di/dt = 100A/μs	
Reverse Recovery Charge	Q <sub>RR</sub>	_	8.3	_	nC	I <sub>F</sub> = -1.0A, di/dt = 100A/µs	

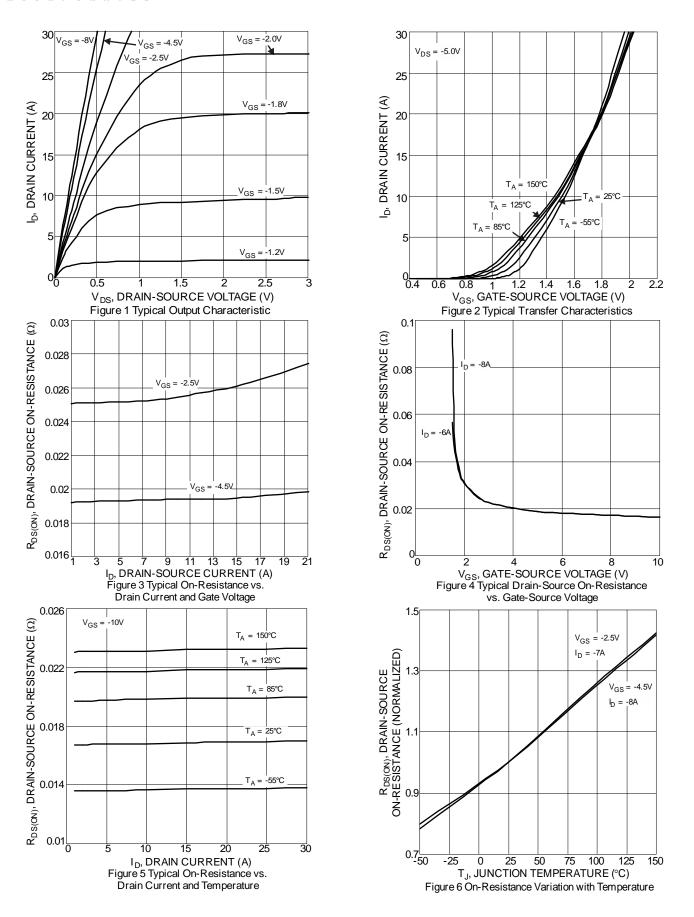
 Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate. Notes:

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

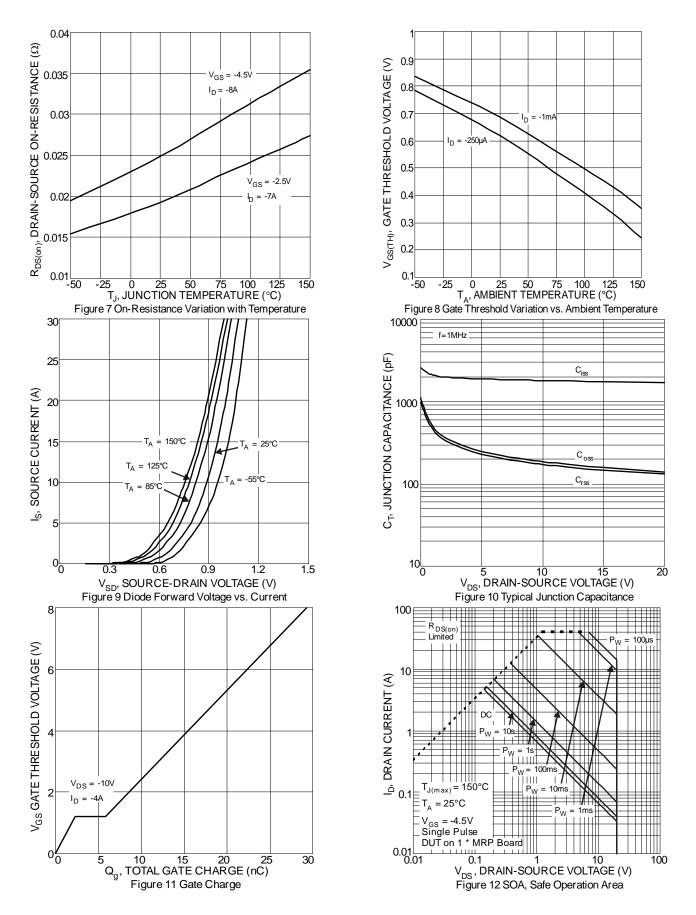
9. Guaranteed by design. Not subject to product testing.

<sup>7.</sup> I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep  $T_J = +25^{\circ}C$ .

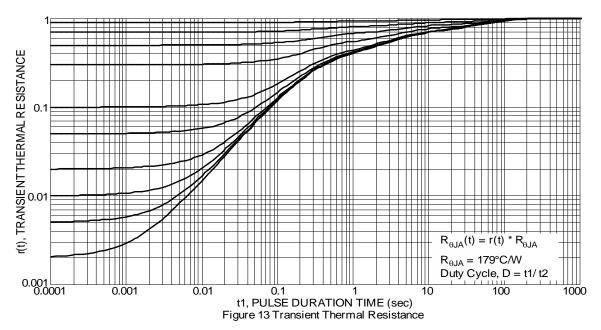










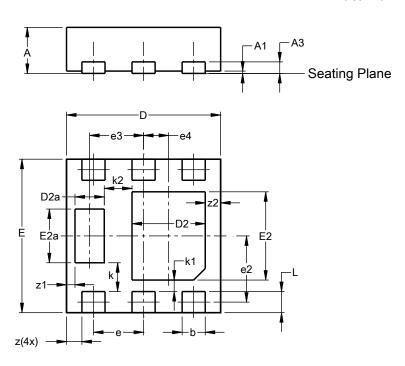




# **Package Outline Dimensions**

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

#### U-DFN2020-6 (Type F)

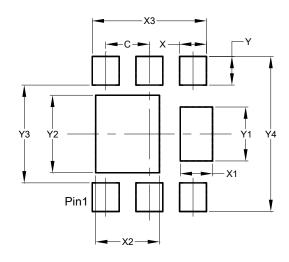


U-DFN2020-6							
Dim	(Type F) Min Max Typ						
A	0.57	0.63	0.60				
A1	0.00	0.05	0.03				
A3	-	-	0.15				
b	0.25	0.35	0.30				
D	1.95	2.05	2.00				
D2	0.85	1.05	0.95				
D2a	0.33	0.43	0.38				
Е	1.95	2.05	2.00				
E2	1.05	1.25	1.15				
E2a	0.65	0.75	0.70				
е	0.65 BSC						
e2	0.863 BSC						
е3	0.70 BSC						
e4	0.325 BSC						
k	0.37 BSC						
k1	0.15 BSC						
k2	0.36 BSC						
L	0.225 0.325 0.275						
Z	0.20 BSC						
z1	0.110 BSC						
z2	0.20 BSC						
All Dimensions 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 (in mm)			
С	0.650			
Х	0.400			
X1	0.480			
X2	0.950			
Х3	1.700			
Y	0.425			
Y1	0.800			
Y2	1.150			
Y3	1.450			
Y4	2.300			



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