

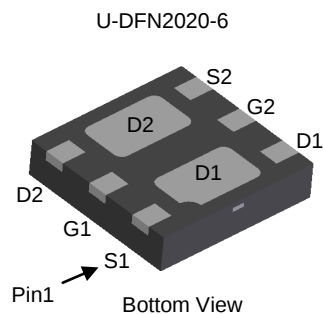
**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ Max              | $I_D$ Max<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|----------------------------------------|
| 30V           | 30mΩ @ $V_{GS} = 10\text{V}$  | 6.2A                                   |
|               | 42mΩ @ $V_{GS} = 4.5\text{V}$ | 5.2A                                   |

**Description and Applications**

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and ideal for use in:

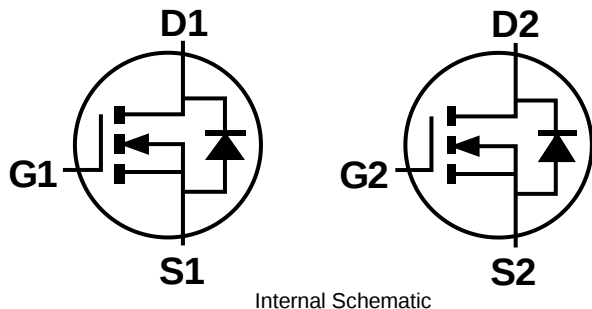
- Body Control Electronics
- Power Management Functions
- DC-DC Converters


**Features and Benefits**

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust Application
- Low On-Resistance – Minimizes Power Losses
- Low Gate Charge – Minimizes Switching Losses
- Small Form Factor Low Profile Package – Increased Power Density
- **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**
- **PPAP Capable (Note 4)**

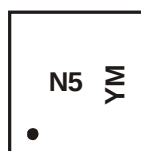
**Mechanical Data**

- 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 (e4)
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)


**Ordering Information** (Notes 4 & 5)

| Part Number     | Case        | Packaging          |
|-----------------|-------------|--------------------|
| DMN3032LFDBQ-7  | U-DFN2020-6 | 3,000/Tape & Reel  |
| DMN3032LFDBQ-13 | U-DFN2020-6 | 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](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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


N5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: C = 2015)  
 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   |

**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 7) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +75°C | I <sub>D</sub>   | 6.2<br>5.0 | A    |
| Maximum Continuous Body Diode Forward Current (Note 7)  |              |                                                  | I <sub>S</sub>   | 2          | A    |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)      |              |                                                  | I <sub>DM</sub>  | 25         | A    |
| Avalanche Current (Note 8) L = 0.1mH                    |              |                                                  | I <sub>AS</sub>  | 12         | A    |
| Avalanche Energy (Note 8) L = 0.1mH                     |              |                                                  | E <sub>AS</sub>  | 10         | mJ   |

**Thermal Characteristics**

| Characteristic                                   |              | Symbol                            | Value       | Unit |
|--------------------------------------------------|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 1.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | R <sub>θJA</sub>                  | 127         | °C/W |
|                                                  | t < 10s      |                                   | 75          |      |
| Total Power Dissipation (Note 7)                 |              | P <sub>D</sub>                    | 1.7         | W    |
| Thermal Resistance, Junction to Ambient (Note 7) | Steady state | R <sub>θJA</sub>                  | 72          | °C/W |
|                                                  | t < 10s      |                                   | 43          |      |
| Thermal Resistance, Junction to Case (Note 7)    |              | R <sub>θJC</sub>                  | 9           |      |
| 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 9)</b>                               |                     |     |      |      |      |                                                                                          |
| 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>    | -   | -    | 1.0  | µA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                              |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +150°C (Note 10) | I <sub>DSS</sub>    | -   | -    | 100  | µA   | V <sub>DS</sub> = 30V, 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 (Note 9)</b>                                |                     |     |      |      |      |                                                                                          |
| Gate Threshold Voltage                                            | V <sub>GS(TH)</sub> | 1.0 | 1.5  | 2.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                               |
| Static Drain-Source On-Resistance                                 | R <sub>DS(ON)</sub> | -   | 25   | 30   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A                                             |
|                                                                   |                     |     | 30   | 42   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.8A                                            |
| Diode Forward Voltage                                             | V <sub>SD</sub>     | -   | 0.75 | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                |
| <b>DYNAMIC CHARACTERISTICS (Note 10)</b>                          |                     |     |      |      |      |                                                                                          |
| Input Capacitance                                                 | C <sub>iss</sub>    | -   | 500  | -    | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz                                  |
| Output Capacitance                                                | C <sub>oss</sub>    | -   | 52   | -    | pF   |                                                                                          |
| Reverse Transfer Capacitance                                      | C <sub>rss</sub>    | -   | 44   | -    | pF   |                                                                                          |
| Gate Resistance                                                   | R <sub>g</sub>      | -   | 2.3  | -    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                     |
| Total Gate Charge (V <sub>GS</sub> = 4.5V)                        | Q <sub>g</sub>      | -   | 5.0  | -    | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 5.8A                                             |
| Total Gate Charge (V <sub>GS</sub> = 10V)                         | Q <sub>g</sub>      | -   | 10.6 | -    | nC   |                                                                                          |
| Gate-Source Charge                                                | Q <sub>gs</sub>     | -   | 1.3  | -    | nC   |                                                                                          |
| Gate-Drain Charge                                                 | Q <sub>gd</sub>     | -   | 1.8  | -    | nC   |                                                                                          |
| Turn-On Delay Time                                                | t <sub>D(ON)</sub>  | -   | 2.2  | -    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 2.6Ω, R <sub>G</sub> = 3Ω |
| Turn-On Rise Time                                                 | t <sub>R</sub>      | -   | 2.6  | -    | ns   |                                                                                          |
| Turn-Off Delay Time                                               | t <sub>D(OFF)</sub> | -   | 9.7  | -    | ns   |                                                                                          |
| Turn-Off Fall Time                                                | t <sub>F</sub>      | -   | 2.0  | -    | ns   |                                                                                          |

- 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 1inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

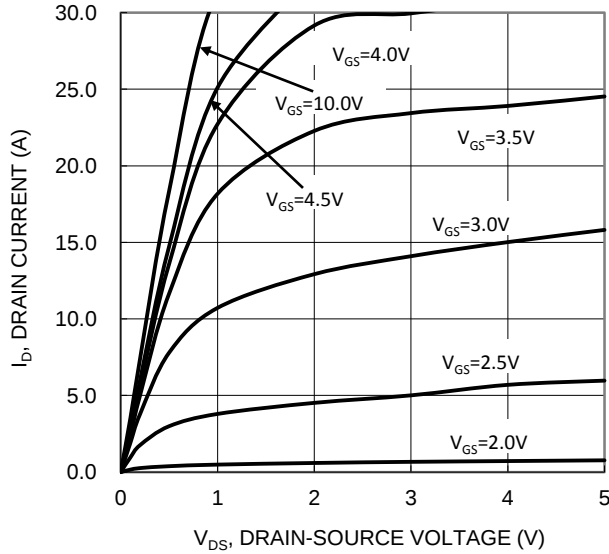


Figure 1. Typical Output Characteristic

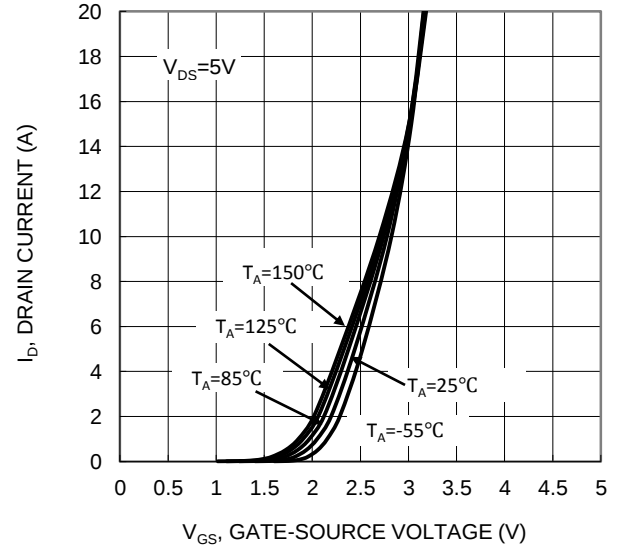


Figure 2. Typical Transfer Characteristic

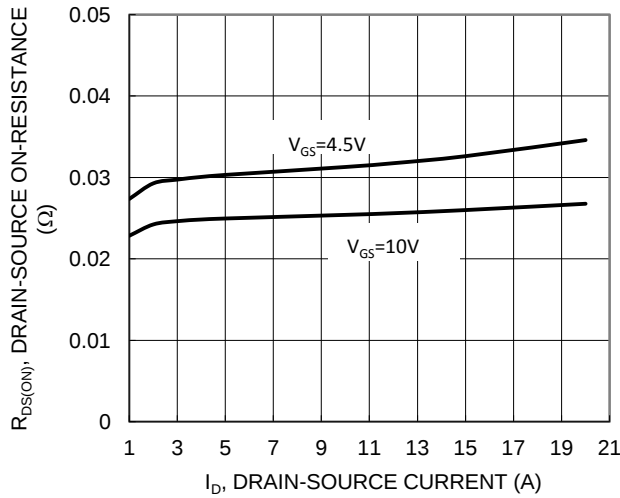


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

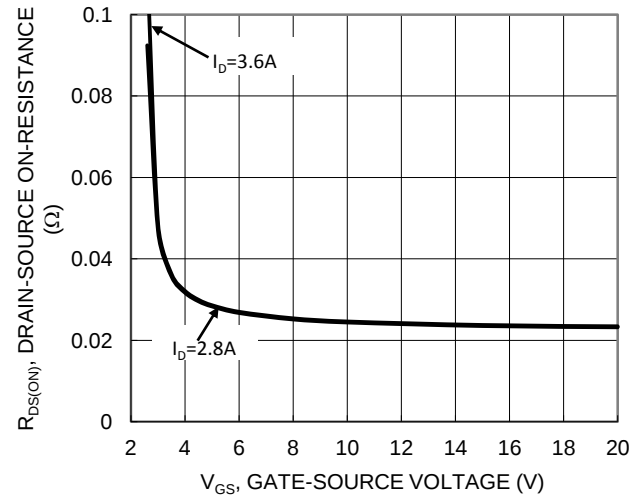


Figure 4. Typical Transfer Characteristic

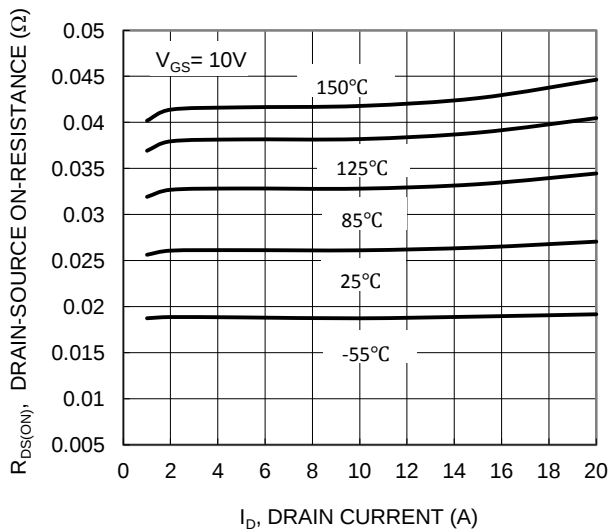


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

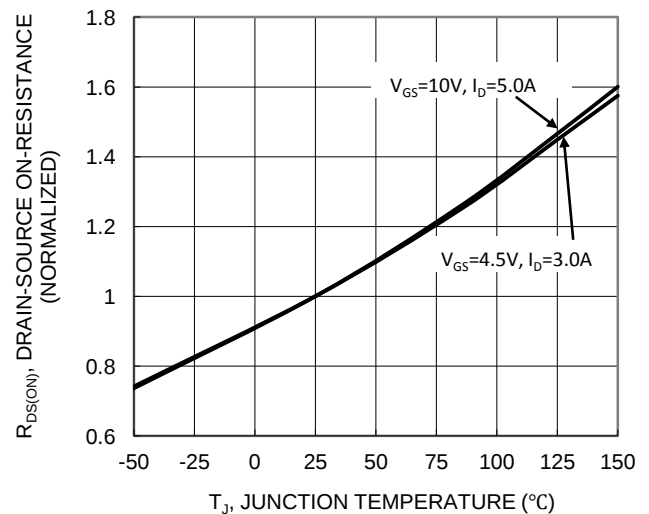
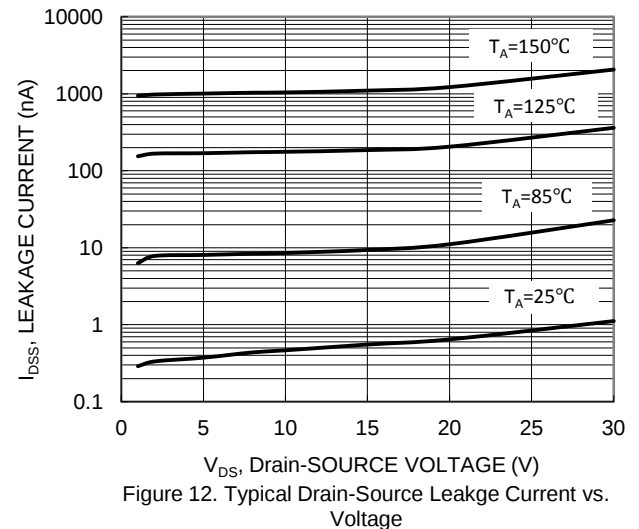
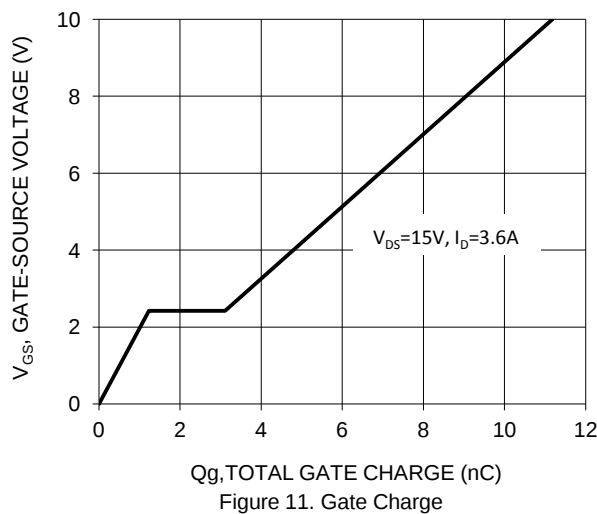
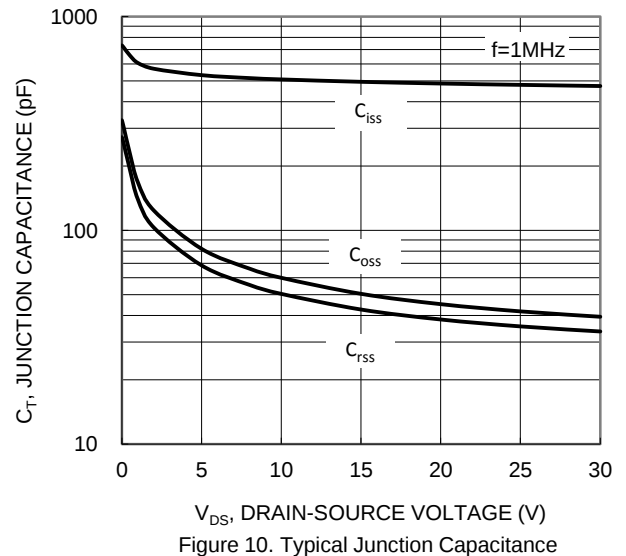
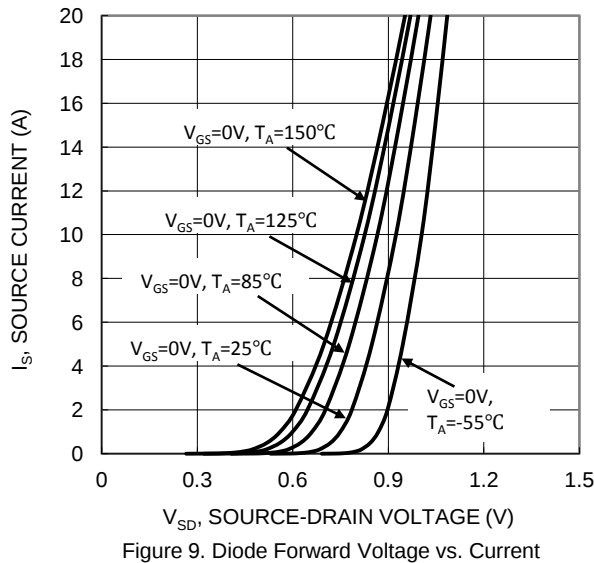
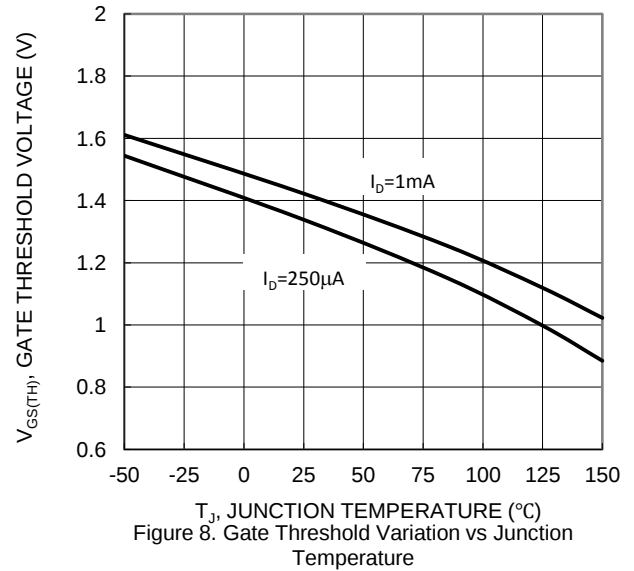
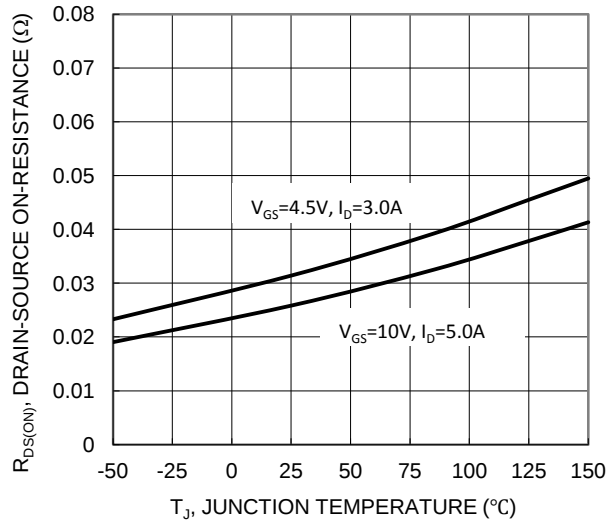
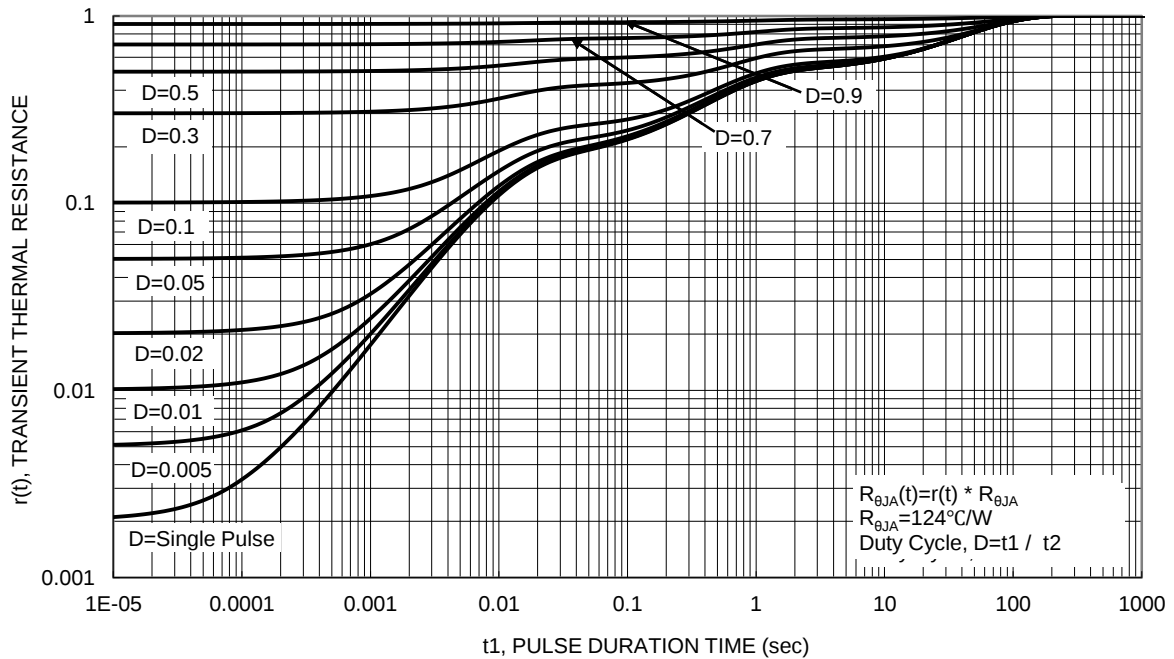
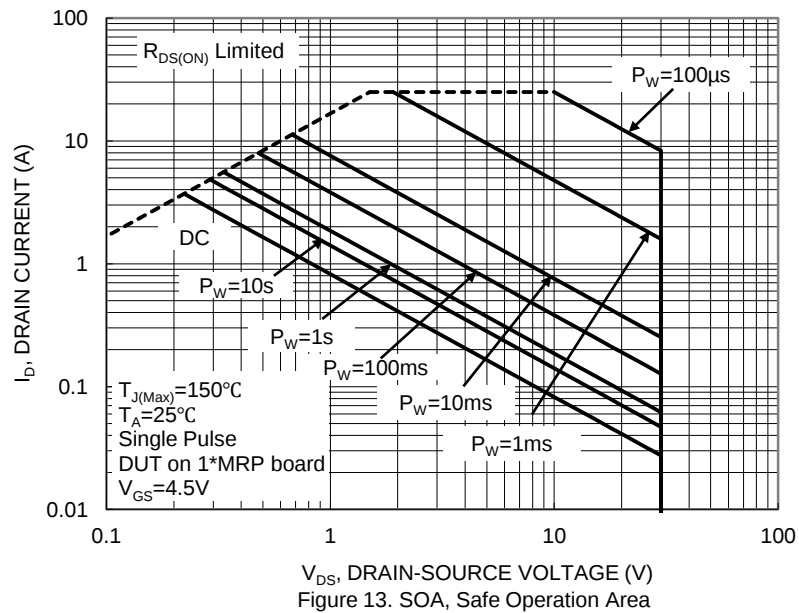


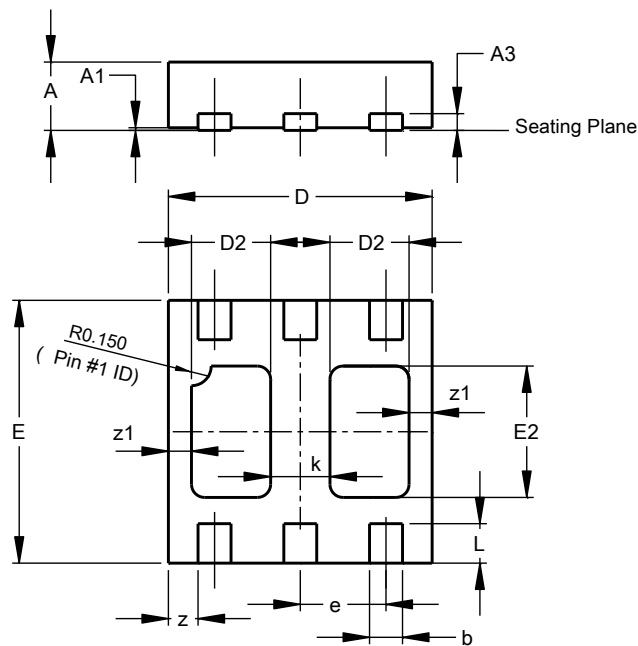
Figure 6. On-Resistance Variation with Temperature





## Package Outline Dimensions

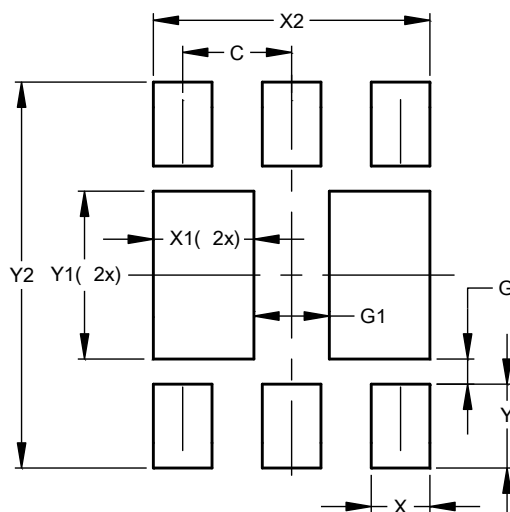
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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                    | -     | -     | 0.15  |
| 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         |
| 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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