

20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	Rds(on)	I _{D Max} T _A = +25°C
20V	9.5mΩ @ V _{GS} = 4.5 V	11.7A
200	11mΩ @ V _{GS} = 2.5V	10.8A

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

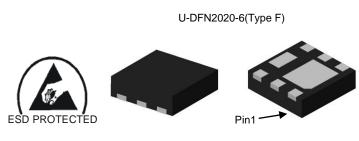
- General Purpose Interfacing Switch
- Power Management Functions

Features

- 0.6mm Profile Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- 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

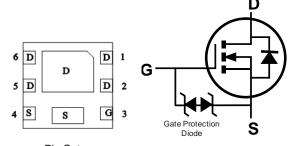
Mechanical Data

- 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)



Top View

Bottom View



Pin Out Bottom View

Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Reel Size (inches)	Quantity per Reel
DMN2011UFDF-7	U-DFN2020-6 (Type F)	7	3,000
DMN2011UFDF-13	U-DFN2020-6 (Type F)	13	10,000

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



N2 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: D = 2016) M = Month (ex: 9 = September)

Date Code Key

- 410 0040 110,												
Year	2016		2017	2018		2019	2020		2021	2022		2023
Code	D		Е	F		G	Н		[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



Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	V _{DSS}	20	V		
Gate-Source Voltage	V _{GSS}	±12	V		
Continuous Dusin Courset (Note CVV)	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	11.7 9.3	А
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t<10s	$T_A = +25$ °C $T_A = +70$ °C	I _D	14.2 11.4	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I _{DM}	80	Α	
Maximum Body Diode Continuous Current	Is	2.5	Α		
Avalanche Current (Notes 7) L = 0.1mH	I _{AS}	18	Α		
Avalanche Energy (Notes 7) L = 0.1mH	E _{AS}	17	mJ		

Thermal Characteristics

Characteristic	Symbol	Value	Unit		
Total Dower Dissination (Note 5)	T _A = +25°C	0	0.73	W	
Total Power Dissipation (Note 5)	T _A = +70°C	P _D	0.47		
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	0	175	°C/W	
memial Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	128		
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	C	2.1	W	
Total Power Dissipation (Note 6)	$T_A = +70^{\circ}C$	P_{D}	1.3		
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	61	°C/W	
Thermal Resistance, Junction to Ambient (Note o)	t<10s	$R_{\theta JA}$	45		
Thermal Resistance, Junction to Case (Note 6)	_	$R_{ heta JC}$	9.3		
Operating and Storage Temperature Range		$T_{J_1}T_{STG}$	-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}	20	l		V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}		1	1	μА	$V_{DS} = 16V$, $V_{GS} = 0V$
Gate-Source Leakage	IGSS	I	l	±10	μΑ	$V_{GS} = \pm 10V$, $V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.4	_	1.0	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$
			6.5	9.5		$V_{GS} = 4.5V, I_D = 7A$
Static Drain-Source On-Resistance	B-s/s/	_	7.5	11	mΩ	$V_{GS} = 2.5V, I_D = 7A$
Static Dialit-Source Off-Resistance	R _{DS(ON)}		10	20	11152	$V_{GS} = 1.8V, I_D = 5A$
			15	35		$V_{GS} = 1.5V, I_D = 3A$
Diode Forward Voltage	V_{SD}		0.7	1.2	V	$V_{GS} = 0V$, $I_{S} = 8.5A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	Ciss		2248	_	pF	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Output Capacitance	Coss		295	_	pF	$V_{DS} = 10V, V_{GS} = 0V,$ - f = 1.0MHz
Reverse Transfer Capacitance 4	C _{rss}	_	265	_	pF	1 = 1.000112
Gate Resistance	R_g	-	1.5	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$
Total Gate Charge (V _{GS} = 4.5V)	Q_g	_	24	_	nC	
Total Gate Charge (V _{GS} = 10V)	Qg	_	56	_	nC	V 40V I 9.5A
Gate-Source Charge	Qgs	_	3.5	_	nC	$V_{DS} = 10V, I_{D} = 8.5A$
Gate-Drain Charge	Q _{qd}	_	5.1	_	nC	
Turn-On Delay Time	t _{D(ON)}		3.6	_	ns	
Turn-On Rise Time	t _R		2.6	_	ns	$V_{DS} = 10V, I_{D} = 8.5A$
Turn-Off Delay Time	t _{D(OFF)}		21.6	_	ns	$V_{GS} = 4.5V, R_q = 1.8\Omega$
Turn-Off Fall Time	t _F		13.5	_	ns	1
Reverse Recovery Time	T _{RR}	_	12.8	_	ns	1 054 11/11 0404/
Reverse Recovery Charge	Q _{RR}		6.9	_	nC	I _F = 8.5A, di/dt = 210A/μs

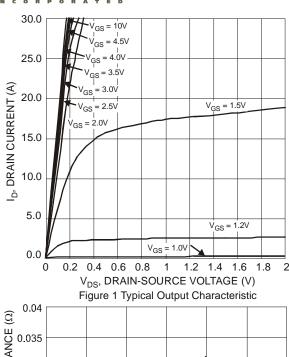
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout. 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. Notes:

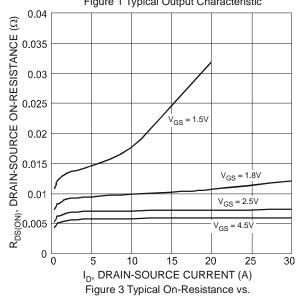
^{7.} I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.

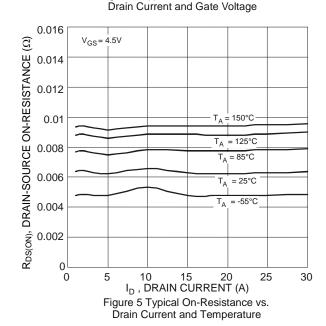
^{8.} Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

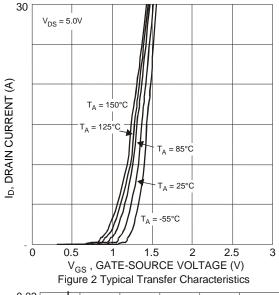


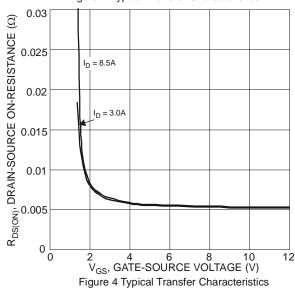












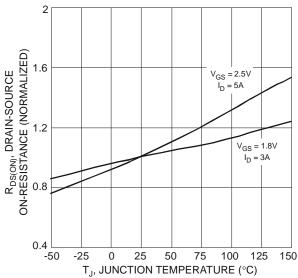
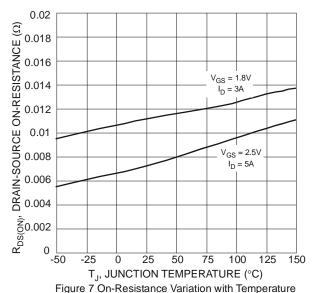


Figure 6 On-Resistance Variation with Temperature







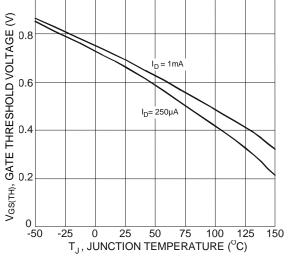
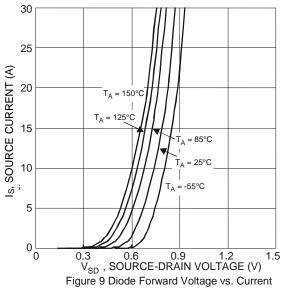
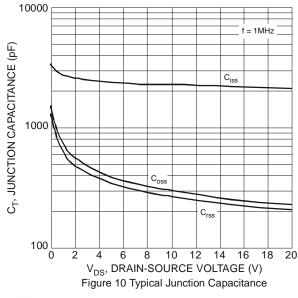
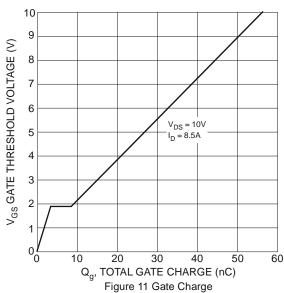
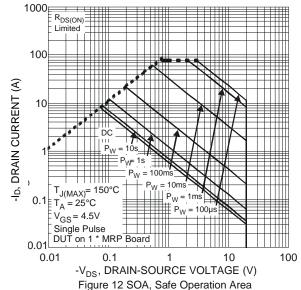


Figure 8 Gate Threshold Variation vs. Ambient Temperature

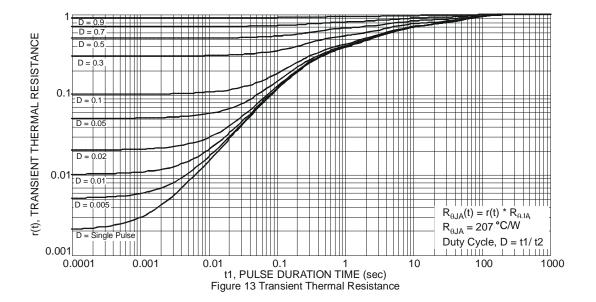










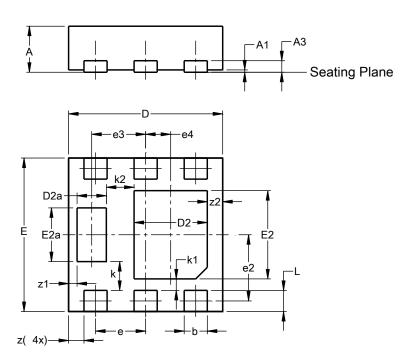




Package Outline Dimensions

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

U-DFN2020-6 (Type F)

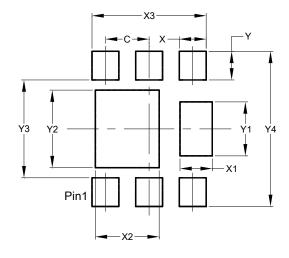


U-DFN2020-6								
(Type F)								
Dim	Min	Max	Тур					
Α	0.57	0.63	0.60					
A1	0.00	0.00 0.05 0.0						
A3	-	-	0.15					
b	0.25	0.35	0.30					
D	1.95	2.05	2.00					
D2	0.85	1.05	0.95					
D2a	0.33	0.43	0.38					
E	1.95	2.05	2.00					
E2	1.05	1.25	1.15					
E2a	0.65	0.75	0.70					
е	0.65 BSC							
e2	().863 BS	SC					
е3		0.70 BS	С					
e4	().325 BS	SC					
k		0.37 BS	С					
k1	0.15 BSC							
k2	0.36 BSC							
L	0.225 0.325 0.275							
Z	0.20 BSC							
z 1	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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