

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).

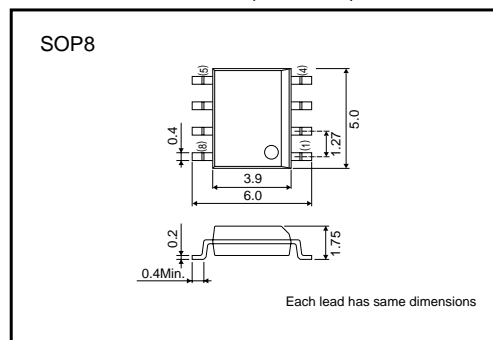
●Application

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_{DSS}	−30	V
Gate-source voltage	V_{GSS}	±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

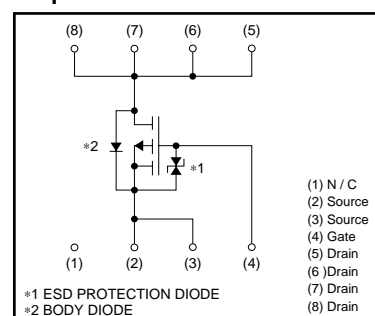
*1 $P_w \leq 10 \mu s$, Duty cycles $\leq 1\%$
*2 Mounted on a ceramic board

●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



*1 ESD PROTECTION DIODE
*2 BODY DIODE

(1) N / C
(2) Source
(3) Source
(4) Gate
(5) Drain
(6) Drain
(7) Drain
(8) Drain

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●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	m Ω	$I_D=-4.0A, V_{GS}=-10V$
		–	68	92	m Ω	$I_D=-2.0A, V_{GS}=-4.5V$
		–	78	106	m Ω	$I_D=-2.0A, V_{GS}=-4.0V$
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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●Electrical characteristic curves

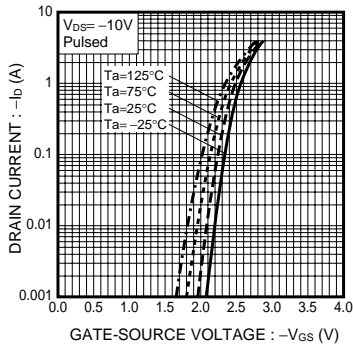


Fig.1 Typical Transfer Characteristics

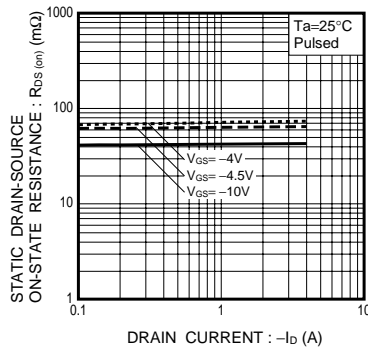


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

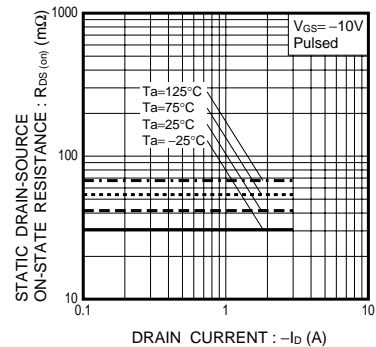


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

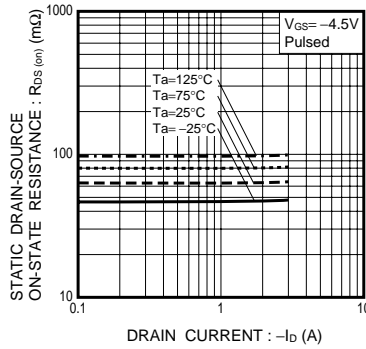


Fig.4 Static Drain-Source On-State vs. Drain Current

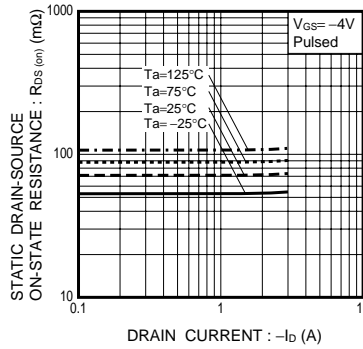


Fig.5 Static Drain-Source On-State vs. Drain Current

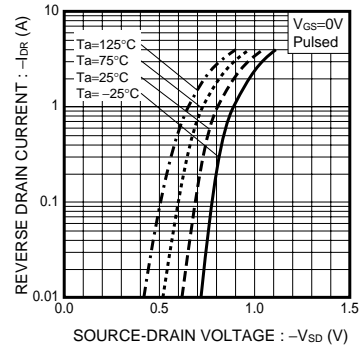


Fig.6 Reverse Drain Current Source-Drain Current

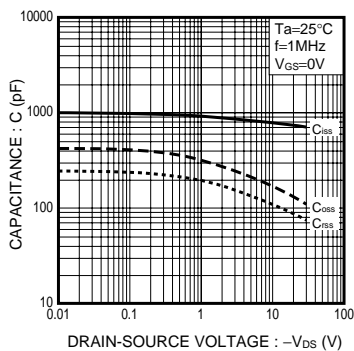


Fig.7 Typical Capacitance vs. Drain-Source Voltage

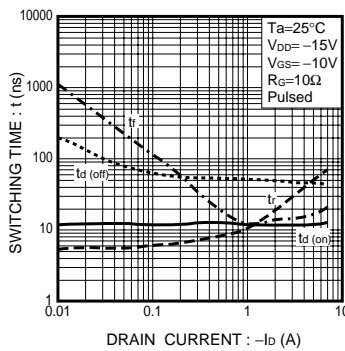


Fig.8 Switching Characteristics

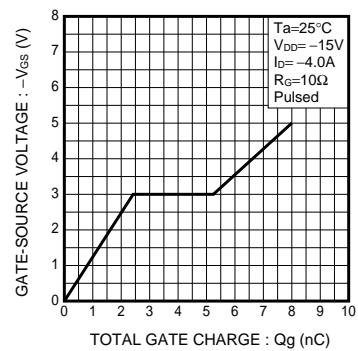


Fig.9 Dynamic Input Characteristics

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● Measurement circuits

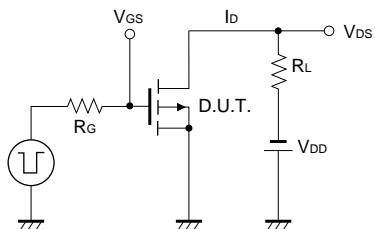


Fig.10 Switching Time Test Circuit

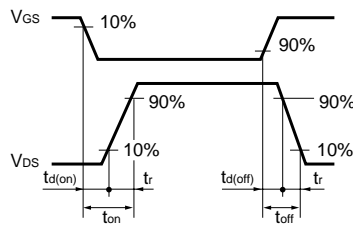


Fig.11 Switching Time Waveforms

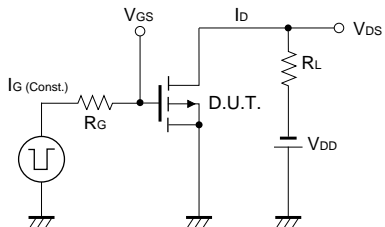


Fig.12 Gate Charge Test Circuit

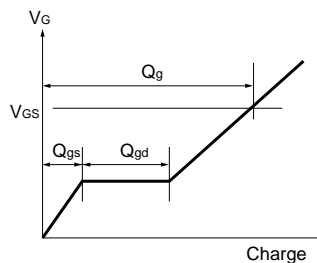


Fig.13 Gate Charge Waveform

Appendix

Notes

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