Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_A = +25°C
30V	12mΩ @ V_{GS} = 10V	10A
	16mΩ @ V_{GS} = 4.5V	8.5A

Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm^2
- Low Gate Threshold Voltage
- Low On-Resistance
- **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

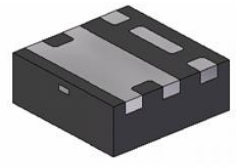
This MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

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

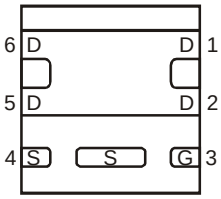
Mechanical Data

- Case: U-DFN2020-6
- 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
- Weight: 0.0065 grams (Approximate)

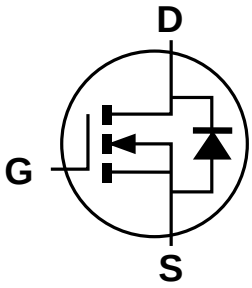
U-DFN2020-6
(Type E)



Bottom View



Pin Out



Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LFDE-7	U-DFN2020-6 (Type E)	3,000/Tape & Reel
DMN3016LFDE-13	U-DFN2020-6 (Type E)	10,000/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

Site 1



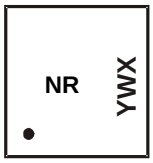
NR = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

Year	2012	…	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	Z	…	H	I	J	K	L	M	N	O	P	R

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

Site 2



NR = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 0 = 2020)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2012	…	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	2	…	0	1	2	3	4	5	6	7	8	9

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	10 8	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	12 9	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	90	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	22	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	24	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	0.73	W
	T_A = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	171	°C/W
	t<10s		121	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.02	W
	T_A = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	62	°C/W
	t<10s		42	
Thermal Resistance, Junction to Case (Note 6)	Steady State	$R_{\theta JC}$	9.3	
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}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.4	—	2.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	8	12	mΩ	V_{GS} = 10V, I_D = 11A
		—	12	16		V_{GS} = 4.5V, I_D = 9A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	32	—	S	V_{DS} = 5V, I_D = 12A
Diode Forward Voltage	V_{SD}	—	0.70	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1415	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	119	—		
Reverse Transfer Capacitance	C_{rss}	—	82	—		
Gate Resistance	R_g	—	2.6	3.2	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	11.3	—	nC	V_{DS} = 15V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	25.1	—		
Gate-Source Charge	Q_{gs}	—	3.5	—		
Gate-Drain Charge	Q_{gd}	—	3.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.8	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_L = 1.25Ω, R_G = 3Ω
Turn-On Rise Time	t_R	—	16.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	26.1	—		
Turn-Off Fall Time	t_F	—	5.6	—		
Reverse Recovery Time	t_{RR}	—	12.3	—	ns	I_F = 12A, di/dt = 500A/µs
Reverse Recovery Charge	Q_{RR}	—	10.4	—	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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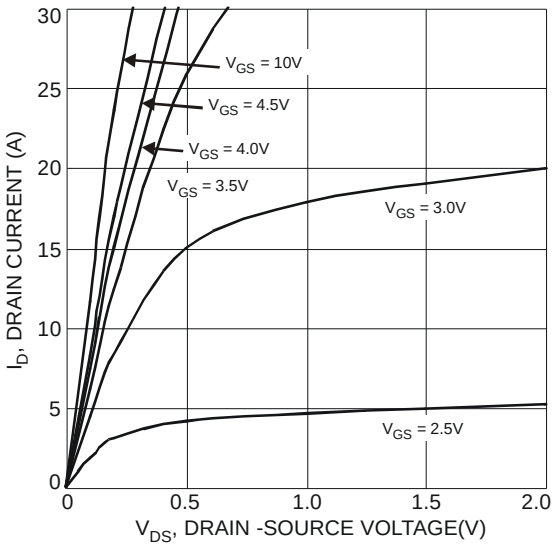


Fig. 1 Typical Output Characteristics

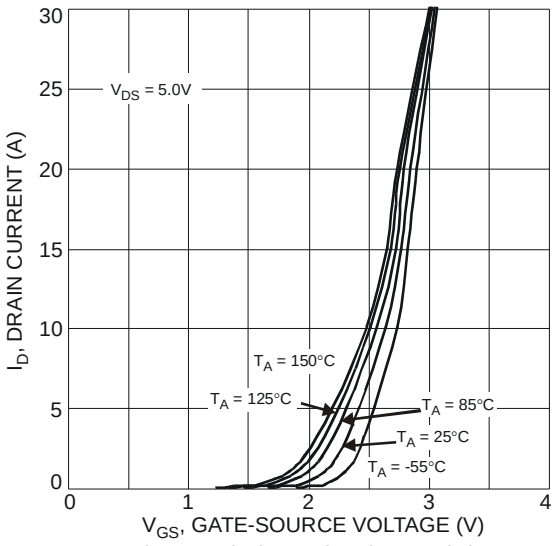


Fig. 2 Typical Transfer Characteristics

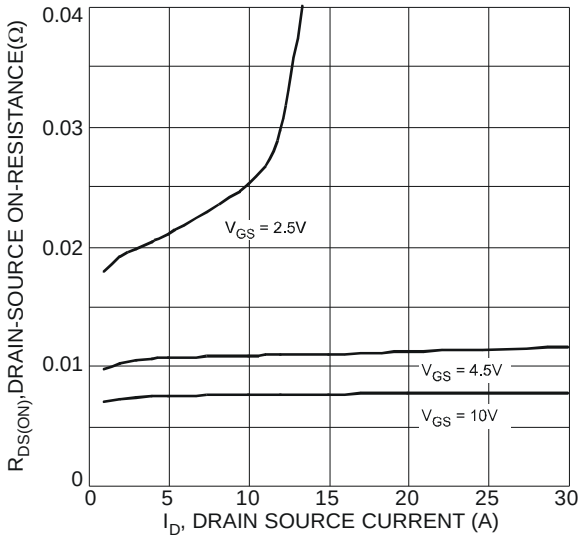


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

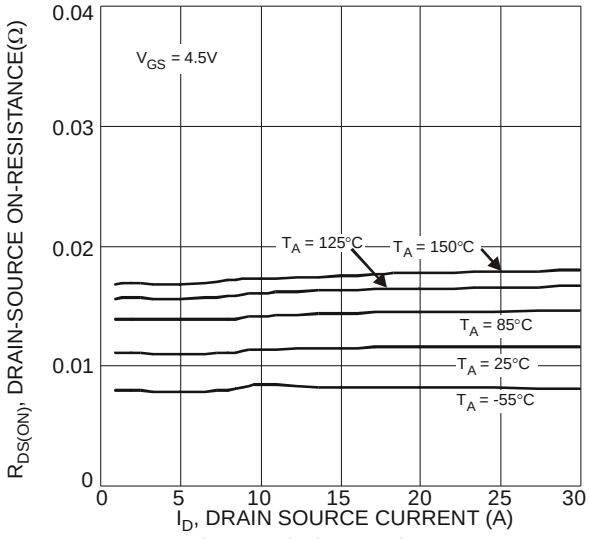


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

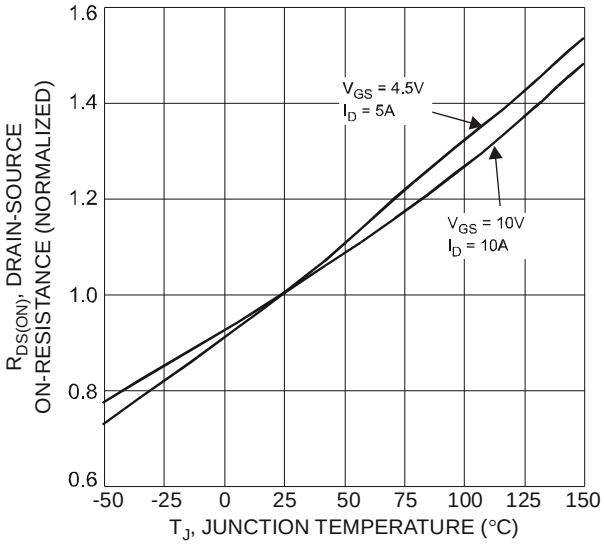


Fig. 5 On-Resistance Variation with Temperature

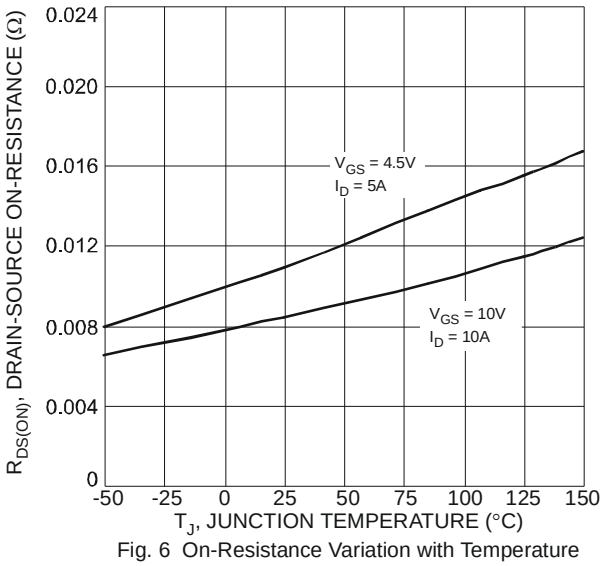


Fig. 6 On-Resistance Variation with Temperature

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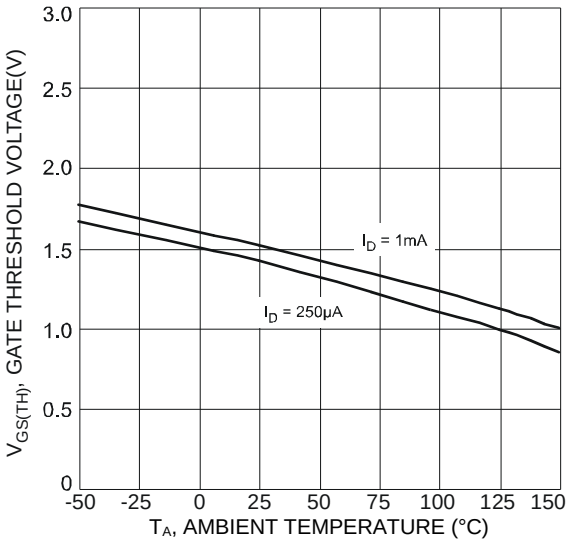


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

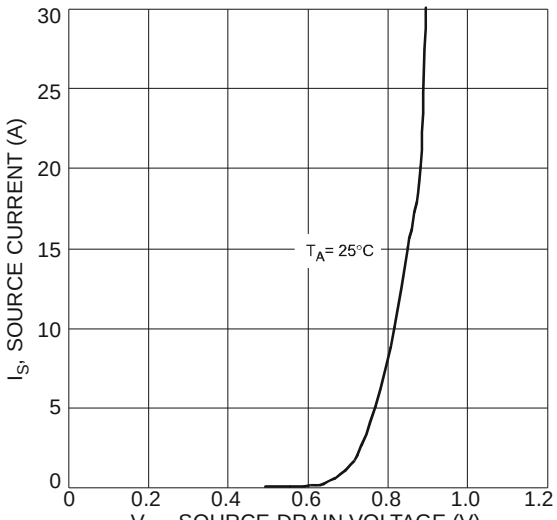


Fig. 8 Diode Forward Voltage vs. Current

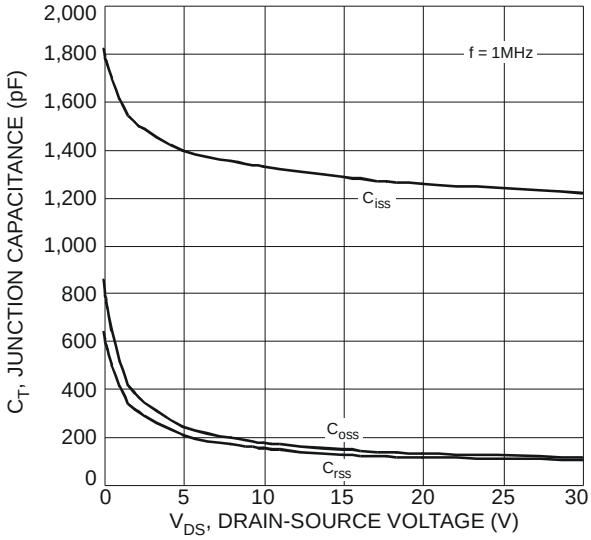


Fig. 9 Typical Junction Capacitance

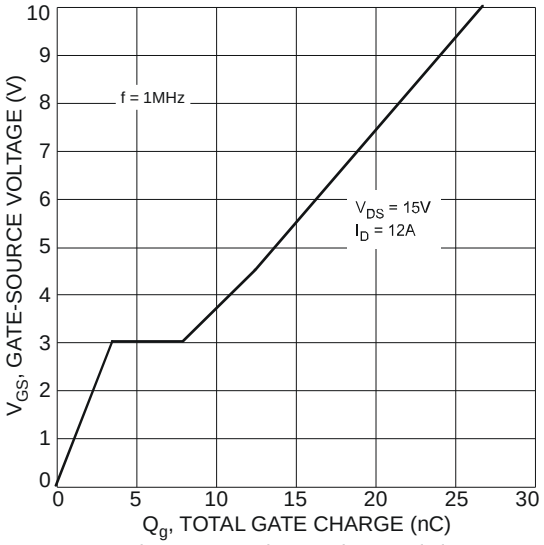


Fig. 10 Gate-Charge Characteristics

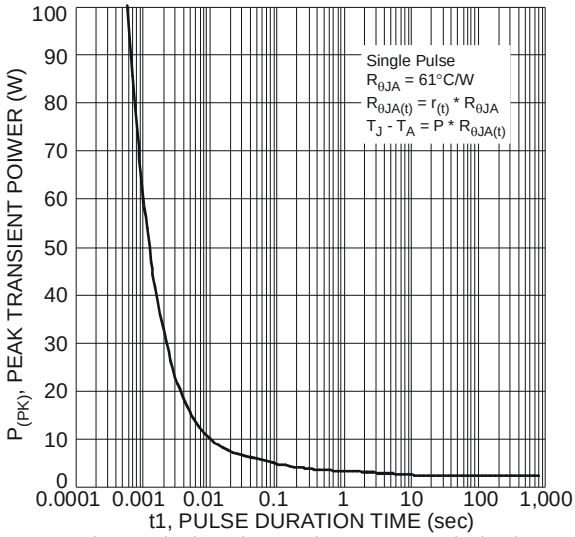


Fig. 11 Single Pulse Maximum Power Dissipation

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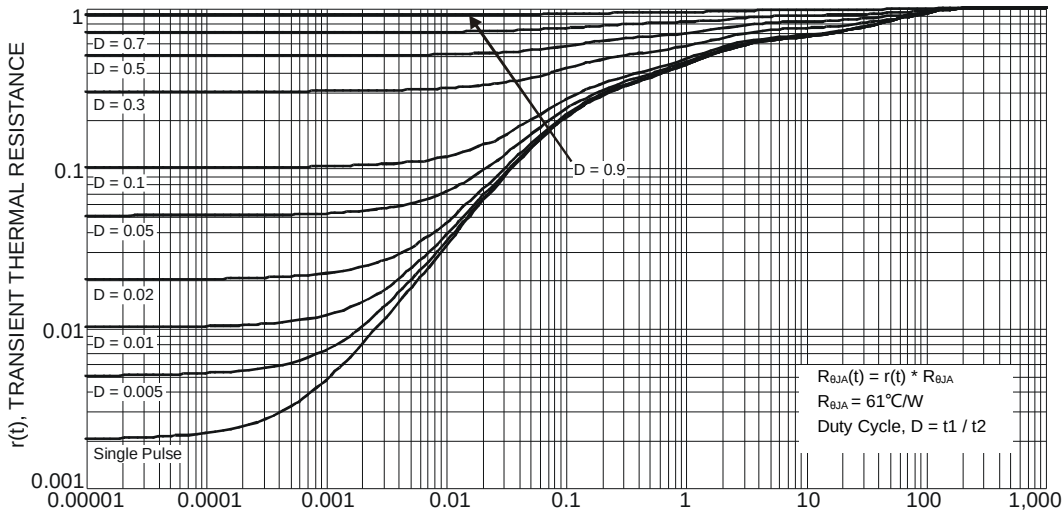


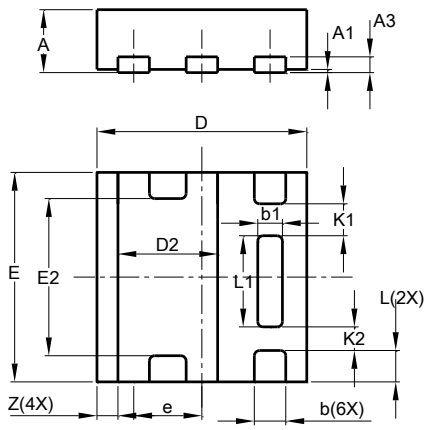
Fig. 12 Transient Thermal Resistance

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Package Outline Dimension

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

U-DFN2020-6 (Type E)

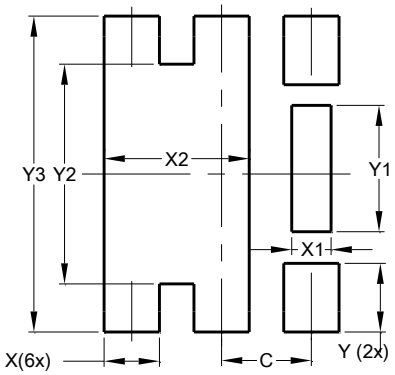


U-DFN2020-6 Type E			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	–	–	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	–	–	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	–	–	0.305
K2	–	–	0.225
Z	–	–	0.20
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type E)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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