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			◯

●**Inner circuit**

*1 ESD Protection Diode.
*2 Body Diode.

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

∗ 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.

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

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	45	V
Gate-source voltage		V_{GSS}	20	V
Drain current	Continuous	I_D	±7.0	A
	Pulsed	I_{DP} [*1]	±28	A
Source current (Body diode)	Continuous	I_S	1.6	A
	Pulsed	I_{SP} [*1]	28	A
Total power dissipation		P_D [*2]	2	W
Chanel temperature		T_{ch}	150	°C
Range of Storage temperature		T_{stg}	-55 to +150	°C

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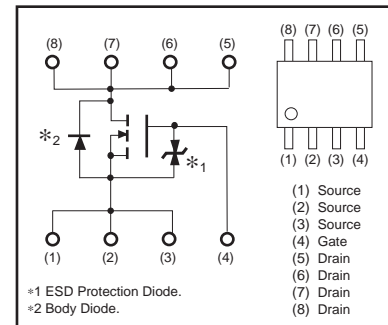
*2 Mounted on a ceramic board

●**Thermal resistance**

Parameter	Symbol	Limits	Unit
Chanel to ambient	$R_{th(ch-a)}$ *	62.5	°C/W

* Mounted on a ceramic board

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I$_{GSS}$	–	–	10	μA	V$_{GS}$=20V, V$_{DS}$=0V
Drain-source breakdown voltage	V$_{(BR)\,DSS}$	45	–	–	V	I$_D$= 1mA, V$_{GS}$=0V
Zero gate voltage drain current	I$_{DSS}$	–	–	1	μA	V$_{DS}$= 45V, 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$_{DS\,(on)}$*	–	18	25	mΩ	I$_D$=7A, V$_{GS}$= 10V
		–	23	32	mΩ	I$_D$= 7A, V$_{GS}$= 4.5V
		–	25	35	mΩ	I$_D$= 7A, V$_{GS}$= 4.0V
Forward transfer admittance	│Y$_{fs}$│ *	6.0	–	–	S	V$_{DS}$= 10V, I$_D$= 7A
Input capacitance	C$_{iss}$	–	1000	–	pF	V$_{DS}$= 10V
Output capacitance	C$_{oss}$	–	230	–	pF	V$_{GS}$=0V
Reverse transfer capacitance	C$_{rss}$	–	125	–	pF	f=1MHz
Turn-on delay time	t$_{d\,(on)}$ *	–	16	–	ns	V$_{DD}$≒ 25V
Rise time	t$_r$ *	–	27	–	ns	I$_D$= 3.5A
Turn-off delay time	t$_{d\,(off)}$ *	–	57	–	ns	V$_{GS}$= 10V
Fall time	t$_f$ *	–	21	–	ns	R$_L$=7.1Ω R$_G$=10Ω
Total gate charge	Q$_g$ *	–	12.0	16.8	nC	V$_{DD}$≒ 25V V$_{GS}$= 5V
Gate-source charge	Q$_{gs}$ *	–	3.0	–	nC	I$_D$= 7A
Gate-drain charge	Q$_{gd}$ *	–	4.6	–	nC	R$_L$=3.6Ω R$_G$=10Ω

∗Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V$_{SD}$ *	—	—	1.2	V	I$_S$=1.6A/V$_{GS}$=0V

* pulsed

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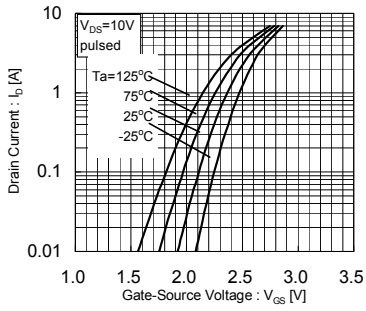
●**Electrical characteristic curves**

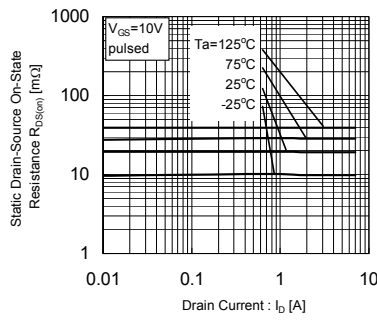Fig.1 Typical Transfer Characteristics

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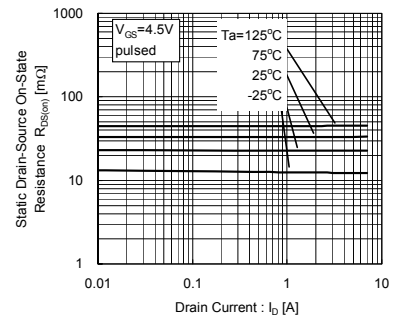Resistance vs. Drain Current (1)

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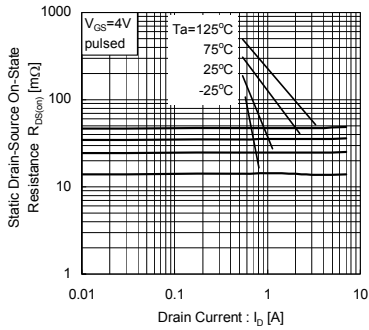Resistance vs. Drain Current (2)

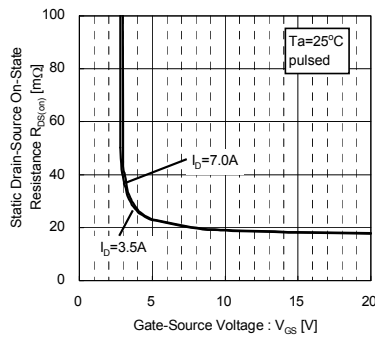Fig.4 Static Drain-Source On-State
Resistance vs. Drain Current (3)

Fig.5 Static Drain-Source
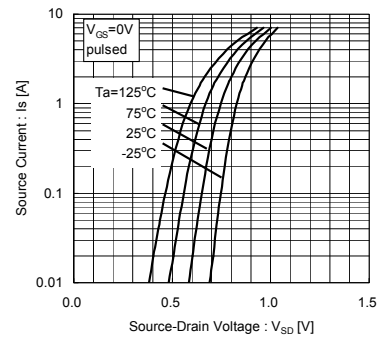On-State Resistance vs.
Gate-Source Voltage
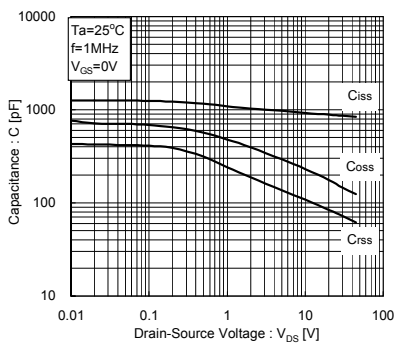
Fig.6 Source-Current vs.
Source-Drain Voltage

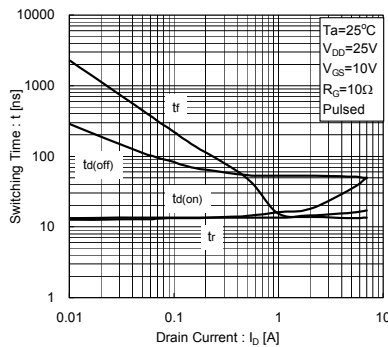Fig.7 Typical capacitance vs.
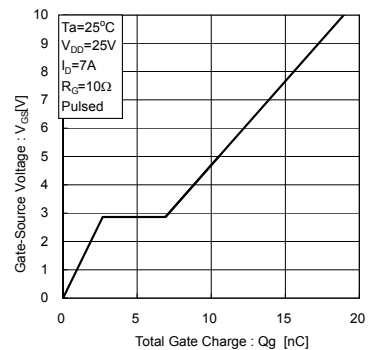Source-Drain Voltage

Fig.8 Switching Characteristics

Fig.9 Dynamic Input Characteristics
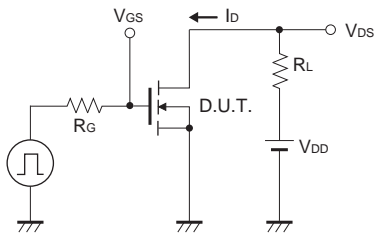
● **Measurement circuits**

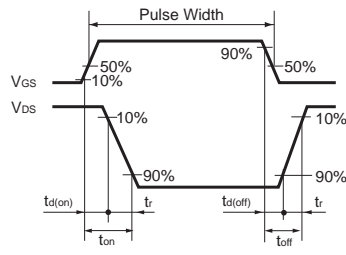Fig.10 Switching Time Test Circuit

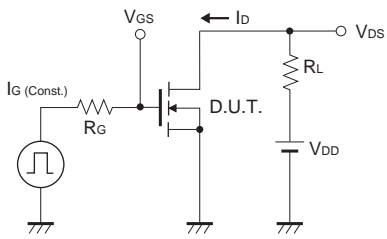Fig.11 Switching Time Waveforms
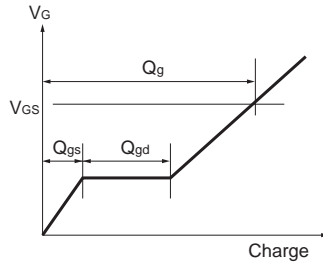

Fig.12 Gate Charge Test Circuit

Fig.13 Gate Charge Waveform

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