

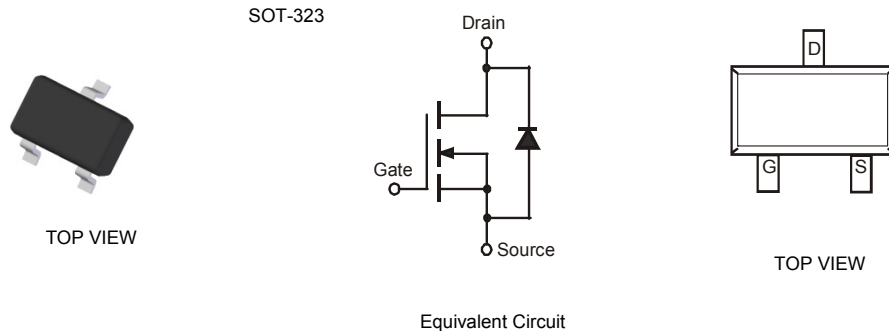
N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Features

- Low-On Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **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**

Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)

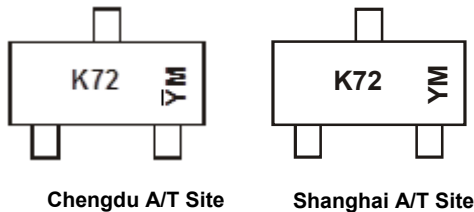


Ordering Information (Notes 4)

| Part Number | Case | Packaging |
|-------------|---------|------------------|
| 2N7002W-7-F | SOT-323 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



K72 = Product Type Marking Code
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)
 Y or Y̅ = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|------|------|------|------|------|------|------|------|
| Code | Z | A | B | C | D | E | F |

| 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} | 60 | V |
| Drain-Gate Voltage R _{GS} ≤ 1.0MΩ | V _{DGR} | 60 | V |
| Gain-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Pulsed | | ±40 | |
| Drain Current (Note 5) | I _D | 115 | mA |
| Continuous | | 73 | |
| Continuous @ +100°C Pulsed | | 800 | |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 200 | mW |
| Derating above T _A = +25°C | | 1.60 | mW |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 625 | °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 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 60 | 70 | — | V | V _{GS} = 0V, I _D = 10μA |
| Zero Gate Voltage Drain Current @ T _C = +125°C | I _{DSS} | — | — | 1.0 500 | μA | V _{DS} = 60V, V _{GS} = 0V |
| Gate-Body Leakage | I _{GSS} | — | — | ±10 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance @ T _J = +125°C | R _{DS(ON)} | — | 1.8 2.6 | 7.5 13.5 | Ω | 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 (Note 7) | | | | | | |
| 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 (Note 7) | | | | | | |
| 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:
- 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>.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

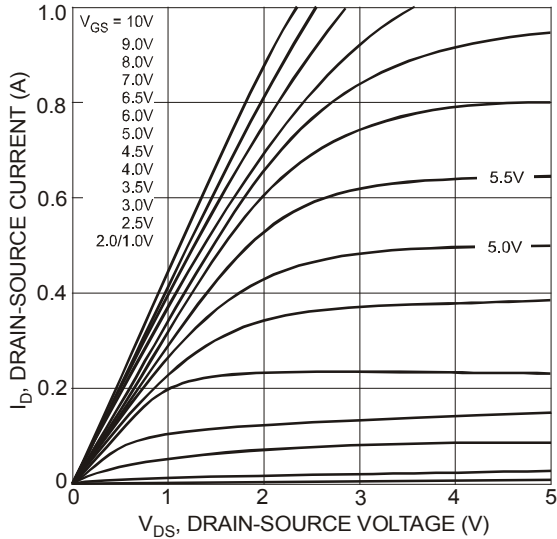


Fig. 1 On-Region Characteristics

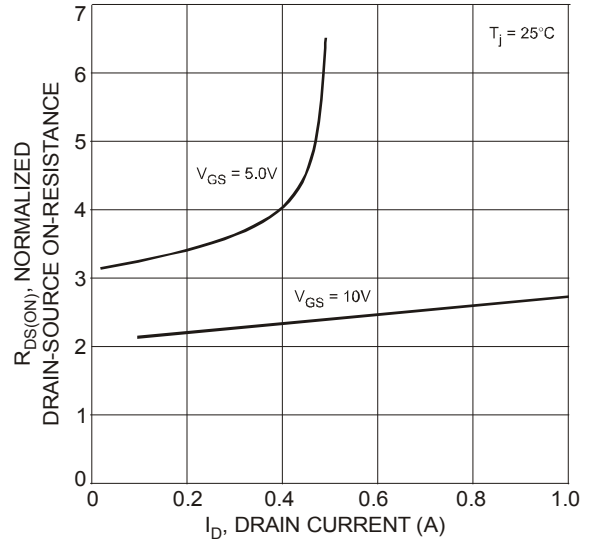


Fig. 2 On-Resistance vs. Drain Current

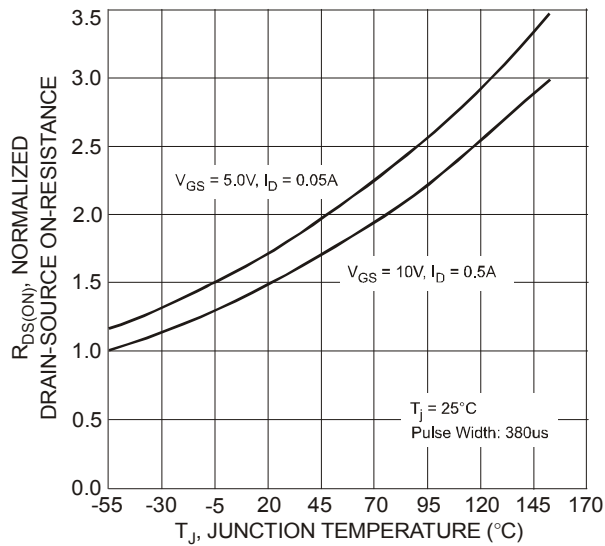


Fig. 3 On-Resistance vs. Junction Temperature

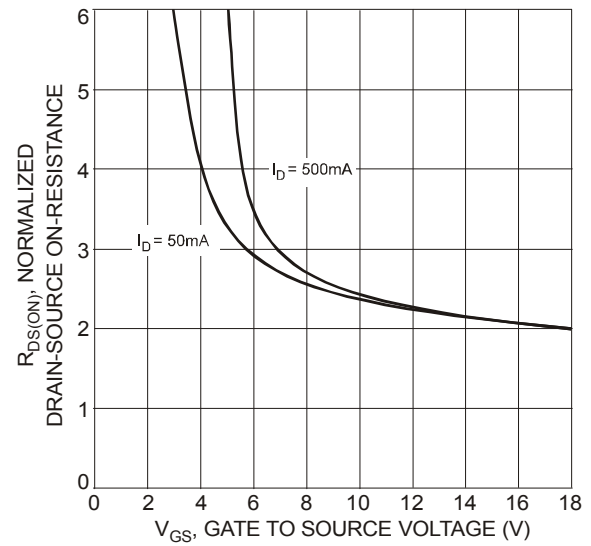
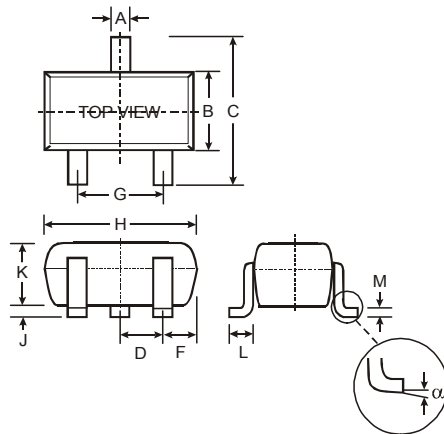


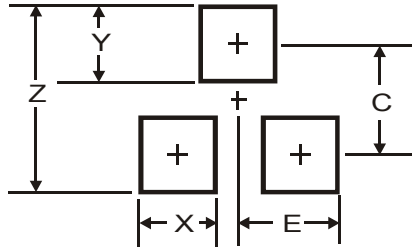
Fig. 4 On-Resistance vs. Gate-Source Voltage

Package Outline Dimensions



| SOT-323 | | |
|----------------------|--------------|------|
| Dim | Min | Max |
| A | 0.25 | 0.40 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Nominal | |
| F | 0.30 | 0.40 |
| G | 1.20 | 1.40 |
| H | 1.80 | 2.20 |
| J | 0.0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.18 |
| 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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