



### N-CHANNEAL ENHANCEMENT MODE MOSFET

### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D MAX</sub> T <sub>A</sub> = +25°C
12V	$29m\Omega @ V_{GS} = 4.5V$	5.6A
	$34m\Omega @ V_{GS} = 2.5V$	5.1A
	44mΩ @ V <sub>GS</sub> = 1.8V	4.5A
	$65m\Omega @ V_{GS} = 1.5V$	3.7A

### **Features**

- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Max Height
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

### **Description**

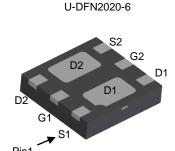
This MOSFET has been designed to minimize the on-state resistance  $(R_{DS(ON)})$  and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

# **Applications**

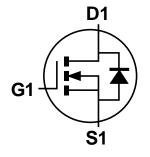
- Load Switch
- Power Management Functions
- Portable Power Adaptors

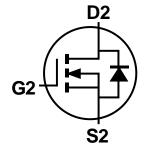
### **Mechanical Data**

- 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)
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)



**Bottom View** 





Q1 N-CHANNEL MOSFET

Q2 N-CHANNEL MOSFET

Internal Schematic

### **Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN1029UFDB -7	U-DFN2020-6	3000/Tape & Reel
DMN1029UFDB -13	U-DFN2020-6	10000/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**



D5 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: C = 2015) M = Month (ex: 9 = September)

Date Code Key

Date Code Ney												
Year	201	5	2016		2017	20	18	2019		2020	2	2021
Code	С		D		Е		F	G		Н		
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	Unit	
Drain-Source Voltage		$V_{DSS}$	12	V	
Gate-Source Voltage			$V_{GSS}$	±8	V
Continuous Drain Current (Note E) // 4 E)/	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	5.6 4.4	А
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	t < 5s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	7.2 5.8	А
Maximum Continuous Body Diode Forward Curre	ent (Note 5)		I <sub>S</sub>	1	Α
Pulsed Drain Current (10μs pulse, Duty Cycle = 1	1%)	I <sub>DM</sub>	20	Α	
Avalanche Current (L = 0.1mH)		I <sub>AS</sub>	15	Α	
Avalanche Energy (L = 0.1mH)		E <sub>AS</sub>	12	mJ	

### **Thermal Characteristics**

Characteristic	Symbol	Value	Unit		
Total Bower Dissipation (Note 5)	Steady State	Ь	1.4	W	
Total Power Dissipation (Note 5)	t < 5s	$P_{D}$	2.2		
Thermal Peciatones, Junction to Ambient (Note 5)	Steady State	Б	91	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t < 5s	$R_{ hetaJA}$	55		
Thermal Resistance, Junction to Case	$R_{ hetaJC}$	20			
Operating and Storage Temperature Range	$T_{J_i} T_{STG}$	-55 to +150	°C		

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

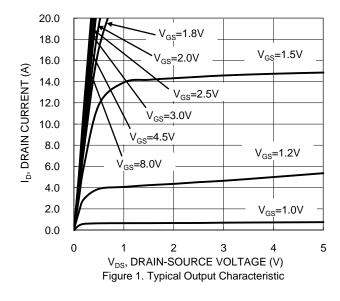
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 6)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	12	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>		_	1.0	μΑ	$V_{DS} = 12V, V_{GS} = 0V$	
Gate-Source Leakage	Igss		_	±100	nA	$V_{GS} = \pm 8V$ , $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.4	_	1	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	
		_	17	29		$V_{GS} = 4.5V, I_D = 5A$	
Statia Drain Sauras On Basistanas	<u> </u>	_	20	34	mΩ	$V_{GS} = 2.5V, I_D = 4.6A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	24	44	11177	$V_{GS} = 1.8V, I_D = 4.1A$	
		_	30	65		$V_{GS} = 1.5V, I_D = 2A$	
Diode Forward Voltage	$V_{SD}$		0.6	1.2	V	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C <sub>iss</sub>		914		pF	V 0V V 0V	
Output Capacitance	Coss		132		pF	$V_{DS} = 6V, V_{GS} = 0V,$ -f = 1.0MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>	_	119	_	pF	1 = 1.0WH12	
Gate Resistance	$R_g$	_	1.26	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge (V <sub>GS</sub> = 4.5V)	0	_	10.5	_	nC		
Total Gate Charge (V <sub>GS</sub> = 8V)	$Q_g$		19.6	_	nC	\/ O\/   O.5A	
Gate-Source Charge	Qgs		1.2	_	nC	$V_{DS} = 6V, I_{D} = 6.5A$	
Gate-Drain Charge	$Q_{gd}$	_	1.6	_	nC	1	
Turn-On Delay Time	t <sub>D(ON)</sub>	_	5.0	_	ns		
Turn-On Rise Time	t <sub>R</sub>		10.5	_	ns	$V_{DD} = 6V, V_{GS} = 4.5V,$	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	16.6	_	ns	$R_L = 1.2\Omega$ , $R_G = 1\Omega$	
Turn-Off Fall Time	t <sub>F</sub>	_	4.1	_	ns	7	

Notes: 5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.

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

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





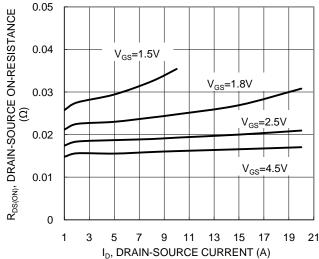


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

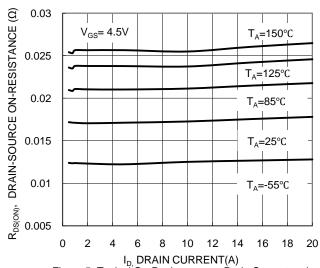
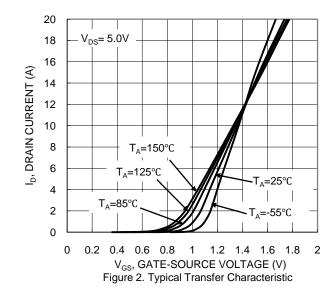
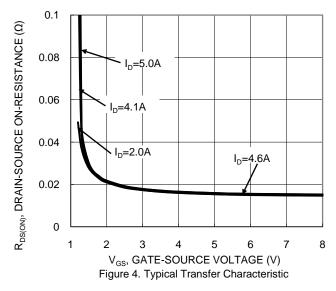
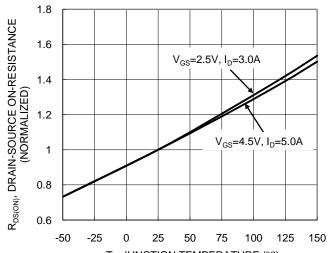


Figure 5. Typical On-Resistance vs. Drain Current and Temperature







T<sub>J</sub>, JUNCTION TEMPERATURE (°C) Figure 6. On-Resistance Variation with Temperature



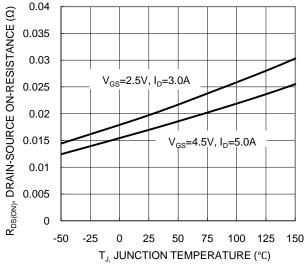
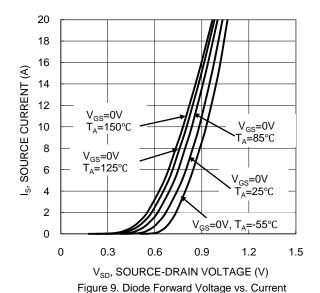
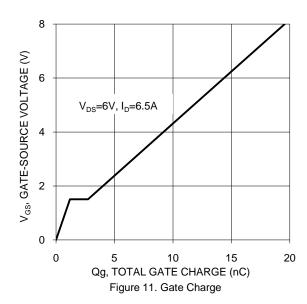


Figure 7. On-Resistance Variation with Temperature





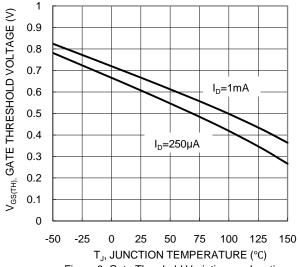
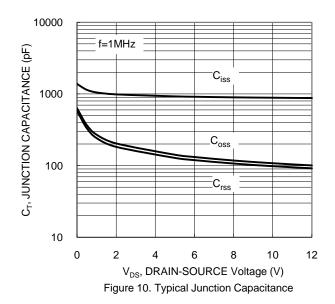
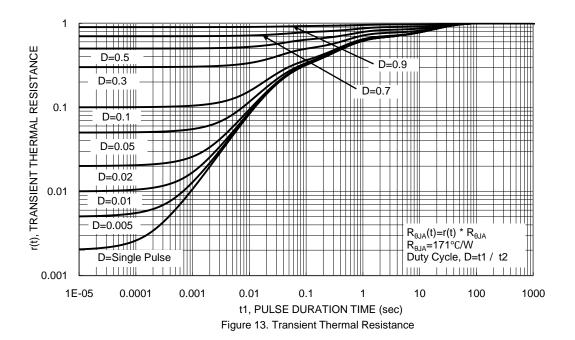


Figure 8. Gate Threshold Variation vs. Junction Temperature



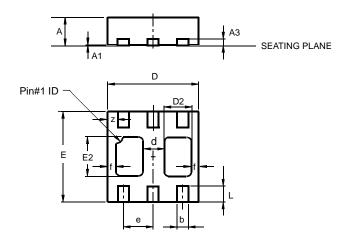
100 ∰P<sub>W</sub>=100μs R<sub>DS(ON)</sub> Limited ID, DRAIN CURRENT (A) 10 1 T<sub>J(Max)</sub>=150°C T<sub>A</sub>=25°C 0.1 Single Pulse DUT on 1\*MRP board V<sub>GS</sub>=4.5V 0.01 0.01 1 100 V<sub>DS.</sub> DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area





# **Package Outline Dimensions**

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

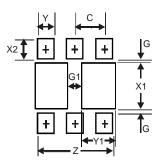


U-DFN2020-6										
	Type B									
Dim	Min	Max	Тур							
Α	0.545	0.605	0.575							
A1	0	0.05	0.02							
A3	_	_	0.13							
b	0.20	0.30	0.25							
D	1.95	2.075	2.00							
d	_	_	0.45							
D2	0.50	0.70	0.60							
е	_		0.65							
E	1.95	2.075	2.00							
E2	0.90	1.10	1.00							
f		_	0.15							
L	0.25	0.35	0.30							
Z			0.225							
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)				
Z	1.67				
G	0.20				
G1	0.40				
X1	1.0				
X2	0.45				
Υ	0.37				
Y1	0.70				
С	0.65				

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