

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

| $V_{(BR)DSS}$ | $R_{DS(ON)}$                  | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------|
| 30V           | 25mΩ @ $V_{GS} = 10\text{V}$  | 6.2A                               |
|               | 28mΩ @ $V_{GS} = 4.5\text{V}$ | 5.8A                               |

**Description and Applications**

This new generation 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.

- Load Switch
- DC-DC Converters
- Power Management Functions

**Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Gate
- **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**

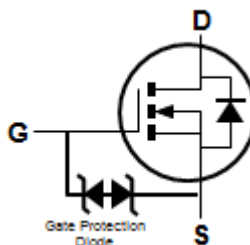
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram ③
- Weight: 0.009 grams (Approximate)



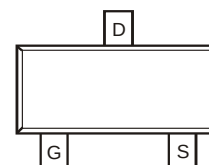
SOT23



Top View



Equivalent Circuit



Top View

**Ordering Information (Note 4)**

| Part Number | Case  | Packaging          |
|-------------|-------|--------------------|
| DMN3023L-7  | SOT23 | 3,000/Tape & Reel  |
| DMN3023L-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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


3N7 = Product Type Marking Code  
 Y or Ȳ = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    |

| 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> | ±20   | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 6.2   | A     |
|                                                         |              | T <sub>A</sub> = +70°C |                  | 4.9   |       |
| Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)     |              |                        | I <sub>DM</sub>  | 44    | A     |
| Maximum Body Diode Forward Current (Note 6)             |              |                        | I <sub>S</sub>   | 1.5   | A     |
| Avalanche Current (Note 7) L = 0.1mH                    |              |                        | I <sub>AS</sub>  | 17.5  | A     |
| Avalanche Energy (Note 7) L = 0.1mH                     |              |                        | E <sub>AS</sub>  | 15.2  | mJ    |

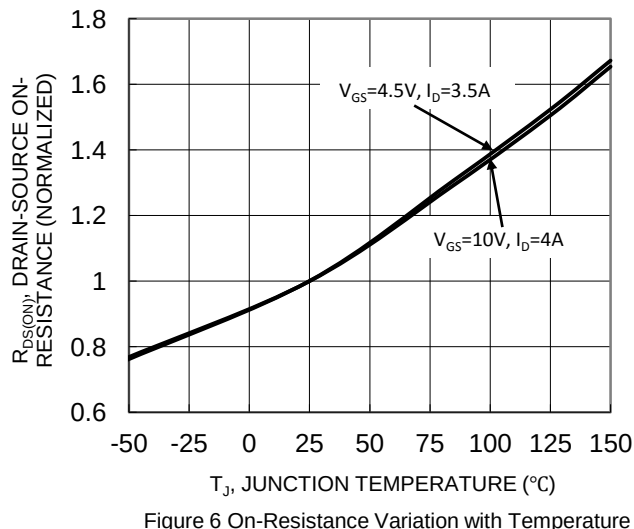
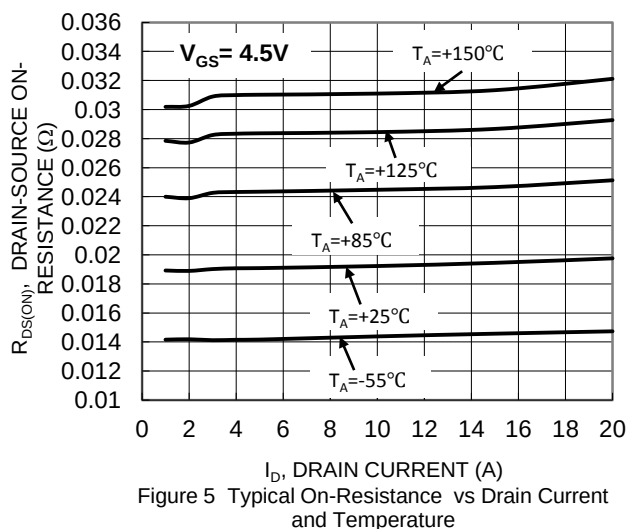
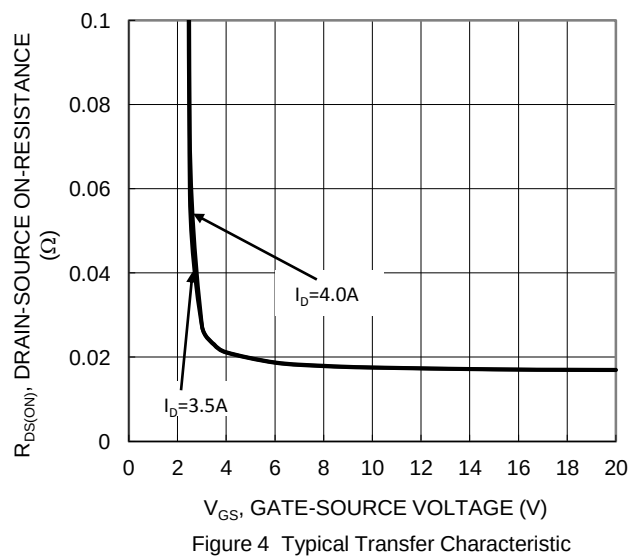
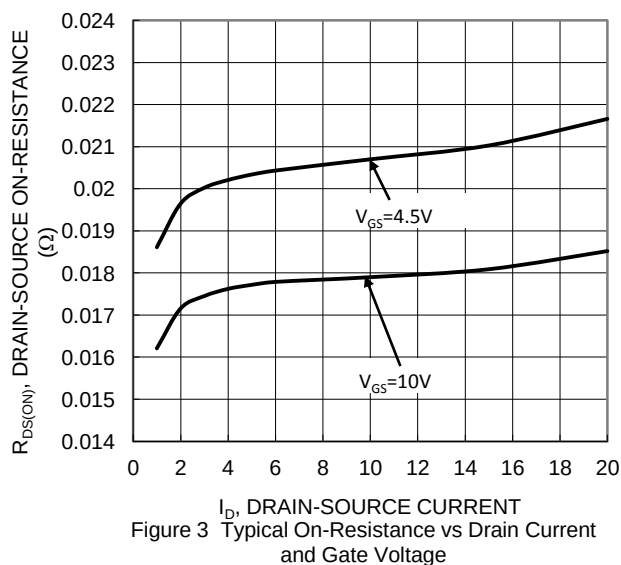
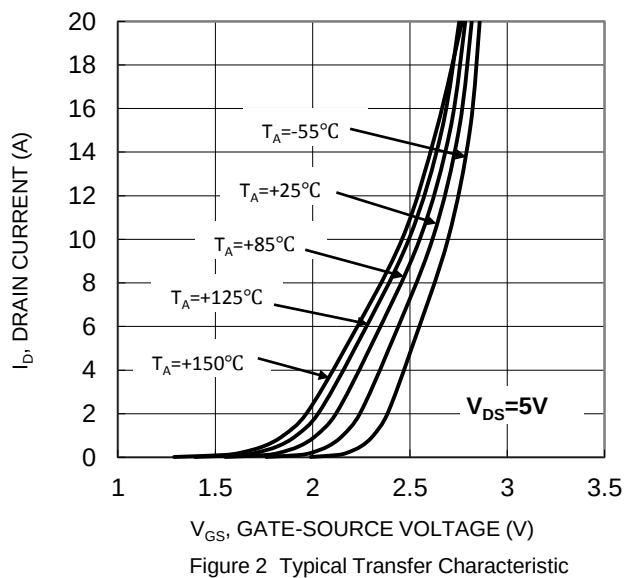
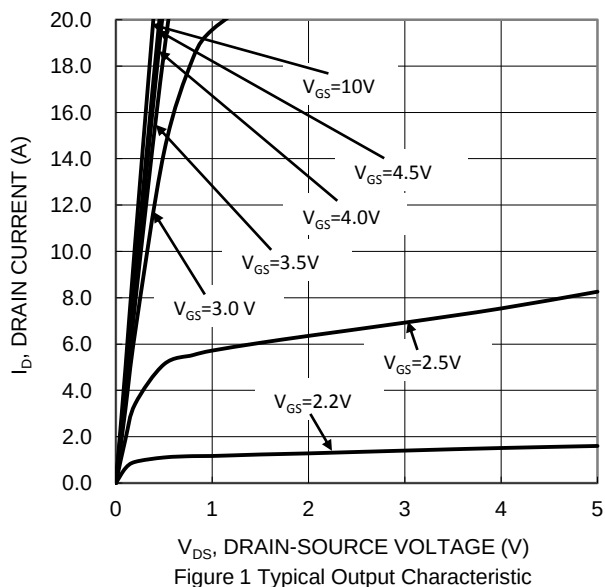
**Thermal Characteristics**

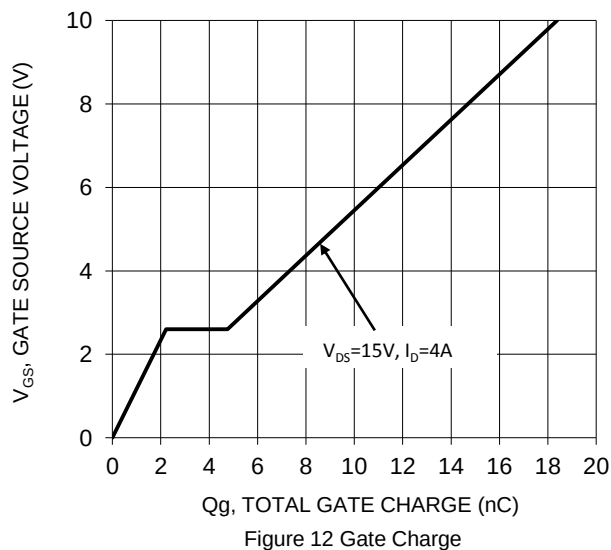
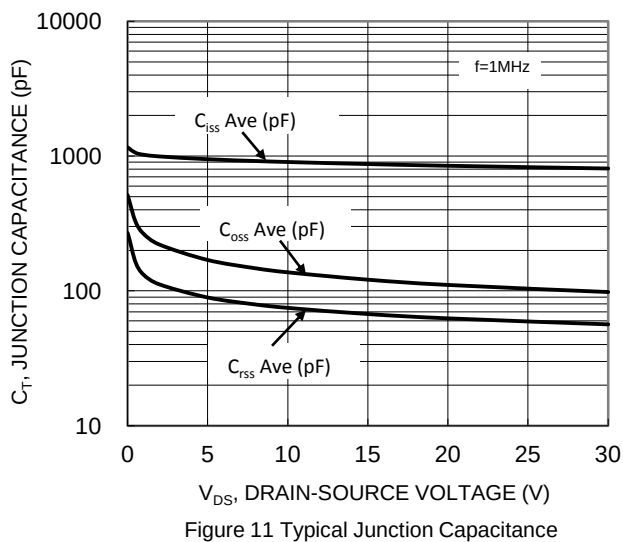
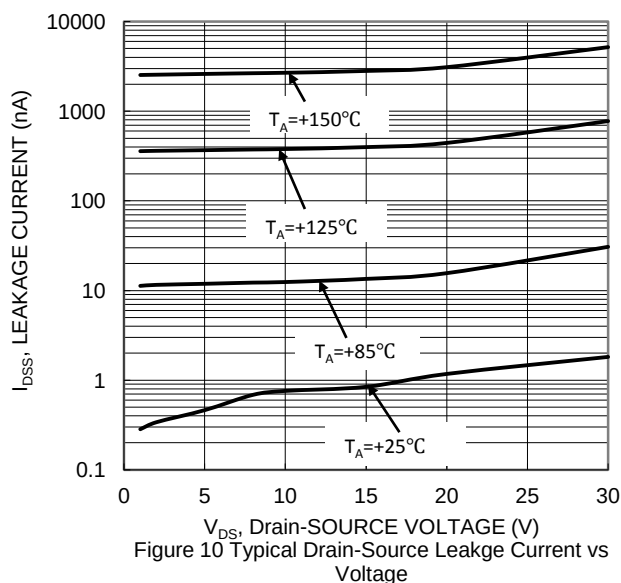
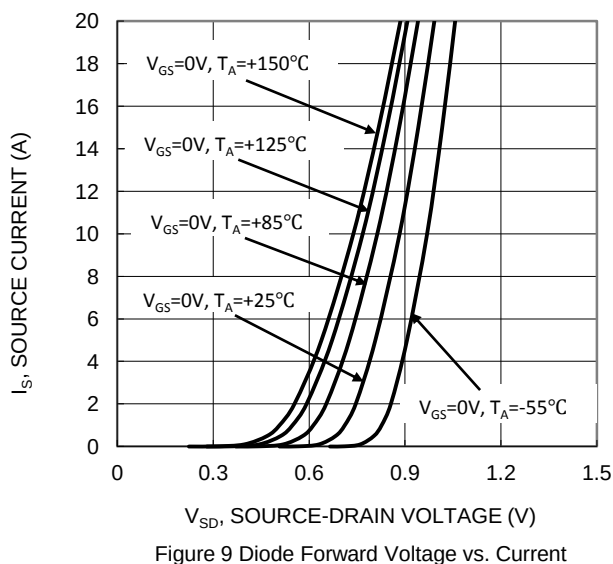
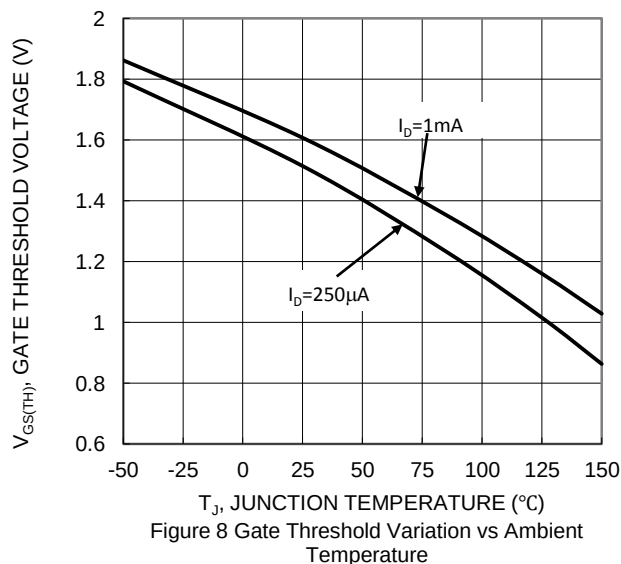
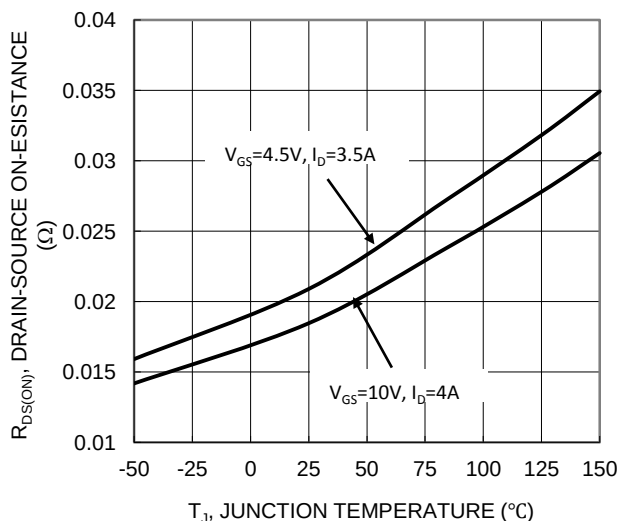
| Characteristic                                   |                        | Symbol                            | Value       | Units |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 0.9         | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 0.6         |       |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state           | R <sub>θJA</sub>                  | 144         | °C/W  |
|                                                  | t < 10s                |                                   | 103         |       |
| Total Power Dissipation (Note 6)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 1.3         | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 0.8         |       |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state           | R <sub>θJA</sub>                  | 97          | °C/W  |
|                                                  | t < 10s                |                                   | 70          |       |
| Thermal Resistance, Junction to Case (Note 6)    |                        | R <sub>θJC</sub>                  | 24          |       |
| Operating and Storage Temperature Range          |                        | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

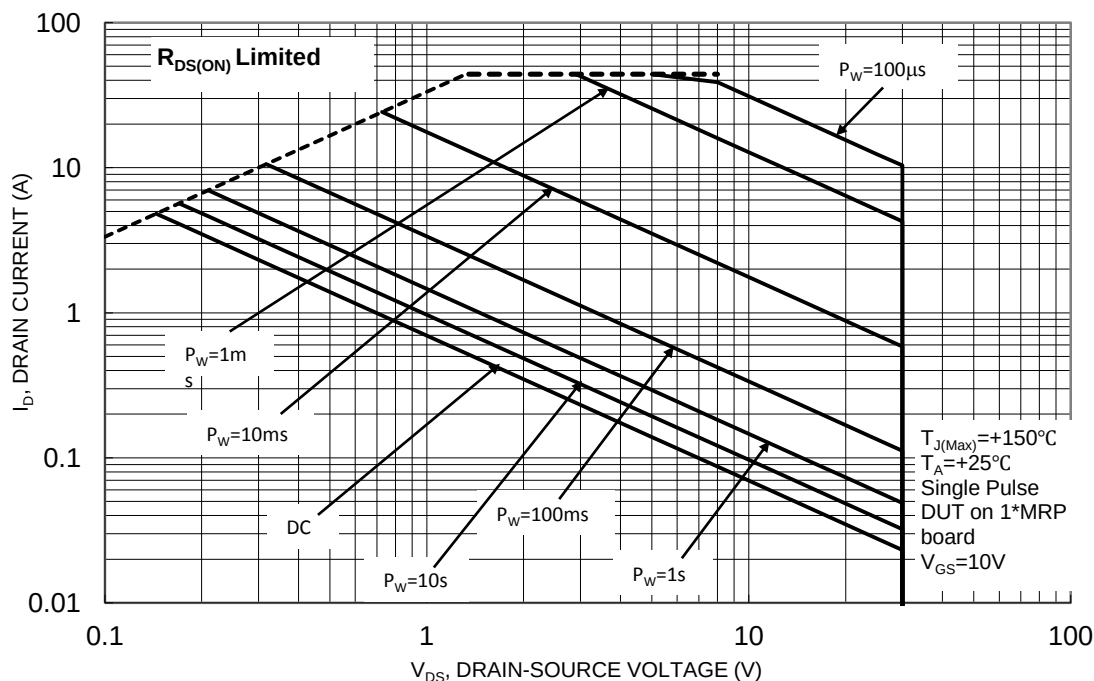
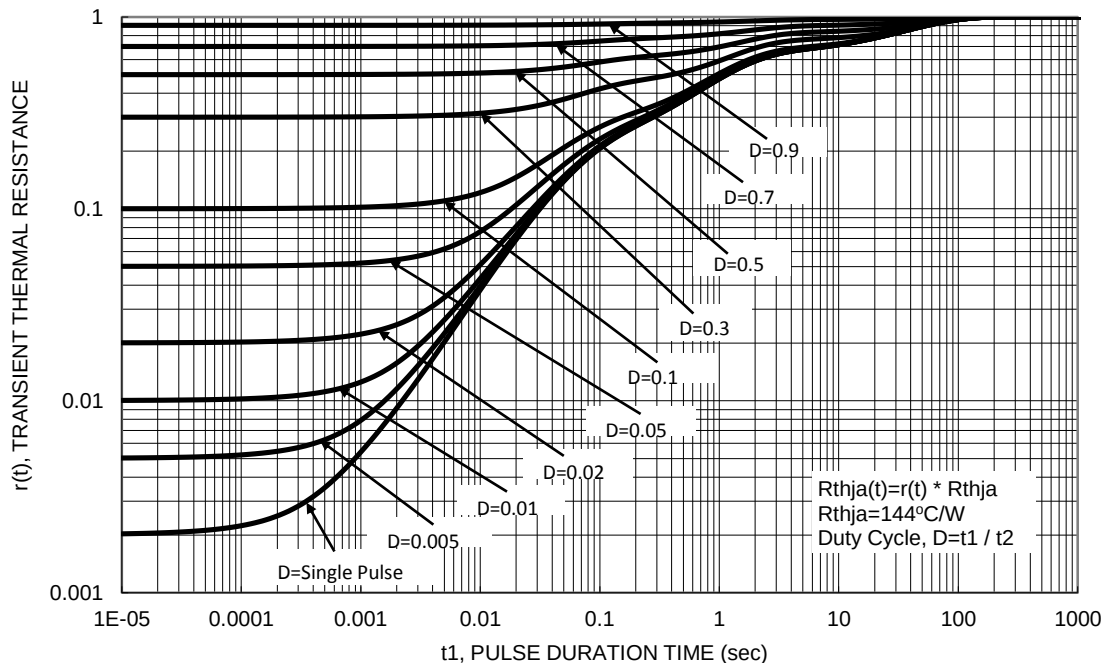
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ  | Max | Unit | Test Condition                                                                             |
|--------------------------------------------|---------------------|-----|------|-----|------|--------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 8)</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            | I <sub>DSS</sub>    | —   | —    | 1   | µA   | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                                |
| Gate-Body Leakage                          | I <sub>GSS</sub>    | —   | —    | ±10 | µA   | V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V                                               |
| <b>ON CHARACTERISTICS (Note 8)</b>         |                     |     |      |     |      |                                                                                            |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 0.8 | —    | 1.8 | 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  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.0A                                               |
|                                            |                     | —   | —    | 28  |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.5A                                              |
|                                            |                     | —   | —    | 68  |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2.5A                                              |
| Source-Drain Diode Forward Voltage         | V <sub>SD</sub>     | —   | —    | 1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                  |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>    |                     |     |      |     |      |                                                                                            |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 873  | —   | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                  |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 121  | —   | pF   |                                                                                            |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 67   | —   | pF   |                                                                                            |
| Gate Resistance                            | R <sub>g</sub>      | —   | 77   | —   | 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>      | —   | 18.4 | —   | nC   | V <sub>DS</sub> = 15V, I <sub>D</sub> = 4A                                                 |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 8.3  | —   | nC   |                                                                                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 2.2  | —   | nC   |                                                                                            |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 2.5  | —   | nC   |                                                                                            |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 17   | —   | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>L</sub> = 15Ω, R <sub>G</sub> = 6Ω |
| Turn-On Rise Time                          | t <sub>r</sub>      | —   | 18   | —   | ns   |                                                                                            |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 231  | —   | ns   |                                                                                            |
| Turn-Off Fall Time                         | t <sub>f</sub>      | —   | 70   | —   | 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> rating 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.

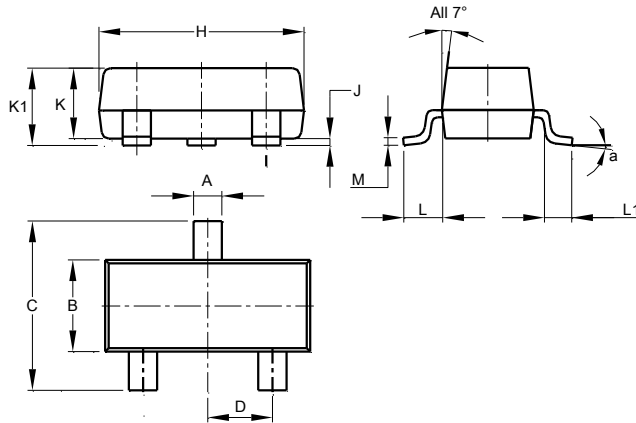






## Package Outline Dimensions

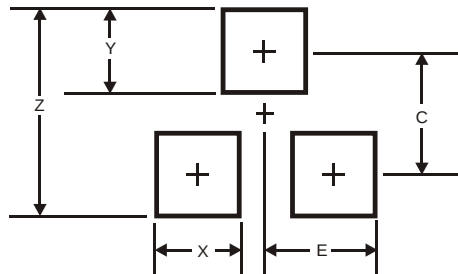
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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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