Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D MAX T_A = +25°C
-20V	70mΩ @ V_{GS} = -4.5V	-3.8A
	85mΩ @ V_{GS} = -2.5V	-3.3A

Description

This MOSFET is designed to minimize the on-state resistance ($R_{DS(on)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

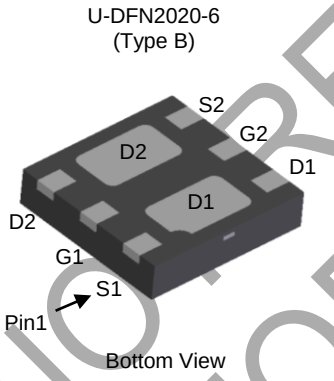
- Load switches
- Power management functions
- Portable power adaptors

Features

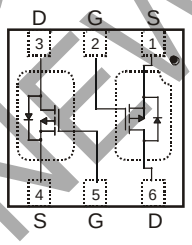
- Low On-Resistance
- Low Gate Threshold Voltage, -0.9V Max
- Fast Switching Speed
- Low Input/Output Leakage
- Low Profile, 0.5mm Max Height
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP2160UFDBQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

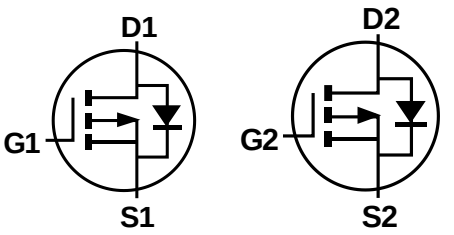
- Package: U-DFN2020-6
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0065 grams (Approximate)



Bottom View



Top View
Internal Schematic



Q1 P-CHANNEL O2 P-CHANNEL

Internal Schematic

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Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
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) & 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/.

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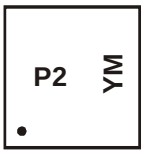
Marking Information



P2 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: J = 2022)
M = Month (ex: 1 = January)
Dot denotes Pin 1

Date Code Key

Year	2015	…	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	C	…	J	K	L	M	N	O	P	R	S	T

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}	-20	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current (Note 5)	I_D	-3.8	A
Pulsed Drain Current (Note 6)	I_{DM}	-13	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	89	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	— —	— —	±100 ±800	nA	V_{GS} = ±8V, V_{DS} = 0V V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.45	—	-0.9	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— — —	54 68 86	70 85 —	mΩ	V_{GS} = -4.5V, I_D = -2.8A V_{GS} = -2.5V, I_D = -2.0A V_{GS} = -1.8V, I_D = -1.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	8	—	S	V_{DS} = -5V, I_D = -2.8A
Diode Forward Voltage (Note 7)	V_{SD}	—	0.7	-1.2	V	V_{GS} = 0V, I_S = -1.6A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	536	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	68	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	59	—	pF	
Gate Resistance	R_g	—	8.72	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	6.5	—	nC	V_{GS} = -4.5V, V_{DD} = -10V, I_D = -1.5A
Gate-Source Charge	Q_{gs}	—	0.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.4	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	11.51	—	ns	V_{GEN} = -4.5V, V_{DD} = -10V, R_L = 10Ω, R_G = 6Ω
Turn-On Rise Time	t_r	—	12.09	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	55.34	—	ns	
Turn-Off Fall Time	t_f	—	27.54	—	ns	

Notes: 5. Device mounted on FR-4 PCB, on minimum recommended 2oz Copper pad layout.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.

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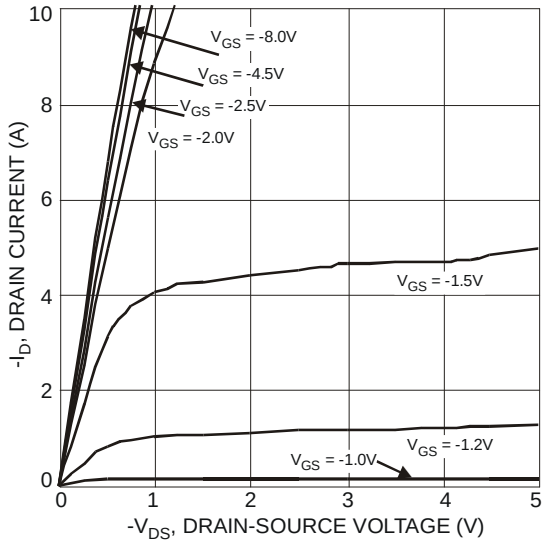

Fig. 1 Typical Output Characteristics

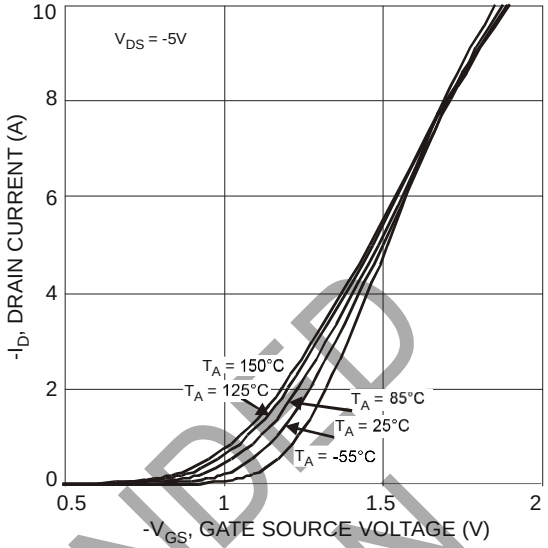

Fig. 2 Typical Transfer Characteristics

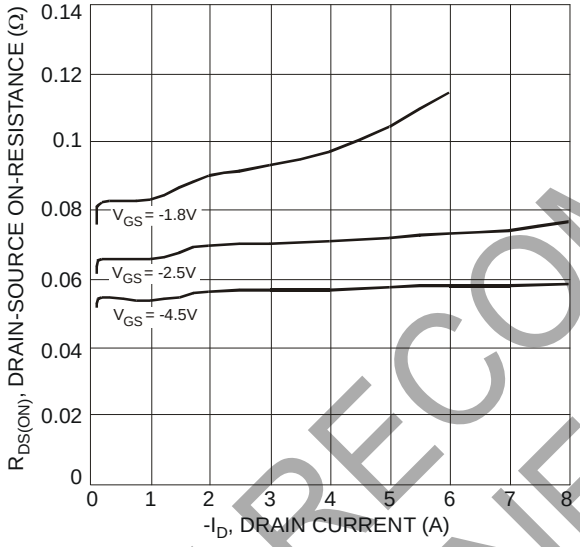

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

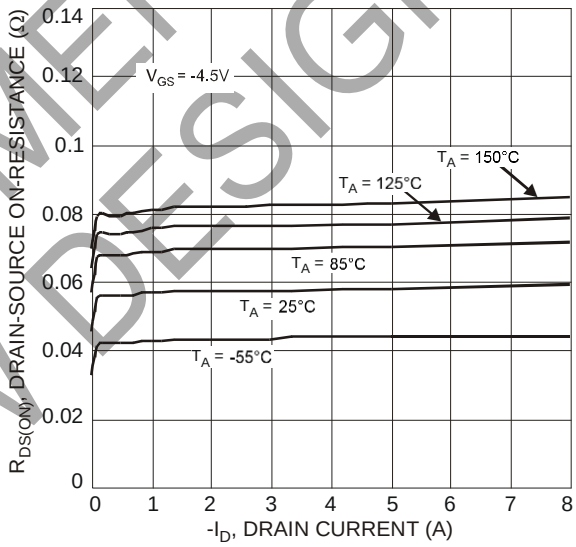

Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

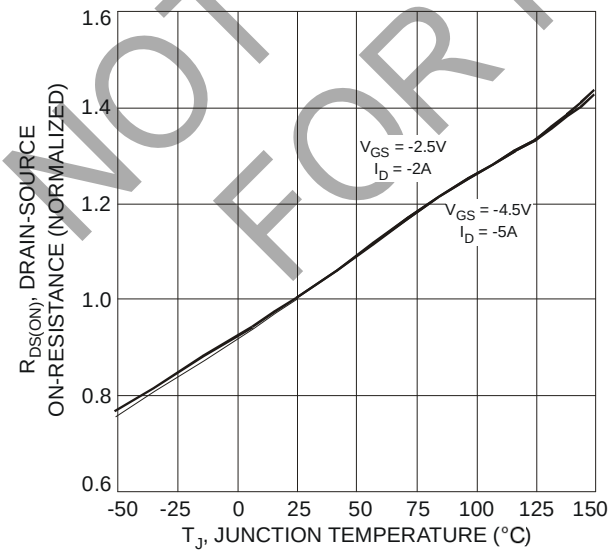

Fig. 5 On-Resistance Variation with Temperature

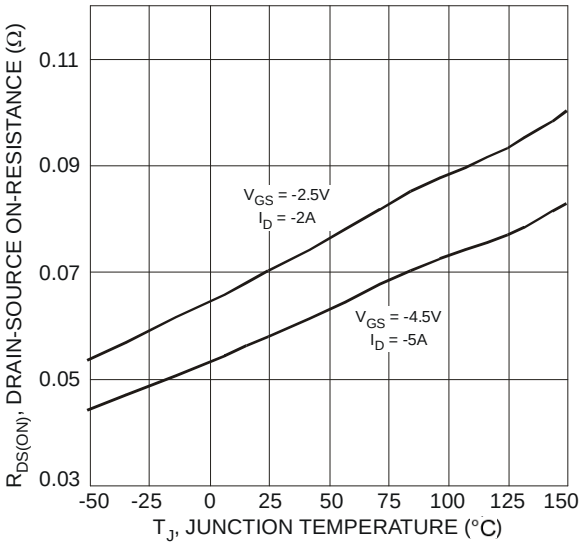

Fig. 6 On-Resistance Variation with Temperature

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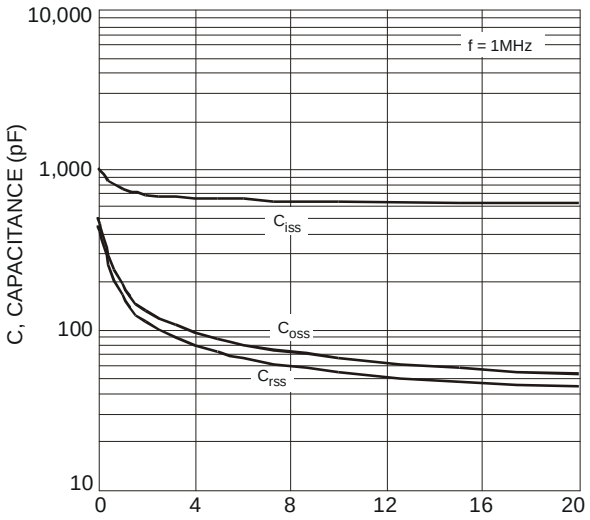

Fig. 7 Typical Capacitance

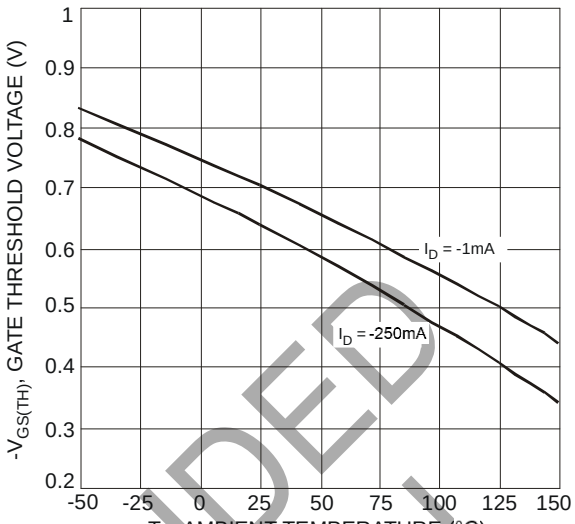

Fig. 8 Gate Threshold Variation vs. Ambient Temperature

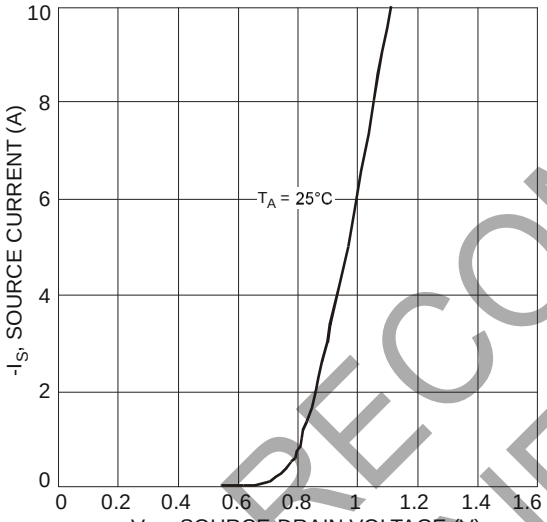

Fig. 9 Diode Forward Voltage vs. Current

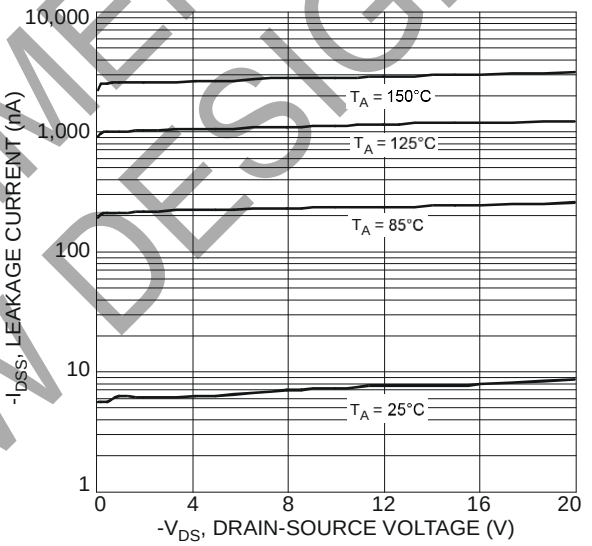

Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

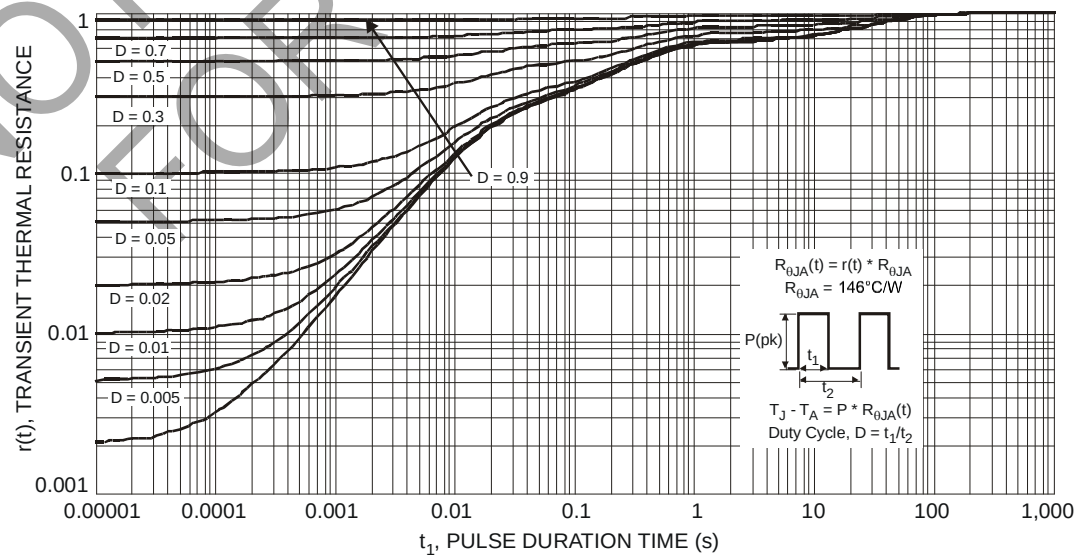

Fig. 11 Transient Thermal Response

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Package Outline Dimensions

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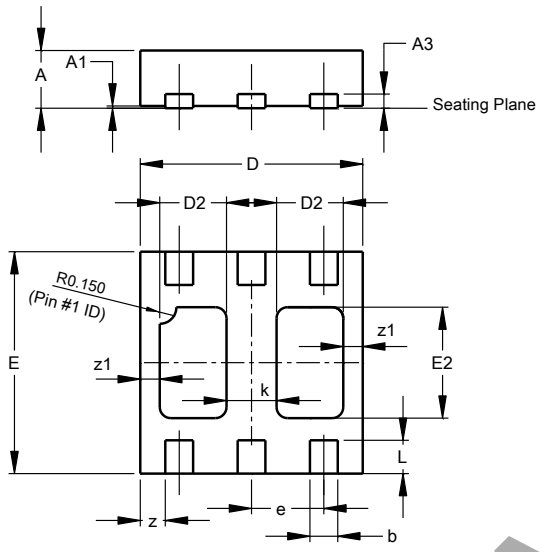
U-DFN2020-6 (Type B)



U-DFN2020-6 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	-	-	0.45
L	0.25	0.35	0.30
z	-	-	0.225
z1	-	-	0.175
All Dimensions in mm			

Suggested Pad Layout

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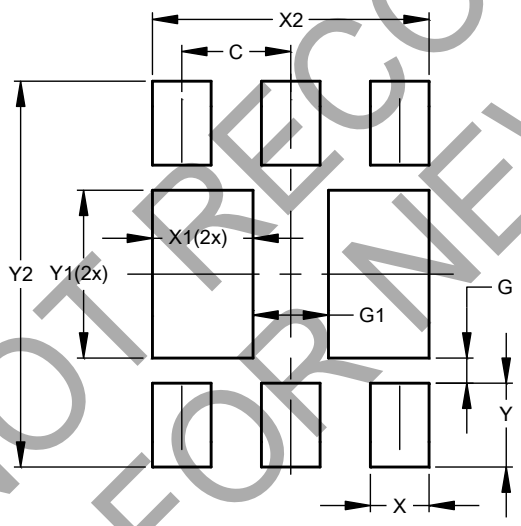
U-DFN2020-6 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300

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