# 4V Drive Nch MOSFET

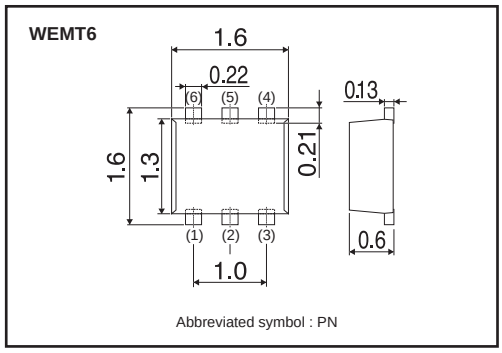
## RW1E014SN

### ●Structure
Silicon N-channel MOSFET

### ●Features
1) Low On-resistance, High speed switching.
2) Built-in G-S Protection Diode.
3) Space Saving, Small Surface Mount Package (WEMT6).

### ●Applications
Switching

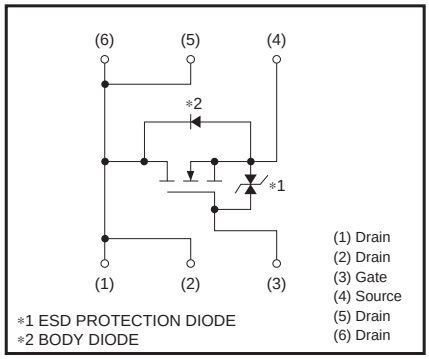
### ●Dimensions (Unit : mm)




### ●Packaging specifications

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | T2R |
| | Basic ordering unit (pieces) | 8000 |
| RW1E014SN | | ○ |

### ●Inner circuit




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

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | 30 | V |
| Gate-source voltage | | $V_{GSS}$ | ±20 | V |
| Drain current | Continuous | $I_D$ | ±1.4 | A |
| | Pulsed | $I_{DP}$ ∗1 | ±2.8 | A |
| Source current (Body diode) | Continuous | $I_S$ | 0.5 | A |
| | Pulsed | $I_{SP}$ ∗1 | 2.8 | A |
| Total power dissipation | | $P_D$ ∗2 | 0.7 | W |
| Channel temperature | | Tch | 150 | °C |
| Range of Storage temperature | | Tstg | −55 to +150 | °C |

∗1 Pw≤10µs, Duty cycle≤1%
∗2 When mounted on a ceramic board

### ●Thermal resistance

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to ambient | Rth (ch-a) ∗ | 179 | °C / W |

∗ When mounted on a ceramic board

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±10 | μA | $V_{GS}$= ±20V, $V_{DS}$=0V |
| Drain-source breakdown voltage | $V_{(BR)\ DSS}$ | 30 | – | – | V | $I_D$= 1mA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | – | – | 1 | μA | $V_{DS}$= 30V, $V_{GS}$=0V |
| Gate threshold voltage | $V_{GS\ (th)}$ | 1.0 | – | 2.5 | V | $V_{DS}$= 10V, $I_D$= 1mA |
| Static drain-source on-state resistance | $R_{DS\ (on)}$* | – | 170 | 240 | mΩ | $I_D$= 1.4A, $V_{GS}$= 10V |
| | | – | 250 | 350 | mΩ | $I_D$= 1.4A, $V_{GS}$= 4.5V |
| | | – | 270 | 380 | mΩ | $I_D$= 1.4A, $V_{GS}$= 4V |
| Forward transfer admittance | $\|Y_{fs}\|$ * | 1 | – | – | S | $V_{DS}$= 10V, $I_D$= 1.4A |
| Input capacitance | $C_{iss}$ | – | 70 | – | pF | $V_{DS}$= 10V |
| Output capacitance | $C_{oss}$ | – | 15 | – | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 12 | – | pF | f=1MHz |
| Turn-on delay time | $t_{d\ (on)}$ * | – | 6 | – | ns | $V_{DD}$≒15V<br>$I_D$= 0.7A<br>$V_{GS}$= 10V<br>$R_L$≒21Ω<br>$R_G$=10Ω |
| Rise time | $t_r$ * | – | 6 | – | ns | |
| Turn-off delay time | $t_{d\ (off)}$ * | – | 13 | – | ns | |
| Fall time | $t_f$ * | – | 8 | – | ns | |
| Total gate charge | $Q_g$ * | – | 1.4 | – | nC | $V_{DD}$≒15V<br>$I_D$= 1.4A<br>$V_{GS}$= 5V<br>$R_L$≒11Ω<br>$R_G$=10Ω |
| Gate-source charge | $Q_{gs}$ * | – | 0.6 | – | nC | |
| Gate-drain charge | $Q_{gd}$ * | – | 0.3 | – | nC | |

*Pulsed

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Forward voltage | $V_{SD}$ * | – | – | 1.2 | V | $I_S$= 1.4A, $V_{GS}$=0V |

*Pulsed

## ●Electrical characteristics curves

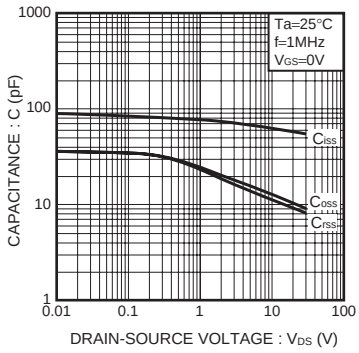



Fig.1 Typical Capacitance vs. Drain-Source Voltage

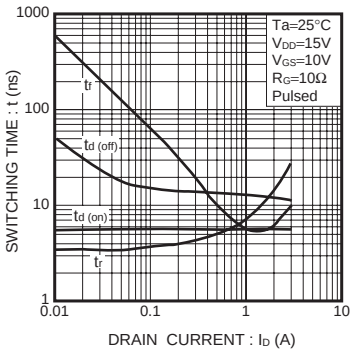



Fig.2 Switching Characteristics

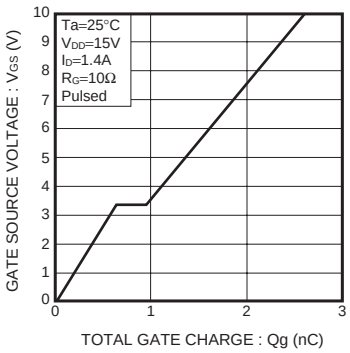



Fig.3 Dynamic Input Characteristics

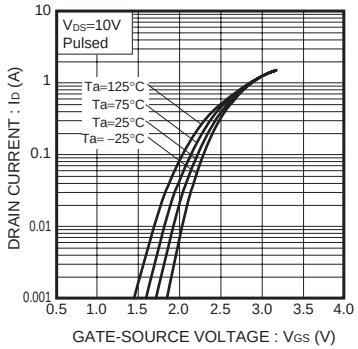



Fig.4 Typical Transfer Characteristics

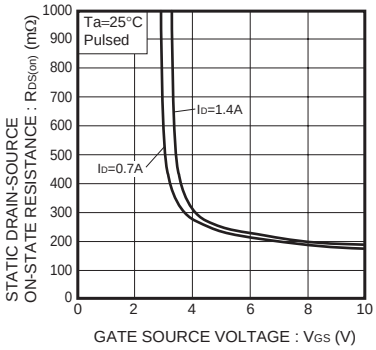



Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

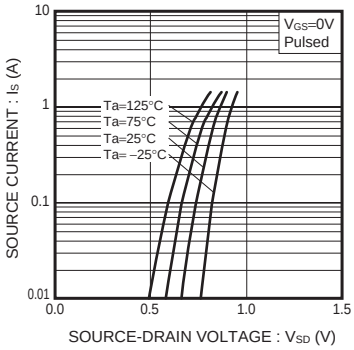



Fig.6 Source Current vs. Source-Drain Voltage

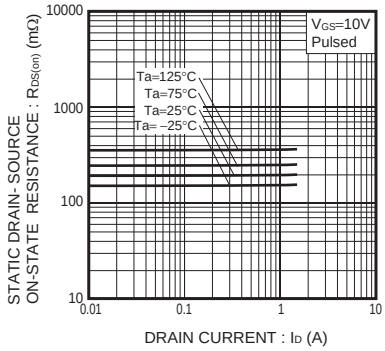



Fig.7 Static Drain-Source On-State Resistance vs. Drain Current ( I )

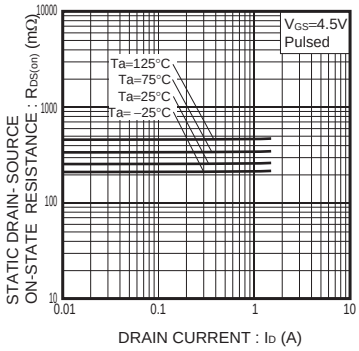



Fig.8 Static Drain-Source On-State Resistance vs. Drain Current ( II )

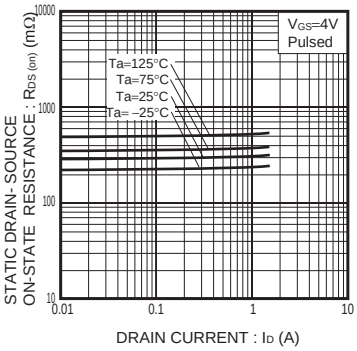



Fig.9 Static Drain-Source On-State Resistance vs. Drain Current ( III )

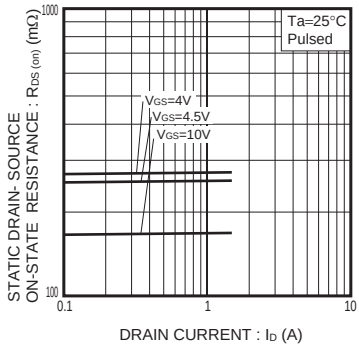



Fig.10 Static Drain-Source On-State Resistance vs. Drain Current ( IV )

●**Measurement circuit**

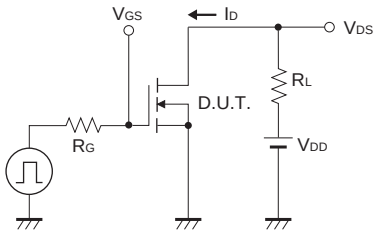



Fig.1-1 Switching Time Measurement Circuit

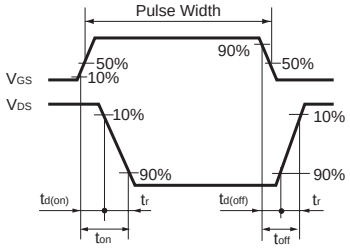



Fig.1-2 Switching Waveforms

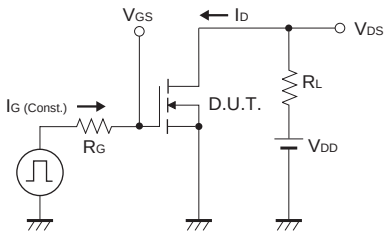



Fig.2-1 Gate Charge Measurement Circuit

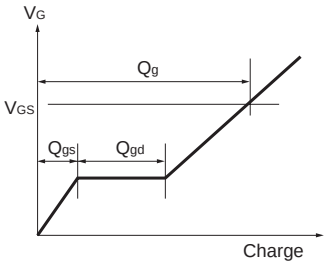



Fig.2-2 Gate Charge Waveform

●**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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