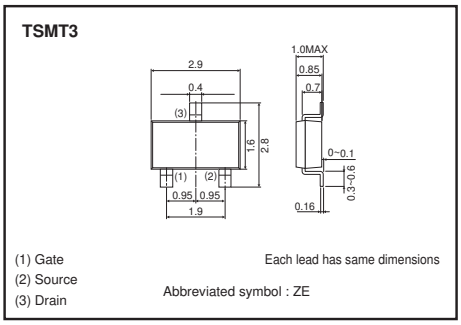
# 1.5V Drive Pch MOSFET

## RZR020P01

### ●Structure
Silicon P-channel MOSFET

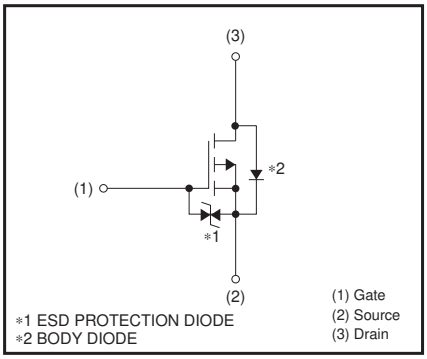
### ●Features
1) Low on-resistance.
2) Built-in G-S Protection Diode.
3) Small and Surface Mount Package (TSMT3).
4) Low voltage drive (1.5V).

### ●Dimensions (Unit : mm)




### ●Applications
Switching

### ●Inner circuit




### ●Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | TL |
| | Basic ordering unit (pieces) | 3000 |
| RZR020P01 | | ○ |

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

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | −12 | V |
| Gate-source voltage | | $V_{GSS}$ | ±10 | V |
| Drain current | Continuous | $I_D$ | ±2 | A |
| | Pulsed | $I_{DP}$ *1 | ±6 | A |
| Source current (Body diode) | Continuous | $I_S$ | −0.8 | A |
| | Pulsed | $I_{SP}$ *1 | −6 | A |
| Total power dissipation | | $P_D$ *2 | 1.0 | W |
| Channel temperature | | Tch | 150 | °C |
| Range of storage temperature | | Tstg | −55 to +150 | °C |

*1 Pw≤10μs, Duty cycle≤1%
*2 When mounted on a ceramic board.

### ●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to ambient | Rth (ch-a) * | 125 | °C / W |

* When mounted on a ceramic board.

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±10 | μA | $V_{GS}$=±10V, $V_{DS}$=0V |
| Drain-source breakdown voltage | $V_{(BR)\ DSS}$ | −12 | – | – | V | $I_D$= −1mA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | – | – | −1 | μA | $V_{DS}$= −12V, $V_{GS}$=0V |
| Gate threshold voltage | $V_{GS\ (th)}$ | −0.3 | – | −1.0 | V | $V_{DS}$= −6V, $I_D$= −1mA |
| Static drain-source on-state resistance | $R_{DS\ (on)}$ * | – | 75 | 105 | mΩ | $I_D$= −2A, $V_{GS}$= −4.5V |
| | | – | 105 | 145 | mΩ | $I_D$= −1A, $V_{GS}$= −2.5V |
| | | – | 150 | 225 | mΩ | $I_D$= −1A, $V_{GS}$= −1.8V |
| | | – | 200 | 400 | mΩ | $I_D$= −0.4A, $V_{GS}$= −1.5V |
| Forward transfer admittance | $\|Y_{fs}\|$ * | 2 | – | – | S | $V_{DS}$= −6V, $I_D$= −2A |
| Input capacitance | $C_{iss}$ | – | 770 | – | pF | $V_{DS}$= −6V |
| Output capacitance | $C_{oss}$ | – | 75 | – | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 60 | – | pF | f=1MHz |
| Turn-on delay time | $t_{d\ (on)}$ * | – | 10 | – | ns | $V_{DD}$≒ −6V<br>$I_D$= −1A<br>$V_{GS}$= −4.5V<br>$R_L$≒6Ω<br>$R_G$=10Ω |
| Rise time | $t_r$ * | – | 17 | – | ns | |
| Turn-off delay time | $t_{d\ (off)}$ * | – | 65 | – | ns | |
| Fall time | $t_f$ * | – | 35 | – | ns | |
| Total gate charge | $Q_g$ * | – | 6.5 | – | nC | $V_{DD}$≒ −6V, $I_D$= −2A |
| Gate-source charge | $Q_{gs}$ * | – | 1.3 | – | nC | $V_{GS}$= −4.5V |
| Gate-drain charge | $Q_{gd}$ * | – | 0.8 | – | nC | $R_L$≒ 3Ω, $R_G$=10Ω |

*Pulsed

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Forward voltage | $V_{SD}$ * | – | – | −1.2 | V | $I_S$= −2A, $V_{GS}$=0V |

* Pulsed

## ●Electrical characteristics curves

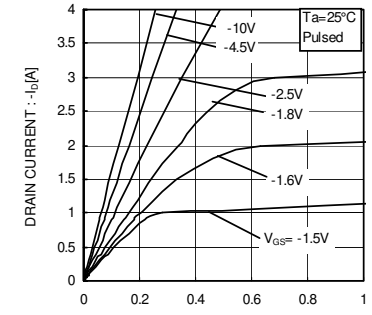



Fig.1 Typical Output Characteristics( Ⅰ )

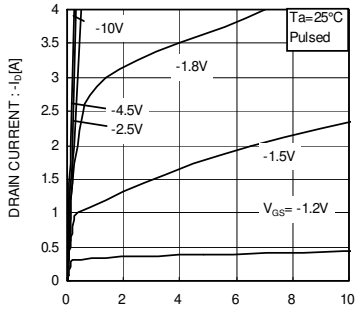



Fig.2 Typical Output Characteristics( Ⅱ )

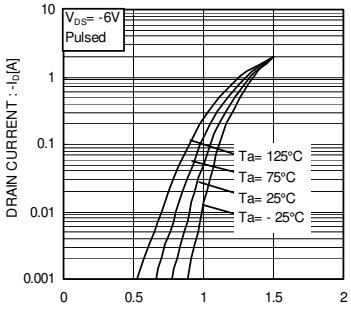



Fig.3 Typical Transfer Characteristics

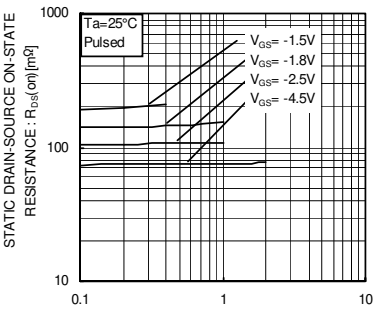



Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( Ⅰ )

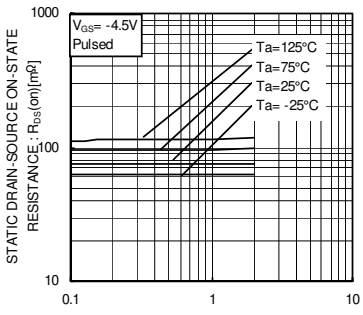



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( Ⅱ )

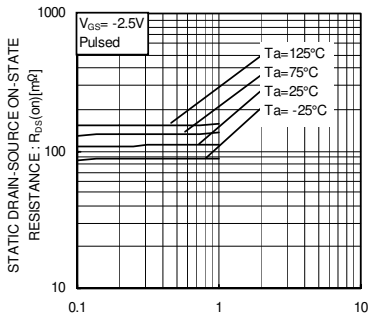



Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( Ⅲ )

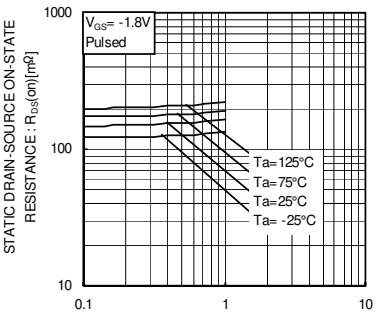



Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( Ⅳ )

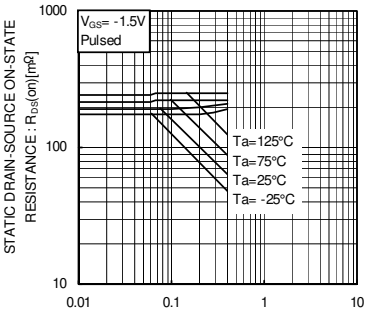



Fig.8 Static Drain-Source On-State Resistance vs. Drain Current( Ⅴ )

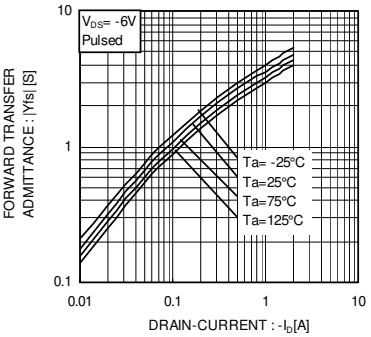



Fig.9 Forward Transfer Admittance vs. Drain Current

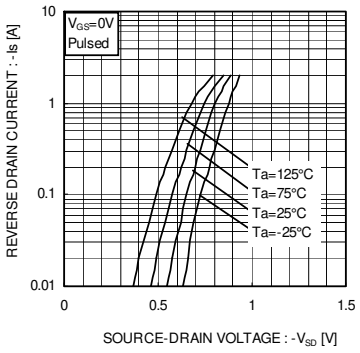



Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

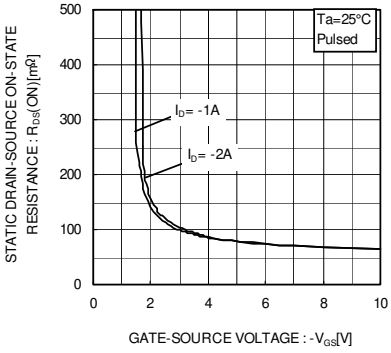



Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

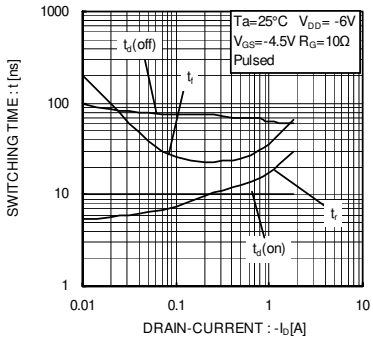



Fig.12 Switching Characteristics

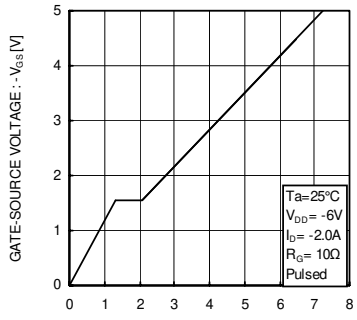



Fig.13 Dynamic Input Characteristics

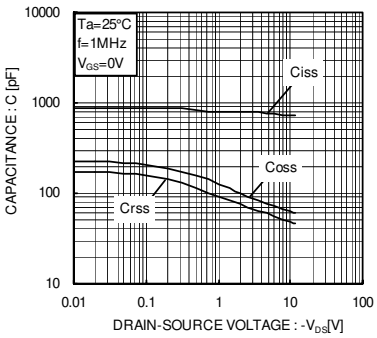



Fig.14 Typical Capacitance vs. Drain-Source Voltage

## ●Measurement circuit

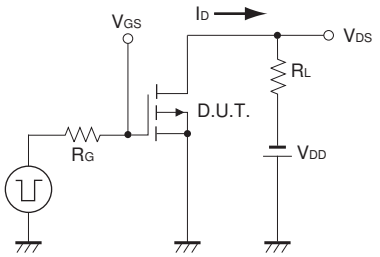



Fig.1-1 Switching Time Measurement Circuit

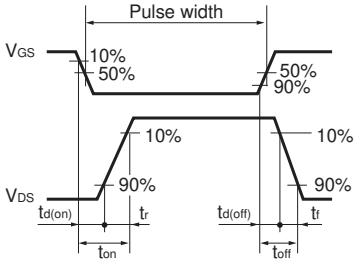



Fig.1-2 Switching Waveforms

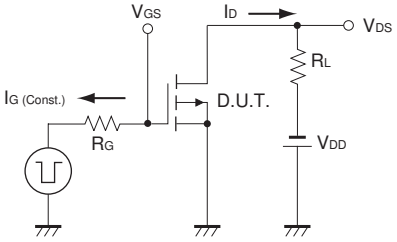



Fig.2-1 Gate Charge Measurement Circuit

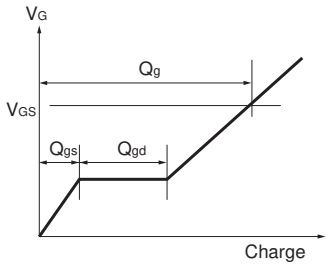



Fig.2-2 Gate Charge Waveform

## ●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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