

Transistors

# Switching (−30V, −4.0A)

## RSS040P03

### ●Features

- 1) Low On-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small and Surface Mount Package (SOP8).

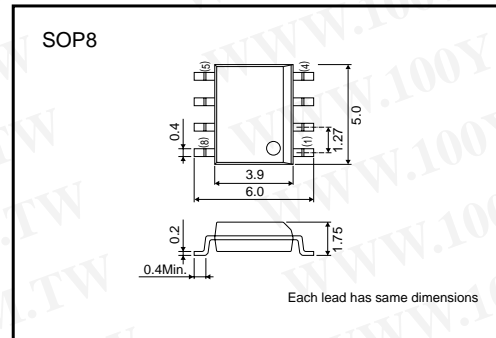
### ●Application

Power switching, DC / DC converter.

### ●Structure

Silicon P-channel  
 MOS FET

### ●External dimensions (Unit : mm)



### ●Packaging specifications

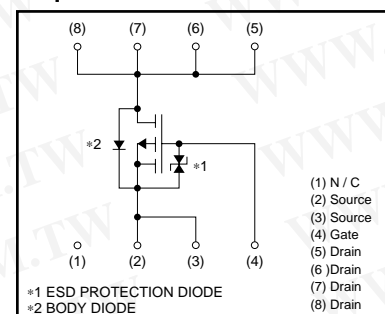
Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
RSS040P03		○

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DS}$	−30	V
Gate-source voltage	$V_{GS}$	±20	V
Drain current	Continuous	$I_D$	±4.0
	Pulsed	$I_{DP}$	±16
Source current (Body diode)	Continuous	$I_S$	−1.6
	Pulsed	$I_{SP}$	−16
Total power dissipation	$P_D$	2.0	W
Channel temperature	$T_{ch}$	150	°C
Range of Storage temperature	$T_{stg}$	−55 to +150	°C

\*1  $P_w \leq 10\text{mW}$ , Duty cycle ≤ 1%  
 \*2 Mounted on a ceramic board

### ●Equivalent circuit



### ●Thermal resistance (Ta=25°C)

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$	62.5	°C / W

\* Mounted on a ceramic board.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu A$	$V_{GS} = \pm 20V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-30	—	—	V	$I_D = -1mA, V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	—	—	-1	$\mu A$	$V_{DS} = -30V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	-1.0	—	-2.5	V	$V_{DS} = -10V, I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	—	42	58	m $\Omega$	$I_D = -4.0A, V_{GS} = -10V$
		—	68	92	m $\Omega$	$I_D = -2.0A, V_{GS} = -4.5V$
		—	78	106	m $\Omega$	$I_D = -2.0A, V_{GS} = -4.0V$
Forward transfer admittance	$ Y_{fs} $ *	2.5	—	—	S	$V_{DS} = -10V, I_D = -2.0A$
Input capacitance	$C_{iss}$	—	800	—	pF	$V_{DS} = -10V$
Output capacitance	$C_{oss}$	—	180	—	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	—	110	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	—	12	—	ns	$I_D = -2.0A$
Rise time	$t_r$ *	—	25	—	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}$ *	—	45	—	ns	$V_{GS} = -10V$
Fall time	$t_f$ *	—	15	—	ns	$R_L = 7.5\Omega$
Total gate charge	$Q_g$	—	8.0	—	nC	$V_{DD} = -15V$
Gate-source charge	$Q_{gs}$	—	2.5	—	nC	$V_{GS} = -5V$
Gate-drain charge	$Q_{gd}$	—	3.0	—	nC	$I_D = -4.0A$
*Pulsed						
Body diode characteristics (source-drain characteristics)						
Forward voltage	$V_{SD}$	—	—	-1.2	V	$I_S = -1.6A, V_{GS} = 0V$

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### ●Electrical characteristic curves

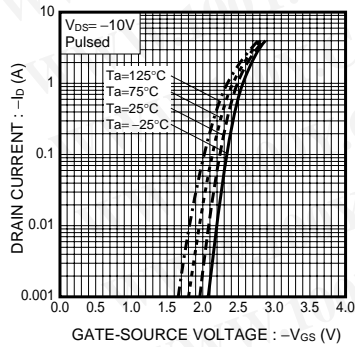


Fig.1 Typical Transfer Characteristics

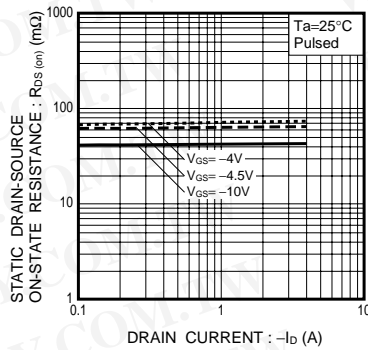


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

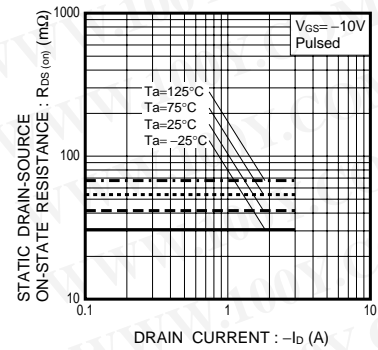


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

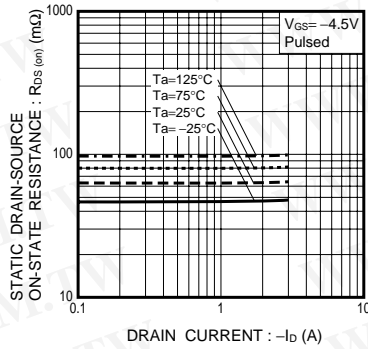


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

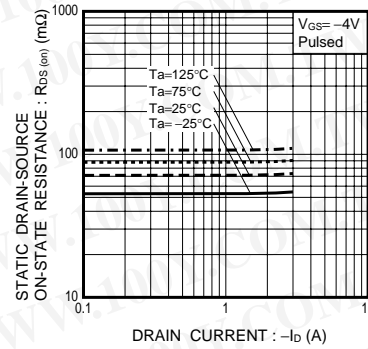


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

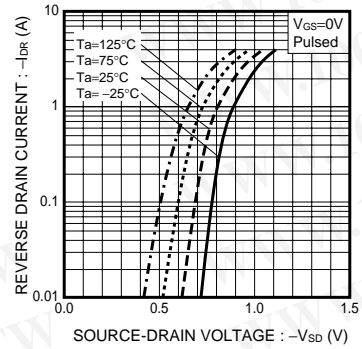


Fig.6 Reverse Drain Current Source-Drain Current

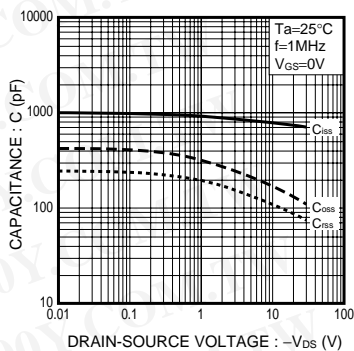


Fig.7 Typical Capacitance vs. Drain-Source Voltage

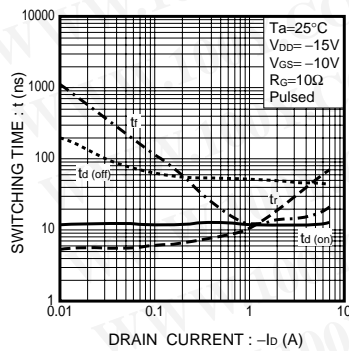


Fig.8 Switching Characteristics

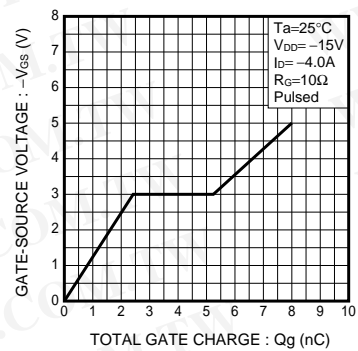


Fig.9 Dynamic Input Characteristics

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### ●Measurement circuits

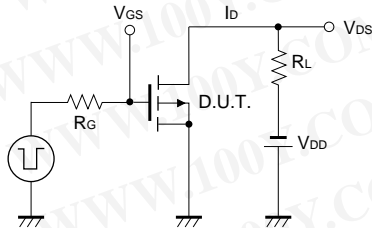


Fig.10 Switching Time Test Circuit

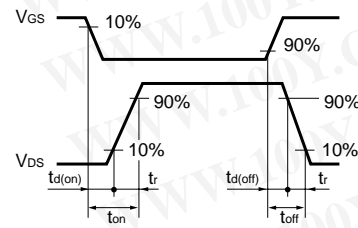


Fig.11 Switching Time Waveforms

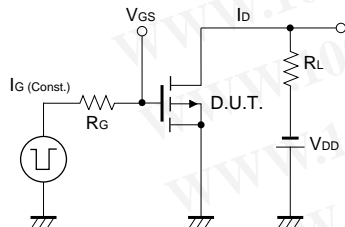


Fig.12 Gate Charge Test Circuit

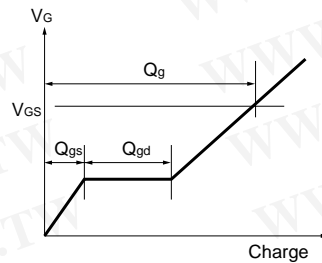


Fig.13 Gate Charge Waveform



## Appendix

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