

# 0.9V Drive Nch MOSFET

## RYM002N05

### ● Structure

Silicon N-channel MOSFET

### ● Features

- 1) High speed switing.
- 2) Small package(VMT3).
- 3) Ultra low voltage drive(0.9V drive).

### ● Application

Switching

### ● Packaging specifications

| Type      | Package                      | Taping |
|-----------|------------------------------|--------|
|           | Code                         | T2L    |
|           | Basic ordering unit (pieces) | 8000   |
| RYM002N05 |                              | ○      |

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

| Parameter                      |            | Symbol      | Limits      | Unit |
|--------------------------------|------------|-------------|-------------|------|
| Drain-source voltage           |            | $V_{DSS}$   | 50          | V    |
| Gate-source voltage            |            | $V_{GSS}$   | ±8          | V    |
| Drain current                  | Continuous | $I_D$       | ±200        | mA   |
|                                | Pulsed     | $I_{DP}$ *1 | ±800        | mA   |
| Source current<br>(Body Diode) | Continuous | $I_S$       | 125         | mA   |
|                                | Pulsed     | $I_{SP}$ *1 | 800         | mA   |
| Power dissipation              |            | $P_D$ *2    | 150         | mW   |
| 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  $\leq 1\%$

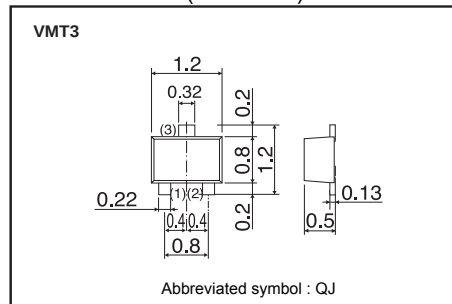
\*2 Each terminal mounted on a recommended land.

### ● Thermal resistance

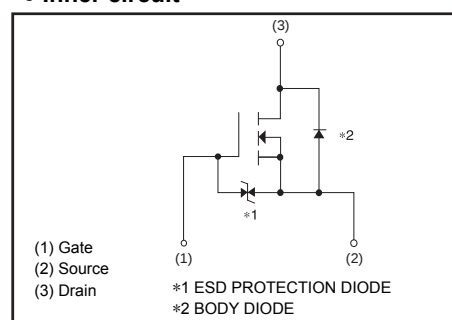
| Parameter          | Symbol           | Limits | Unit   |
|--------------------|------------------|--------|--------|
| Channel to Ambient | $R_{th}(ch-a)^*$ | 833    | °C / W |

\* Each terminal mounted on a recommended land.

### ● Dimensions (Unit : mm)



### ● Inner circuit



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

| Parameter                               | Symbol         | Min. | Typ. | Max.     | Unit     | Conditions                        |
|-----------------------------------------|----------------|------|------|----------|----------|-----------------------------------|
| Gate-source leakage                     | $I_{GSS}$      | -    | -    | $\pm 10$ | $\mu A$  | $V_{GS} = \pm 8V, V_{DS} = 0V$    |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$  | 50   | -    | -        | V        | $I_D = 1mA, V_{GS} = 0V$          |
| Zero gate voltage drain current         | $I_{DSS}$      | -    | -    | 1        | $\mu A$  | $V_{DS} = 50V, V_{GS} = 0V$       |
| Gate threshold voltage                  | $V_{GS(th)}$   | 0.3  | -    | 0.8      | V        | $V_{DS} = 10V, I_D = 1mA$         |
| Static drain-source on-state resistance | $R_{DS(on)}$   | -    | 1.6  | 2.2      | $\Omega$ | $I_D = 200mA, V_{GS} = 4.5V$      |
|                                         |                | -    | 1.7  | 2.4      |          | $I_D = 200mA, V_{GS} = 2.5V$      |
|                                         |                | -    | 2.0  | 2.8      |          | $I_D = 200mA, V_{GS} = 1.5V$      |
|                                         |                | -    | 2.2  | 3.3      |          | $I_D = 100mA, V_{GS} = 1.2V$      |
|                                         |                | -    | 3.0  | 9.0      |          | $I_D = 10mA, V_{GS} = 0.9V$       |
| Forward transfer admittance             | $ Y_{fs} ^*$   | 0.2  | -    | -        | S        | $I_D = 200mA, V_{DS} = 10V$       |
| Input capacitance                       | $C_{iss}$      | -    | 26   | -        | pF       | $V_{DS} = 10V$                    |
| Output capacitance                      | $C_{oss}$      | -    | 6    | -        | pF       | $V_{GS} = 0V$                     |
| Reverse transfer capacitance            | $C_{rss}$      | -    | 3    | -        | pF       | $f = 1MHz$                        |
| Turn-on delay time                      | $t_{d(on)}^*$  | -    | 5    | -        | ns       | $I_D = 100mA, V_{DD} \approx 25V$ |
| Rise time                               | $t_r^*$        | -    | 8    | -        | ns       | $V_{GS} = 4.5V$                   |
| Turn-off delay time                     | $t_{d(off)}^*$ | -    | 17   | -        | ns       | $R_L = 250\Omega$                 |
| Fall time                               | $t_f^*$        | -    | 43   | -        | ns       | $R_G = 10\Omega$                  |

\*Pulsed

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

| Parameter       | Symbol     | Min. | Typ. | Max. | Unit | Conditions                 |
|-----------------|------------|------|------|------|------|----------------------------|
| Forward Voltage | $V_{SD}^*$ | -    | -    | 1.2  | V    | $I_S = 200mA, V_{GS} = 0V$ |

\*Pulsed

● Electrical characteristics curves (Ta = 25°C)

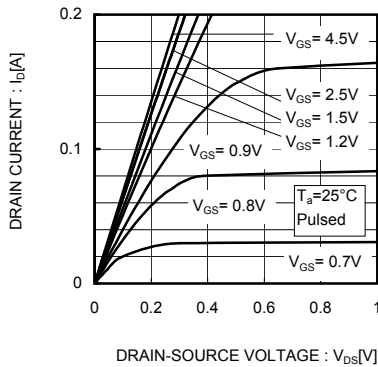


Fig.1 Typical Output Characteristics( I )

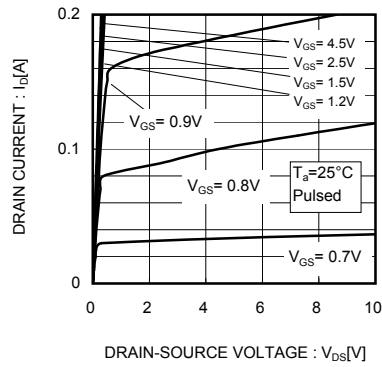


Fig.2 Typical Output Characteristics( II )

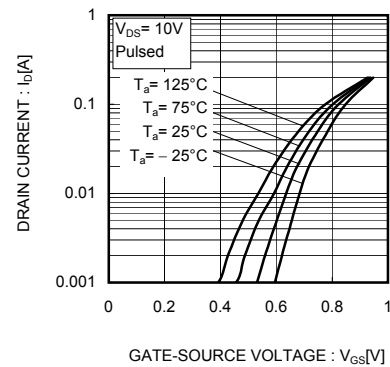


Fig.3 Typical Transfer Characteristics

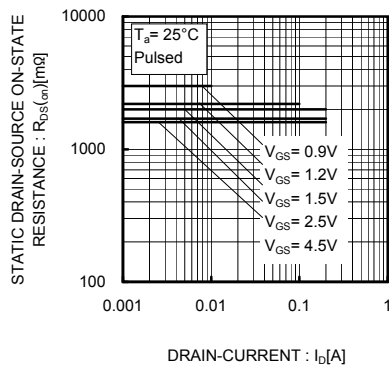


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

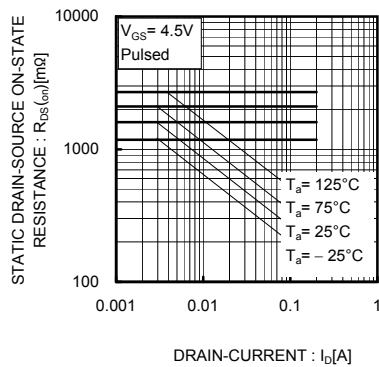


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

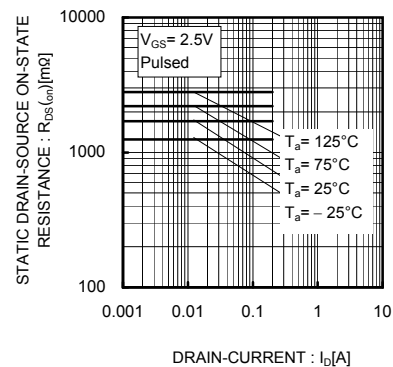


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

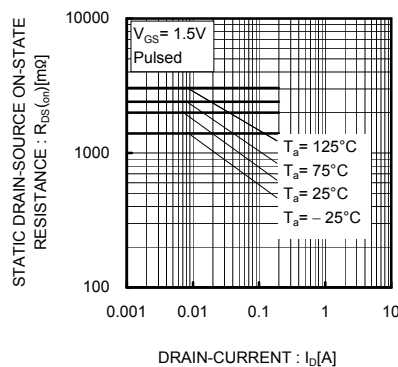


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( IV )

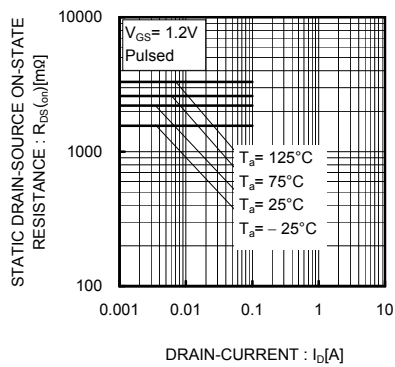


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current( V )

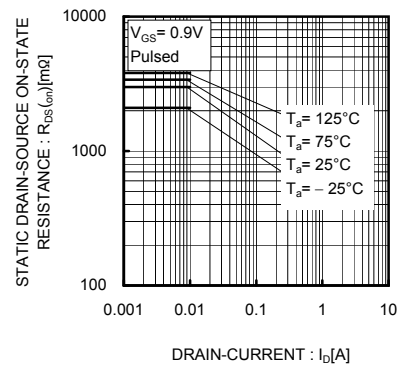


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current( VI )

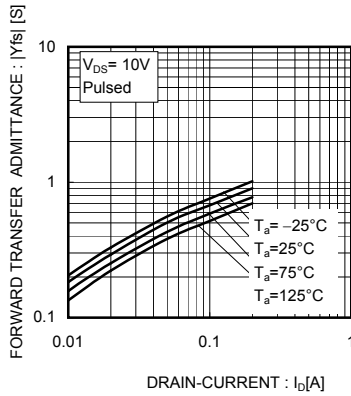


Fig.10 Forward Transfer Admittance vs. Drain Current

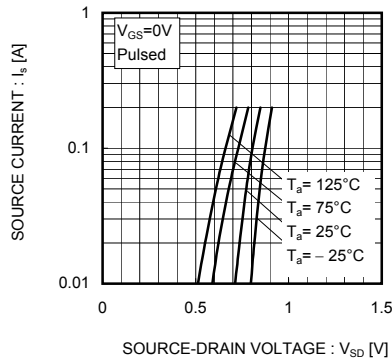


Fig.11 Reverse Drain Current vs. Source-Drain Voltage

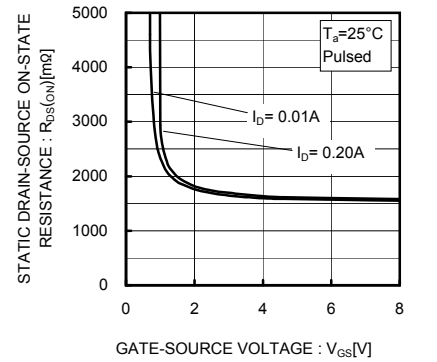


Fig.12 Static Drain-Source On-State Resistance vs. Gate Source Voltage

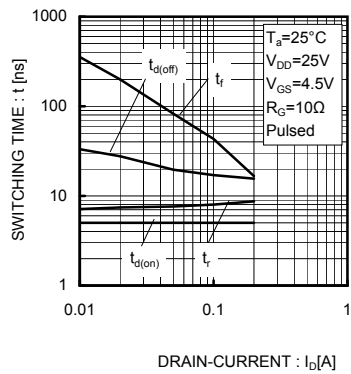


Fig.13 Switching Characteristics

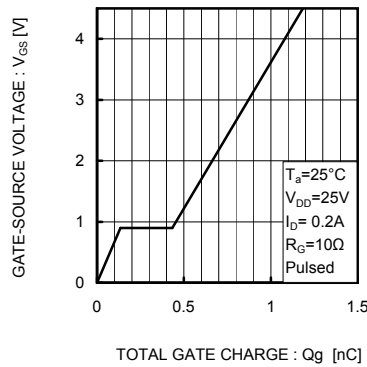


Fig.14 Typical Capacitance vs. Drain-Source Voltage

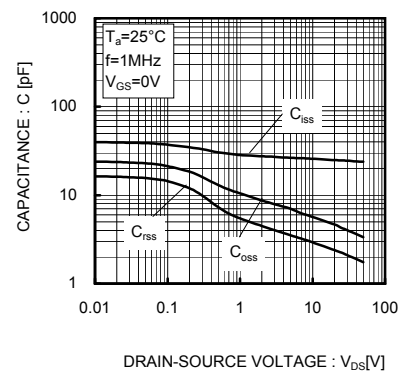


Fig.15 Typical Capacitance vs. Drain-Source Voltage

### ● Measurement circuits

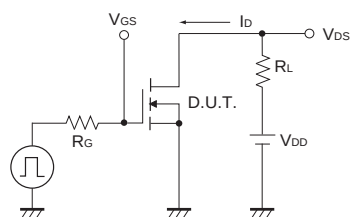


Fig.1-1 Switching time measurement circuit

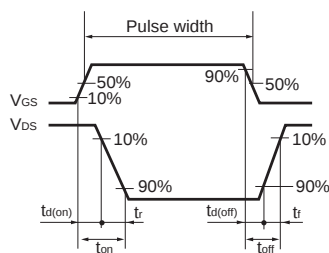


Fig.1-2 Switching waveforms

### ● 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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