ROHM SEMICONDUCTOR

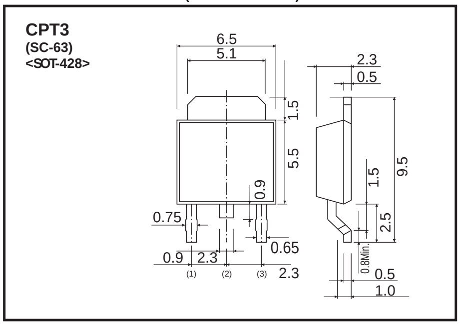
Data Sheet

10V Drive Nch MOSFET

RCD040N25

● Structure
Silicon N-channel MOSFET

● Dimensions (Unit : mm)



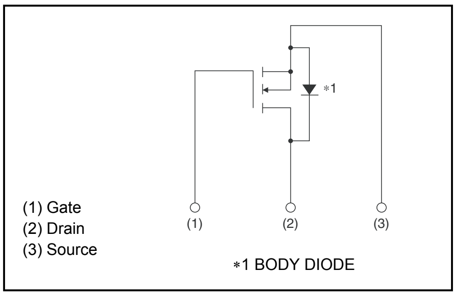
●Features
1) Low on-resistance.
2) High-speed switching.
3) Wide range of SOA.
4) Drive circuits can be simple.
5) Parallel use is easy.

● Application
Switching

● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
RCD040N25		O

● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	250	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	Continuous	I_D *3	±4	A
	Pulsed	I_{DP} *1,3	±16	A
Source current (Body Diode)	Continuous	I_S	4	A
	Pulsed	I_{SP} *1	16	A
Avalanche current		I_{AS} *2	2	A
Avalanche energy		E_{AS} *2	1.61	mJ
Power dissipation		P_D *4	20	W
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%

*2 L ≒ 500μH, V_{DD}=50V, R_G=25Ω, T_{ch}=25°C

*3 Limited only by maximum channel temperature allowed.

*4 T_C=25°C

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	Rth (ch-c)*	6.25	°C / W

* T_C=25°C

* Limited only by maximum channel temperature allowed.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±100	nA	V_{GS}=±30V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	250	-	-	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	V_{DS}=250V, V_{GS}=0V
Gate threshold voltage	$V_{GS (th)}$	3.5	-	5.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS (on)}$ *	-	780	1000	mΩ	I_D=2A, V_{GS}=10V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.2	-	-	S	V_{DS}=10V, I_D=2A
Input capacitance	C_{iss}	-	410	-	pF	V_{DS}=25V
Output capacitance	C_{oss}	-	30	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	15	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	-	17	-	ns	V_{DD}≒125V, I_D=2A
Rise time	t_r *	-	15	-	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	-	20	-	ns	R_L=62.5Ω
Fall time	t_f *	-	12	-	ns	R_G=10Ω
Total gate charge	Q_g *	-	9.0	-	nC	V_{DD}≒125V, I_D=4A
Gate-source charge	Q_{gs} *	-	3.5	-	nC	V_{GS}=10V
Gate-drain charge	Q_{gd} *	-	3.5	-	nC	R_L=31.25Ω, R_G=10Ω

*Pulsed

●**Body diode characteristics** (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	1.5	V	I_s=4A, V_{GS}=0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (Ⅰ)

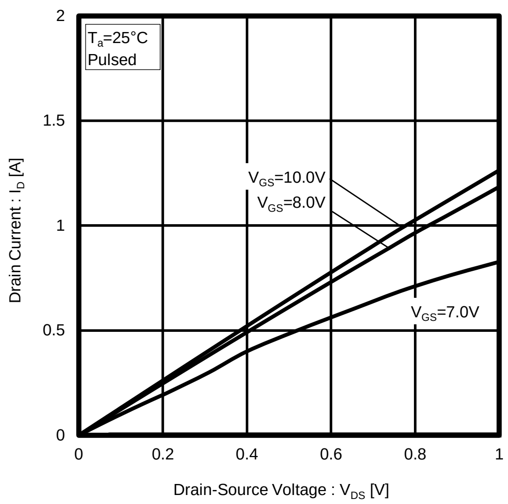


Fig.2 Typical Output Characteristics (Ⅱ)

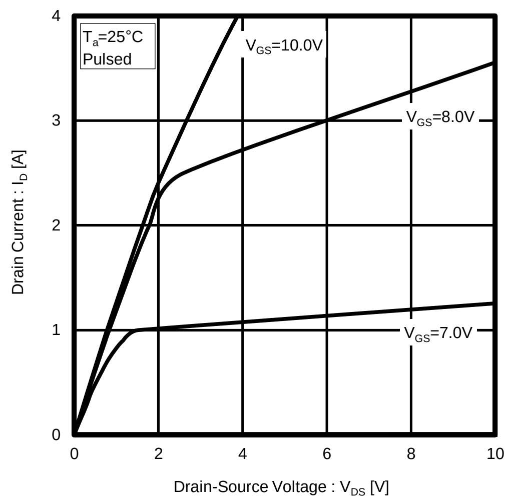


Fig.3 Typical Transfer Characteristics

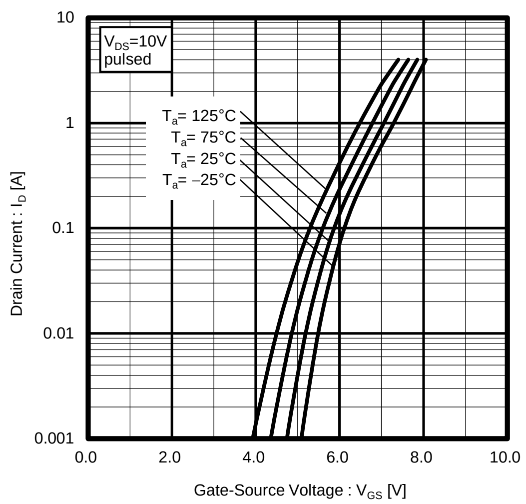


Fig.4 Gate Threshold Voltage vs. Channel Temperature

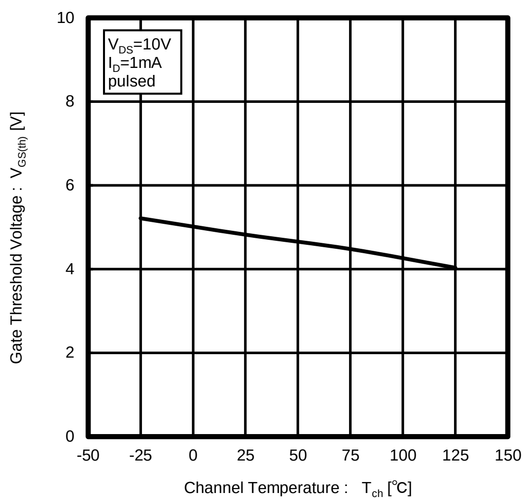


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

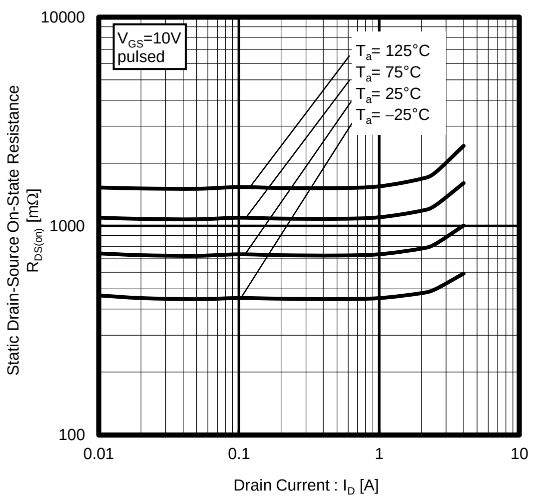


Fig.6 Static Drain-Source On-State Resistance vs. Channel Temperature

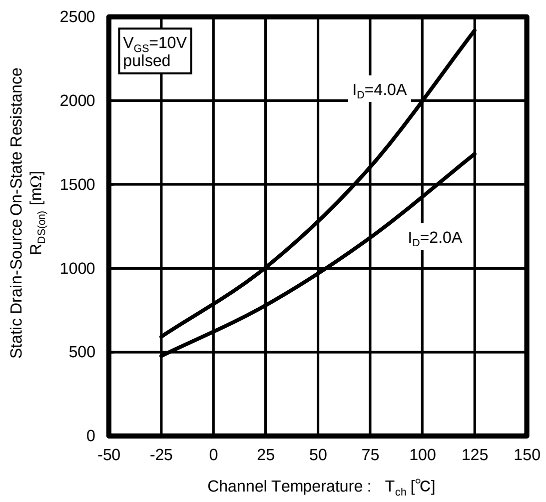


Fig.7 Forward Transfer Admittance vs. Drain Current

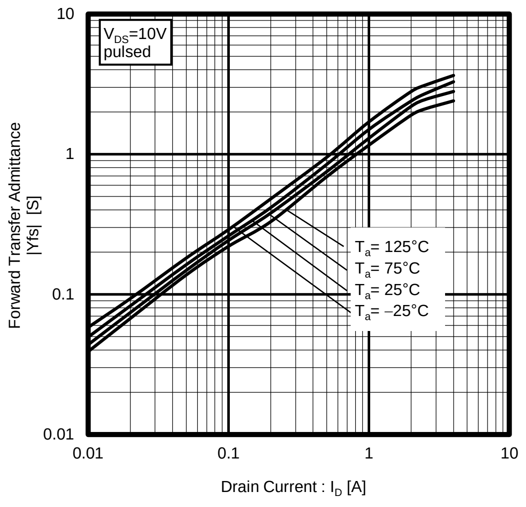


Fig.8 Source Current vs. Source-Drain Voltage

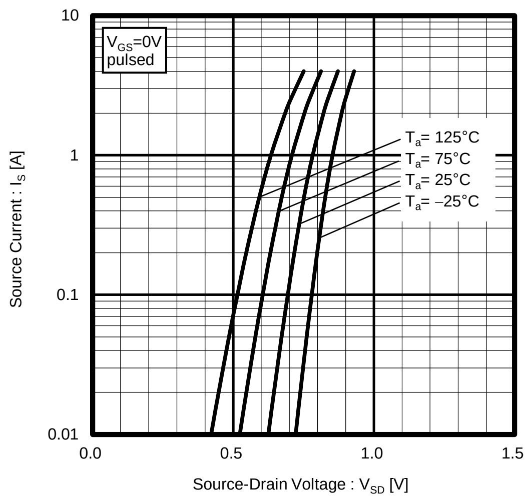


Fig.9 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

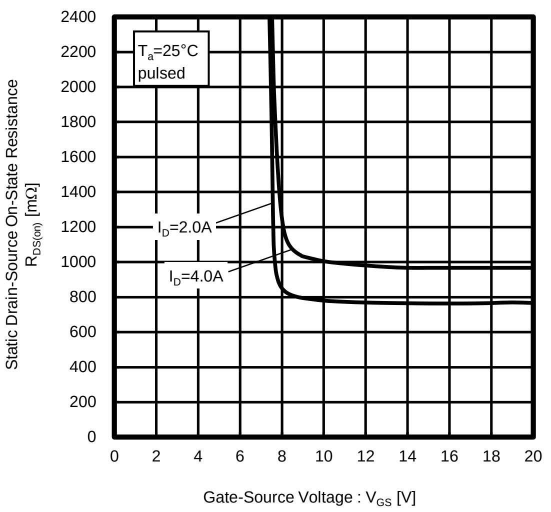


Fig.10 Switching Characteristics

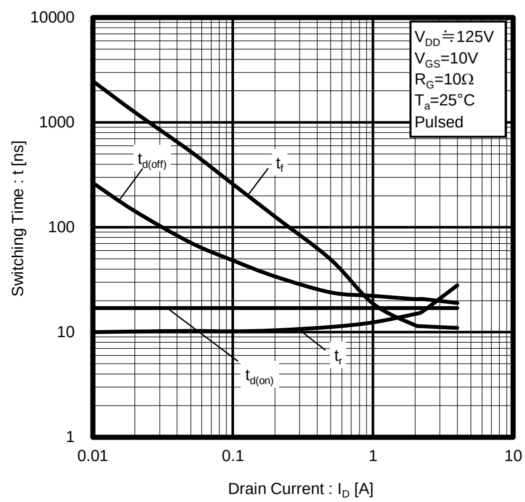


Fig.11 Dynamic Input Characteristics

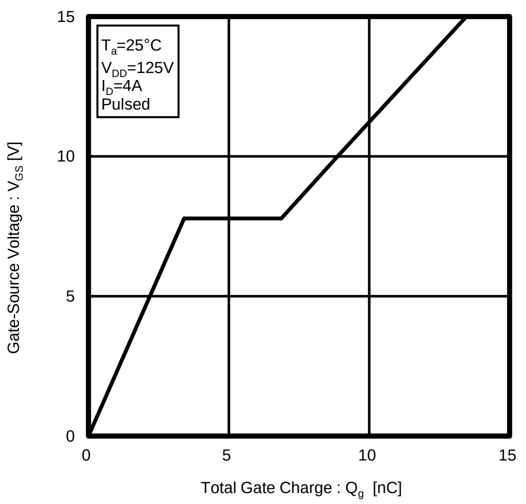


Fig.12 Typical Capacitance vs. Drain-Source Voltage

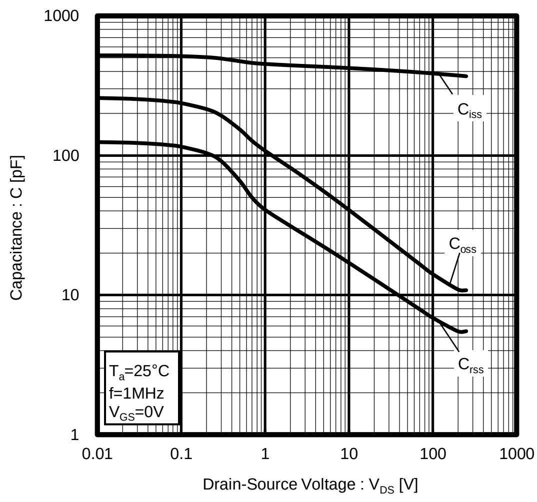
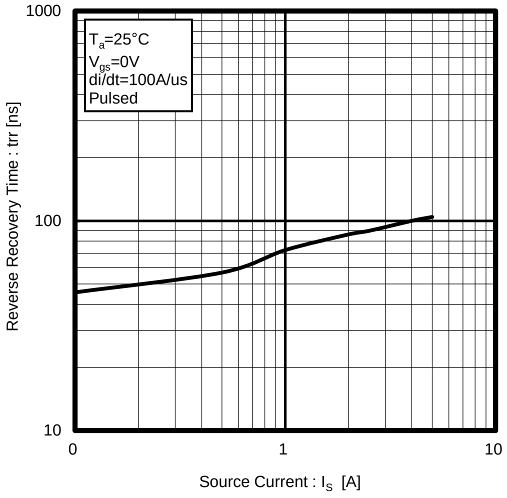


Fig.13 Reverse Recovery Time vs. Source Current



● Measurement circuits

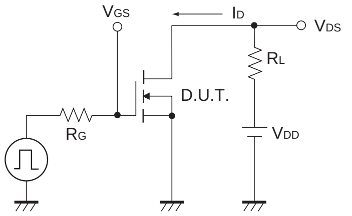


Fig.1-1 Switching Time Measurement Circuit

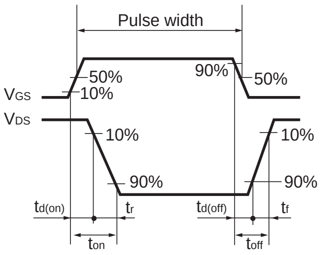


Fig.1-2 Switching Waveforms

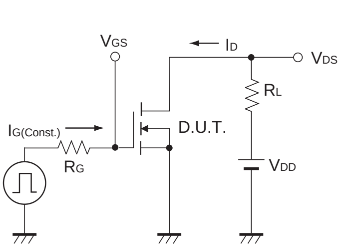


Fig.2-1 Gate Charge Measurement Circuit

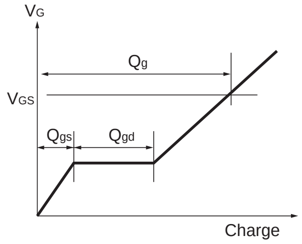


Fig.2-2 Gate Charge Waveform

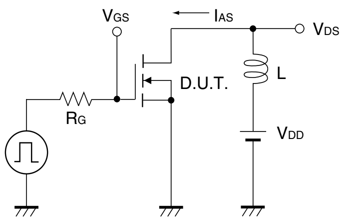
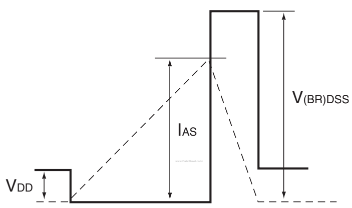


Fig.3-1 Avalanche Measurement Circuit



$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}^2 \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

Fig.3-2 Avalanche Waveform

Notes

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