# 4V Drive Nch MOS FET

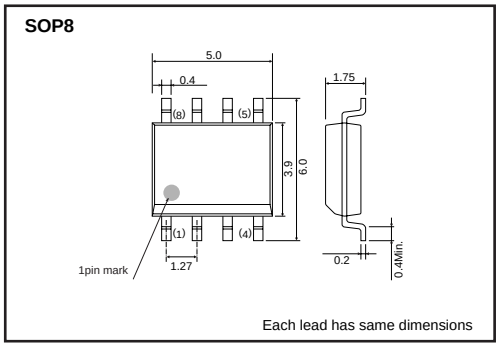
## RSS090N03

### ●Structure
Silicon N-channel MOS FET

### ●Features
1) Low on-resistance.
2) Built-in G-S Protection Diode.
3) Small Surface Mount Package (SOP8).

### ●Application
Power switching, DC/DC converter.

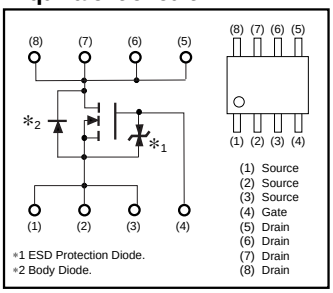
### ●External dimensions (Unit : mm)




### ●Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | TB |
| | Basic ordering unit (pieces) | 2500 |
| RSS090N03 | | ◯ |

### ●Equivalent circuit




∗ A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use.Use a protection circuit when the fixed voltage are exceeded.

### ●Absolute maximum ratings (Ta = 25°C)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GSS}$ | 20 | V |
| Drain Current | Continuous | $I_D$ | ±9.0 | A |
| | Pulsed | $I_{DP}$ *1 | ±36 | A |
| Source Current (Body Diode) | Continuous | $I_S$ | 1.6 | A |
| | Pulsed | $I_{SP}$ *1 | 18 | A |
| Total Power Dissipation | | $P_D$ *2 | 2 | W |
| Channel Temperature | | Tch | 150 | °C |
| Storage Temperature | | Tstg | −55 to +150 | °C |

∗1 Pw≤10µs, Duty cycle≤1%
∗2 Mounted on a ceramic board.

### ●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to Ambient | Rth (ch-a)* | 62.5 | °C / W |

∗ Mounted on a ceramic board.

●**Electrical characteristics** (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Gate-Source Leakage | $I_{GSS}$ | – | – | 10 | μA | $V_{GS}$=20V, $V_{DS}$=0V |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | – | – | V | $I_D$=1mA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | – | – | 1 | μA | $V_{DS}$=30V, $V_{GS}$=0V |
| Gate Threshold Voltage | $V_{GS\ (th)}$ | 1.0 | – | 2.5 | V | $V_{DS}$=10V, $I_D$=1mA |
| Static Drain-Source On-State Resistance | $R_{DS\ (on)}$ * | – | 11 | 16 | mΩ | $I_D$=9A, $V_{GS}$=10V |
| | | – | 15 | 22 | | $I_D$=9A, $V_{GS}$=4.5V |
| | | – | 17 | 24 | | $I_D$=9A, $V_{GS}$=4V |
| Forward Transfer Admittance | $\|Y_{fs}\|$ * | 6.0 | – | – | S | $I_D$=9A, $V_{DS}$=10V |
| Input Capacitance | $C_{iss}$ | – | 810 | – | pF | $V_{DS}$=10V |
| Output Capacitance | $C_{oss}$ | – | 225 | – | pF | $V_{GS}$=0V |
| Reverse Transfer Capacitance | $C_{rss}$ | – | 160 | – | pF | f=1MHz |
| Turn-On Delay Time | $t_{d(on)}$ * | – | 10 | – | ns | $I_D$=4.5A, $V_{DD}$≒ 15V |
| Rise Time | $t_r$ * | – | 13 | – | ns | $V_{GS}$=10V |
| Turn-Off Delay Time | $t_{d(off)}$ * | – | 46 | – | ns | $R_L$=3.33Ω |
| Fall Time | $t_f$ * | – | 15 | – | ns | $R_G$ =10Ω |
| Total Gate Charge | $Q_g$ * | – | 11 | 15 | nC | $V_{DD}$≒15V |
| Gate-Source Charge | $Q_{gs}$ * | – | 2.5 | – | nC | $V_{GS}$=5V |
| Gate-Drain Charge | $Q_{gd}$ * | – | 4.5 | – | nC | $I_D$=9A |

*Pulsed

●**Body diode characteristics** (Source-Drain) (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_{SD}$ * | – | – | 1.2 | V | $I_S$=6.4A, $V_{GS}$=0V |

*Pulsed

**●Electrical characteristic curves**

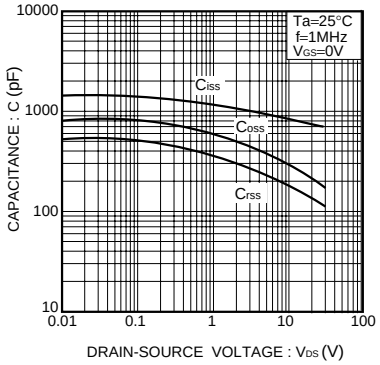



Fig.1 Typical Capacitance vs. Drain-Source Voltage

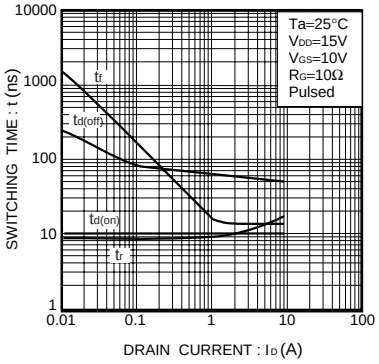



Fig.2 Switching Characteristics

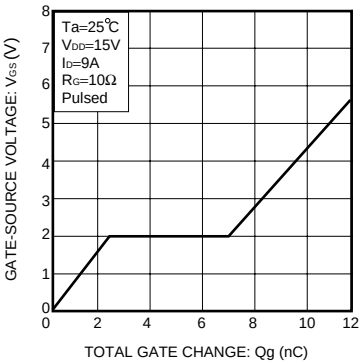



Fig.3 Dynamic Input Characteristics

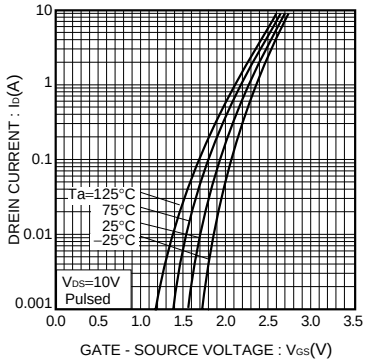



Fig.4 Typical Transfer Characteristics

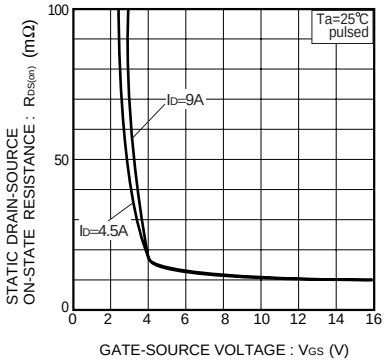



Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

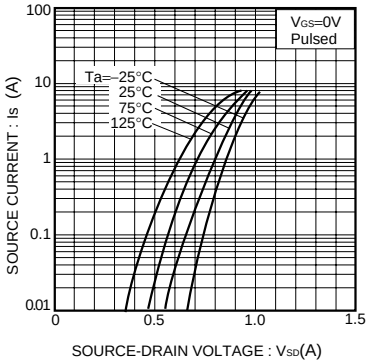



Fig.6 Source-Current vs. Source-Drain Voltage

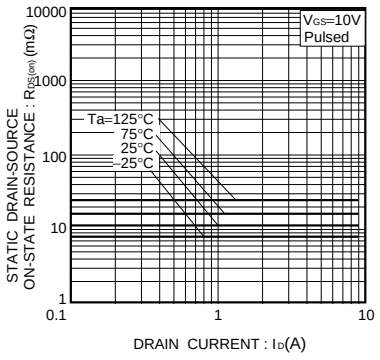



Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (1)

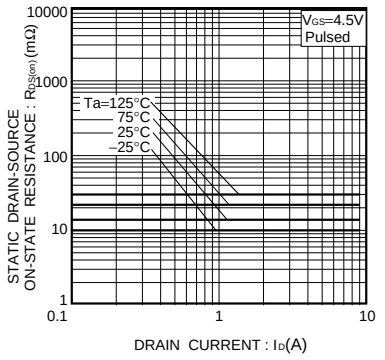



Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (2)

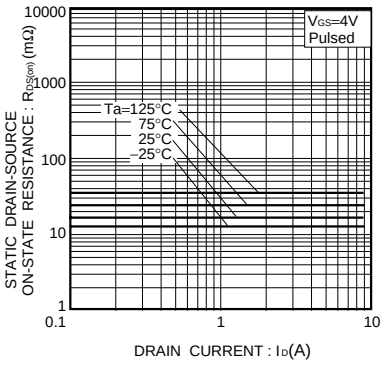



Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (3)

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