



20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D max T _A = 25°C
	11mΩ @ $V_{GS} = 4.5V$	10.5A
20V	13mΩ @ V _{GS} = 2.5V	9.4A

Description and Applications

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

- General Purpose Interfacing Switch
- Power Management Functions

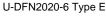
Features and Benefits

- 0.6mm profile ideal for low profile applications
- PCB footprint of 4mm²
- Low Gate Threshold Voltage
- 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

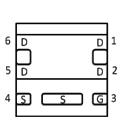
- Case: U-DFN2020-6 Type E
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0065 grams (approximate)



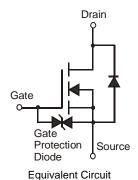




Bottom View



Pin Out



Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Quantity per reel
DMN2013UFDE-7	N6	7	3,000
DMN2013UFDE-13	N6	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 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.

Marking Information



N6 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: Y = 2011) M = Month (ex: 9 = September)

Date Code Key

-													
	Year	201	1	2012		2013	20	14	2015		2016	2	2017
	Code	Υ		Z		Α	E	3	С		D		Е
Ī	Month	Jan	Feb	Mar	Apr	Mav	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ī	Code	1	2	3	4	5	6	7	8	9	0	N	D



Maximum Ratings @ $T_A = 25$ °C unless otherwise specified

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V _{DSS}	20	V		
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Durin Courset (Note C) V	Steady State	T _A = 25°C T _A = 70°C	ID	10.5 8.5	А
Continuous Drain Current (Note 6) V _{GS} = 4.5V	t<10s	T _A = 25°C T _A = 70°C	I _D	12.5 10.0	А
Continuous Durin Courset (Nata C) V	T _A = 25°C T _A = 70°C	I _D	9.4 7.5	А	
Continuous Drain Current (Note 6) V _{GS} = 2.5V	t<10s	T _A = 25°C T _A = 70°C	I _D	11.2 8.8	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	80	Α		
Maximum Body Diode Continuous Current	IS	2.5	Α		

Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	_	Symbol	Value	Units
Total Dawar Dissination (Note 5)	T _A = 25°C		0.66	W
Total Power Dissipation (Note 5)	$T_A = 70$ °C	P_D	0.42	
Thermal Begintenes, Junetian to Ambient (Note 5)	Steady state	<u> </u>	189	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	132	
Total Dawer Dissination (Note 6)	$T_A = 25$ °C	Р	2.03	W
Total Power Dissipation (Note 6)	$T_A = 70$ °C	P_{D}	1.31	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	<u> </u>	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 _{J,} T _{STG}	-55 to +150	°C

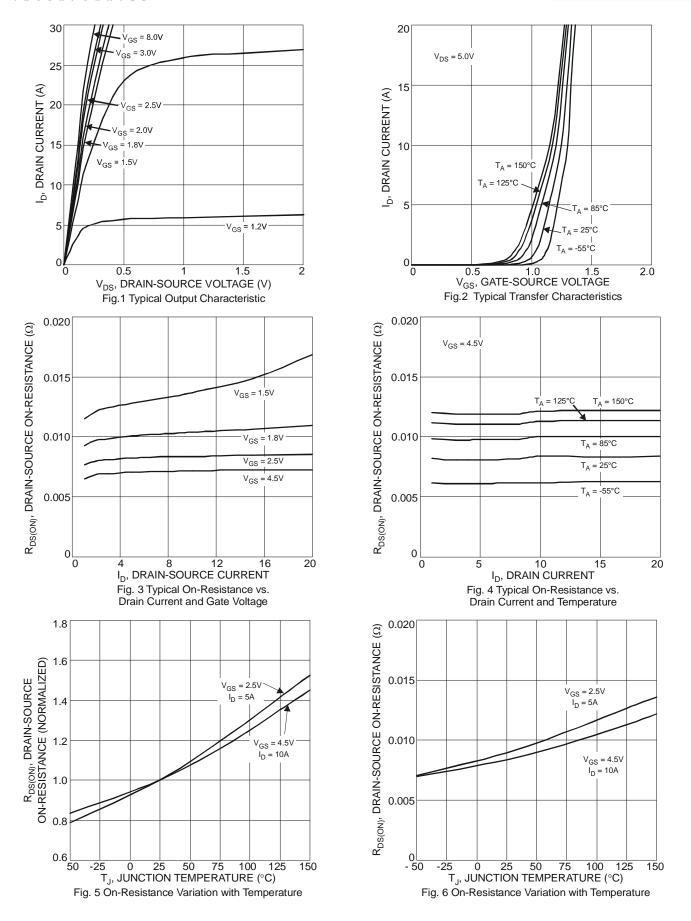
Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current T _J = 25°C	I _{DSS}	-	-	1	μΑ	V _{DS} = 16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±2	μΑ	$V_{GS} = \pm 8V$, $V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	0.5	-	1.1	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$
Static Drain-Source On-Resistance	В		8.4	11	mΩ	$V_{GS} = 4.5V, I_D = 8.5A$
Static Diain-Source On-Resistance	R _{DS (ON)}	-	9.8	13	1117.5	$V_{GS} = 2.5V, I_D = 8.5A$
Forward Transfer Admittance	Y _{fs}	-	10	-	S	$V_{DS} = 5V, I_{D} = 4A$
Diode Forward Voltage	V _{SD}	-	-	1.2	V	$V_{GS} = 0V, I_S = 8.5A$
DYNAMIC CHARACTERISTICS (Note 8)				ā.		_
Input Capacitance	C _{iss}	-	2453	-	pF	401/1/
Output Capacitance	Coss	-	275	-	pF	$V_{DS} = 10V, V_{GS} = 0V,$ - f = 1.0MHz
Reverse Transfer Capacitance	C _{rss}	-	257	-	pF	1 = 1.000112
Gate Resistance	Rg	-	1.2	-	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$
Total Gate Charge (V _{GS} = 4.5V)	Qg	-	14.3	-	nC	
Total Gate Charge (V _{GS} = 8V)	Qg	-	25.8	-	nC	V 40V I 0.5A
Gate-Source Charge	Q _{gs}	-	1.8	-	nC	$V_{DS} = 10V, I_{D} = 8.5A$
Gate-Drain Charge	Q_{gd}	-	2.1	-	nC	
Turn-On Delay Time	t _{D(on)}	-	9.9	-	ns	
Turn-On Rise Time	t _r	-	24.5	-	ns	$V_{DS} = 10V, I_{D} = 8.5A$
Turn-Off Delay Time	t _{D(off)}	-	66.4	-	ns	$V_{GS} = 4.5V, R_G = 1.8\Omega$
Turn-Off Fall Time	t _f	-	20.8	-	ns	

Notes:

- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate
- 7. Short duration pulse test used to minimize self-heating effect 8. Guaranteed by design. Not subject to production testing







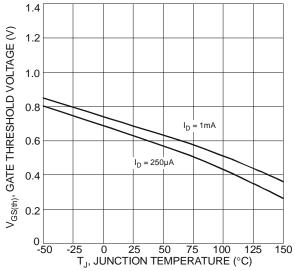
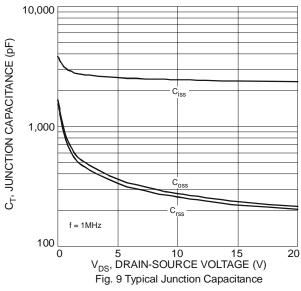
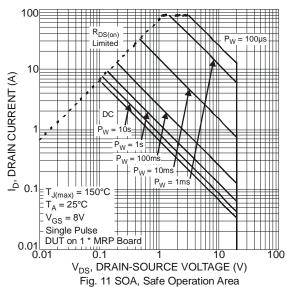
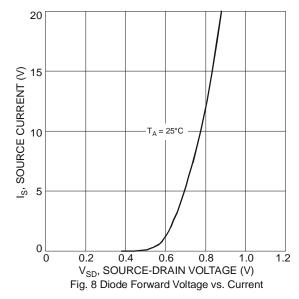
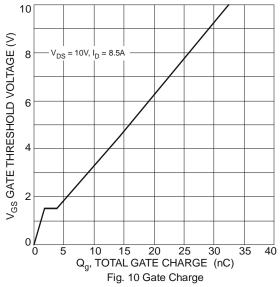


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

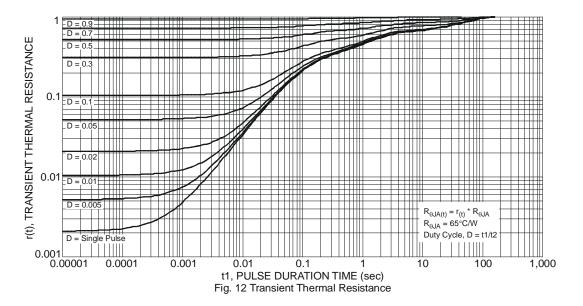




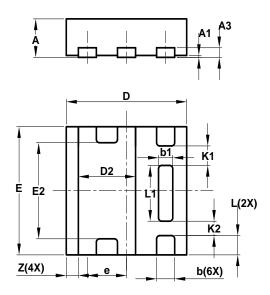






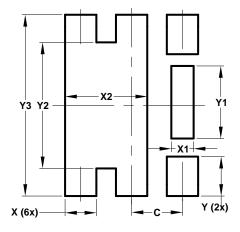


Package Outline Dimensions



U-DFN2020-6 Type E								
Dim	7							
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	Dimens	ions in r	nm					

Suggested Pad Layout



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



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