

Product Summary

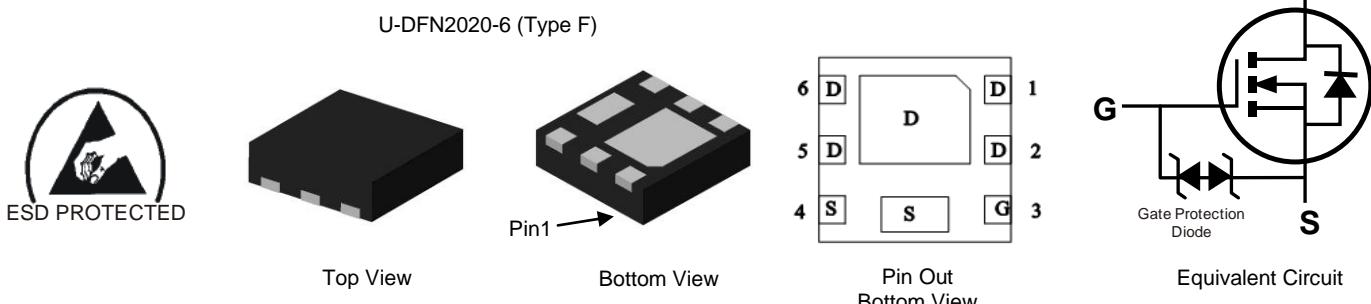
BV _{DSS}	R _{DSON} Max	I _D Max T _A = +25°C
12V	4.8mΩ @ V _{GS} = 4.5V	15A
	7.0mΩ @ V _{GS} = 2.5V	12A

Description

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

Applications

- General Purpose Interfacing Switch
- Power Management Functions



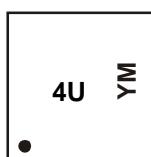
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1004UFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMN1004UFDF-13	U-DFN2020-6 (Type F)	10,000/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



4U = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025			
Code	E	F	G	H	I	J	K	L	M			
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	12	V
Gate-Source Voltage			V_{GSS}	± 8	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	15 12	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)			I_{DM}	70	A
Maximum Body Diode Continuous Current (Note 6)			I_S	3	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	34	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	55	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	167	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	72	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	22	
Operating and Storage Temperature Range	T_J, T_{STG}		-55 to +150	$^\circ\text{C}$

 Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	12	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DS}	—	—	1	μA	$V_{DS} = 9.6\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.3	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	4.1	4.8	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$
		—	4.5	7.0		$V_{GS} = 2.5\text{V}, I_D = 10\text{A}$
Diode Forward Voltage	V_{SD}	—	0.6	1.2	V	$V_{GS} = 0\text{V}, I_S = 3.2\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	2,385	—	pF	$V_{DS} = 6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	678	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	520	—	pF	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Gate Resistance	R_G	—	2.2	—	Ω	
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	26	—	nC	$V_{DS} = 6\text{V}, I_D = 10\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_G	—	47	—	nC	
Gate-Source Charge	Q_{GS}	—	2.8	—	nC	$V_{DS} = 6\text{V}, I_D = 5.0\text{A}$
Gate-Drain Charge	Q_{GD}	—	5.3	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.3	—	ns	$V_{GS} = 4.5\text{V}, R_G = 1.0\Omega$
Turn-On Rise Time	t_R	—	10.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	31.6	—	ns	$I_F = 2.0\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Turn-Off Fall Time	t_F	—	16.9	—	ns	
Reverse Recovery Time	t_{RR}	—	24.3	—	ns	$I_F = 2.0\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	7.4	—	nC	

Notes:

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

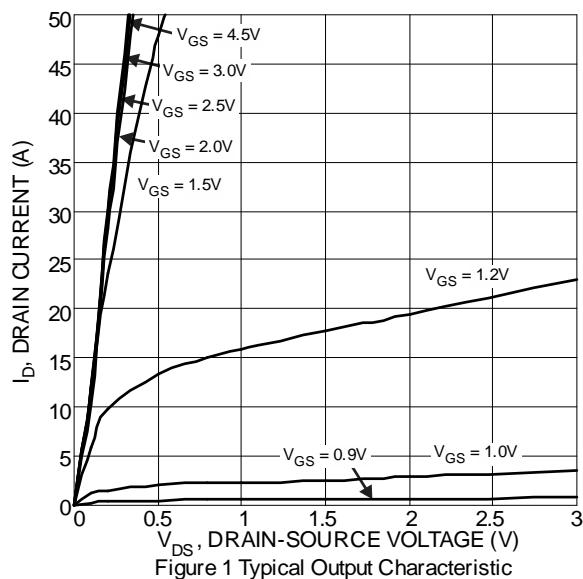


Figure 1 Typical Output Characteristic

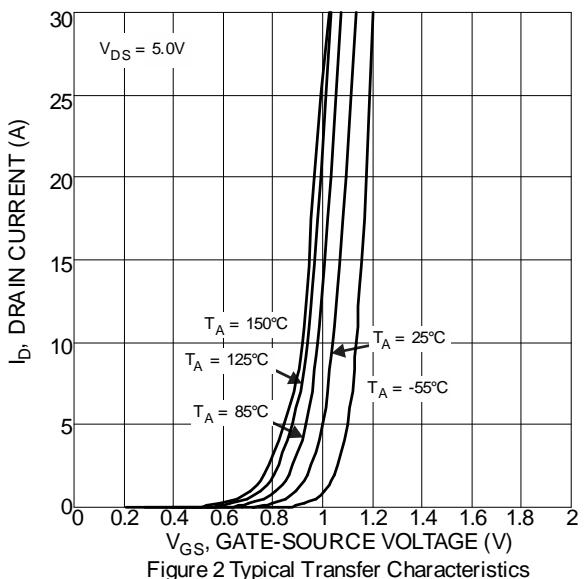


Figure 2 Typical Transfer Characteristics

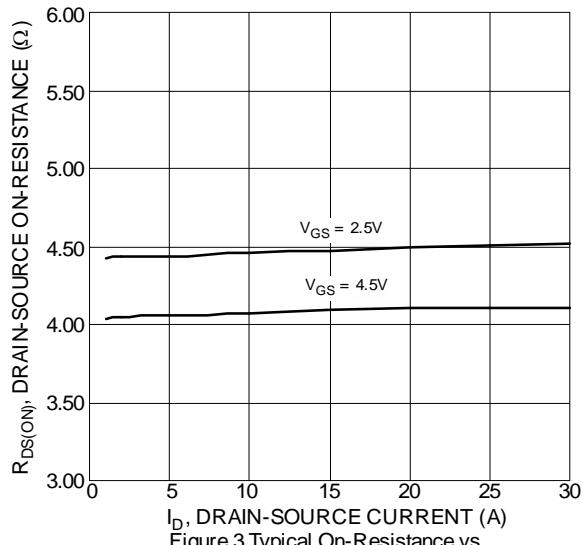


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

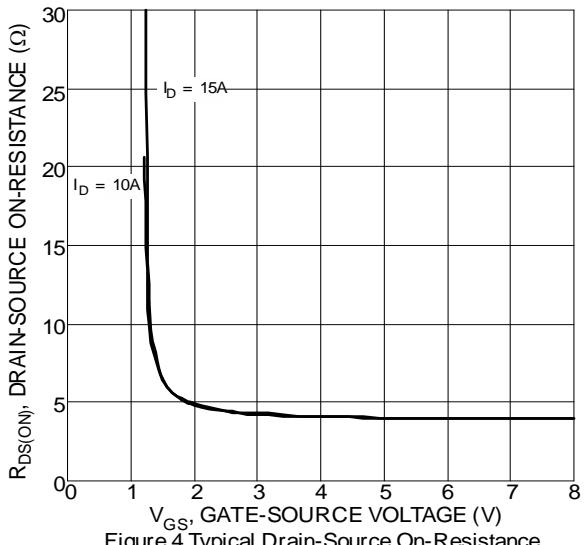


Figure 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

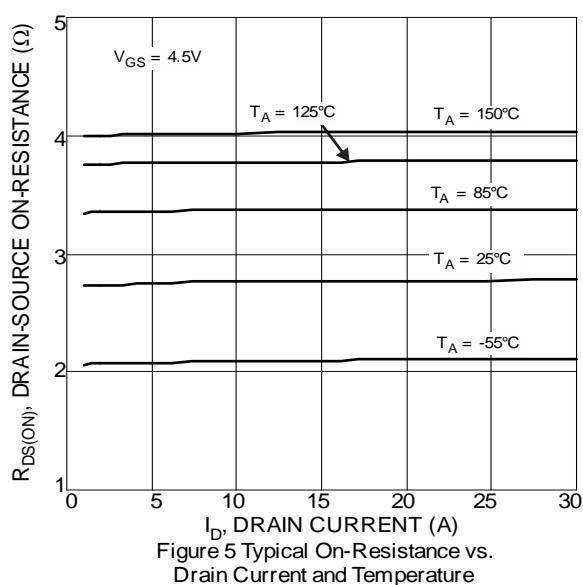


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

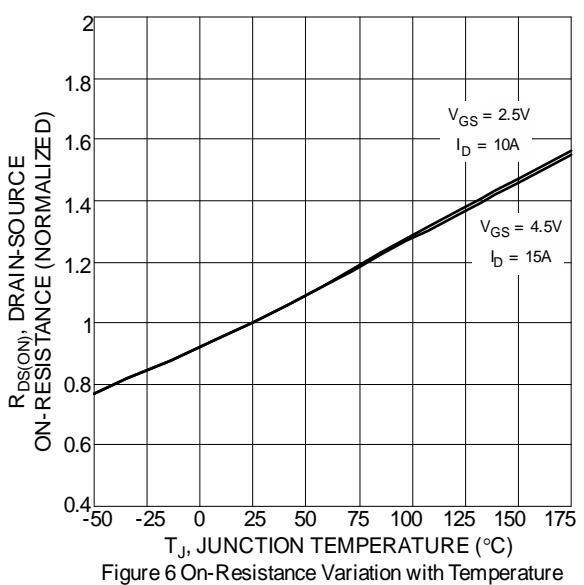
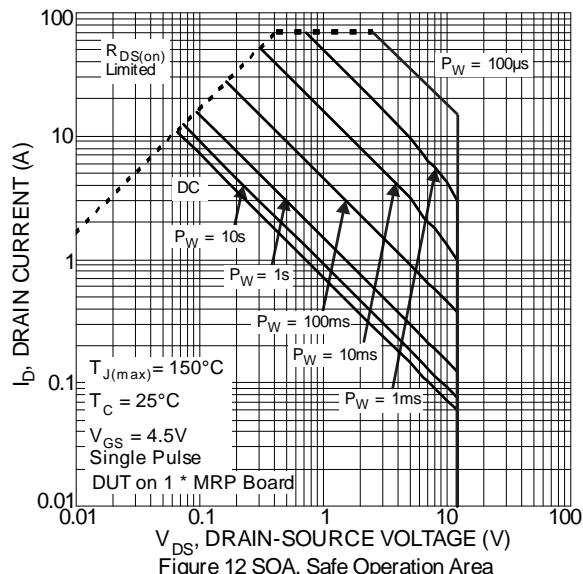
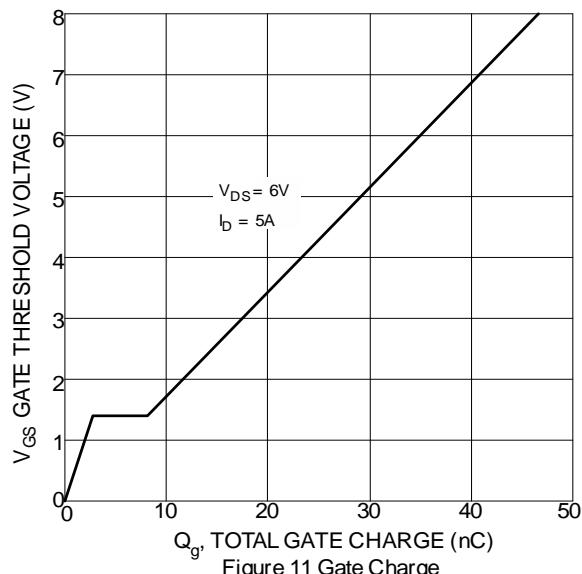
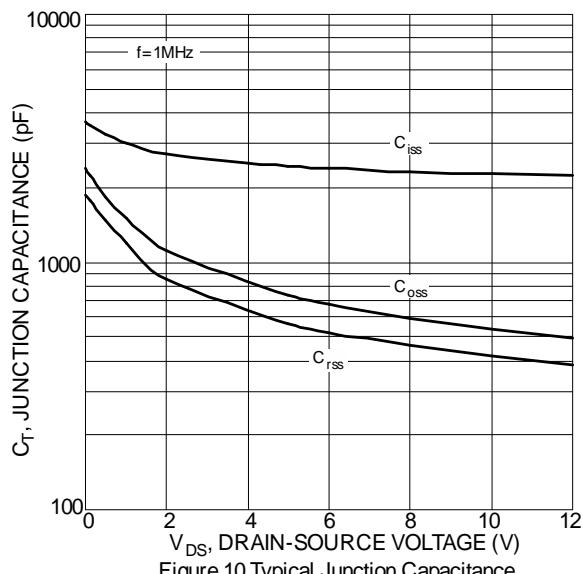
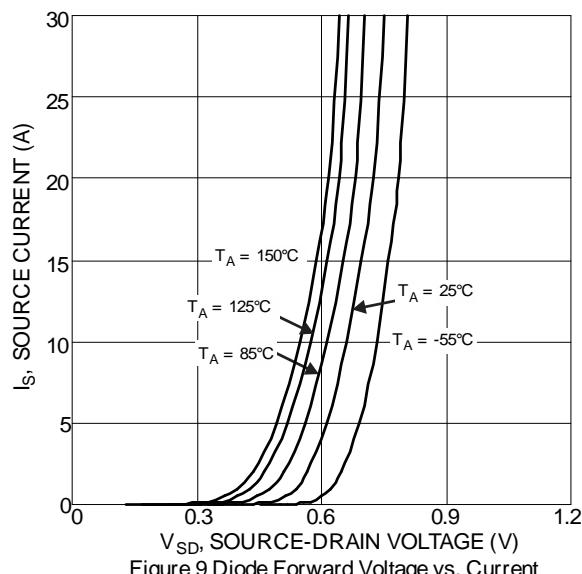
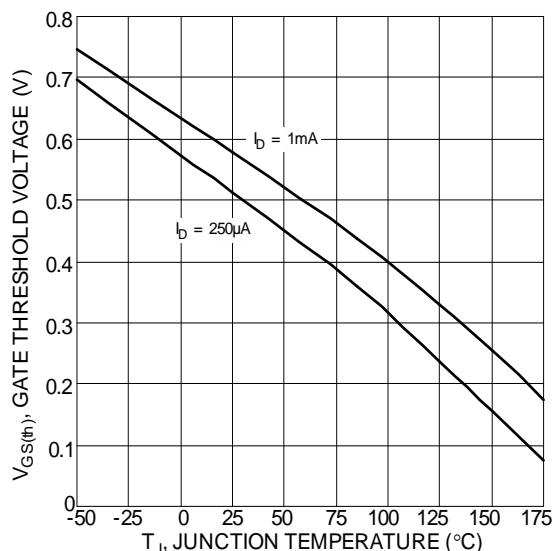
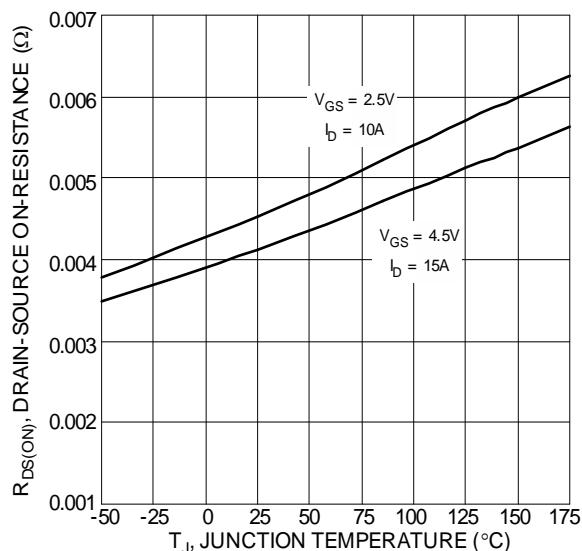
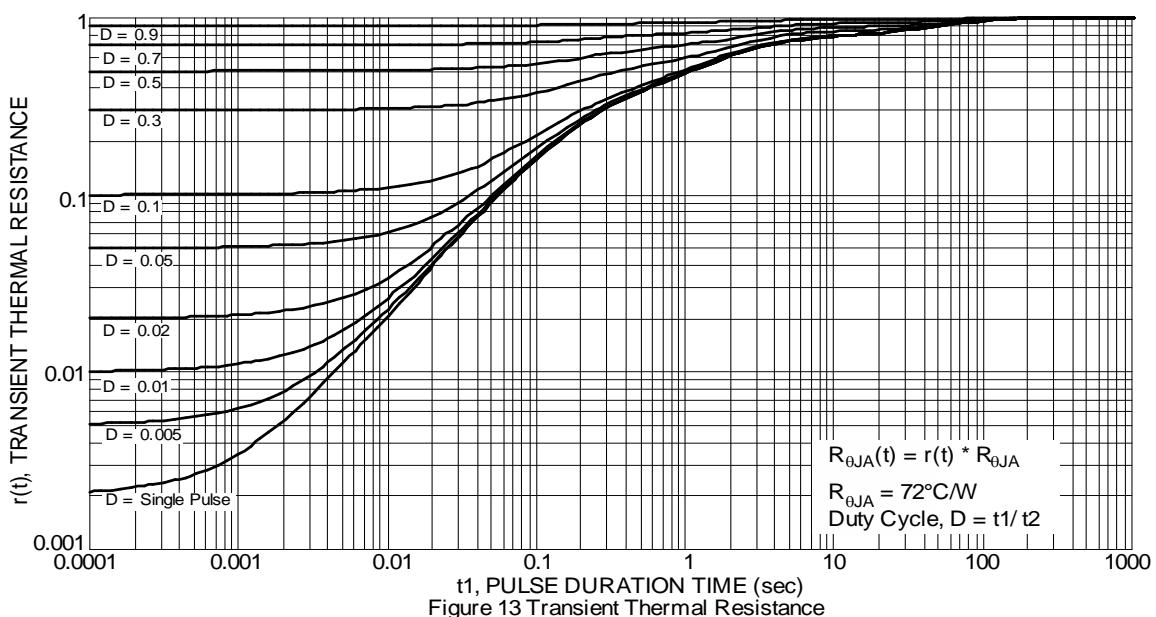


Figure 6 On-Resistance Variation with Temperature

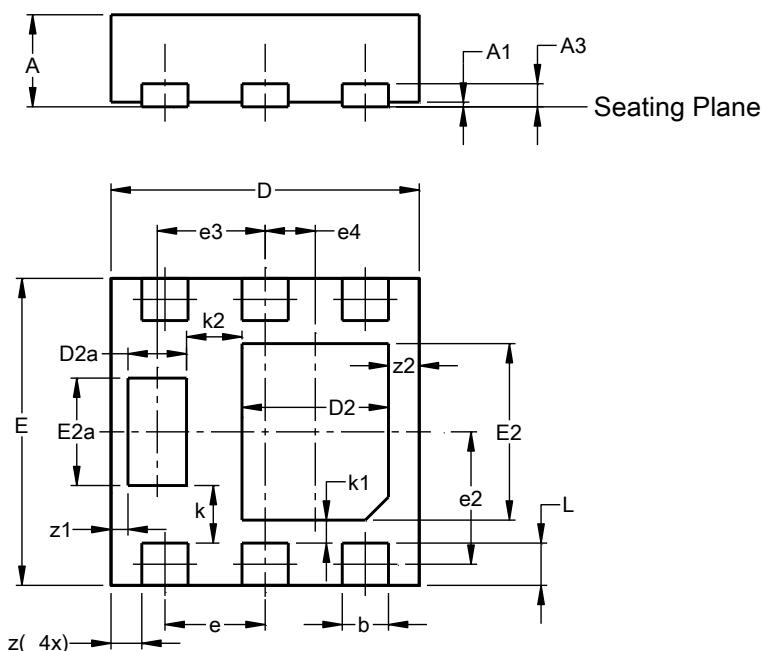




Package Outline Dimensions

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

U-DFN2020-6 (Type F)

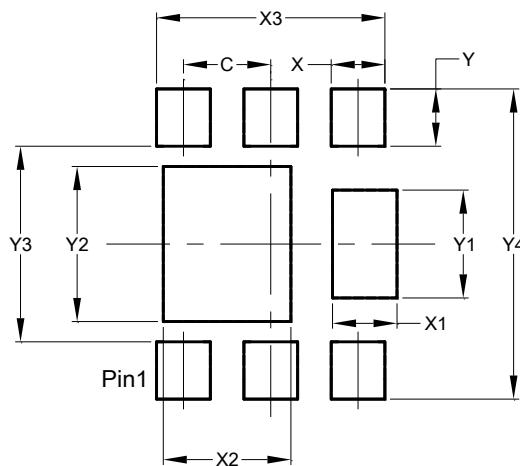


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36 BSC		
L	0.225	0.325	0.275
z	0.20 BSC		
z1	0.110 BSC		
z2	0.20 BSC		
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type F)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.480
X2	0.950
X3	1.700
Y	0.425
Y1	0.800
Y2	1.150
Y3	1.450
Y4	2.300

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