# 0.9V Drive Nch MOSFET

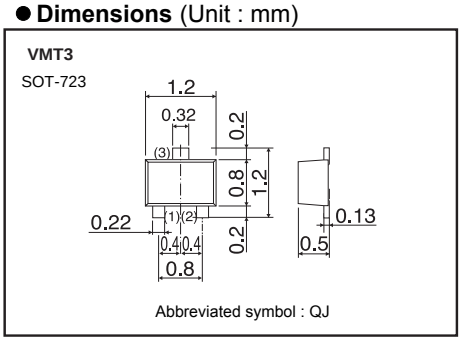
## RYM002N05

### ● Structure
Silicon N-channel MOSFET

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

### ● Application
Switching

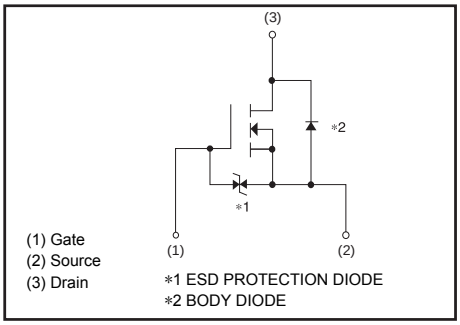
### ● Dimensions (Unit : mm)




### ● Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | T2CL |
| | Basic ordering unit (pieces) | 8000 |
| RYM002N05 | | O |

### ● Inner circuit




### ● 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 (Body Diode) | Continuous | $I_S$ | 125 | mA |
| | Pulsed | $I_{SP}$ *1 | 800 | mA |
| Power dissipation | | $P_D$ *2 | 150 | mW |
| Channel temperature | | Tch | 150 | °C |
| Range of storage temperature | | Tstg | −55 to +150 | °C |

*1 Pw≤10μs, Duty cycle≤1%

*2 Each terminal mounted on a recommended land.

### ● Thermal resistance

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to Ambient | Rth (ch-a)* | 833 | °C / W |

* Each terminal mounted on a recommended land.

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | - | - | ±10 | μA | $V_{GS}$=±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 | μA | $V_{DS}$=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 | Ω | $I_D$=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, $V_{DD}$≒25V |
| Rise time | $t_r$ * | - | 8 | - | ns | $V_{GS}$=4.5V |
| Turn-off delay time | $t_{d(off)}$* | - | 17 | - | ns | $R_L$=250Ω |
| Fall time | $t_f$ * | - | 43 | - | ns | $R_G$=10Ω |

*Pulsed

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

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

*Pulsed

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

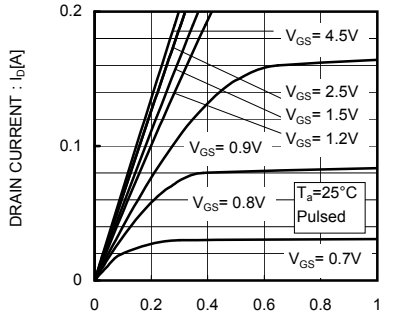



Fig.1 Typical Output Characteristics( Ⅰ )

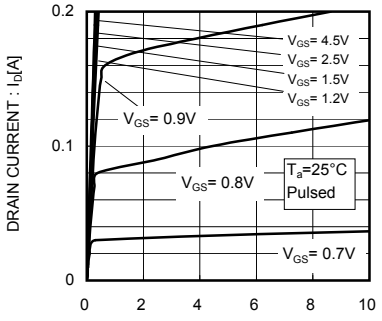



Fig.2 Typical Output Characteristics( Ⅱ )

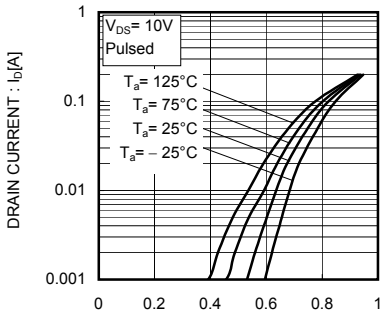



Fig.3 Typical Transfer Characteristics

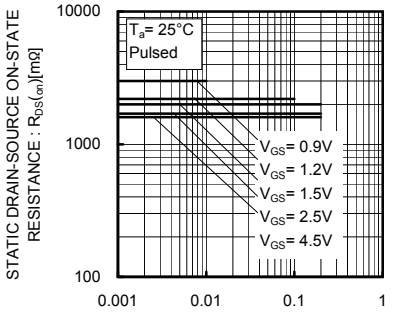



Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( Ⅰ )

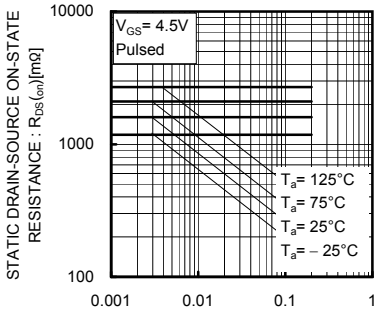



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( Ⅱ )

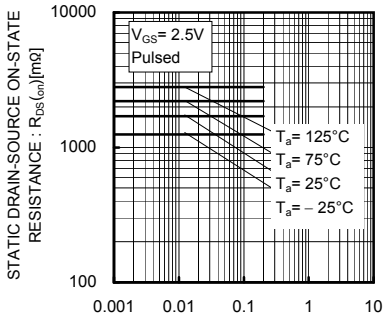



Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( Ⅲ )

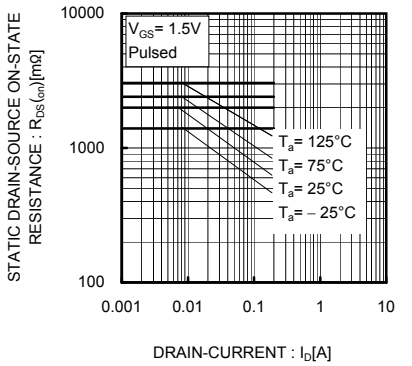



Fig.7 Static Drain-Source On-State Resistance vs. Drain Current( Ⅳ )

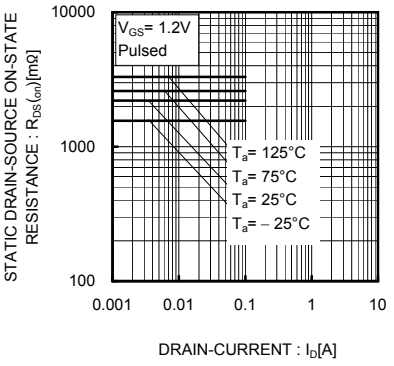



Fig.8 Static Drain-Source On-State Resistance vs. Drain Current( Ⅴ )

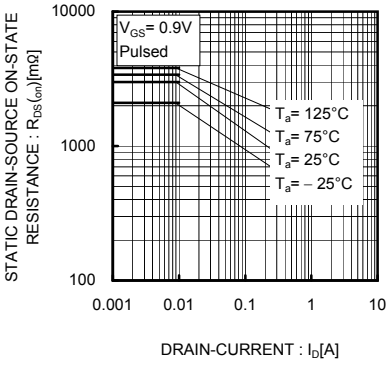



Fig.9 Static Drain-Source On-State Resistance vs. Drain Current( Ⅵ )

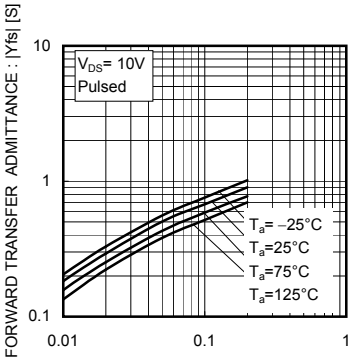



Fig.10 Forward Transfer Admittance vs. Drain Current

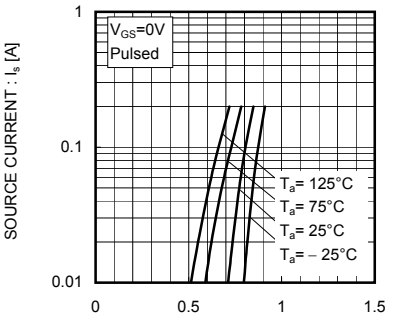



Fig.11 Reverse Drain Current vs. Sourse-Drain Voltage

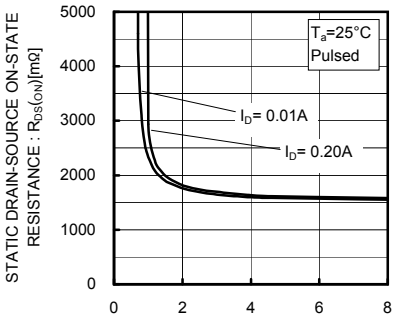



Fig.12 Static Drain-Source On-State Resistance vs. Gate Source Voltage

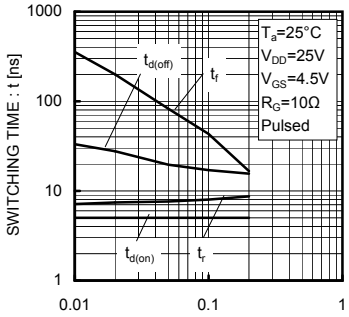



Fig.13 Switching Characteristics

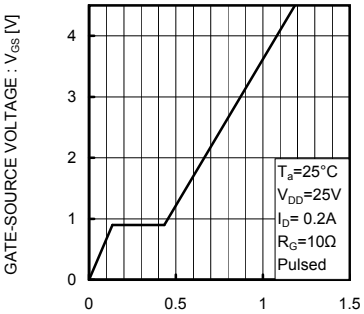



Fig.14 Typical Capacitance vs. Drain-Source Voltage

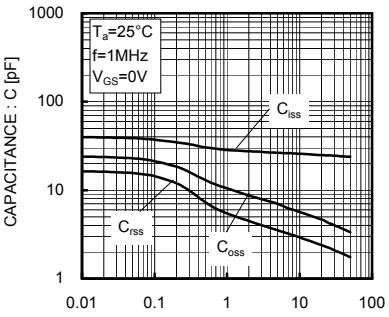



Fig.15 Typical Capacitance vs. Drain-Source Voltage

● **Measurement circuits**

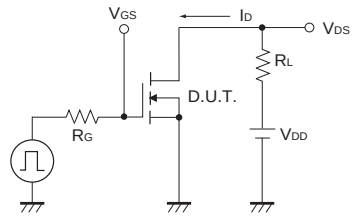



Fig.1-1 Switching time measurement circuit

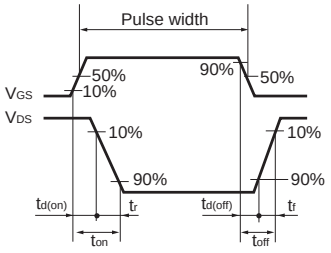



Fig.1-2 Switching waveforms

● **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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