

## Transistors

## 1.8V Drive Nch MOSFET

## RUF015N02

## ●Structure

Silicon N-channel MOSFET

## ●Features

- 1) Low On-resistance.
- 2) Space saving, small surface mount package (TUMT3).
- 3) Low voltage drive (1.8V drive).

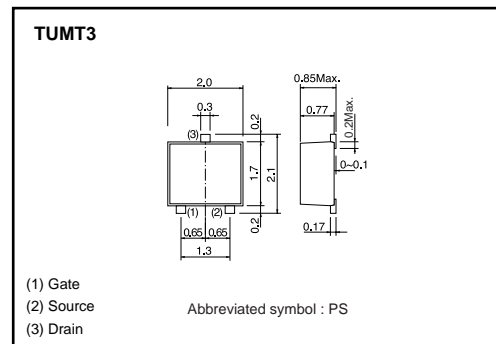
## ●Applications

Switching

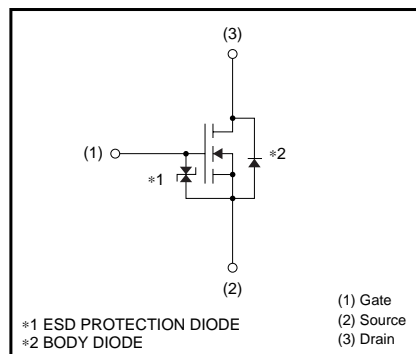
## ●Packaging specifications

| Type      | Package                      | Taping |
|-----------|------------------------------|--------|
|           | Code                         | TL     |
|           | Basic ordering unit (pieces) | 3000   |
| RUF015N02 |                              | ○      |

## ●Dimensions (Unit : mm)



## ●Inner circuit



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

| Parameter                      | Symbol     | Limits      | Unit      |   |
|--------------------------------|------------|-------------|-----------|---|
| Drain-source voltage           | $V_{DS}$   | 20          | V         |   |
| Gate-source voltage            | $V_{GS}$   | 10          | V         |   |
| Drain current                  | Continuous | $I_D$       | $\pm 1.5$ | A |
|                                | Pulsed     | $I_{DP}$ *1 | $\pm 3.0$ | A |
| Source current<br>(Body diode) | Continuous | $I_S$       | 0.6       | A |
|                                | Pulsed     | $I_{SP}$ *1 | 2.4       | A |
| Total power dissipation        | $P_D$ *2   | 0.8         | W         |   |
| Channel temperature            | $T_{ch}$   | 150         | °C        |   |
| Range of storage temperature   | $T_{stg}$  | -55 to +150 | °C        |   |

\*1  $P_w \leq 10 \mu s$ , Duty cycle  $\leq 1\%$ 

\*2 Mounted on a ceramic board

## ●Thermal resistance

| Parameter          | Symbol           | Limits | Unit |
|--------------------|------------------|--------|------|
| Channel to ambient | $R_{th(ch-a)}$ * | 156    | °C/W |

\* Mounted on a ceramic board

## Transistors

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

| Parameter                               | Symbol         | Min. | Typ. | Max. | Unit       | Conditions                 |
|---|----------------|------|------|------|------------|----------------------------|
| Gate-source leakage                     | $I_{GSS}$      | –    | –    | 10   | $\mu A$    | $V_{GS}=10V, V_{DS}=0V$    |
| Drain-source breakdown voltage          | $V_{(BR) DSS}$ | 20   | –    | –    | V          | $I_D=1mA, V_{GS}=0V$       |
| Zero gate voltage drain current         | $I_{DSS}$      | –    | –    | 1    | $\mu A$    | $V_{DS}=20V, V_{GS}=0V$    |
| Gate threshold voltage                  | $V_{GS(th)}$   | 0.3  | –    | 1.0  | V          | $V_{DS}=10V, I_D=1mA$      |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | –    | 130  | 180  | m $\Omega$ | $I_D=1.5A, V_{GS}=4.5V$    |
|   |                | –    | 170  | 240  | m $\Omega$ | $I_D=1.5A, V_{GS}=2.5V$    |
|   |                | –    | 220  | 310  | m $\Omega$ | $I_D=0.8A, V_{GS}=1.8V$    |
| Forward transfer admittance             | $ Y_{fs} $ *   | 1.6  | –    | –    | S          | $V_{DS}=10V, I_D=1.5A$     |
| Input capacitance                       | $C_{iss}$      | –    | 110  | –    | pF         | $V_{DS}=10V$               |
| Output capacitance                      | $C_{oss}$      | –    | 18   | –    | pF         | $V_{GS}=0V$                |
| Reverse transfer capacitance            | $C_{rss}$      | –    | 15   | –    | pF         | $f=1MHz$                   |
| Turn-on delay time                      | $t_{d(on)}$ *  | –    | 5    | –    | ns         | $I_D=1.0A$<br>$V_{DD}=10V$ |
| Rise time                               | $t_r$ *        | –    | 5    | –    | ns         | $V_{GS}=4.5V$              |
| Turn-off delay time                     | $t_{d(off)}$ * | –    | 20   | –    | ns         | $R_L=10\Omega$             |
| Fall time                               | $t_f$ *        | –    | 3    | –    | ns         | $R_G=10\Omega$             |
| Total gate charge                       | $Q_g$ *        | –    | 1.8  | 2.5  | nC         | $V_{DD}=10V$               |
| Gate-source charge                      | $Q_{gs}$ *     | –    | 0.3  | –    | nC         | $V_{GS}=4.5V$              |
| Gate-drain charge                       | $Q_{gd}$ *     | –    | 0.3  | –    | nC         | $I_D=1.5A$                 |

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

| Parameter       | Symbol   | Min. | Typ. | Max. | Unit | Conditions            |
|-----------------|----------|------|------|------|------|-----------------------|
| Forward voltage | $V_{SD}$ | –    | –    | 1.2  | V    | $I_S=0.6A, V_{GS}=0V$ |

Transistors

●Electrical characteristics curves

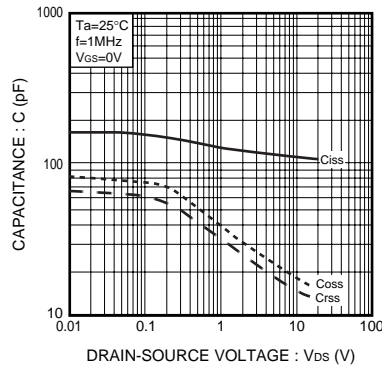


Fig.1 Typical Capacitance vs. Drain-Source Voltage

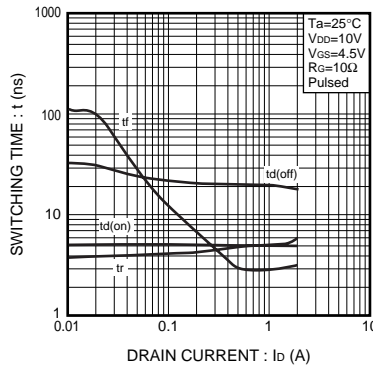


Fig.2 Switching Characteristics

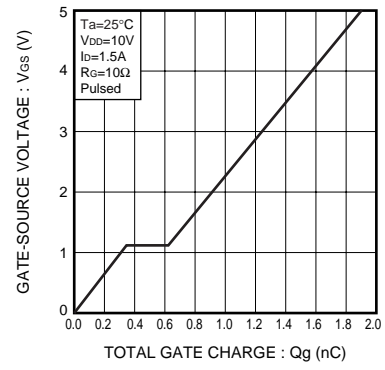


Fig.3 Dynamic Input Characteristics

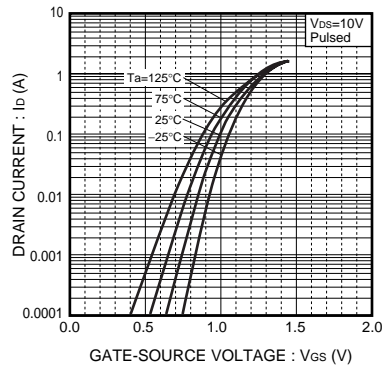


Fig.4 Typical Transfer Characteristics

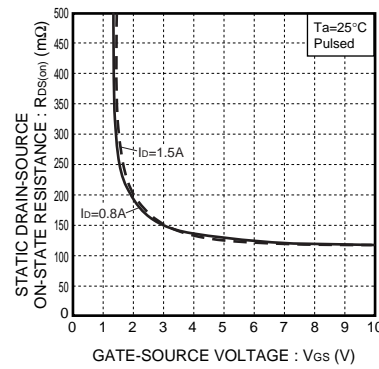


Fig.5 Static Drain-Source On-State Resistance vs. Gate-source Voltage

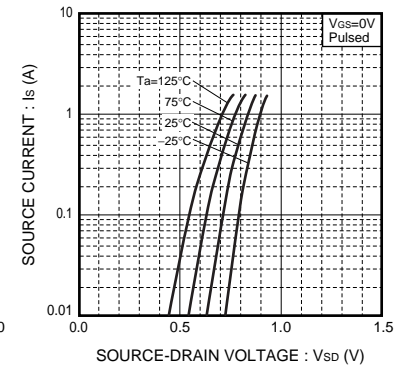


Fig.6 Source Current vs. Source-Drain Voltage

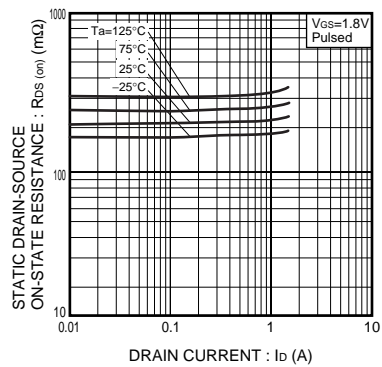


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current ( I )

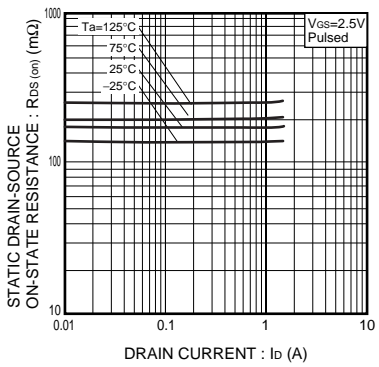


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current ( II )

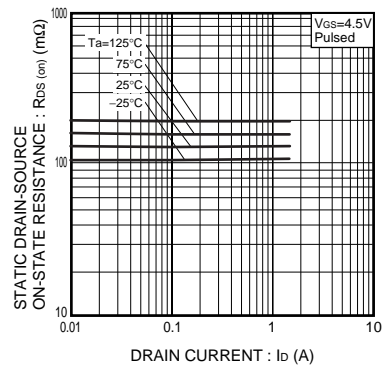


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current ( III )

●Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

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