# Interface and switching (60V, 115mA)

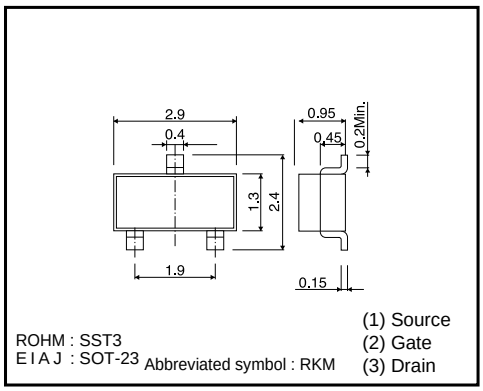
## RK7002

●**Structure**
Silicon N-channel
MOSFET

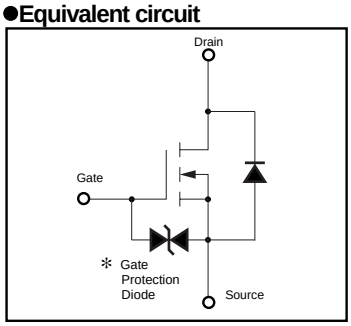
●**Features**
1) Low on-resistance.
2) High-speed switching.
3) Low-voltage drive(5V).

●**Application**
Switching

●**Dimensions** (Unit : mm)




●**Equivalent circuit**




✻ A protection diode has been built in between the gate and the source to protect against static electricity when the product is in use.
Use the protection circuit when fixed voltages are exceeded.

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

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | 60 | V |
| Gate-source voltage | | $V_{GSS}$ | ±20 | V |
| Drain current | Continuous | $I_D$ | 115 | mA |
| | Pulsed | $I_{DP}$*1 | 800 | mA |
| Reverse drain current | Continuous | $I_{DR}$ | 115 | mA |
| | Pulsed | $I_{DRP}$*1 | 800 | mA |
| Total power dissipation | | $P_D$*2 | 225 | mW |
| Channel temperature | | Tch | 150 | °C |
| Storage temperature | | Tstg | –55 to +150 | °C |

✻1 Pw≤10μs, Duty cycle≤1%
✻2 When mounted on a 1x0.75x0.062 inch glass epoxy board.

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±10 | μA | $V_{GS}$= ±20V, $V_{DS}$= 0V |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 60 | – | – | V | $I_D$=10μA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | – | – | 1.0 | μA | $V_{DS}$= 60V, $V_{GS}$= 0V |
| Gate threshold voltage | $V_{GS\,(th)}$ | 1.0 | 1.85 | 2.5 | V | $V_{DS}$= 10V, $I_D$= 1mA |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | – | – | 7.5 | Ω | $I_D$= 0.5A, $V_{GS}$=10V |
| | | – | – | 7.5 | | $I_D$= 0.05A, $V_{GS}$= 5V |
| Forward transfer admittance | $\|Y_{fs}\|$* | 80 | – | – | mS | $I_D$= 0.2A, $V_{DS}$= 10V |
| Input capacitance | $C_{iss}$ | – | 25 | 50 | pF | $V_{DS}$= 25V |
| Output capacitance | $C_{oss}$ | – | 10 | 25 | pF | $V_{GS}$= 0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 3.0 | 5.0 | pF | f= 1MHz |
| Turn-on delay time | $t_{d(on)}$* | – | 12 | 20 | ns | $I_D$= 0.2A, $V_{DD}$ ≒ 30V, $V_{GS}$=10V, |
| Turn-off delay time | $t_{d(off)}$* | – | 20 | 30 | ns | $R_L$=150Ω, $R_G$=10Ω |

* Pw≤300μs, Duty cycle≤1%

●**Electrical characteristic curves**

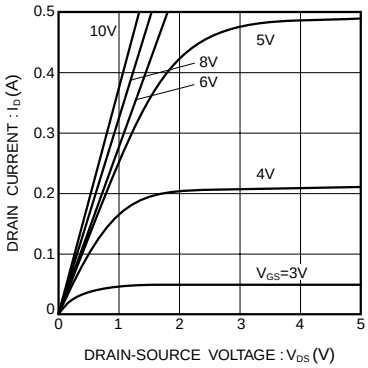



Fig.1 Typical Output Characteristics

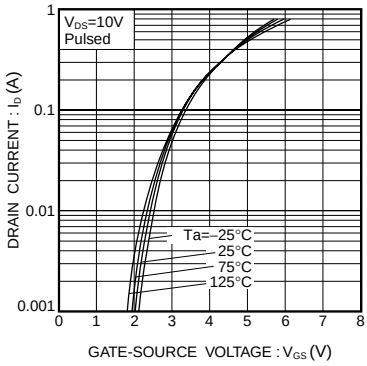



Fig.2 Typical Transfer Characteristics

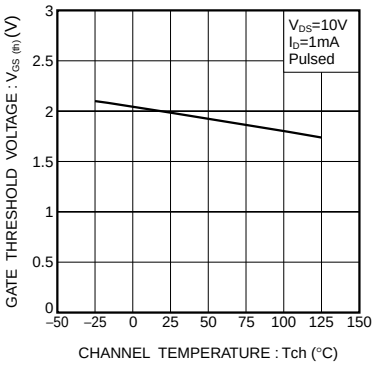



Fig.3 Gate Threshold Voltage vs. Channel Temperature

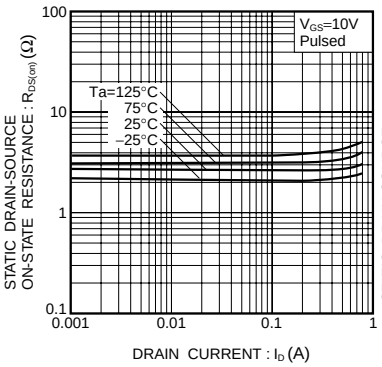



Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

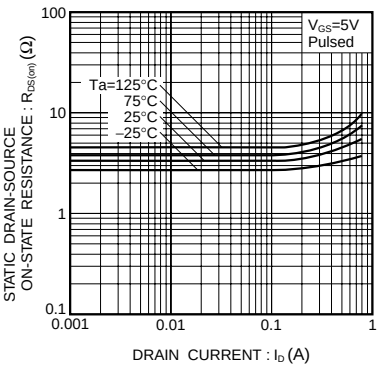



Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II)

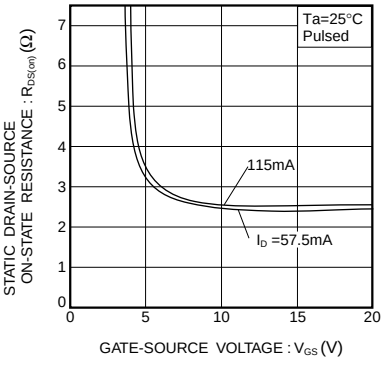



Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

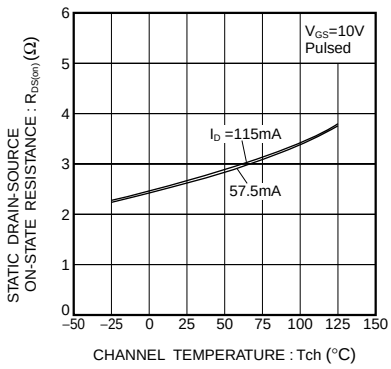



Fig.7 Static Drain-Source On-State Resistance vs. Channel Temperature

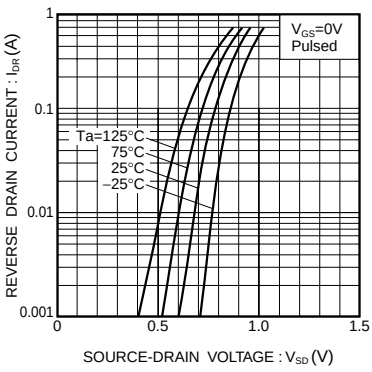



Fig.8 Reverse Drain Current vs. Source-Drain Voltage ( I )

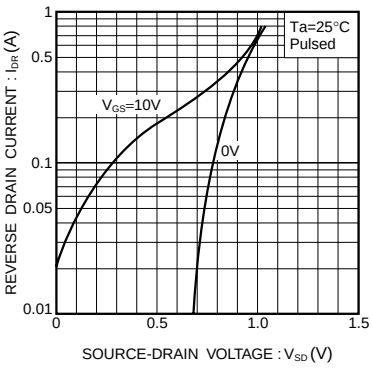



Fig.9 Reverse Drain Current vs. Source-Drain Voltage (II)

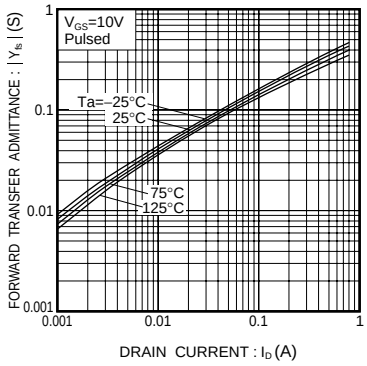



Fig.10 Reverse Drain Current vs. Source-Drain Voltage (II)

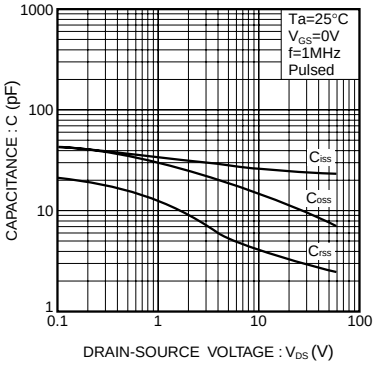



Fig.11 Typical Capacitance vs. Drain-Source Voltage

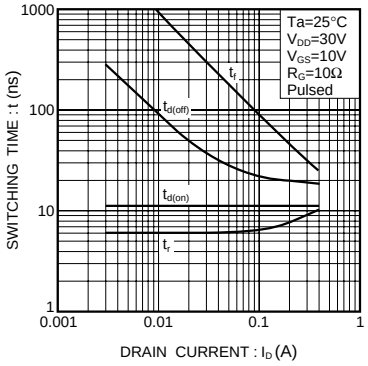



Fig.12 Switching Characteristics (See Figure. 13 and 14 for measurement circuits)

**●Measurement circuit**

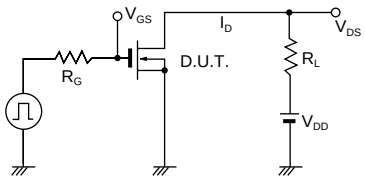



Fig.13 Switching Time Test Circuit

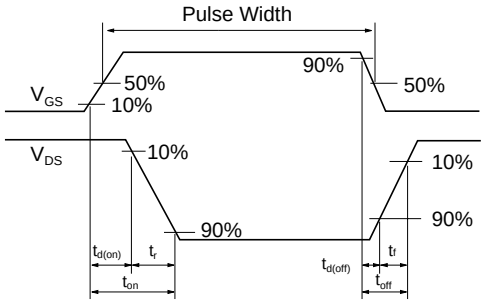



Fig.14 Switching Time Waveforms

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