

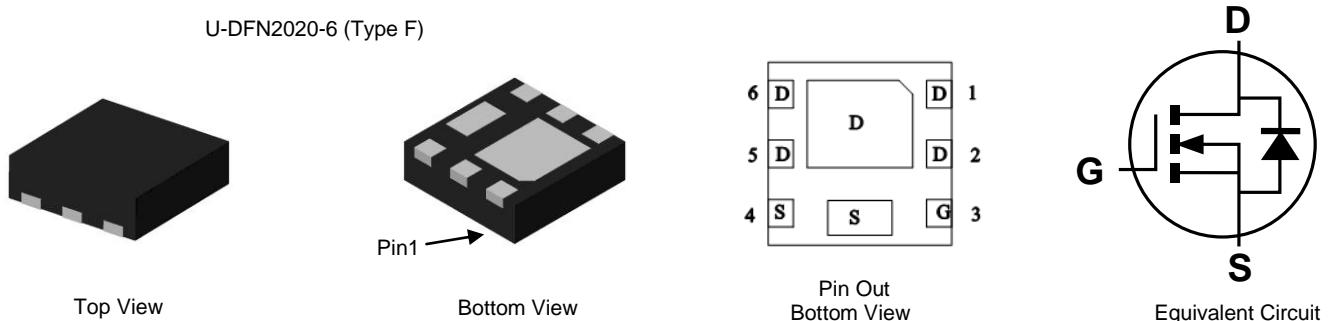
Product Summary

| BV_{DSS} | R_{DSON} Max | I_D Max T_A = 25°C |
|-------------------------|-------------------------------|---|
| 30V | 12mΩ @ V _{GS} = 10V | 10A |
| | 16mΩ @ V _{GS} = 4.5V | 8.5A |

Description and Applications

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

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



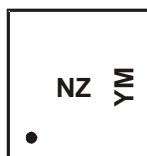
Ordering Information (Note 4)

| Part Number | Case | Packaging |
|----------------|----------------------|--------------------|
| DMN3016LFDF-7 | U-DFN2020-6 (Type F) | 3,000/Tape & Reel |
| DMN3016LFDF-13 | U-DFN2020-6 (Type F) | 10,000/Tape & Reel |

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. 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.
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 <http://www.diodes.com/products/packages.html>.

Marking Information



NZ = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: D = 2016)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | | | | |
|-------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|
| Code | D | E | F | G | H | I | J | K | | | | |
| 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} | 30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 10 8 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 12 9 | A |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I_S | 2.5 | A |
| Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%) | | | I_{DM} | 50 | A |
| Avalanche Current (Note 7) $L = 0.1\text{mH}$ | | | I_{AR} | 22 | A |
| Avalanche Energy (Note 7) $L = 0.1\text{mH}$ | | | E_{AR} | 24 | mJ |

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

| Characteristic | | Symbol | Value | Unit |
|--|---------------------------|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5) | $T_A = +25^\circ\text{C}$ | P_D | 0.73 | W |
| | $T_A = +70^\circ\text{C}$ | | 0.47 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 174 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 121 | |
| Total Power Dissipation (Note 6) | $T_A = +25^\circ\text{C}$ | P_D | 2.02 | W |
| | $T_A = +70^\circ\text{C}$ | | 1.30 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 66 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 42 | |
| Thermal Resistance, Junction to Case (Note 6) | Steady State | $R_{\theta JC}$ | 11.6 | |
| 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} | 30 | - | - | V | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1 | μA | $V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1.4 | - | 2.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 8 | 12 | $\text{m}\Omega$ | $V_{GS} = 10\text{V}, I_D = 11\text{A}$ |
| | | - | 12 | 16 | | $V_{GS} = 4.5\text{V}, I_D = 9\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | 0.70 | 1.0 | V | $V_{GS} = 0\text{V}, I_S = 1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C_{iss} | - | 1415 | - | pF | $V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 119 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 82 | - | | |
| Gate Resistance | R_g | - | 2.6 | - | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Total Gate Charge ($V_{GS} = 4.5\text{V}$) | Q_g | - | 11.3 | - | nC | $V_{DS} = 15\text{V}, I_D = 12\text{A}$ |
| Total Gate Charge ($V_{GS} = 10\text{V}$) | Q_g | - | 25.1 | - | | |
| Gate-Source Charge | Q_{gs} | - | 3.5 | - | | |
| Gate-Drain Charge | Q_{qd} | - | 3.6 | - | | |
| Turn-On Delay Time | $t_{D(ON)}$ | - | 4.8 | - | ns | $V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 1.25\Omega, R_g = 3\Omega$ |
| 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 | $I_F = 12\text{A}, di/dt = 500\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge | Q_{RR} | - | 10.4 | - | | |

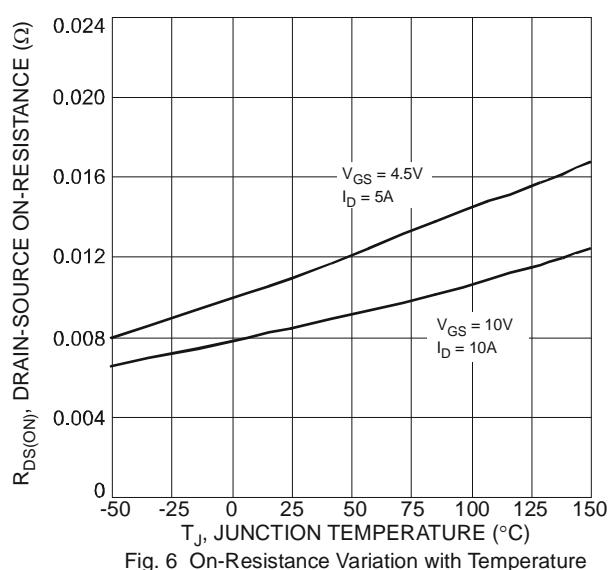
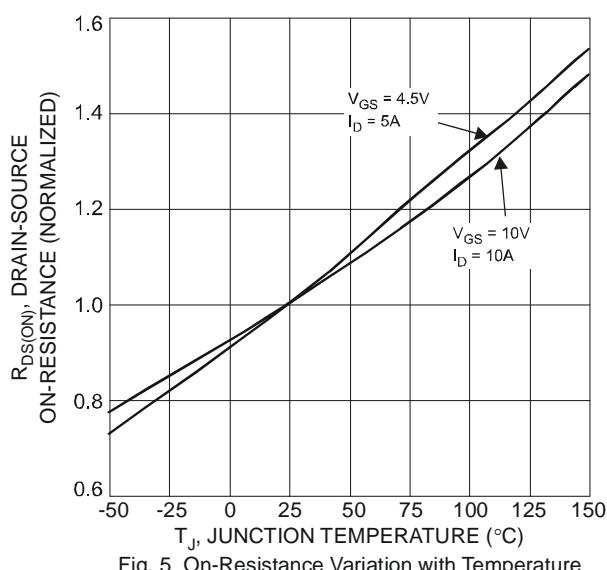
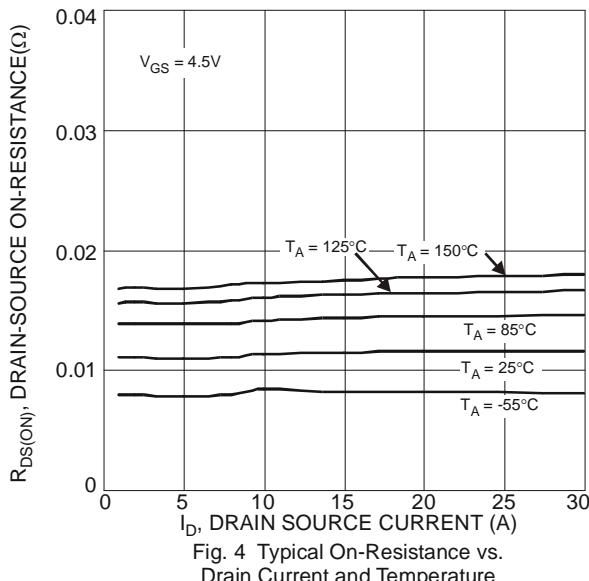
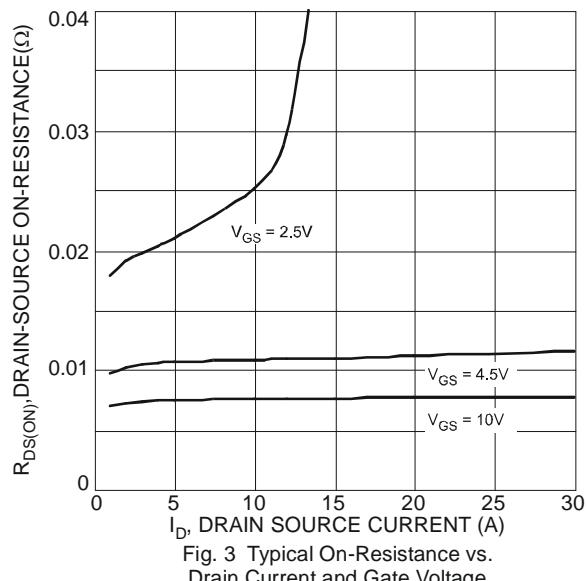
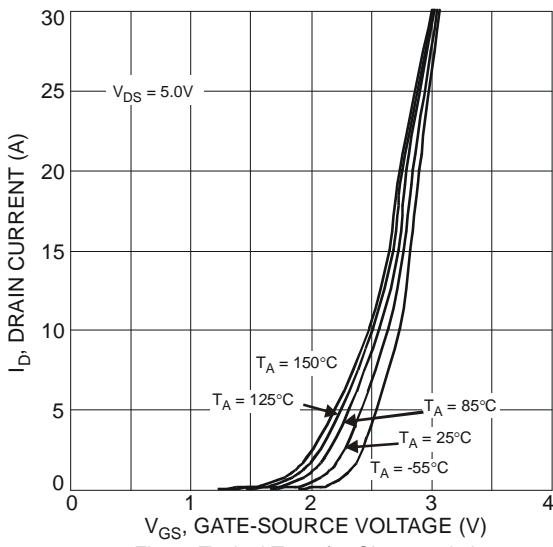
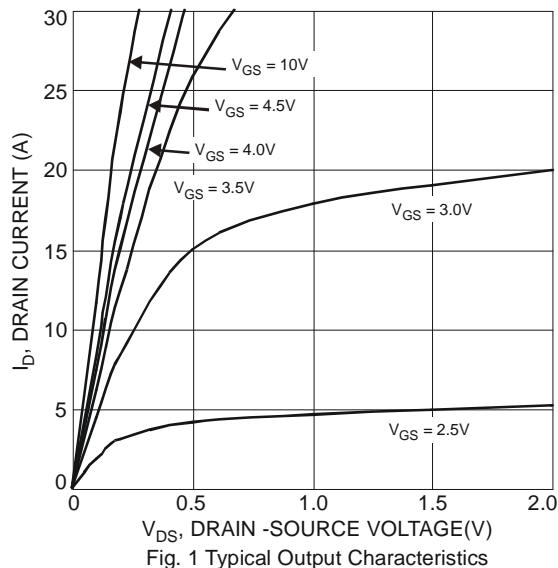
Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

7. I_{AS} and E_{AS} rating 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.



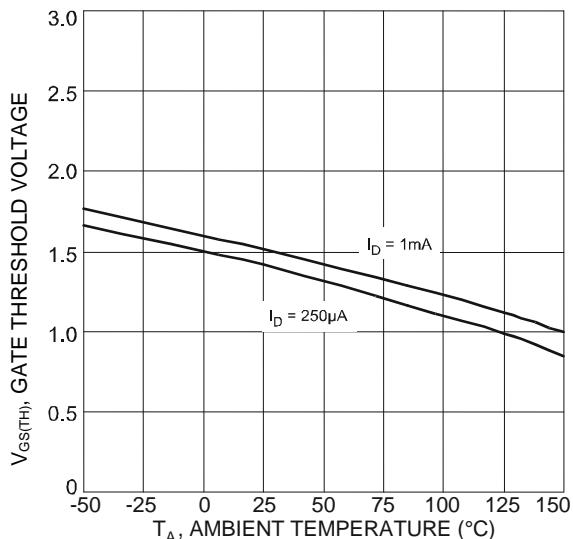


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

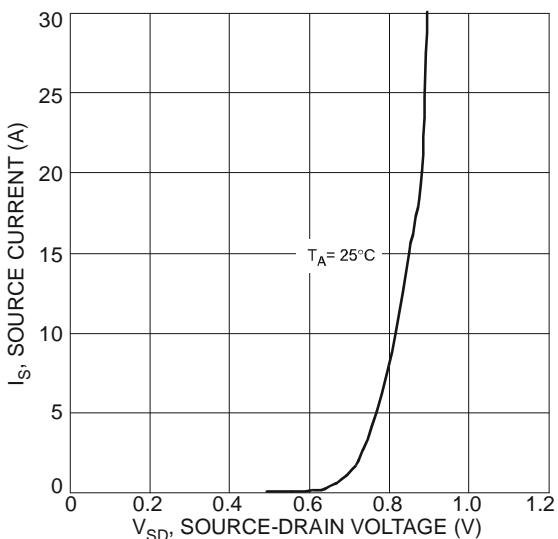


Fig. 8 Diode Forward Voltage vs. Current

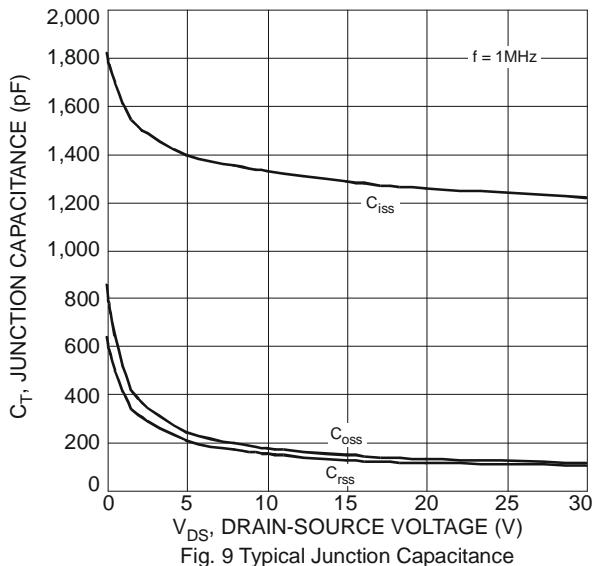


Fig. 9 Typical Junction Capacitance

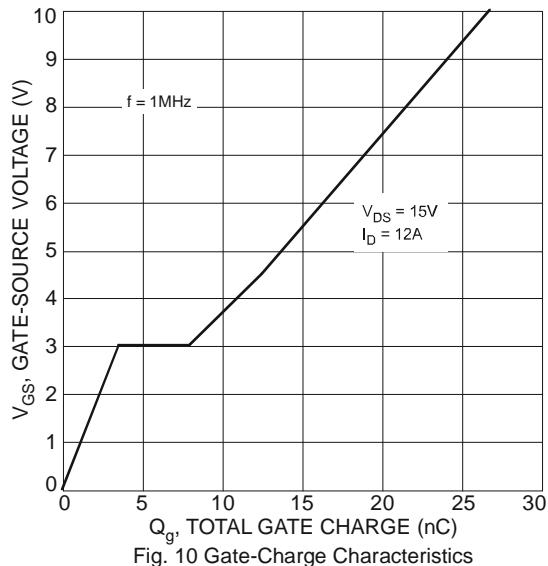


Fig. 10 Gate-Charge Characteristics

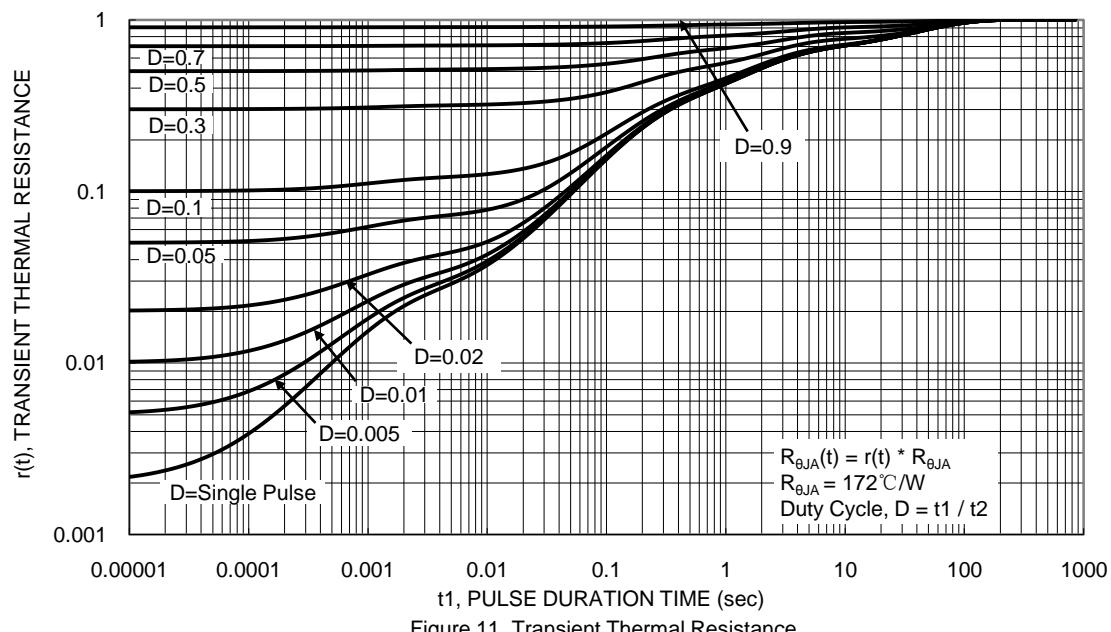
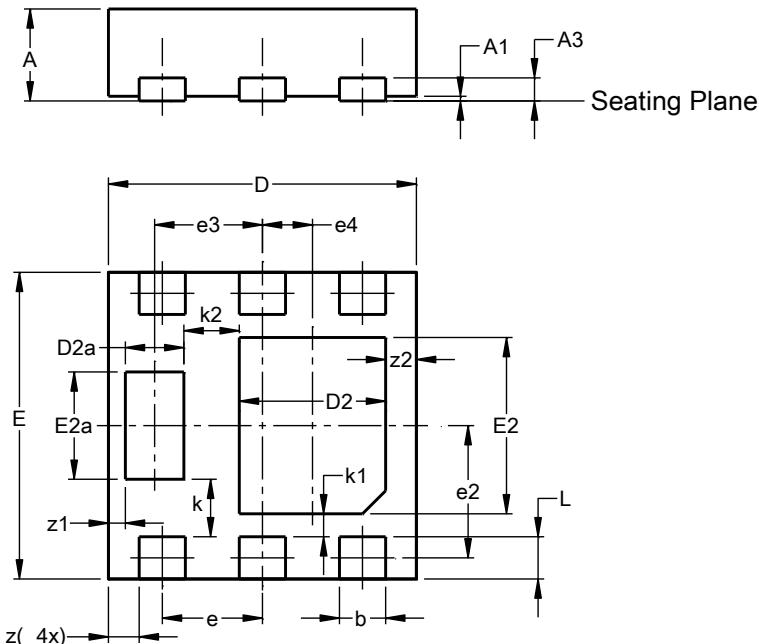


Figure 11. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6 (Type F)

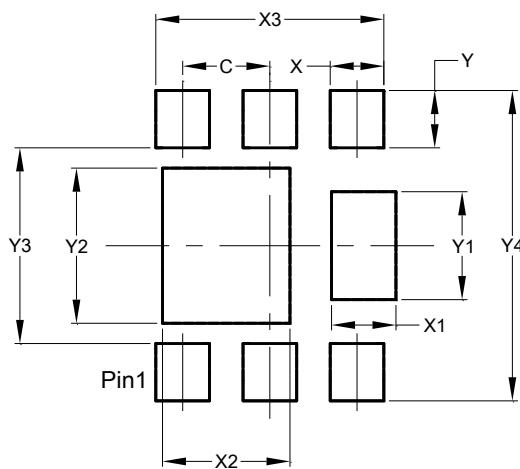


| U-DFN2020-6 (Type F) | | | |
|-------------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.57 | 0.63 | 0.60 |
| A1 | 0.00 | 0.05 | 0.03 |
| A3 | - | - | 0.15 |
| b | 0.25 | 0.35 | 0.30 |
| D | 1.95 | 2.05 | 2.00 |
| D2 | 0.85 | 1.05 | 0.95 |
| D2a | 0.33 | 0.43 | 0.38 |
| 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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