

## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ Max               | $I_D$ Max<br>$T_A = +25^\circ C$ |
|------------|--------------------------------|----------------------------------|
| 30V        | 20m $\Omega$ @ $V_{GS} = 10V$  | 7.7A                             |
|            | 32m $\Omega$ @ $V_{GS} = 4.5V$ | 6.1A                             |

## Description

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

## Applications

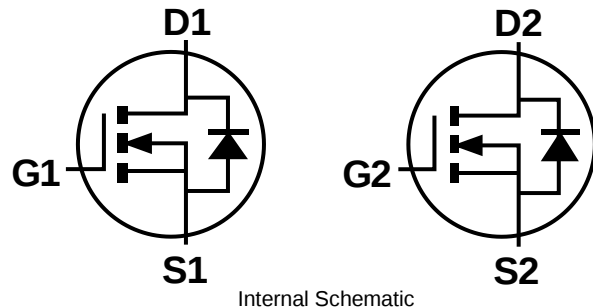
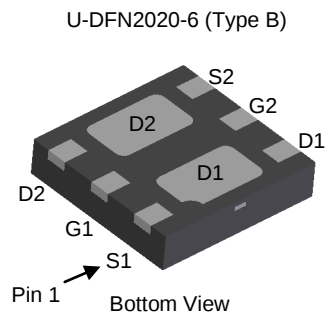
- General Purpose Interfacing Switch
- Power Management Functions

## Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- Low Gate Threshold Voltage
- Low On-Resistance
- 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 Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)



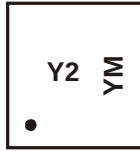
## Ordering Information (Note 4)

| Part Number    | Case                 | Packaging          |
|----------------|----------------------|--------------------|
| DMT3020LFDB-7  | U-DFN2020-6 (Type B) | 3,000/Tape & Reel  |
| DMT3020LFDB-13 | U-DFN2020-6 (Type B) | 10,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - 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.
  - 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

### Site 1



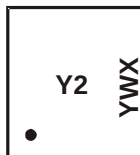
Y2 = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: F = 2018)  
M = Month (ex: 9 = September)

#### Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    |

| 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



Y2 = Product Type Marking Code  
YWX = Date Code Marking  
Y = Year (ex: 8 = 2018)  
W = Week (ex: a = week 27; z represents week 52 and 53)  
X = Internal Code (ex: U = Monday)

#### Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|------|------|------|------|------|------|------|
| Code | 8    | 9    | 0    | 1    | 2    | 3    | 4    | 5    |

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

| Characteristic                                          |              |                                                  | Symbol           | Value      | Unit |
|---------------------------------------------------------|--------------|--------------------------------------------------|------------------|------------|------|
| Drain-Source Voltage                                    |              |                                                  | V <sub>DSS</sub> | 30         | 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> = +75°C | I <sub>D</sub>   | 7.7<br>6.2 | A    |
| Maximum Continuous Body Diode Forward Current (Note 6)  |              |                                                  | I <sub>S</sub>   | 2          | A    |
| Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)     |              |                                                  | I <sub>DM</sub>  | 50         | A    |

**Thermal Characteristics**

| Characteristic                                   |              | Symbol                            | Value       | Unit |
|--------------------------------------------------|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 |              | P <sub>D</sub>                    | 0.7         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R <sub>θJA</sub>                  | 170         | °C/W |
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 1.8         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R <sub>θJA</sub>                  | 70          | °C/W |
| 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</b> (Note 7)                    |                     |     |     |      |      |                                                                                           |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | 30  | —   | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA                                              |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —   | —   | 1    | µA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                               |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —   | —   | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                              |
| <b>ON CHARACTERISTICS</b> (Note 7)                     |                     |     |     |      |      |                                                                                           |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | 1.0 | —   | 2.5  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | —   | —   | 20   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.0A                                              |
|                                                        |                     |     |     | 32   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7.0A                                             |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —   | —   | 1.0  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 2A                                                 |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 8)                |                     |     |     |      |      |                                                                                           |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | 393 | —    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                |
| Output Capacitance                                     | C <sub>oss</sub>    | —   | 173 | —    | pF   |                                                                                           |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —   | 27  | —    | pF   |                                                                                           |
| Gate Resistance                                        | R <sub>G</sub>      | —   | 1.1 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                      |
| Total Gate Charge (V <sub>GS</sub> = 10V)              | Q <sub>G</sub>      | —   | 7.0 | —    | nC   | V <sub>DD</sub> = 15V, I <sub>D</sub> = 9A                                                |
| Total Gate Charge (V <sub>GS</sub> = 4.5V)             | Q <sub>G</sub>      | —   | 3.6 | —    | nC   |                                                                                           |
| Gate-Source Charge                                     | Q <sub>GS</sub>     | —   | 0.9 | —    | nC   |                                                                                           |
| Gate-Drain Charge                                      | Q <sub>GD</sub>     | —   | 1.5 | —    | nC   |                                                                                           |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —   | 1.8 | —    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>G</sub> = 6Ω, I <sub>D</sub> = 9A |
| Turn-On Rise Time                                      | t <sub>R</sub>      | —   | 1.9 | —    | ns   |                                                                                           |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —   | 7.5 | —    | ns   |                                                                                           |
| Turn-Off Fall Time                                     | t <sub>F</sub>      | —   | 2.4 | —    | ns   | I <sub>F</sub> = 9A, di/dt = 100A/µs                                                      |
| Reverse Recovery Time                                  | t <sub>RR</sub>     | —   | 10  | —    | ns   |                                                                                           |
| Reverse Recovery Charge                                | Q <sub>RR</sub>     | —   | 2.6 | —    | nC   |                                                                                           |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

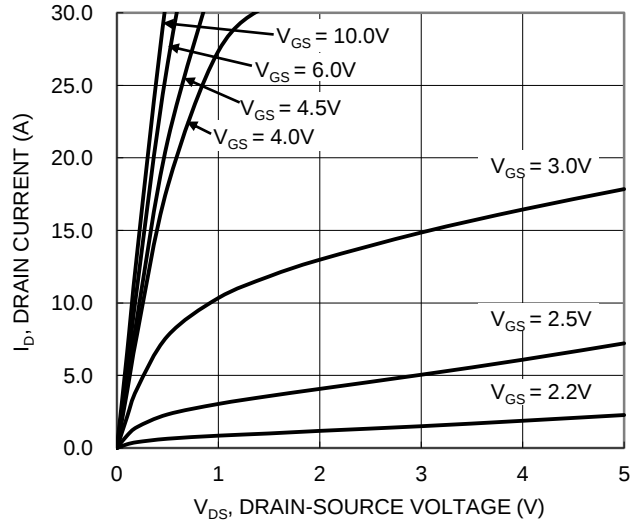


Figure 1. Typical Output Characteristic

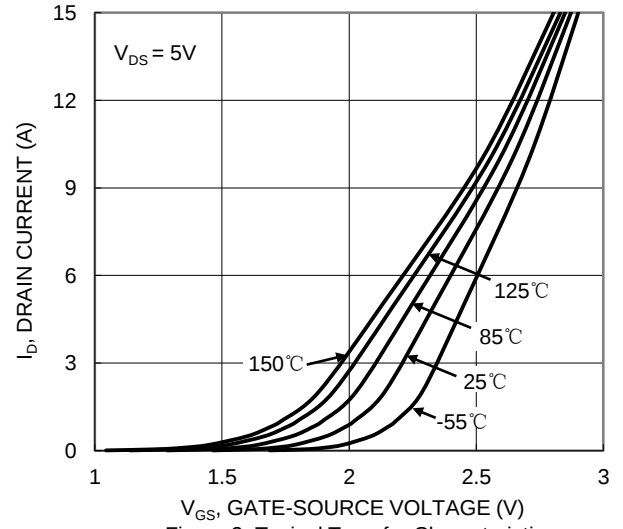


Figure 2. Typical Transfer Characteristic

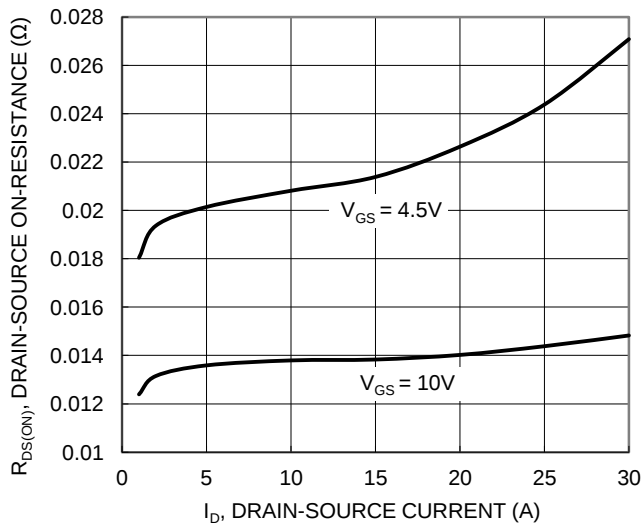


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

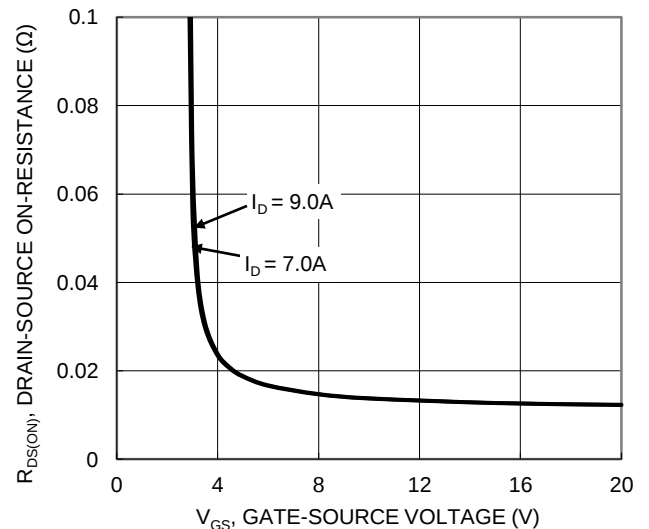


Figure 4. Typical Transfer Characteristic

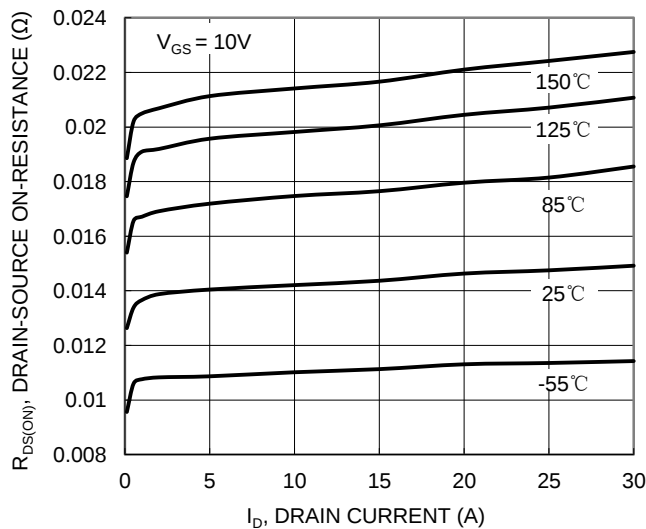


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

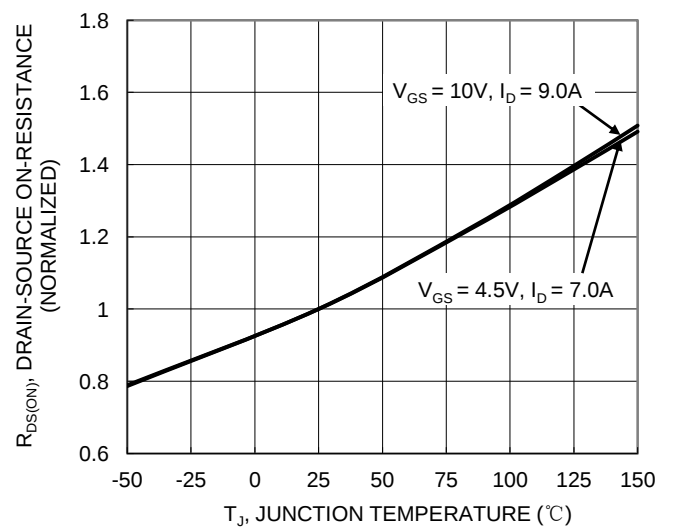
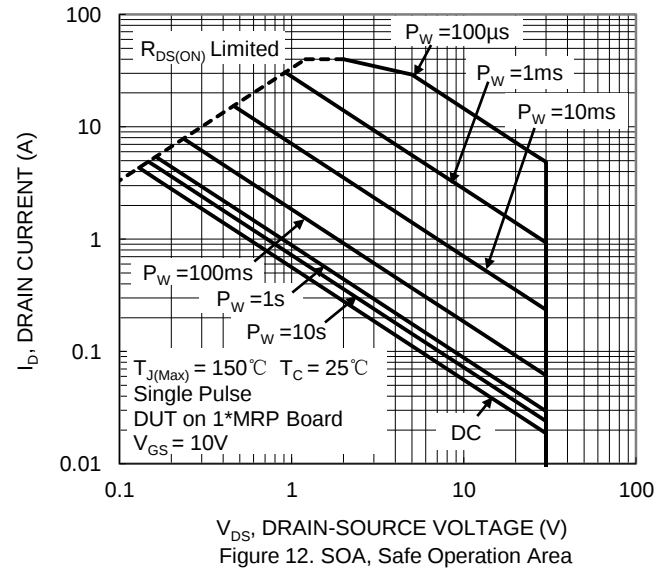
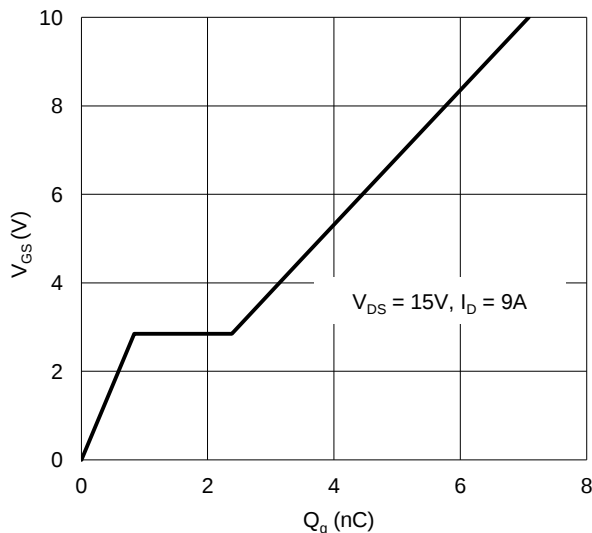
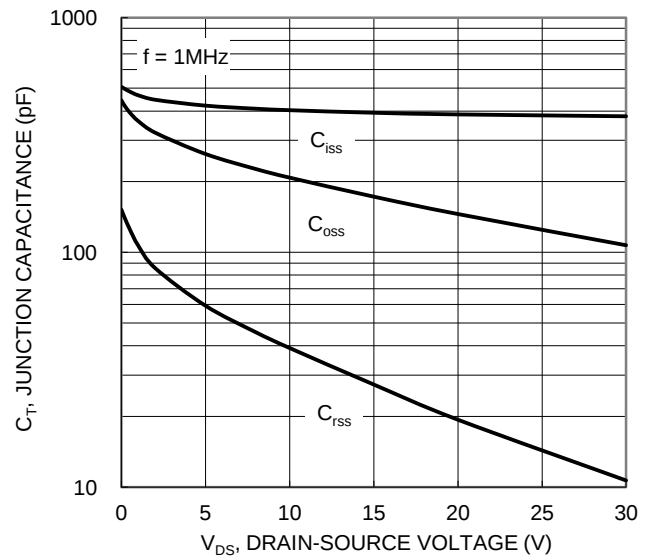
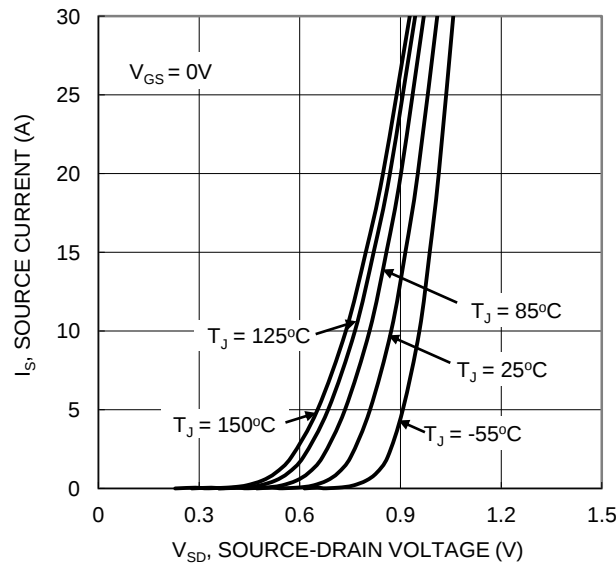
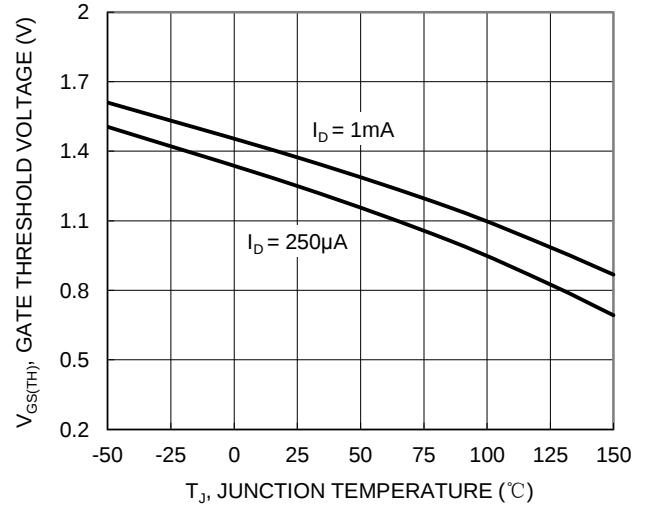
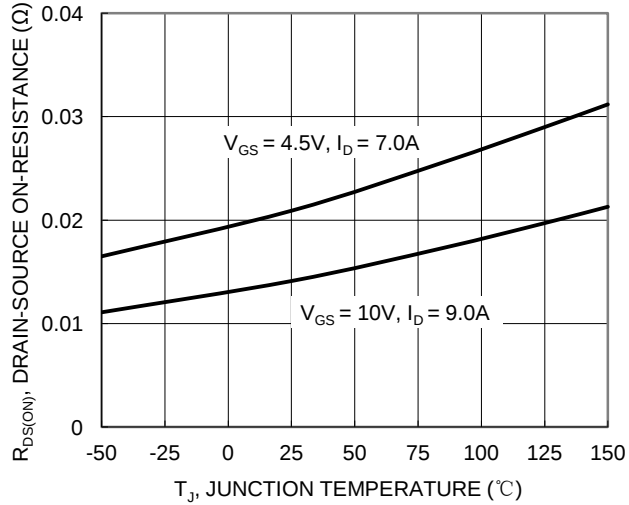


Figure 6. On-Resistance Variation with Junction Temperature



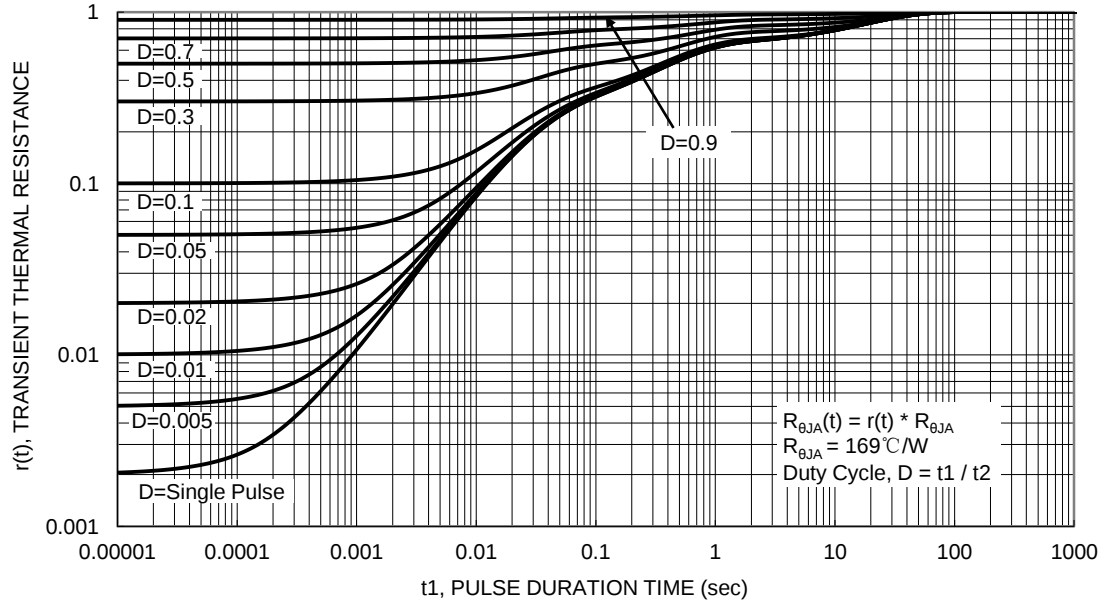
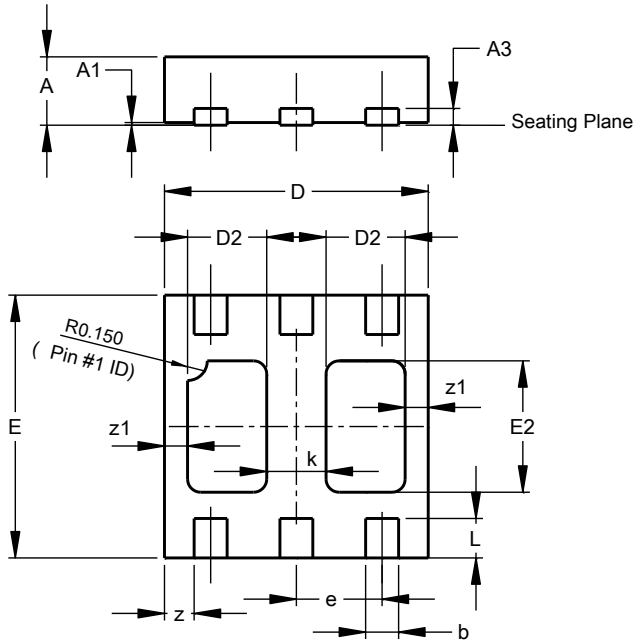


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### U-DFN2020-6 (Type B)

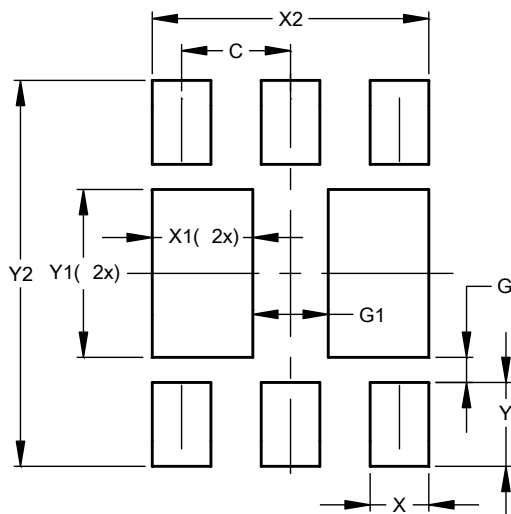


| U-DFN2020-6<br>Type B |       |       |       |
|-----------------------|-------|-------|-------|
| Dim                   | Min   | Max   | Typ   |
| A                     | 0.545 | 0.605 | 0.575 |
| A1                    | 0.00  | 0.05  | 0.02  |
| A3                    | -     | -     | 0.13  |
| b                     | 0.20  | 0.30  | 0.25  |
| D                     | 1.95  | 2.075 | 2.00  |
| D2                    | 0.50  | 0.70  | 0.60  |
| e                     | -     | -     | 0.65  |
| E                     | 1.95  | 2.075 | 2.00  |
| E2                    | 0.90  | 1.10  | 1.00  |
| k                     | -     | -     | 0.45  |
| L                     | 0.25  | 0.35  | 0.30  |
| z                     | -     | -     | 0.225 |
| z1                    | -     | -     | 0.175 |
| All Dimensions in mm  |       |       |       |

## Suggested Pad Layout

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

### U-DFN2020-6 (Type B)



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 0.150         |
| G1         | 0.450         |
| X          | 0.350         |
| X1         | 0.600         |
| X2         | 1.650         |
| Y          | 0.500         |
| Y1         | 1.000         |
| Y2         | 2.300         |

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