# TM7002
# N-CHANNEL ENHANCEMENT MOSFET

## General Description

- Low On-Resistance: $R_{DS(ON)}$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

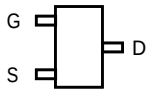
## Product Summary

| | |
|---|---|
| $V_{DS}$ | 60V |
| $R_{DS(ON)}$ (at $V_{GS}$=5V) | < 7.5Ω |

100% UIS Tested
100% $R_g$ Tested

RoHS Compliant

SOT-23
**Top View**

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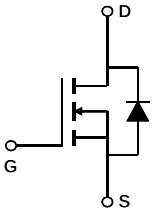



## Maximum Ratings @ $T_A$ = 25°C unless otherwise specified

| 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 — Continuous<br>Pulsed | $V_{GSS}$ | ±20<br>±40 | V |
| Drain Current (Note 1) — 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°C | $P_d$ | 200<br>1.60 | mW<br>mW/°C |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | $T_j$, $T_{STG}$ | -55 to +150 | °C |

Note: 1. Valid provided that terminals are kept at specified ambient temperature.
2. Short duration test pulse used to minimize self-heating effect.

## Electrical Characteristics @ $T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 2)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 60 | 70 | — | V | $V_{GS}$ = 0V, $I_D$ = 10μA |
| Zero Gate Voltage Drain Current @ $T_C$ = 25°C<br>@ $T_C$ = 125°C | $I_{DSS}$ | — | — | 1.0<br>500 | μA | $V_{DS}$ = 60V, $V_{GS}$ = 0V |
| Gate-Body Leakage | $I_{GSS}$ | — | — | ±10 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 2)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | — | 2.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ =-250μA |
| Static Drain-Source On-Resistance @ $T_j$ = 25°C<br>@ $T_j$ = 125°C | $R_{DS\ (ON)}$ | — | 3.2<br>4.4 | 7.5<br>13.5 | Ω | $V_{GS}$ = 5.0V, $I_D$ = 0.05A<br>$V_{GS}$ = 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<br>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,<br>$R_L$ = 150Ω, $V_{GEN}$ = 10V,<br>$R_{GEN}$ = 25Ω |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 11 | 20 | ns | |

Note: 1. Valid provided that terminals are kept at specified ambient temperature.
2. Short duration test pulse used to minimize self-heating effect.

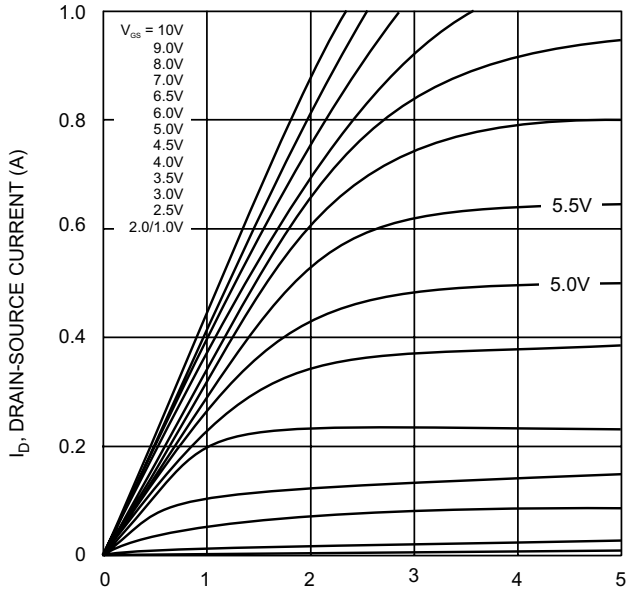



Fig. 1 On-Region Characteristics

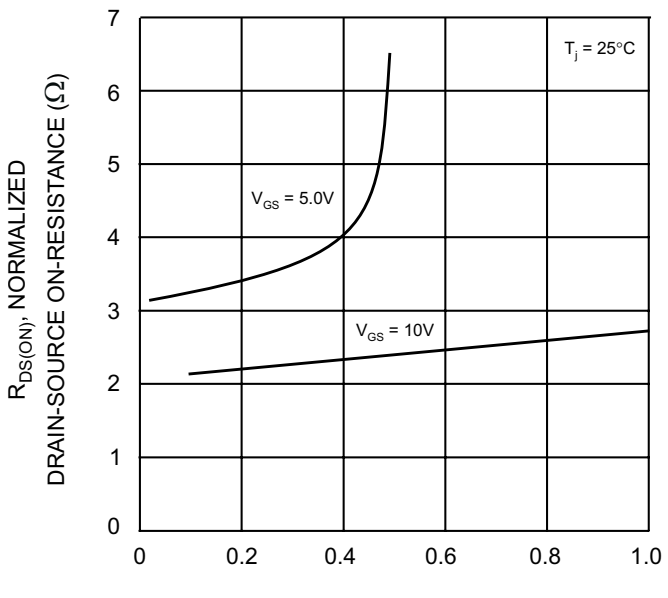



Fig. 2 On-Resistance vs Drain Current

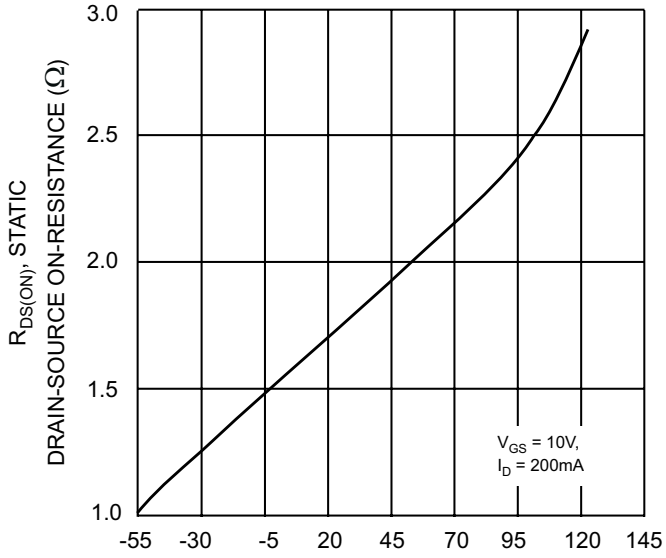



Fig. 3 On-Resistance vs Junction Temperature

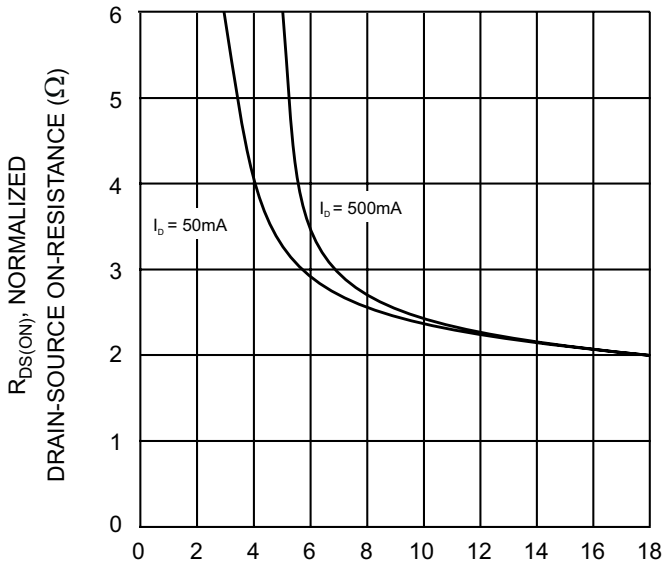
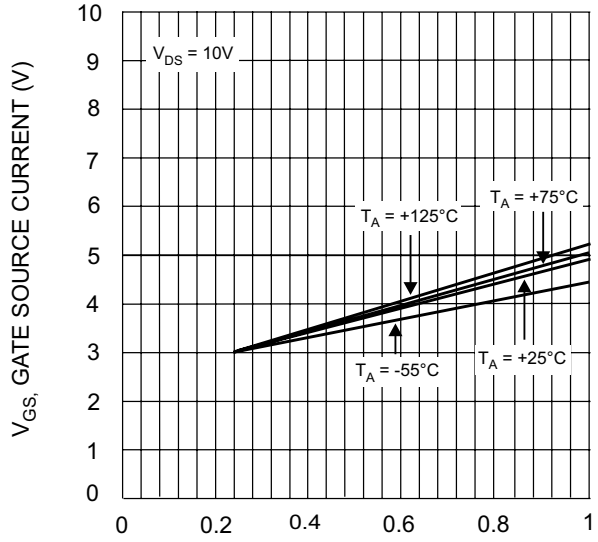
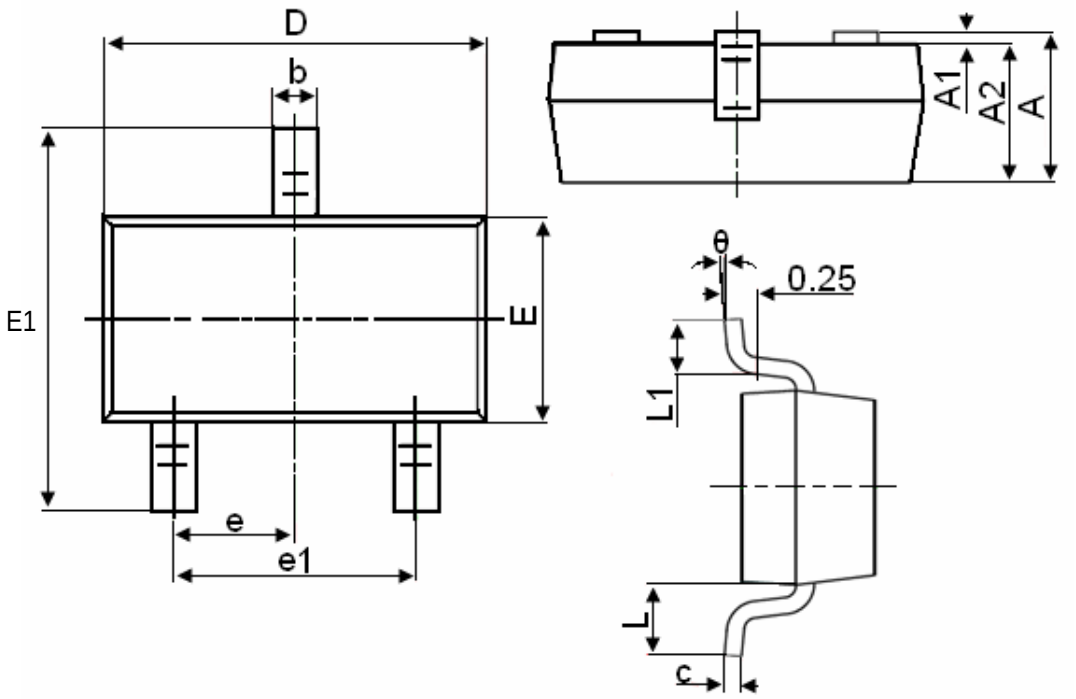



Fig. 4 On-Resistance vs. Gate-Source Voltage



## SOT-23 Package Information




| Symbol | Dimensions in Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |

## Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.