

Switching (–30V, –4.0A)

RSS040P03

●Features

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

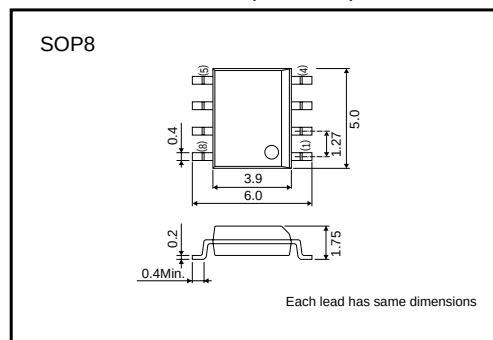
●Application

Power switching, DC / DC converter.

●Structure

Silicon P-channel
MOS FET

●External dimensions (Unit : mm)



●Packaging specifications

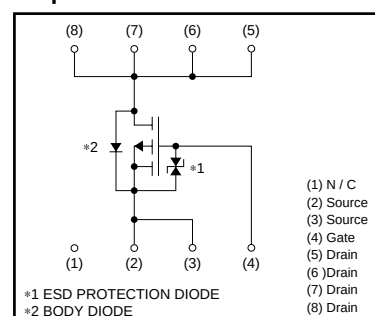
Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
RSS040P03		○

●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

●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.

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	—	—	±10	μA	$V_{GS}=\pm 20V$, $V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	−30	—	—	V	$I_D = -1mA$, $V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	—	—	−1	μA	$V_{DS} = -30V$, $V_{GS}=0V$
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	mΩ	$I_D = -4.0A$, $V_{GS} = -10V$
		—	68	92	mΩ	$I_D = -2.0A$, $V_{GS} = -4.5V$
		—	78	106	mΩ	$I_D = -2.0A$, $V_{GS} = -4.0V$
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	$R_L=7.5\Omega$ $R_{GS}=10\Omega$
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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Transistors

●Electrical characteristic curves

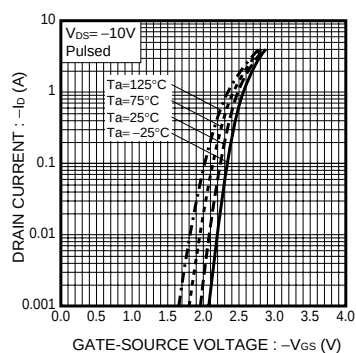


Fig.1 Typical Transfer Characteristics

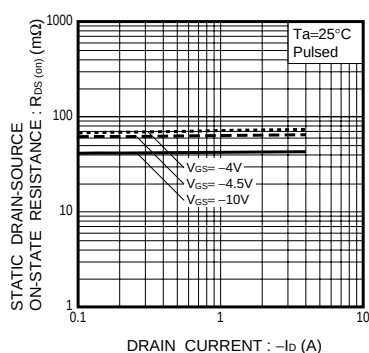


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

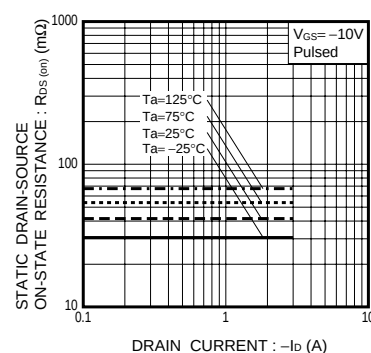


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

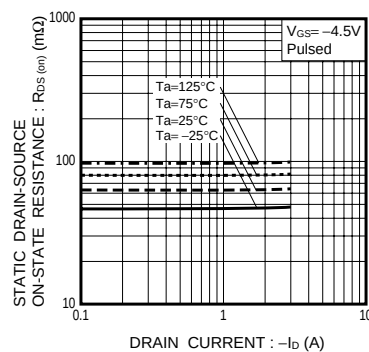


Fig.4 Static Drain-Source On-State vs. Drain Current

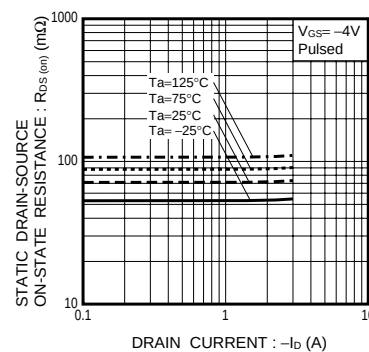


Fig.5 Static Drain-Source On-State vs. Drain Current

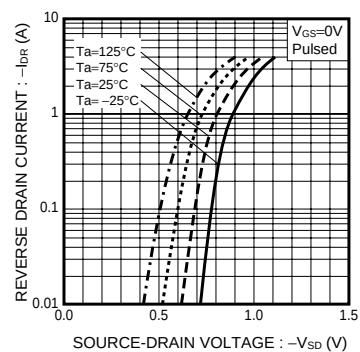


Fig.6 Reverse Drain Current Source-Drain Current

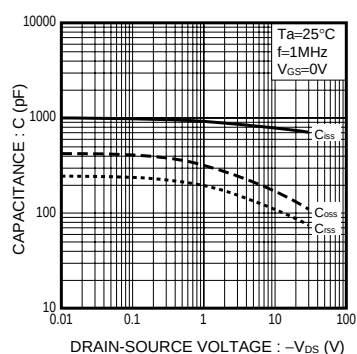


Fig.7 Typical Capacitance vs. Drain-Source Voltage

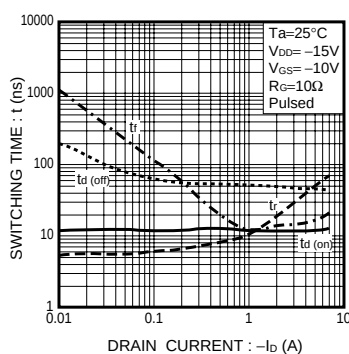


Fig.8 Switching Characteristics

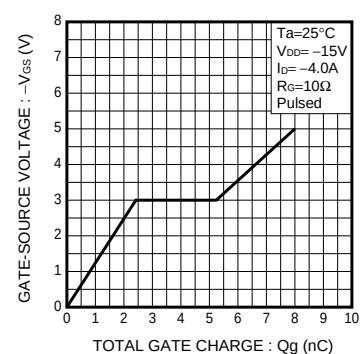


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

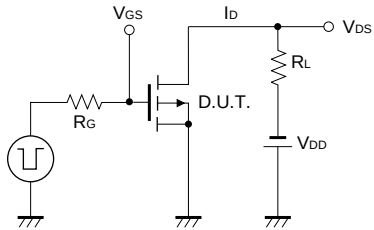


Fig.10 Switching Time Test Circuit

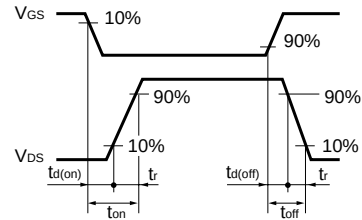


Fig.11 Switching Time Waveforms

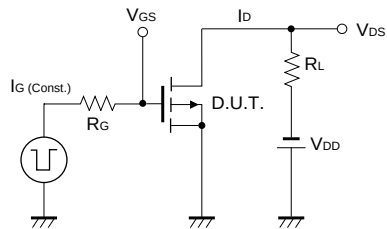


Fig.12 Gate Charge Test Circuit

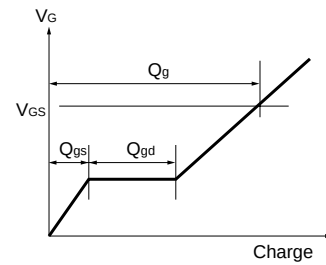


Fig.13 Gate Charge Waveform