

# 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).

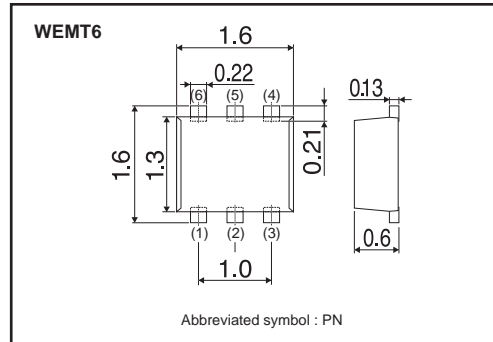
### ●Applications

Switching

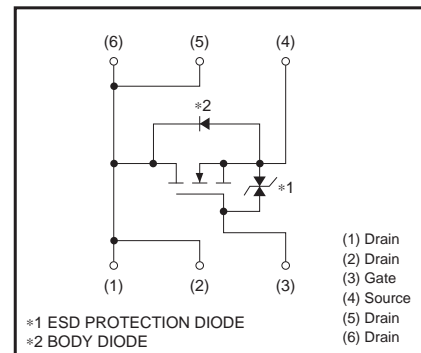
### ●Packaging specifications

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

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	30	V	
Gate-source voltage	$V_{GSS}$	$\pm 20$	V	
Drain current	Continuous	$I_D$	$\pm 1.4$	A
	Pulsed	$I_{DP}$ *1	$\pm 2.8$	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	$T_{ch}$	150	°C	
Range of Storage temperature	$T_{stg}$	-55 to +150	°C	

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

\*2 When mounted on a ceramic board

### ●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$ *	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 <sub>GSS</sub>	–	–	±10	μA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR) DSS</sub>	30	–	–	V	I <sub>D</sub> = 1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	–	–	1	μA	V <sub>DS</sub> = 30V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS (th)</sub>	1.0	–	2.5	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Static drain-source on-state resistance	R <sub>DS (on)</sub> *	–	170	240	mΩ	I <sub>D</sub> = 1.4A, V <sub>GS</sub> = 10V
		–	250	350	mΩ	I <sub>D</sub> = 1.4A, V <sub>GS</sub> = 4.5V
		–	270	380	mΩ	I <sub>D</sub> = 1.4A, V <sub>GS</sub> = 4V
Forward transfer admittance	Y <sub>fs</sub>   *	1	–	–	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.4A
Input capacitance	C <sub>iss</sub>	–	70	–	pF	V <sub>DS</sub> = 10V
Output capacitance	C <sub>oss</sub>	–	15	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	12	–	pF	f=1MHz
Turn-on delay time	t <sub>d (on)</sub> *	–	6	–	ns	V <sub>DD</sub> ≐ 15V
Rise time	t <sub>r</sub> *	–	6	–	ns	I <sub>D</sub> = 0.7A
Turn-off delay time	t <sub>d (off)</sub> *	–	13	–	ns	V <sub>GS</sub> = 10V
Fall time	t <sub>f</sub> *	–	8	–	ns	R <sub>L</sub> ≐ 21Ω
Total gate charge	Q <sub>g</sub> *	–	1.4	–	nC	V <sub>DD</sub> ≐ 15V
Gate-source charge	Q <sub>gs</sub> *	–	0.6	–	nC	I <sub>D</sub> = 1.4A
Gate-drain charge	Q <sub>gd</sub> *	–	0.3	–	nC	V <sub>GS</sub> = 5V
						R <sub>L</sub> ≐ 11Ω
						R <sub>G</sub> =10Ω

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub> *	–	–	1.2	V	I <sub>S</sub> = 1.4A, V <sub>GS</sub> =0V

\*Pulsed

●Electrical characteristics curves

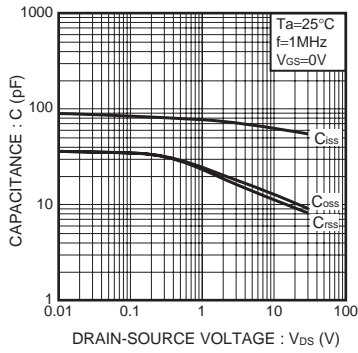


Fig.1 Typical Capacitance vs. Drain-Source Voltage

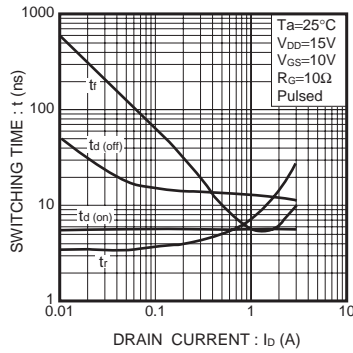


Fig.2 Switching Characteristics

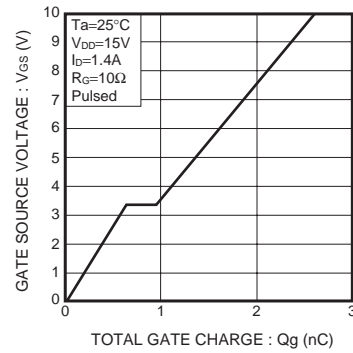


Fig.3 Dynamic Input Characteristics

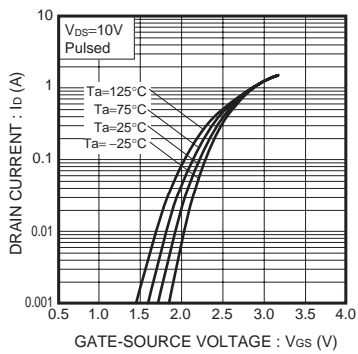


Fig.4 Typical Transfer Characteristics

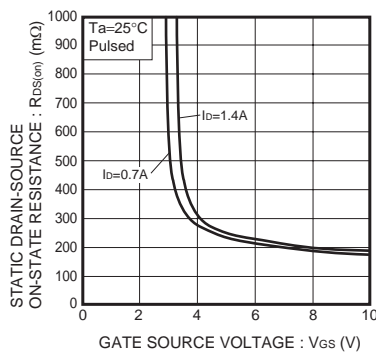


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

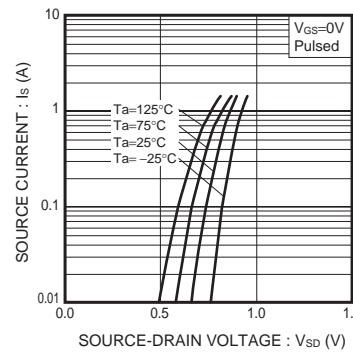


Fig.6 Source Current vs. Source-Drain Voltage

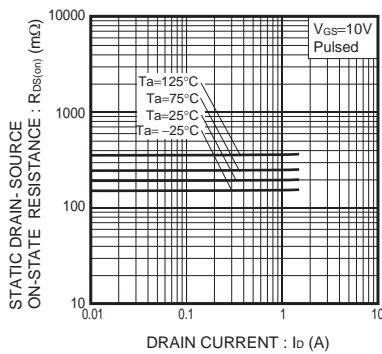


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current ( I )

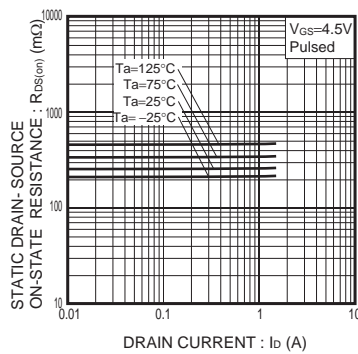


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current ( II )

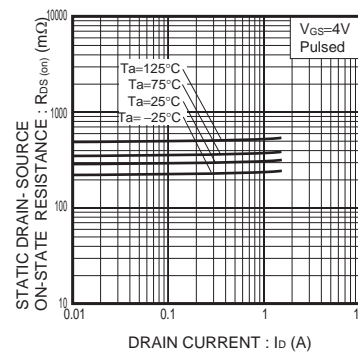


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current ( III )

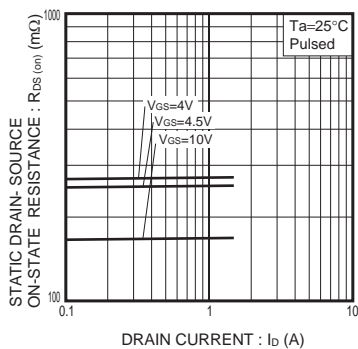


Fig.10 Static Drain-Source On-State Resistance vs. Drain Current ( IV )

●Measurement circuit

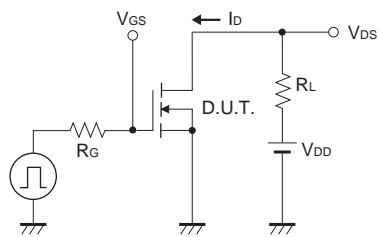


Fig.1-1 Switching Time Measurement Circuit

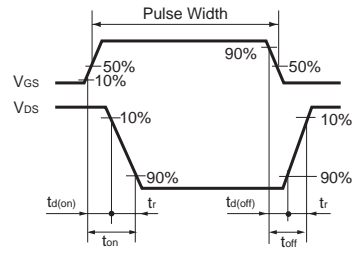


Fig.1-2 Switching Waveforms

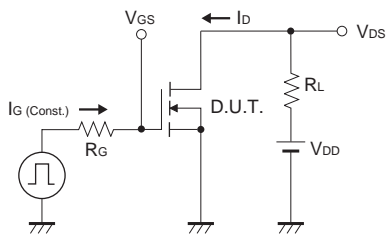


Fig.2-1 Gate Charge Measurement Circuit

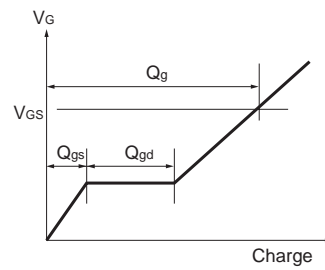


Fig.2-2 Gate Charge Waveform

●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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