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## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$         | $I_D$<br>$T_A = +25^\circ C$ |
|---------------|----------------------|------------------------------|
| 300V          | 4Ω @ $V_{GS} = 10V$  | 0.55A                        |
|               | 4Ω @ $V_{GS} = 4.5V$ | 0.55A                        |
|               | 6Ω @ $V_{GS} = 2.7V$ | 0.44A                        |

## Description

This new generation 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.

## Applications

- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

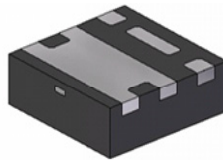
## Features

- 0.6mm profile – ideal for low profile applications
- PCB footprint of 4mm<sup>2</sup>
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

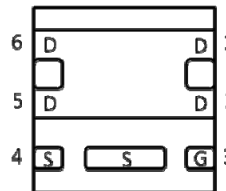
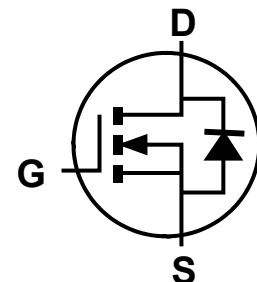
## Mechanical Data

- 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 (G4)
- Weight: 0.0065 grams (approximate)

U-DFN2020-6



Bottom View


 Pin Out  
Bottom View


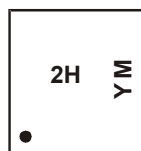
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number      | Compliance | Case        | Quantity per reel |
|------------------|------------|-------------|-------------------|
| DMN30H4D0LFDE-7  | Standard   | U-DFN2020-6 | 3,000             |
| DMN30H4D0LFDE-13 | Standard   | U-DFN2020-6 | 10,000            |

- 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](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 <http://www.diodes.com/products/packages.html>.

## Marking Information



2H = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|------|------|------|------|------|------|------|------|
| Code | A    | B    | C    | D    | E    | F    | G    |

| 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic  |              |  | Symbol           | Value        | Units |
|---|--------------|--|------------------|--------------|-------|
| Drain-Source Voltage                                    |              |  | V <sub>DSS</sub> | 300          | V     |
| Gate-Source Voltage                                     |              |  | V <sub>GSS</sub> | ±20          | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 0.55<br>0.43 | A     |
| Pulsed Drain Current (10µs pulse, duty cycle ≤1%)       |              |  | I <sub>DM</sub>  | 2            | A     |
| Maximum Body Diode Continuous Current (Note 6)          |              |  | I <sub>S</sub>   | 2            | A     |

**Thermal Characteristics**

| Characteristic                          |          | Symbol                            | Value       | Units |
|---|----------|-----------------------------------|-------------|-------|
| Total Power Dissipation                 | (Note 5) | P <sub>D</sub>                    | 0.63        | W     |
|   | (Note 6) |                                   | 1.98        |       |
| Thermal Resistance, Junction to Ambient | (Note 5) | R <sub>θJA</sub>                  | 189         | °C/W  |
|   | (Note 6) |                                   | 61          |       |
| Thermal Resistance, Junction to Case    | (Note 6) | R <sub>θJC</sub>                  | 9.3         |       |
| Operating and Storage Temperature Range |          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol              | Min | Typ   | Max  | Unit | Test Condition  |
|---|---------------------|-----|-------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b>     |                     |     |       |      |      |   |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 300 | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA  |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —     | 1    | µA   | V <sub>DS</sub> = 240V, V <sub>GS</sub> = 0V  |
| Gate-Body Leakage                       | I <sub>GSS</sub>    | —   | —     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 7)</b>      |                     |     |       |      |      |   |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub> | 1   | 1.7   | 2.8  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                  |
| Static Drain-Source On-Resistance       | R <sub>DS(on)</sub> | —   | 2.3   | 4    | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.3A  |
|   |                     | —   | 2.3   | 4    |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.2A   |
|   |                     | —   | 2.4   | 6    |      | V <sub>GS</sub> = 2.7V, I <sub>D</sub> = 0.1A   |
|   |                     | —   | —     | —    |      | —   |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.7   | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.3A   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |     |       |      |      |   |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 187.3 | —    | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                    |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 11.7  | —    |      |   |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 8.7   | —    |      |   |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 7.6   | —    | nC   | V <sub>DS</sub> = 192V, V <sub>GS</sub> = 10V,<br>I <sub>D</sub> = 0.5A                     |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 0.5   | —    |      |   |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 3.3   | —    |      |   |
| Turn-On Delay Time                      | t <sub>D(on)</sub>  | —   | 4.9   | —    | nS   | V <sub>DS</sub> = 60V, R <sub>L</sub> = 200Ω<br>V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 4.7   | —    |      |   |
| Turn-Off Delay Time                     | t <sub>D(off)</sub> | —   | 25.8  | —    |      |   |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 17.5  | —    |      |   |

- 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 1inch square copper plate.
  7. Short duration pulse test used to minimize self-heating effect
  8. Guaranteed by design. Not subject to production testing

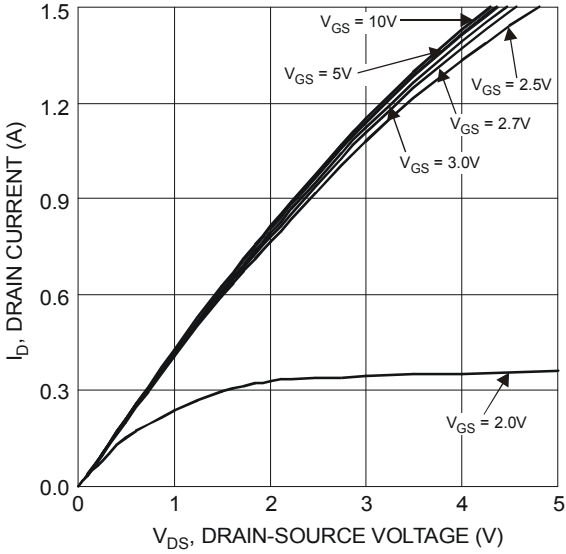


Figure 1 Typical Output Characteristics

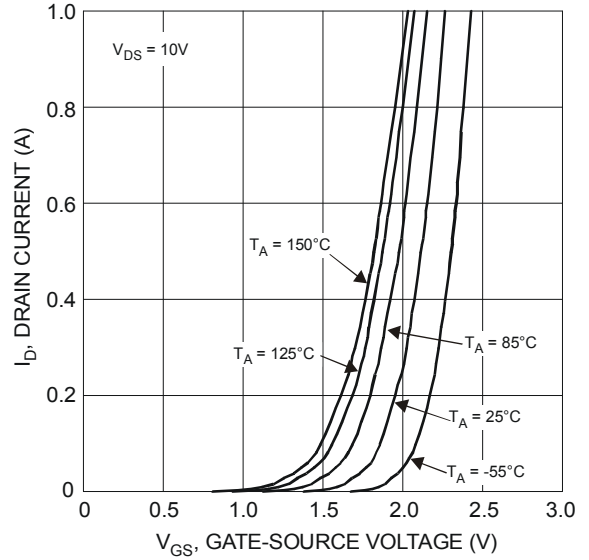


Figure 2 Typical Transfer Characteristics

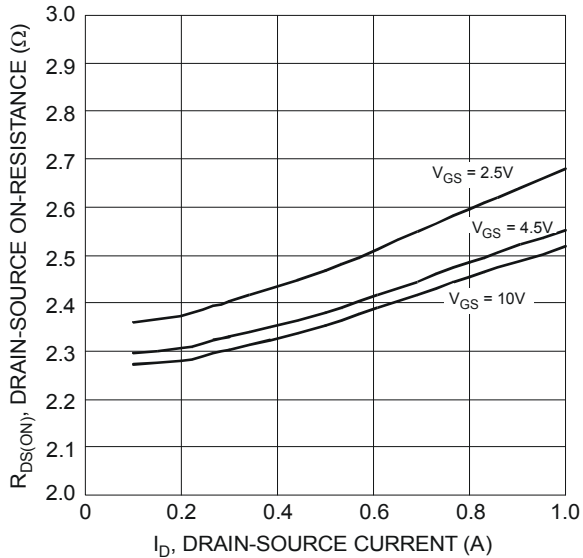


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

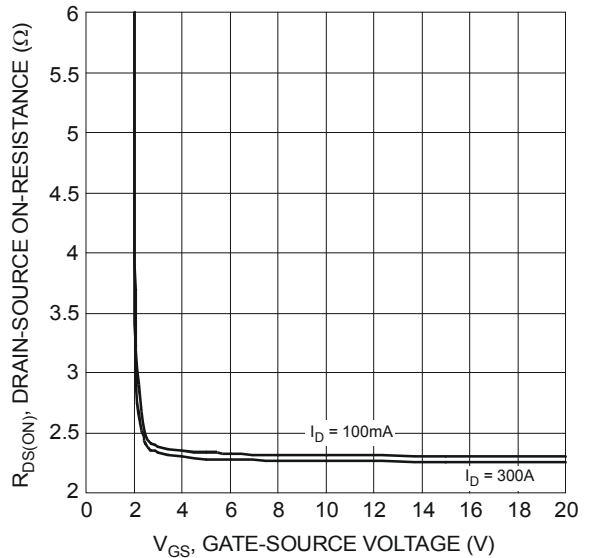


Figure 4 Typical Transfer Characteristics

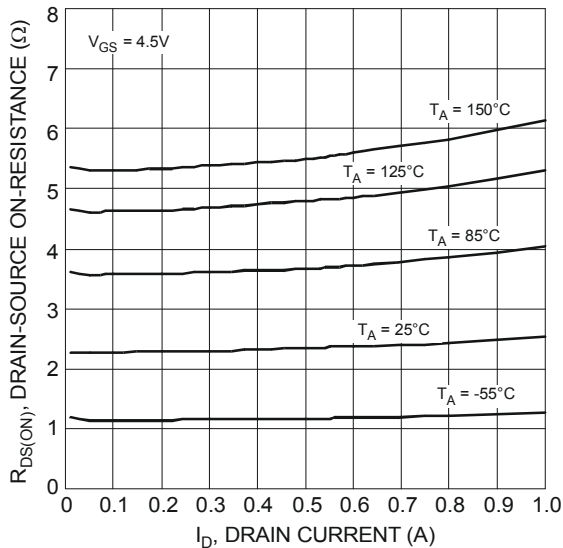


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

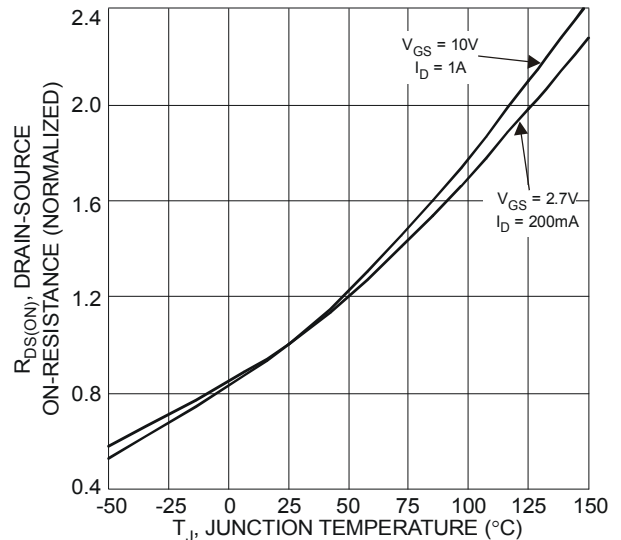
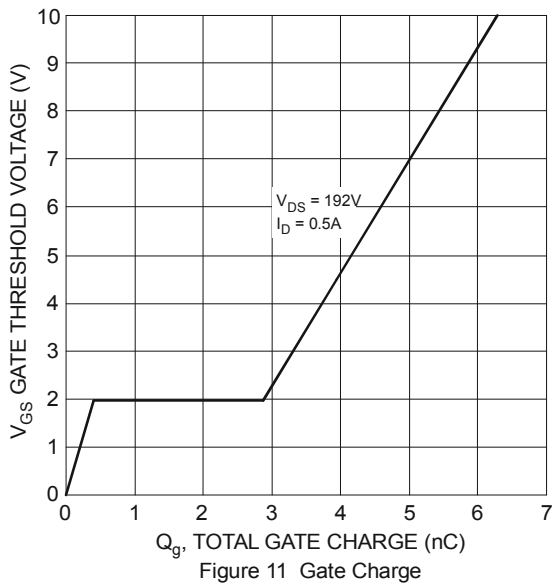
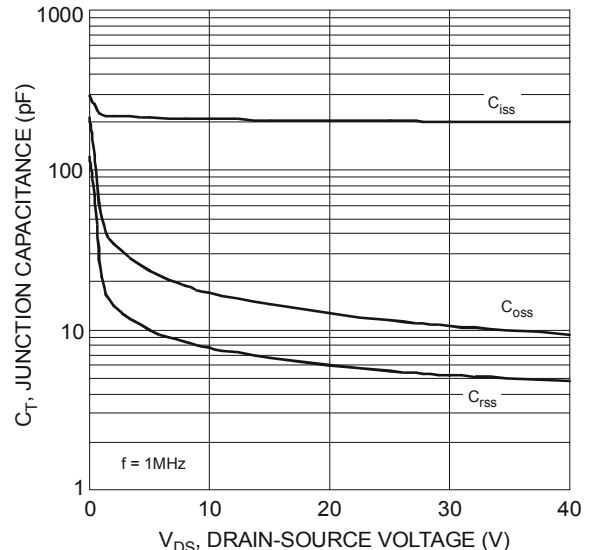
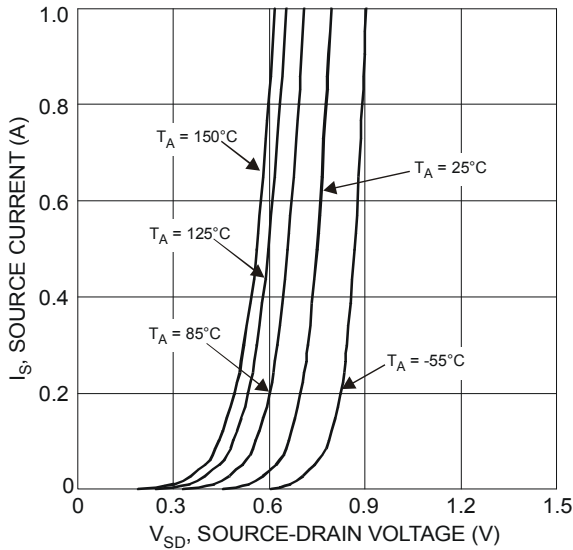
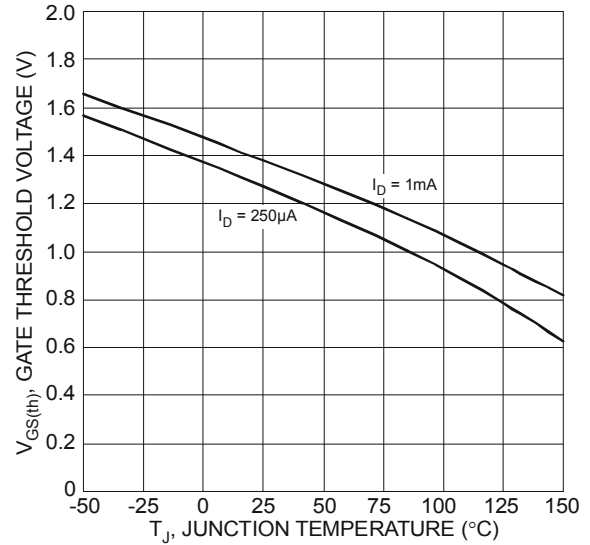
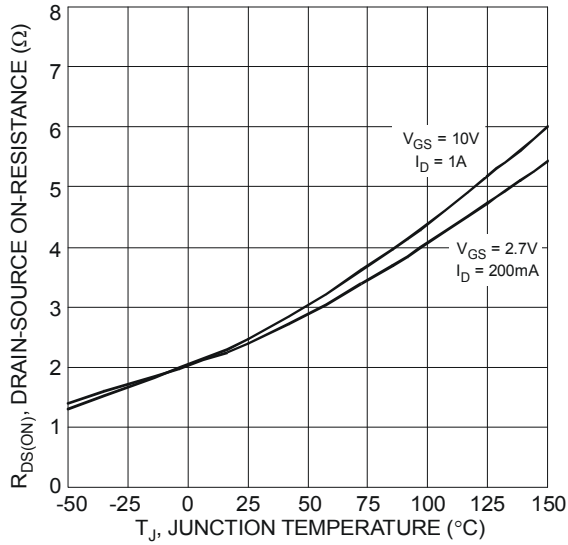


Figure 6 On-Resistance Variation with Temperature



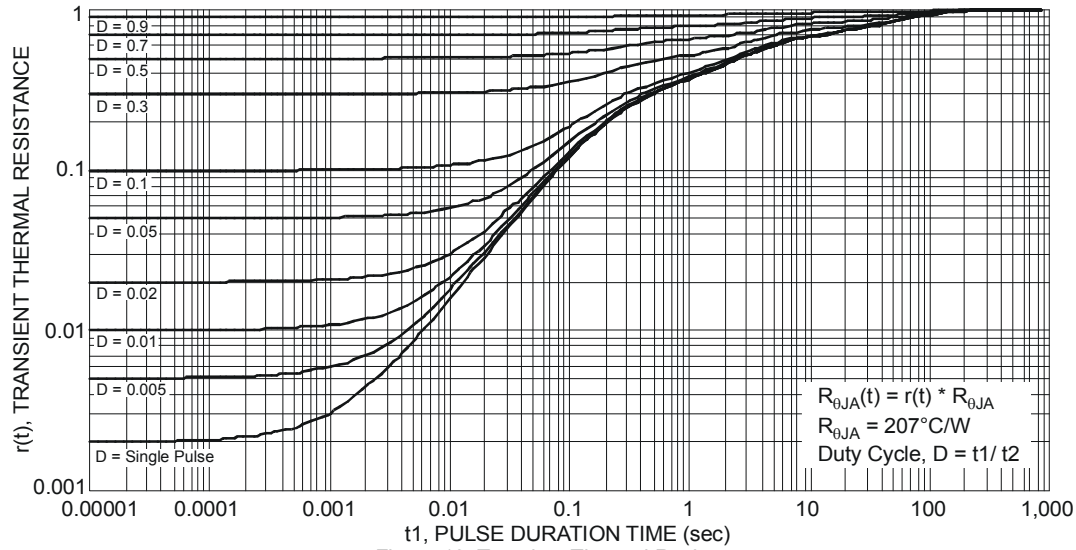
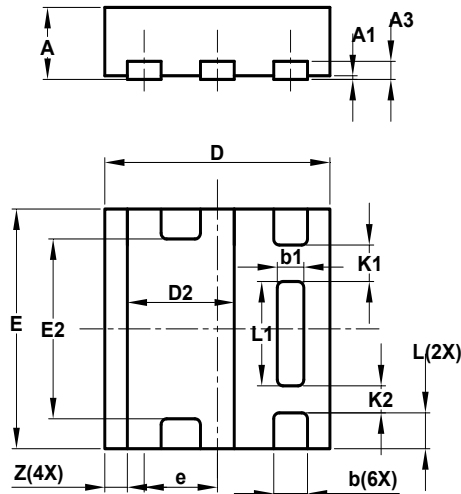


Figure 12 Transient Thermal Resistance

## Package Outline Dimensions

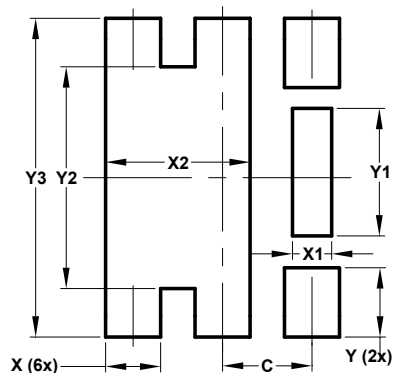
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| U-DFN2020-6<br>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 AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| 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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