

Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **ESD Protected Up To 2KV**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

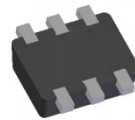
- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.006 grams (approximate)



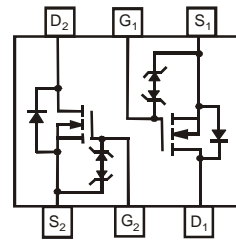
ESD PROTECTED TO 2kV



TOP VIEW



BOTTOM VIEW



TOP VIEW

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | | | Symbol | Value | Unit |
|-----------------------------------|--------------|--------------------------|-----------|---------|------|
| Drain-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 6 | V |
| Continuous Drain Current (Note 3) | Steady State | $T_A = 25^\circ\text{C}$ | I_D | 1.38 | A |
| | | $T_A = 85^\circ\text{C}$ | | 0.89 | |
| Pulsed Drain Current (Note 4) | | | I_{DM} | 3 | A |

Thermal Characteristics

| Characteristic | Symbol | Max | Unit |
|-----------------------------------------------------------------------------|-----------------|-------------|---------------------------|
| Power Dissipation (Note 3) | P_D | 530 | mW |
| Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 3) | $R_{\theta JA}$ | 235 | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 4. Repetitive rating, pulse width limited by junction temperature.

Electrical Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------------------------|---------------------|-----|-------|------|------|-------------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | - | - | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = 25°C | I _{DSS} | - | - | 100 | nA | V _{DS} = 20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | - | - | ±1.0 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | - | 1.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | - | 0.3 | 0.45 | Ω | V _{GS} = 4.5V, I _D = 600mA |
| | | | 0.4 | 0.6 | | V _{GS} = 2.5V, I _D = 500mA |
| | | | 0.5 | 0.75 | | V _{GS} = 1.8V, I _D = 350mA |
| | | | - | 9 | | V _{GS} = 1.7V, I _D = 140mA |
| | | | - | 10 | | V _{GS} = 1.5V, I _D = 100mA |
| Forward Transfer Admittance | Y _{fs} | - | 1.4 | - | S | V _{DS} = 10V, I _D = 400mA |
| Diode Forward Voltage | V _{SD} | - | 0.7 | 1.2 | V | V _{GS} = 0V, I _S = 150mA |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C _{iss} | - | 60.67 | - | pF | V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | - | 9.68 | - | pF | |
| Reverse Transfer Capacitance | C _{rss} | - | 5.37 | - | pF | |
| Total Gate Charge | Q _g | - | 736.6 | - | pC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA |
| Gate-Source Charge | Q _{gs} | - | 93.6 | - | pC | |
| Gate-Drain Charge | Q _{gd} | - | 116.6 | - | pC | |
| Turn-On Delay Time | t _{D(on)} | - | 5.1 | - | ns | V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA |
| Turn-On Rise Time | t _r | - | 7.4 | - | ns | |
| Turn-Off Delay Time | t _{D(off)} | - | 26.7 | - | ns | |
| Turn-Off Fall Time | t _f | - | 12.3 | - | ns | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.
6. Guaranteed by design. Not subject to production testing.

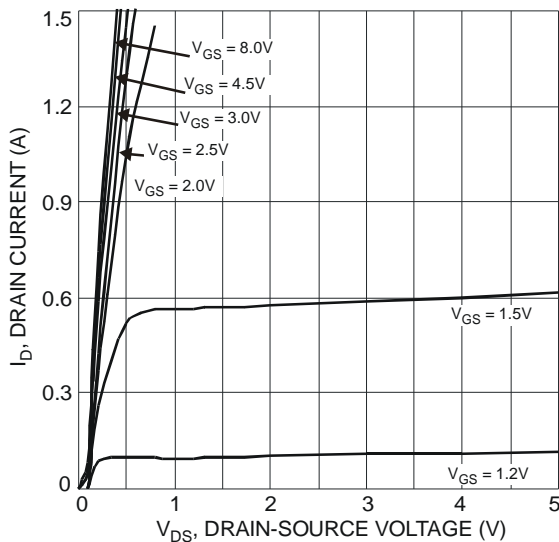


Fig. 1 Typical Output Characteristics

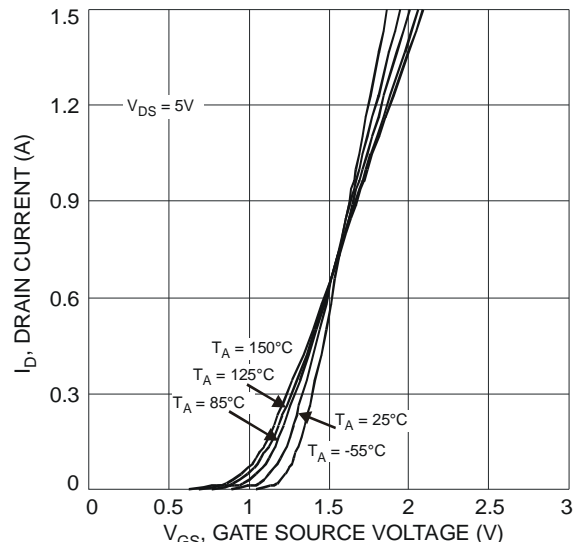


Fig. 2 Typical Transfer Characteristics

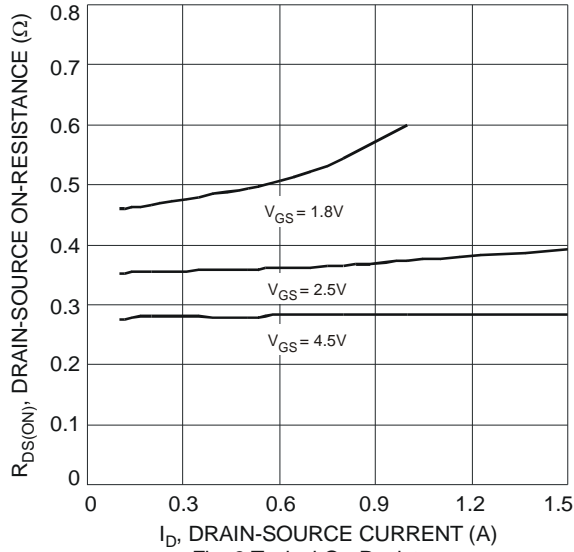


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

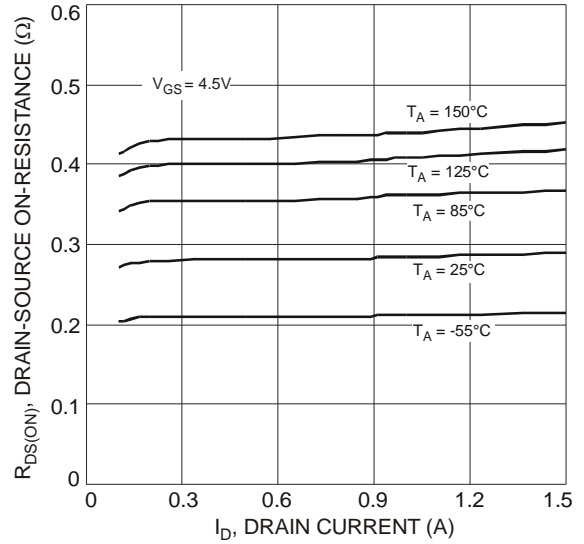


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

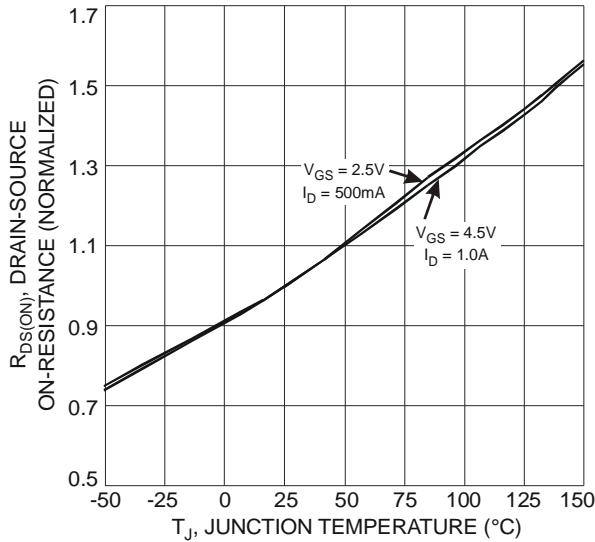


Fig. 5 On-Resistance Variation with Temperature

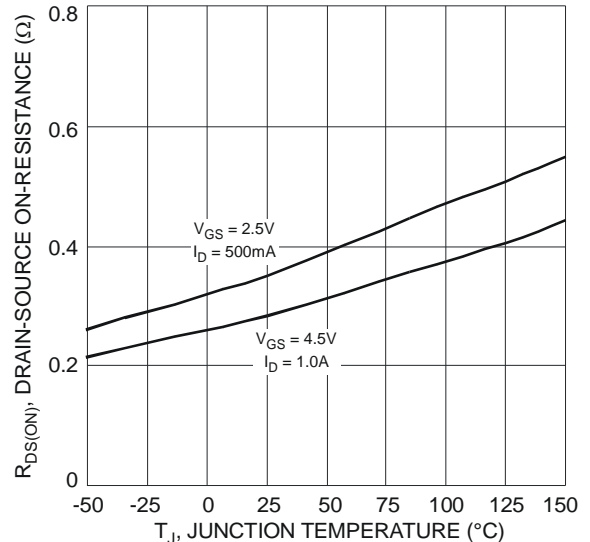


Fig. 6 On-Resistance Variation with Temperature

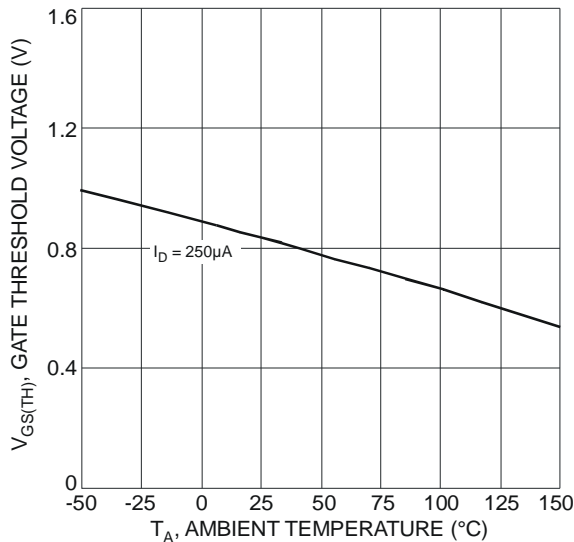


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

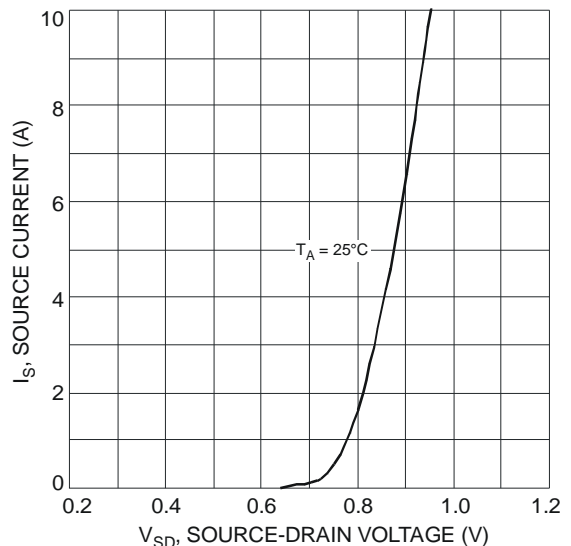


Fig. 8 Diode Forward Voltage vs. Current

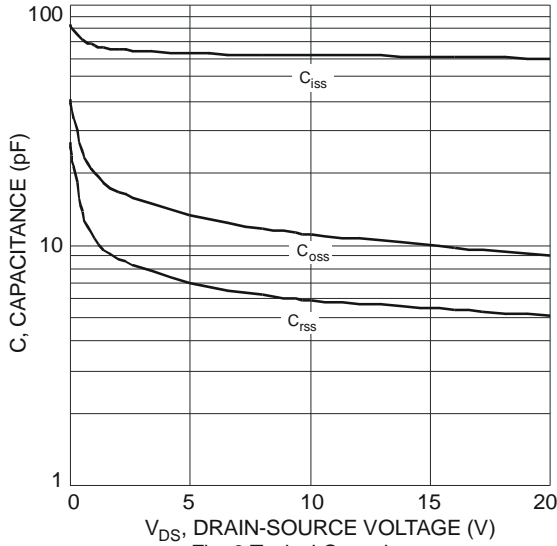


Fig. 9 Typical Capacitance

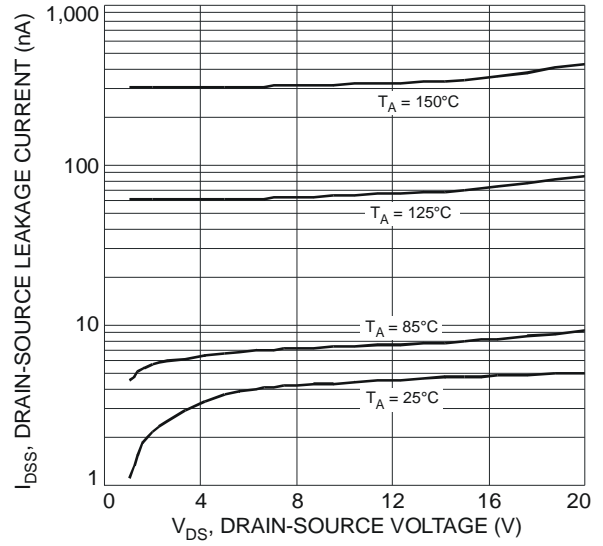


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

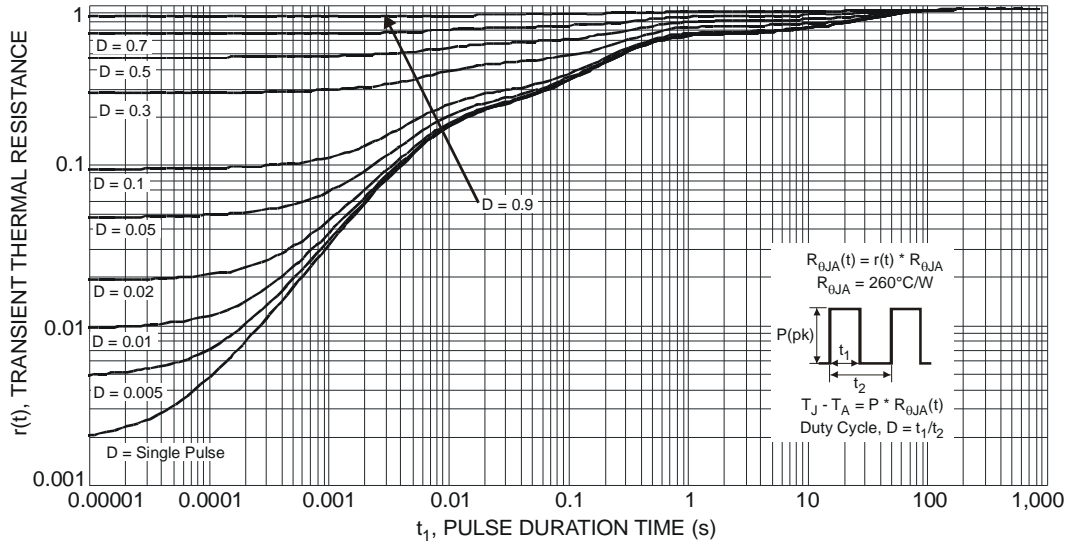


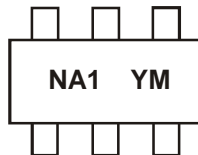
Fig. 11 Transient Thermal Response

Ordering Information (Note 7)

| Part Number | Case | Packaging |
|-------------|---------|--------------------|
| DMG1024UV-7 | SOT-563 | 3000 / Tape & Reel |

Notes: 7. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



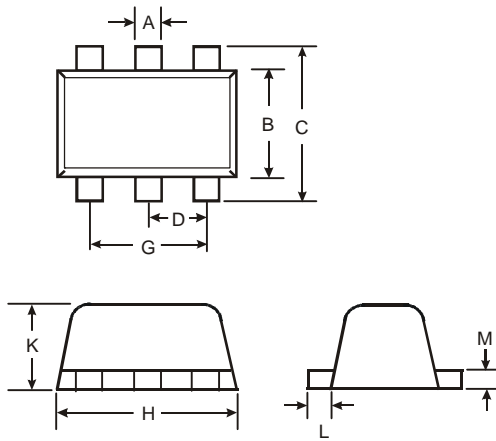
NA1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|
| Code | W | X | Y | Z | A | B | C |

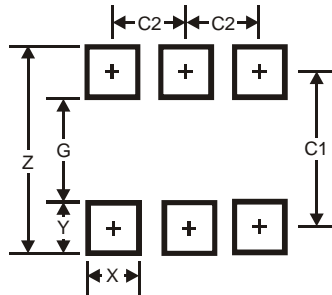
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Package Outline Dimensions



| SOT-563 | | | |
|----------------------|------|------|------|
| 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



| 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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