

# 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	°C	
Range of storage temperature	$T_{stg}$	-55 to +150	°C	

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

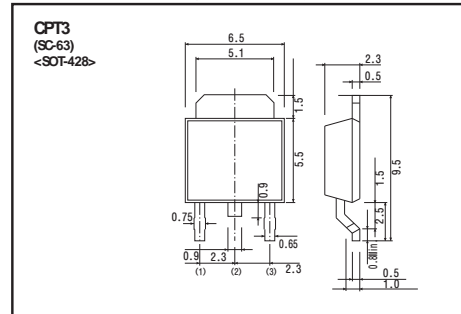
\*2  $T_c = 25^\circ C$

### ●Thermal resistance

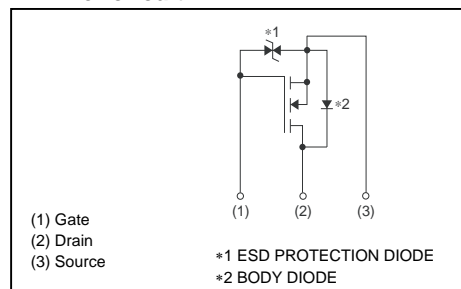
Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th(ch-c)}$ *	6.25	°C / W

\*  $T_c = 25^\circ C$

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$	$V_{GS}=\pm 20\text{V}$ , $V_{DS}=0\text{V}$
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	$\mu\text{A}$	$V_{DS}=45\text{V}$ , $V_{GS}=0\text{V}$
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 $\Omega$	$I_D=20\text{A}$ , $V_{GS}=10\text{V}$
		-	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	$I_D=10\text{A}$ , $V_{DD}\approx 25\text{V}$
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	$V_{DD}\approx 25\text{V}$
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 )

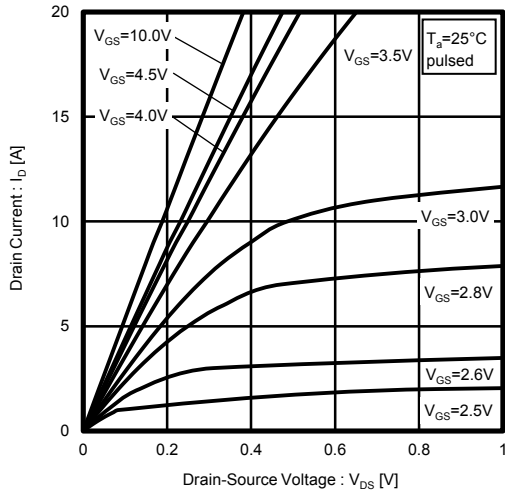


Fig.2 Typical Output Characteristics ( II )

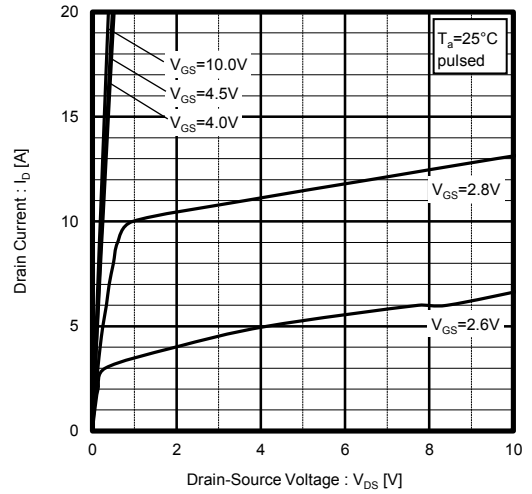


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

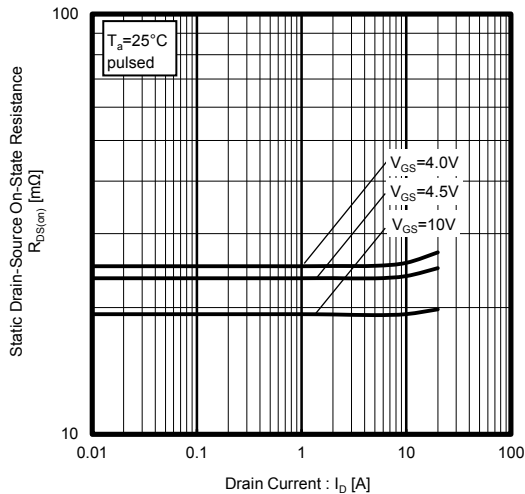


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

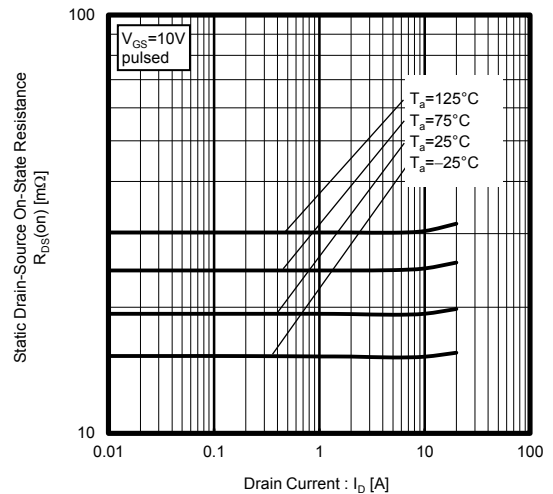


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

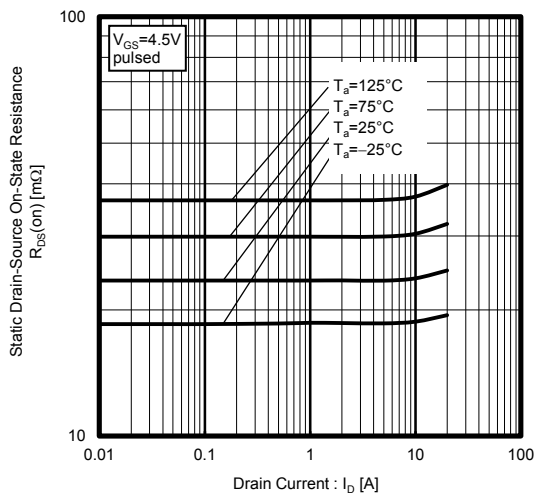


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

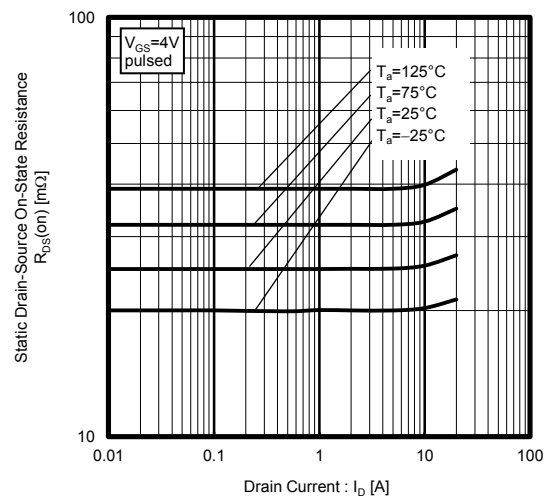


Fig.7 Forward Transfer Admittance vs. Drain Current

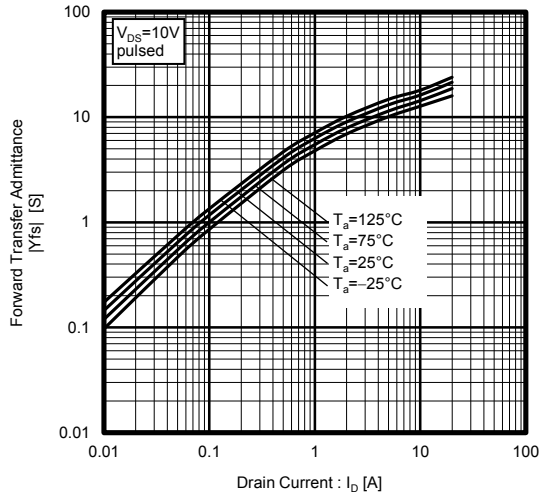


Fig.8 Typical Transfer Characteristics

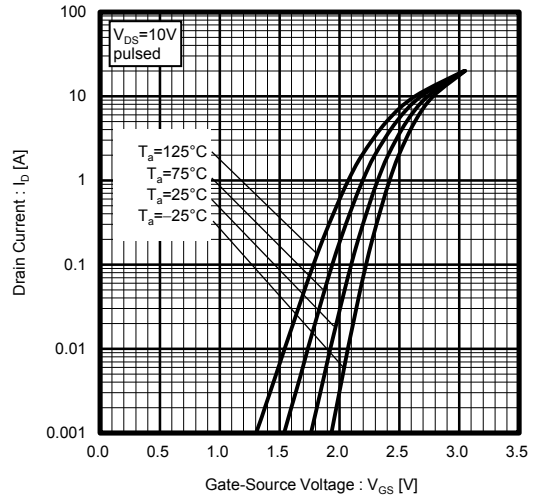


Fig.9 Source Current vs. Source-Drain Voltage

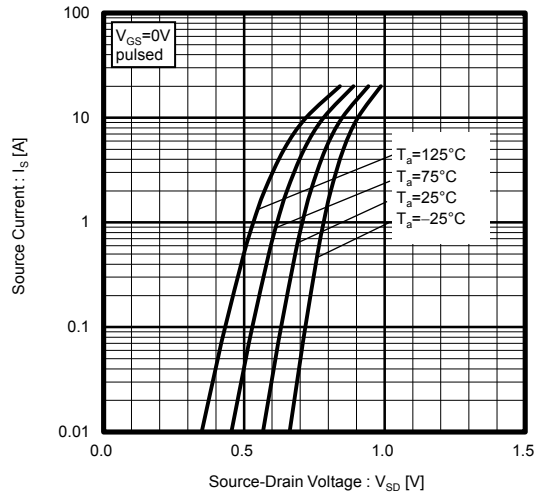


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

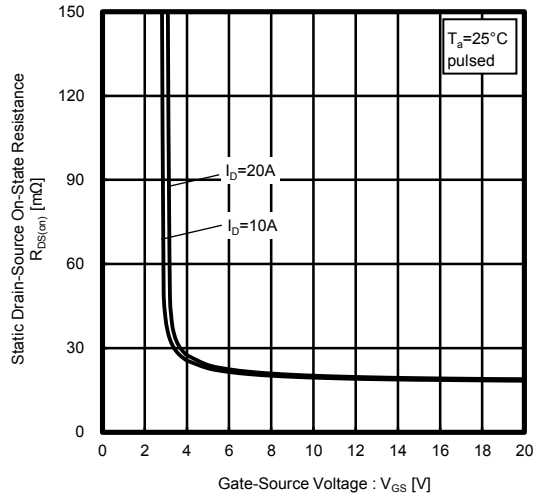


Fig.11 Switching Characteristics

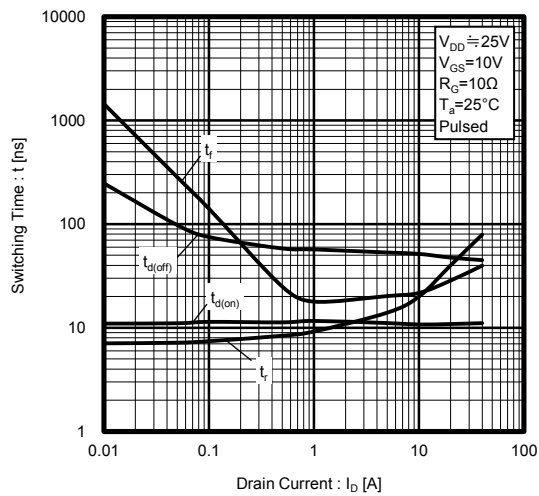


Fig.12 Dynamic Input Characteristics

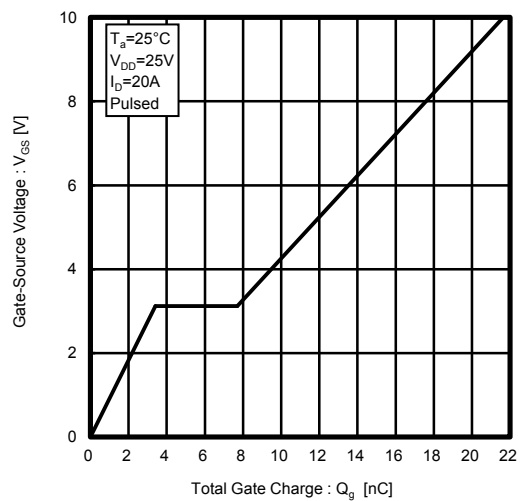


Fig.13 Typical Capacitance vs. Drain-Source Voltage

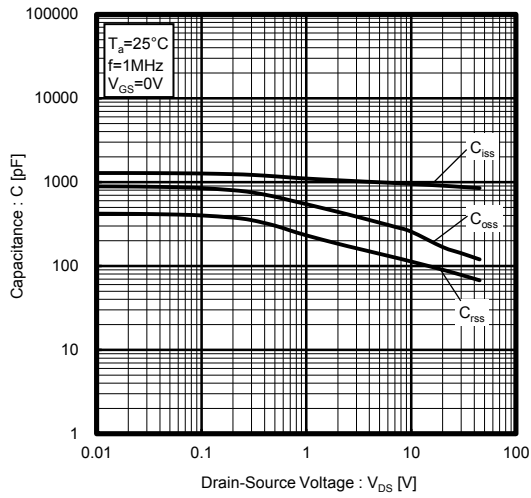


Fig.14 Maximum Safe Operating Area

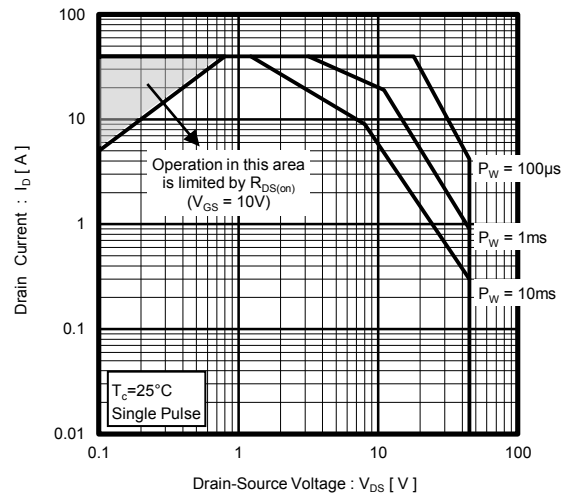
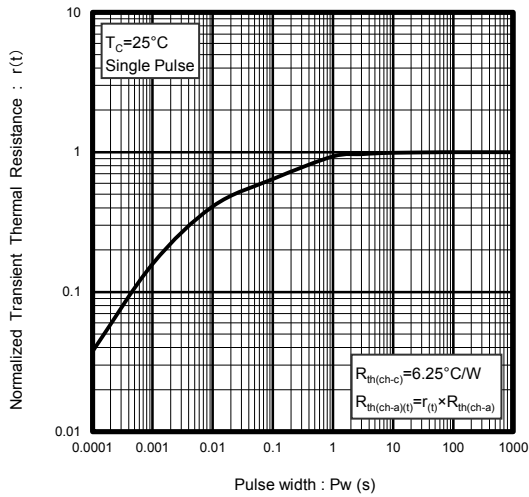


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

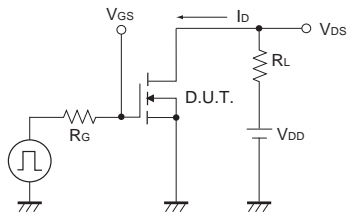


Fig.1-1 Switching Time Measurement Circuit

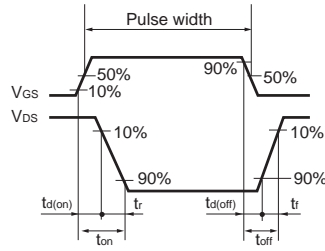


Fig.1-2 Switching Waveforms

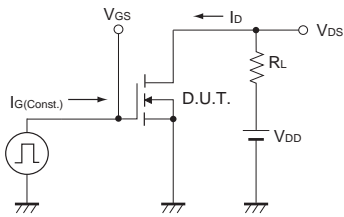


Fig.2-1 Gate Charge Measurement Circuit

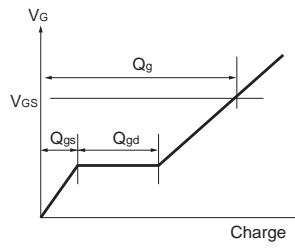


Fig.2-2 Gate Charge Waveform

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