Switching (30V, ±14A)

RSS140N03

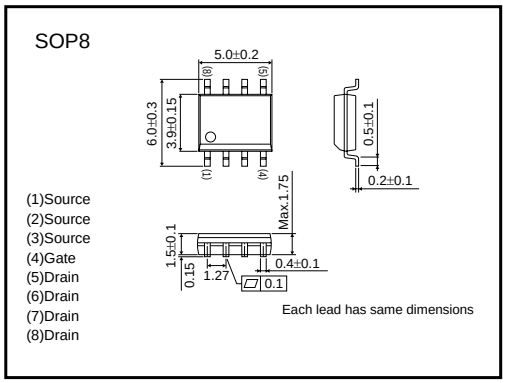
●Features

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

●Applications

Power switching, DC/DC converter.

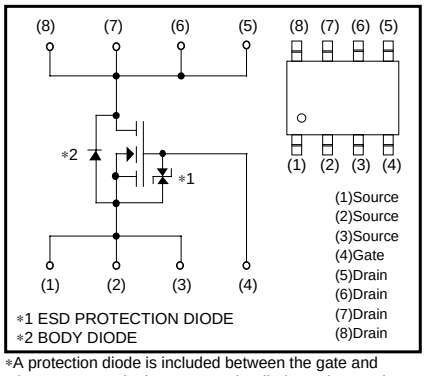
●External dimensions (Unit : mm)



●Structure

•Silicon N-channel MOS FET

●Equivalent 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 the protection circuit when the fixed voltages are exceeded.

●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	±14	A	
	Pulsed	I_{DP}	±56	A	∗1
Source current (Body diode)	Continuous	I_S	1.6	A	
	Pulsed	I_{SP}	6.4	A	∗1
Total power dissipatino		P_D	2	W	∗2
Channel temperature		Tch	150	°C	
Strage temperature		Tstg	−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	
Channel to ambient	Rth (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	$V_{(BR)\ DSS}$	30	–	–	V	I_D=1mA, V_{GS}=0V	
Zero gate voltage drain current	I_{DSS}	–	–	10	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-starte resistance	$R_{DS\ (on)}$	–	4.9	6.7	mΩ	I_D=±14A, V_{GS}=10V	*
		–	6.0	8.4		I_D=±14A, V_{GS}=4.5V	*
		–	6.5	9.0		I_D=±14A, V_{GS}=4V	*
Forward transfer admittance	$\|Y_{fs}\|$	13	–	–	S	I_D=±14A, V_{DS}=10V	*
Input capacitance	C_{iss}	–	3150	–	pF	V_{DS}=10V	
Output capacitance	C_{oss}	–	830	–	pF	V_{GS}=0V	
Reverse transfer capacitance	C_{rss}	–	500	–	pF	f=1MHz	
Tum-on delay time	$t_{d\ (on)}$	–	16	–	ns	I_D=7A, V_{DD}≒15V	*
Rise time	t_r	–	52	–	ns	V_{GS}=10V	*
Tum-off delay time	$t_{d\ (off)}$	–	125	–	ns	R_L=2.14Ω	*
Fall time	t_f	–	78	–	ns	R_{GS}=10Ω	*
Total gate charge	Q_g	–	37	–	nC	V_{DD}≒15V	*
Gate-source charge	Q_{gs}	–	6.2	–	nC	V_{GS}=5V	*
Gate-drain charge	Q_{gd}	–	13.5	–	nC	I_D=±14A	*

*Pulsed

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

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

*Pulsed

●**Electrical characteristic curves**

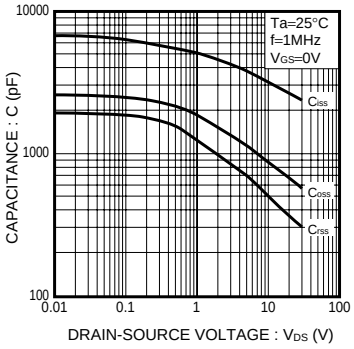


Fig.1 Typical Capacitance vs. Drain-Source Voltage

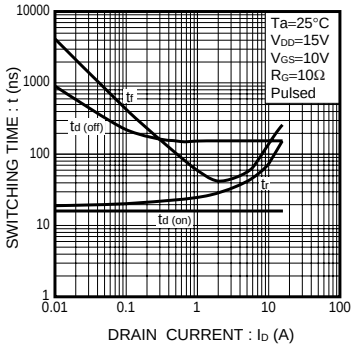


Fig.2 Switching Characteristics

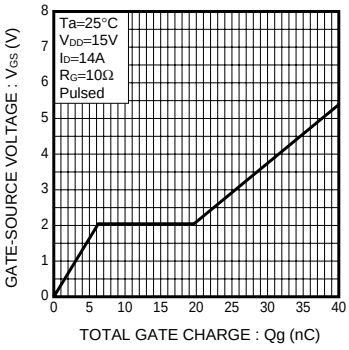


Fig.3 Dynamic Input Characteristics

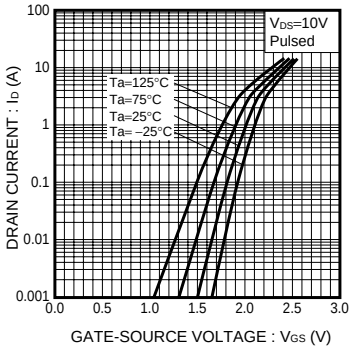


Fig.4 Typical Transfer Characteristics

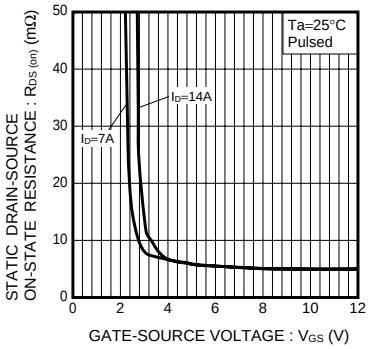


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

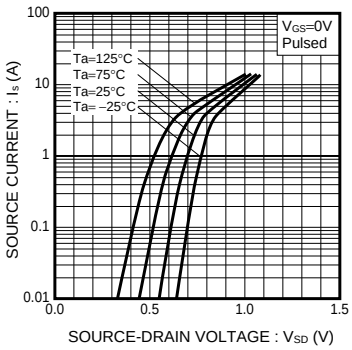


Fig.6 Source Current vs. Source-Drain Voltage

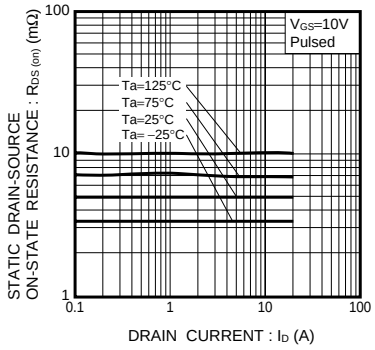


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

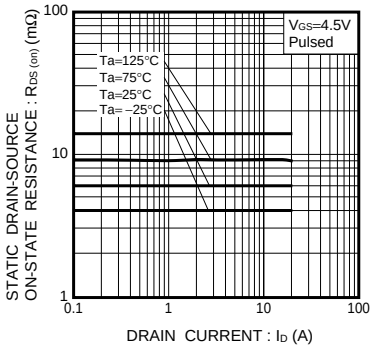


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

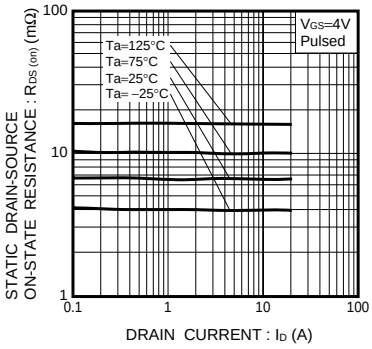


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

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