



### 100V N-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
400\/	62mΩ @ V <sub>GS</sub> = 10V	4A
100V	80mΩ @ V <sub>GS</sub> = 6V	3.5A

## **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**

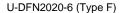
- Power Management Functions
- · Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

### **Features and Benefits**

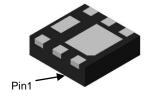
- 0.6mm Profile Ideal for Low Profile Applications
- PCB Footprint of 4mm<sup>2</sup>
- Low On-Resistance
- 100% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

### **Mechanical Data**

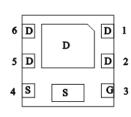
- Case: U-DFN2020-6
- Case Material: Molded Plastic, "Green" Molding Compound.
  UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0065 grams (Approximate)



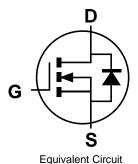




Top View Bottom View



Pin Out Bottom View



## Ordering Information (Note 4)

Part Number	Case	Quantity Per Reel
DMT10H072LFDF-7	U-DFN2020-6 (Type F)	3,000
DMT10H072LFDF-13	U-DFN2020-6 (Type F)	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
- 4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.



## **Marking Information**

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



72 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: G = 2019) M = Month (ex: 9 = September)

Date Code Key

Year	2019	20	20	2021	2022	20	)23	2024	2025	20	)26	2027
Code	G		Н	ı	J		K	L	М		N	0
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

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



72 = Product Type Marking Code YWX = Date Code Marking Y = Year (ex: 9 = 2019) W = Week (ex: a = week 27; z represents week 52 and 53) X = Internal Code (ex: U = Monday)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027
Code	9	0	1	2	3	4	5	6	7

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

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



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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage		$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GSS}$	±20	V	
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	ΙD	4 3.2	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I <sub>DM</sub>	22	Α
Maximum Body Diode Continuous Current	Is	1.6	Α	
Avalanche Current, L = 0.1mH (Note 9)	I <sub>AS</sub>	6	Α	
Avalanche Energy, L = 0.1mH (Note 9)	E <sub>AS</sub>	1.8	mJ	

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

Characteristic		Symbol	Value	Unit
Total Dawer Dissination (Note 5)	T <sub>A</sub> = +25°C	<u> </u>	0.8	W
Total Power Dissipation (Note 5)	$T_A = +70^{\circ}C$	$P_{D}$	0.5	VV
Thermal Resistance, Junction to Ambient (Note 5)	·	$R_{\theta JA}$	149	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C		1.8	W
Total Power Dissipation (Note 6)	$T_A = +70^{\circ}C$	$P_D$	1.1	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	71	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	13	C/VV	
Operating and Storage Temperature Range		TJ, TSTG	-55 to +150	°C

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

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)	, ,		7.			
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	1	μΑ	$V_{DS} = 80V, V_{GS} = 0V$
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	_	3	٧	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$
			47	62	mΩ	$V_{GS} = 10V, I_D = 4.5A$
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	54	80	11122	$V_{GS} = 6V, I_{D} = 4A$
	, ,	1	64	110	mΩ	$V_{GS} = 4.5V, I_D = 2.6A$
Diode Forward Voltage	$V_{SD}$		0.7	1.0	V	$V_{GS} = 0V, I_{S} = 1A$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C <sub>iss</sub>	-	228	_	pF	
Output Capacitance	Coss	_	89.3	_	pF	$V_{DS} = 50V, V_{GS} = 0V,$ -f = 1MHz
Reverse Transfer Capacitance	C <sub>rss</sub>	_	2.5	_	pF	
Gate Resistance	Rg	_	8.2	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$
Total Gate Charge (V <sub>GS</sub> = 4.5V)	$Q_{g}$	_	2.5	_	nC	
Total Gate Charge (V <sub>GS</sub> = 10V)	Qg	_	4.5	_	nC	
Gate-Source Charge	$Q_{gs}$	_	0.6	_	nC	$V_{DS} = 50V, I_{D} = 4.5A$
Gate-Drain Charge	Q <sub>gd</sub>	_	1.3	_	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	_	3.0	_	ns	
Turn-On Rise Time	t <sub>R</sub>	_	3.1	_	ns	$V_{DS} = 50V, R_{L} = 11\Omega$
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	12.3	_	ns	$V_{GS} = 10V, R_{GEN} = 3\Omega$
Turn-Off Fall Time	t <sub>F</sub>		4.3	_	ns	
Reverse Recovery Time	t <sub>RR</sub>		22.9	_	ns	1 4 5 4 4 300 4 6 5
Reverse Recovery Charge	Q <sub>RR</sub>		45.2	_	nC	I <sub>F</sub> = 4.5A, di/dt = 300A/μs

Notes:

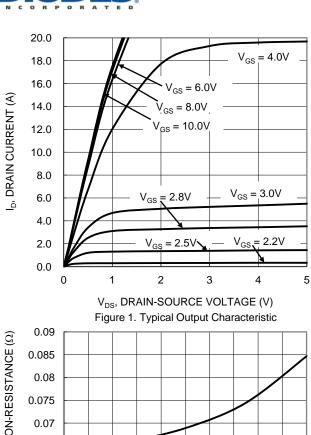
Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

<sup>7.</sup> Short duration pulse test used to minimize self-heating effect.

<sup>8.</sup> Guaranteed by design. Not subject to product testing.

<sup>9.</sup>  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25$ °C.





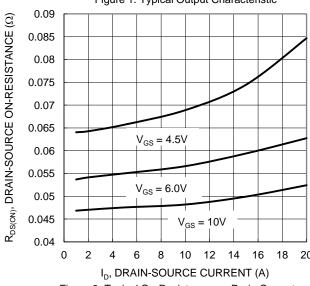


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

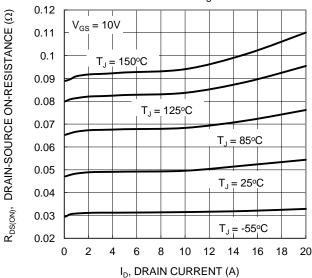


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

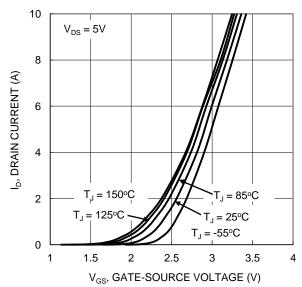


Figure 2. Typical Transfer Characteristic

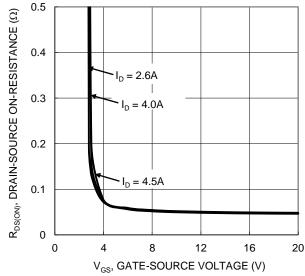


Figure 4. Typical Transfer Characteristic

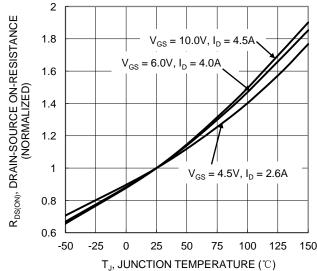
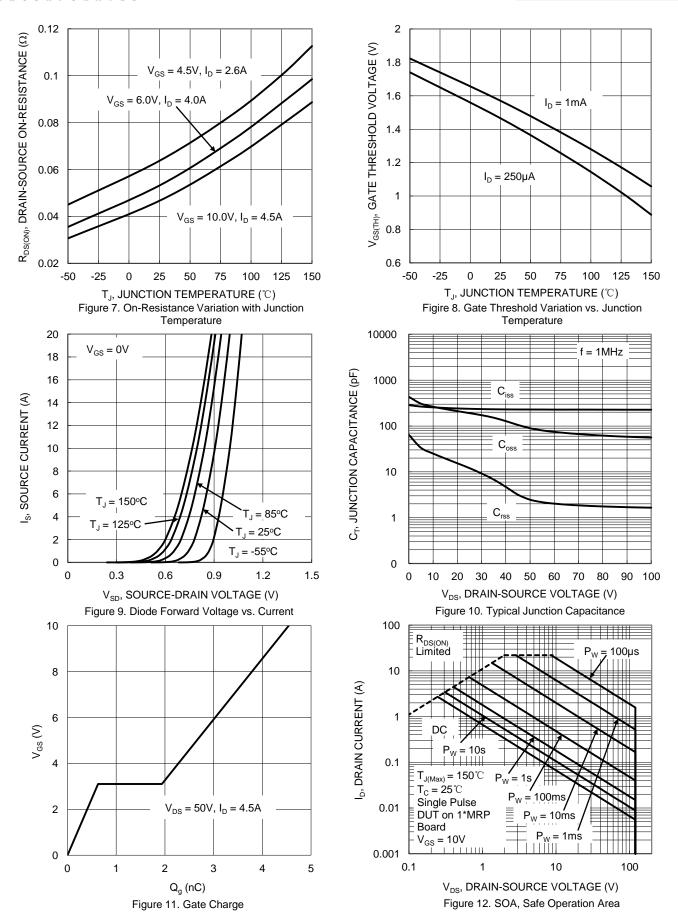


Figure 6. On-Resistance Variation with Junction Temperature







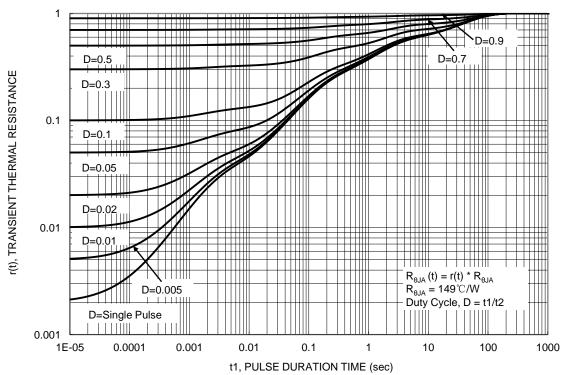


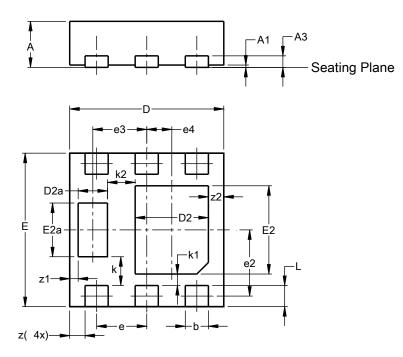
Figure 13. Transient Thermal Resistance



## **Package Outline Dimension**

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

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

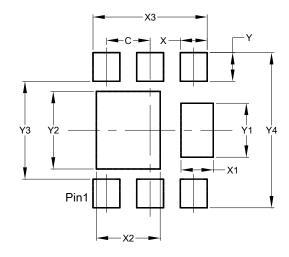


U-DFN2020-6									
	(Type F)								
Dim	Min Max Typ								
Α	0.57	0.63	0.60						
A1	0.00	0.05	0.03						
А3	-	-	0.15						
b	0.25	0.35	0.30						
D	1.95	2.05	2.00						
D2	0.85	1.05	0.95						
D2a	0.33	0.43	0.38						
Е	1.95	2.05	2.00						
E2	1.05	1.25	1.15						
E2a	0.65	0.75	0.70						
е		0.65 BS							
e2	C	).863 BS	SC						
е3		0.70 BS	С						
e4	C	).325 BS	SC						
k		0.37 BS							
k1	0.15 BSC								
k2		0.36 BS							
L	0.225 0.325 0.275								
Z	0.20 BSC								
<b>z</b> 1	0.110 BSC								
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
Dillicipions	(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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