

Features

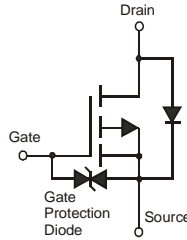
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead Free By Design/RoHS Compliant (Note 1)
- **ESD Protected Up To 3KV**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**



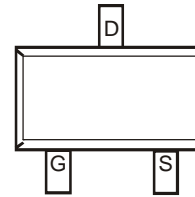
ESD PROTECTED



Top View



Equivalent Circuit



Top View

Mechanical Data

- Case: SOT-323
- 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 Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 2
- Ordering Information: See Page 2
- Weight: 0.006 grams (approximate)

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 | -0.82 | A |
| | | $T_A = 85^\circ\text{C}$ | | -0.54 | |
| Pulsed Drain Current (Note 4) | | | I_{DM} | -6 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|---------------------------|
| Power Dissipation (Note 3) | P_D | 0.31 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 3) | $R_{\theta JA}$ | 398 | $^\circ\text{C}/\text{W}$ |
| 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 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|------|-------|-----------|----------|---|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -20 | - | - | V | $V_{GS} = 0V, I_D = -250\mu A$ |
| Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$ | I_{DSS} | - | - | -100 | nA | $V_{DS} = -20V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 2.0 | μA | $V_{GS} = \pm 4.5V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.5 | - | -1.0 | V | $V_{DS} = V_{GS}, I_D = -250\mu A$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | - | 0.5 | 0.75 | Ω | $V_{GS} = -4.5V, I_D = -430mA$ |
| | | - | 0.7 | 1.05 | | $V_{GS} = -2.5V, I_D = -300mA$ |
| | | - | 1.0 | 1.5 | | $V_{GS} = -1.8V, I_D = -150mA$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 0.9 | - | S | $V_{DS} = -10V, I_D = -250mA$ |
| Diode Forward Voltage | V_{SD} | - | -0.8 | -1.2 | V | $V_{GS} = 0V, I_S = -150mA$ |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C_{iss} | - | 59.76 | - | pF | $V_{DS} = -16V, V_{GS} = 0V, f = 1.0MHz$ |
| Output Capacitance | C_{oss} | - | 12.07 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 6.36 | - | pF | |
| Total Gate Charge | Q_g | - | 622.4 | - | pC | $V_{GS} = -4.5V, V_{DS} = -10V, I_D = -250mA$ |
| Gate-Source Charge | Q_{gs} | - | 100.3 | - | pC | |
| Gate-Drain Charge | Q_{gd} | - | 132.2 | - | pC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 5.1 | - | ns | $V_{DD} = -10V, V_{GS} = -4.5V, R_L = 47\Omega, R_G = 10\Omega, I_D = -200mA$ |
| Turn-On Rise Time | t_r | - | 8.1 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 28.4 | - | ns | |
| Turn-Off Fall Time | t_f | - | 20.7 | - | ns | |

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

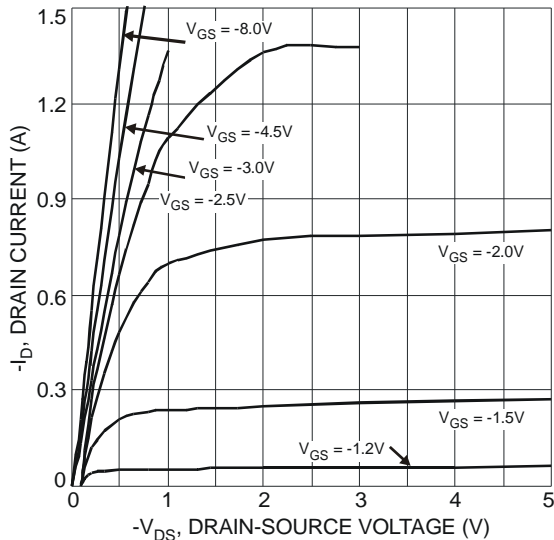


Fig. 1 Typical Output Characteristic

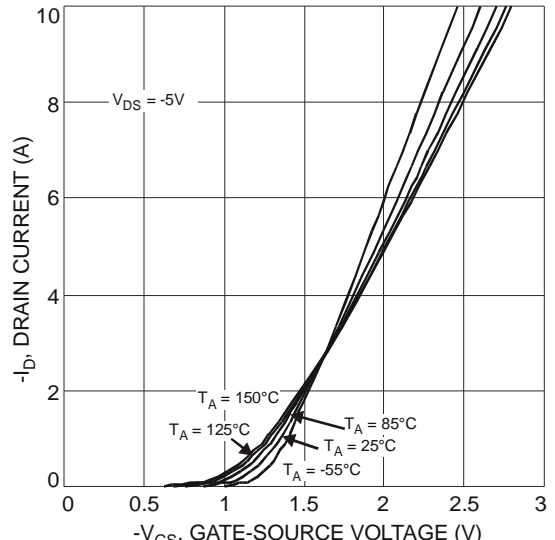


Fig. 2 Typical Transfer Characteristic

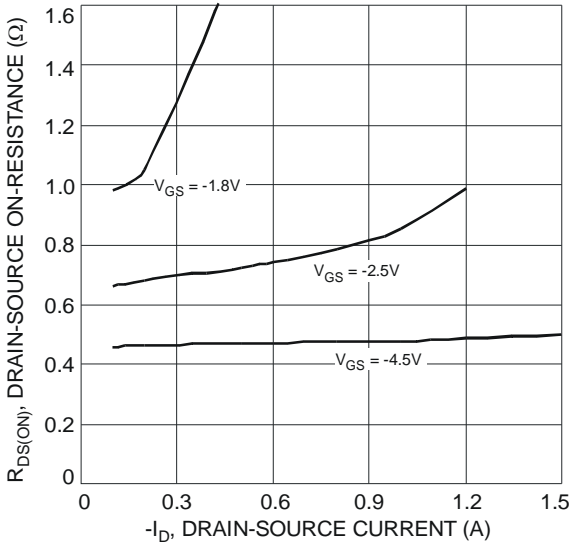


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

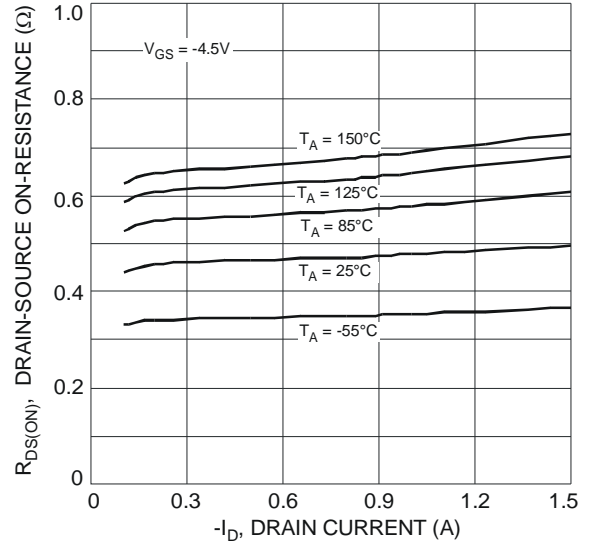


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

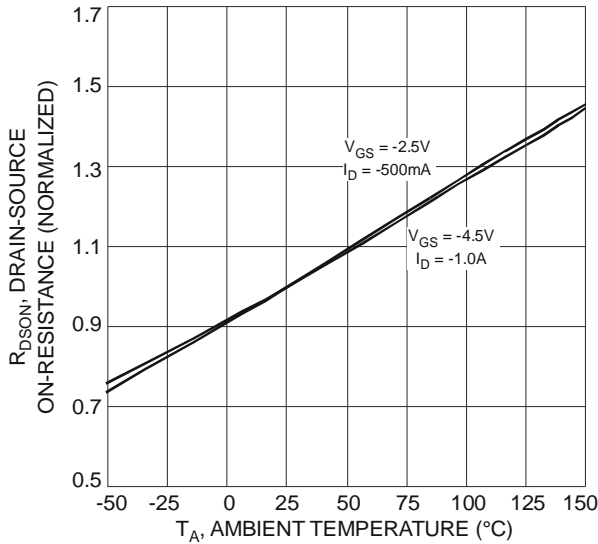


Fig. 5 On-Resistance Variation with Temperature

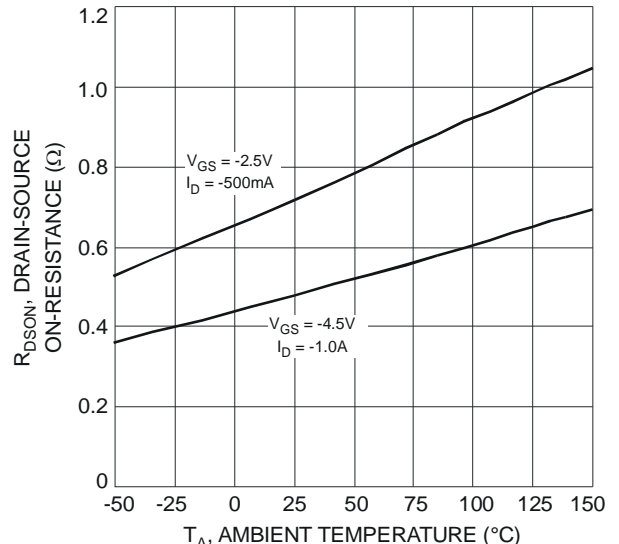


Fig. 6 On-Resistance Variation with Temperature

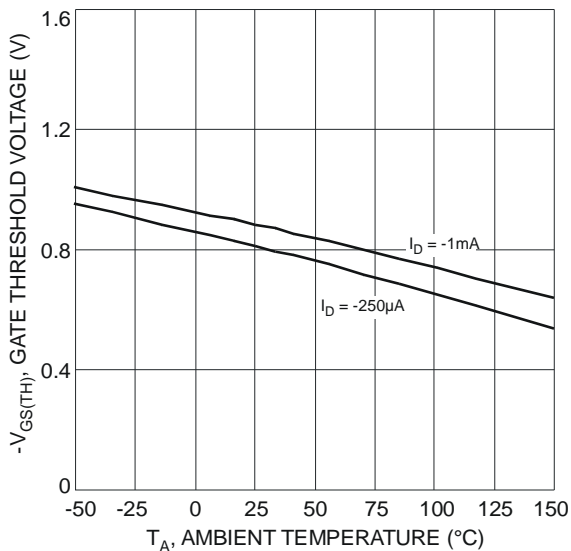


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

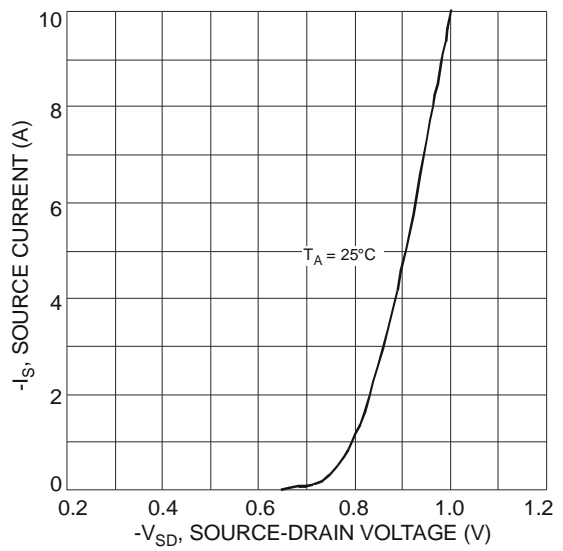
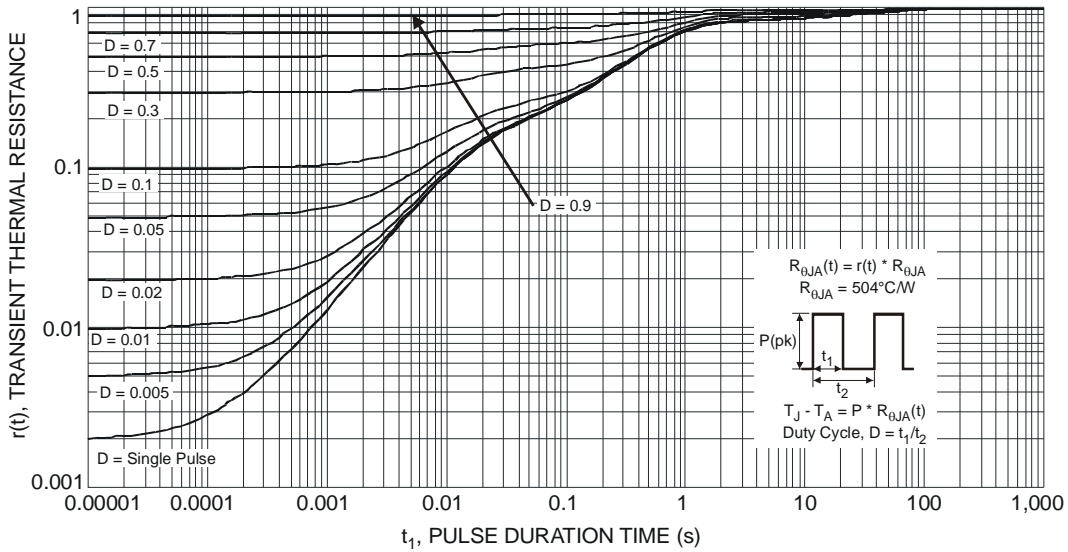
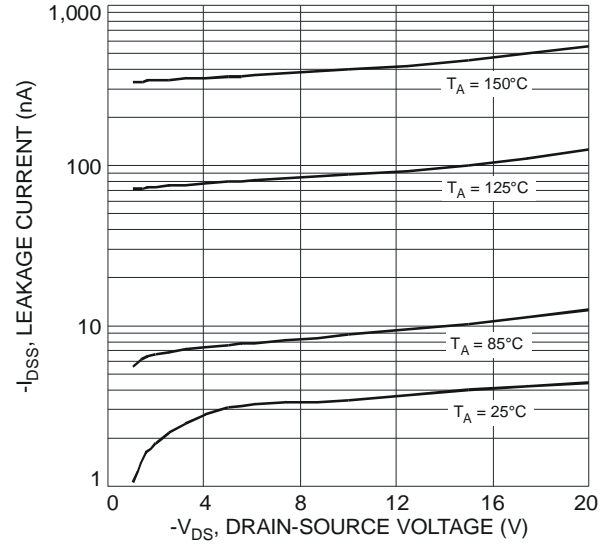
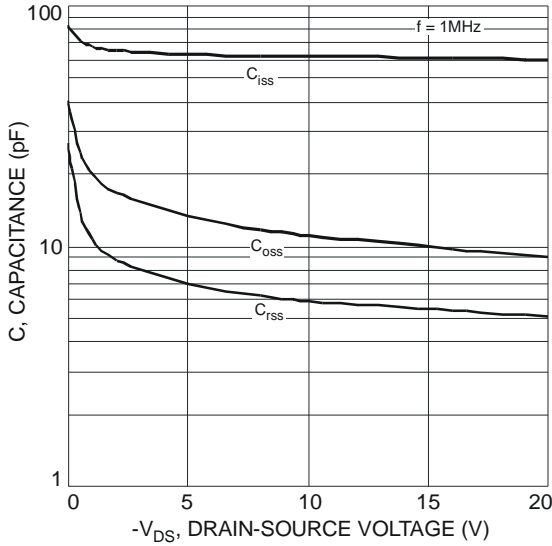


Fig. 8 Diode Forward Voltage vs. Current

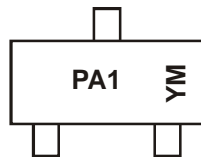


Ordering Information (Note 7)

| Part Number | Case | Packaging |
|-------------|---------|--------------------|
| DMG1013UW-7 | SOT-323 | 3000 / Tape & Reel |

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

Marking Information



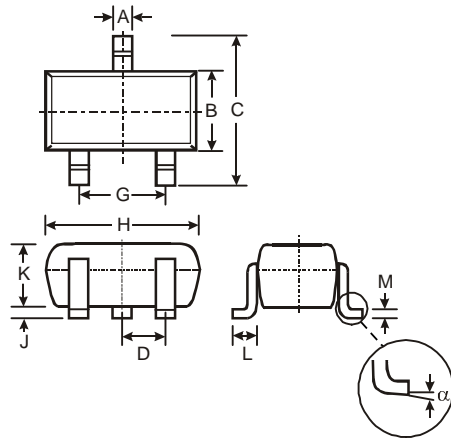
PA1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V | 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 |

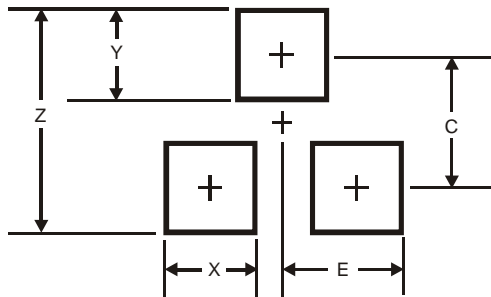
Package Outline Dimensions



| SOT-323 | | | |
|----------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | - | - | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| α | 0° | 8° | - |

All Dimensions in mm

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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