

Transistors

# Switching (−30V, −9.0A)

## RSS090P03

●Features

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

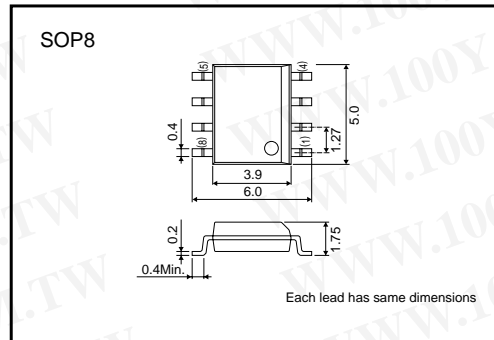
●Application

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
RSS090P03		○

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	V <sub>DSS</sub>	−30	V
Gate-source voltage	V <sub>GSS</sub>	±20	V
Drain current	Continuous	I <sub>D</sub>	±9.0 A
	Pulsed	I <sub>DP</sub>	±36 A *1
Source current (Body diode)	Continuous	I <sub>S</sub>	−1.6 A
	Pulsed	I <sub>SP</sub>	−36 A *1
Total power dissipation	P <sub>D</sub>	2.0	W *2
Channel temperature	T <sub>ch</sub>	150	°C
Range of Storage temperature	T <sub>stg</sub>	−55 to +150	°C

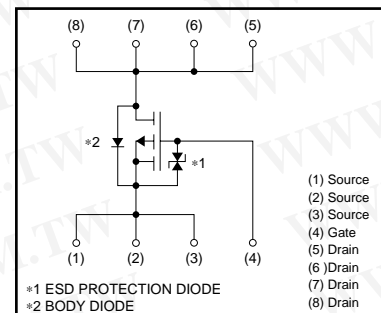
\*1 P<sub>WS</sub>≤10μs, Duty cycle≤1%  
 \*2 Mounted on a ceramic board

●Thermal resistance (Ta=25°C)

Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th (ch-a)</sub>	62.5	°C / W *

\* Mounted on a ceramic board.

●Equivalent circuit



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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	$R_{DS(on)}$ *	-	10	14	$m\Omega$	$I_D = -9.0A, V_{GS} = -10V$
		-	15	21	$m\Omega$	$I_D = -4.5A, V_{GS} = -4.5V$
		-	17	23	$m\Omega$	$I_D = -4.5A, V_{GS} = -4.0V$
Forward transfer admittance	$ Y_{fs} $ *	6.0	-	-	S	$V_{DS} = -10V, I_D = -4.5A$
Input capacitance	$C_{iss}$	-	4000	-	pF	$V_{DS} = -10V$
Output capacitance	$C_{oss}$	-	750	-	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	-	580	-	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	25	-	ns	$I_D = -4.5A$
Rise time	$t_r$ *	-	50	-	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}$ *	-	150	-	ns	$V_{GS} = -10V$
Fall time	$t_f$ *	-	80	-	ns	$R_L = 3.3\Omega$ $R_{GS} = 10\Omega$
Total gate charge	$Q_g$	-	39	-	nC	$V_{DD} = -15V$
Gate-source charge	$Q_{gs}$	-	7.0	-	nC	$V_{GS} = -5V$
Gate-drain charge	$Q_{gd}$	-	15	-	nC	$I_D = -9.0A$
*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

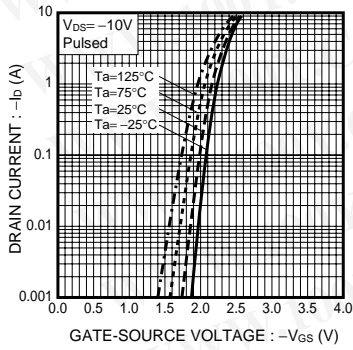


Fig.1 Typical Transfer Characteristics

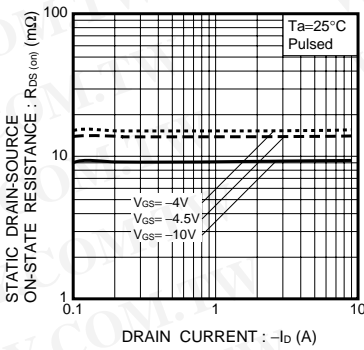


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

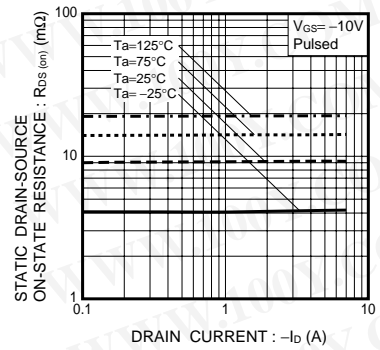


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

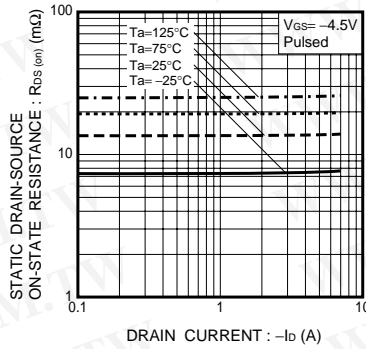


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

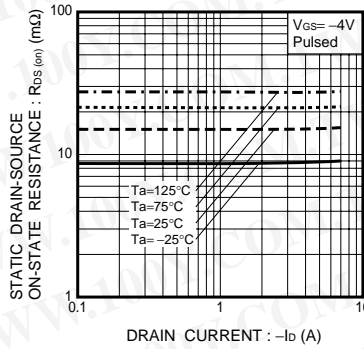


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

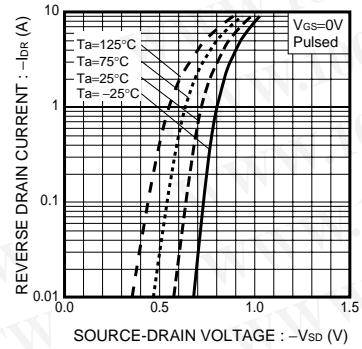


Fig.6 Reverse Drain Current Source-Drain Current

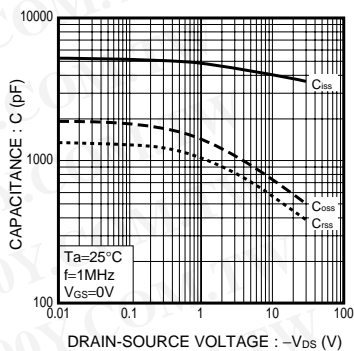


Fig.7 Typical Capacitance vs. Drain-Source Voltage

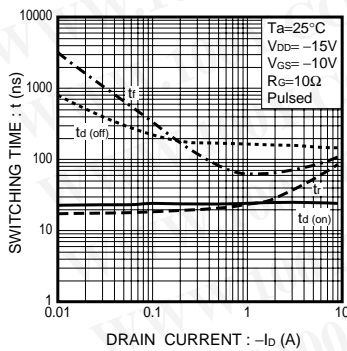


Fig.8 Switching Characteristics

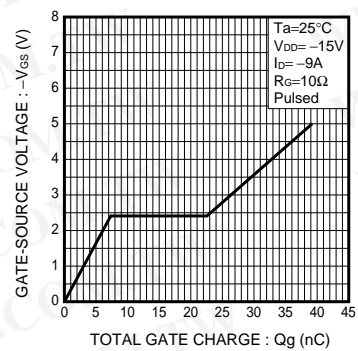


Fig.9 Dynamic Input Characteristics

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●Measurement circuits

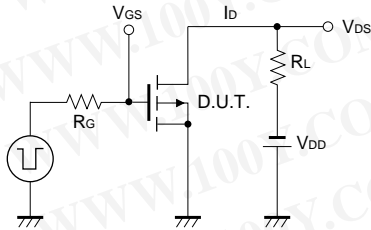


Fig.10 Switching Time Test Circuit

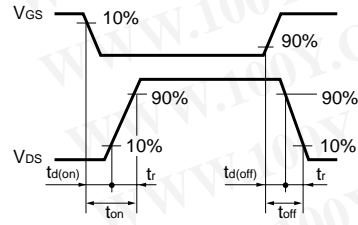


Fig.11 Switching Time Waveforms

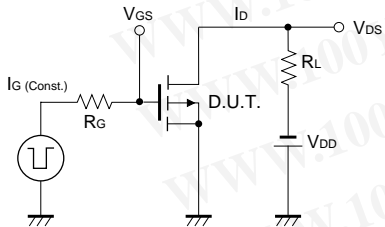


Fig.12 Gate Charge Test Circuit

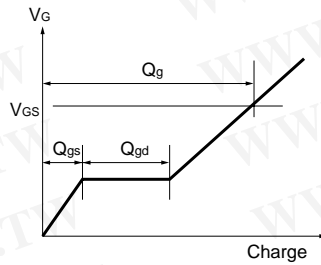


Fig.13 Gate Charge Waveform

## Appendix

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