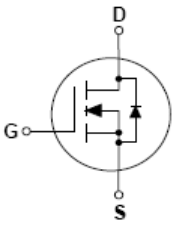
# N-Channel Enhancement Mode Field Effect Transistor

## 2N7002W

## FEATURES

- Low On-Resistance。
- Low Gate Threshold Voltage.
- Low Input Capacitance.
- Fast Switching Speed.
- Low Input/Output Leakage.

Lead-free





**SOT-323**

## APPLICATIONS

- N-channel enhancement mode effect transistor.
- Switching application.

## ORDERING INFORMATION

| Type No. | Marking | Package Code |
|---|---|---|
| 2N7002W | 7002 | SOT-323 |

## MAXIMUM RATING @ Ta=25℃ unless otherwise specified

| **Symbol** | **Parameter** | **Value** | **Units** |
|---|---|---|---|
| $V_{DSS}$ | Drain-Source voltage | 60 | V |
| $V_{DGR}$ | Drain-Gate voltage($R_{GS}$≤1MΩ) | 60 | V |
| $V_{GSS}$ | Gate -Source voltage - continuous<br>-Non Repetitive ($t_p$<50μs) | ±20<br>±40 | V |
| $I_D$ | Maximum Drain current -continuous<br>-Pulsed | 115<br>800 | mA |
| $P_D$ | Power Dissipation | 200 | mW |
| $R_{\theta JA}$ | Thermal resistance,Junction-to-Ambient | 625 | ℃/W |
| $T_J$, Tstg | Junction and Storage Temperature | -55 to +150 | ℃ |

# N-Channel Enhancement Mode Field Effect Transistor

## 2N7002W

## ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

| Parameter | Symbol | Test conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=10μA | 60 | 70 | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | - | 2.0 | V |
| Gate-body Leakage Forward | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=20V | - | - | 100 | nA |
| Reverse | | $V_{DS}$=0V, $V_{GS}$=-20V | - | - | -100 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $V_{DS}$=60V,$V_{GS}$=0V,$T_j$=125℃ | - | - | 500 | |
| On-state Drain Current | $I_{D(On)}$ | $V_{GS}$=10V, $V_{DS}$=7.5V | 0.5 | 1.0 | - | A |
| Drain-Source on-voltage | $V_{DS(ON)}$ | $V_{GS}$=10V,$I_D$=500mA | - | 0.6 | 3.75 | V |
| | | $V_{GS}$=5V,$I_D$=50mA | - | 0.09 | 1.5 | |
| Forward transconductance | $g_{FS}$ | $V_{DS}$=10V,$I_D$=200mA | 80 | - | - | mS |
| Static drain-Source on-resistance | $R_{DS(ON)}$ | $V_{GS}$=5.0V,$I_D$=50mA | - | 3.2 | 7.5 | Ω |
| | | $V_{GS}$=10V,$I_D$=500mA, $T_j$=125℃ | - | 4.4 | 13.5 | |
| On-state drain current | $I_{D(ON)}$ | $V_{GS}$=10V,$V_{DS}$=7.5V | 0.5 | 1.0 | - | A |
| Drain-Source diode forward voltage | $V_{SD}$ | $V_{GS}$=0V,$I_D$=115mA | - | 0.88 | 1.5 | V |
| Input capacitance | $C_{ISS}$ | $V_{DS}$=25V,$V_{GS}$=0V,f=1.0MHz | - | 22 | 50 | pF |
| Output capacitance | $C_{OSS}$ | | - | 11 | 25 | |
| Reverse transfer capacitance | $C_{RSS}$ | | - | 2 | 5 | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}$ = 30V, $I_D$= 0.2A, $R_L$ = 150Ω, $V_{GS}$= 10V, $R_{GEN}$= 25Ω | - | 7 | 20 | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | - | 11 | 20 | ns |

# N-Channel Enhancement Mode Field Effect Transistor

**2N7002W**

## TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

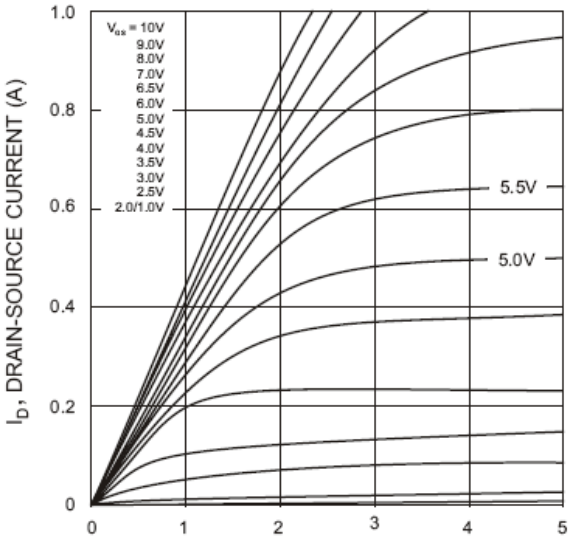



Fig. 1 On-Region Characteristics

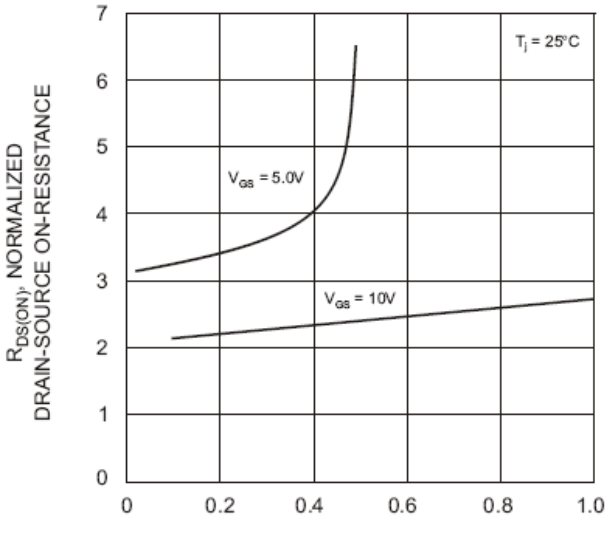



Fig. 2 On-Resistance vs Drain Current

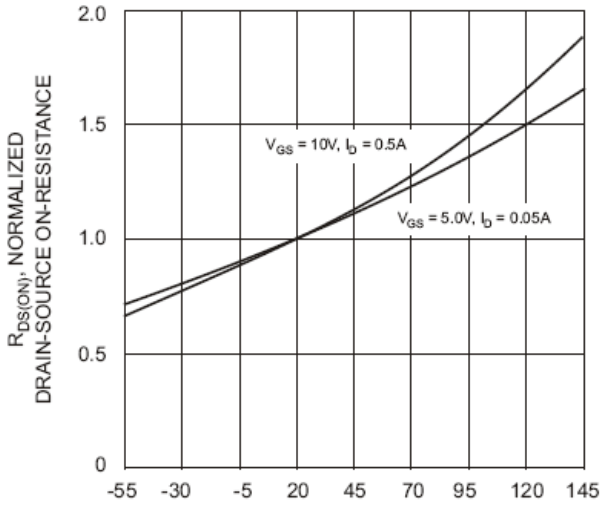



Fig. 3 On-Resistance vs Junction Temperature

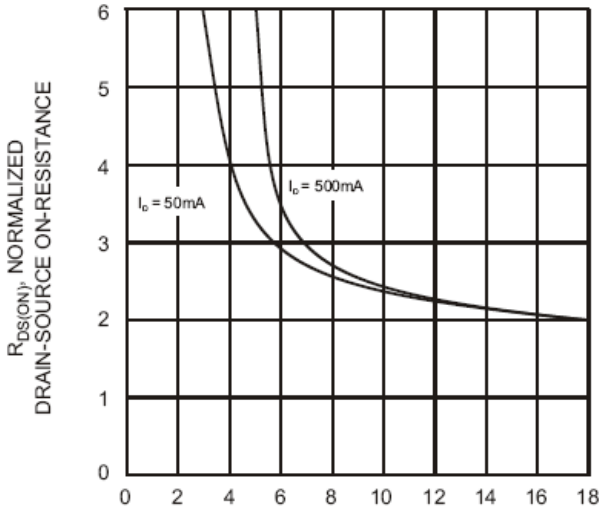



Fig. 4 On-Resistance vs. Gate-Source Voltage

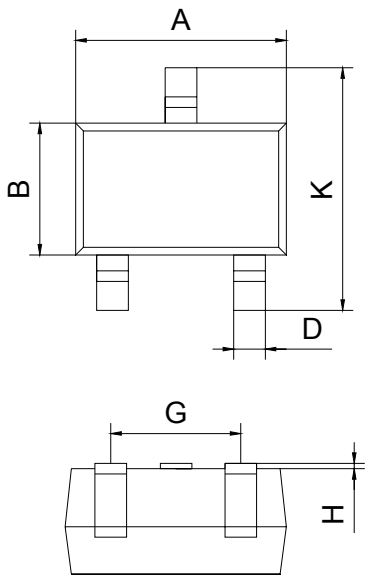
# N-Channel Enhancement Mode Field Effect Transistor

**2N7002W**

## PACKAGE OUTLINE

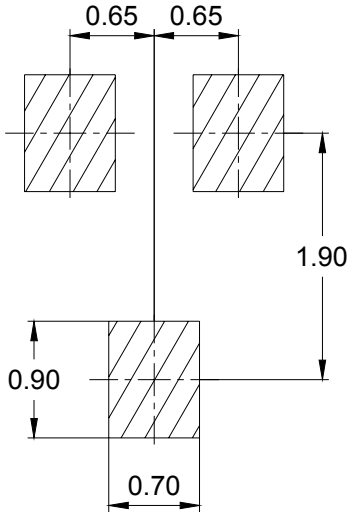
Plastic surface mounted package

SOT-323




| SOT-323 | | |
|---|---|---|
| Dim | Min | Max |
| A | 2.00 | 2.20 |
| B | 1.15 | 1.35 |
| C | 0.95 Typical | |
| D | 0.30 Typical | |
| E | 0.25 | 0.40 |
| G | 1.2 | 1.4 |
| H | 0.02 | 0.10 |
| J | 0.10 Typical | |
| K | 2.20 | 2.40 |
| All Dimensions in mm | | |

## SOLDERING FOOTPRINT




Unit : mm

## PACKAGE INFORMATION

| Device | Package | Shipping |
|---|---|---|
| 2N7002W | SOT-323 | 3000/Tape&Reel |