

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON) max}$	$I_D MAX$ $T_A = +25^{\circ}C$
-20V	70m $\Omega$ @ $V_{GS} = -4.5V$	-3.8A
	85m $\Omega$ @ $V_{GS} = -2.5V$	-3.3A

**Description**

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.

**Applications**

- Load Switch
- Power Management Functions
- Portable Power Adaptors

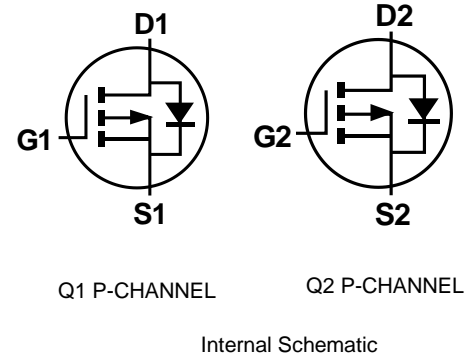
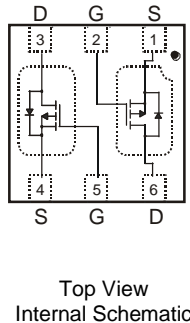
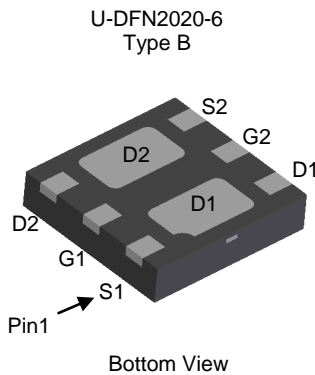
**Features**

- Low On-Resistance
- Low Gate Threshold Voltage, -0.9V Max
- Fast Switching Speed
- Low Input/Output Leakage
- Low Profile, 0.5mm Max Height
- **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**
- **PPAP Capable (Note 4)**

**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
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ④
- Weight: 0.0065 grams (Approximate)

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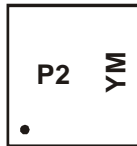


**Ordering Information** (Note 5)

Part Number	Case	Packaging
DMP2160UFDBQ-7	U-DFN2020-6 Type B	3000/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](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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/)
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



P2 = Marking Code  
 YM = Date Marking  
 Y = Year (ex: V = 2008)  
 M = Month (ex: 9 = September)  
 Dot denotes Pin 1

### Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Code	V	W	X	Y	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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	V
Drain Current (Note 6)	I <sub>D</sub>	-3.8	A
Pulsed Drain Current (Note 7)	I <sub>DM</sub>	-13	A

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	89	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100 ±800	nA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.45	—	-0.9	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	54	70	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.8A
		—	68	85		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -2.0A
		—	86	—		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -1.0A
Forward Transfer Admittance	Y <sub>fs</sub>	—	8	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -2.8A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.6A
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	—	536	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	68	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	59	—	pF	
Gate Resistance	R <sub>g</sub>	—	8.72	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	6.5	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DD</sub> = -10V, I <sub>D</sub> = -1.5A
Gate-Source Charge	Q <sub>gs</sub>	—	0.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	1.4	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	11.51	—	ns	V <sub>GEN</sub> = -4.5V, V <sub>DD</sub> = -10V, R <sub>L</sub> = 10Ω, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	12.09	—	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	—	55.34	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	27.54	—	ns	

- Notes:
- Device mounted on FR-4 PCB, on minimum recommended, 2oz Copper pad layout.
  - Repetitive rating, pulse width limited by junction temperature.
  - Short duration pulse test used to minimize self-heating effect.

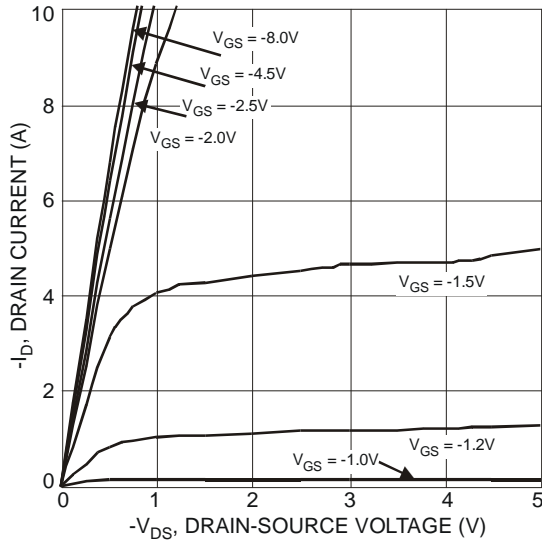


Fig. 1 Typical Output Characteristics

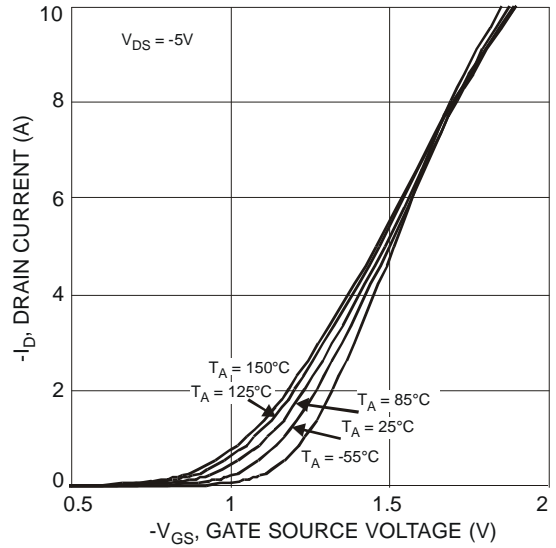


Fig. 2 Typical Transfer Characteristics

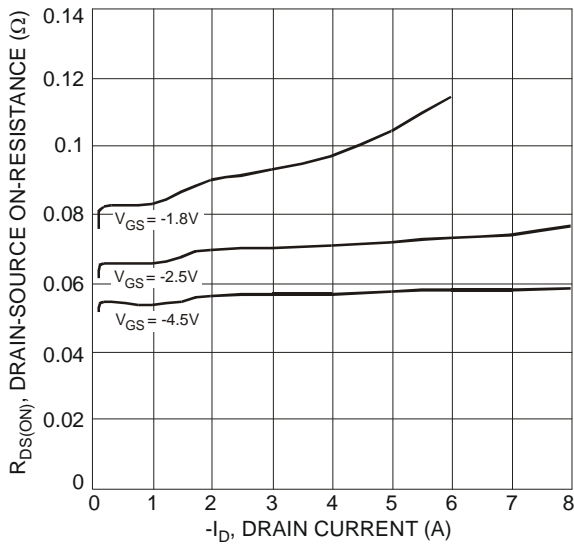


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

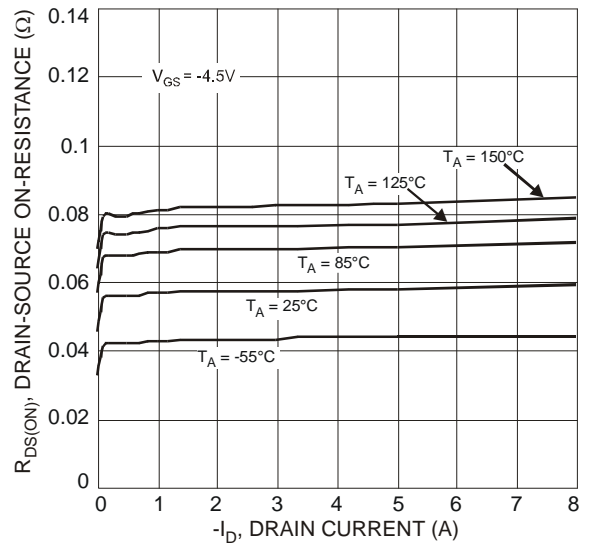


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

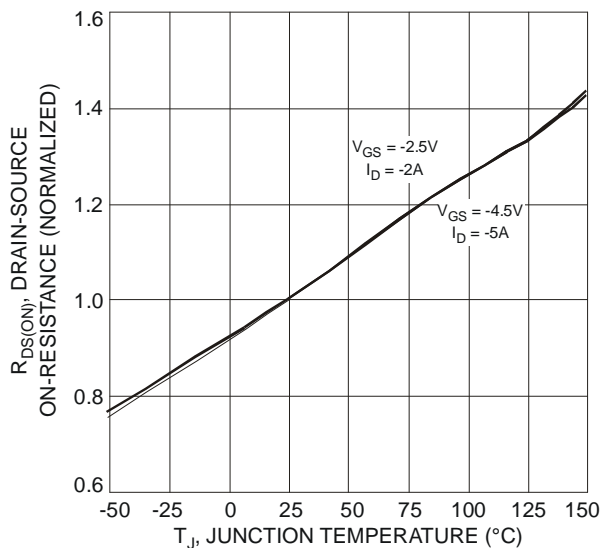


Fig. 5 On-Resistance Variation with Temperature

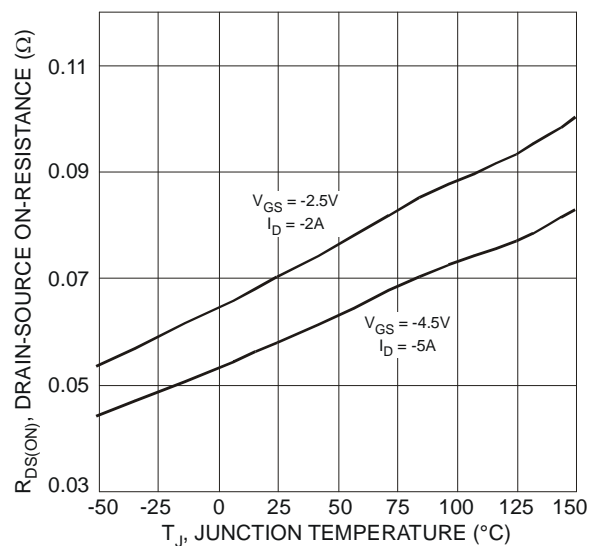


Fig. 6 On-Resistance Variation with Temperature

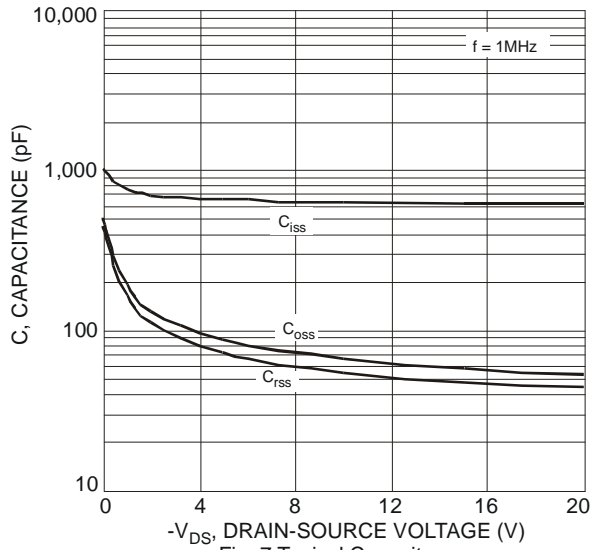


Fig. 7 Typical Capacitance

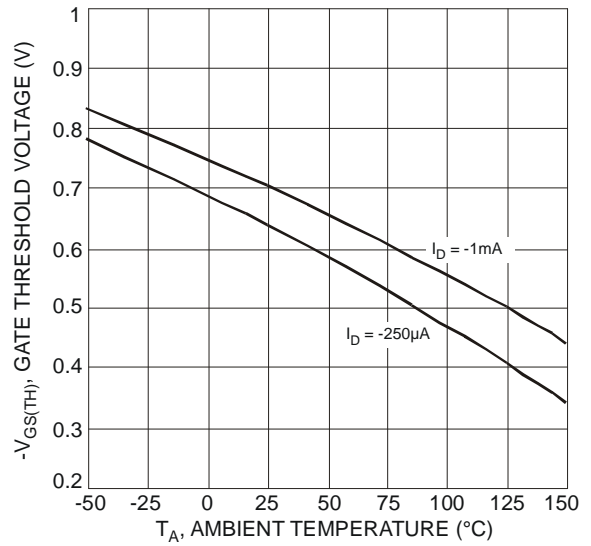


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

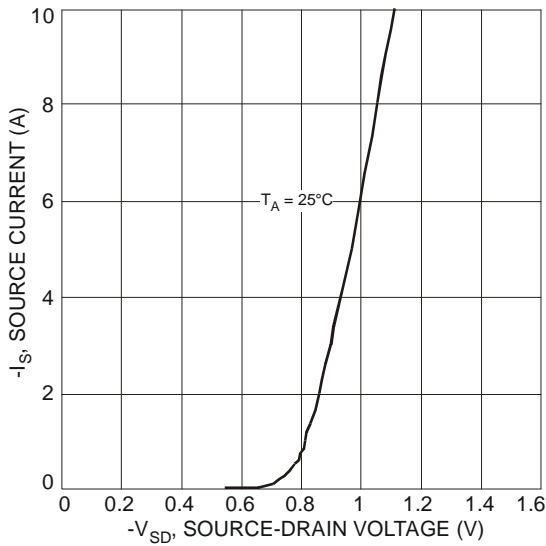


Fig. 9 Diode Forward Voltage vs. Current

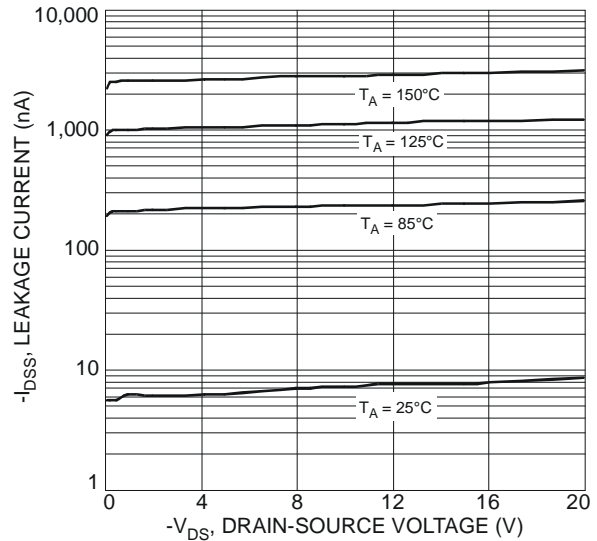


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

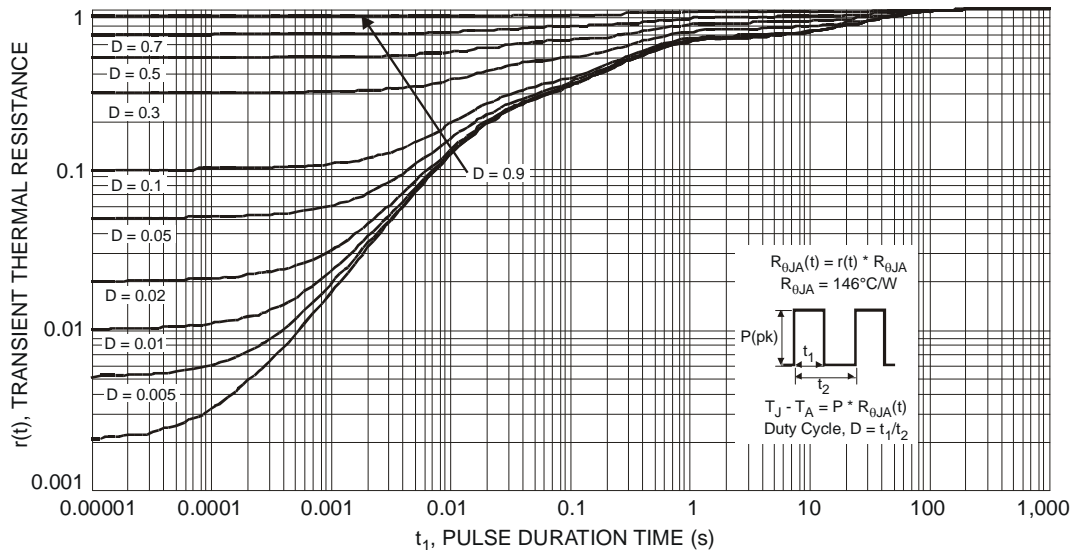
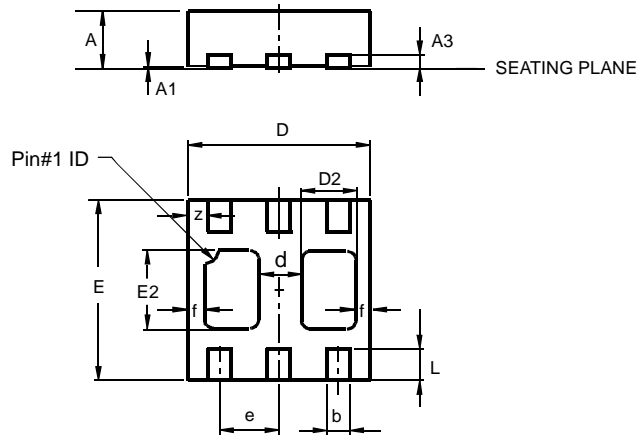


Fig. 11 Transient Thermal Response

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**Package Outline Dimensions**

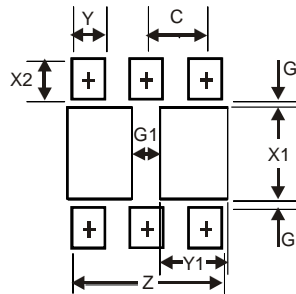
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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