

# 2N7002W

## Features

- Low ON-Resistance
- Low Input Capacitance
- Low Gate Threshold Voltage
- Fast Switching Speed
- Low Input/Output Leakage
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

## Mechanical Data

- Halogen free available upon request by adding suffix "-HF"
- Case: SOT-323, Molded Plastic
- Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking: K72

## Maximum Ratings

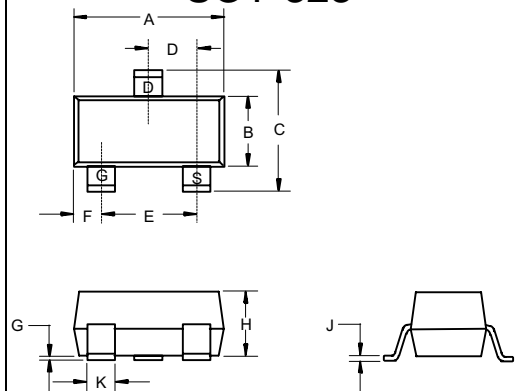
- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- Maximum Thermal Resistance; 625K/W Junction To Ambient

| Parameter   | Symbol    | Value                | Unit        |
|---|-----------|----------------------|-------------|
| Drain-Source-Voltage  | $V_{DSS}$ | 60                   | V           |
| Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$                           | $V_{DGR}$ | 60                   | V           |
| Gate-Source-Voltage<br>Continuous<br>Pulsed                           | $V_{GSS}$ | $\pm 20$<br>$\pm 40$ | V           |
| Drain Current (Note 1)<br>Continuous<br>Continuous @ 100°C<br>Pulsed  | $I_D$     | 115<br>73<br>800     | mA          |
| Total Power Dissipation (Note 1)<br>Derating above $T_A = 25^\circ C$ | $P_D$     | 200<br>1.60          | mW<br>mW/°C |

**Note:** 1. Valid provided that terminals are kept at specified ambient temperature.  
 2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

## N-Channel Enhancement Mode Field Effect Transistor

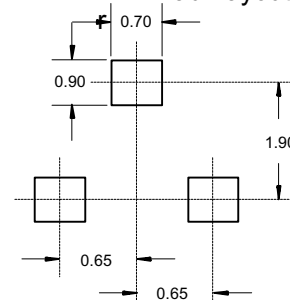
### SOT-323



DIMENSIONS

| DIM | INCHES       |      | MM          |      | NOTE |
|-----|--------------|------|-------------|------|------|
|     | MIN          | MAX  | MIN         | MAX  |      |
| A   | .071         | .087 | 1.80        | 2.20 |      |
| B   | .045         | .053 | 1.15        | 1.35 |      |
| C   | .079         | .087 | 2.00        | 2.20 |      |
| D   | .026 Nominal |      | 0.65Nominal |      |      |
| E   | .047         | .055 | 1.20        | 1.40 |      |
| F   | .012         | .016 | .30         | .40  |      |
| G   | .000         | .004 | .000        | .100 |      |
| H   | .035         | .039 | .90         | 1.00 |      |
| J   | .004         | .010 | .100        | .250 |      |
| K   | .012         | .016 | .30         | .40  |      |

### Suggested Solder Pad Layout



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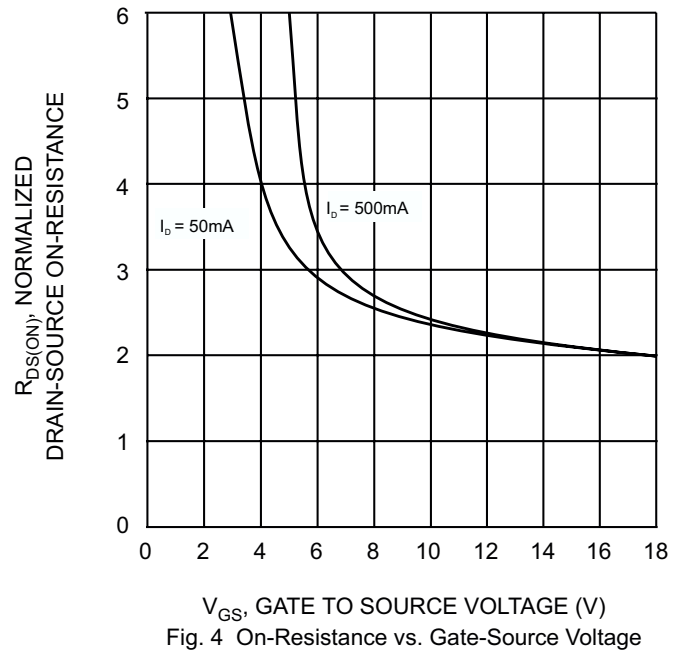
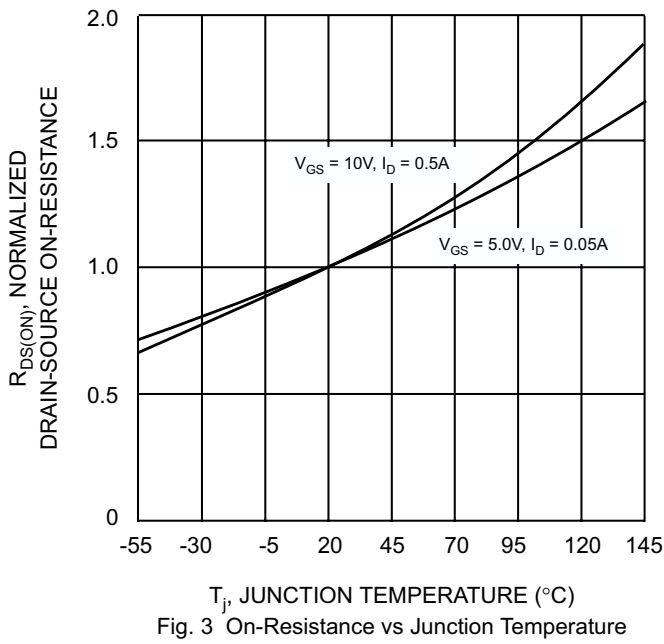
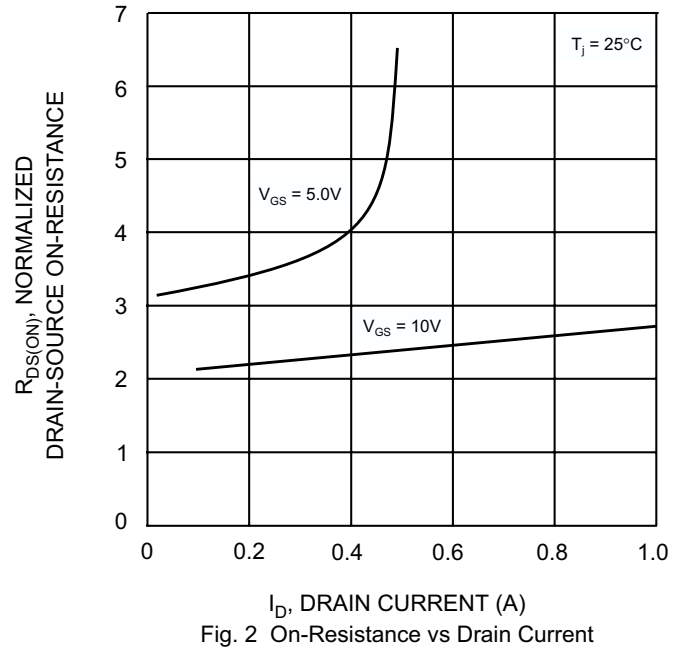
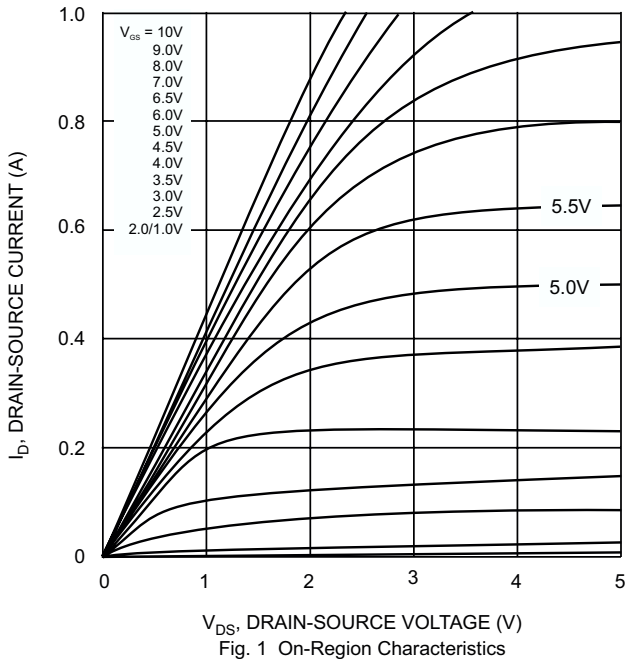
## Electrical Characteristics @ T<sub>A</sub> = 25 C unless otherwise specified

| Characteristic                      | Symbol              | Min | Typ        | Max         | Unit | Test Condition  |
|-------------------------------------|---------------------|-----|------------|-------------|------|---|
| <b>OFF CHARACTERISTICS (Note 2)</b> |                     |     |            |             |      |   |
| Drain-Source Breakdown Voltage      | BV <sub>DSS</sub>   | 60  | 70         |             | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10 A   |
| Zero Gate Voltage Drain Current     | I <sub>DSS</sub>    |     |            | 1.0<br>500  | μA   | V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V   |
| Gate-Body Leakage                   | I <sub>GSS</sub>    |     |            | ±10         | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 2)</b>  |                     |     |            |             |      |   |
| Gate Threshold Voltage              | V <sub>GS(th)</sub> | 1.0 |            | 2.0         | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 A   |
| Static Drain-Source On-Resistance   | R <sub>DS(ON)</sub> |     | 3.2<br>4.4 | 7.5<br>13.5 | Ω    | V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 0.05A<br>V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A                              |
| On-State Drain Current              | I <sub>D(ON)</sub>  | 0.5 | 1.0        |             | A    | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 7.5V   |
| Forward Transconductance            | g <sub>FS</sub>     | 80  |            |             | mS   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A  |
| <b>DYNAMIC CHARACTERISTICS</b>      |                     |     |            |             |      |   |
| Input Capacitance                   | C <sub>iss</sub>    |     | 22         | 50          | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz   |
| Output Capacitance                  | C <sub>oss</sub>    |     | 11         | 25          | pF   |   |
| Reverse Transfer Capacitance        | C <sub>rss</sub>    |     | 2.0        | 5.0         | pF   |   |
| <b>SWITCHING CHARACTERISTICS</b>    |                     |     |            |             |      |   |
| Turn-On Delay Time                  | t <sub>D(ON)</sub>  |     | 7.0        | 20          | ns   | V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.2A,<br>R <sub>L</sub> = 150 Ω, V <sub>GEN</sub> = 10V,<br>R <sub>GEN</sub> = 25 Ω |
| Turn-Off Delay Time                 | t <sub>D(OFF)</sub> |     | 11         | 20          | ns   |   |

Note: 1. Valid provided that terminals are kept at specified ambient temperature.

2. Pulse width ≤ 300μs, duty cycle ≤ 2%.

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### Ordering Information :

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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