

## 4V Drive Pch MOSFET

## RSR020P03

## ●Structure

Silicon P-channel MOSFET

## ●Features

- 1) Low On-resistance
- 2) Space saving—small surface mount package (TSMT3)
- 3) 4V drive

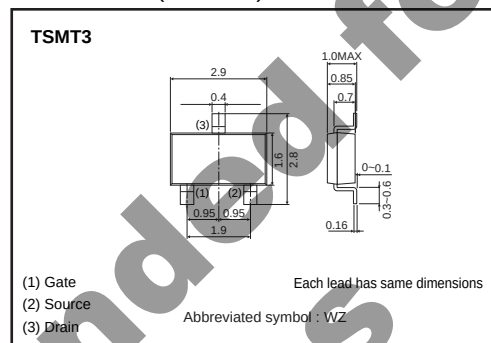
## ●Applications

Switching

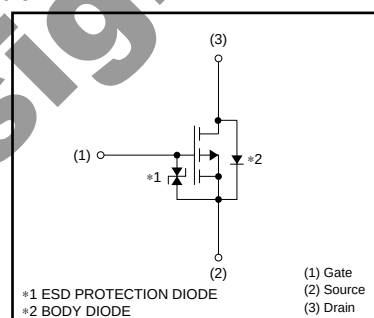
## ●Packaging specifications

| Type      | Package                      | Taping |
|-----------|------------------------------|--------|
|           | Code                         | TL     |
|           | Basic ordering unit (pieces) | 3000   |
| RSR020P03 |                              | ○      |

## ●Dimensions (Unit : mm)



## ●Inner circuit



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

| Parameter                    | Symbol     | Limits      | Unit |
|------------------------------|------------|-------------|------|
| Drain-source voltage         | $V_{DS}$   | -30         | V    |
| Gate-source voltage          | $V_{GS}$   | ±20         | V    |
| Drain current                | Continuous | $I_D$       | ±2   |
|                              | Pulsed     | $I_{DP}$ *1 | ±8   |
| Source current (Body diode)  | Continuous | $I_S$       | -0.8 |
|                              | Pulsed     | $I_{SP}$ *1 | -8   |
| Total power dissipation      | $P_D$ *2   | 1           | 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 | $R_{th(ch-a)}$ * | 125    | °C/W |

\* Mounted on a ceramic board

## Transistors

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

| Parameter                               | Symbol                 | Min. | Typ. | Max. | Unit | Conditions                                    |
|-----------------------------------------|------------------------|------|------|------|------|-----------------------------------------------|
| Gate-source leakage                     | I <sub>GSS</sub>       | —    | —    | ±10  | μA   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V    |
| Drain-source breakdown voltage          | V <sub>(BR) DSS</sub>  | −30  | —    | —    | V    | I <sub>D</sub> = −1mA, V <sub>GS</sub> =0V    |
| Zero gate voltage drain current         | I <sub>DSS</sub>       | —    | —    | −1   | μA   | V <sub>DS</sub> = −30V, V <sub>GS</sub> =0V   |
| Gate threshold voltage                  | V <sub>GS (th)</sub>   | −1.0 | —    | −2.5 | V    | V <sub>DS</sub> = −10V, I <sub>D</sub> = −1mA |
| Static drain-source on-state resistance | R <sub>DS (on)</sub> * | —    | 85   | 120  | mΩ   | I <sub>D</sub> = −2A, V <sub>GS</sub> = −10V  |
|                                         |                        | —    | 135  | 190  | mΩ   | I <sub>D</sub> = −1A, V <sub>GS</sub> = −4.5V |
|                                         |                        | —    | 150  | 210  | mΩ   | I <sub>D</sub> = −1A, V <sub>GS</sub> = −4V   |
| Forward transfer admittance             | Y <sub>fs</sub>   *    | 1.4  | —    | —    | S    | V <sub>DS</sub> = −10V, I <sub>D</sub> = −1A  |
| Input capacitance                       | C <sub>iss</sub>       | —    | 370  | —    | pF   | V <sub>DS</sub> = −10V                        |
| Output capacitance                      | C <sub>oss</sub>       | —    | 80   | —    | pF   | V <sub>GS</sub> =0V                           |
| Reverse transfer capacitance            | C <sub>rss</sub>       | —    | 55   | —    | pF   | f=1MHz                                        |
| Turn-on delay time                      | t <sub>d (on)</sub> *  | —    | 8    | —    | ns   | V <sub>DD</sub> = −15V                        |
| Rise time                               | t <sub>r</sub> *       | —    | 10   | —    | ns   | I <sub>D</sub> = −1A                          |
| Turn-off delay time                     | t <sub>d (off)</sub> * | —    | 35   | —    | ns   | V <sub>GS</sub> = −10V                        |
| Fall time                               | t <sub>f</sub> *       | —    | 11   | —    | ns   | R <sub>L</sub> =15Ω                           |
| Total gate charge                       | Q <sub>g</sub> *       | —    | 4.3  | —    | nC   | R <sub>G</sub> =10Ω                           |
| Gate-source charge                      | Q <sub>gs</sub> *      | —    | 1.4  | —    | nC   | V <sub>DD</sub> = −15V V <sub>GS</sub> = −5V  |
| Gate-drain charge                       | Q <sub>gd</sub> *      | —    | 1.5  | —    | nC   | I <sub>D</sub> = −2A                          |

\*Pulsed

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

| Parameter       | Symbol            | Min. | Typ. | Max. | Unit | Conditions                                  |
|-----------------|-------------------|------|------|------|------|---------------------------------------------|
| Forward voltage | V <sub>SD</sub> * | —    | —    | −1.2 | V    | I <sub>S</sub> = −0.8A, V <sub>GS</sub> =0V |

\*Pulsed

## Transistors

## ●Electrical characteristics curves

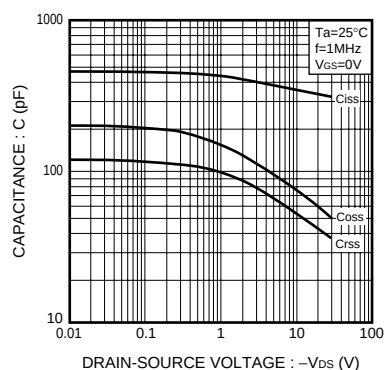


Fig.1 Typical Capacitance vs. Drain-Source Voltage

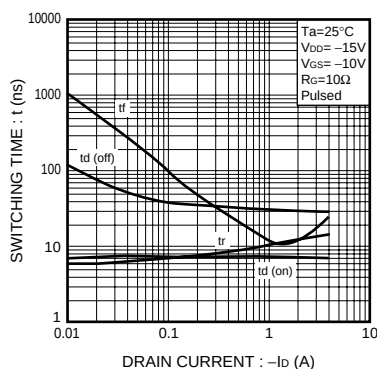


Fig.2 Switching Characteristics

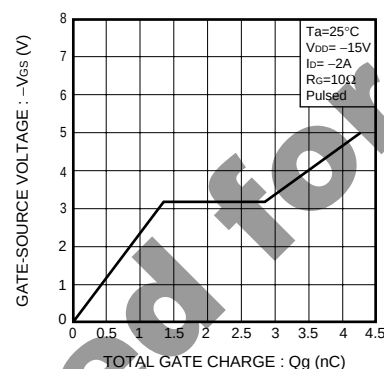


Fig.3 Dynamic Input Characteristics

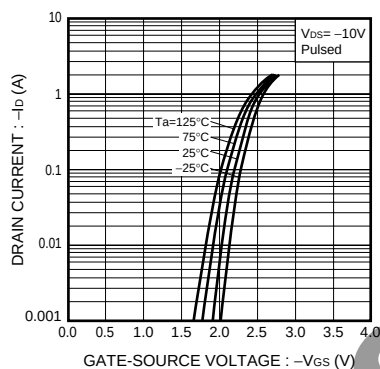


Fig.4 Typical Transfer Characteristics

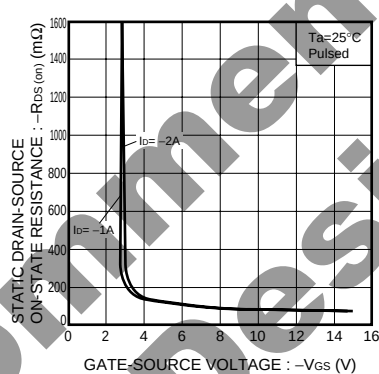


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

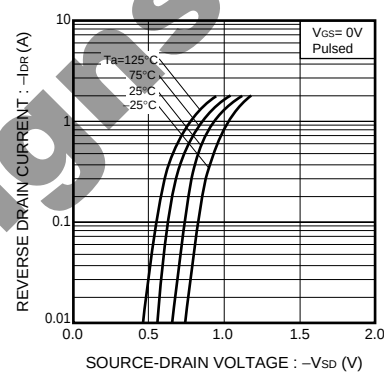


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

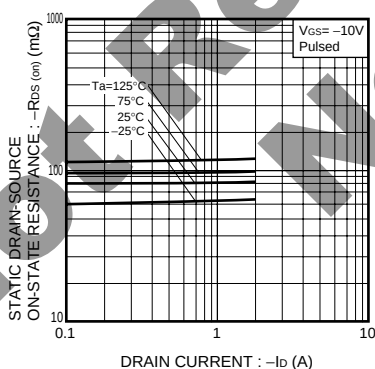


Fig.7 Static Drain-Source On-State Resistance vs. Drain current ( I )

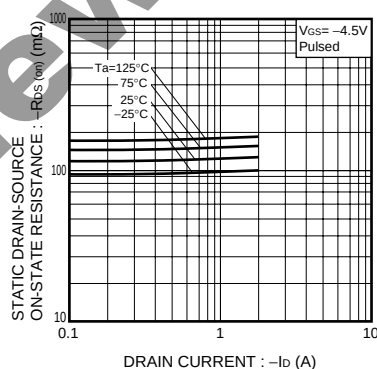


Fig.8 Static Drain-Source On-State Resistance vs. Drain current ( II )

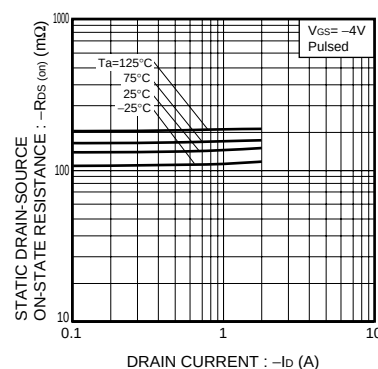


Fig.9 Static Drain-Source On-State Resistance vs. Drain current ( III )

Transistors

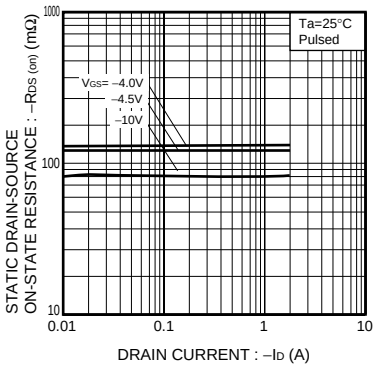


Fig.10 Static Drain-Source On-State Resistance vs. Drain current (  $I_D$  )

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