

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------|
| 50V | 1.6Ω @ $V_{GS} = 10\text{V}$ | 350 mA |
| | 2.5Ω @ $V_{GS} = 4.5\text{V}$ | 200 mA |

Description and Applications

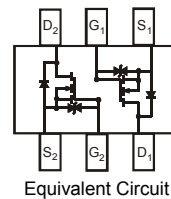
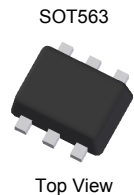
This MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Features and Benefits

- Dual N-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/ Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected to 2KV
- **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: SOT563
- 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 **e3**
- Weight: 0.006 grams (approximate)

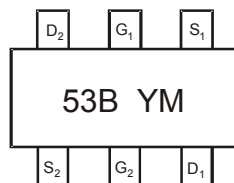


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|--------|-------------------|
| DMN53D0LV-7 | SOT563 | 3000/Tape & Reel |
| DMN53D0LV-13 | SOT563 | 10000/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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



53B = Product Type Marking Code (See Note 6)
 YM = Date Code Marking
 Y = Year ex: B = 2014
 M = Month ex: 9 = September

Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|
| Code | B | C | D | E | F | G | H |

| 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------|-----------|----------|------|
| Drain Source Voltage | V_{DSS} | 50 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current (Note 5) | I_D | 350 | mA |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5) | P_D | 430 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 294 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|-----|-----|-----|---------------|---|
| OFF CHARACTERISTICS (Note 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 50 | — | — | V | $V_{GS} = 0V, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1.0 | μA | $V_{DS} = 50V, V_{GS} = 0V$ |
| Gate-Body Leakage | I_{GSS} | — | — | 10 | μA | $V_{GS} = \pm 20V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.8 | — | 1.5 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | — | — | 1.6 | Ω | $V_{GS} = 10V, I_D = 500\text{mA}$ |
| | | — | — | 2.5 | | $V_{GS} = 4.5V, I_D = 200\text{mA}$ |
| | | — | — | 4.5 | | $V_{GS} = 2.5V, I_D = 100\text{mA}$ |
| Source-Drain Diode Forward Voltage | V_{SD} | 0.5 | — | 1.4 | V | $V_{GS} = 0V, I_S = 500\text{mA}$ |
| DYNAMIC CHARACTERISTICS (Note 7) | | | | | | |
| Input Capacitance | C_{iss} | — | 46 | — | pF | $V_{DS} = 25V, V_{GS} = 0V$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 5.3 | — | pF | |
| Reverse Transfer Capacitance | C_{rss} | — | 4.0 | — | pF | |
| Total Gate Charge | Q_g | — | 0.6 | — | nC | $V_{GS} = 4.5V, V_{DS} = 10V,$ $I_D = 250\text{mA}$ |
| Gate-Source Charge | Q_{gs} | — | 0.2 | — | nC | |
| Gate-Drain Charge | Q_{gd} | — | 0.1 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 2.7 | — | ns | $V_{DD} = 30V, V_{GS} = 10V,$ $R_G = 25\Omega, I_D = 200\text{mA}$ |
| Turn-On Rise Time | t_r | — | 2.5 | — | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 19 | — | ns | |
| Turn-Off Fall Time | t_f | — | 11 | — | ns | |

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

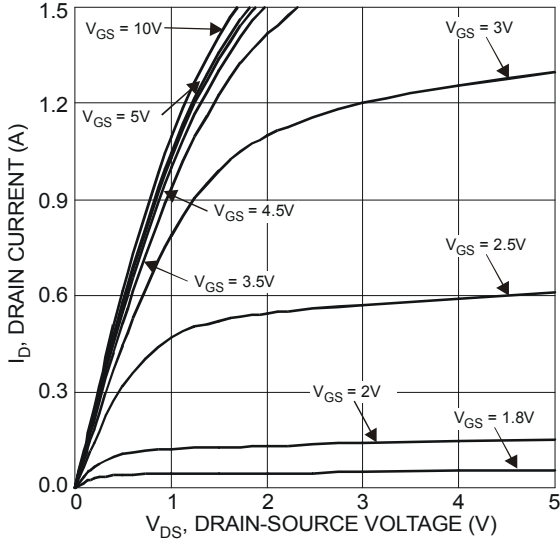


Figure 1 Typical Output Characteristics

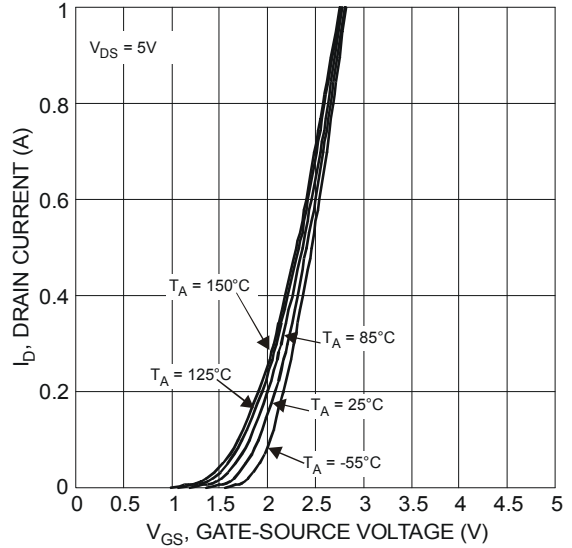


Figure 2 Typical Transfer Characteristics

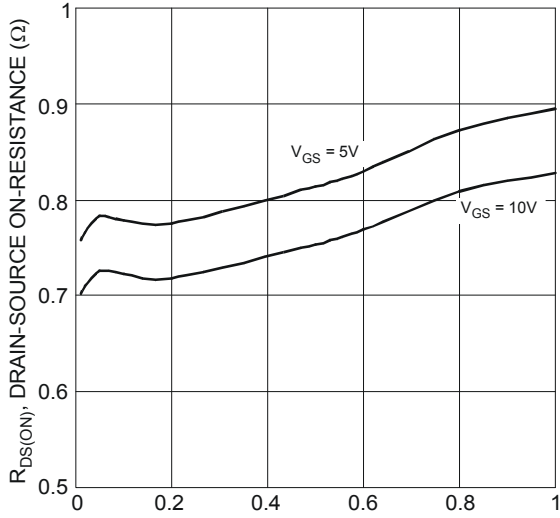


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

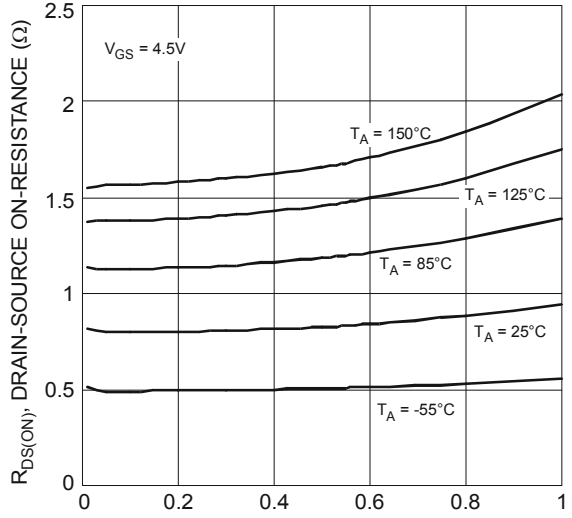


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

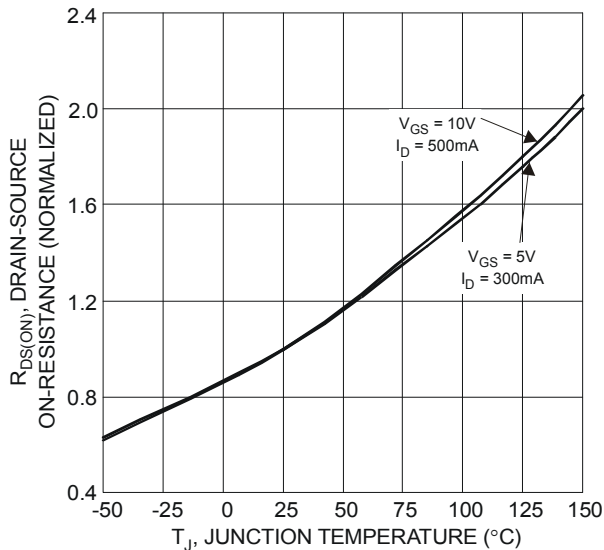


Figure 5 On-Resistance Variation with Temperature

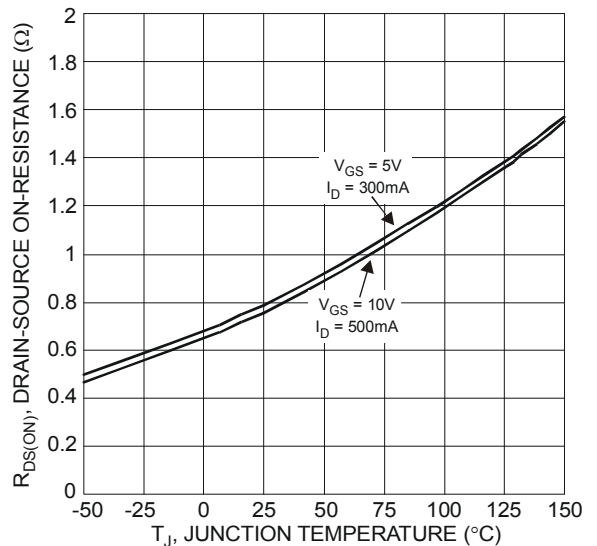


Figure 6 On-Resistance Variation with Temperature

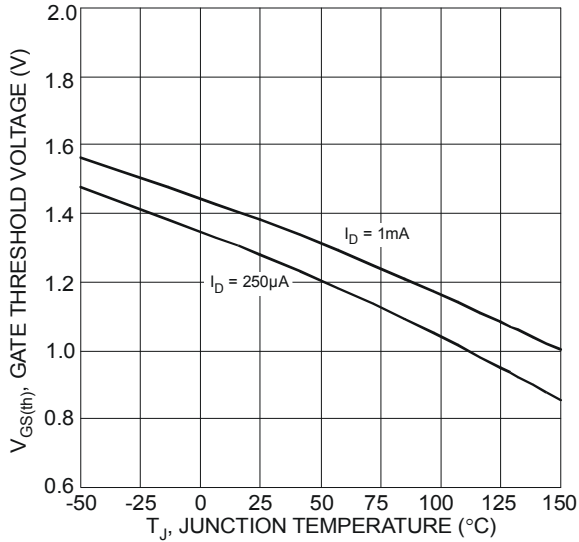


Figure 7 Gate Threshold Variation vs. Ambient Temperature

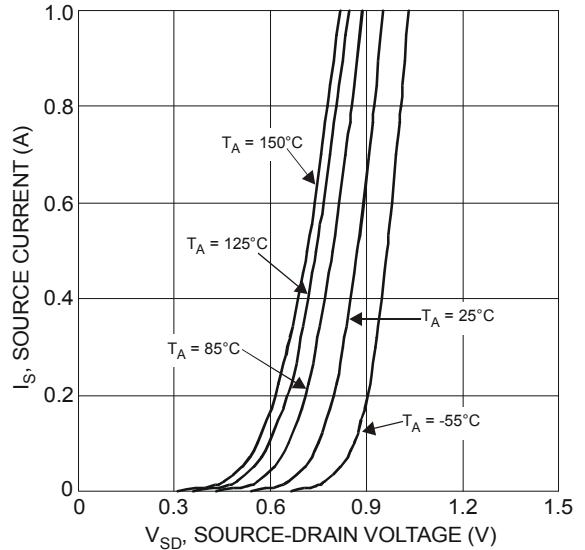


Figure 8 Diode Forward Voltage vs. Current

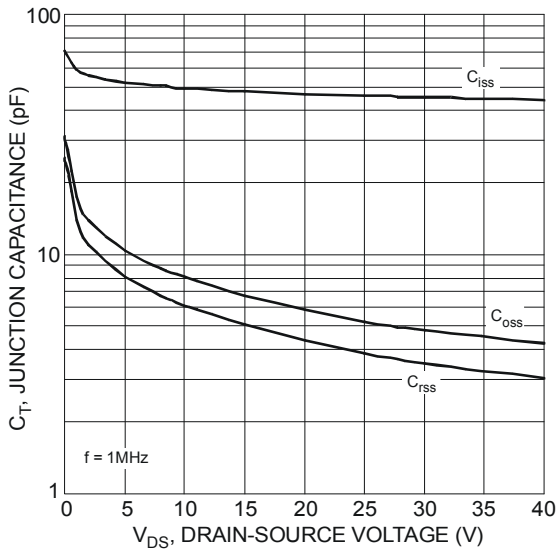


Figure 9 Typical Junction Capacitance

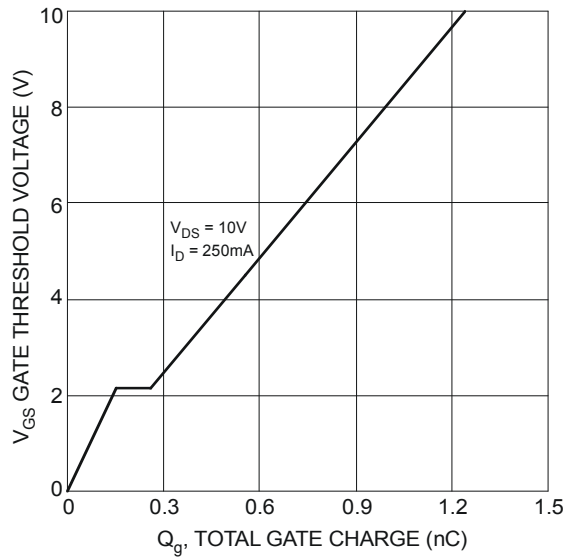
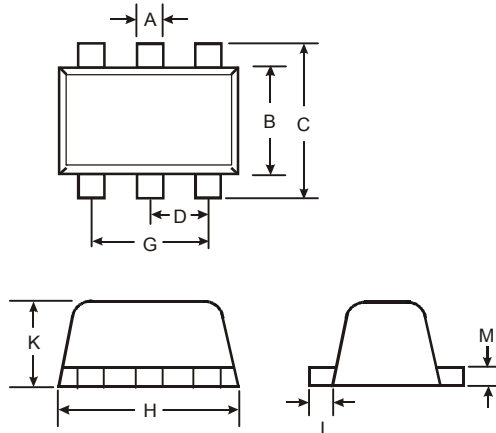


Figure 10 Gate Charge

Package Outline Dimensions

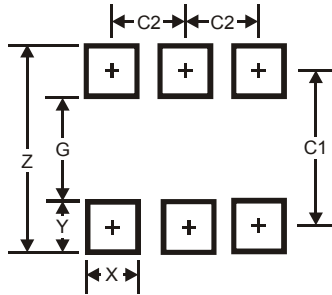
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT563 | | | |
|-----------------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | - | - | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| 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 | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C1 | 1.7 |
| C2 | 0.5 |

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