

Product Summary

Device	V _{(BR)DSS}	R _{DS(ON)} max	I _D MAX T _A = +25°C
N-Channel	12V	25mΩ @ V _{GS} = 4.5V	6.9A
		30mΩ @ V _{GS} = 2.5V	6.3A
		38mΩ @ V _{GS} = 1.8V	5.5A

Description

This MOSFET has been 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

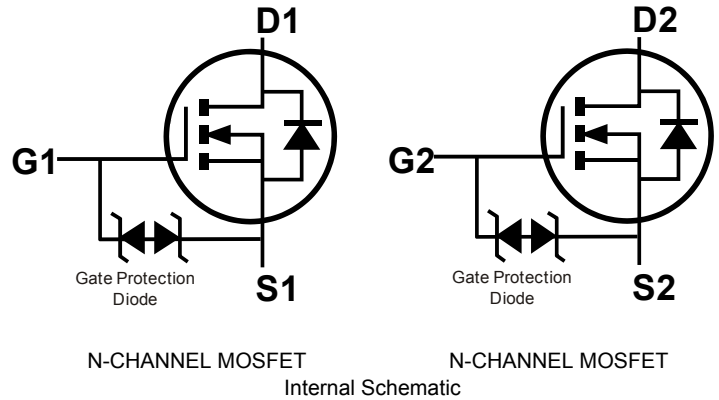
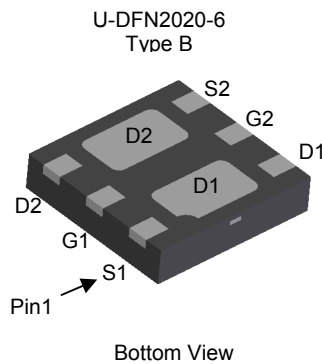
- Load Switch
- Power Management Functions
- Portable Power Adaptors

Features

- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Max Height
- 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 B
- 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)
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (approximate)

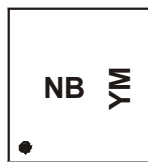


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1025UFDB-7	U-DFN2020-6 Type B	3000/Tape & Reel
DMN1025UFDB-13	U-DFN2020-6 Type B	10000/Tape & Reel

- 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/quality/product_compliance_definitions/.

Marking Information



NB = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

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}	12	V	
Gate-Source Voltage	V _{GSS}	±10	V	
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C	6.9	A
		T _A = +70°C	5.5	
	t < 5s	T _A = +25°C	8.8	A
		T _A = +70°C	7.0	
Maximum Continuous Body Diode Forward Current (Note 5)	I _S	1	A	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	35	A	
Avalanche Current (Note 6) L = 0.1mH	I _{AS}	9.8	A	
Avalanche Energy (Note 6) L = 0.1mH	E _{AS}	4.8	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)	P _D	Steady State	1.7	W
		t < 5s	2.9	
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	Steady State	71	°C/W
		t < 5s	43	
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	13		
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C	

Electrical Characteristics N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	12	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	µA	V _{DS} = 12V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	0.4	—	1	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	18	25	mΩ	V _{GS} = 4.5V, I _D = 5.2A
		—	20	30		V _{GS} = 2.5V, I _D = 4.8A
		—	25	38		V _{GS} = 1.8V, I _D = 2.5A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 5.4A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	917	—	pF	V _{DS} = 6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	120	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	102	—	pF	
Gate Resistance	R _g	—	11.4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	12.6	—	nC	V _{DS} = 10V, I _D = 6.8A
Total Gate Charge (V _{GS} = 8V)		—	23.1	—	nC	
Gate-Source Charge	Q _{gs}	—	1.3	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.6	—	nC	
Turn-On Delay Time	t _{D(on)}	—	3.0	—	ns	V _{DD} = 6V, V _{GS} = 4.5V, R _L = 1.1Ω, R _G = 1Ω
Turn-On Rise Time	t _r	—	9.3	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	17.2	—	ns	
Turn-Off Fall Time	t _f	—	2.8	—	ns	
Body Diode Reverse Recovery Time	t _{rr}	—	6.8	—	nS	I _S = 5.4A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{rr}	—	1.1	—	nC	I _S = 5.4A, dI/dt = 100A/µs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating 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.

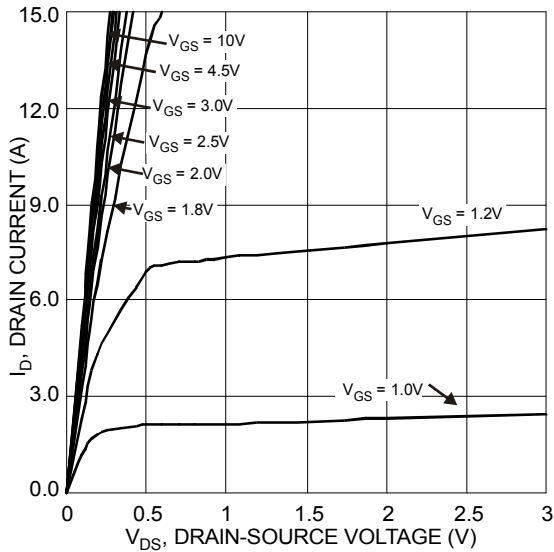


Figure 1 Typical Output Characteristic

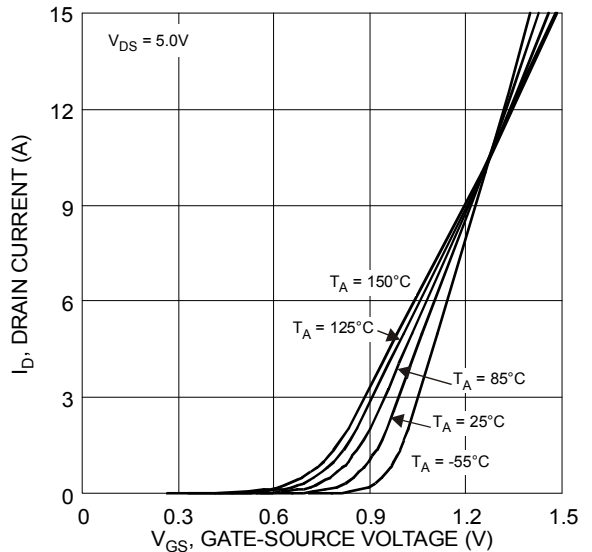


Figure 2 Typical Transfer Characteristics

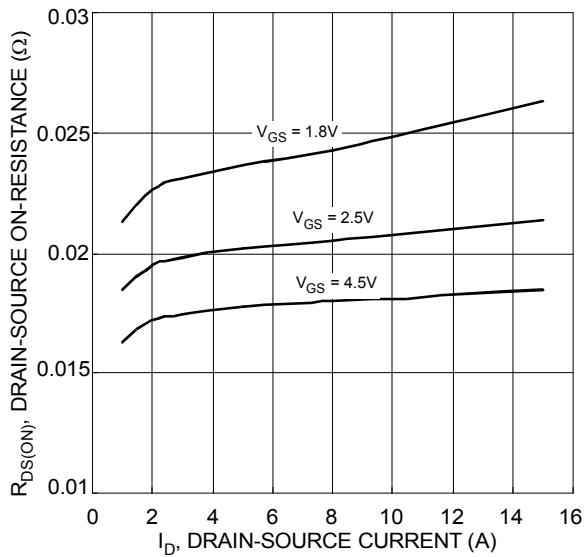


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

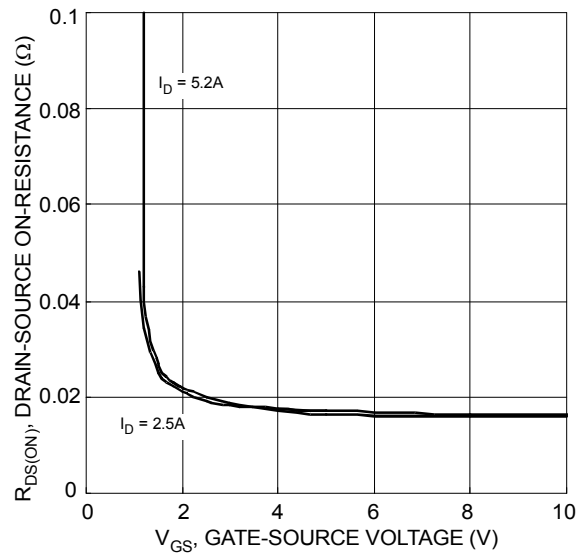


Figure 4 Typical Transfer Characteristic

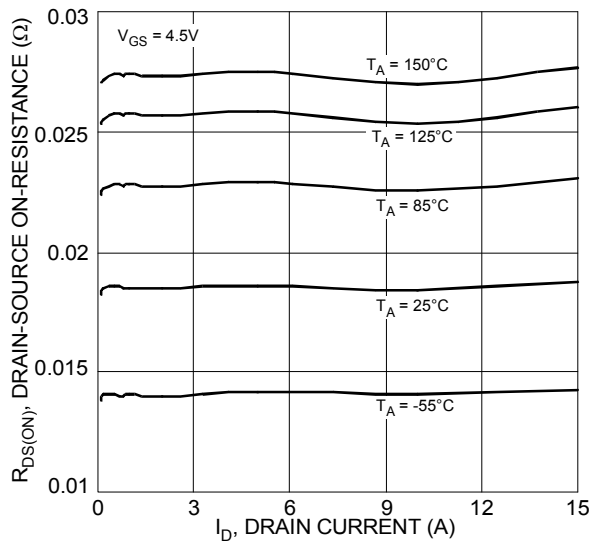


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

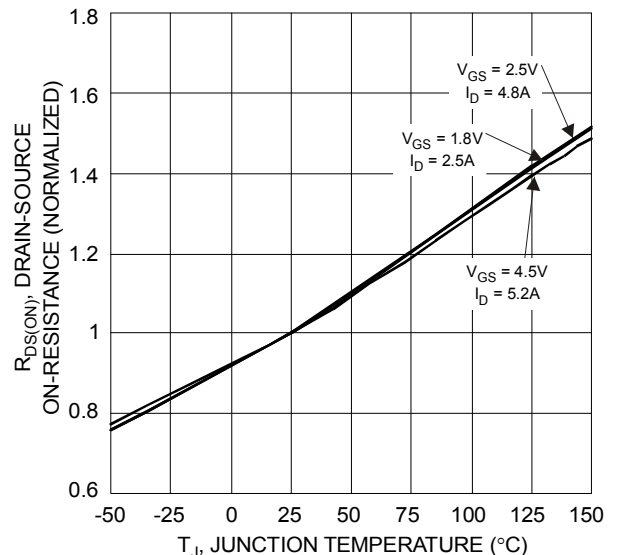


Figure 6 On-Resistance Variation with Temperature

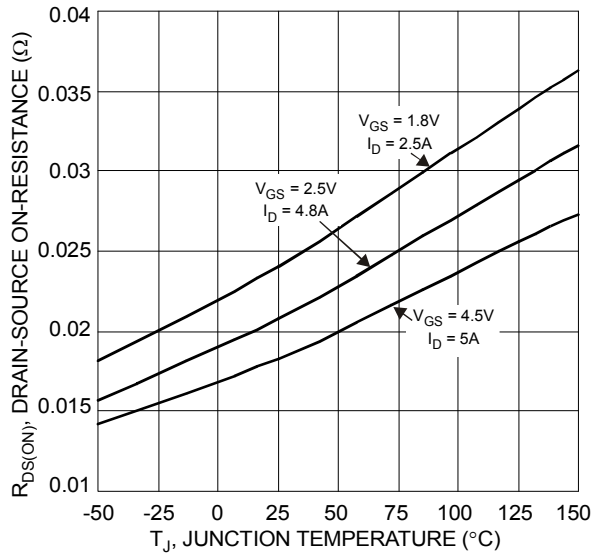


Figure 7 On-Resistance Variation with Temperature

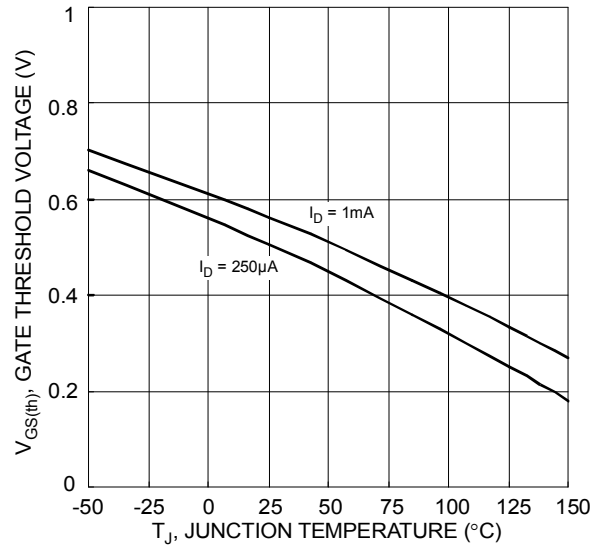


Figure 8 Gate Threshold Variation vs. Ambient Temperature

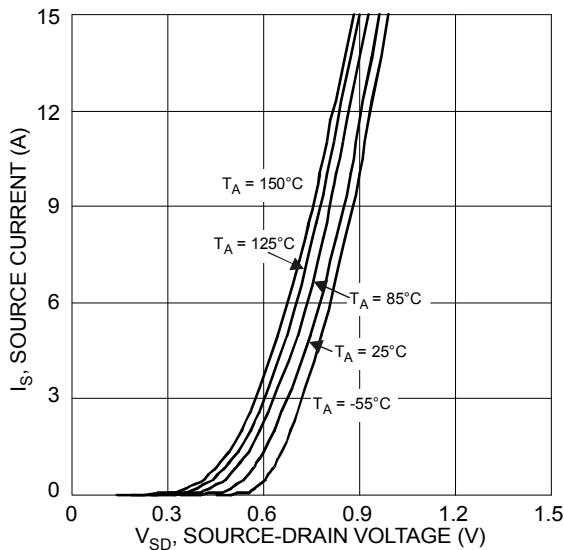


Figure 9 Diode Forward Voltage vs. Current

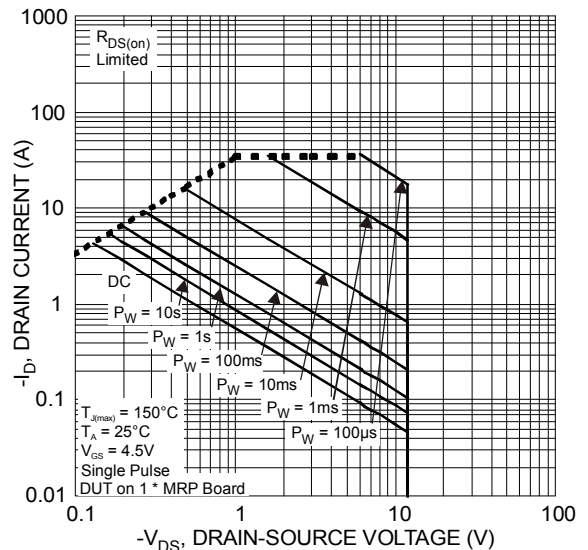


Figure 10 SOA, Safe Operation Area

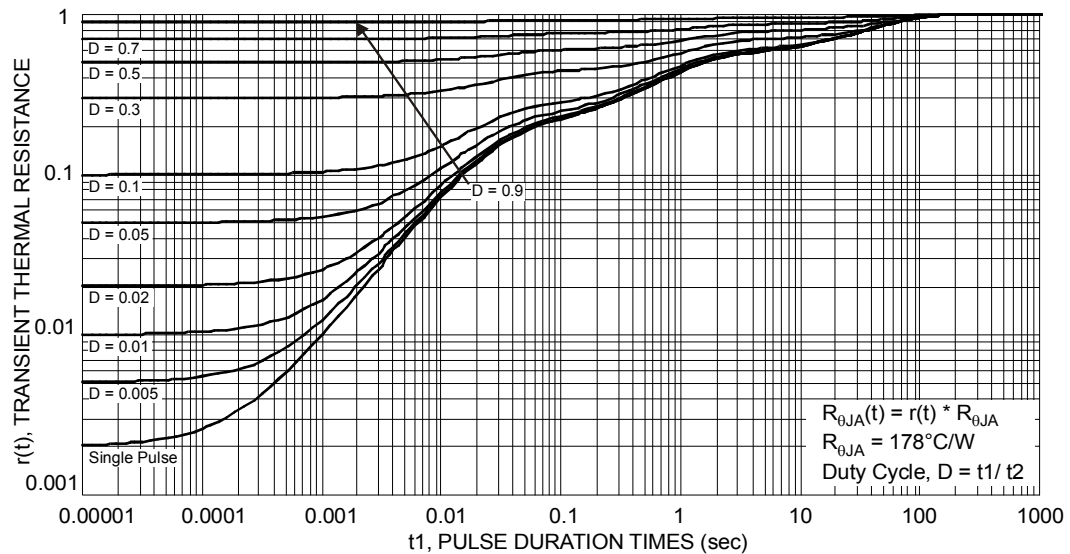
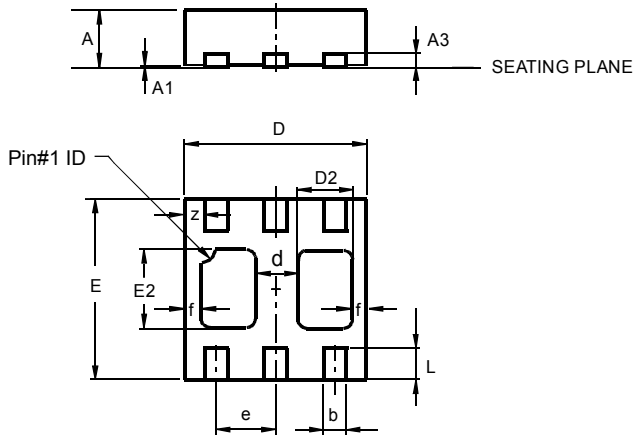


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

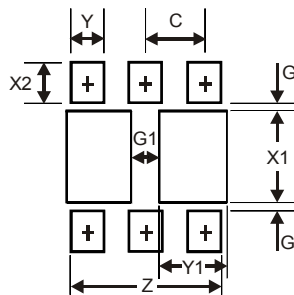
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



U-DFN2020-6 Type B			
Dim	Min	Max	Typ
A	0.545	0.605	0.575
A1	0	0.05	0.02
A3	—	—	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
d	—	—	0.45
D2	0.50	0.70	0.60
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
f	—	—	0.15
L	0.25	0.35	0.30
z	—	—	0.225
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)
Z	1.67
G	0.20
G1	0.40
X1	1.0
X2	0.45
Y	0.37
Y1	0.70
C	0.65

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