

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$                    | Package | $I_D$<br>$T_A = +25^\circ C$ |
|---------------|---------------------------------|---------|------------------------------|
| 30V           | 0.15 $\Omega$ @ $V_{GS} = 4.5V$ | SOT23   | 2A                           |
|               | 0.2 $\Omega$ @ $V_{GS} = 2.5V$  |         | 1.6A                         |
|               | 0.25 $\Omega$ @ $V_{GS} = 1.8V$ |         | 1.4A                         |
|               | 0.3 $\Omega$ @ $V_{GS} = 1.5V$  |         | 1.2A                         |

## 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.

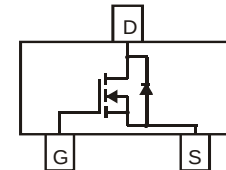
## Applications

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

SOT23



Top View



Internal Schematic

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- **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

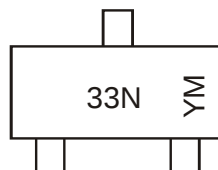
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

## Ordering Information (Note 4)

| Part Number | Case  | Packaging        |
|-------------|-------|------------------|
| DMN3300U-7  | SOT23 | 3000/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> 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>.

## Marking Information



33N = Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: U = 2007)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | U    | V    | W    | X    | Y    | Z    | A    | B    | C    | D    | E    |

| 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> | 30    | V     |
| Gate-Source Voltage                                      |              |                        | V <sub>GSS</sub> | ±12   | V     |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 1.5   | A     |
|                                                          |              | T <sub>A</sub> = +70°C |                  | 1.2   |       |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 2.0   | A     |
|                                                          |              | T <sub>A</sub> = +70°C |                  | 1.6   |       |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)       |              |                        | I <sub>DM</sub>  | 8     | A     |
| Maximum Body Diode Continuous Current (Note 6)           |              |                        | I <sub>S</sub>   | 1.6   | A     |

**Thermal Characteristics**

| Characteristic                          |          | Symbol                            | Value       | Units |
|-----------------------------------------|----------|-----------------------------------|-------------|-------|
| Total Power Dissipation                 | (Note 5) | P <sub>D</sub>                    | 0.7         | W     |
|                                         | (Note 6) |                                   | 1.3         |       |
| Thermal Resistance, Junction to Ambient | (Note 5) | R <sub>θJA</sub>                  | 176         | °C/W  |
|                                         | (Note 6) |                                   | 102         |       |
| Thermal Resistance, Junction to Case    | (Note 6) | R <sub>θJC</sub>                  | 45          | °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 (Note 7)</b>     |                     |     |     |     |      |                                                                                                                  |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 30  | 37  | —   | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 100μA                                                                     |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —   | 1   | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                                                      |
| Gate-Source Leakage                     | I <sub>GSS</sub>    | —   | —   | ±10 | μA   | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V                                                                     |
| <b>ON CHARACTERISTICS (Note 7)</b>      |                     |     |     |     |      |                                                                                                                  |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub> | 0.5 | —   | 1   | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                       |
| Static Drain-Source On-Resistance       | R <sub>DS(on)</sub> | —   | 100 | 150 | mΩ   | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.5A                                                                    |
|                                         |                     |     | 140 | 200 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3.5A                                                                    |
|                                         |                     |     | 185 | 250 |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 1.5A                                                                    |
|                                         |                     |     | 240 | 300 |      | V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 0.5A                                                                    |
|                                         |                     |     | —   | —   |      | V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 0.5A                                                                    |
| Forward Transfer Admittance             | Y <sub>fs</sub>     | —   | 5   | —   | S    | V <sub>DS</sub> = 5V, I <sub>D</sub> = 2.4A                                                                      |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.8 | 1.1 | V    | V <sub>GS</sub> = 0V, I = 0.5A                                                                                   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |     |     |     |      |                                                                                                                  |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 193 | —   | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                                        |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 35  | —   | pF   |                                                                                                                  |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 23  | —   | pF   |                                                                                                                  |
| Turn-On Delay Time                      | t <sub>d(on)</sub>  | —   | 7   | —   | ns   | V <sub>DD</sub> = 10V, R <sub>L</sub> = 10Ω<br>I <sub>D</sub> = 1A, V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 6Ω |
| Rise Time                               | t <sub>r</sub>      | —   | 24  | —   |      |                                                                                                                  |
| Turn-Off Delay Time                     | t <sub>d(off)</sub> | —   | 24  | —   |      |                                                                                                                  |
| Fall Time                               | t <sub>f</sub>      | —   | 12  | —   |      |                                                                                                                  |

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

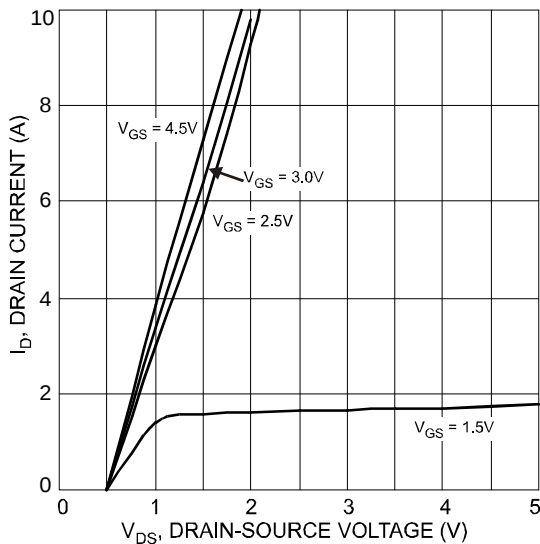


Fig. 1 Typical Output Characteristic

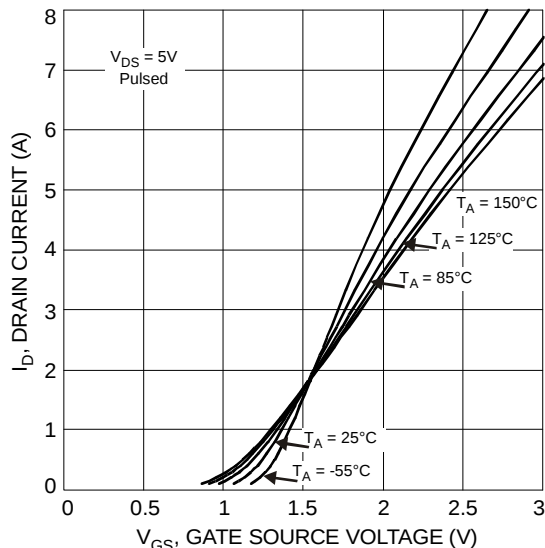


Fig. 2 Typical Transfer Characteristics

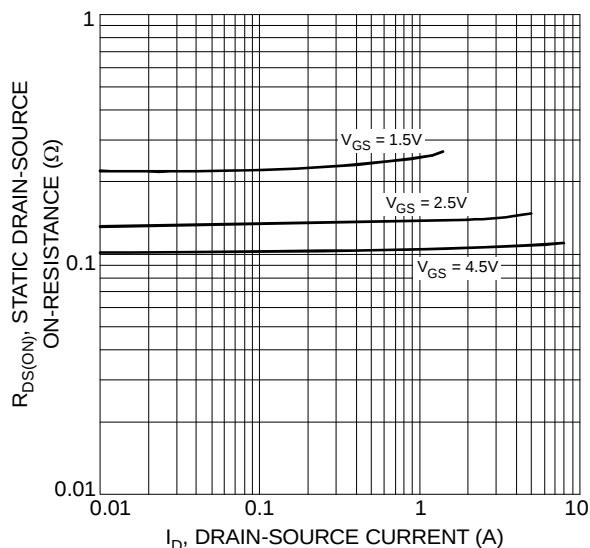


Fig. 3 On-Resistance vs. Drain Current & Gate Voltage

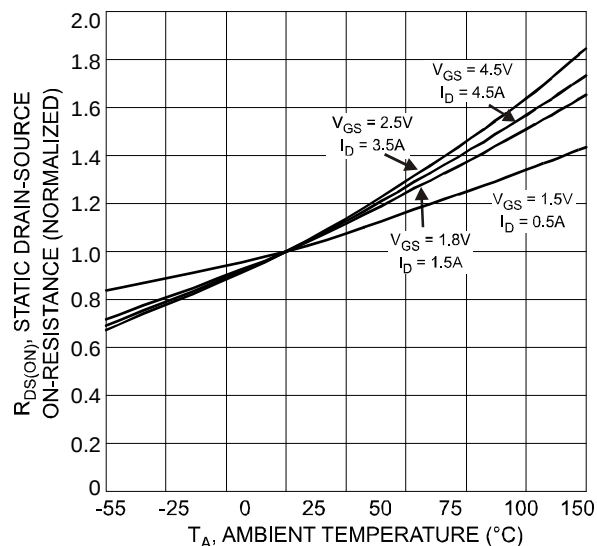


Fig. 4 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

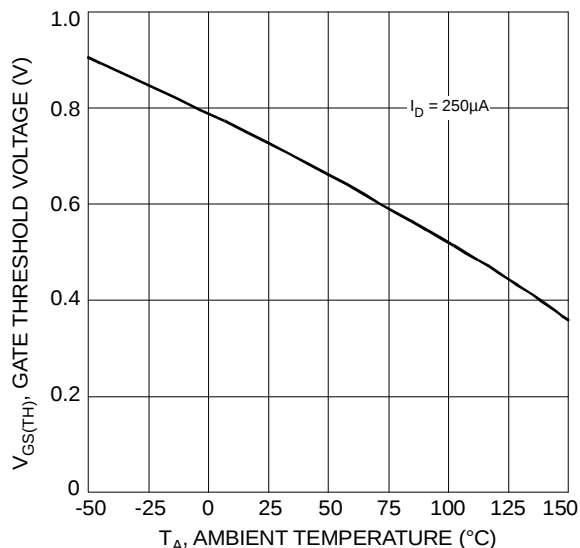


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

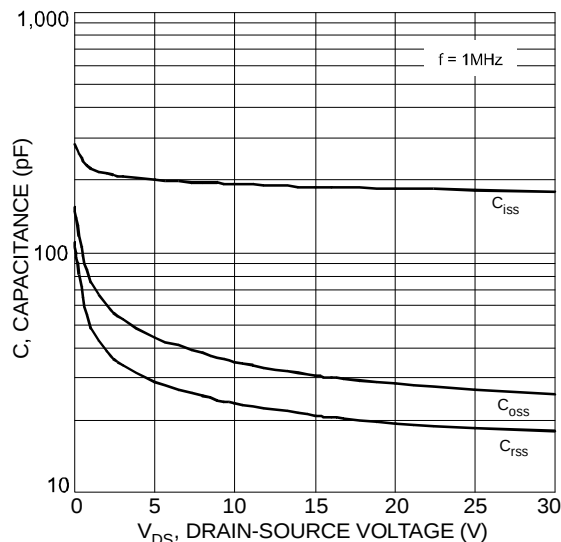


Fig. 6 Typical Total Capacitance

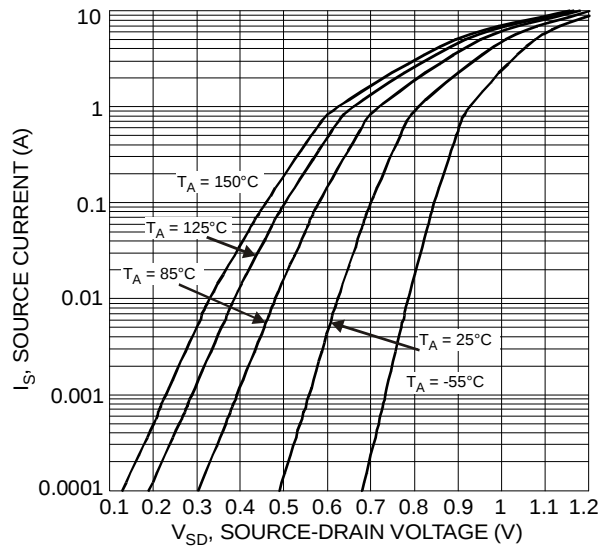


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

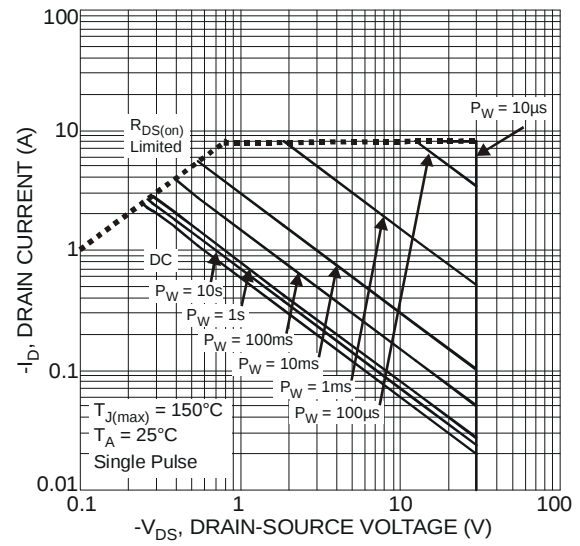


Fig. 8 SOA, Safe Operation Area

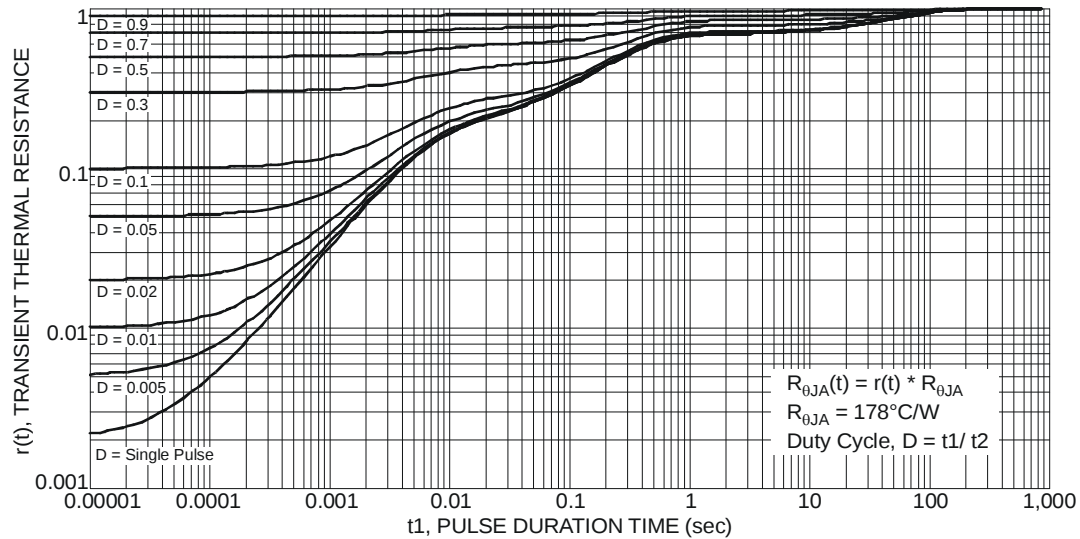
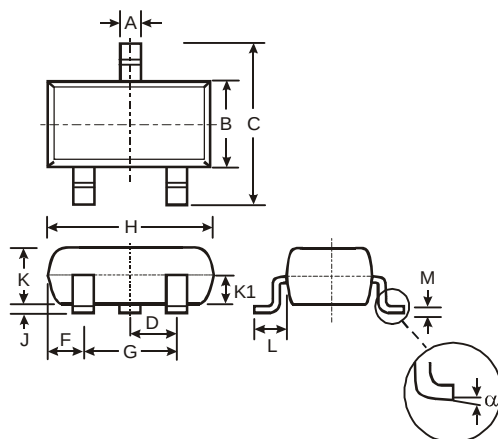


Fig. 9 Transient Thermal Resistance

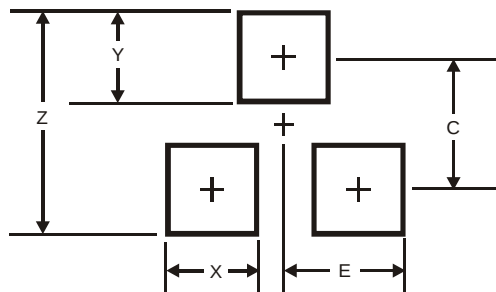
## Package Outline Dimensions

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


| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| 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) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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