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[DMN10H170SFDE-7](#)

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DMN10H170SFDE

100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ C$
100V	160mΩ @ $V_{GS} = 10V$	2.9A
	200mΩ @ $V_{GS} = 4.5V$	2.6A

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

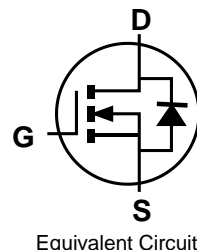
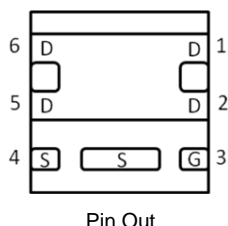
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- 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 Ⓔ4
- Weight: 0.0065 grams (Approximate)



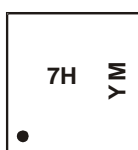
Ordering Information (Note 4)

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.
 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

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 Code	2014	2015	2016	2017	2018	2019	2020	2020
	B	C	D	E	F	G	H	I

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

Maximum Ratings (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	I_D	$T_A = +25^\circ\text{C}$	2.9
		$T_A = +70^\circ\text{C}$	2.3
	I_D	$T_A = +25^\circ\text{C}$	3.4
		$T_A = +70^\circ\text{C}$	2.7
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	10	A
Maximum Body Diode Continuous Current	I_S	2.5	A
Avalanche Current (Note 7)	I_{AS}	4.7	A
Avalanche Energy (Note 7)	E_{AS}	16	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	$T_A = +25^\circ\text{C}$	0.66
		$T_A = +70^\circ\text{C}$	0.42
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	Steady state	189
		$t < 10\text{s}$	132
Total Power Dissipation (Note 6)	P_D	$T_A = +25^\circ\text{C}$	2.03
		$T_A = +70^\circ\text{C}$	1.31
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	Steady state	61
		$t < 10\text{s}$	43
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	9.3	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	-	-	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	-	-	1	μA	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	2.0	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	116	160	m Ω	$V_{GS} = 10\text{V}, I_D = 5.0\text{A}$
			126	200		$V_{GS} = 4.5\text{V}, I_D = 5.0\text{A}$
Diode Forward Voltage	V_{SD}	-	0.9	1.0	V	$V_{GS} = 0\text{V}, I_S = 10\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	1167	-	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	36	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	25	-	pF	
Gate Resistance	R_g	-	1.3	-	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	-	4.9	-	nC	$V_{DS} = 80\text{V}, I_D = 12.8\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	-	9.7	-	nC	
Gate-Source Charge	Q_{gs}	-	2.0	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.0	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	10.5	-	ns	$V_{DS} = 50\text{V}, I_D = 12.8\text{A}$ $V_{GS} = 10\text{V}, R_G = 25\Omega$
Turn-On Rise Time	t_r	-	11.1	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	42.6	-	ns	
Turn-Off Fall Time	t_f	-	12.8	-	ns	$I_F = 12.8\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Time	T_{rr}	-	30.3	-	ns	
Reverse Recovery Charge	Q_{rr}	-	35.2	-	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.
 - .UIS in production with $L = 1.43\text{mH}$, $T_J = +25^\circ\text{C}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.



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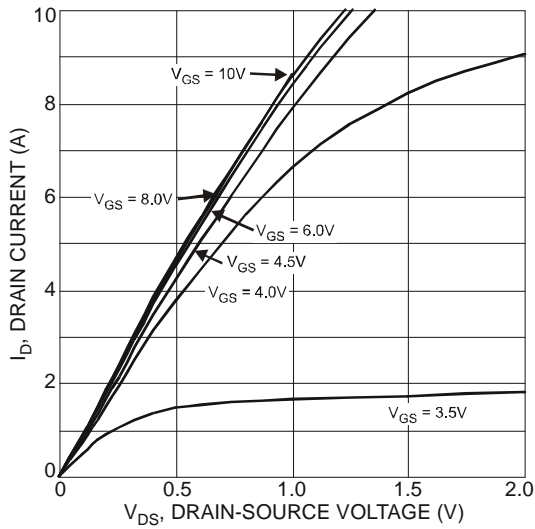


Fig. 1 Typical Output Characteristic

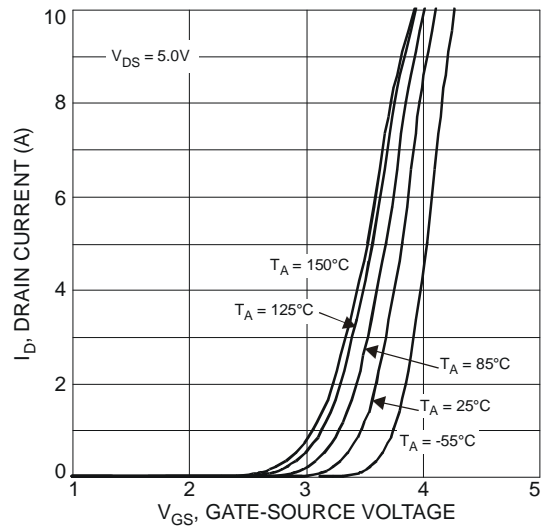


Fig. 2 Typical Transfer Characteristics

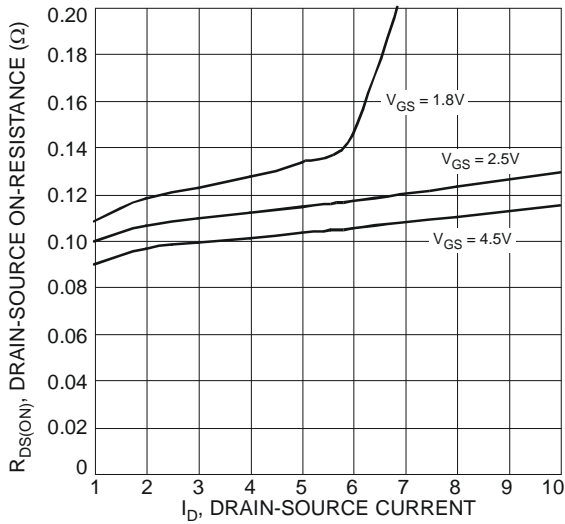


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

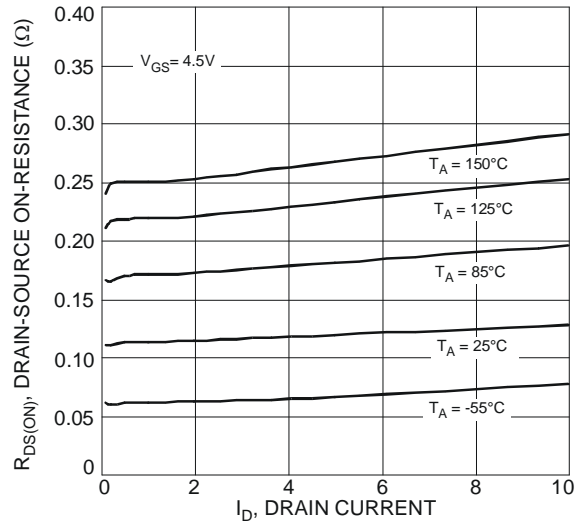


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

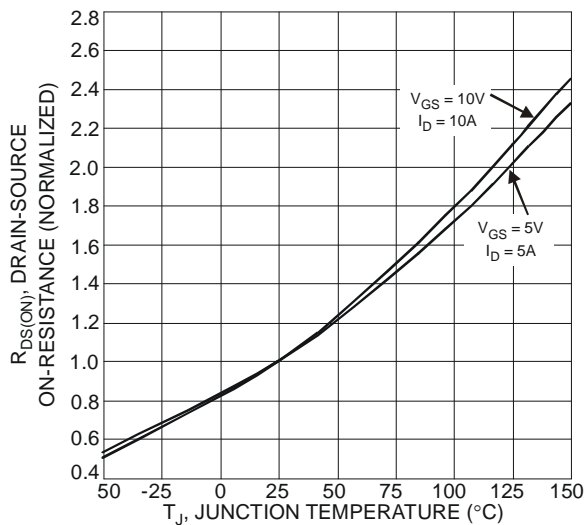


Fig. 5 On-Resistance Variation with Temperature

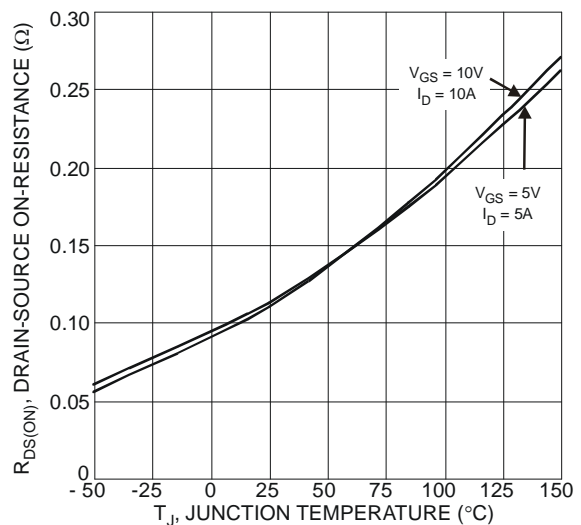


Fig. 6 On-Resistance Variation with Temperature



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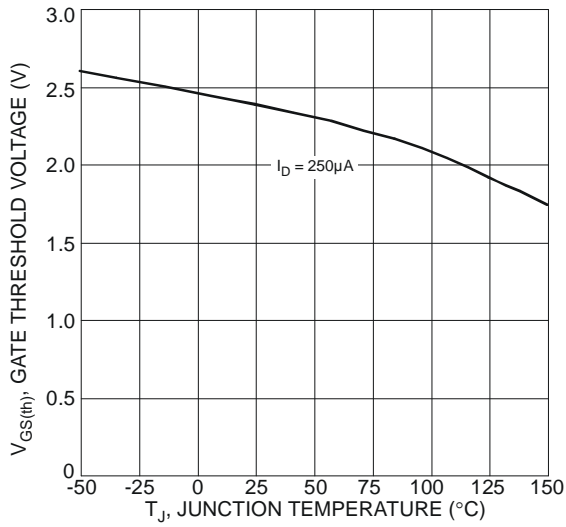


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

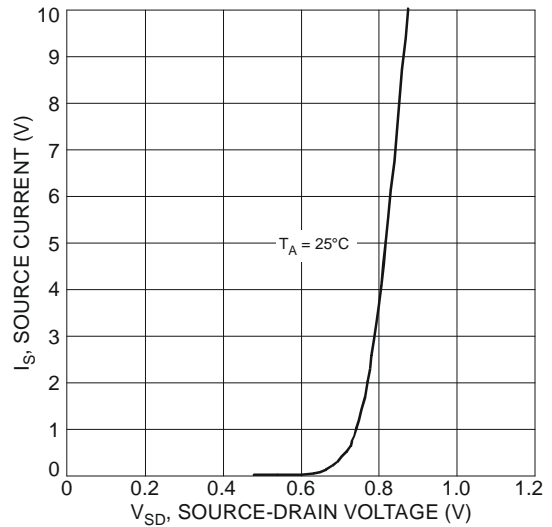


Fig. 8 Diode Forward Voltage vs. Current

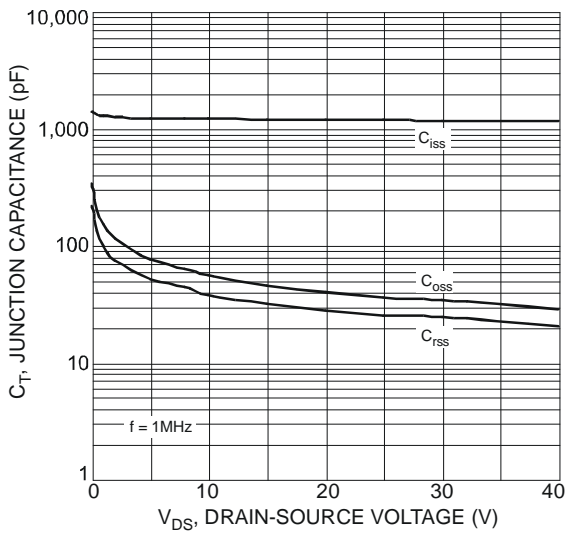


Fig. 9 Typical Junction Capacitance

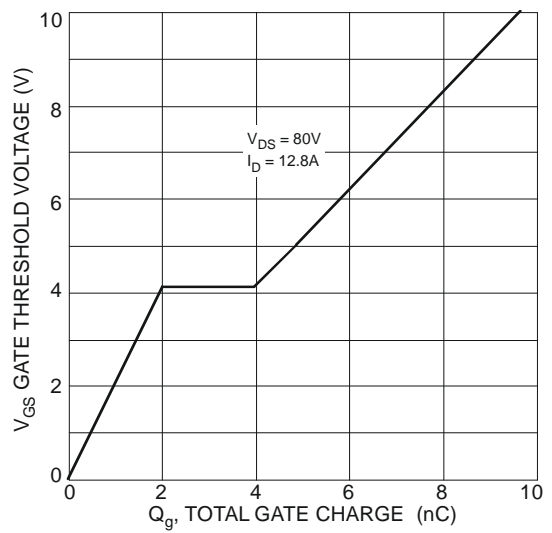


Fig. 10 Gate Charge

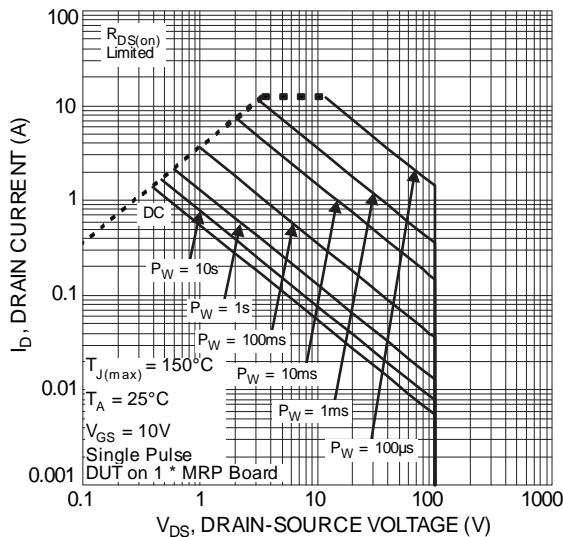


Figure 11 SOA, Safe Operation Area

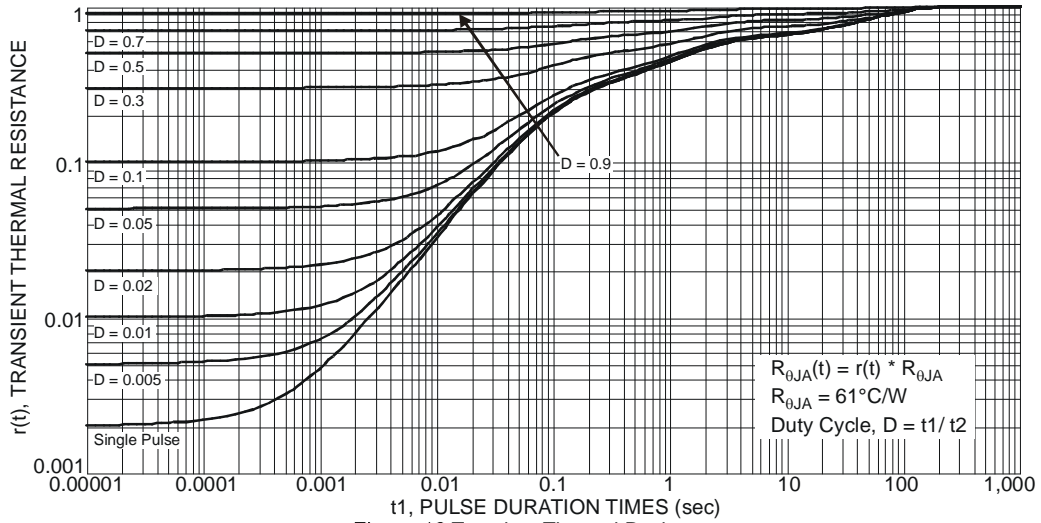
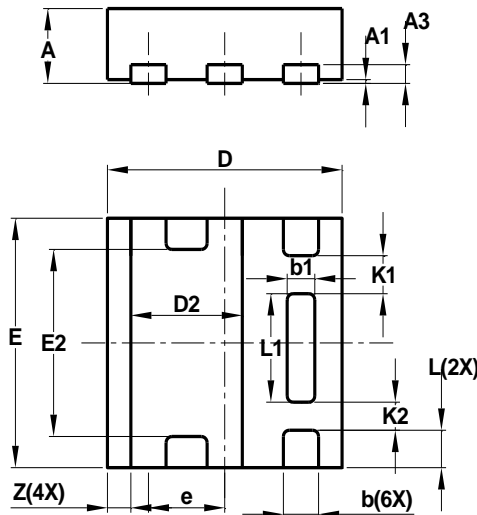


Figure 12 Transient Thermal Resistance

Package Outline Dimensions

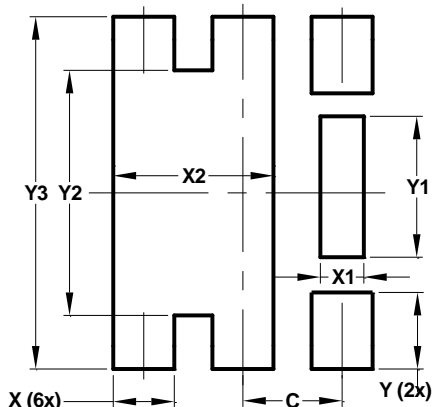
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	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
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	—	—	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)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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