

4V Drive Nch MOSFET

RSD200N05

● Structure

Silicon N-channel MOSFET

●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Drive circuits can be simple.
- 4) Parallel use is easy.

●Application

Switching

●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
RSD200N05		○

● 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	± 20	A
	Pulsed	I_{DP}^{*1}	± 40	A
Source current (Body Diode)	Continuous	I_S	16	A
	Pulsed	I_{SP}^{*1}	40	A
Power dissipation		P_D^{*2}	20	W
Channel temperature		T_{ch}	150	$^{\circ}\text{C}$
Range of storage temperature		T_{std}	-55 to $+150$	$^{\circ}\text{C}$

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

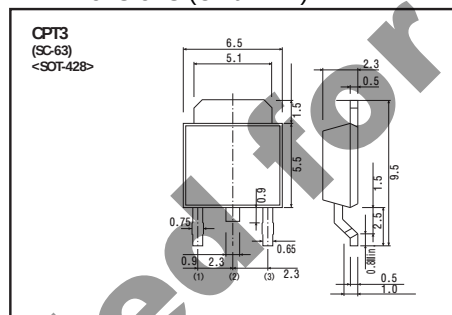
*2 $T_c = 25^\circ\text{C}$

- Thermal resistance

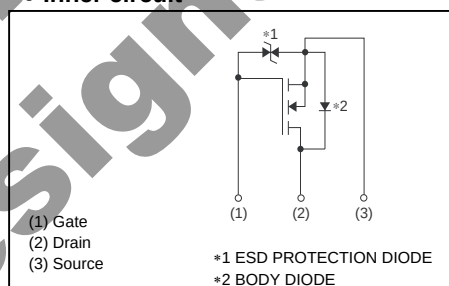
Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th(ch-c)}^*$	6.25	°C / W

* $T_c=25^{\circ}\text{C}$

● **Dimensions** (Unit : mm)



- Inner circuit



●Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 10	μA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
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	μA	$V_{DS} = 45\text{V}$, $V_{GS} = 0\text{V}$
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	$R_{DS(on)}^*$	-	20	28	m Ω	$I_D = 20\text{A}$, $V_{GS} = 10\text{V}$
		-	25	35		$I_D = 20\text{A}$, $V_{GS} = 4.5\text{V}$
		-	28	40		$I_D = 20\text{A}$, $V_{GS} = 4.0\text{V}$
Forward transfer admittance	$ Y_{fs} ^*$	10	-	-	S	$I_D = 20\text{A}$, $V_{DS} = 10\text{V}$
Input capacitance	C_{iss}	-	950	-	pF	$V_{DS} = 10\text{V}$
Output capacitance	C_{oss}	-	250	-	pF	$V_{GS} = 0\text{V}$
Reverse transfer capacitance	C_{rss}	-	120	-	pF	$f = 1\text{MHz}$
Turn-on delay time	$t_{d(on)}^*$	-	10	-	ns	$I_D = 10\text{A}$, $V_{DD} = 25\text{V}$
Rise time	t_r^*	-	20	-	ns	$V_{GS} = 10\text{V}$
Turn-off delay time	$t_{d(off)}^*$	-	50	-	ns	$R_L = 2.5\Omega$
Fall time	t_f^*	-	20	-	ns	$R_G = 10\Omega$
Total gate charge	Q_g^*	-	12	-	nC	$V_{DD} = 25\text{V}$
Gate-source charge	Q_{gs}^*	-	3.5	-	nC	$I_D = 20\text{A}$,
Gate-drain charge	Q_{gd}^*	-	4.0	-	nC	$V_{GS} = 5\text{V}$

*Pulsed

●Body diode characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	1.2	V	$I_S = 20\text{A}$, $V_{GS} = 0\text{V}$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

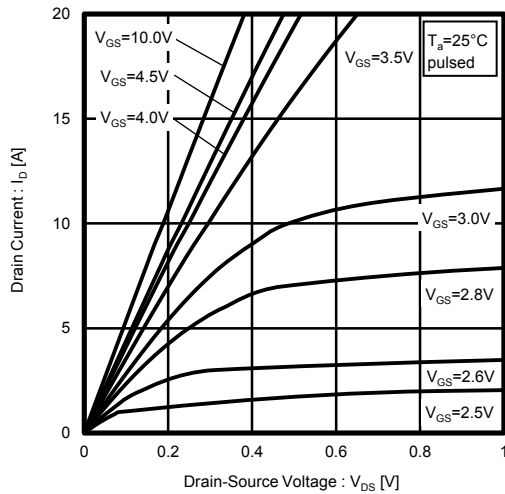


Fig.2 Typical Output Characteristics (II)

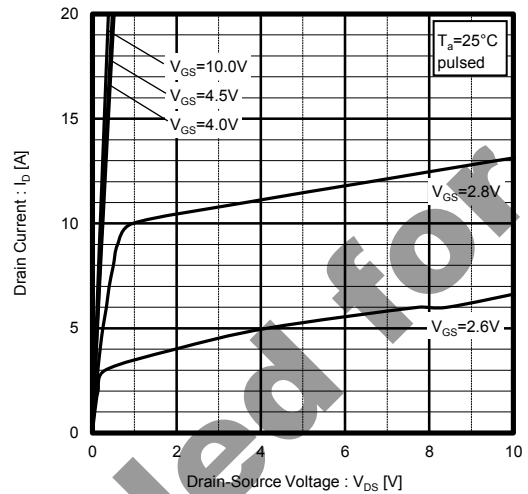


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

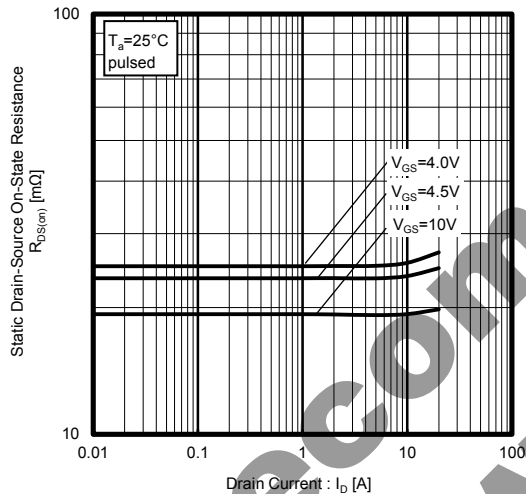


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

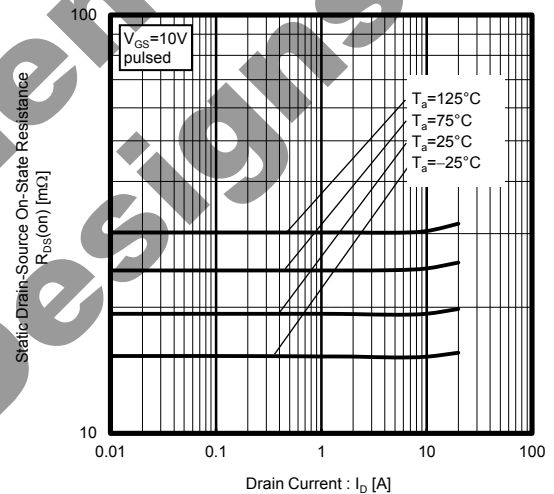


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

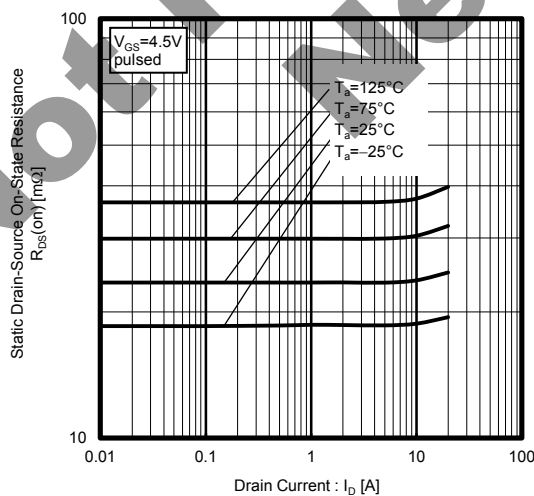


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

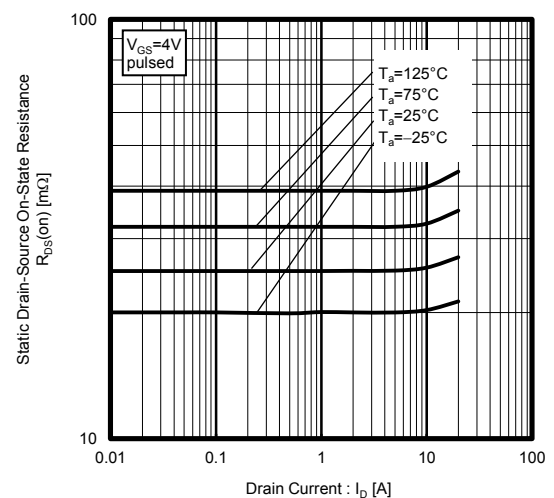


Fig.7 Forward Transfer Admittance vs. Drain Current

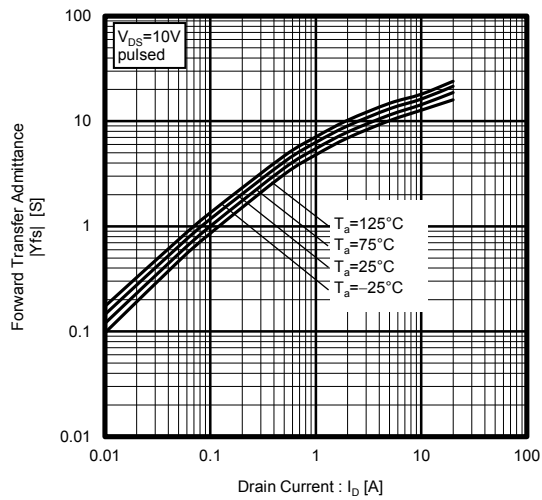


Fig.8 Typical Transfer Characteristics

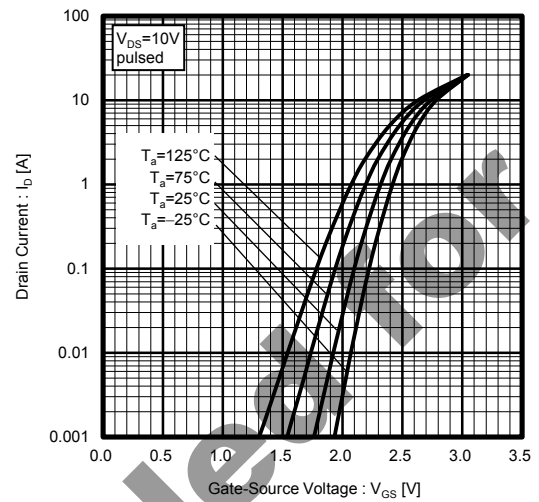


Fig.9 Source Current vs. Source-Drain Voltage

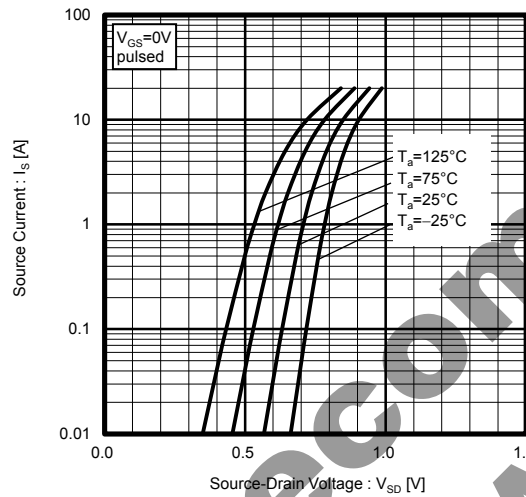


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

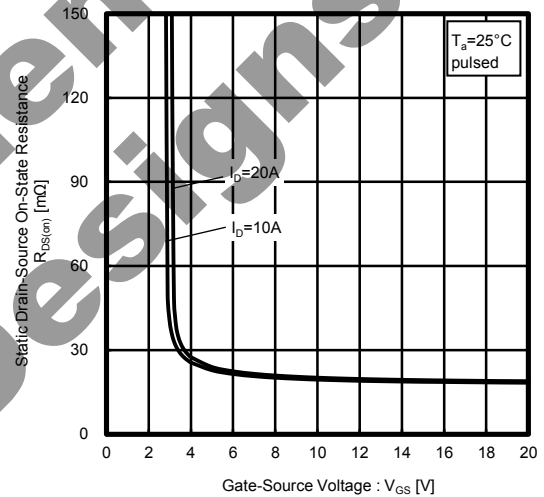


Fig.11 Switching Characteristics

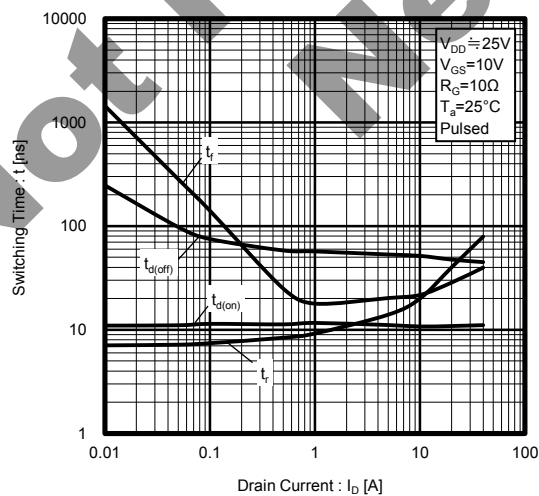


Fig.12 Dynamic Input Characteristics

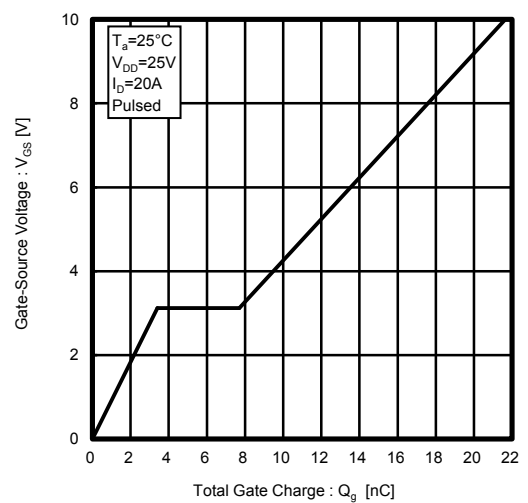


Fig.13 Typical Capacitance vs. Drain-Source Voltage

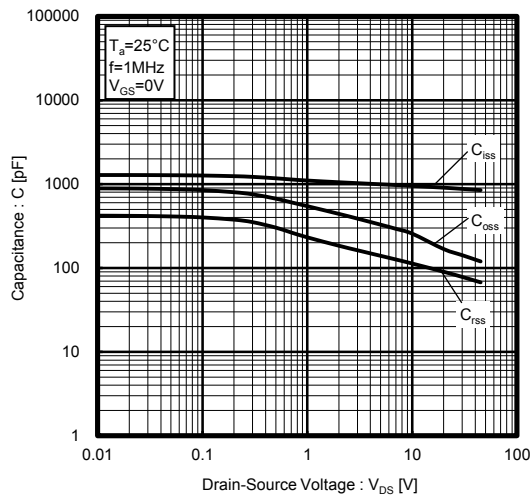


Fig.14 Maximum Safe Operating Area

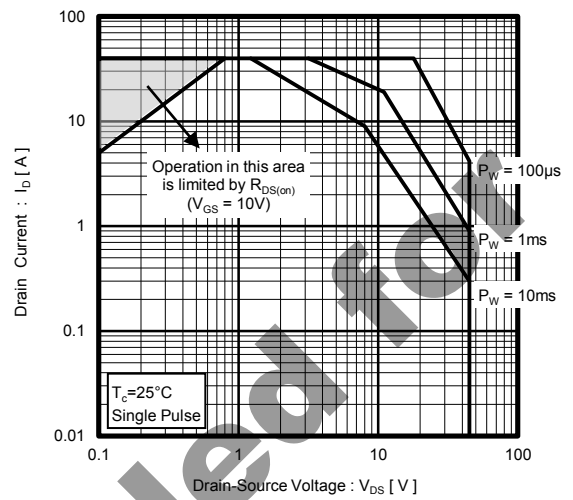
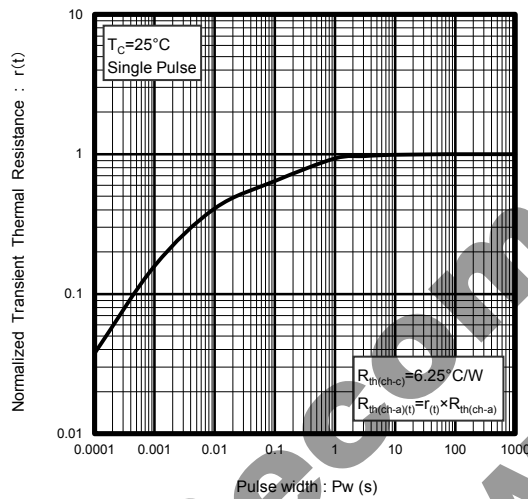


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

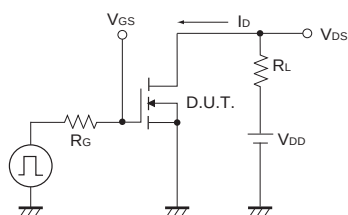


Fig.1-1 Switching Time Measurement Circuit

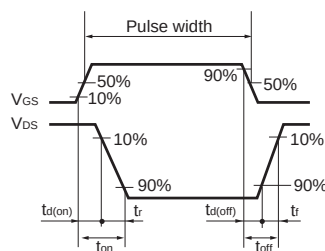


Fig.1-2 Switching Waveforms

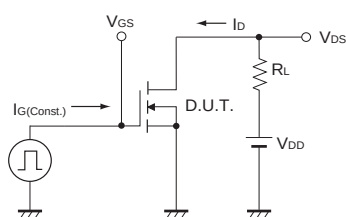


Fig.2-1 Gate Charge Measurement Circuit

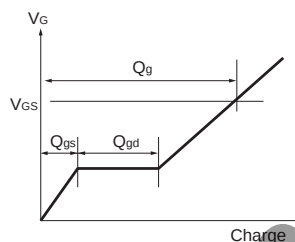


Fig.2-2 Gate Charge Waveform

Notes

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