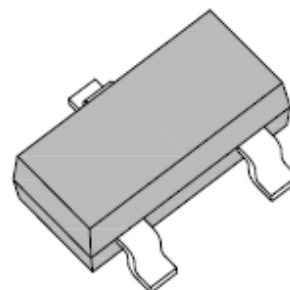


SMD Signal DMOS Transistor (N-Channel)

Features

- Voltage Controlled Small Signal Switch
- High Density Cell Design for Low $R_{DS(ON)}$
- Rugged and Reliable
- High Saturation Current Capability
- RoHS Compliance



Mechanical Data

| | |
|-------------------|---|
| Case: | SOT-23, Plastic Package |
| Terminals: | Solderable per MIL-STD-202G, Method 208 |
| Weight: | 0.008 gram |

SOT-23



Maximum Ratings *(T_{Ambient}=25°C unless noted otherwise)*

| Symbol | Description | 2N7002 | Unit | Conditions |
|------------------------|----------------------------------|-------------|------|------------|
| | Marking Code | WA | | |
| V_{DSS} | Drain-Source Voltage | 60 | V | |
| V_{GSS} | Gate-Source Voltage | ± 20 | V | |
| I_D | Drain Current Continuous | 300 | mA | |
| I_{DP} | Drain Current Pulsed (Note 1) | 1200 | mA | |
| P_D | Drain Power Dissipation (Note 2) | 300 | mW | |
| T_J | Junction Temperature | 150 | ° C | |
| T_{STG} | Storage Temperature Range | -55 to +150 | ° C | |

Electrical Characteristics *(T_{Ambient}=25°C unless noted otherwise)*

| Symbol | Description | Min. | Typ. | Max. | Unit | Conditions |
|-------------------------|---------------------------------|------|------|------|---------|------------------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | 60 | - | - | V | $V_{GS} = 0V, I_D = 10\mu A$ |
| I_{DSS} | Zero Gate Voltage Drain Current | - | - | 1 | μA | $V_{DS} = 60V, V_{GS} = 0V$ |
| I_{GSSF} | Gate-Body Leakage, Forward | - | - | 100 | nA | $V_{DS} = 0V, V_{GS} = 20V$ |
| I_{GSSR} | Gate-Body Leakage, Reverse | - | - | -100 | | $V_{DS} = 0V, V_{GS} = -20V$ |

SMD Signal DMOS Transistor (N-Channel)

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Electrical Characteristics ($T_{Ambient}=25^{\circ}C$) (Note 3)

| Symbol | Description | Min. | Typ. | Max. | Unit | Conditions |
|--------------|---|------|-------|-------|----------|--|
| V_{th} | Gate Threshold Voltage | 1.1 | 1.8 | 2.3 | V | $V_{DS}=V_{GS}$, $I_D=250\mu A$ |
| $R_{DS(ON)}$ | Drain-Source ON Resistance | - | 1.2 | 1.8 | Ω | $V_{GS}=10V$, $I_D=500mA$ |
| | | - | 1.5 | 2.1 | | $V_{GS}=5V$, $I_D=50mA$ |
| $V_{DS(ON)}$ | Drain-Source ON Voltage | - | 0.6 | 0.9 | V | $V_{GS}=10V$, $I_D=500mA$ |
| | | - | 0.075 | 0.105 | | $V_{GS}=5V$, $I_D=50mA$ |
| $I_D(ON)$ | On State Drain Current | 500 | - | - | mA | $V_{GS}=10V$, $V_{DS} \geq 2V_{DS(ON)}$ |
| g_{FS} | Forward Transconductance | 200 | 580 | - | mS | $V_{DS}=10V$, $I_D=500mA$ |
| V_{SD} | Drain-Source Diode Forward Voltage (Note 1) | - | 0.78 | 1.15 | V | $V_{GS}=0V$, $I_S=200mA$ |

Dynamic Characteristics ($T_{Ambient}=25^{\circ}C$ unless noted otherwise)

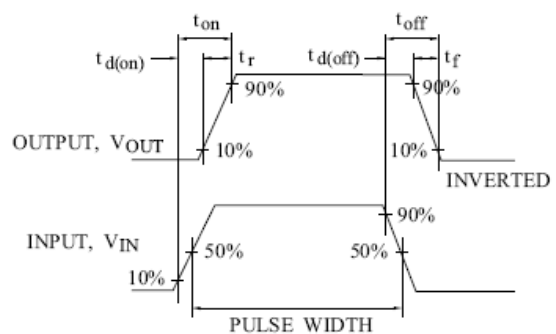
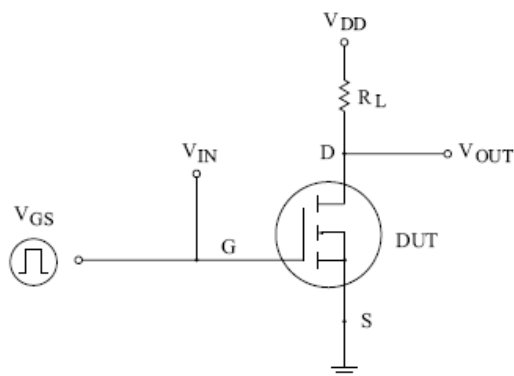
| Symbol | Description | Min. | Typ. | Max. | Unit | Conditions |
|-----------|------------------------------|------|------|------|------|--|
| C_{iss} | Input Capacitance | - | 47.1 | - | pF | $V_{DS}=25V$, $V_{GS}=0V$, $f=1MHz$ |
| C_{rss} | Reverse Transfer Capacitance | - | 3.5 | - | | |
| C_{oss} | Output Capacitance | - | 8.8 | - | | |
| t_{on} | Switching Time Turn-On Time | - | 8.8 | - | nS | $V_{DD}=30V$, $R_L=155\Omega$, $I_D=190mA$, $V_{GS}=10V$ |
| t_{off} | Switching Time Turn-Off Time | - | 14.8 | - | | |

Note: (1) Pulse Width $\leq 10\mu s$, Duty Cycle $\leq 1\%$

(2) Package mounted on a glass epoxy PCB 3.94" x 3.94" x 0.04"

(3) Pulse Test: Pulse Width $\leq 80\mu s$, Duty Cycle $\leq 1\%$

Switching Time Test Circuit



SMD Signal DMOS Transistor (N-Channel)

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Typical Characteristics Curves

Fig.1- Output Characteristics

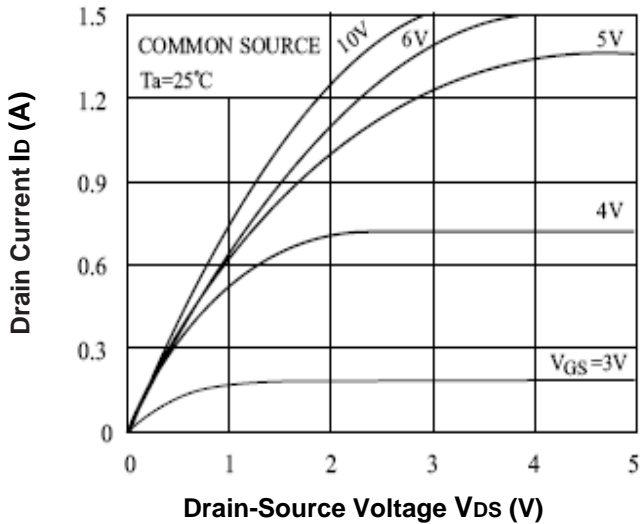


Fig.2- On-Resistance vs. Drain Current

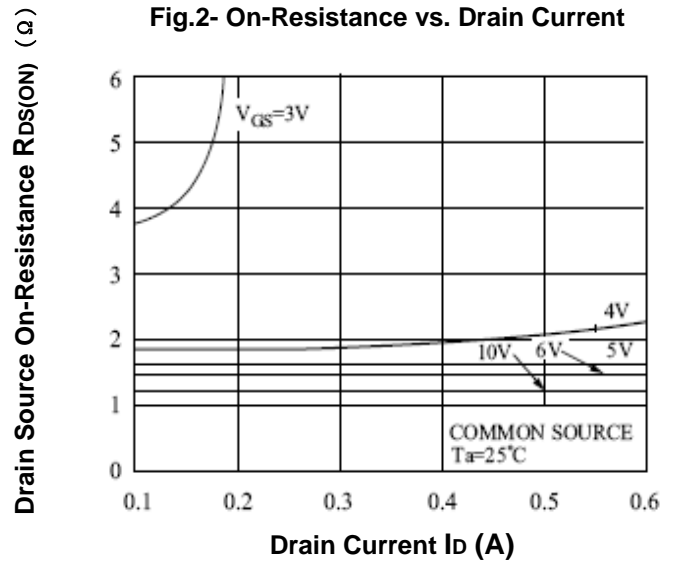


Fig.3- On-Resistance vs. Junction Temperature

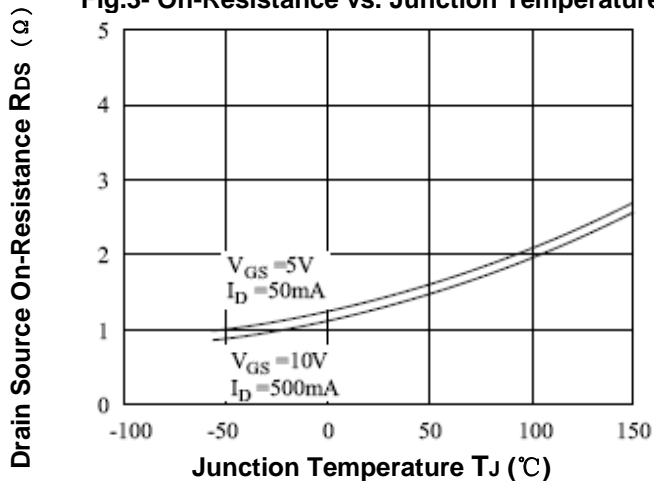
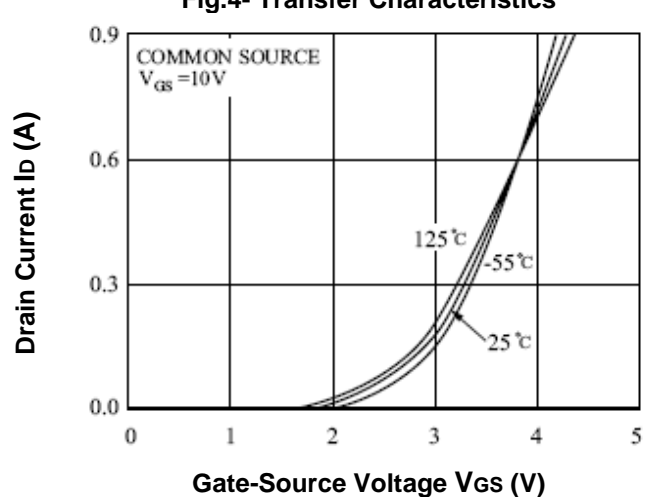


Fig.4- Transfer Characteristics



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Fig.5- Threshold Characteristics

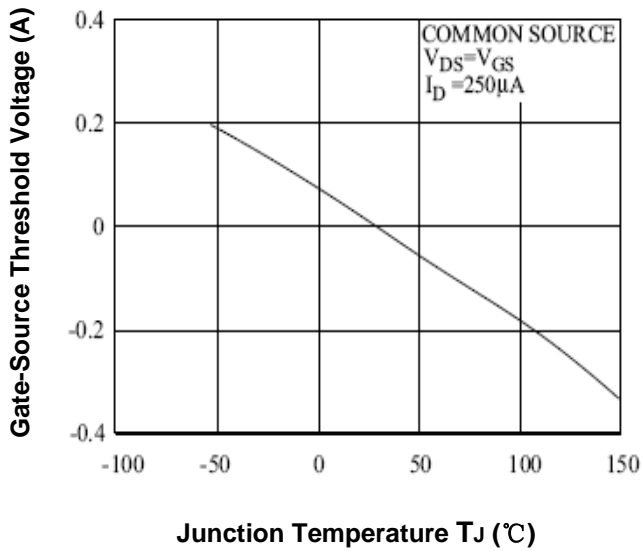


Fig.6- Source-Drain Diode Forward Voltage

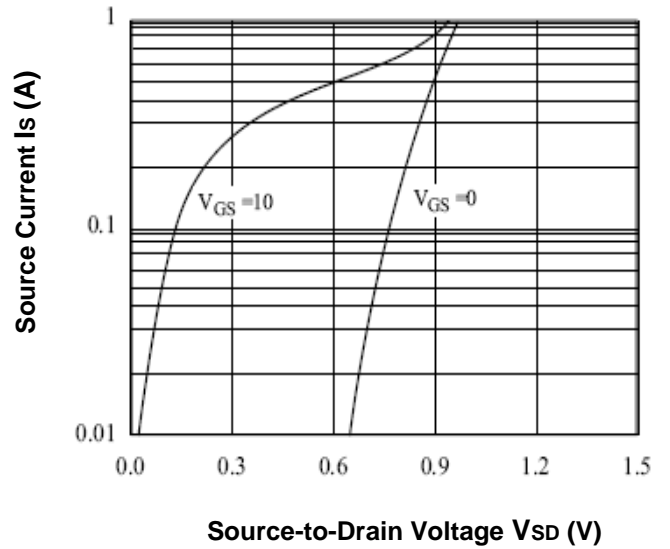


Fig.7- Capacitance

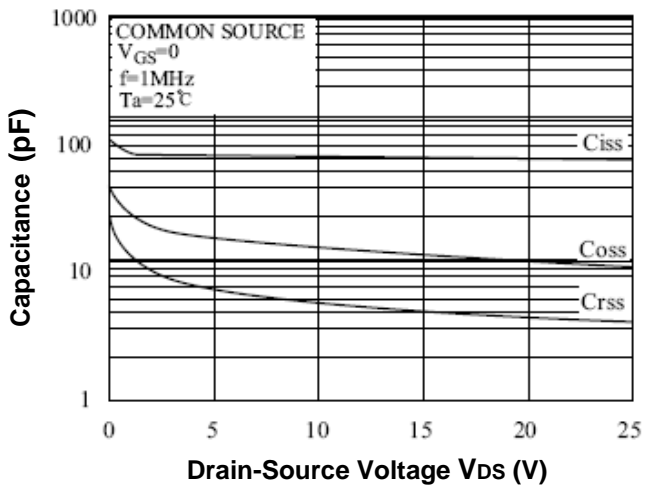
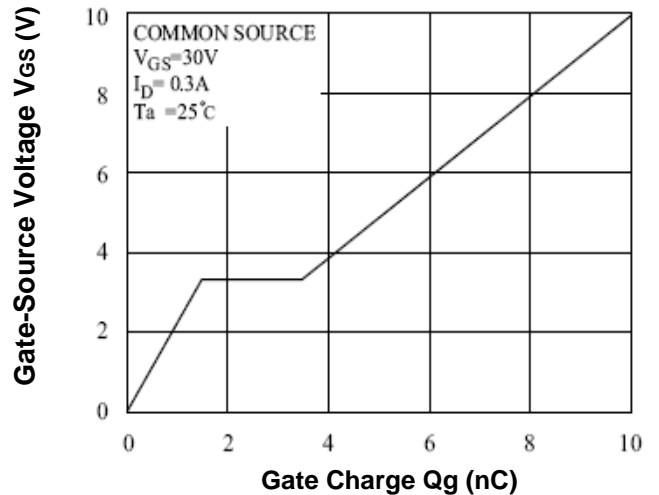


Fig.8- Gate Charge



SMD Signal DMOS Transistor (N-Channel)

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Fig.9- Safe Operating Area

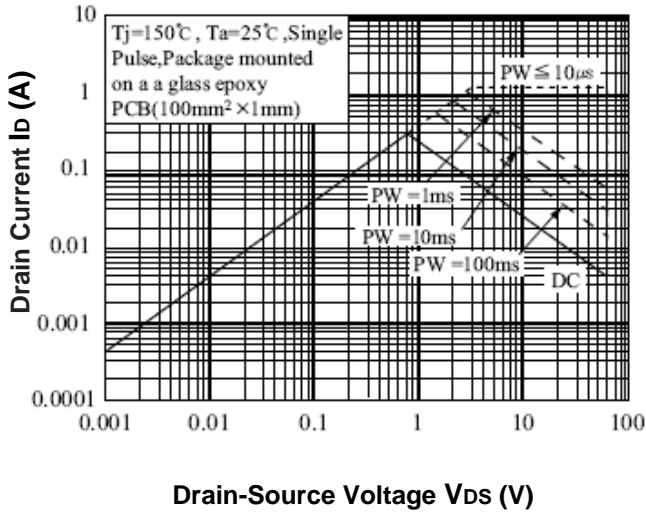
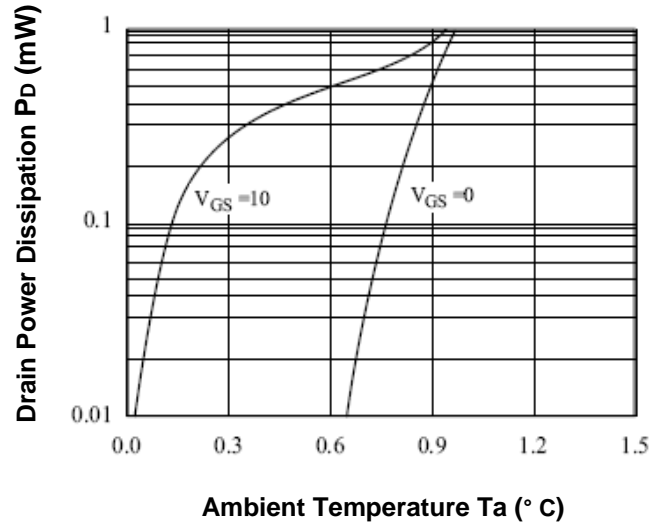
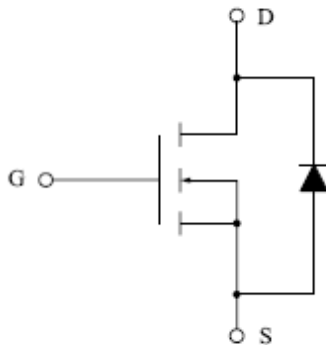


Fig.10- Power Dissipation vs. Ambient Temperature



Equivalent Circuit

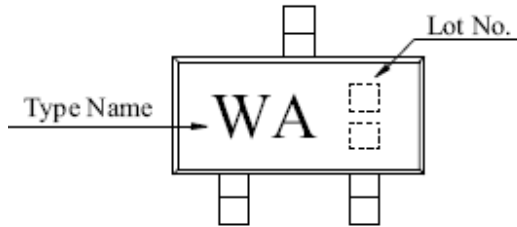


This transistor is electrostatic sensitive device.
Please handle with caution.

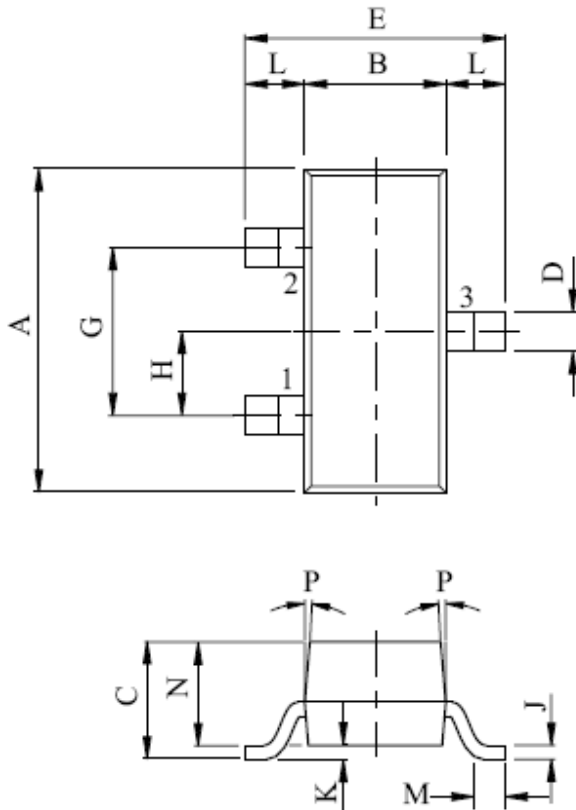
SMD Signal DMOS Transistor (N-Channel)

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Marking



Dimensions in mm



| DIM | MILLIMETERS |
|-----|-----------------|
| A | 2.93±0.20 |
| B | 1.30+0.20/-0.15 |
| C | 1.30 MAX |
| D | 0.45+0.15/-0.05 |
| E | 2.40+0.30/-0.20 |
| G | 1.90 |
| H | 0.95 |
| J | 0.13+0.10/-0.05 |
| K | 0.00 ~ 0.10 |
| L | 0.55 |
| M | 0.20 MIN |
| N | 1.00+0.20/-0.10 |
| P | 7° |

1. Source
2. Gate
3. Drain

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SMD Signal DMOS Transistor (N-Channel)

2N7002

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