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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

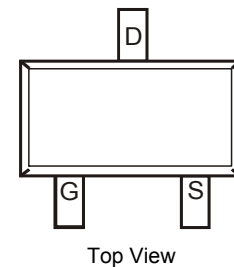
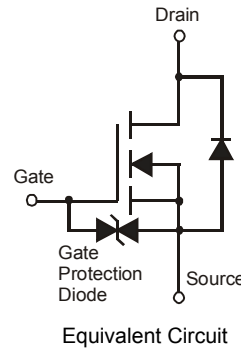
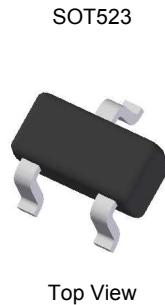


Features

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

Mechanical Data

- Case: SOT523
- 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 Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.002 grams (approximate)

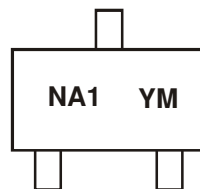


Ordering Information (Note 3)

| Part Number | Qualification | Case | Packaging |
|-------------|---------------|--------|------------------|
| DMG1012T-7 | Commercial | SOT523 | 3000/Tape & Reel |
| DMG1012TQ-7 | Automotive | SOT523 | 3000/Tape & Reel |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

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 |

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

| Characteristic | | | Symbol | Value | Units |
|-----------------------------------|--------------|--------------------------|-----------|---------|-------|
| Drain-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 6 | V |
| Continuous Drain Current (Note 4) | Steady State | $T_A = 25^\circ\text{C}$ | I_D | 0.63 | A |
| | | $T_A = 85^\circ\text{C}$ | | 0.45 | |
| Pulsed Drain Current | | | I_{DM} | 6 | A |

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Units |
|---|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 4) | P_D | 0.28 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 452 | $^\circ\text{C/W}$ |
| 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 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | - | - | V | $V_{GS} = 0V, I_D = 250\mu\text{A}$ |
| 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} | - | - | ± 1.0 | μA | $V_{GS} = \pm 4.5V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.5 | - | 1.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | - | 0.3 | 0.4 | Ω | $V_{GS} = 4.5V, I_D = 600\text{mA}$ |
| | | | 0.4 | 0.5 | | $V_{GS} = 2.5V, I_D = 500\text{mA}$ |
| | | | 0.5 | 0.7 | | $V_{GS} = 1.8V, I_D = 350\text{mA}$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 1.4 | - | S | $V_{DS} = 10V, I_D = 400\text{mA}$ |
| Diode Forward Voltage (Note 5) | V_{SD} | - | 0.7 | 1.2 | V | $V_{GS} = 0V, I_S = 150\text{mA}$ |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{iss} | - | 60.67 | - | pF | $V_{DS} = 16V, V_{GS} = 0V, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 9.68 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 5.37 | - | pF | |
| Total Gate Charge | Q_g | - | 736.6 | - | pC | $V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250\text{mA}$ |
| 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 | $V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47\Omega, R_G = 10\Omega, I_D = 200\text{mA}$ |
| 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:
- Device mounted on FR-4 PCB.
 - Short duration pulse test used to minimize self-heating effect.

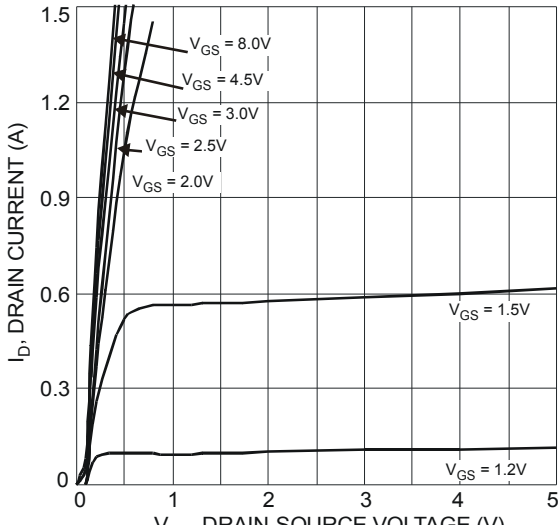


Fig. 1 Typical Output Characteristics

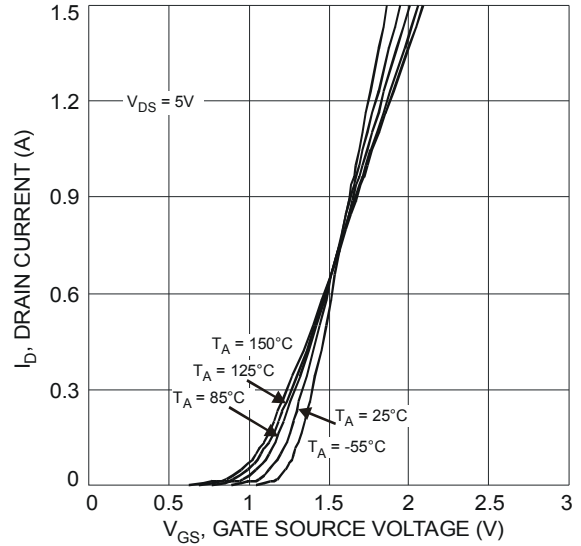


Fig. 2 Typical Transfer Characteristics

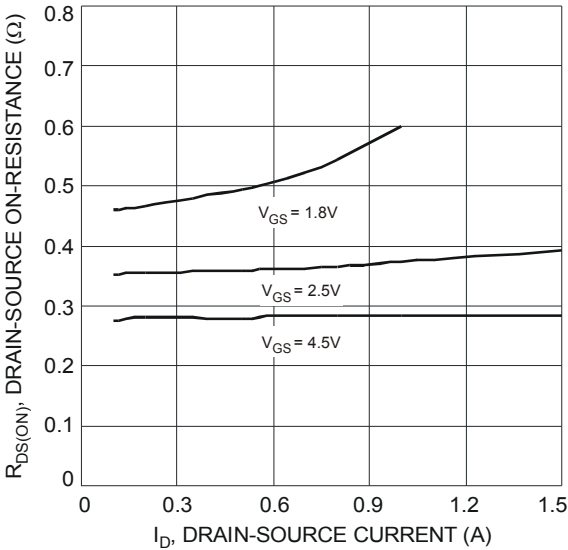


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

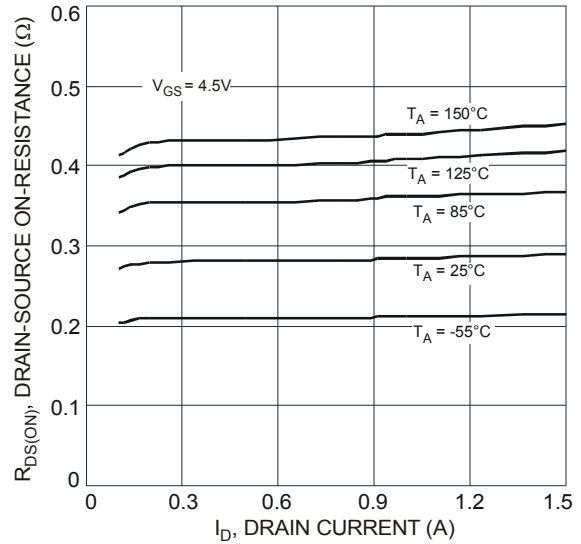


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

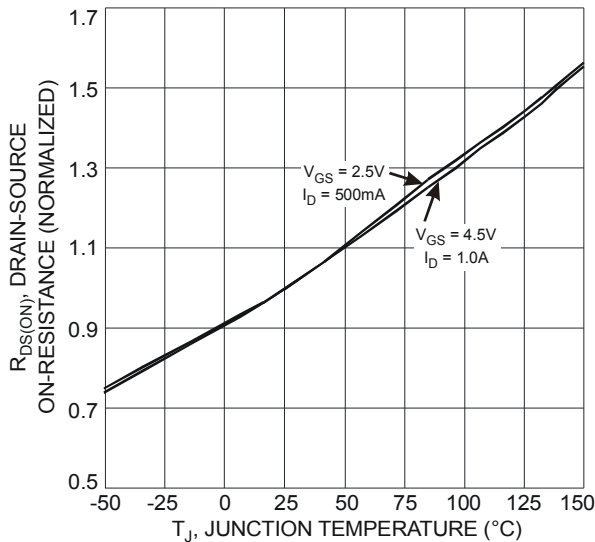


Fig. 5 On-Resistance Variation with Temperature

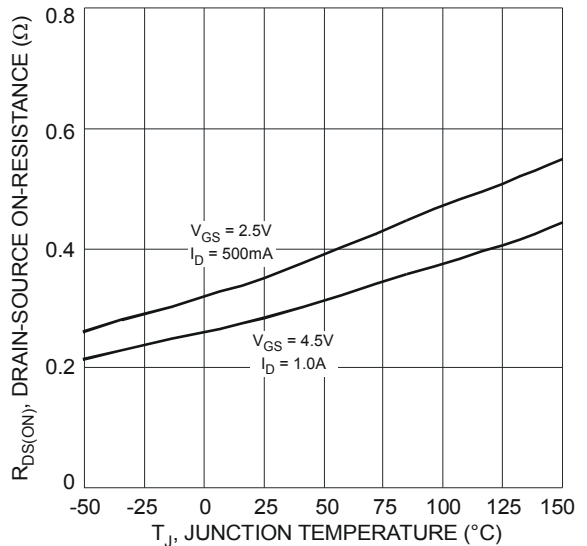


Fig. 6 On-Resistance Variation with Temperature

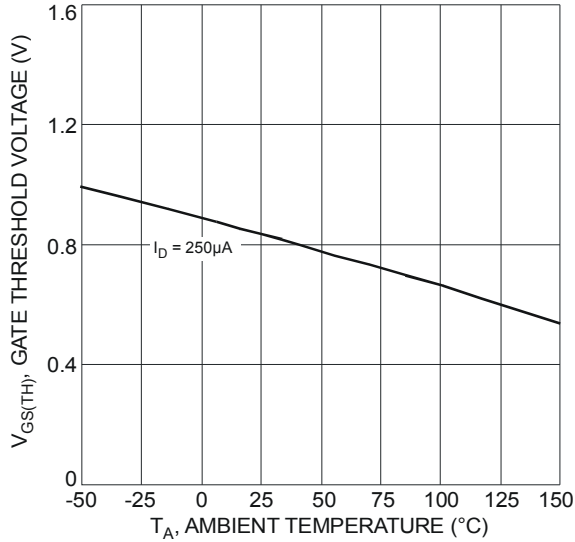


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

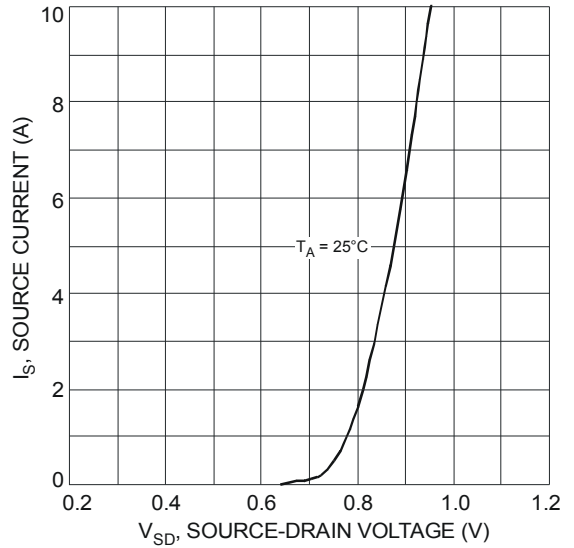


Fig. 8 Diode Forward Voltage vs. Current

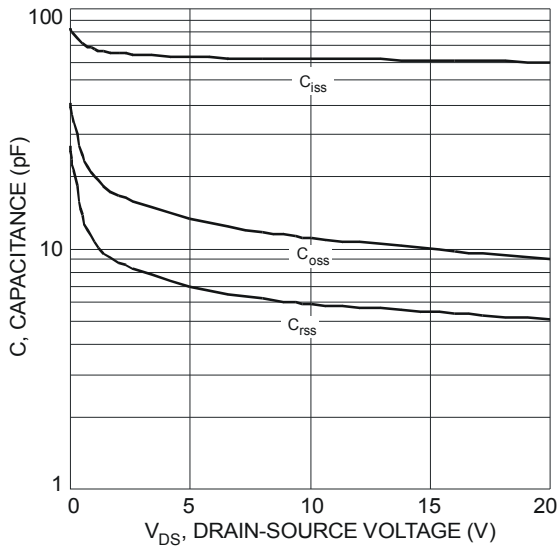


Fig. 9 Typical Capacitance

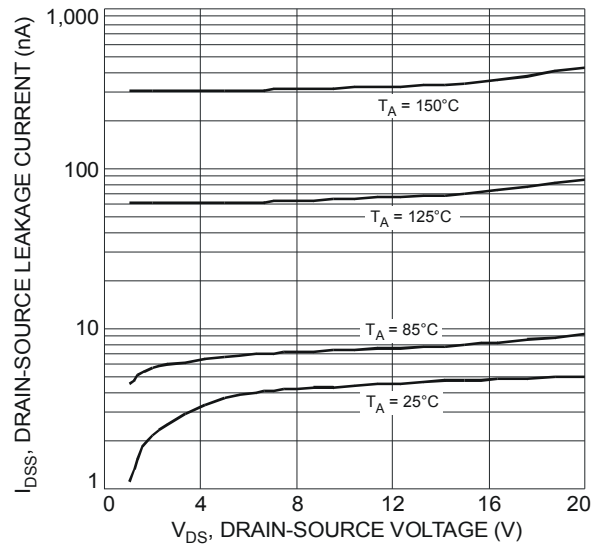


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

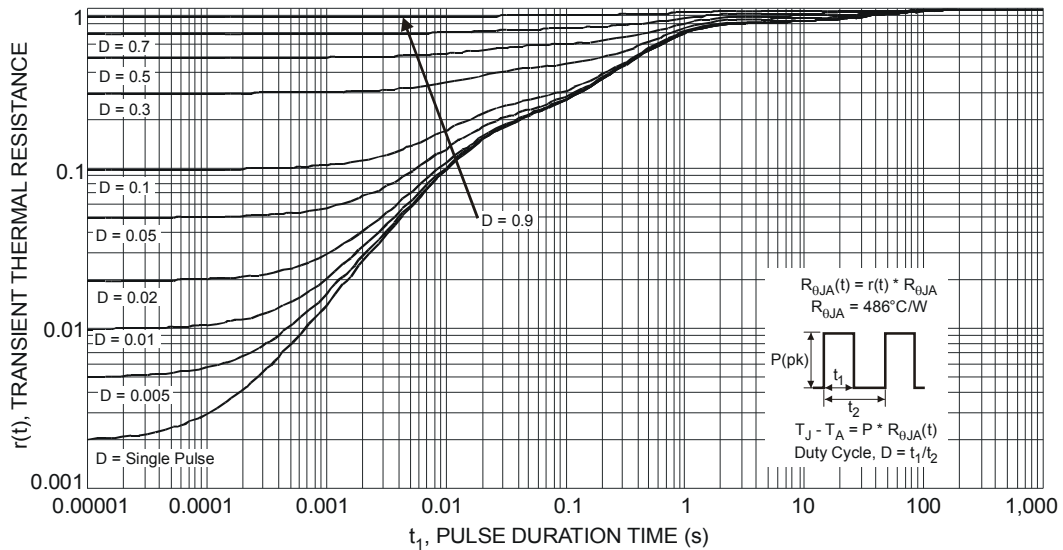
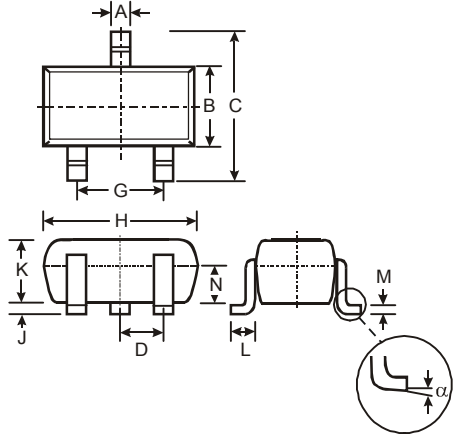


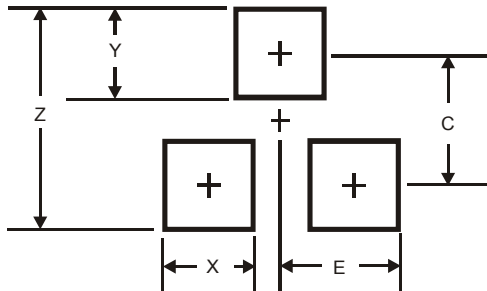
Fig. 11 Transient Thermal Response

Package Outline Dimensions



| SOT523 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.22 |
| B | 0.75 | 0.85 | 0.80 |
| C | 1.45 | 1.75 | 1.60 |
| D | — | — | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| J | 0.00 | 0.10 | 0.05 |
| K | 0.60 | 0.80 | 0.75 |
| L | 0.10 | 0.30 | 0.22 |
| M | 0.10 | 0.20 | 0.12 |
| N | 0.45 | 0.65 | 0.50 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 1.8 |
| X | 0.4 |
| Y | 0.51 |
| C | 1.3 |
| E | 0.7 |

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