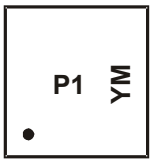
## Marking Information

Site 1

U-DFN2020-6



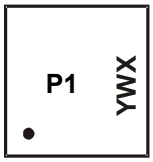

P1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2014 | 2015 | … | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| Code | B | C | … | 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 |

Site 2




P1 = 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 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|
| Code | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

| 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 |

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

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -20 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±8 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = -4.5V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -9.0<br>-7.2 | A |
| | t<10s | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -11.1<br>-8.9 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | $I_{DM}$ | -60 | A |
| Continuous Source-Drain Diode Current (Note 6) | | $T_A$ = +25°C | $I_S$ | -2.4 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | $I_{AS}$ | -27 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | $E_{AS}$ | 38 | mJ |

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

| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| 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 | $R_{\theta JA}$ | 172 | °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 | $R_{\theta JA}$ | 63 | °C/W |
| | t<10s | | 42 | |
| Thermal Resistance, Junction to Case (Note 6) | Steady State | $R_{\theta JC}$ | 18 | |
| 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 | — | -1.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | — | 12 | 16 | mΩ | $V_{GS}$ = -4.5V, $I_D$ = -7.0A |
| | | | 15 | 22 | | $V_{GS}$ = -2.5V, $I_D$ = -5.0A |
| | | | 19 | 40 | | $V_{GS}$ = -1.8V, $I_D$ = -3.0A |
| | | | 21 | 80 | | $V_{GS}$ = -1.5V, $I_D$ = -1.0A |
| Diode Forward Voltage | $V_{SD}$ | — | -0.8 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -1.0A |
| **DYNAMIC CHARACTERISTICS (Note 9)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2,760 | — | pF | $V_{DS}$ = -15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 262 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 220 | — | | |
| Gate Resistance | $R_g$ | — | 16 | 30 | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = -4.5V) | $Q_g$ | — | 34 | — | nC | $V_{DS}$ = -15V, $I_D$ = -4.0A |
| Total Gate Charge ($V_{GS}$ = -8V) | $Q_g$ | — | 59 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 3.5 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 8.3 | — | | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 7.5 | — | ns | $V_{DS}$ = -15V, $V_{GS}$ = -4.5V, $R_G$ = 1Ω, $I_D$ = -4.0A |
| Turn-On Rise Time | $t_r$ | — | 25 | — | | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 125 | — | | |
| Turn-Off Fall Time | $t_f$ | — | 96 | — | | |
| Reverse Recovery Time | $t_{rr}$ | — | 48 | — | ns | $I_F$ = -1.0A, di/dt = 100A/µs |
| Reverse Recovery Charge | $Q_{rr}$ | — | 33 | — | nC | $I_F$ = -1.0A, di/dt = 100A/µs |

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 1-inch square copper plate.
7. $I_{AS}$ and $E_{AS}$ rating 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.

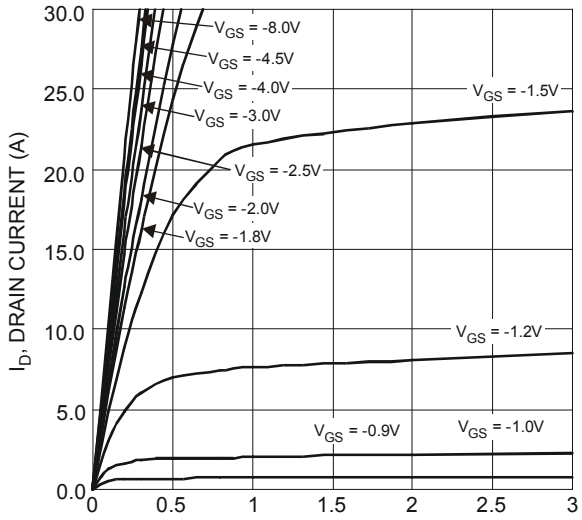



Figure 1 Typical Output Characteristics

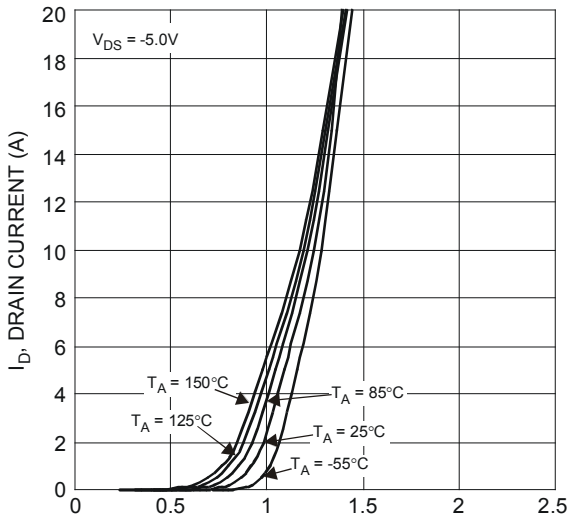



Figure 2 Typical Transfer Characteristics

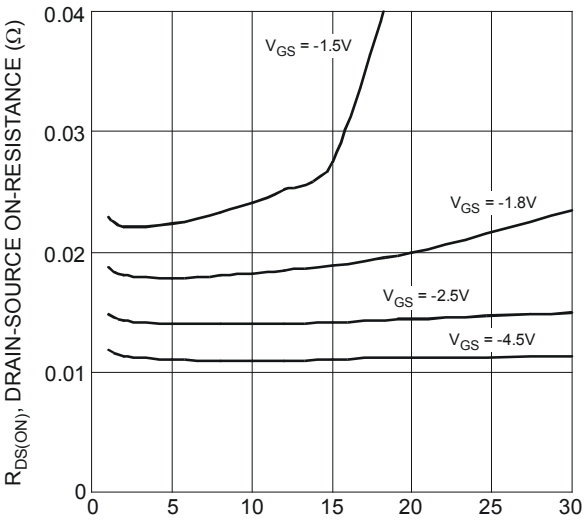



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

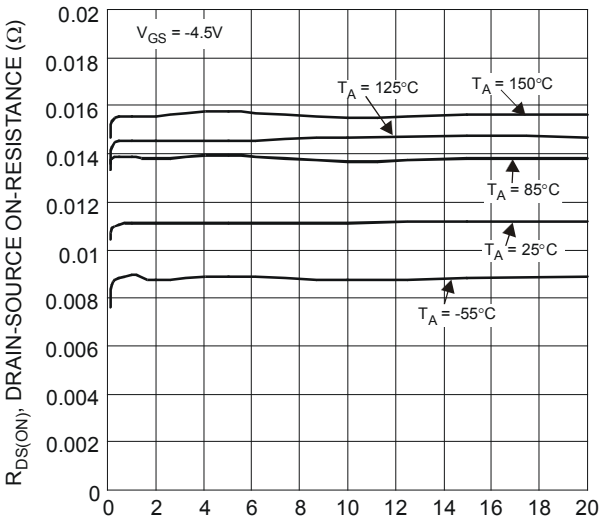



Figure 4 Typical On-Resistance vs. Drain Current and Temperature

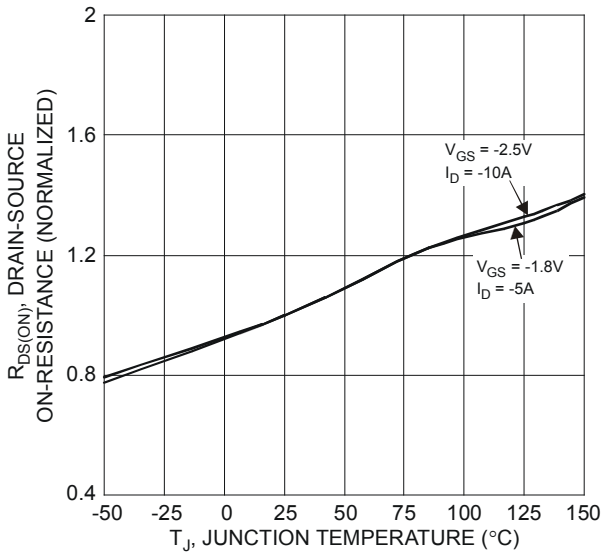



Figure 5 On-Resistance Variation with Temperature

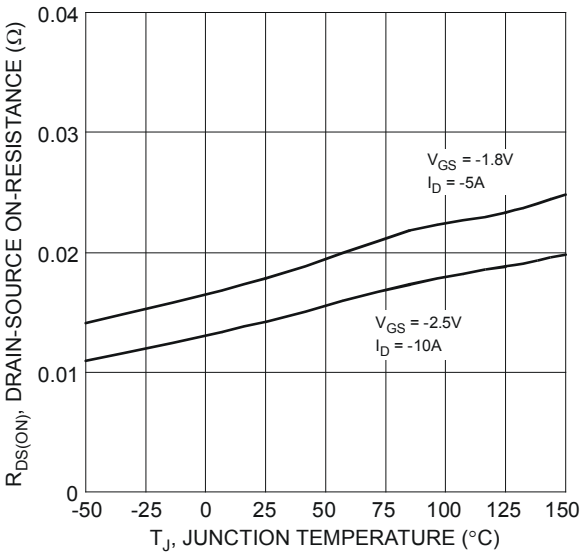



Figure 6 On-Resistance Variation with Temperature

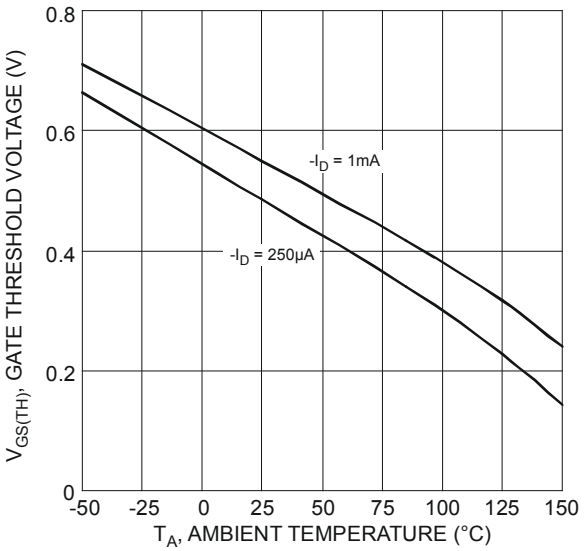



Figure 7 Gate Threshold Variation vs. Ambient Temperature

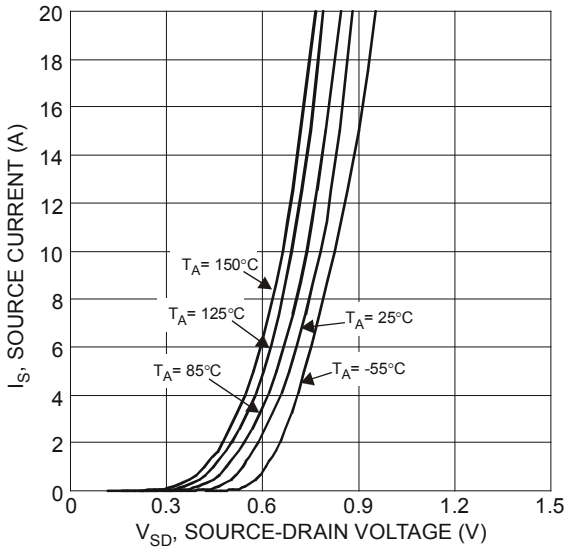



Figure 8 Diode Forward Voltage vs. Current

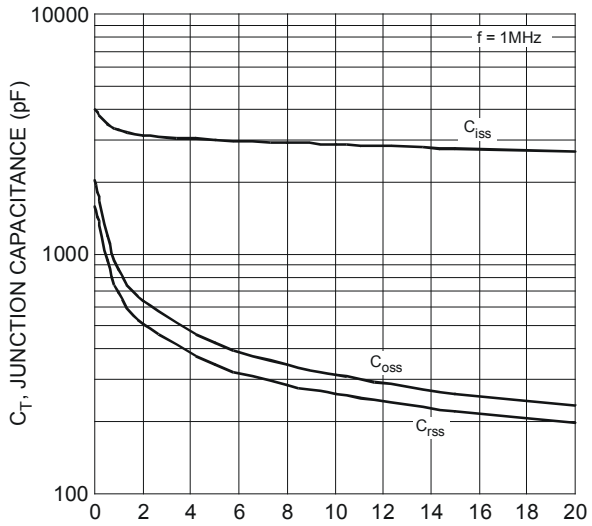



Figure 9 ypical Junction Capacitance

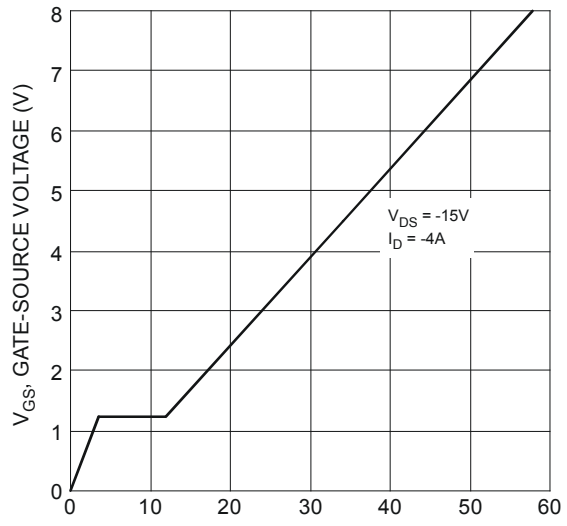



Figure 10 Gate-Charge Characteristics

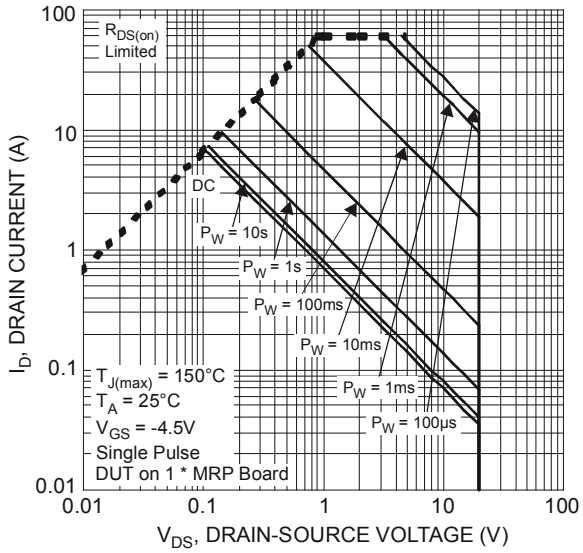



Figure 11 SOA, Safe Operation Area

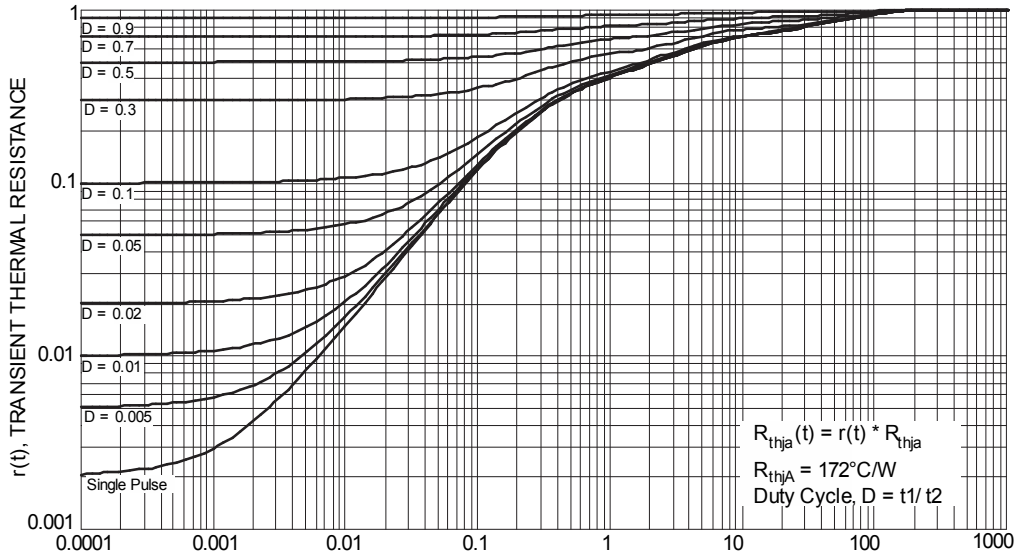
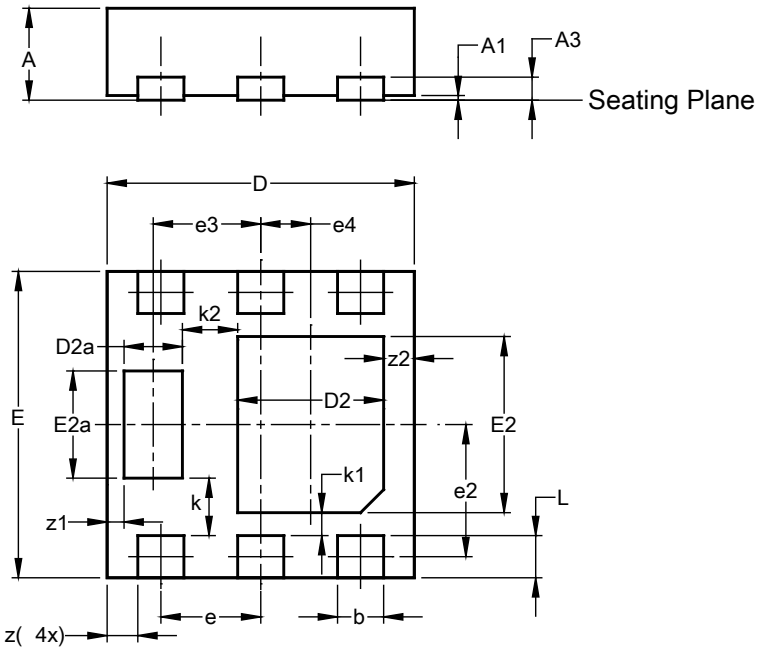



Figure 12 Transient Thermal Resistance

## Package Outline Dimensions

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

**U-DFN2020-6 (Type F)**

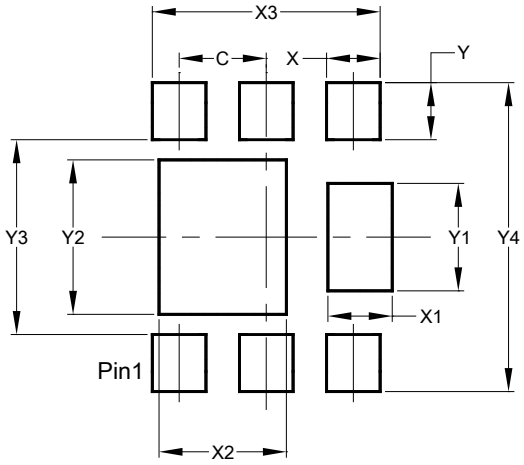



| U-DFN2020-6 (Type F) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.57 | 0.63 | 0.60 |
| **A1** | 0.00 | 0.05 | 0.03 |
| **A3** | - | - | 0.15 |
| **b** | 0.25 | 0.35 | 0.30 |
| **D** | 1.95 | 2.05 | 2.00 |
| **D2** | 0.85 | 1.05 | 0.95 |
| **D2a** | 0.33 | 0.43 | 0.38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