

Product Summary

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

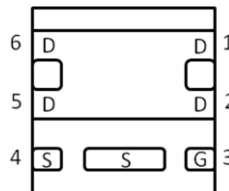
Mechanical Data

- 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 
- Weight: 0.0065 grams (Approximate)

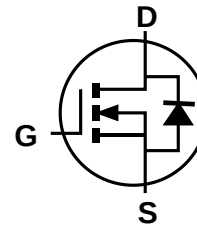
U-DFN2020-6



Bottom View



Pin Out



Equivalent Circuit

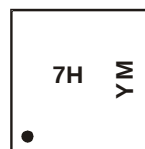
Ordering Information (Note 4)

Part Number	Compliance	Case	Quantity per reel
DMN10H170SFDE-7	Standard	U-DFN2020-6	3,000
DMN10H170SFDE-13	Standard	U-DFN2020-6	10,000

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - 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	2014	2015	2016	2017	2018	2019	2020	2020
Code	B	C	D	E	F	G	H	I

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

Maximum Ratings (@T_A = +25°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} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	2.9 2.3	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	3.4 2.7	A
Pulsed Drain Current (10μs 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°C unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.66	W
	T _A = +70°C		0.42	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	189	°C/W
	t < 10s		132	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.03	W
	T _A = +70°C		1.31	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	61	°C/W
	t < 10s		43	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	1	μA	V _{DS} = 100V, 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)}	1.0	2.0	3.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	116	160	mΩ	V _{GS} = 10V, I _D = 5.0A
			126	200		V _{GS} = 4.5V, I _D = 5.0A
Diode Forward Voltage	V _{SD}	-	0.9	1.0	V	V _{GS} = 0V, I _S = 10A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	1167	-	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	36	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	25	-	pF	
Gate Resistance	R _g	-	1.3	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	-	4.9	-	nC	V _{DS} = 80V, I _D = 12.8A
Total Gate Charge (V _{GS} = 10V)	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} = 50V, I _D = 12.8A V _{GS} = 10V, R _G = 25Ω
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	
Reverse Recovery Time	T _{rr}	-	30.3	-	ns	I _F = 12.8A, di/dt = 100A/μs
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 = 1.43mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

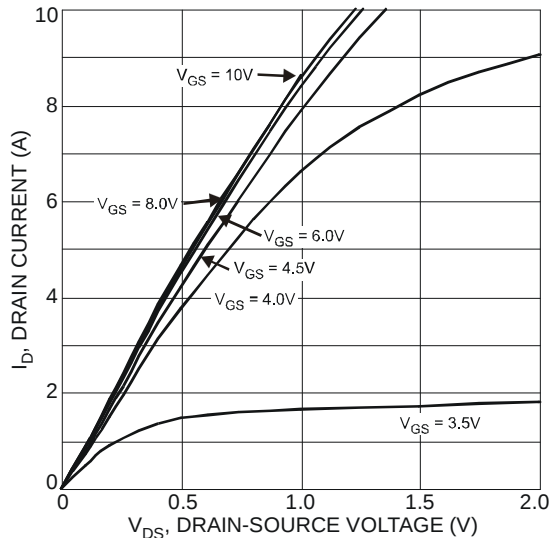


Fig. 1 Typical Output Characteristic

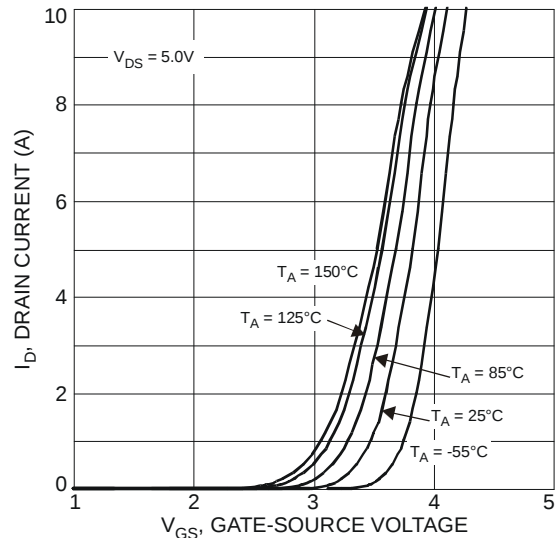


Fig. 2 Typical Transfer Characteristics

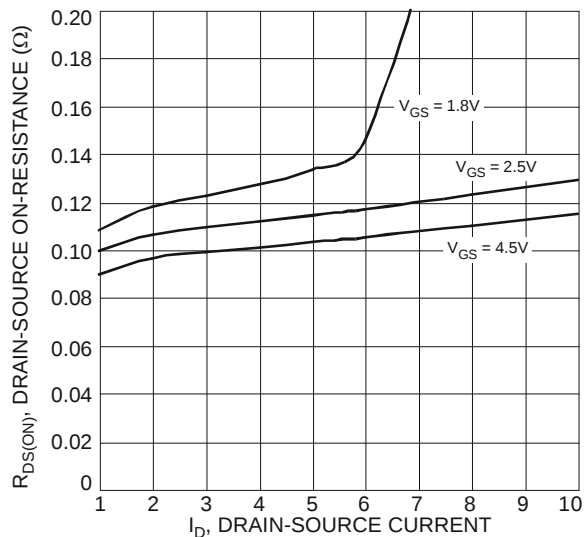


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

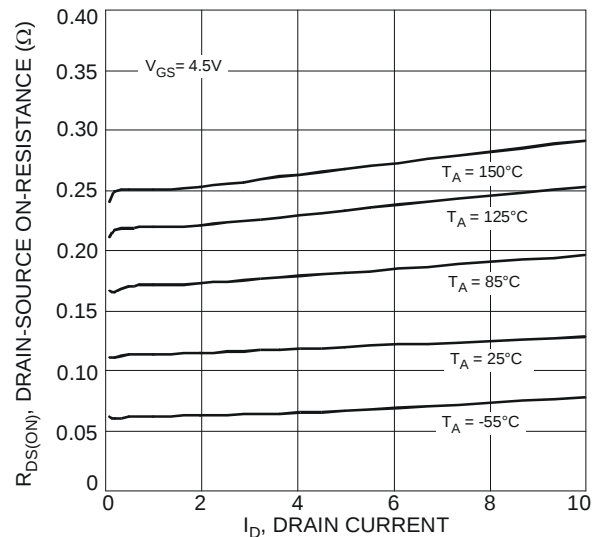


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

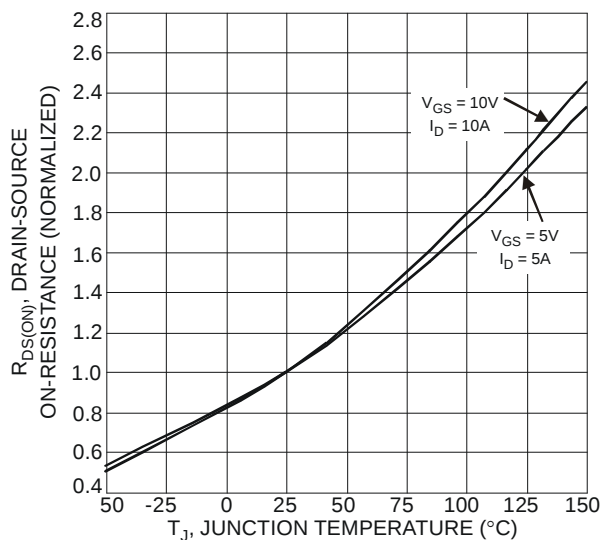


Fig. 5 On-Resistance Variation with Temperature

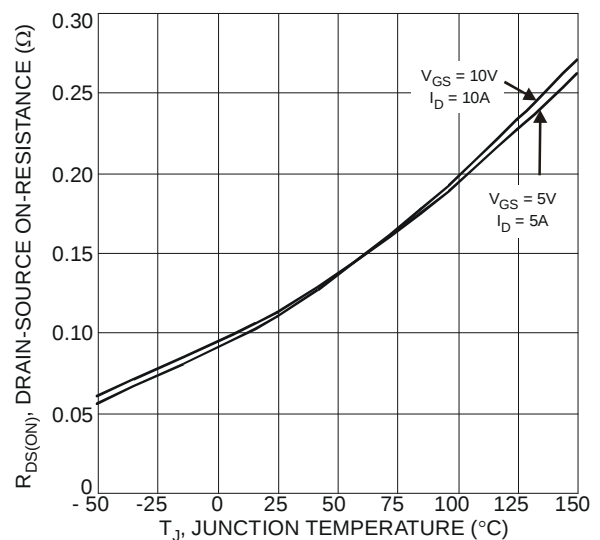


Fig. 6 On-Resistance Variation with Temperature

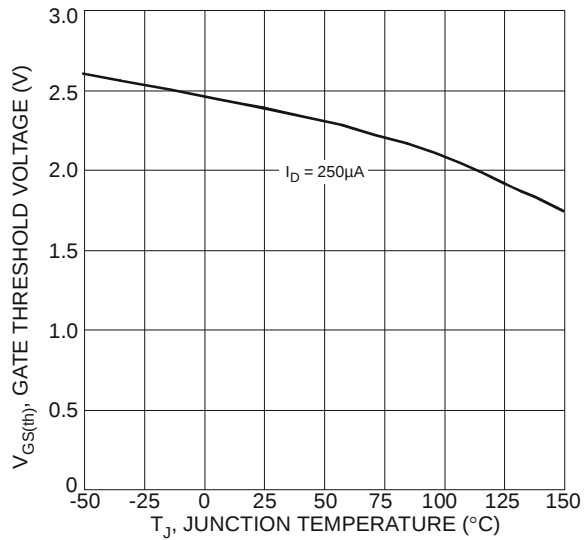


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

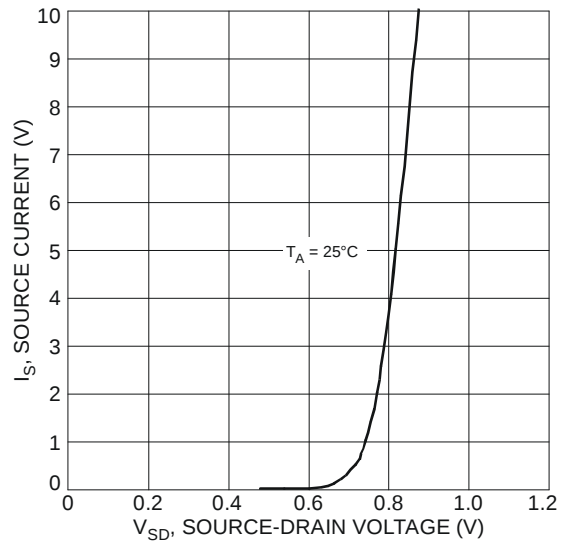


Fig. 8 Diode Forward Voltage vs. Current

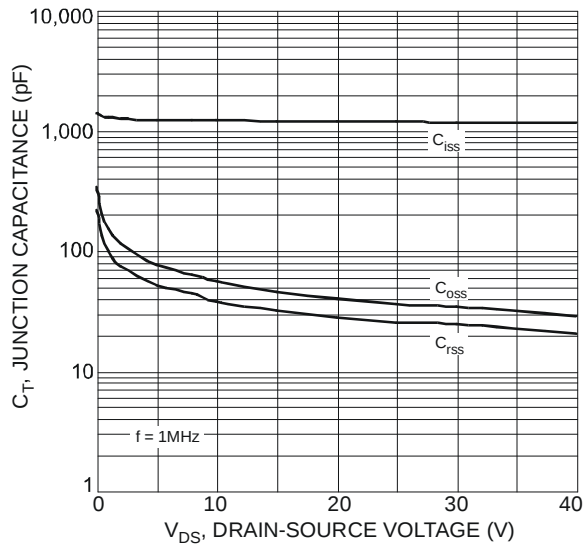


Fig. 9 Typical Junction Capacitance

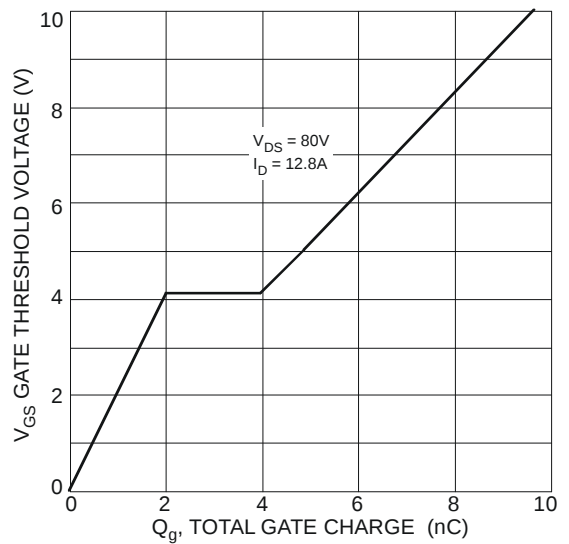


Fig. 10 Gate Charge

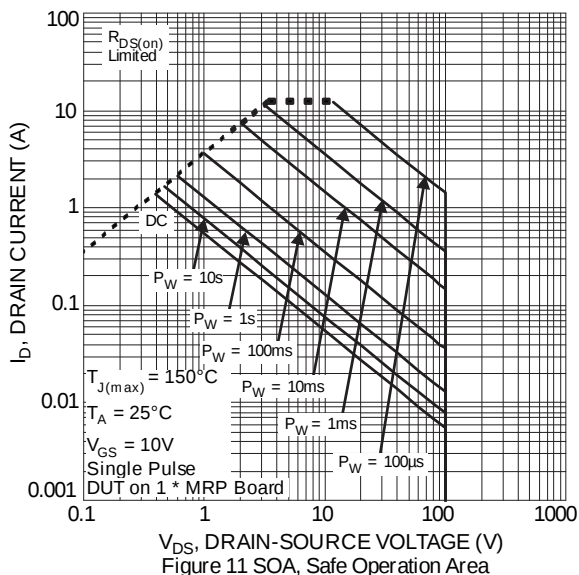
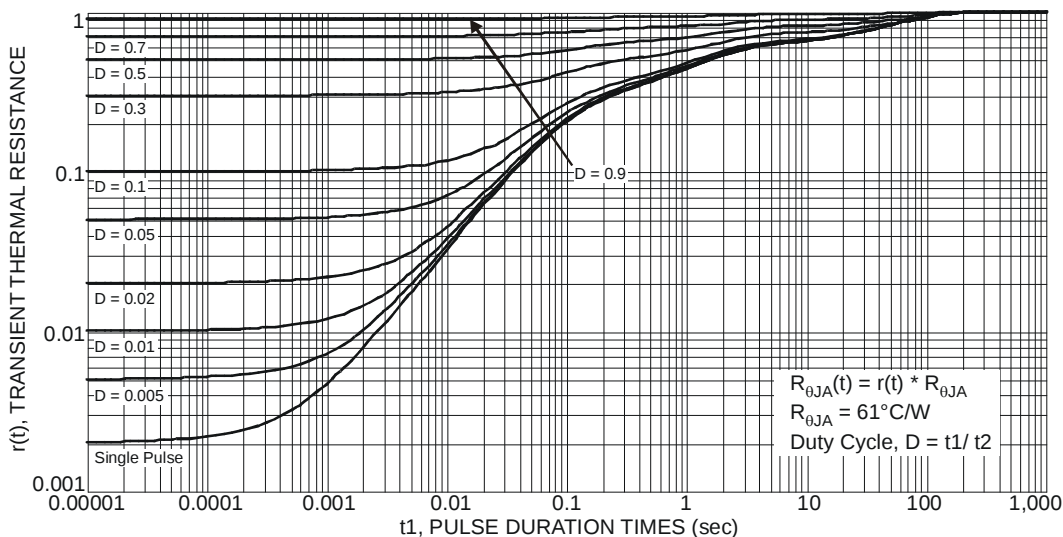
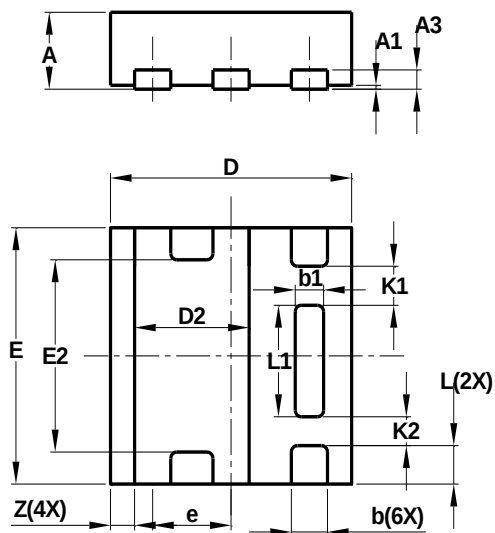


Figure 11 SOA, Safe Operation Area



Package Outline Dimensions

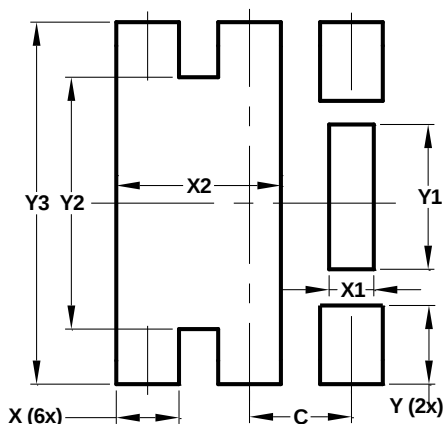
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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