# 2.5V Drive Pch MOSFET

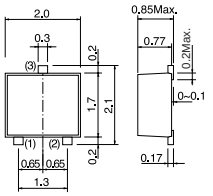
## RTF015P02

### ●Structure
Silicon P-channel
MOSFET

### ●Features
1) Low on-resistance. (180mΩ at 2.5V)
2) High power package.
3) High speed switching.
4) Low voltage drive. (2.5V)

### ●Dimensions (Unit : mm)

**TUMT3**




(1) Gate
(2) Source
(3) Drain

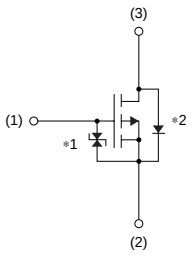
Abbreviated symbol : WV

### ●Applications
DC-DC converter

### ●Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | TL |
| | Basic ordering unit (pieces) | 3000 |
| RTF015P02 | | ◯ |

### ●Equivalent circuit




*1 ESD PROTECTION DIODE
*2 BODY DIODE

(1) Gate
(2) Source
(3) Drain

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

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | −20 | V |
| Gate-source voltage | | $V_{GSS}$ | ±12 | V |
| Drain current | Continuous | $I_D$ | ±1.5 | A |
| | Pulsed | $I_{DP}$ *1 | ±6 | A |
| Source current (Body diode) | Continuous | $I_S$ *1 | −0.6 | A |
| | Pulsed | $I_{SP}$ | −6 | A |
| Total power dissipation | | $P_D$ *2 | 0.8 | W |
| Channel temperature | | Tch | 150 | °C |
| Range of 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) * | 156 | °C / W |

* Mounted on a ceramic board.

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±10 | μA | $V_{GS}$=±12V, $V_{DS}$=0V |
| Drain-source breakdown voltage | $V_{(BR)\ DSS}$ | –20 | – | – | V | $I_D$= –1mA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | – | – | –1 | μA | $V_{DS}$= –20V, $V_{GS}$=0V |
| Gate threshold voltage | $V_{GS\ (th)}$ | –0.7 | – | –2.0 | V | $V_{DS}$= –10V, $I_D$= –1mA |
| Static drain-source on-state resistance | $R_{DS\ (on)}$ * | – | 100 | 135 | mΩ | $I_D$= –1.5A, $V_{GS}$= –4.5V |
| | | – | 110 | 150 | mΩ | $I_D$= –1.5A, $V_{GS}$= –4V |
| | | – | 180 | 250 | mΩ | $I_D$= –0.8A, $V_{GS}$= –2.5V |
| Forward transfer admittance | $\|Y_{fs}\|$ * | 1.5 | – | – | S | $V_{DS}$= –10V, $I_D$= –0.8A |
| Input capacitance | $C_{iss}$ | – | 560 | – | pF | $V_{DS}$= –10V |
| Output capacitance | $C_{oss}$ | – | 90 | – | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 55 | – | pF | f=1MHz |
| Turn-on delay time | $t_{d\ (on)}$ * | – | 12 | – | ns | $I_D$= –0.8A<br>$V_{DD}$≒ –15V<br>$V_{GS}$= –4.5V<br>$R_L$=19Ω<br>$R_G$=10Ω |
| Rise time | $t_r$ * | – | 12 | – | ns | |
| Turn-off delay time | $t_{d\ (off)}$ * | – | 38 | – | ns | |
| Fall time | $t_f$ * | – | 12 | – | ns | |
| Total gate charge | $Q_g$ * | – | 5.2 | – | nC | $V_{DD}$≒ –15V $R_L$=10Ω |
| Gate-source charge | $Q_{gs}$ * | – | 1.3 | – | nC | $V_{GS}$= –4.5V $R_G$=10Ω |
| Gate-drain charge | $Q_{gd}$ * | – | 1.4 | – | 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 |

●**Electrical characteristic curves**

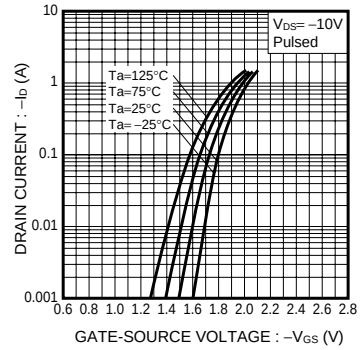



Fig.1 Typical Transfer Characteristics

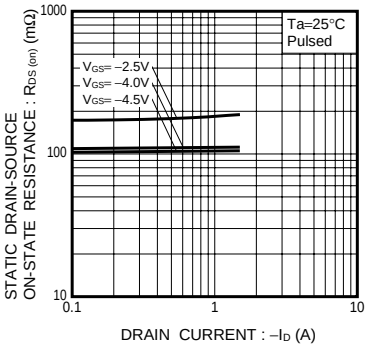



Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

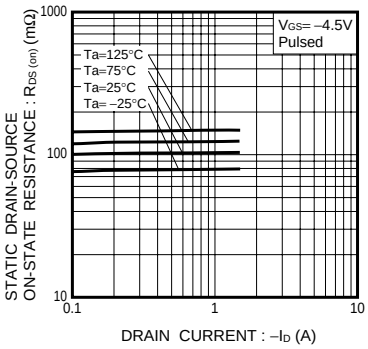



Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

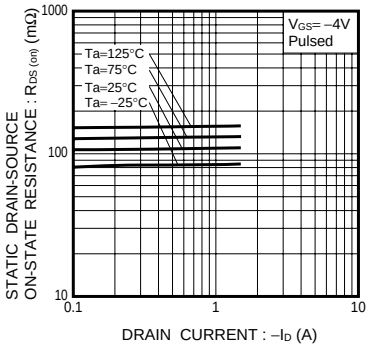



Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

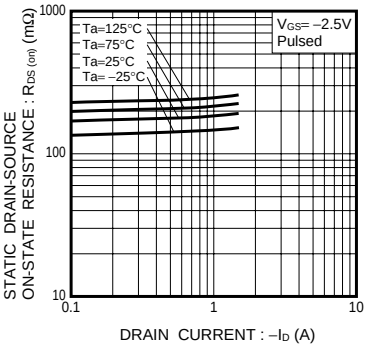



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

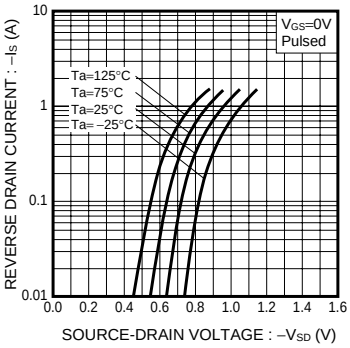



Fig.6 Reverse Drain Current vs. Source-Drain Voltage

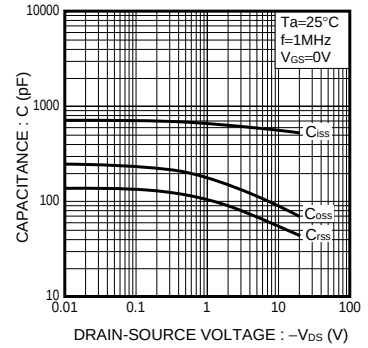



Fig.7 Typical Capacitance vs. Drain-Source Voltage

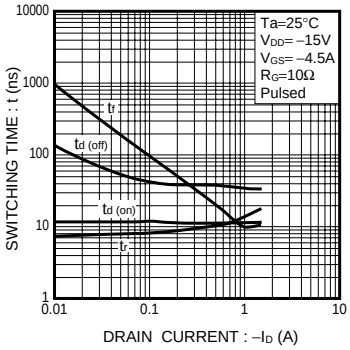



Fig.8 Switching Characteristics

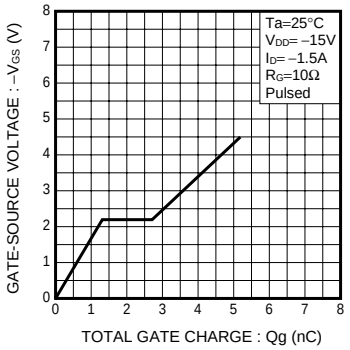



Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

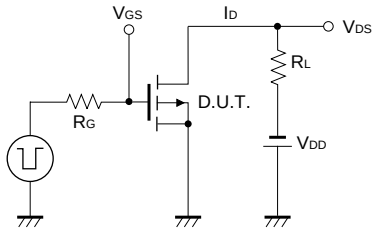



Fig.10 Switching Time Measurement Circuit

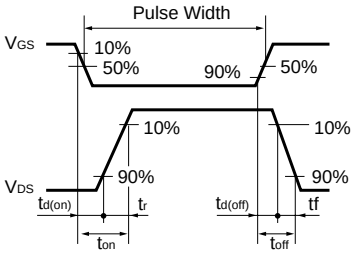



Fig.11 Switching Waveforms

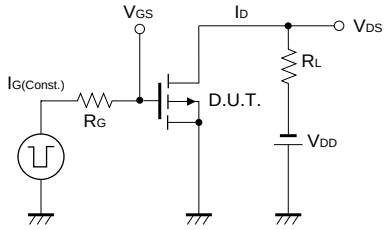



Fig.12 Gate Charge Measurement Circuit

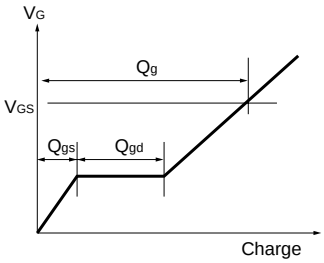



Fig.13 Gate Charge Waveforms

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