

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
20V	20.2mΩ @ V _{GS} = 4.5V	21A
	23.5mΩ @ V _{GS} = 2.5V	14A

Features and Benefits

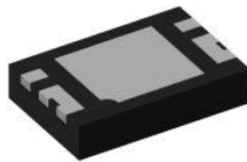
- Low Gate Threshold Voltage
- Low On-Resistance
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Description and Applications

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.

- Battery Management Application
- Power Management Functions
- DC-DC Converters

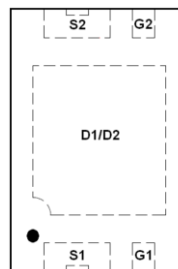
U-DFN2030-6 (Type B)



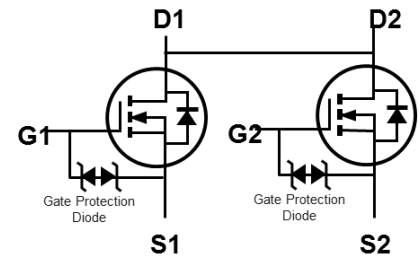
Bottom View

Mechanical Data

- Case: U-DFN2030-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 [e4](#)
- Weight: 0.012 grams (Approximate)



Top View
Pin Configuration



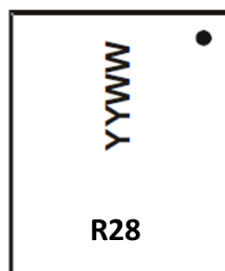
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2024UFU-7	U-DFN2030-6 (Type B)	3000/Tape & Reel
DMN2024UFU-13	U-DFN2030-6 (Type B)	10000/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/>.

Marking Information



R28 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 20 for 2020)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±10	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	7.5 6	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	21 17	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	50	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	0.6	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	12	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	8	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.81	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	155	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.71	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	73	°C/W
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	8.9	
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}	20	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	µA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.35	—	0.95	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	11.2	20.2	mΩ	V _{GS} = 4.5V, I _D = 6.5A
			13.2	23.5		V _{GS} = 2.5V, I _D = 5.5A
Diode Forward Voltage	V _{SD}	—	0.7	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iSS}	—	647	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	78	—	pF	
Reverse Transfer Capacitance	C _{rSS}	—	38	—	pF	
Gate Resistance	R _G	—	400	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _G	—	6.5	—	nC	V _{DS} = 10V, I _D = 6.5A
Total Gate Charge (V _{GS} = 10V)	Q _G	—	14.8	—	nC	
Gate-Source Charge	Q _{GS}	—	1.1	—	nC	
Gate-Drain Charge	Q _{GD}	—	1.7	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	140	—	ns	V _{DS} = 10V, V _{GS} = 4.5V, R _G = 6Ω, R _L = 10Ω, I _D = 1A
Turn-On Rise Time	t _R	—	1024	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	434	—	ns	
Turn-Off Fall Time	t _F	—	245	—	ns	
Reverse Recovery Time	t _{RR}	—	149	—	ns	I _F = 1A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	647	—	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.
 - I_{AS} and E_{AS} ratings 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.

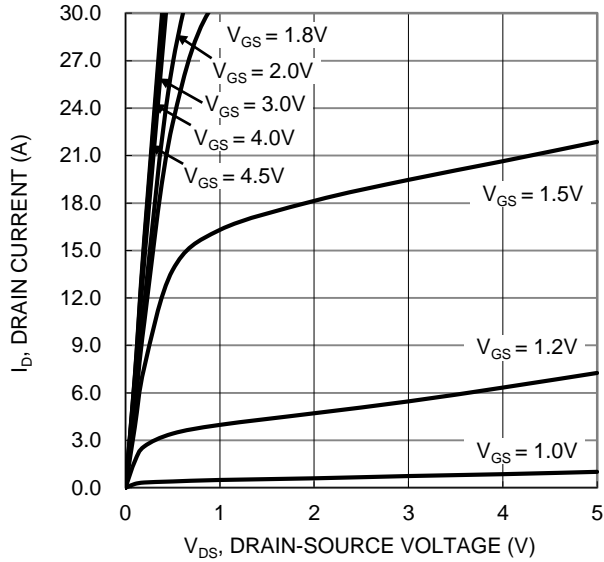


Figure 1. Typical Output Characteristic

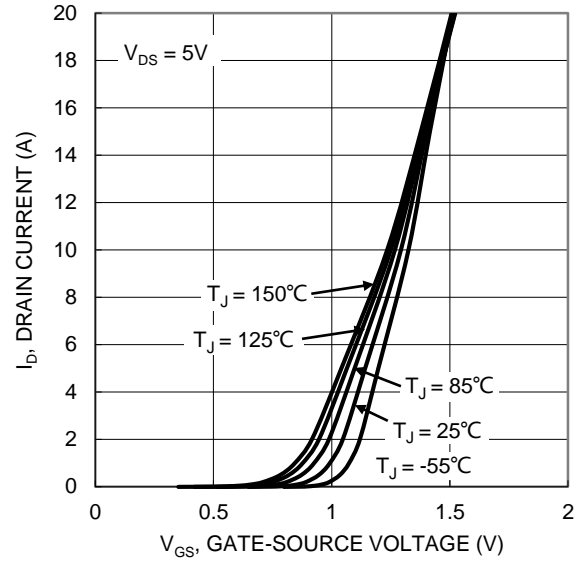


Figure 2. Typical Transfer Characteristic

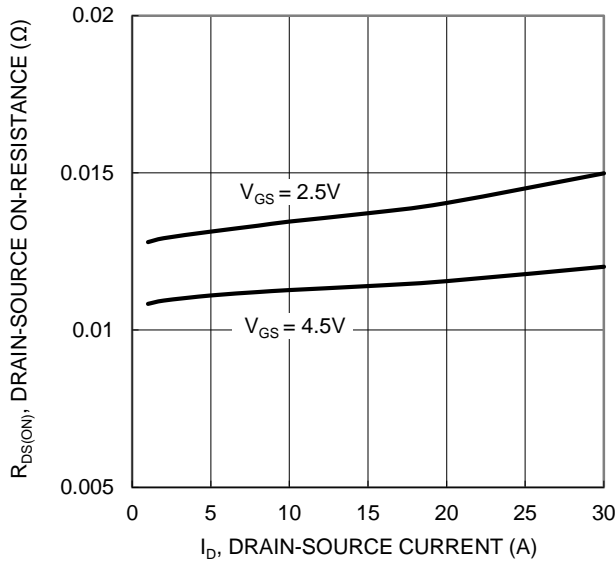


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

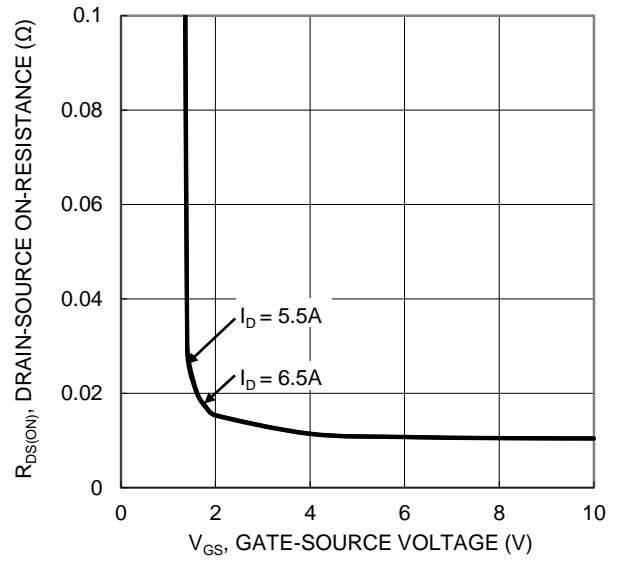


Figure 4. Typical Transfer Characteristic

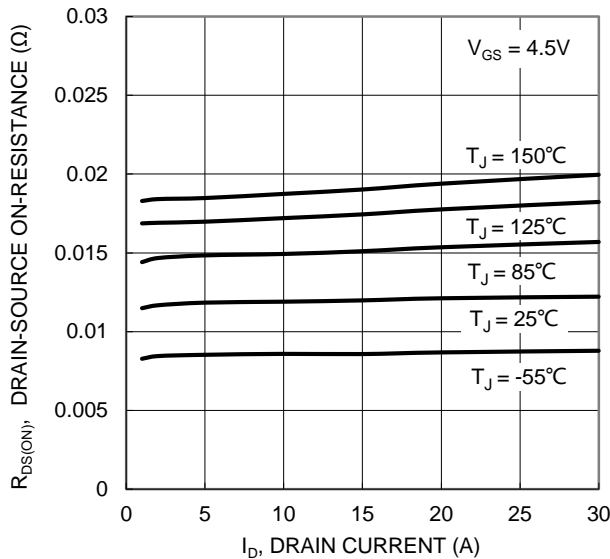


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

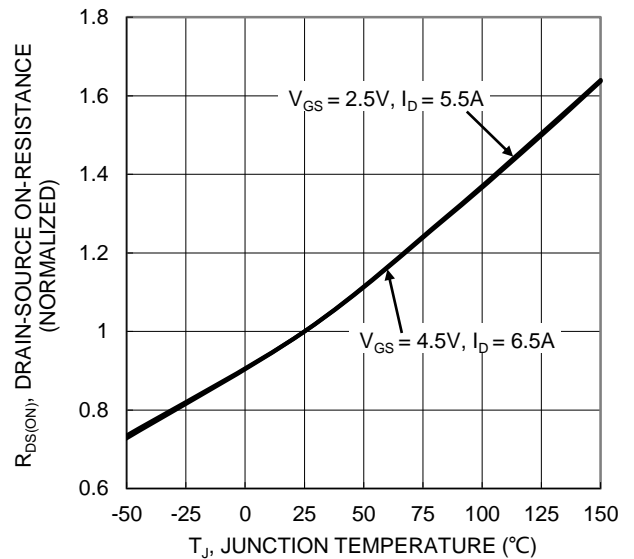


Figure 6. On-Resistance Variation with Junction Temperature

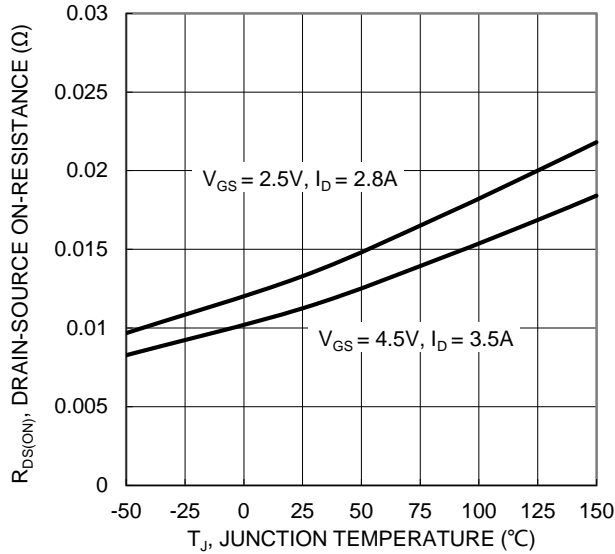


Figure 7. On-Resistance Variation with Junction Temperature

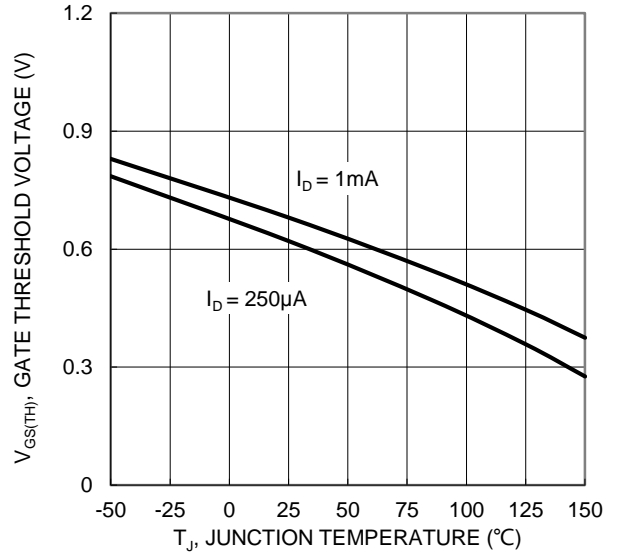


Figure 8. Gate Threshold Variation vs. Junction Temperature

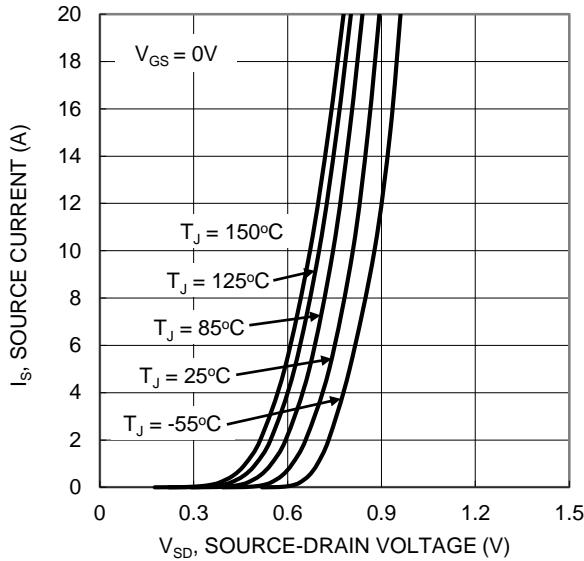


Figure 9. Diode Forward Voltage vs. Current

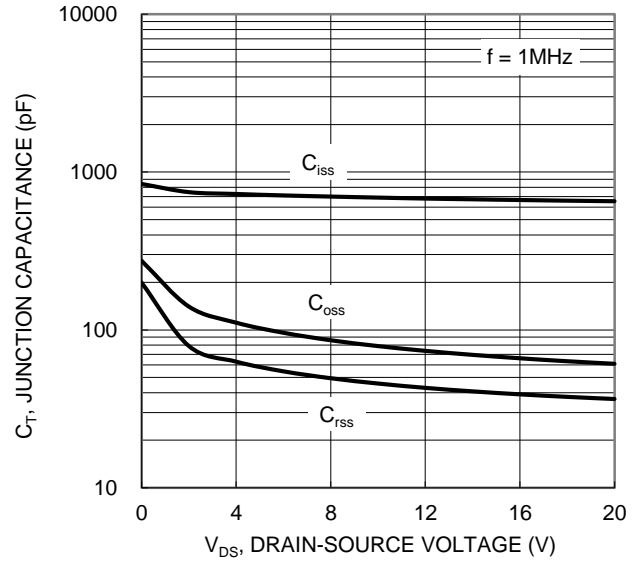


Figure 10. Typical Junction Capacitance

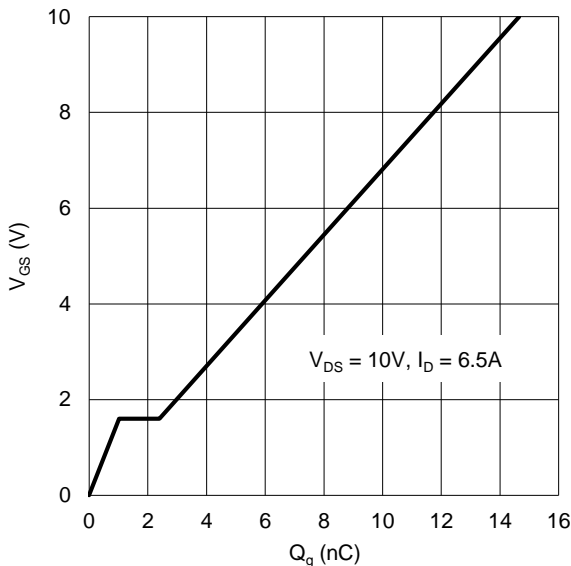


Figure 11. Gate Charge

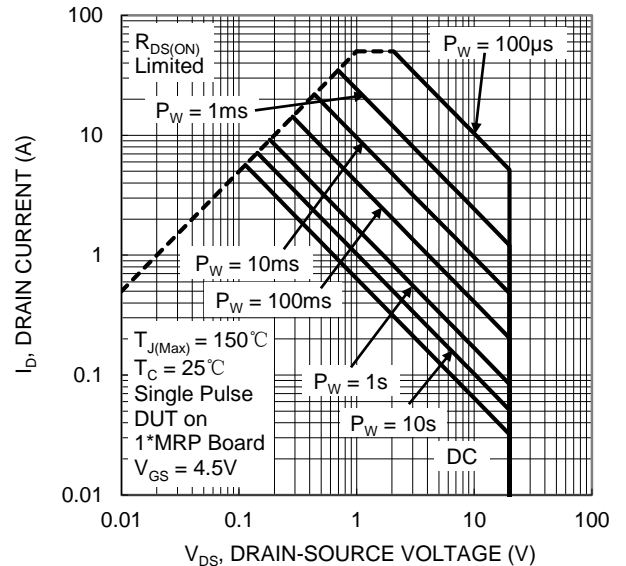


Figure 12. SOA, Safe Operation Area

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