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DMN2024UFU

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

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.

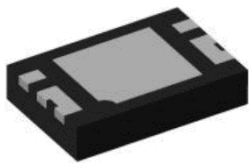
- Battery Management Application
- Power Management Functions
- DC-DC Converters

Mechanical Data

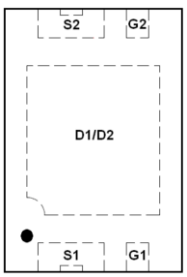
- Case: U-DFN2030-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.012 grams (Approximate)

U-DFN2030-6 (Type B)

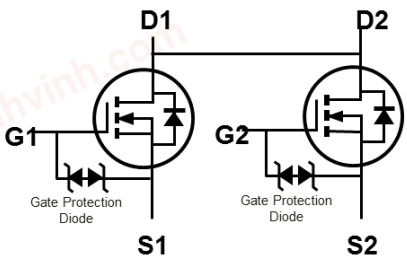




Bottom View



Top View
Pin Configuration



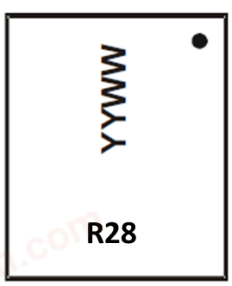
Equivalent Circuit

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)

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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	$R_{\theta JA}$	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	$R_{\theta JA}$	73	°C/W
Thermal Resistance, Junction to Case (Note 6)	Steady State	$R_{\theta JC}$	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:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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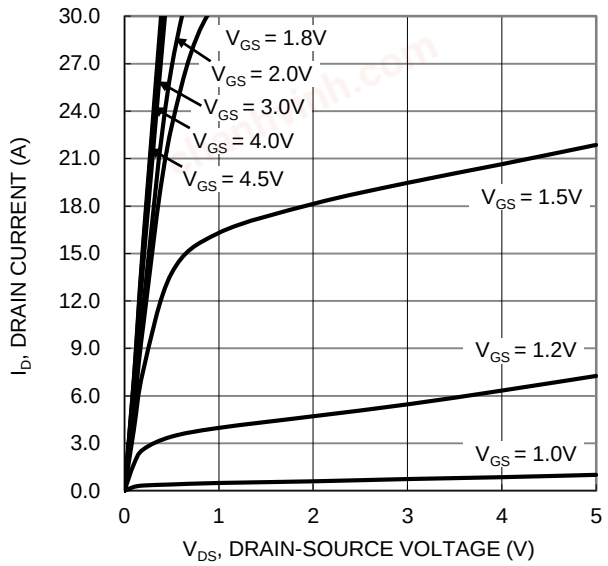


Figure 1. Typical Output Characteristic

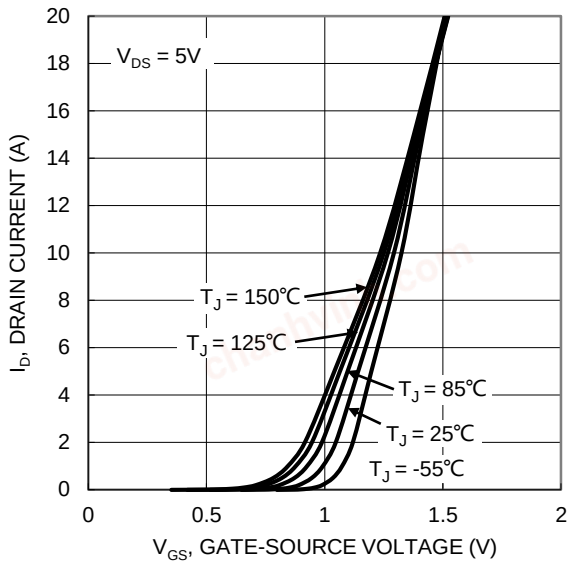


Figure 2. Typical Transfer Characteristic

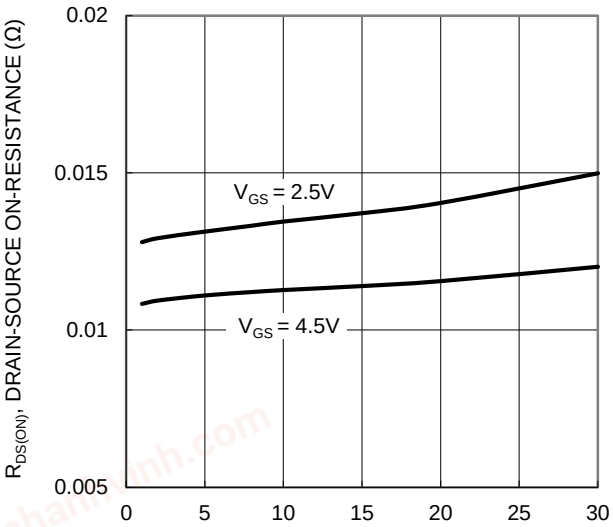


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

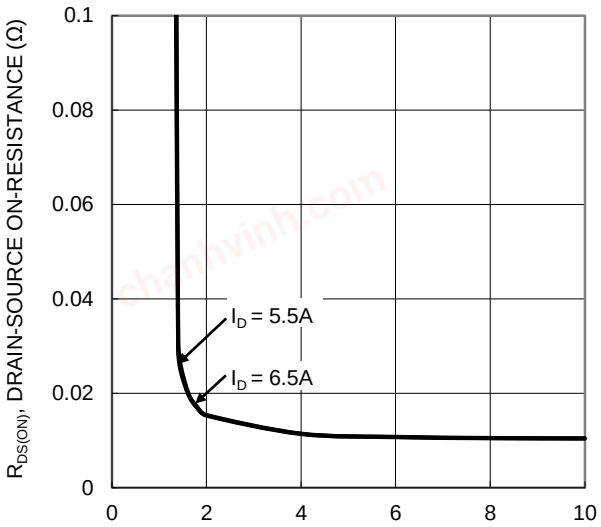


Figure 4. Typical Transfer Characteristic

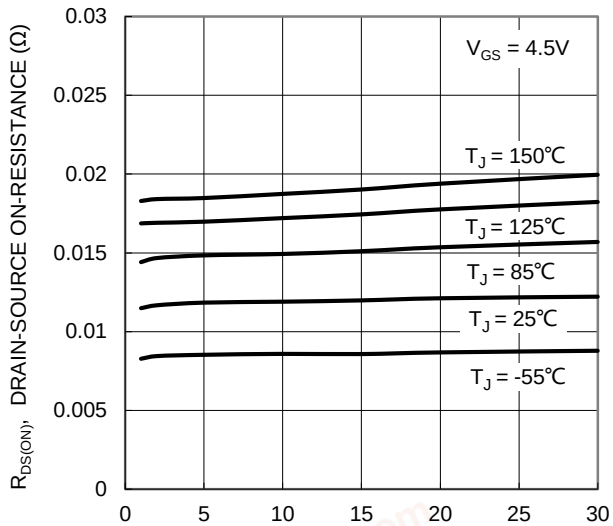


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

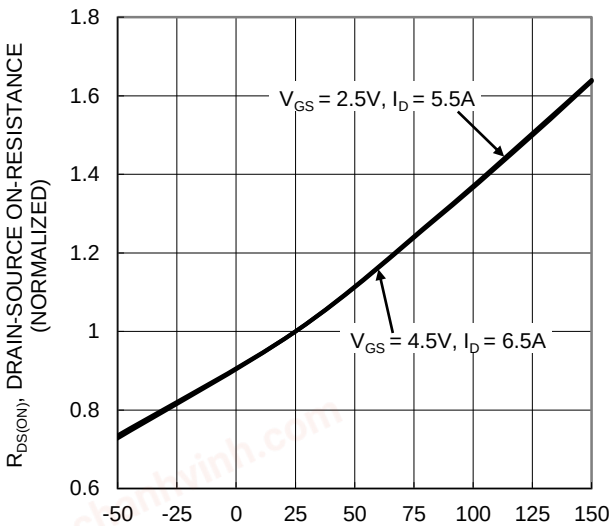


Figure 6. On-Resistance Variation with Junction Temperature

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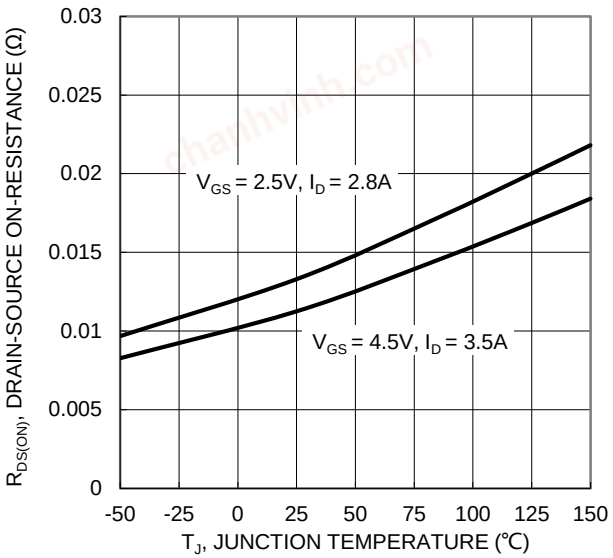


Figure 7. On-Resistance Variation with Junction Temperature

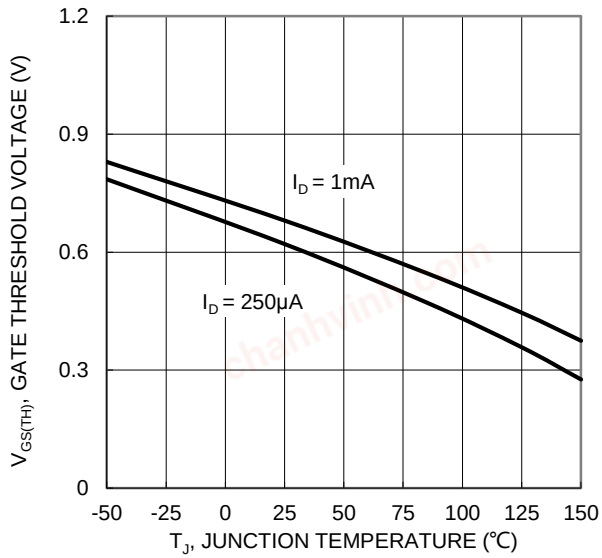


Figure 8. Gate Threshold Variation vs. Junction Temperature

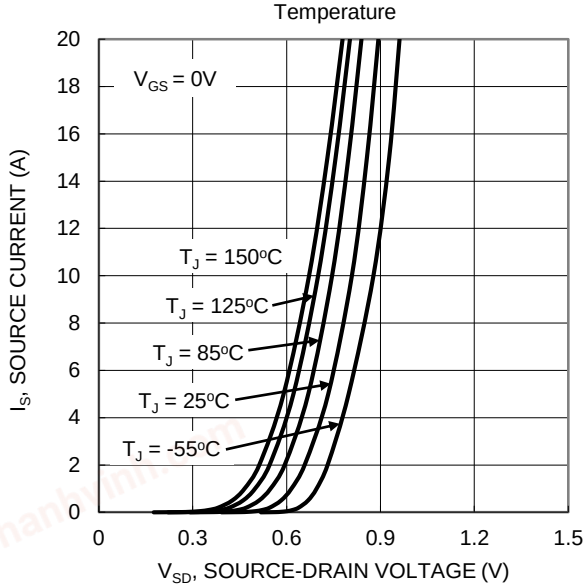


Figure 9. Diode Forward Voltage vs. Current

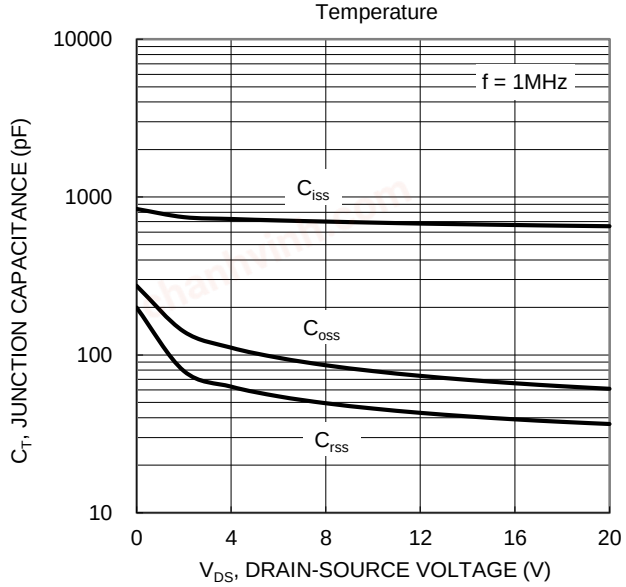


Figure 10. Typical Junction Capacitance

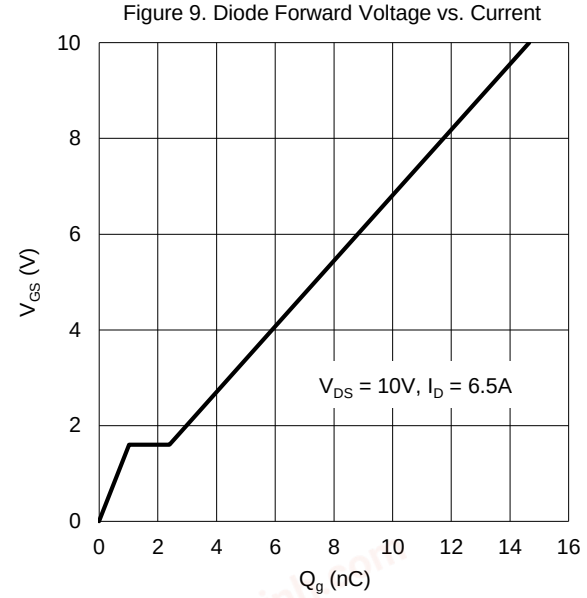


Figure 11. Gate Charge

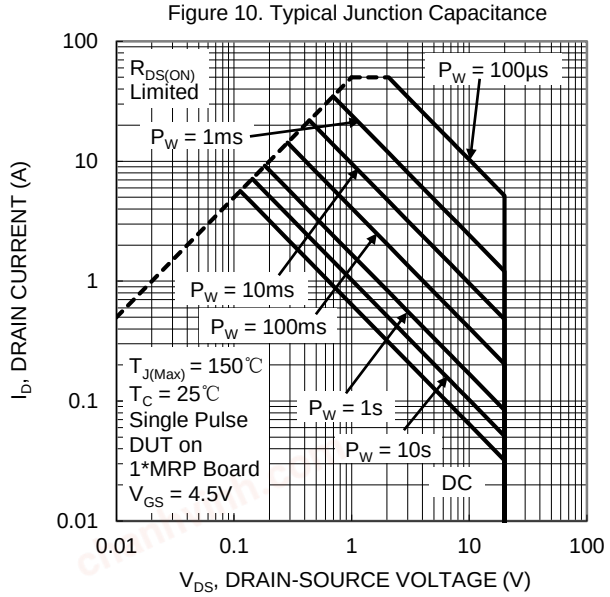


Figure 12. SOA, Safe Operation Area

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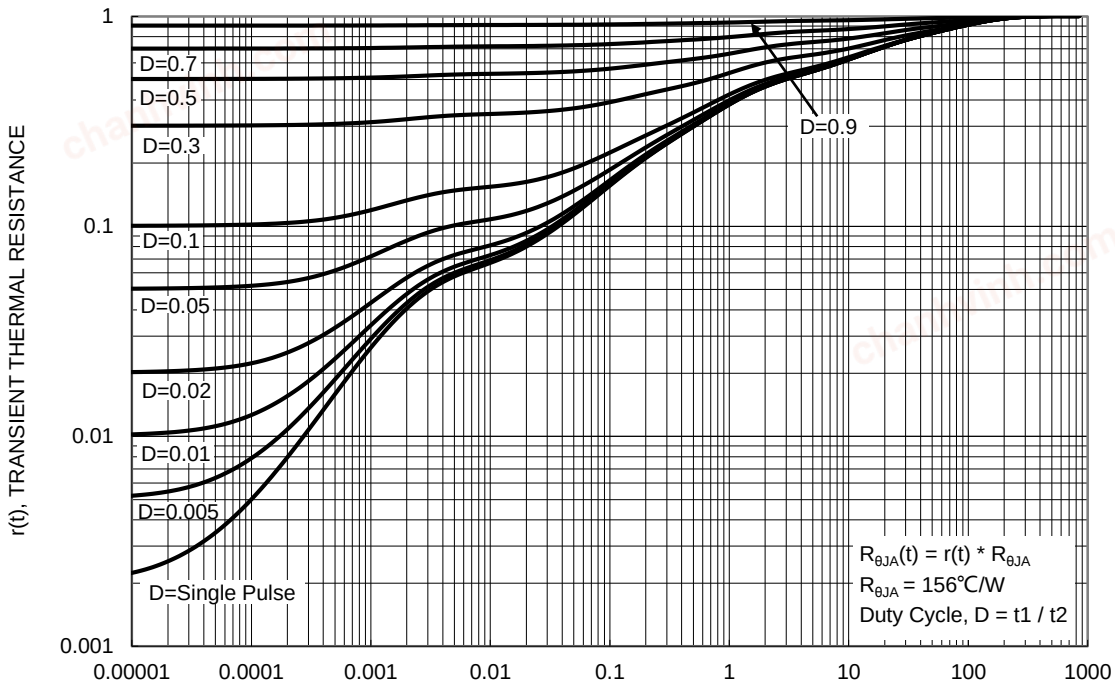


Figure 13. Transient Thermal Resistance

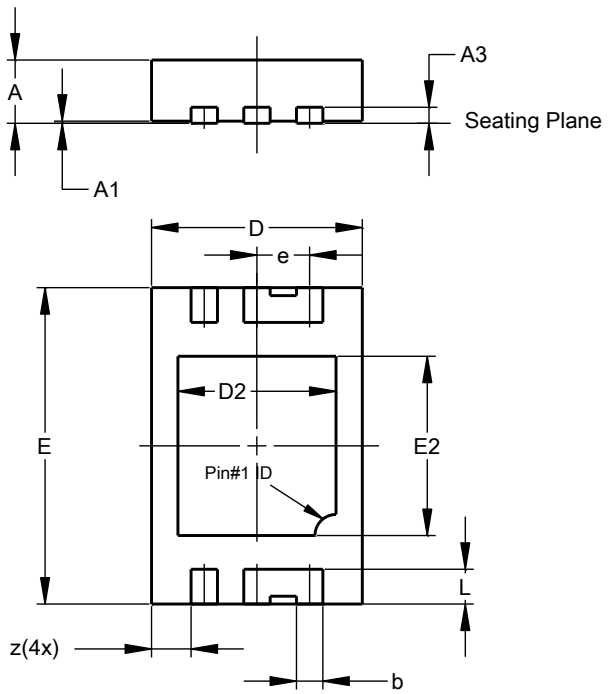
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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN2030-6 (Type B)

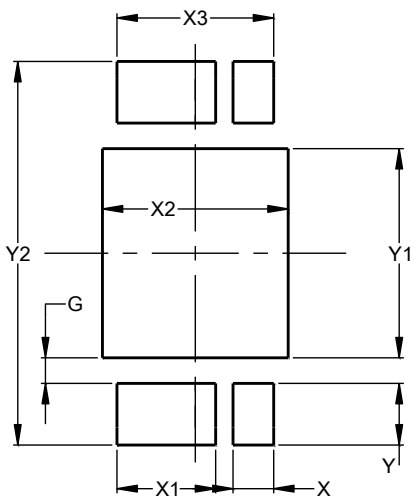


U-DFN2030-6 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	--	--	0.15
b	0.20	0.30	0.25
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.65	1.75	1.70
e	--	--	0.50
L	0.28	0.38	0.33
z	--	--	0.375
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN2030-6 (Type B)



Dimensions	Value (in mm)
G	0.220
X	0.350
X1	0.850
X2	1.600
X3	1.350
Y	0.530
Y1	1.800
Y2	3.300

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