

# Switching (30V, 9A)

## RSS090N03

### ●Features

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

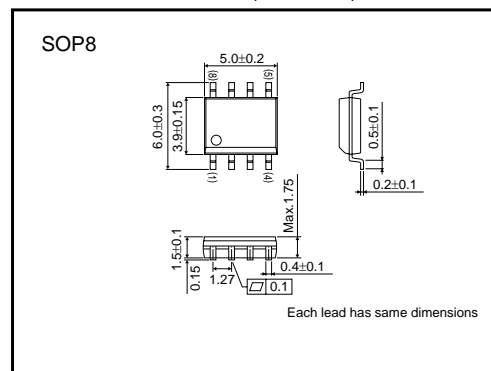
### ●Application

Power switching, DC/DC converter.

### ●Structure

Silicon N-channel  
MOS FET

### ●External dimensions (Unit : mm)



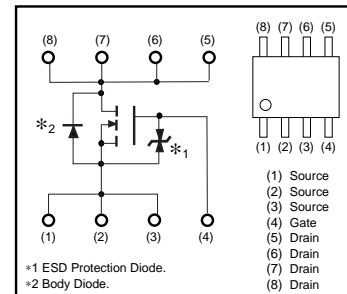
### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	20	V
Drain Current	Continuous	$I_D$	$\pm 9.0$ A
	Pulsed	$I_{DP}$	$\pm 36$ A *1
Source Current (Body Diode)	Continuous	$I_S$	1.6 A
	Pulsed	$I_{SP}$	6.4 A *1
Total Power Dissipation	$P_D$	2	W *2
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C

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

\*2 Mounted on a ceramic board.

### ●Equivalent circuit



\*1 ESD Protection Diode.

\*2 Body Diode.

\* A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use a protection circuit when the fixed voltage are exceeded.

### ●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.

## Transistors

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test 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> *	—	11	15	mΩ	I <sub>D</sub> =9A, V <sub>GS</sub> =10V
		—	15	22		I <sub>D</sub> =9A, V <sub>GS</sub> =4.5V
		—	17	24		I <sub>D</sub> =9A, V <sub>GS</sub> =4V
Forward Transfer Admittance	Y <sub>fs</sub>   *	6.0	—	—	S	I <sub>D</sub> =9A, V <sub>DS</sub> =10V
Input Capacitance	C <sub>iss</sub>	—	810	—	pF	V <sub>DS</sub> =10V
Output Capacitance	C <sub>oss</sub>	—	225	—	pF	V <sub>GS</sub> =0V
Reverse Transfer Capacitance	C <sub>rss</sub>	—	160	—	pF	f=1MHz
Turn-On Delay Time	t <sub>d(on)</sub> *	—	10	—	ns	I <sub>D</sub> =4.5A, V <sub>DD</sub> =15V
Rise Time	t <sub>r</sub> *	—	13	—	ns	V <sub>GS</sub> =10V
Turn-Off Delay Time	t <sub>d(off)</sub> *	—	46	—	ns	R <sub>L</sub> =3.33Ω
Fall Time	t <sub>f</sub> *	—	15	—	ns	R <sub>GS</sub> =10Ω
Total Gate Charge	Q <sub>g</sub> *	—	11	15	nC	V <sub>DD</sub> =15V
Gate-Source Charge	Q <sub>gs</sub> *	—	2.5	—	nC	V <sub>GS</sub> =5V
Gate-Drain Charge	Q <sub>gd</sub> *	—	4.5	—	nC	I <sub>D</sub> =9A

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward Voltage	V <sub>SD</sub> *	—	—	1.2	V	I <sub>S</sub> =6.4A, V <sub>GS</sub> =0V

\*Pulsed

## Transistors

## ●Electrical characteristic curves

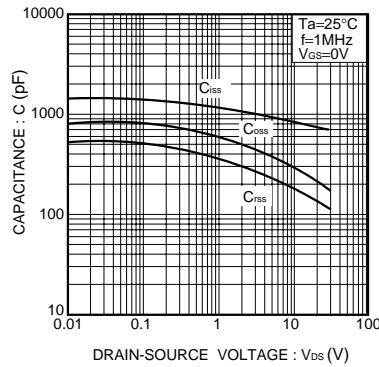


Fig.1 Typical Capacitance vs. Drain-Source Voltage

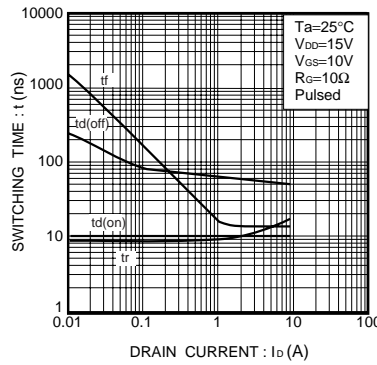


Fig.2 Switching Characteristics

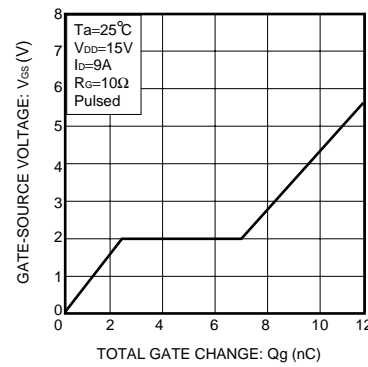


Fig.3 Dynamic Input Characteristics

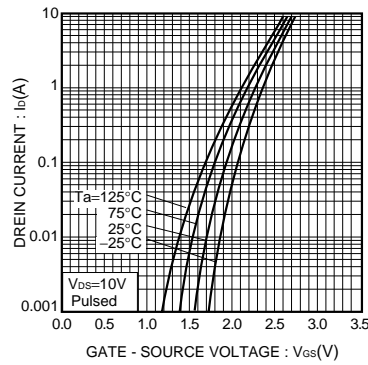


Fig.4 Typical Transfer Characteristics

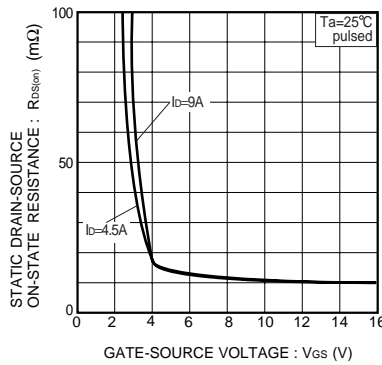


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

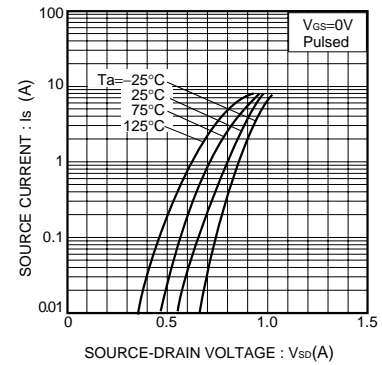


Fig.6 Source-Current vs. Source-Drain Voltage

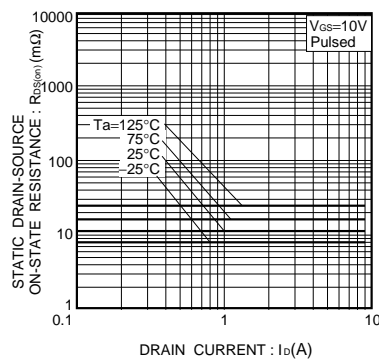


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (1)

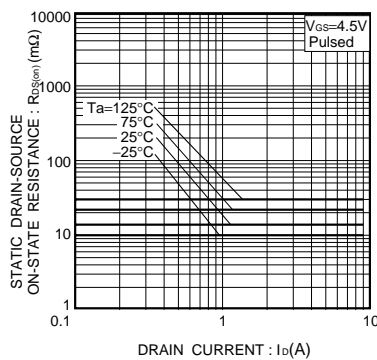


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (2)

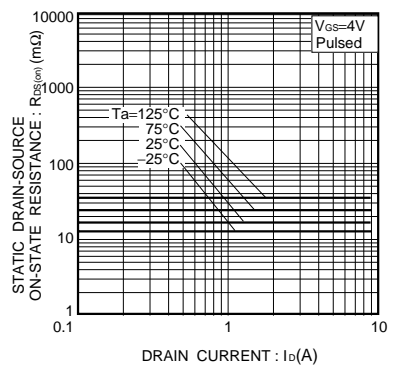


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (3)

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