

# 4V Drive Pch MOSFET

## RSQ015P10

● **Structure**

Silicon P-channel MOSFET

● **Features**

- 1) Low on-resistance.
- 2) Low voltage drive(4V).
- 3) Small surface mount package (TSMT6).

● **Application**

Switching

● **Packaging specifications**

| Type      | Package                      | Taping |
|-----------|------------------------------|--------|
|           | Code                         | TR     |
|           | Basic ordering unit (pieces) | 3000   |
| RSQ015P10 |                              | ○      |

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

| Parameter                      | Symbol     | Limits      | Unit |   |
|--------------------------------|------------|-------------|------|---|
| Drain-source voltage           | $V_{DSS}$  | -100        | V    |   |
| Gate-source voltage            | $V_{GSS}$  | ±20         | V    |   |
| Drain current                  | Continuous | $I_D$       | ±1.5 | A |
|                                | Pulsed     | $I_{DP}$ *1 | ±6.0 | A |
| Source current<br>(Body Diode) | Continuous | $I_S$       | -1.0 | A |
|                                | Pulsed     | $I_{SP}$ *1 | -6.0 | A |
| Power dissipation              | $P_D$ *2   | 1.25        | W    |   |
| Channel temperature            | Tch        | 150         | °C   |   |
| Range of storage temperature   | Tstg       | -55 to +150 | °C   |   |

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

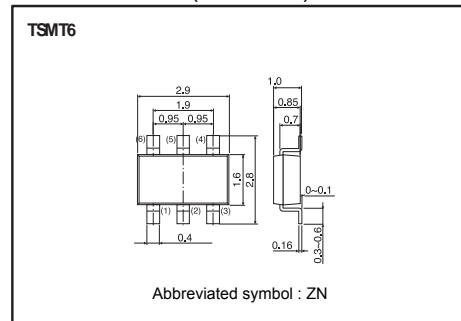
\*2 Mounted on a ceramic board.

● **Thermal resistance**

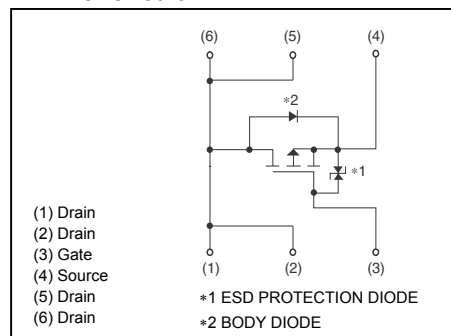
| Parameter          | Symbol           | Limits | Unit   |
|--------------------|------------------|--------|--------|
| Channel to Ambient | $R_{th}(ch-a)^*$ | 100    | °C / W |

\*Mounted on a ceramic board.

● **Dimensions (Unit : mm)**



● **Inner circuit**



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

| Parameter                               | Symbol         | Min. | Typ. | Max.     | Unit       | Conditions                      |
|---|----------------|------|------|----------|------------|---------------------------------|
| Gate-source leakage                     | $I_{GSS}$      | -    | -    | $\pm 10$ | $\mu A$    | $V_{GS} = \pm 20V, V_{DS} = 0V$ |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$  | -100 | -    | -        | V          | $I_D = -1mA, V_{GS} = 0V$       |
| Zero gate voltage drain current         | $I_{DSS}$      | -    | -    | -1       | $\mu A$    | $V_{DS} = -100V, V_{GS} = 0V$   |
| Gate threshold voltage                  | $V_{GS(th)}$   | -1.0 | -    | -2.5     | V          | $V_{DS} = -10V, I_D = -1mA$     |
| Static drain-source on-state resistance | $R_{DS(on)}^*$ | -    | 350  | 470      | m $\Omega$ | $I_D = -1.5A, V_{GS} = -10V$    |
|   |                | -    | 380  | 510      |            | $I_D = -0.75A, V_{GS} = -4.5V$  |
|   |                | -    | 400  | 540      |            | $I_D = -0.75A, V_{GS} = -4.0V$  |
| Forward transfer admittance             | $ Y_{fs} ^*$   | 1.5  | -    | -        | S          | $V_{DS} = -10V, I_D = -1.5A$    |
| Input capacitance                       | $C_{iss}$      | -    | 950  | -        | pF         | $V_{DS} = -25V$                 |
| Output capacitance                      | $C_{oss}$      | -    | 45   | -        | pF         | $V_{GS} = 0V$                   |
| Reverse transfer capacitance            | $C_{rss}$      | -    | 20   | -        | pF         | $f = 1MHz$                      |
| Turn-on delay time                      | $t_{d(on)}^*$  | -    | 10   | -        | ns         | $V_{DD} = -50V, I_D = -0.75A$   |
| Rise time                               | $t_r^*$        | -    | 15   | -        | ns         | $V_{GS} = -10V$                 |
| Turn-off delay time                     | $t_{d(off)}^*$ | -    | 60   | -        | ns         | $R_L = 66\Omega$                |
| Fall time                               | $t_f^*$        | -    | 10   | -        | ns         | $R_G = 10\Omega$                |
| Total gate charge                       | $Q_g^*$        | -    | 17.0 | -        | nC         | $V_{DD} = -50V, I_D = -1.5A$    |
| Gate-source charge                      | $Q_{gs}^*$     | -    | 4.5  | -        | nC         | $V_{GS} = -5V$                  |
| Gate-drain charge                       | $Q_{gd}^*$     | -    | 5.0  | -        | nC         |                                 |

\*Pulsed

**● Body diode characteristics (Source-Drain)**

| Parameter       | Symbol     | Min. | Typ. | Max. | Unit | Conditions                 |
|-----------------|------------|------|------|------|------|----------------------------|
| Forward Voltage | $V_{SD}^*$ | -    | -    | -1.2 | V    | $V_{GS} = 0V, I_s = -1.5A$ |

\*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics ( I )

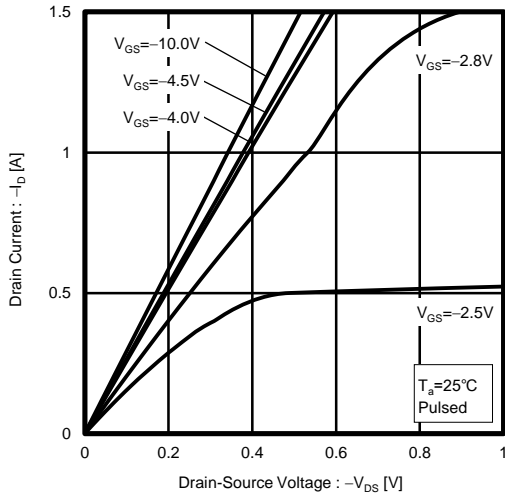


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

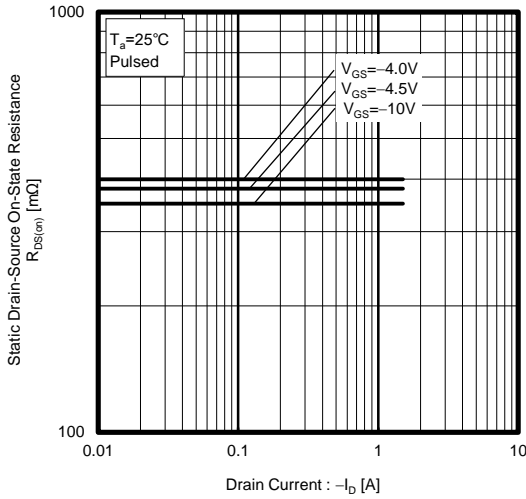


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

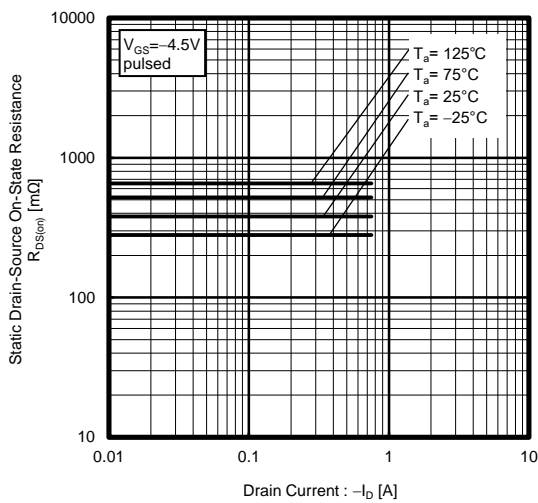


Fig.2 Typical Output Characteristics ( II )

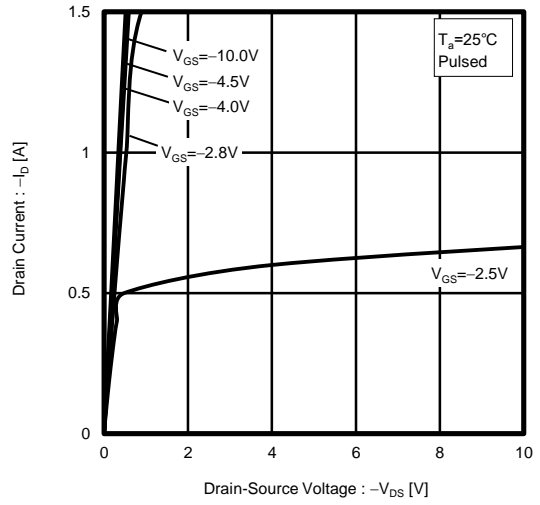


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

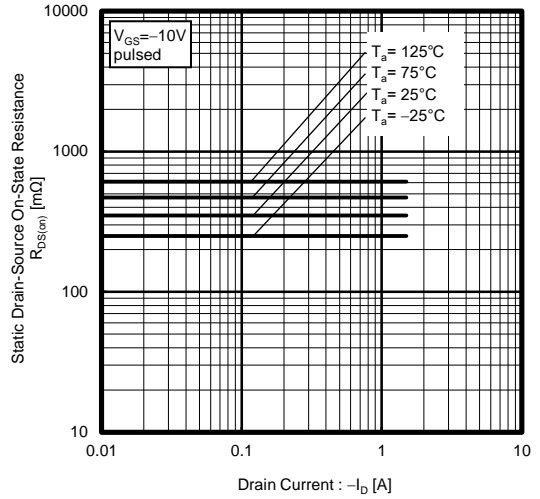


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

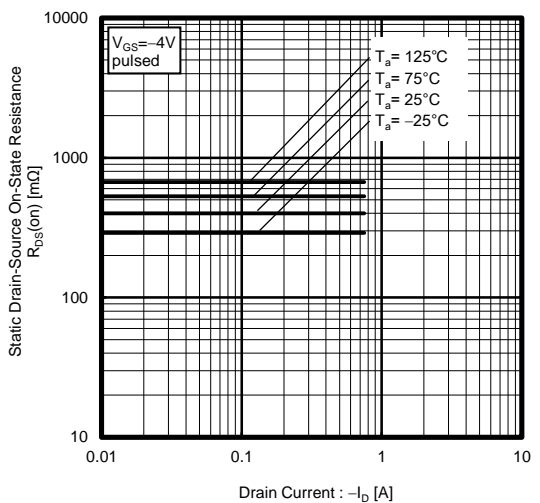


Fig.7 Forward Transfer Admittance vs. Drain Current

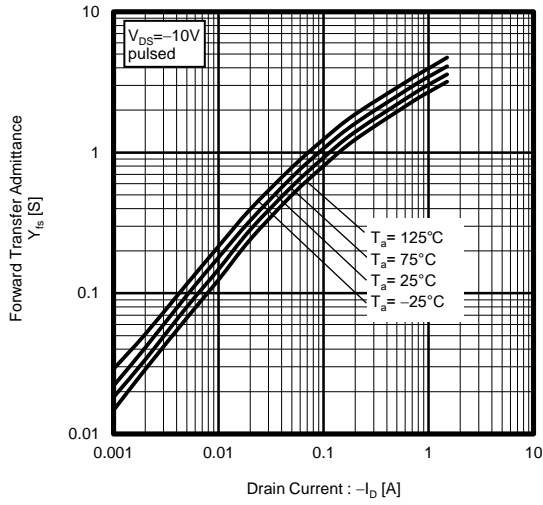


Fig.8 Typical Transfer Characteristics

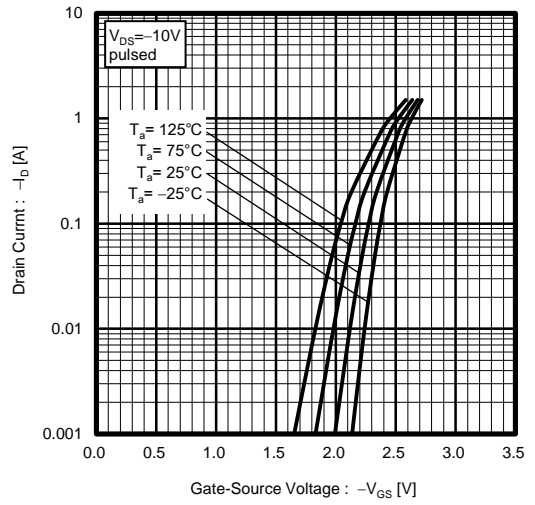


Fig.9 Source Current vs. Source-Drain Voltage

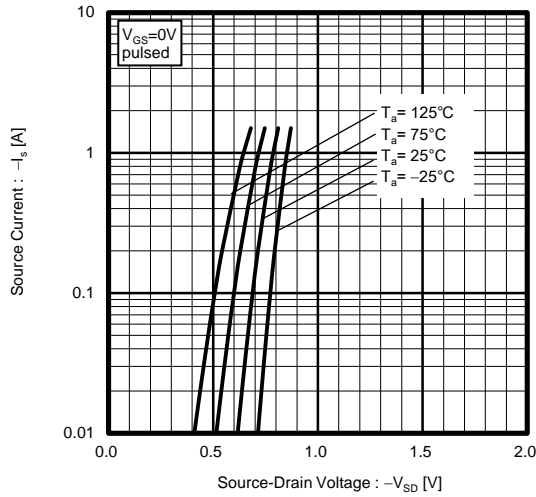


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

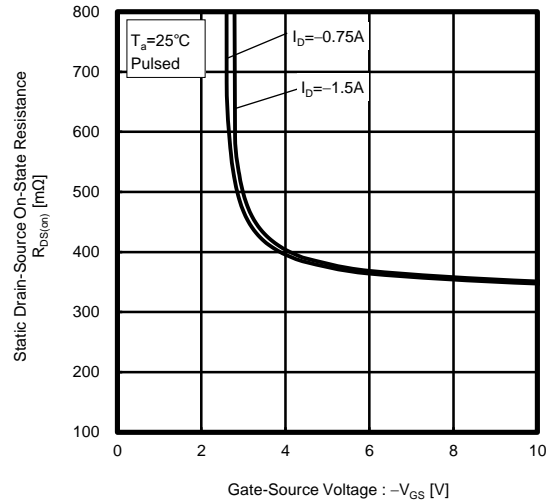


Fig.11 Switching Characteristics

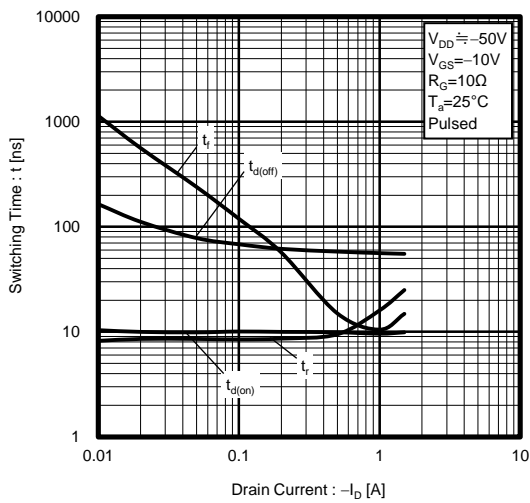


Fig.12 Dynamic Input Characteristics

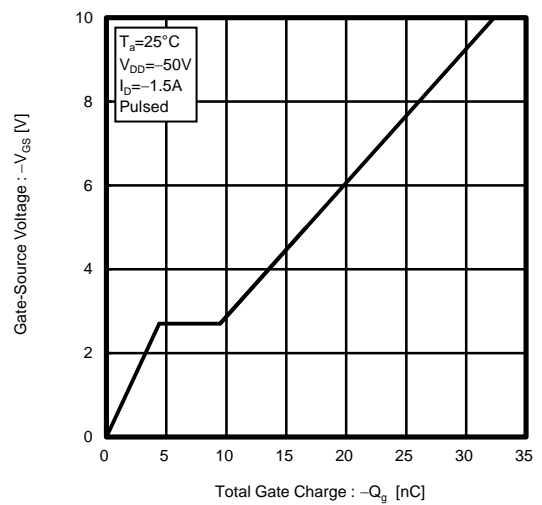


Fig.13 Typical Capacitance vs. Drain-Source Voltage

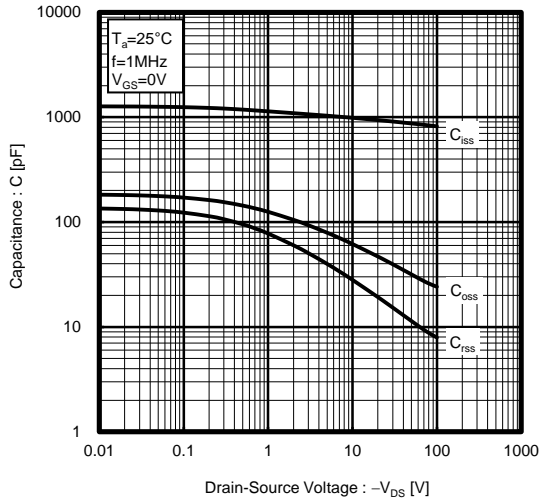


Fig.14 Normalized Transient Thermal Resistance v.s. Pulse Width

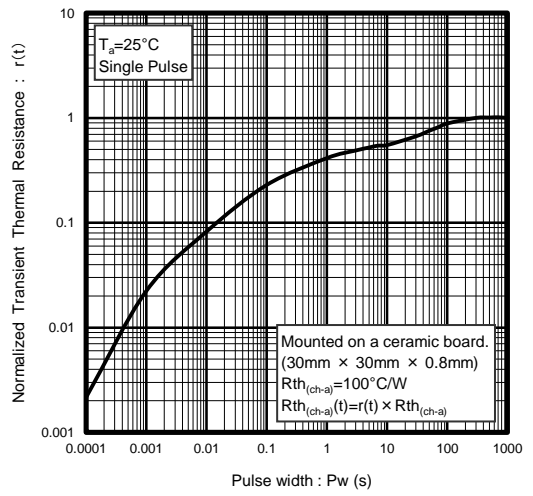
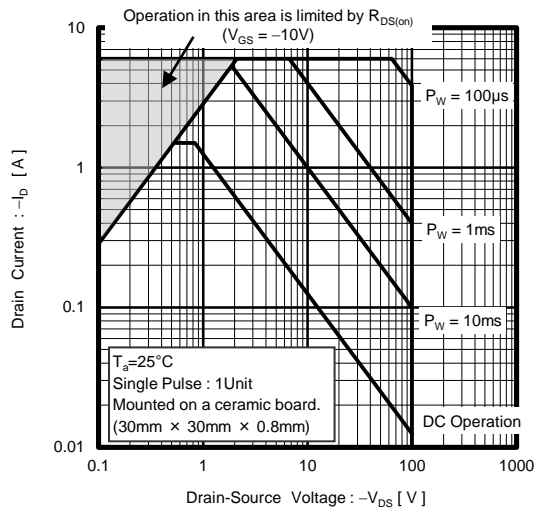


Fig.15 Maximum Safe Operating Area



● Measurement circuits

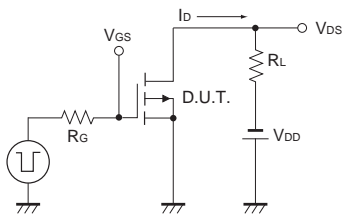


Fig.1-1 Switching Time Measurement Circuit

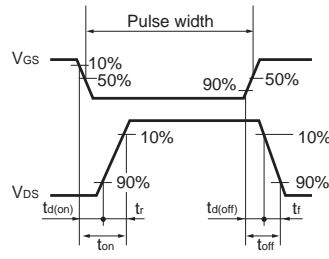


Fig.1-2 Switching Waveforms

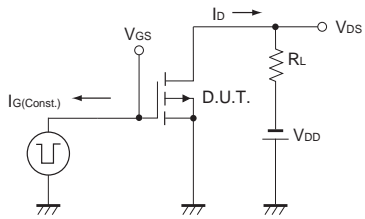


Fig.2-1 Gate Charge Measurement Circuit

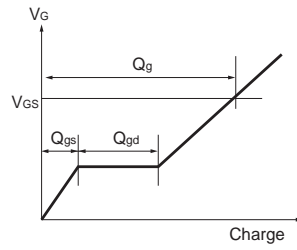


Fig.2-2 Gate Charge Waveform

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