

#### 100V N-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
	160mΩ @ V <sub>GS</sub> = 10V	2.9A
100V	200mΩ @ V <sub>GS</sub> = 4.5V	2.6A

## **Description**

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(on)</sub>) 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
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

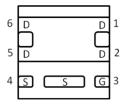
#### **Mechanical Data**

- 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)

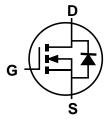
#### U-DFN2020-6



**Bottom View** 



Pin Out



**Equivalent Circuit** 

#### Ordering Information (Note 4)

Part Number	Compliance	Case	Quantity per reel
DMN10H170SFDE-7	Standard	U-DFN2020-6	3,000
DMN10H170SFDE-13	Standard	U-DFN2020-6	10,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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**

#### U-DFN2020-6



7H = Product Type Marking Code YM = Date Code Marking Y = Year (ex: B = 2014) M = Month (ex: 9 = September)

Date Code Key

Year	2014		2015	2016		2017	2018		2019	2020		2020
Code	В		С	D		Е	F		G	Н		I
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<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	n-Source Voltage				V
Gate-Source Voltage	$V_{GSS}$	±20	V		
Continuous Drain Current (Note C) V	I <sub>D</sub>	2.9 2.3	А		
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	t<10s	$T_A = +25$ °C $T_A = +70$ °C	ΙD	3.4 2.7	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	$I_{DM}$	10	Α		
Maximum Body Diode Continuous Current	Is	2.5	Α		
Avalanche Current (Note 7)	I <sub>AS</sub>	4.7	Α		
Avalanche Energy (Note 7)	E <sub>AS</sub>	16	mJ		

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

Characteristic		Symbol	Value	Units	
Total Power Dissipation (Note 5)	$T_A = +25$ °C	D	0.66	W	
Total Fower Dissipation (Note 5)	$T_A = +70^{\circ}C$	$P_D$	0.42		
Thermal Resistance, Junction to Ambient (Note 5)	Steady state		189	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	132	C/VV	
Total Dawer Dissipation (Note 6)	$T_A = +25$ °C	<b>D</b>	2.03	W	
Total Power Dissipation (Note 6)	$T_A = +70^{\circ}C$	$P_{D}$	1.31		
Thermal Begintenes, Junetian to Ambient (Note 6)	Steady state	D	61	°C/W	
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	43		
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	9.3		
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C	

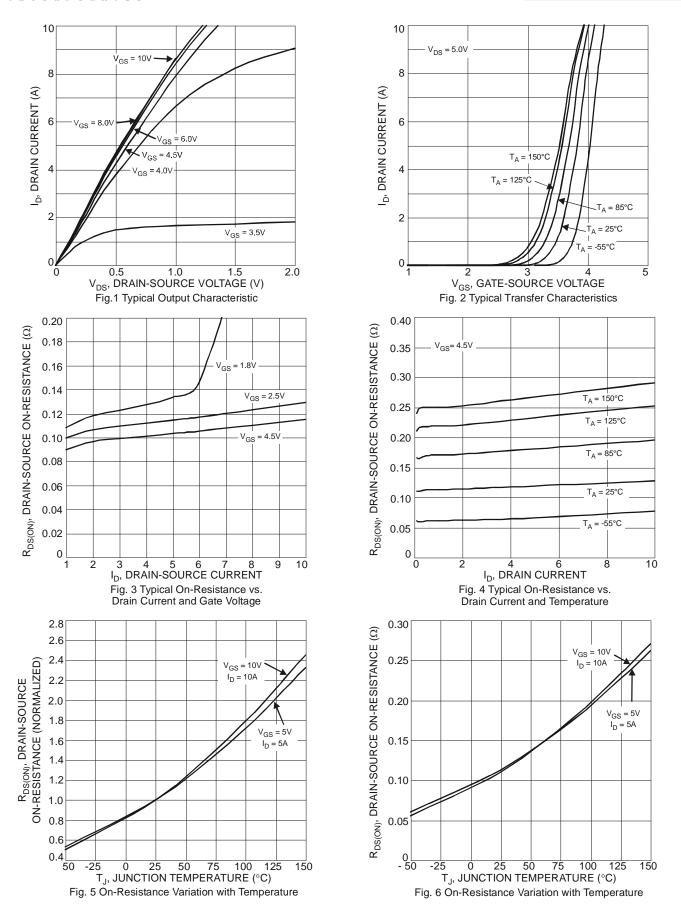
## Electrical Characteristics (@TA = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)	, cjc.		- 712		•		
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	-	-	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 <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)						•	
Gate Threshold Voltage	$V_{GS(th)}$	1.0	2.0	3.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance	D- e (e) ii	-	116	160	mΩ	$V_{GS} = 10V, I_D = 5.0A$	
Static Diain-Source On-Nesistance	R <sub>DS(ON)</sub>	_	126	200	11122	$V_{GS} = 4.5V, I_{D} = 5.0A$	
Diode Forward Voltage	$V_{SD}$	-	0.9	1.0	V	$V_{GS} = 0V, I_{S} = 10A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C <sub>iss</sub>	-	1167	-	pF	\/ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Output Capacitance	Coss	-	36	-	рF	$V_{DS} = 25V, V_{GS} = 0V,$ - f = 1.0MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	25	-	рF	1 = 1.000112	
Gate Resistance	Rg	-	1.3	-	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge (V <sub>GS</sub> = 4.5V)	$Q_g$	-	4.9	-	nC		
Total Gate Charge (V <sub>GS</sub> = 10V)	Qq	-	9.7	-	nC	7, , , , , , , , , , , , , , , , , , ,	
Gate-Source Charge	Q <sub>gs</sub>	-	2.0	-	nC	$V_{DS} = 80V, I_{D} = 12.8A$	
Gate-Drain Charge	Q <sub>qd</sub>	-	2.0	-	nC		
Turn-On Delay Time	t <sub>D(on)</sub>	-	10.5	-	ns		
Turn-On Rise Time	t <sub>r</sub>	-	11.1	-	ns	$V_{DS} = 50V, I_{D} = 12.8A$	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	42.6	-	ns	$V_{GS} = 10V, R_G = 25\Omega$	
Turn-Off Fall Time	t <sub>f</sub>	-	12.8	-	ns		
Reverse Recovery Time	T <sub>rr</sub>	-	30.3	-	ns	10.04 11/11 1004/	
Reverse Recovery Charge	Q <sub>rr</sub>	-	35.2	-	nC	$I_F = 12.8A$ , di/dt = 100A/ $\mu$ s	

Notes:

- 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
- 7 .UIS in production with L = 1.43mH, TJ = +25°C.
- 8. Short duration pulse test used to minimize self-heating effect.
- 9. Guaranteed by design. Not subject to product testing.







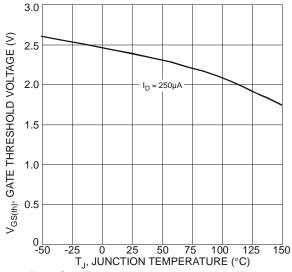
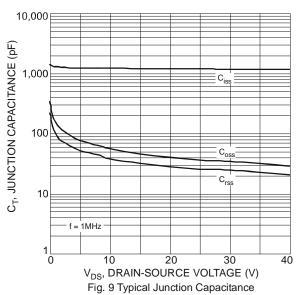
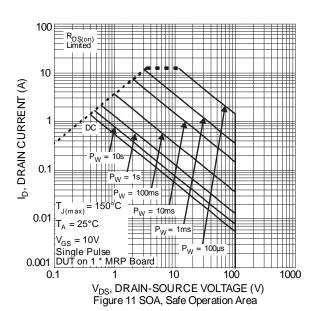
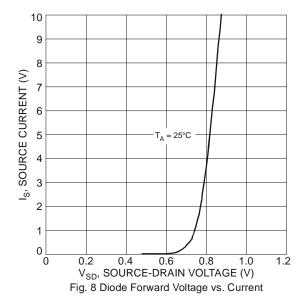
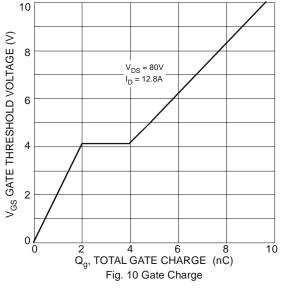


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

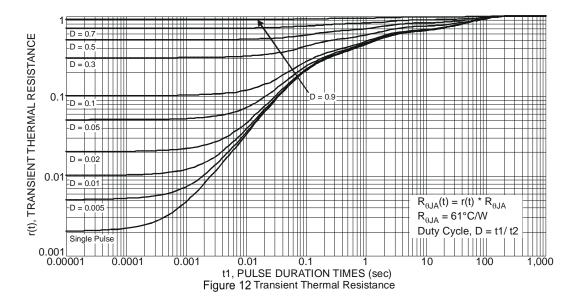






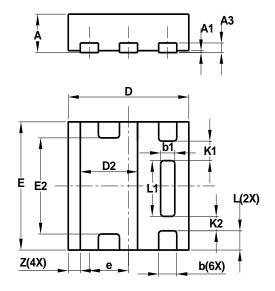






# **Package Outline Dimensions**

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

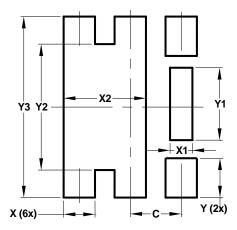


U-DFN2020-6								
Type E								
Dim	Min	Max	Тур					
Α	0.57	0.63	0.60					
A1	0	0.05	0.03					
A3	_		0.15					
b	0.25	0.35	0.30					
b1	0.185	0.285	0.235					
D	1.95	2.05	2.00					
D2	0.85	1.05	0.95					
Е	1.95	2.05	2.00					
E2	1.40	1.60	1.50					
е	_	_	0.65					
L	0.25	0.35	0.30					
L1	0.82	0.92	0.87					
K1	_	_	0.305					
K2	_	_	0.225					
Z	_	_	0.20					
All Dimensions in mm								



#### Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)		
С	0.650		
Х	0.400		
X1	0.285		
X2	1.050		
Υ	0.500		
Y1	0.920		
Y2	1.600		
Y3	2.300		

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