

# 4V Drive Nch MOSFET

## RSH070N05

### ●Structure

Silicon N-channel MOSFET

### ●Features

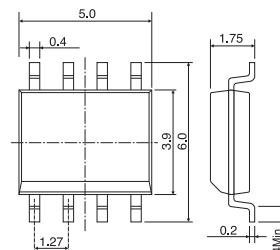
- 1) Built-in G-S Protection Diode.
- 2) Small Surface Mount Package (SOP8).

### ●Application

Power switching, DC / DC converter, Inverter

### ●Dimensions (Unit : mm)

SOP8



Each lead has same dimensions

### ●Packaging specifications

Type	Package	Taping
Code	TB	
Basic ordering unit (pieces)	2500	
RSH070N05	○	

### ●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
	Pulsed	I <sub>DP</sub>	*1 ±28
Source current (Body diode)	Continuous	I <sub>S</sub>	1.6
	Pulsed	I <sub>SP</sub>	*1 28
Total power dissipation	P <sub>D</sub>	*2 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%

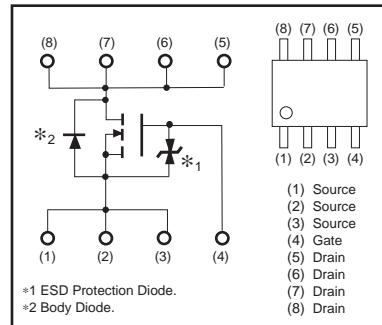
\*2 Mounted on a ceramic board

### ●Thermal resistance

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

\* Mounted on a ceramic board

### ●Inner 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.

## ●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>	45	—	—	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> = 45V, 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>DSS (on)*</sub>	—	18	25	mΩ	I <sub>D</sub> =7A, V <sub>GS</sub> = 10V
		—	23	32	mΩ	I <sub>D</sub> = 7A, V <sub>GS</sub> = 4.5V
		—	25	35	mΩ	I <sub>D</sub> = 7A, V <sub>GS</sub> = 4.0V
Forward transfer admittance	Y <sub>fs</sub>   *	6.0	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 7A
Input capacitance	C <sub>iss</sub>	—	1000	—	pF	V <sub>DS</sub> = 10V
Output capacitance	C <sub>oss</sub>	—	230	—	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	—	125	—	pF	f=1MHz
Turn-on delay time	t <sub>d (on)</sub> *	—	16	—	ns	V <sub>DD</sub> = 25V I <sub>D</sub> = 3.5A
Rise time	t <sub>r</sub> *	—	27	—	ns	V <sub>GS</sub> = 10V
Turn-off delay time	t <sub>d (off)</sub> *	—	57	—	ns	R <sub>L</sub> =7.1Ω R <sub>G</sub> =10Ω
Fall time	t <sub>f</sub> *	—	21	—	ns	
Total gate charge	Q <sub>g</sub> *	—	12.0	16.8	nC	V <sub>DD</sub> = 25V V <sub>GS</sub> = 5V
Gate-source charge	Q <sub>gs</sub> *	—	3.0	—	nC	I <sub>D</sub> = 7A
Gate-drain charge	Q <sub>gd</sub> *	—	4.6	—	nC	R <sub>L</sub> =3.6Ω R <sub>G</sub> =10Ω

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V <sub>SD</sub> *	—	—	1.2	V	I <sub>S</sub> =1.6A/V <sub>GS</sub> =0V

\* pulsed

● Electrical characteristic curves

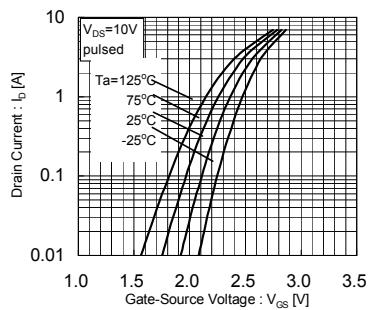


Fig.1 Typical Transfer Characteristics

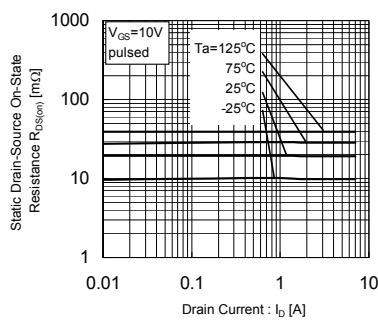


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current (1)

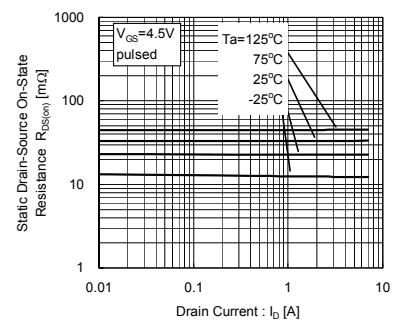


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current (2)

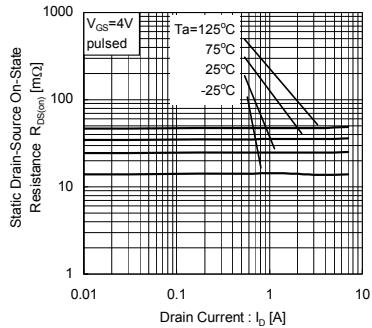


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (3)

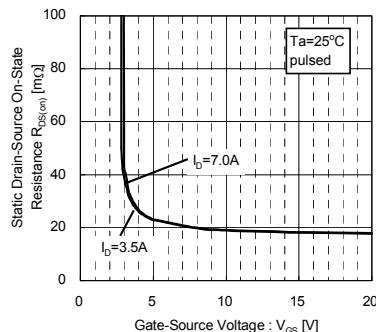


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

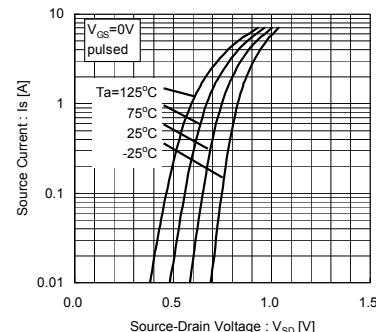


Fig.6 Source-Current vs. Source-Drain Voltage

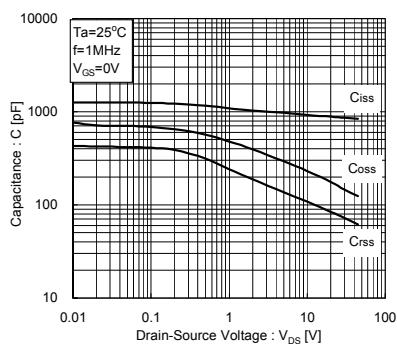


Fig.7 Typical capacitance vs. Source-Drain Voltage

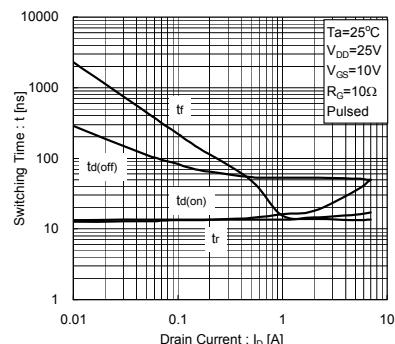


Fig.8 Switching Characteristics

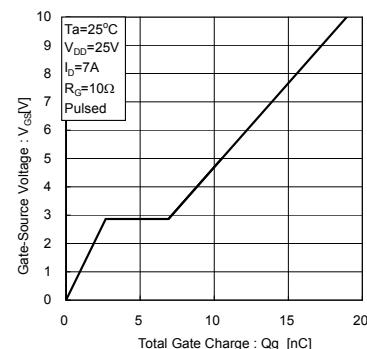


Fig.9 Dynamic Input Characteristics

● Measurement circuits

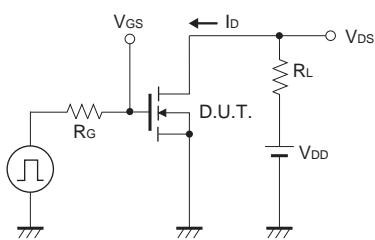


Fig.10 Switching Time Test Circuit

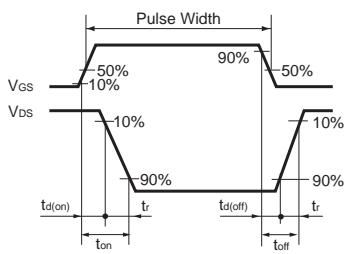


Fig.11 Switching Time Waveforms

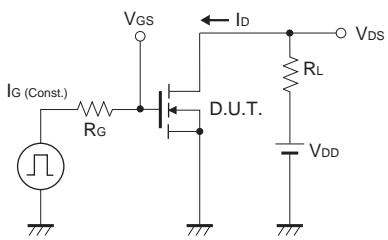


Fig.12 Gate Charge Test Circuit

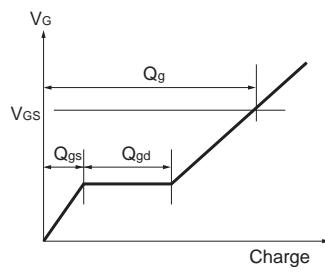


Fig.13 Gate Charge Waveform

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