

Transistor

# Switching (45V, 7.0A)

## RSS070N05

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**●Features**

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

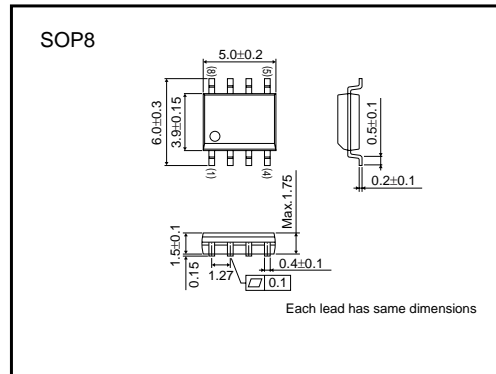
**●Applications**

Power switching , DC / DC converter , Inverter

**●Structure**

Silicon N-channel  
 MOS FET

**●External dimensions (Unit : mm)**



**●Packaging dimensions**

Package	Taping
Code	TB
Basic ordering unit(pieces)	2500

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	V <sub>DSS</sub>	45	V
Gate-source voltage	V <sub>GSS</sub>	20	V
Drain current	Continuous	I <sub>D</sub>	±7.0 A
	Pulsed	I <sub>DP</sub>	±28 A
Source current (Body diode)	Continuous	I <sub>S</sub>	1.6 A
	Pulsed	I <sub>SP</sub>	28 A
Total power dissipation	P <sub>D</sub>	2	W
Chanel temperature	T <sub>ch</sub>	150	°C
Range of Storage temperature	T <sub>stg</sub>	-55 to +150	°C

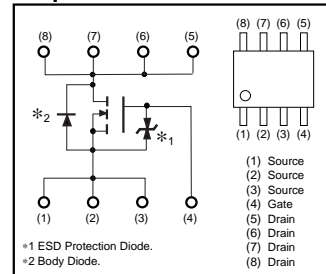
\*1 PW ≤ 10μs, Duty cycle ≤ 1%  
 \*2 Mounted on a ceramic board

**●Thermal resistance (Ta=25°C)**

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

\*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.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Gate-source leakage	$I_{GSS}$	—	—	10	$\mu\text{A}$	$V_{GS}=20\text{V}/V_{DS}=0\text{V}$
Drain-source breakdown voltage	$V_{(BR)DSS}$	45	—	—	V	$I_D=1\text{mA}/V_{GS}=0\text{V}$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS}=45\text{V}/V_{GS}=0\text{V}$
Gate threshold voltage	$V_{GS(th)}$	1.0	—	2.5	V	$V_{DS}=10\text{V}/I_D=1\text{mA}$
Static drain-source on-state resistance	$R_{DS(on)}$ *	—	18	25	m $\Omega$	$I_D=7\text{A}/V_{GS}=10\text{V}$
		—	23	32		$I_D=7\text{A}/V_{GS}=4.5\text{V}$
		—	25	35		$I_D=7\text{A}/V_{GS}=4.0\text{V}$
Forward transfer admittance	$ Y_{fs} $ *	6.0	—	—	S	$V_{DS}=10\text{V}/I_D=7\text{A}$
Input capacitance	$C_{iss}$	—	1000	—	pF	$V_{DS}=10\text{V}$
Output capacitance	$C_{oss}$	—	230	—		$V_{GS}=0\text{V}$
Reverse transfer capacitance	$C_{rss}$	—	125	—		$f=1\text{MHz}$
Turn-on delay time	$t_{d(on)}$ *	—	16	—	ns	$V_{DD}=25\text{V}$
Rise time	$t_r$ *	—	27	—		$I_D=3.5\text{A}$
Turn-off delay time	$t_{d(off)}$ *	—	57	—		$V_{GS}=10\text{V}$
Fall time	$t_f$ *	—	21	—		$R_L=7.1\Omega/R_G=10\Omega$
Total gate charge	$Q_g$ *	—	12.0	16.8	nC	$V_{DD}=25\text{V}/I_D=7\text{A}$
Gate-source charge	$Q_{gs}$ *	—	3.0	—		$V_{GS}=5\text{V}$
Gate-drain charge	$Q_{gd}$ *	—	4.6	—		$R_L=3.6\Omega/R_G=10\Omega$

\* pulsed

## ●Body diode characteristics (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	$V_{SD}$ *	—	—	1.2	V	$I_S=1.6\text{A}/V_{GS}=0\text{V}$

\* pulsed

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●Electrical characteristic curves

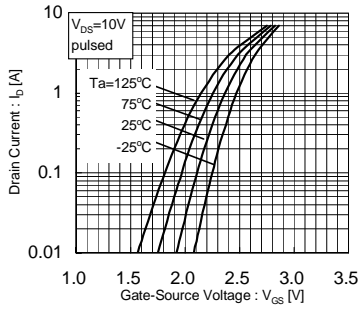


Fig.1 Typical Transfer Characteristics

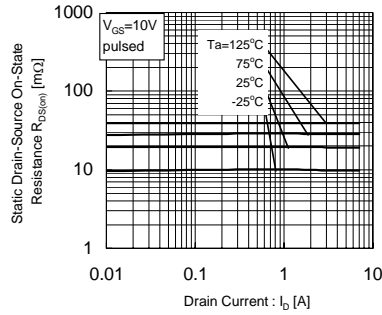


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current (1)

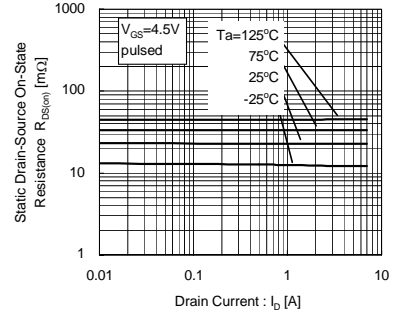


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current (2)

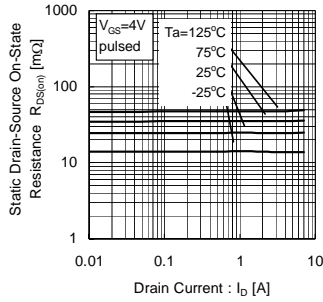


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (3)

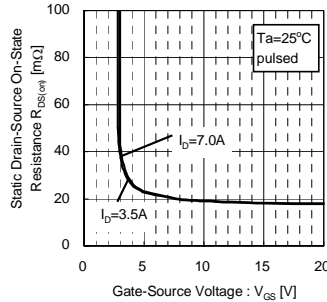


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

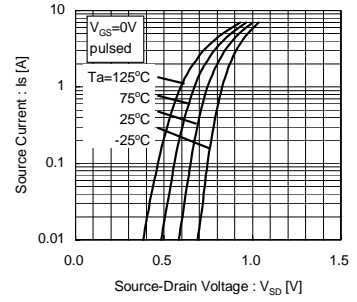


Fig.6 Source-Current vs. Source-Drain Voltage

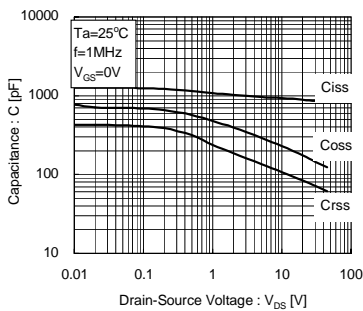


Fig.7 Typical capacitance vs. Source-Drain Voltage

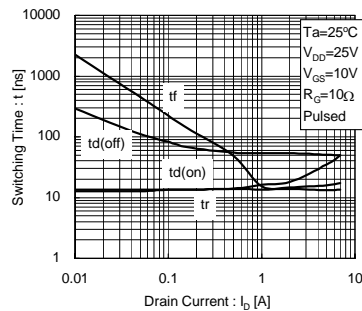


Fig.8 Switching Characteristics

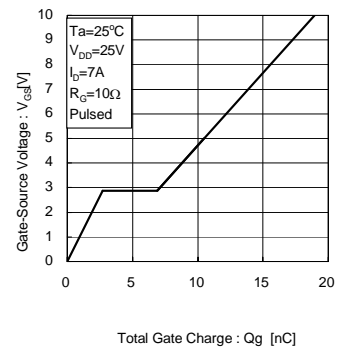


Fig.9 Dynamic Input Characteristics

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● Measurement circuits

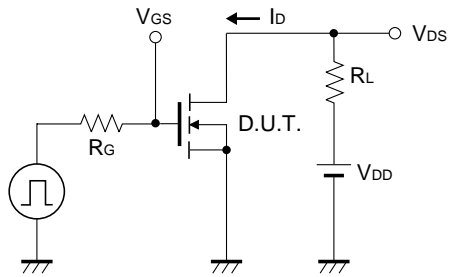


Fig.10 Switching Time Test Circuit

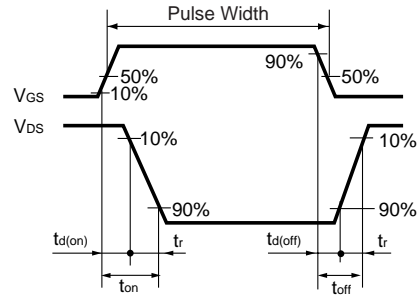


Fig.11 Switching Time Waveforms

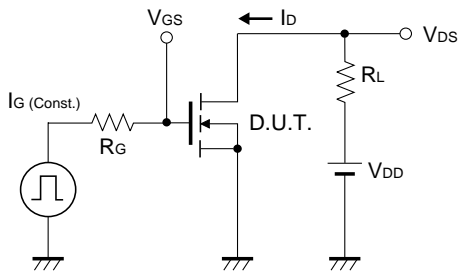


Fig.12 Gate Charge Test Circuit

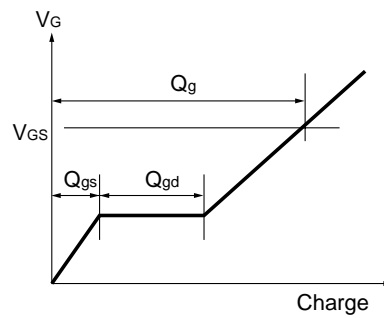


Fig.13 Gate Charge Waveform

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