

# Switching (−30V, −4.0A)

## RSS040P03

### ●Features

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

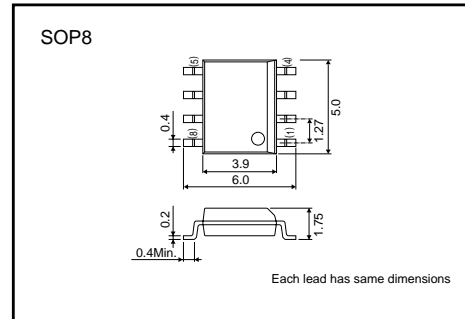
### ●Application

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 A
	Pulsed	$I_{DP}$	±16 A *1
Source current (Body diode)	Continuous	$I_S$	−1.6 A
	Pulsed	$I_{SP}$	−16 A *1
Total power dissipation	$P_D$	2.0	W *2
Channel temperature	$T_{ch}$	150	°C
Range of Storage temperature	$T_{stg}$	−55 to +150	°C

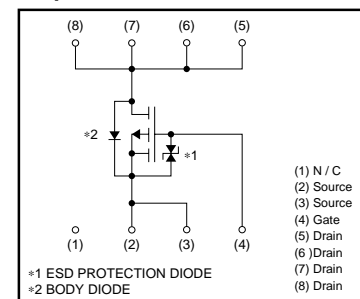
\*1  $P_w \leq 10 \mu s$ , Duty cycle  $\leq 1\%$   
\*2 Mounted on a ceramic board

### ●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.

### ●Equivalent circuit



## Transistors

## ●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> *	-	42	58	mΩ	I <sub>D</sub> =-4.0A, V <sub>GS</sub> =-10V
		-	68	92	mΩ	I <sub>D</sub> =-2.0A, V <sub>GS</sub> =-4.5V
		-	78	106	mΩ	I <sub>D</sub> =-2.0A, V <sub>GS</sub> =-4.0V
Forward transfer admittance	Y <sub>fs</sub>  *	2.5	-	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-2.0A
Input capacitance	C <sub>iss</sub>	-	800	-	pF	V <sub>DS</sub> =-10V
Output capacitance	C <sub>oss</sub>	-	180	-	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	-	110	-	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub> *	-	12	-	ns	I <sub>D</sub> =-2.0A
Rise time	t <sub>r</sub> *	-	25	-	ns	V <sub>DD</sub> ≐-15V
Turn-off delay time	t <sub>d(off)</sub> *	-	45	-	ns	V <sub>GS</sub> =-10V
Fall time	t <sub>f</sub> *	-	15	-	ns	R <sub>L</sub> =7.5Ω
Total gate charge	Q <sub>g</sub>	-	8.0	-	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>	-	3.0	-	nC	I <sub>D</sub> =-4.0A

\*Pulsed

## Body diode characteristics (source-drain characteristics)

Forward voltage	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0V
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Transistors

● Electrical characteristic curves

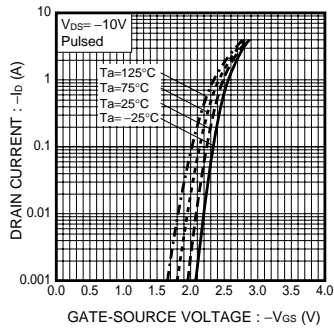


Fig.1 Typical Transfer Characteristics

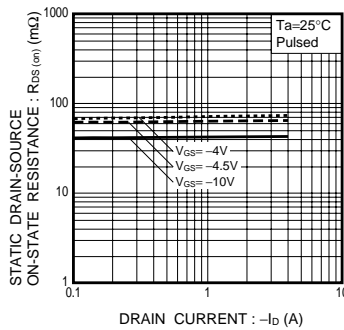


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

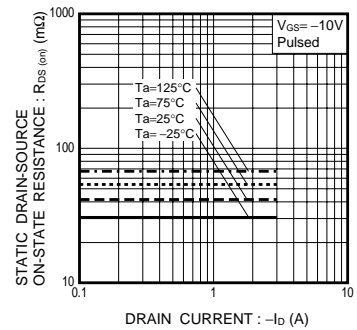


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

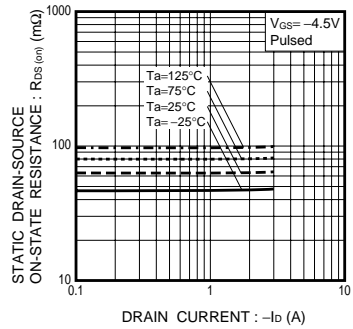


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

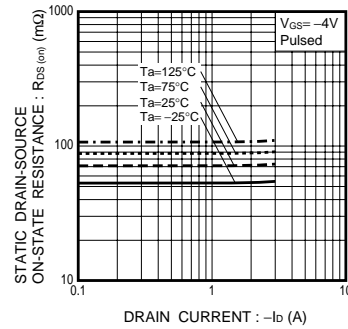


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

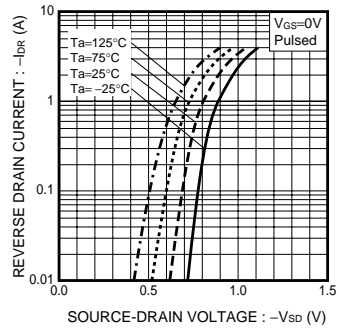


Fig.6 Reverse Drain Current Source-Drain Current

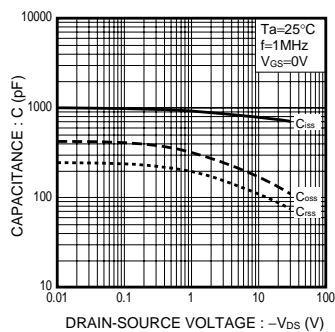


Fig.7 Typical Capacitance vs. Drain-Source Voltage

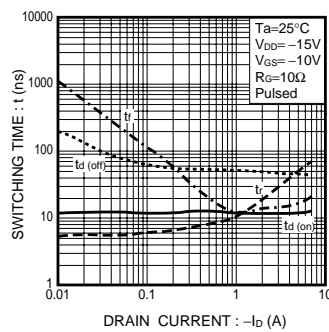


Fig.8 Switching Characteristics

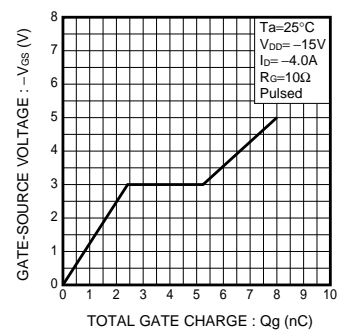


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

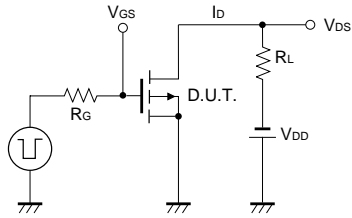


Fig.10 Switching Time Test Circuit

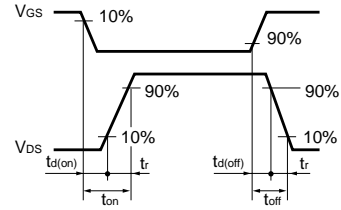


Fig.11 Switching Time Waveforms

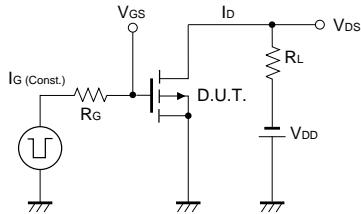


Fig.12 Gate Charge Test Circuit

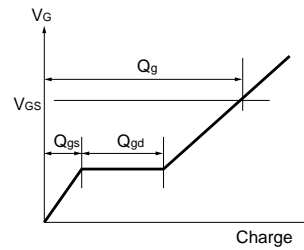


Fig.13 Gate Charge Waveform

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