



TSM2N7000

60V N-Channel Enhancement Mode MOSFET

TO-92



Pin assignment:

1. Gate
2. Source
3. Drain

$V_{DS} = 60V$

$I_D = 200mA$

$R_{DS(on)}, V_{GS} @ 10V, I_{DS} @ 500mA = 5.0\Omega$

General Description

The TSM2N7000 is produced using high cell density, DMOS technology. These products have been designed to minimize on-state resistance while provide rugged, reliable and fast switching performance. It can be used in most applications requiring up to 200mA DC and can deliver pulsed currents up to 500mA. This product is particularly suited for low voltage, low current application such as small servo motor control, power MOSFET gate drivers, and other switching applications.

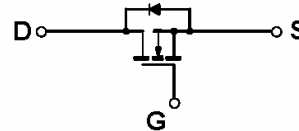
Features

- ◇ High density cell design for low on-resistance
- ◇ Voltage control small signal switch
- ◇ Rugged and reliable
- ◇ High saturation current capability
- ◇ Provide in TO-92 package

Ordering Information

| Part No. | Packing | Package |
|----------------|-----------|---------|
| TSM2N7000CT A3 | Ammo pack | TO-92 |
| TSM2N7000CT B0 | Bulk pack | |

Block Diagram



Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|--------------|------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Drain-Gate Voltage | V_{DGR} | 60 | V |
| Gate-Source Voltage --- Continuous --- Pulsed | V_{GS} | ± 20 | V |
| | V_{GSM} | ± 40 | |
| Continuous Drain Current | I_D | 200 | mA |
| Pulsed Drain Current | I_{DM} | 500 | mA |
| Maximum Power Dissipation | P_D | Ta = 25 °C | 350 |
| | | Ta > 25 °C | 2.8 |
| Operating Junction Temperature | T_J | +150 | °C |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | - 55 to +150 | °C |

Thermal Performance

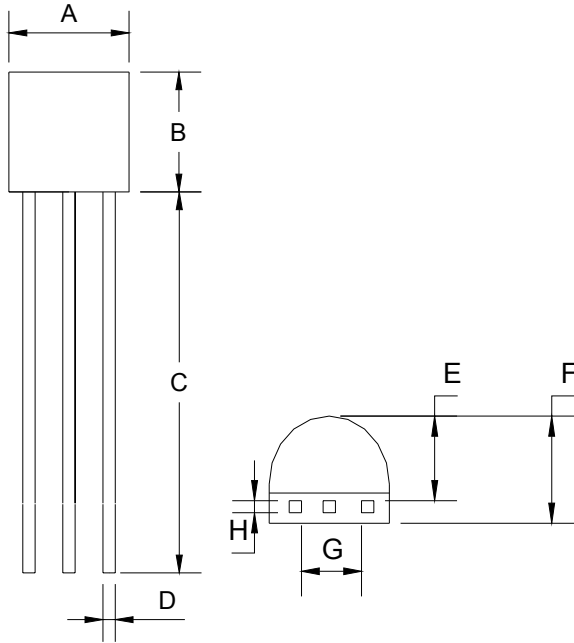
| Parameter | Symbol | Limit | Unit |
|--|-----------------|-------|------|
| Lead Temperature (1/8" from case) | T_L | 10 | S |
| Junction to Ambient Thermal Resistance | $R_{\theta ja}$ | 357 | °C/W |



| Electrical Characteristics | | | | | | |
|------------------------------------|--|--------------|-----|-----|------|----------|
| Tj = 25 °C unless otherwise noted | | | | | | |
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 10\mu A$ | BV_{DSS} | 60 | -- | -- | V |
| Drain-Source On-State Resistance * | $V_{GS} = 10V, I_D = 500mA$ | $R_{DS(ON)}$ | -- | -- | 5.0 | Ω |
| | $V_{GS} = 5V, I_D = 50mA$ | $R_{DS(ON)}$ | -- | 7.5 | -- | |
| Drain-Source On-Voltage * | $V_{GS} = 0V, I_D = 10\mu A$ | $V_{DS(ON)}$ | -- | -- | 2.5 | V |
| Gate Threshold Voltage * | $V_{DS} = V_{GS}, I_D = 1.0mA$ | $V_{GS(TH)}$ | 0.8 | -- | 3.0 | V |
| Zero Gate Voltage Drain Current | $V_{DS} = 48V, V_{GS} = 0V$ | I_{DSS} | -- | -- | 1.0 | μA |
| Gate Body Leakage - Forward | $V_{GS} = 15V, V_{DS} = 0V$ | I_{GSS} | -- | -- | - 10 | nA |
| On-State Drain Current | $V_{DS} \leq 5V, V_{GS} = 10V$ | $I_{D(ON)}$ | 60 | -- | -- | mA |
| Dynamic | | | | | | |
| Turn-On Rise Time * | $V_{DD} = 15V, R_L = 30\Omega,$ $I_D = 500mA,$ $V_{GEN} = 10V, R_G = 25\Omega$ | t_r | -- | 10 | -- | nS |
| Turn-Off Fall Time * | | t_f | -- | 10 | -- | |
| Input Capacitance | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$ | C_{iss} | -- | 60 | -- | pF |
| Output Capacitance | | C_{oss} | -- | 25 | -- | |
| Reverse Transfer Capacitance | | C_{rss} | -- | 5 | -- | |
| Source-Drain Diode | | | | | | |
| Max. Diode Forward Current | | I_S | -- | -- | 500 | mA |
| Diode Forward Voltage | $I_S = 200mA, V_{GS} = 0V$ | V_{SD} | -- | 1.3 | 1.5 | V |

* Note : pulse test: pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$

TO-92 Mechanical Drawing



| TO-92 DIMENSION | | | | |
|-----------------|-------------|------|------------|-------|
| DIM | MILLIMETERS | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 4.30 | 4.70 | 0.169 | 0.185 |
| B | 4.30 | 4.70 | 0.169 | 0.185 |
| C | 14.30(typ) | | 0.563(typ) | |
| D | 0.43 | 0.49 | 0.017 | 0.019 |
| E | 2.19 | 2.81 | 0.086 | 0.111 |
| F | 3.30 | 3.70 | 0.130 | 0.146 |
| G | 2.42 | 2.66 | 0.095 | 0.105 |
| H | 0.37 | 0.43 | 0.015 | 0.017 |
| | | | | |