

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ C$
30V	12m Ω @ $V_{GS} = 10V$	10A
	16m Ω @ $V_{GS} = 4.5V$	8.5A

Description and Applications

This 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.

- Battery Management Application
- Power Management Functions
- DC-DC Converters

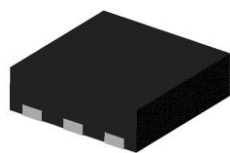
Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

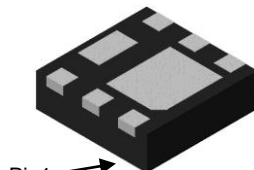
Mechanical Data

- 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 **(e4)**
- Weight: 0.0065 grams (Approximate)

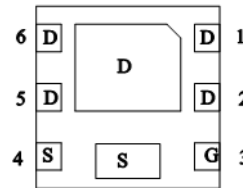
U-DFN2020-6 (Type F)



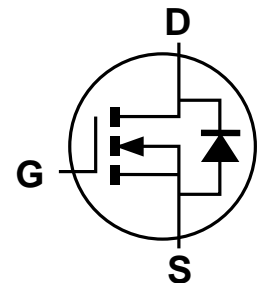
Top View



Bottom View



Pin Out
Bottom View



Equivalent Circuit

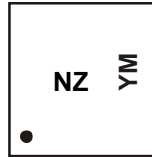
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LDFD-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMN3016LDFD-13	U-DFN2020-6 (Type F)	10,000/Tape & Reel

- 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 <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

Site 1



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

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	E	F	G	H	I	J	K	L	M

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Site 2



NZ = 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
Code	9	0	1	2	3	4	5	6

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	Y	Z

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V _{DSS}	30	V	
Gate-Source Voltage	V _{GSS}	±20	V	
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C	10	A
		T _A = +70°C	8	
	t < 10s	T _A = +25°C	12	A
		T _A = +70°C	9	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	2.5	A	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	50	A	
Avalanche Current (Note 7) L = 0.1mH	I _{AR}	22	A	
Avalanche Energy (Note 7) L = 0.1mH	E _{AR}	24	mJ	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	P _D	T _A = +25°C	0.73	W
		T _A = +70°C	0.47	
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	Steady State	174	°C/W
		t < 10s	121	
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	2.02	W
		T _A = +70°C	1.30	
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	Steady State	66	°C/W
		t < 10s	42	
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	11.6		
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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.4	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	8	12	mΩ	V _{GS} = 10V, I _D = 11A
		—	12	16		V _{GS} = 4.5V, I _D = 9A
Diode Forward Voltage	V _{SD}	—	0.70	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1415	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	119	—		
Reverse Transfer Capacitance	C _{rss}	—	82	—		
Gate Resistance	R _g	—	2.6	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	11.3	—	nC	V _{DS} = 15V, I _D = 12A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	25.1	—		
Gate-Source Charge	Q _{gs}	—	3.5	—		
Gate-Drain Charge	Q _{gd}	—	3.6	—		
Turn-On Delay Time	t _{D(ON)}	—	4.8	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 1.25Ω, R _g = 3Ω
Turn-On Rise Time	t _r	—	16.5	—		
Turn-Off Delay Time	t _{D(OFF)}	—	26.1	—		
Turn-Off Fall Time	t _f	—	5.6	—		
Reverse Recovery Time	t _{RR}	—	12.3	—	ns	I _F = 12A, di/dt = 500A/μs
Reverse Recovery Charge	Q _{RR}	—	10.4	—	nC	

- 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.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

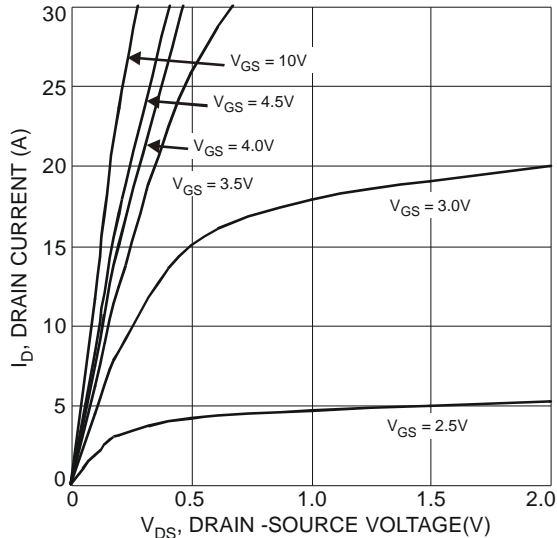


Fig. 1 Typical Output Characteristics

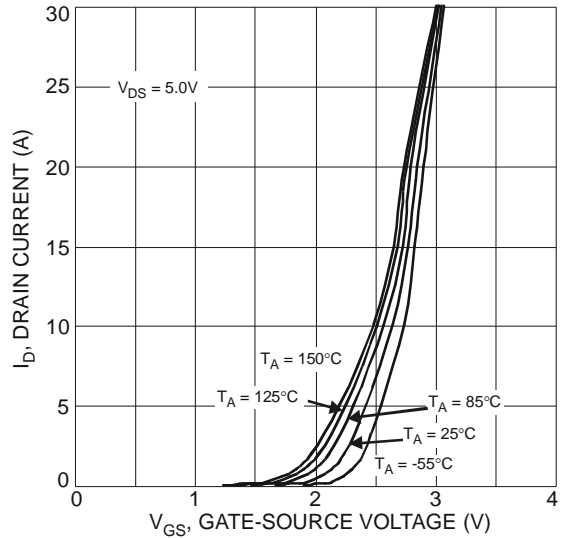


Fig. 2 Typical Transfer Characteristics

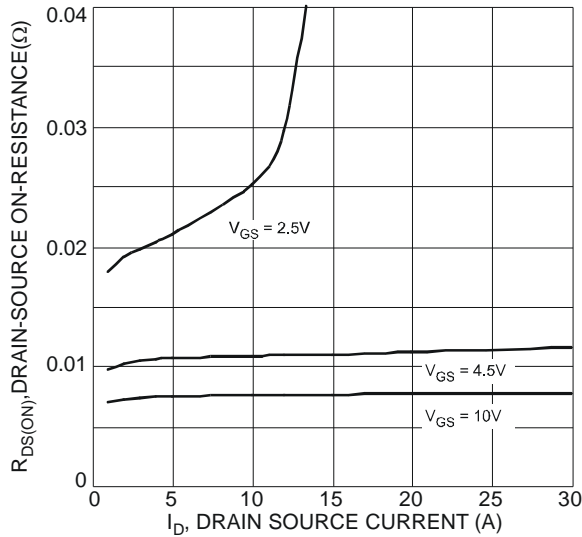


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

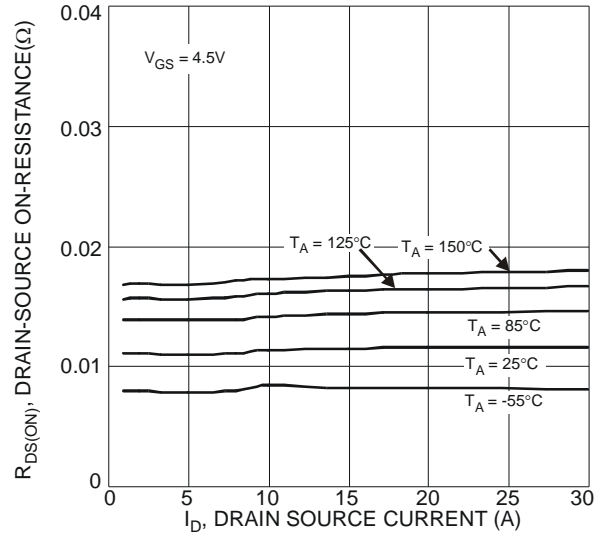


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

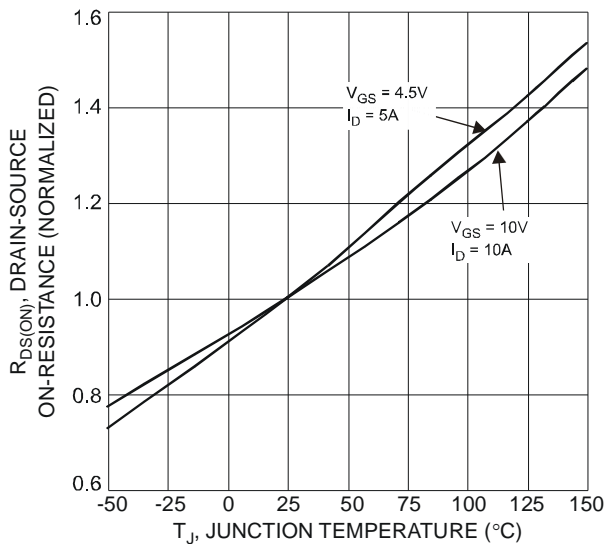


Fig. 5 On-Resistance Variation with Temperature

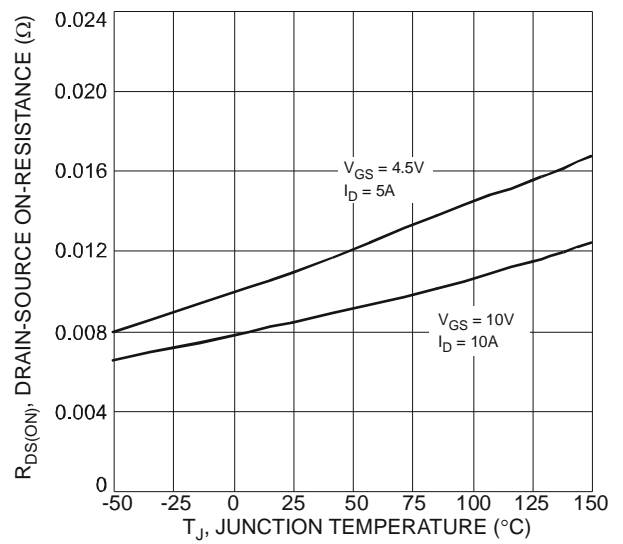


Fig. 6 On-Resistance Variation with Temperature

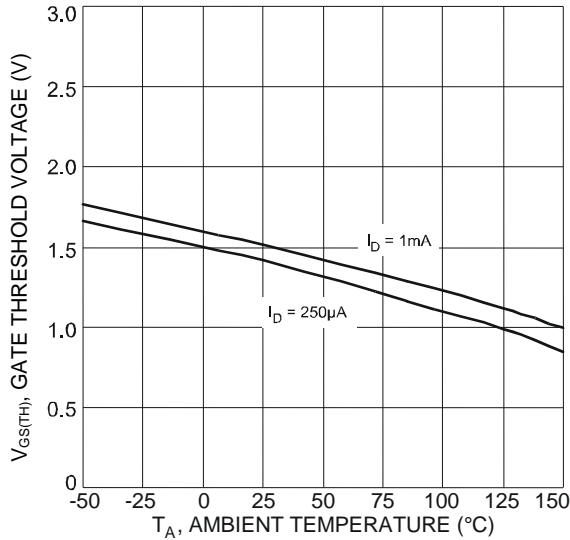


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

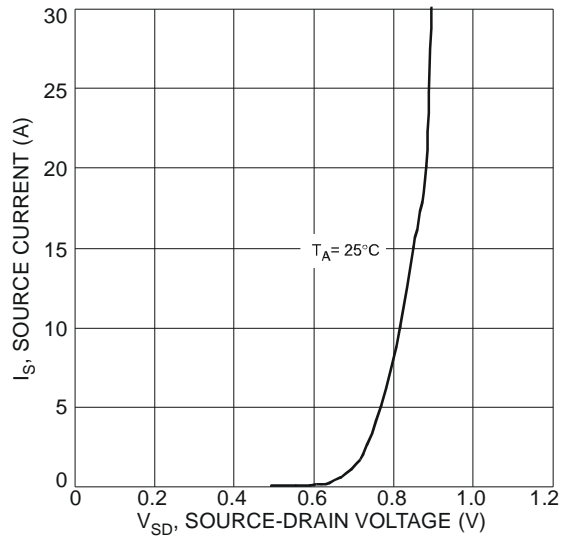


Fig. 8 Diode Forward Voltage vs. Current

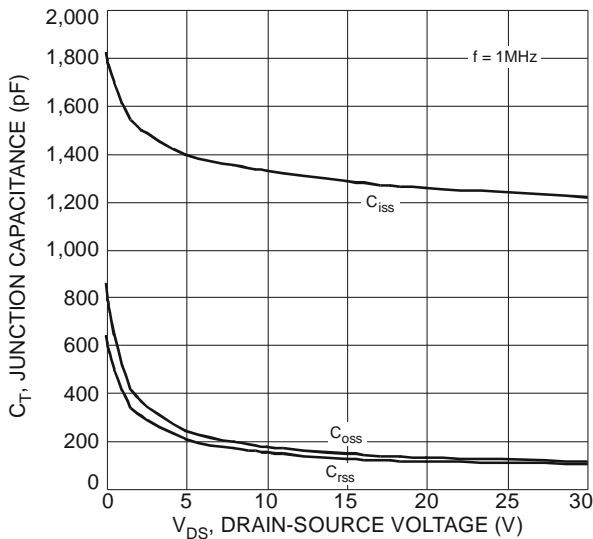


Fig. 9 Typical Junction Capacitance

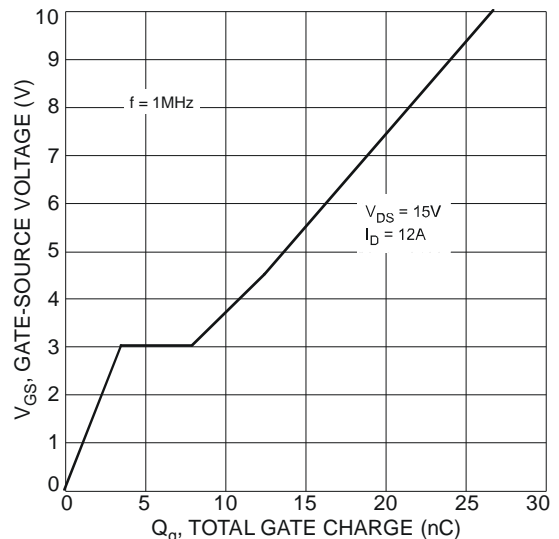


Fig. 10 Gate-Charge Characteristics

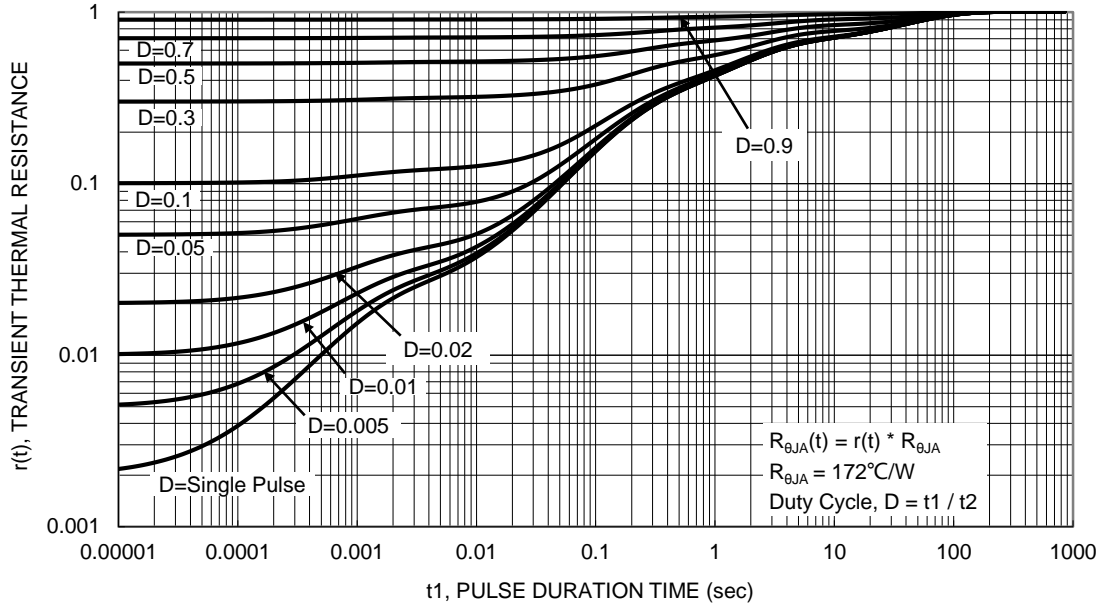


Figure 11. Transient Thermal Resistance

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