

Product Summary

| BV_{DSS} | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ\text{C}$ |
|------------|--|--|
| 20V | 110m Ω @ $V_{GS} = 4.5\text{V}$ | 2A |
| | 145m Ω @ $V_{GS} = 2.5\text{V}$ | 1.7A |
| | 230m Ω @ $V_{GS} = 1.8\text{V}$ | 1.3A |

Description and Applications

This MOSFET is 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.

- General Purpose Interfacing Switch
- Power Management Functions
- Boost Application
- Analog Switch

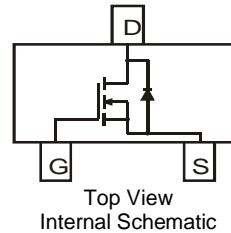


Features

- Low On-Resistance
- 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**
- **PPAP Capable (Note 4)**

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 $\text{\textcircled{3}}$
- Weight: 0.008 grams (Approximate)

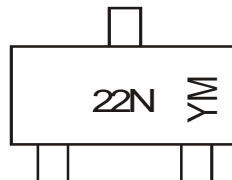


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|-------|--------------------|
| DMN2230UQ-7 | SOT23 | 3,000/Tape & Reel |
| DMN2230UQ-13 | SOT23 | 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 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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

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_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|-------------------------------|------------------|-------|-------|
| Drain-Source Voltage | V _{DSS} | 20 | V |
| Gate-Source Voltage | V _{GSS} | ±12 | V |
| Drain Current (Note 6) | I _D | 2.0 | A |
| Pulsed Drain Current (Note 7) | I _{DM} | 7 | A |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|---|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6) | P _D | 600 | mW |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 208 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|---------------------|-----|------|-----|------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | — | — | V | V _{GS} = 0V, I _D = 10μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±10 | μA | V _{GS} = ±12V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | — | 1.0 | V | V _{DS} = V _{CS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{Ds(on)} | — | 81 | 110 | mΩ | V _{GS} = 4.5V, I _D = 2.5A |
| | | | 113 | 145 | | V _{GS} = 2.5V, I _D = 1.5A |
| | | | 170 | 230 | | V _{GS} = 1.8V, I _D = 1.0A |
| Forward Transfer Admittance | Y _{fs} | — | 5 | — | S | V _{DS} = 5V, I _D = 2.4A |
| Diode Forward Voltage (Note 8) | V _{SD} | — | 0.8 | 1.1 | V | V _{GS} = 0V, I _S = 1.05A |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | 188 | — | pF | V _{DS} = 10V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 44 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 30 | — | pF | |
| Total Gate Charge | Q _g | — | 2.3 | — | nC | V _{DS} = 10V, I _D = 11.6A |
| Gate-Source Charge | Q _{gs} | — | 0.3 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 0.5 | — | nC | |
| Turn-On Delay Time | t _{d(on)} | — | 8 | — | ns | V _{DD} = 10V, R _L = 10Ω I _D = 1A, V _{GEN} = 4.5V, R _G = 6Ω |
| Rise Time | t _r | — | 3.8 | — | | |
| Turn-Off Delay Time | t _{d(off)} | — | 19.6 | — | | |
| Fall Time | t _f | — | 8.3 | — | | |

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

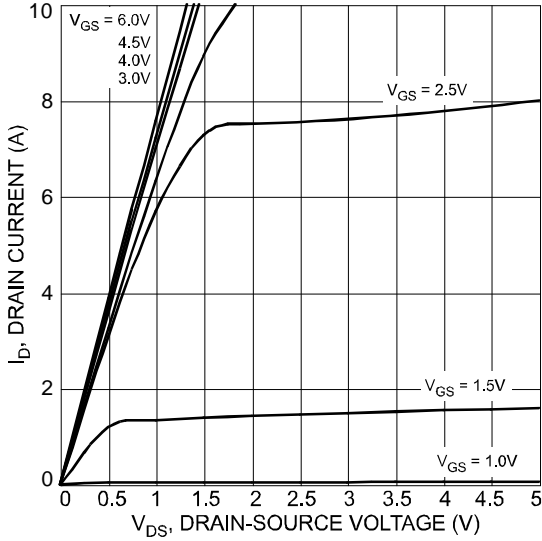


Fig. 1 Typical Output Characteristic

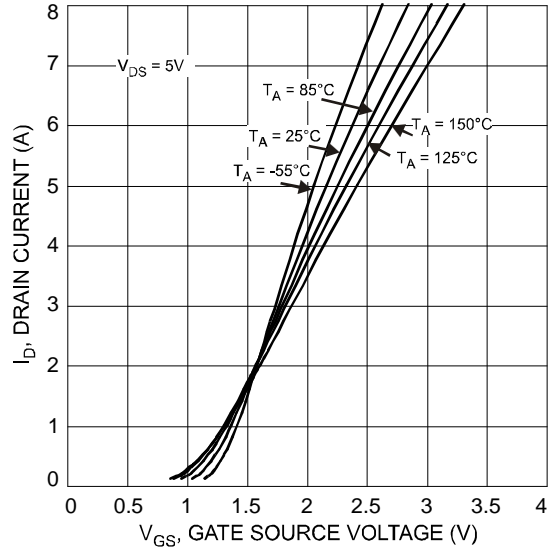


Fig. 2 Typical Transfer Characteristics

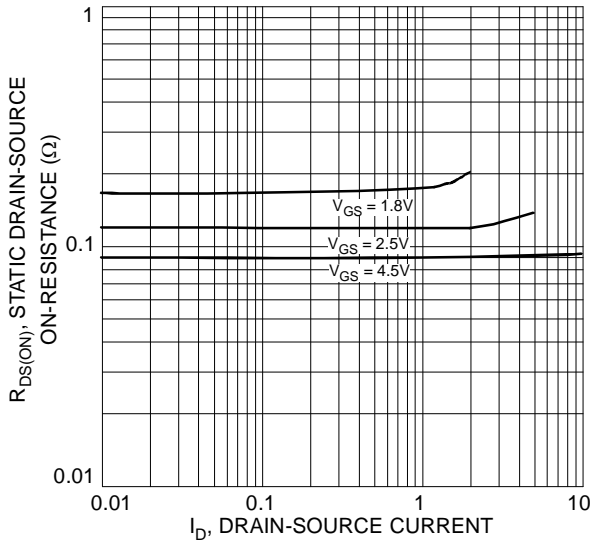


Fig. 3 On-Resistance vs. Drain-Source Current & Gate Voltage

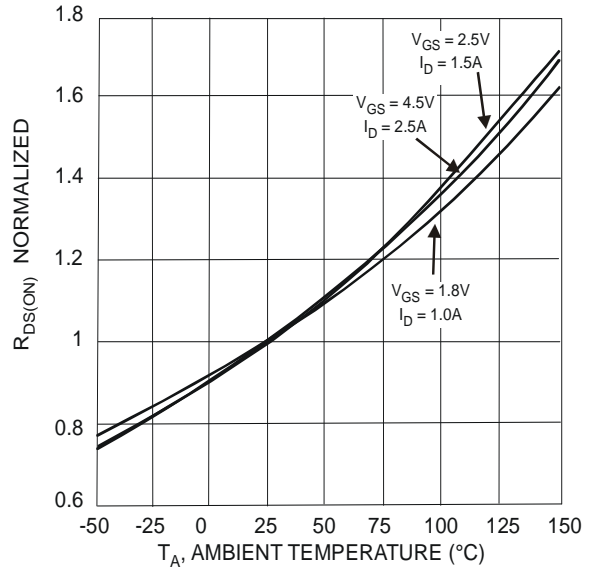


Fig. 4 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

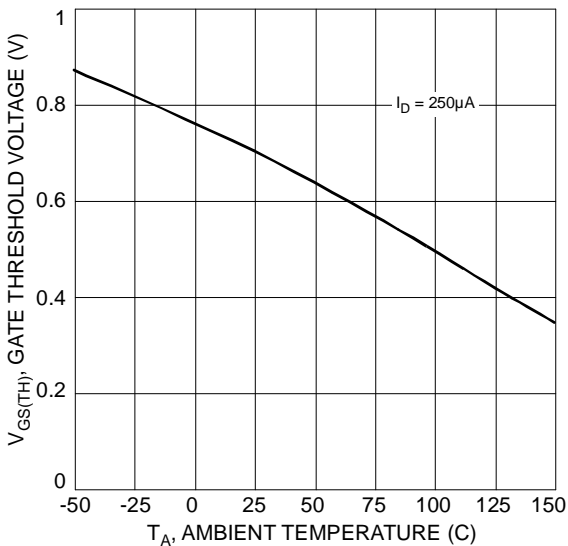


Fig. 5 Gate Threshold Variation with Temperature

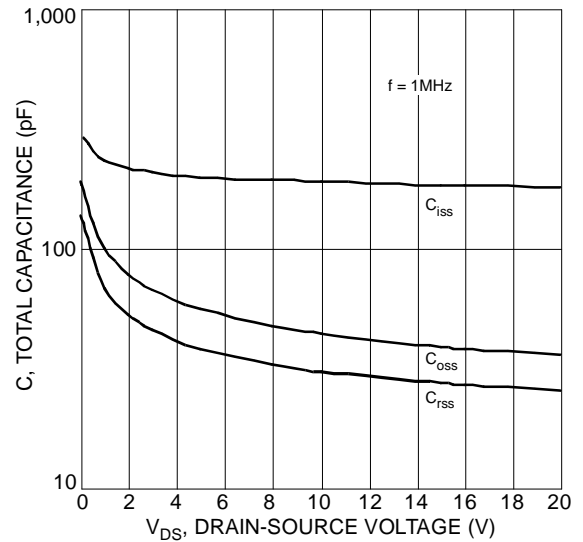


Fig. 6 Typical Total Capacitance

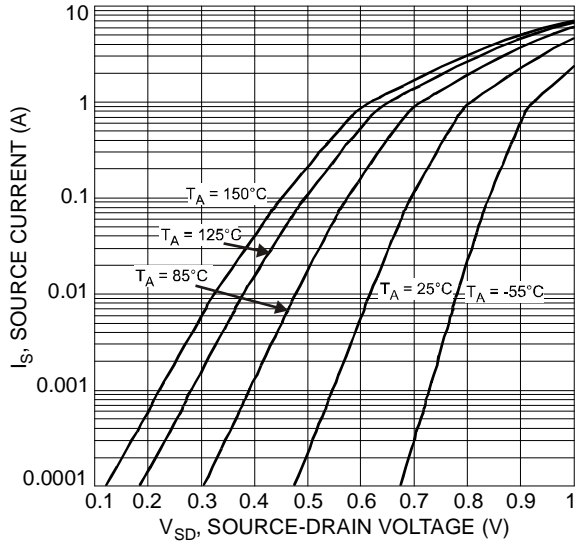


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

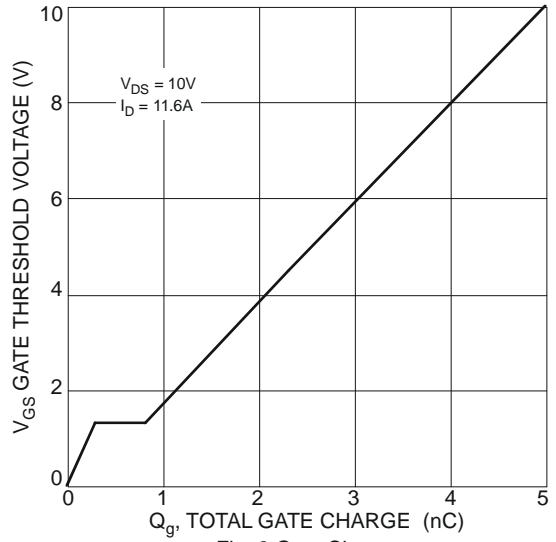


Fig. 8 Gate Charge

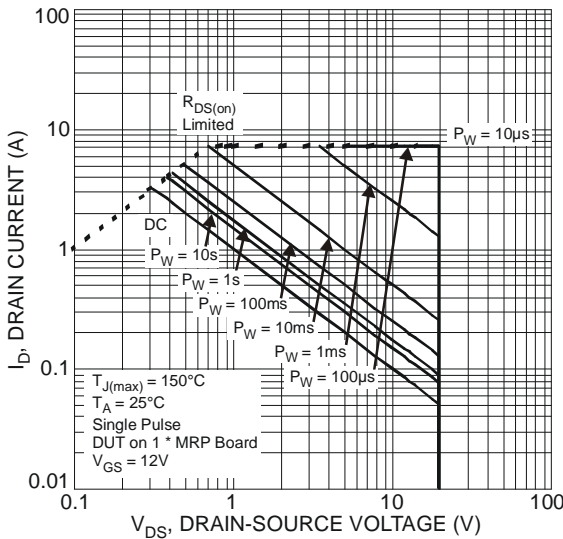
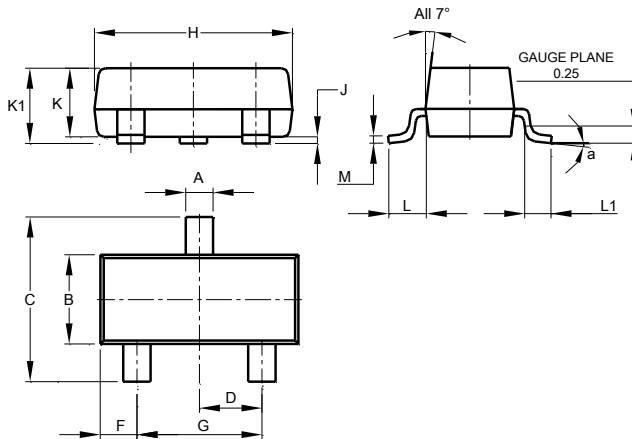


Fig. 9 SOA, Safe Operation Area

Package Outline Dimensions

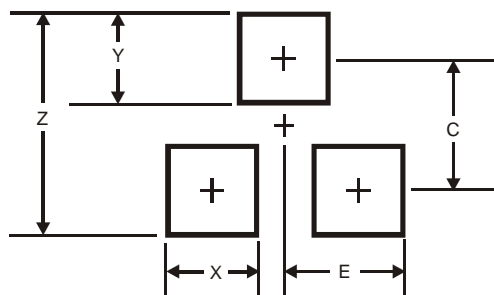
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 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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