

Features

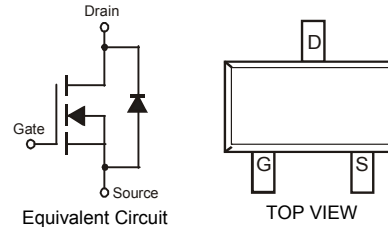
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Note 3 and 4)**



SOT-523

Mechanical Data

- Case: SOT-523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.002 grams (approximate)



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

| Characteristic | Symbol | Value | Units |
|---|-----------|-------|-------|
| Drain-Source Voltage | V_{DSS} | 60 | V |
| Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$ | V_{DGR} | 60 | V |
| Gate-Source Voltage | V_{GSS} | ±20 | V |
| | | ±40 | |
| Drain Current (Note 1) | I_D | 115 | mA |
| | | 73 | |
| | | 800 | |

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

| Characteristic | Symbol | Value | Units |
|---|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 1) | P_d | 150 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 833 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_j, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
1. Device mounted on FR-4 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. No purposefully added lead.
 3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 4. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

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} | 60 | — | — | V | V _{GS} = 0V, I _D = 10μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1.0 500 | μA | @ T _C = 25°C @ T _C = 125°C V _{DS} = 60V, V _{GS} = 0V |
| Gate-Body Leakage | I _{GSS} | — | — | ±10 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 2.0 4.4 | 7.5 13.5 | Ω | @ T _J = 25°C @ T _J = 125°C V _{GS} = 5.0V, I _D = 0.05A V _{GS} = 10V, I _D = 0.5A |
| On-State Drain Current | I _{D(ON)} | 0.5 | 1.0 | — | A | V _{GS} = 10V, V _{DS} = 7.5V |
| Forward Transconductance | g _{FS} | 80 | — | — | mS | V _{DS} = 10V, I _D = 0.2A |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | 22 | 50 | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 11 | 25 | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.0 | 5.0 | pF | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | t _{D(ON)} | — | 7.0 | 20 | ns | V _{DD} = 30V, I _D = 0.2A, R _L = 150Ω, V _{GEN} = 10V, R _{GEN} = 25Ω |
| Turn-Off Delay Time | t _{D(OFF)} | — | 11 | 20 | ns | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.

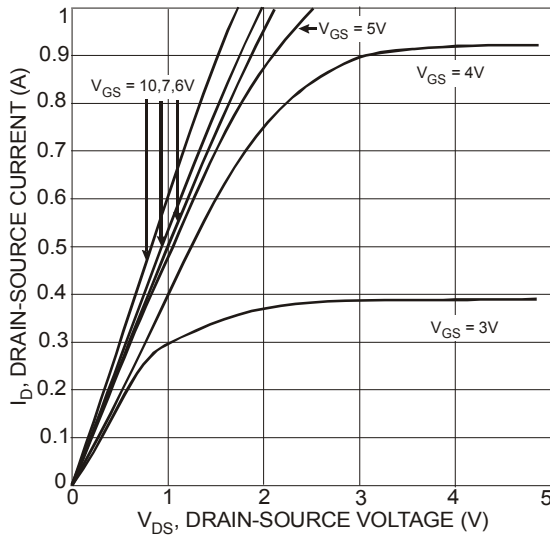


Fig. 1 On-Region Characteristics

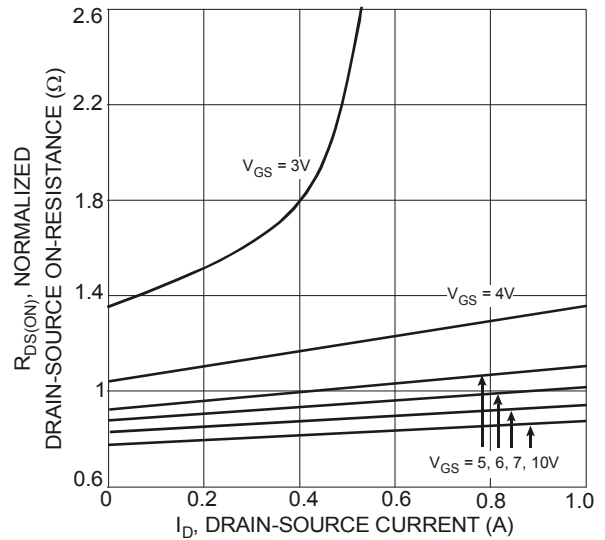


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

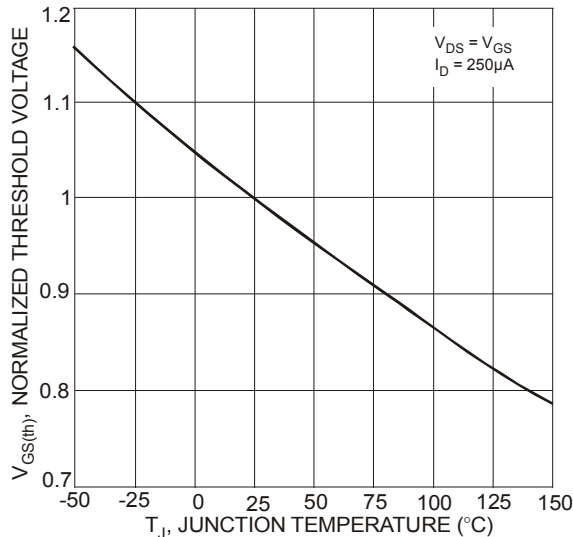


Fig. 3 Gate Threshold Variation with Temperature

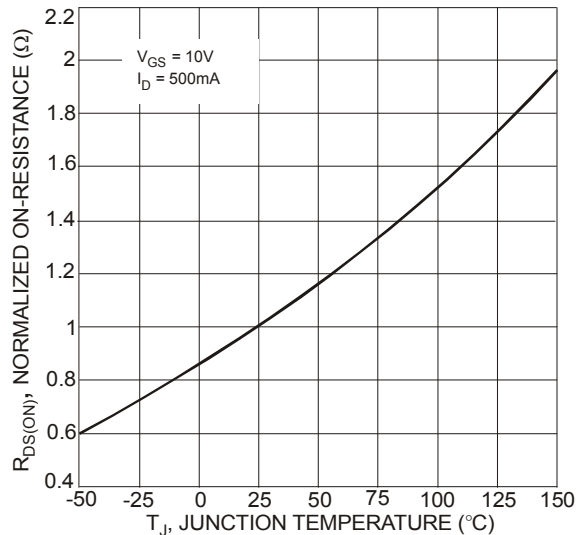


Fig. 4 On-Resistance Variation with Temperature

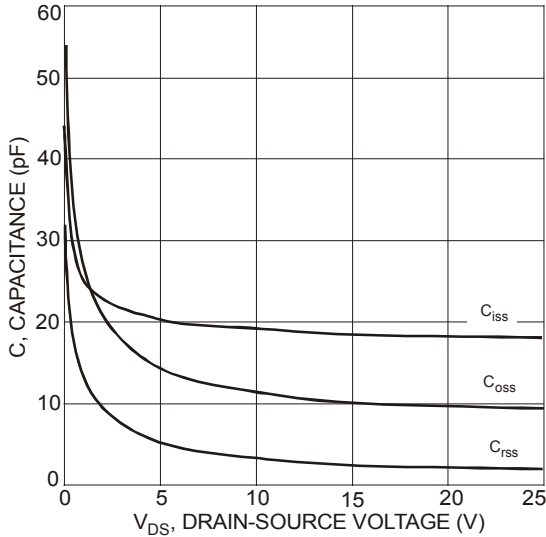


Fig. 5 Typical Capacitance

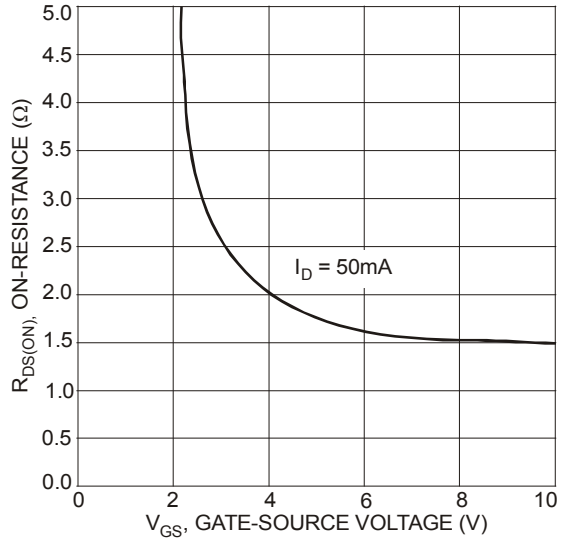


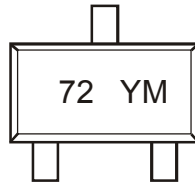
Fig. 6 On-Resistance vs. Gate-Source Voltage

Ordering Information (Note 6)

| Part Number | Case | Packaging |
|-------------|---------|------------------|
| 2N7002T-7-F | SOT-523 | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



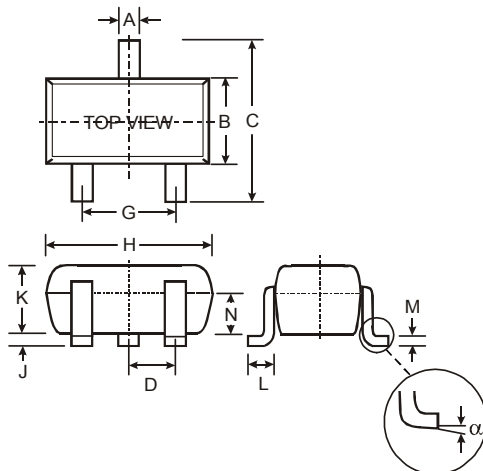
72 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: T = 2006
 M = Month ex: 9 = September

Date Code Key

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|
| Code | S | T | U | V | W | X | Y | Z |

| 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 |

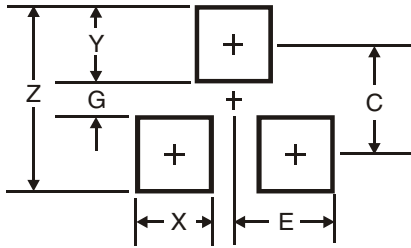
Package Outline Dimensions



| SOT-523 | | | |
|---------|------|------|------|
| 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 | 1.9 |
| G | 0.9 |
| X | 0.5 |
| Y | 0.5 |
| C | 1.4 |
| E | 0.5 |

NEW PRODUCT

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