

Features

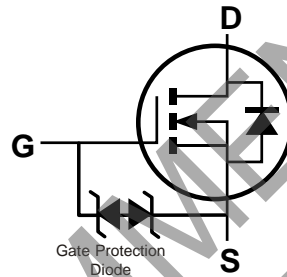
- Low On-Resistance
 - 25mΩ @ $V_{GS} = 4.5V$
 - 29mΩ @ $V_{GS} = 2.5V$
 - 36mΩ @ $V_{GS} = 1.8V$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Up To 2kV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

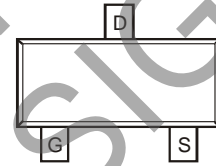
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 [Ⓔ]
- Terminals Connections: See Diagram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



Top View



Internal Schematic



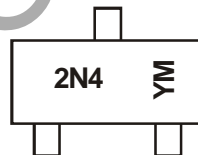
Top View

Ordering Information (Note 5)

| Part Number | Compliance | Case | Packaging |
|-------------|------------|-------|------------------|
| DMG6968U-7 | Standard | SOT23 | 3000/Tape & Reel |
| DMG6968UQ-7 | Automotive | SOT23 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



2N4 = Product Type Marking Code
 YM = Date Code Marking
 Y or ∇ = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Code | W | | E | F | G | H | I | J | K | L | M | N |
| 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 | Unit |
|-----------------------------------|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±12 | V |
| Continuous Drain Current (Note 6) | Steady State | T _A = +25°C | I _D | 6.5 | A |
| | | T _A = +70°C | | 5.2 | |
| Pulsed Drain Current | | | I _{DM} | 30 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6) | P _D | 1.3 | W |
| Thermal Resistance, Junction to Ambient @ T _A = +25°C | R _{θJA} | 157 | °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 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1.0 | μA | T _J = +25°C, V _{DS} = 20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±10 | μA | V _{GS} = ±10V, V _{DS} = 0V |
| Gate-Source Breakdown Voltage | BV _{GSS} | ±12 | — | — | V | V _{DS} = 0V, I _G = ±250μA |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 0.5 | — | 0.9 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 21 | 25 | mΩ | V _{GS} = 4.5V, I _D = 6.5A |
| | | | 23 | 29 | | V _{GS} = 2.5V, I _D = 5.5A |
| | | | 28 | 36 | | V _{GS} = 1.8V, I _D = 3.5A |
| Forward Transfer Admittance | Y _{fs} | — | 8 | — | S | V _{DS} = 10V, I _D = 5A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 151 | — | pF | V _{DS} = 10V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 91 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 32 | — | pF | |
| Total Gate Charge | Q _g | — | 8.5 | — | nC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 6.5A |
| Gate-Source Charge | Q _{gs} | — | 1.6 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.8 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 54 | — | ns | V _{DD} = 10V, V _{GS} = 4.5V, R _L = 10Ω, R _G = 6Ω, I _D = 1A |
| Turn-On Rise Time | t _R | — | 66 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 613 | — | ns | |
| Turn-Off Fall Time | t _F | — | 205 | — | ns | |

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz. copper, with thermal vias to bottom layer 1 inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

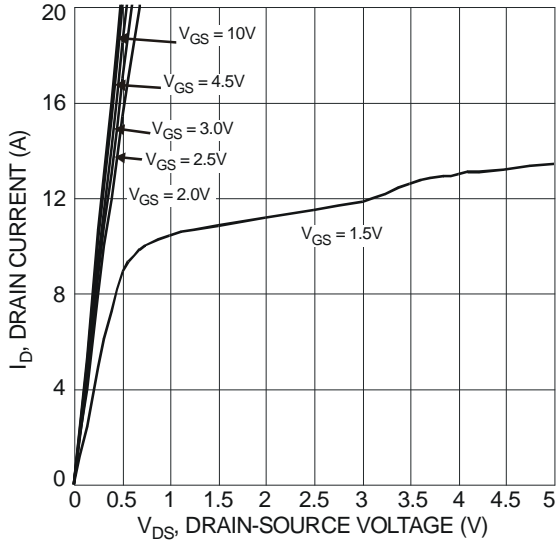


Fig. 1 Typical Output Characteristic

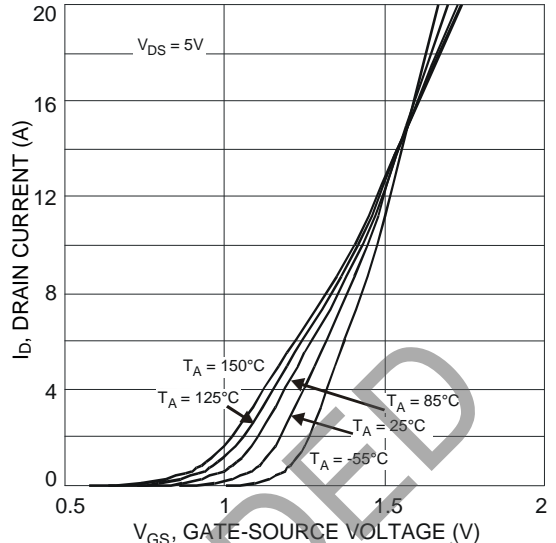


Fig. 2 Typical Transfer Characteristic

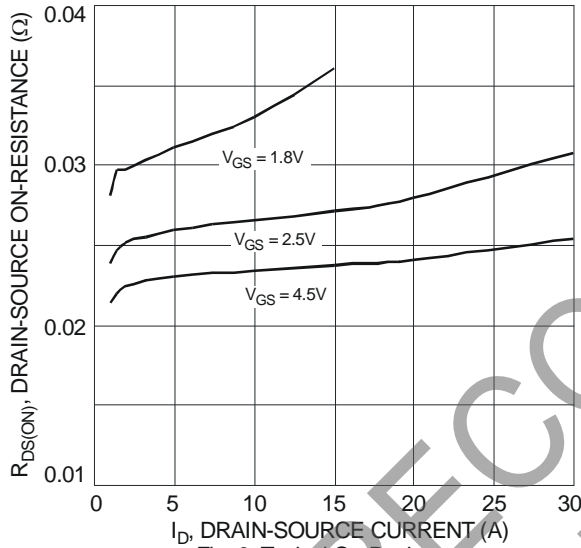


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

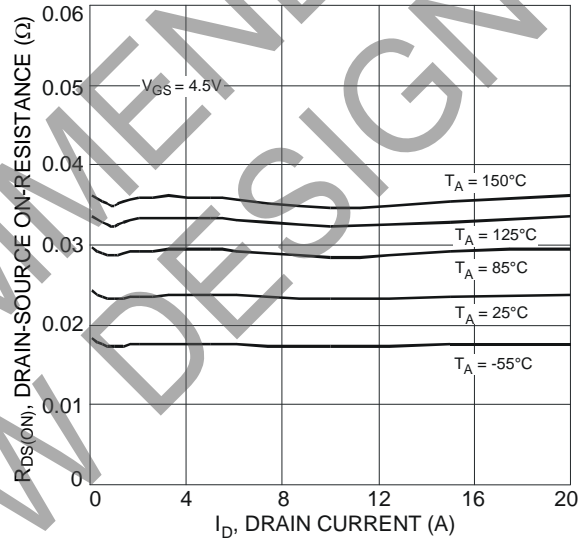


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

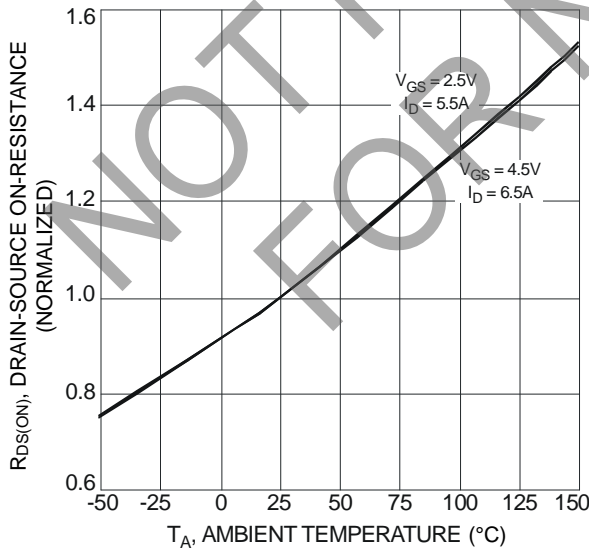


Fig. 5 On-Resistance Variation with Temperature

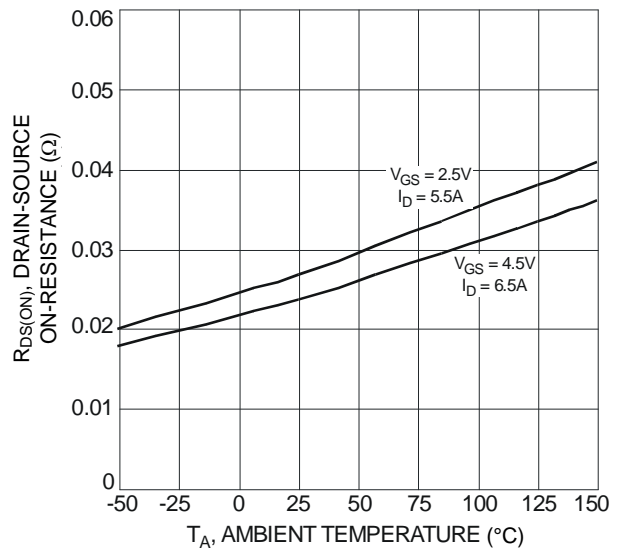


Fig. 6 On-Resistance Variation with Temperature

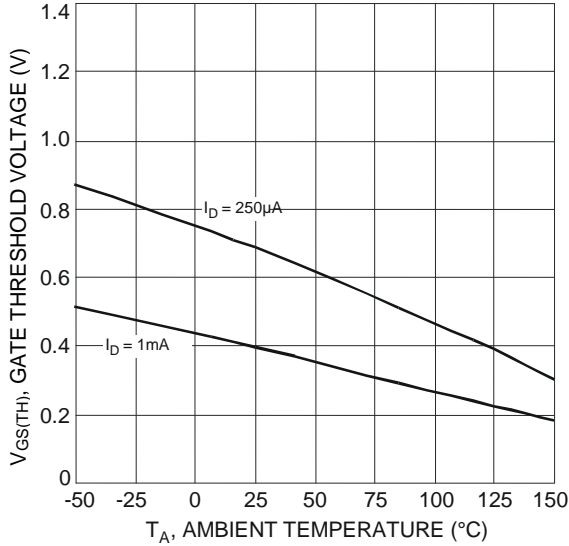


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

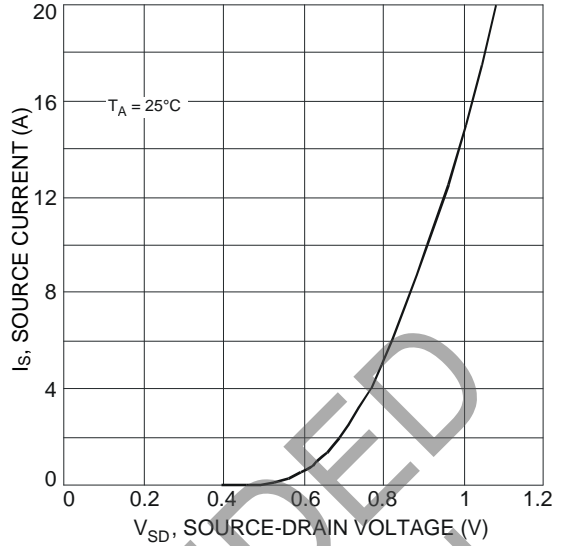


Fig. 8 Diode Forward Voltage vs. Current

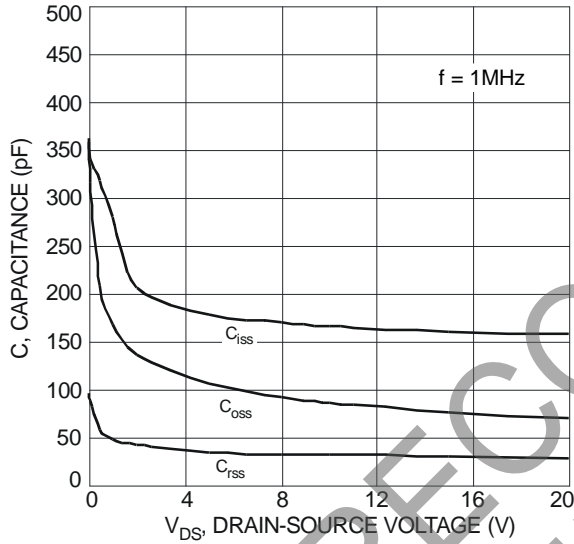


Fig. 9 Typical Total Capacitance

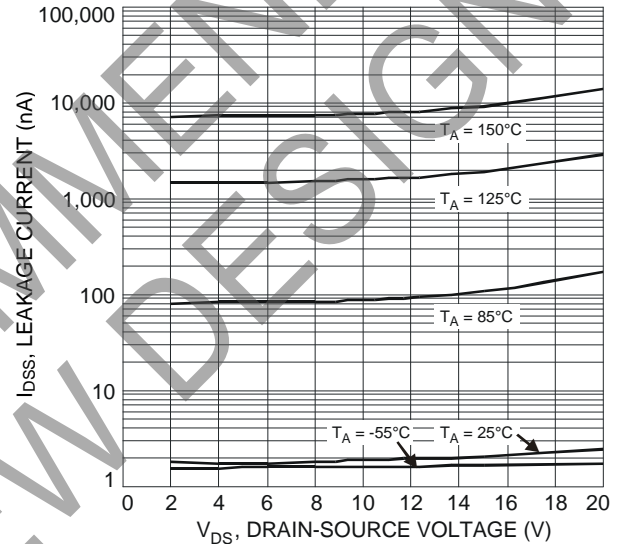


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

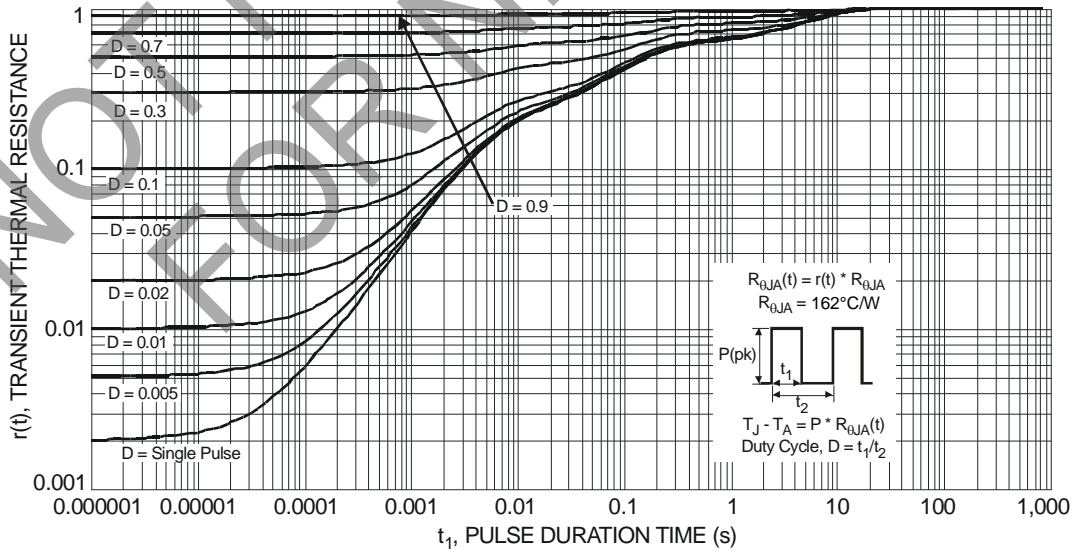
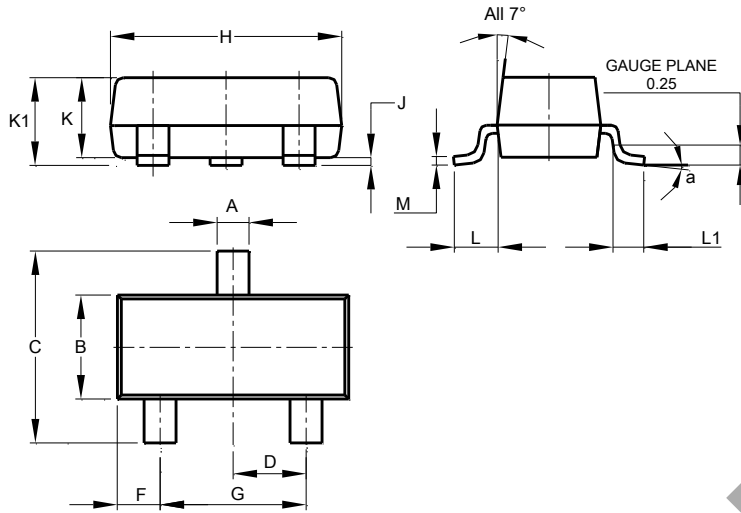


Fig. 11 Transient Thermal Response

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23

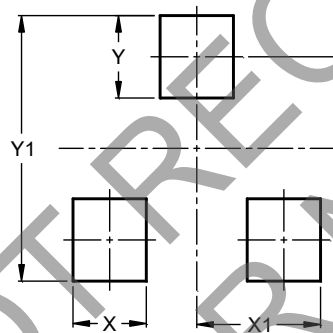


| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 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 | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.0 |
| X | 0.8 |
| X1 | 1.35 |
| Y | 0.9 |
| Y1 | 2.9 |

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