

## Features

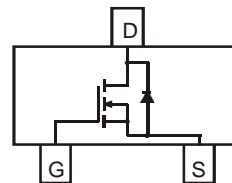
- Low On-Resistance
  - 110 mΩ @  $V_{GS} = 4.5V$
  - 145 mΩ @  $V_{GS} = 2.5V$
  - 230 mΩ @  $V_{GS} = 1.8V$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 1, 2 and 3)**
- **Qualified to AEC-Q101 Standards 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-020
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)



Top View

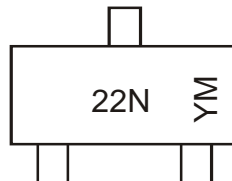

 Top View  
Internal Schematic

## Ordering Information (Note 4)

| Part Number | Case  | Packaging        |
|-------------|-------|------------------|
| DMN2230U-7  | SOT23 | 3000/Tape & Reel |

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Product manufactured with Green Molding Compound and does not contain Halogens or  $Sb_2O_3$  Fire Retardants.
  4. For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information



22N = 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> | 20    | V     |
| Gate-Source Voltage           | V <sub>GSS</sub> | ±12   | V     |
| Drain Current (Note 5)        | I <sub>D</sub>   | 2.0   | A     |
| Pulsed Drain Current (Note 6) | I <sub>DM</sub>  | 7     | A     |

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                          | Symbol                            | Value       | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 600         | mW    |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 208         | °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>   | 20  | —    | —   | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA  |
| Zero Gate Voltage Drain Current     | I <sub>DSS</sub>    | —   | —    | 1   | μA   | V <sub>DS</sub> = 20V, 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 | —    | 1.0 | V    | V <sub>DS</sub> = V <sub>CS</sub> , I <sub>D</sub> = 250μA   |
| Static Drain-Source On-Resistance   | R <sub>DS(on)</sub> | —   | 81   | 110 | mΩ   | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.5A  |
|                                     |                     |     | 113  | 145 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 1.5A  |
|                                     |                     |     | 170  | 230 |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 1.0A  |
| Forward Transfer Admittance         | Y <sub>fs</sub>     | —   | 5    | —   | S    | V <sub>DS</sub> = 5V, I <sub>D</sub> = 2.4A  |
| Diode Forward Voltage (Note 7)      | V <sub>SD</sub>     | —   | 0.8  | 1.1 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.05A   |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |     |      |     |      |  |
| Input Capacitance                   | C <sub>iss</sub>    | —   | 188  | —   | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance                  | C <sub>oss</sub>    | —   | 44   | —   | pF   |  |
| Reverse Transfer Capacitance        | C <sub>rss</sub>    | —   | 30   | —   | pF   |  |
| Total Gate Charge                   | Q <sub>g</sub>      | —   | 2.3  | —   | nC   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 11.6A  |
| Gate-Source Charge                  | Q <sub>gs</sub>     | —   | 0.3  | —   | nC   |  |
| Gate-Drain Charge                   | Q <sub>gd</sub>     | —   | 0.5  | —   | nC   |  |
| Turn-On Delay Time                  | t <sub>d(on)</sub>  | —   | 8    | —   | 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>      | —   | 3.8  | —   |      |  |
| Turn-Off Delay Time                 | t <sub>d(off)</sub> | —   | 19.6 | —   |      |  |
| Fall Time                           | t <sub>f</sub>      | —   | 8.3  | —   |      |  |

- Notes:
5. Device mounted on FR-4 PCB, or minimum recommended pad layout
  6. Repetitive rating, pulse width limited by junction temperature.
  7. Short duration pulse test used to minimize self-heating effect.

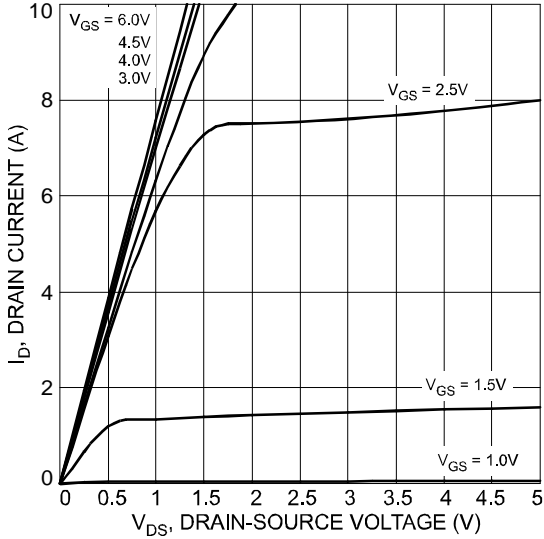


Fig. 1 Typical Output Characteristic

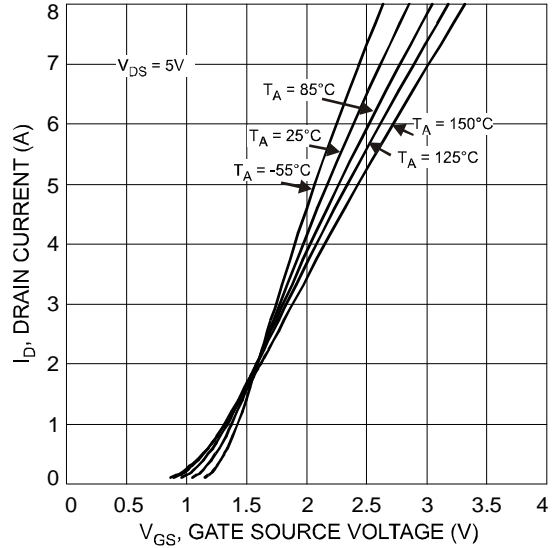


Fig. 2 Typical Transfer Characteristics

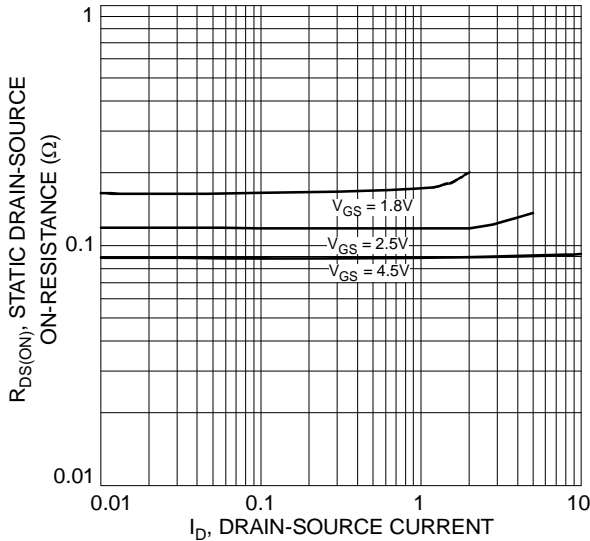


Fig. 3 On-Resistance vs. Drain-Source Current & Gate Voltage

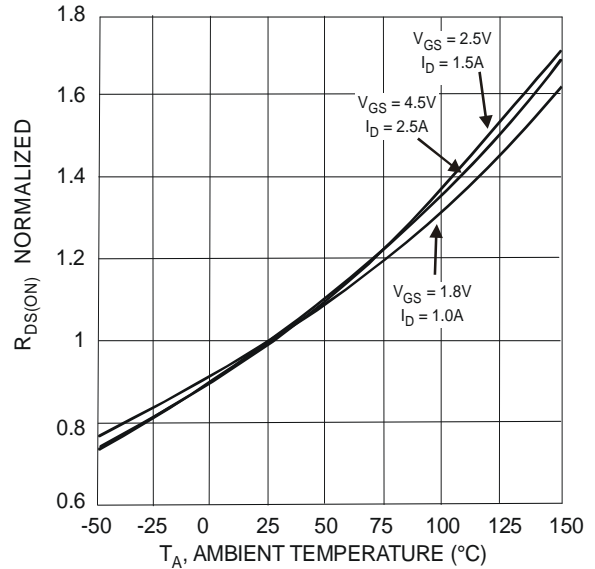


Fig. 4 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

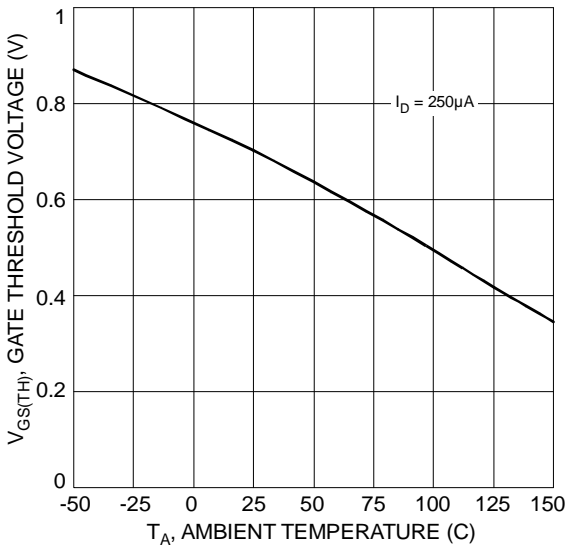


Fig. 5 Gate Threshold Variation with Temperature

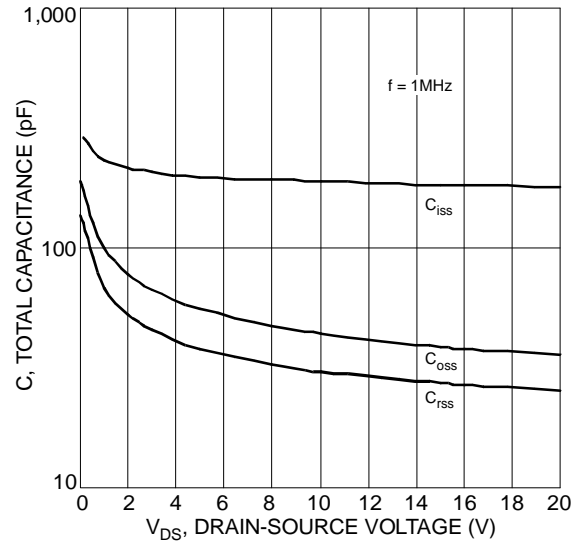


Fig. 6 Typical Total Capacitance

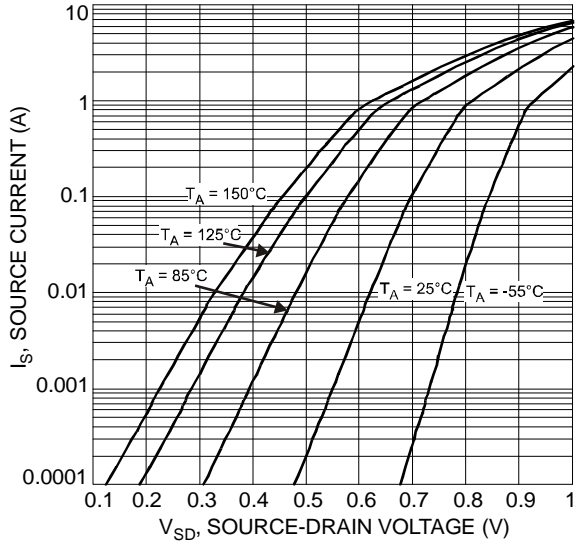


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

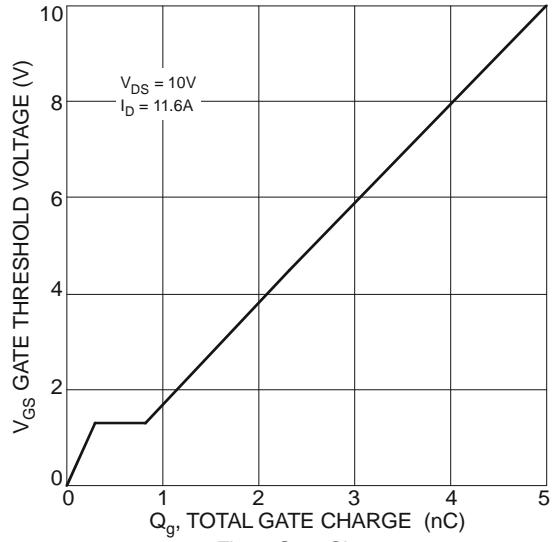


Fig. 8 Gate Charge

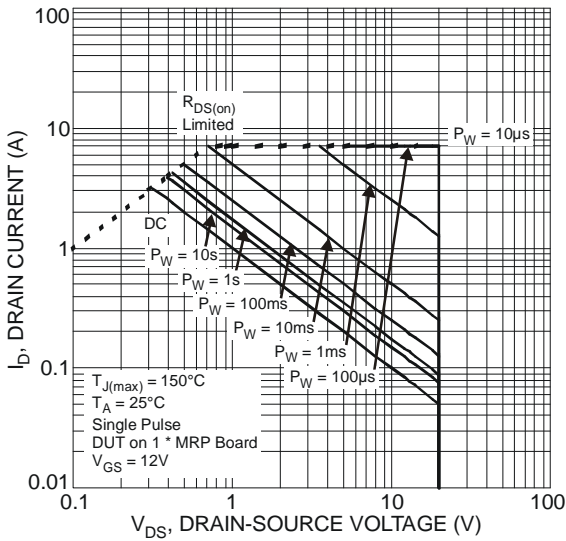
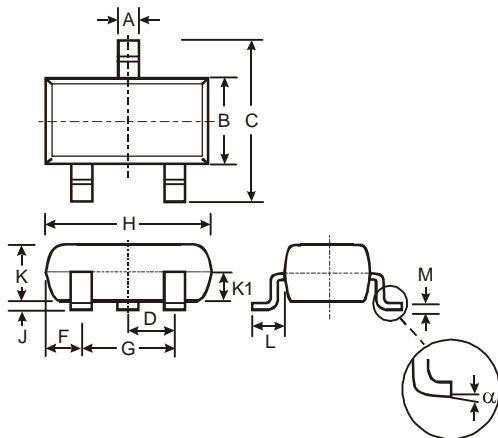


Fig. 9 SOA, Safe Operation Area

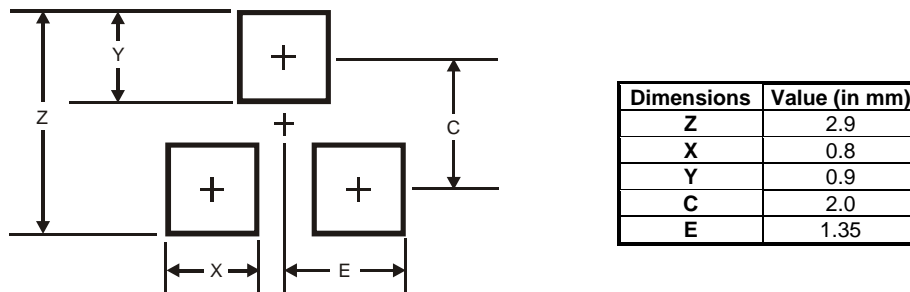
**Package Outline Dimensions**



| 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  |
| $\alpha$ | 0°    | 8°   | -     |

All Dimensions in mm

## Suggested Pad Layout



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