

4V Drive Nch MOSFET

RSH090N03

●Structure

Silicon N-channel MOSFET

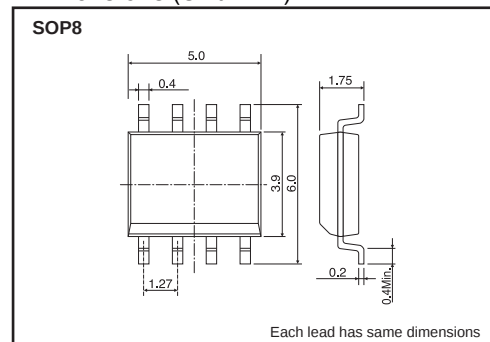
●Features

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

●Application

Power switching, DC / DC converter.

●Dimensions (Unit : mm)



●Packaging specifications

Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
RSH090N03		○

●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	±9.0
	Pulsed	I_{DP}^{*1}	±36
Source Current (Body Diode)	Continuous	I_S	1.6
	Pulsed	I_{SP}^{*1}	18
Total Power Dissipation	P_D^{*2}	2	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C

*1 $P_W \leq 10\mu s$, Duty cycle $\leq 1\%$

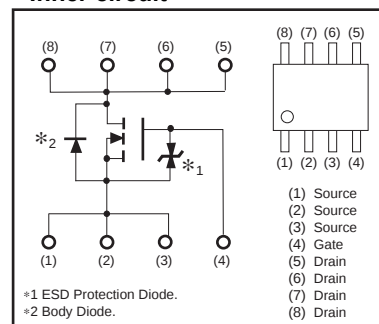
*2 Mounted on a ceramic board.

●Thermal resistance

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

* Mounted on a ceramic board.

●Inner circuit



* 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	Test Conditions
Gate-Source Leakage	I_{GSS}	–	–	10	μA	$V_{GS}=20V, V_{DS}=0V$
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	$R_{DS(on)}^*$	–	11	16	m Ω	$I_D=9A, V_{GS}=10V$
		–	15	22		$I_D=9A, V_{GS}=4.5V$
		–	17	24		$I_D=9A, V_{GS}=4V$
Forward Transfer Admittance	$ Y_{fs} ^*$	6.0	–	–	S	$I_D=9A, V_{DS}=10V$
Input Capacitance	C_{iss}	–	810	–	pF	$V_{DS}=10V$
Output Capacitance	C_{oss}	–	225	–	pF	$V_{GS}=0V$
Reverse Transfer Capacitance	C_{rss}	–	160	–	pF	$f=1MHz$
Turn-On Delay Time	$t_{d(on)}^*$	–	10	–	ns	$I_D=4.5A, V_{DD}=15V$
Rise Time	t_r^*	–	13	–	ns	$V_{GS}=10V$
Turn-Off Delay Time	$t_{d(off)}^*$	–	46	–	ns	$R_L=3.33\Omega$
Fall Time	t_f^*	–	15	–	ns	$R_G=10\Omega$
Total Gate Charge	Q_g^*	–	11	15	nC	$V_{DD}=15V$
Gate-Source Charge	Q_{gs}^*	–	2.5	–	nC	$V_{GS}=5V$
Gate-Drain Charge	Q_{gd}^*	–	4.5	–	nC	$I_D=9A$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward Voltage	V_{SD}^*	–	–	1.2	V	$I_S=6.4A, V_{GS}=0V$

*Pulsed

●Electrical characteristic curves

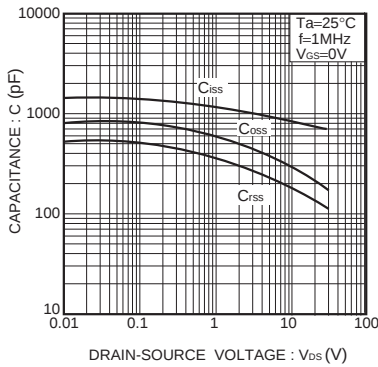


Fig.1 Typical Capacitance vs. Drain-Source Voltage

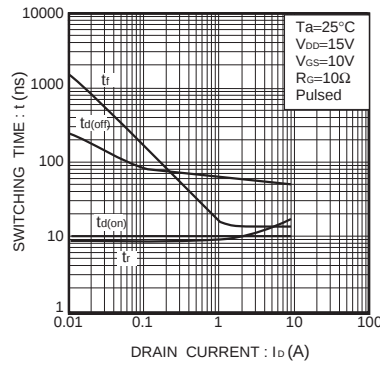


Fig.2 Switching Characteristics

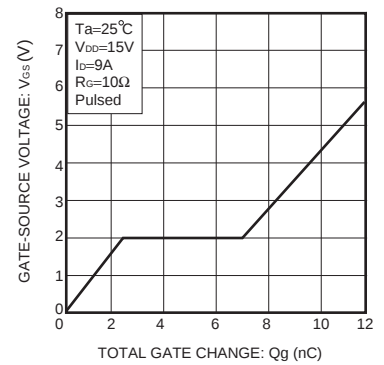


Fig.3 Dynamic Input Characteristics

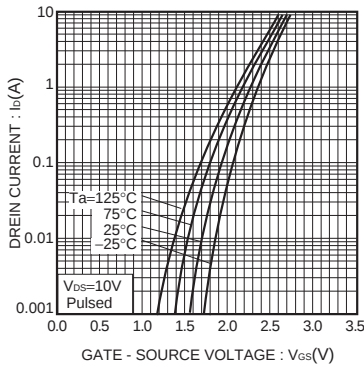


Fig.4 Typical Transfer Characteristics

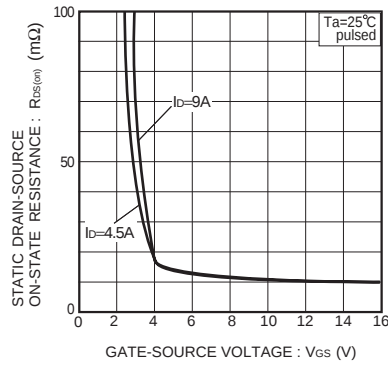


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

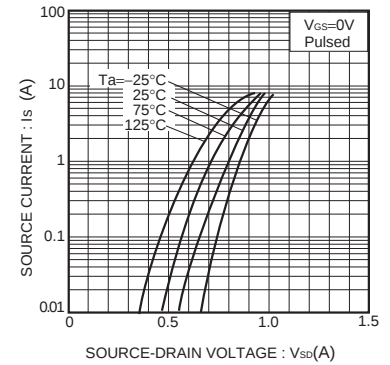


Fig.6 Source-Current vs. Source-Drain Voltage

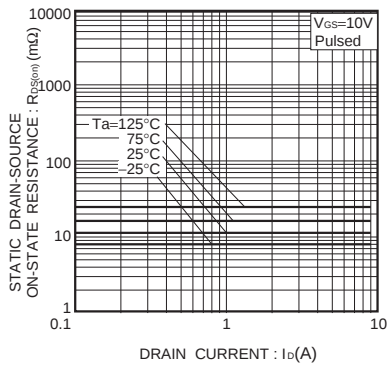


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (1)

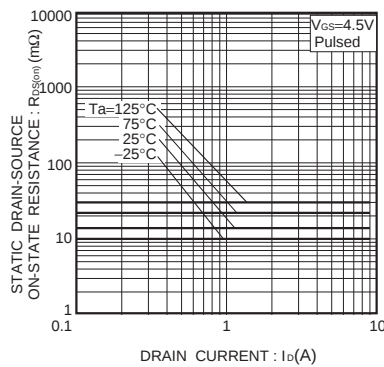


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (2)

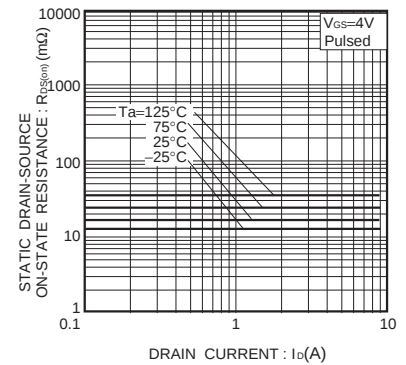


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (3)

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