1.2V Drive Nch MOSFET

RUB002N02

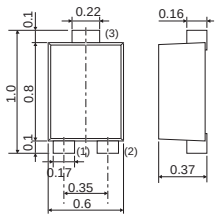
● Structure
Silicon N-channel MOSFET

● Features
1) High speed switing.
2) Small package(VMN3).
3) Ultra low voltage drive(1.2V drive).

● Application
Switching

● Dimensions (Unit : mm)

VMN3

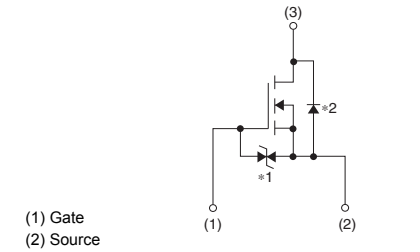


Abbreviated symbol : QR

● Packaging specifications

Type	Package	Taping
	Code	T2CL
	Basic ordering unit (pieces)	8000
RUB002N02		○

● Inner circuit



(1) Gate
(2) Source
(3) Drain

*1 ESD PROTECTION DIODE
*2 BODY DIODE

● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	20	V
Gate-source voltage		V_{GSS}	±8	V
Drain current	Continuous	I_D	±200	mA
	Pulsed	I_{DP} *1	±800	mA
Source current (Body Diode)	Continuous	I_S	125	mA
	Pulsed	I_{SP} *1	800	mA
Power dissipation		P_D *2	150	mW
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%

*2 Each terminal mounted on a recommended land.

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Ambient	Rth (ch-a)*	833	°C / W

* Each terminal mounted on a recommended land.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	±10	μA	V_{GS}=±8V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	20	-	-	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=20V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	0.3	-	1.0	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	-	0.7	1.0	Ω	I_D=200mA, V_{GS}=4V
		-	0.8	1.2		I_D=200mA, V_{GS}=2.5V
		-	1.0	1.4		I_D=200mA, V_{GS}=1.8V
		-	1.2	2.4		I_D=40mA, V_{GS}=1.5V
		-	1.6	4.8		I_D=20mA, V_{GS}=1.2V
Forward transfer admittance	$\|Y_{fs}\|$*	0.2	-	-	S	I_D=200mA, V_{DS}=10V
Input capacitance	C_{iss}	-	25	-	pF	V_{DS}=10V
Output capacitance	C_{oss}	-	10	-	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	-	10	-	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$*	-	5	-	ns	I_D=150mA, V_{DD}≒ 10V
Rise time	t_r *	-	10	-	ns	V_{GS}=4V
Turn-off delay time	$t_{d(off)}$*	-	15	-	ns	R_L=67Ω
Fall time	t_f *	-	10	-	ns	R_G=10Ω

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}*	-	-	1.2	V	I_s=200mA, V_{GS}=0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics(Ⅰ)

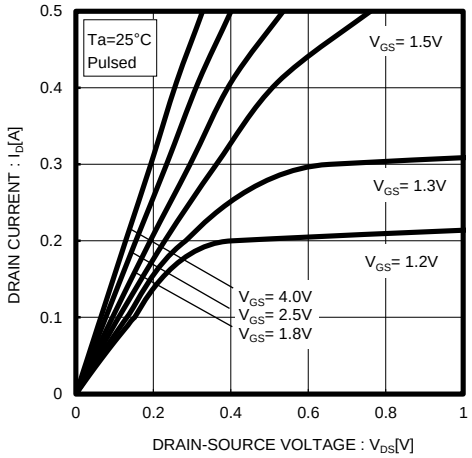


Fig.2 Typical Output Characteristics(Ⅱ)

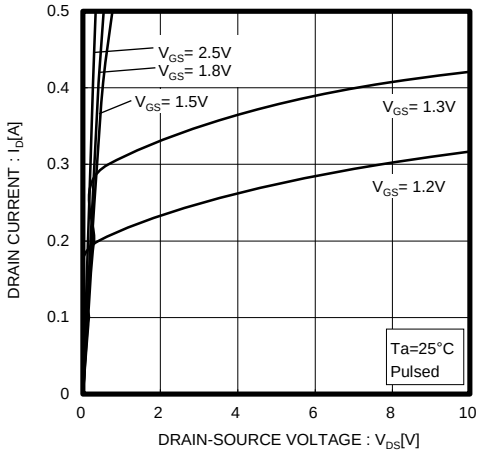


Fig.3 Typical transfer characteristics

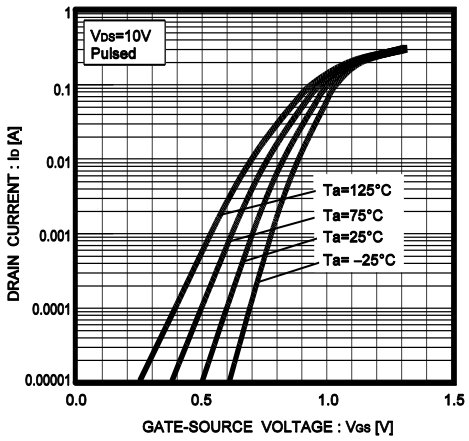


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(Ⅰ)

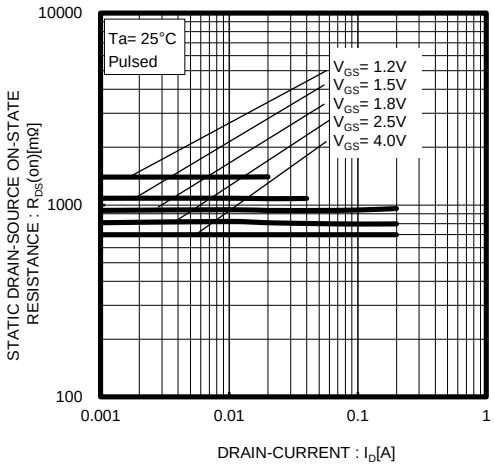


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

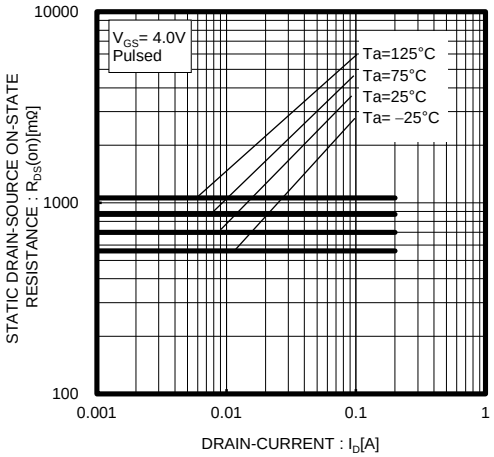


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(Ⅱ)

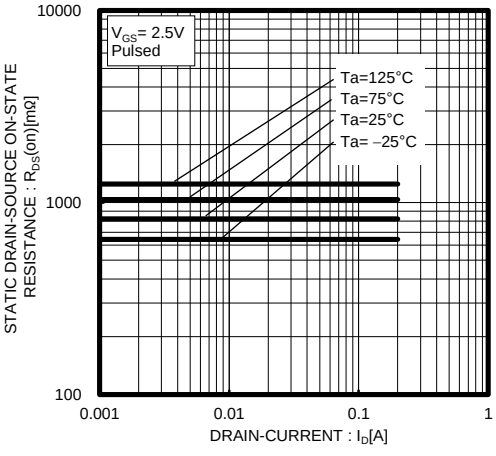


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(Ⅲ)

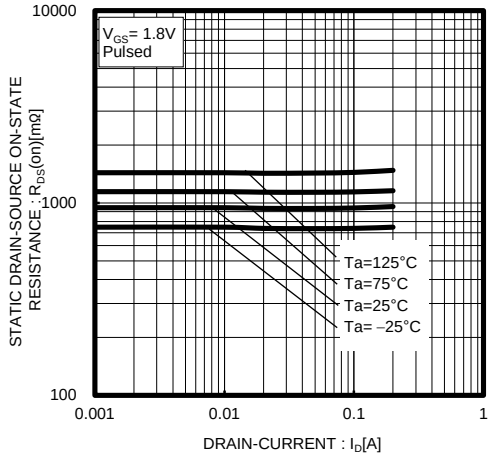


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(Ⅳ)

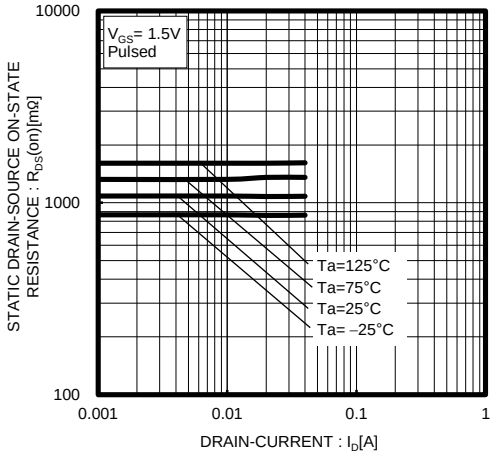


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current(Ⅴ)

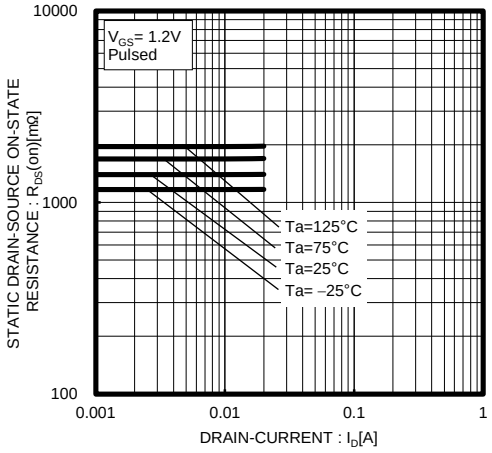


Fig.10 Forward Transfer Admittance vs. Drain Current

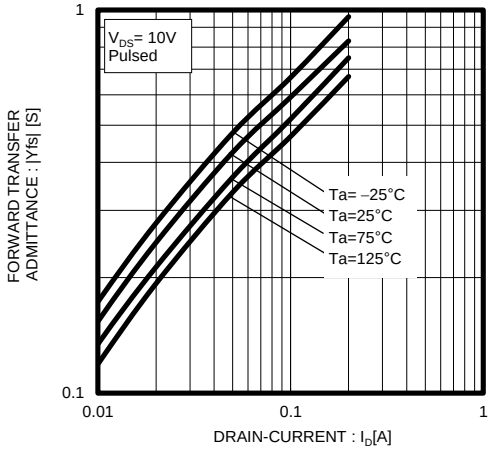


Fig.11 Source current vs. source-drain voltage

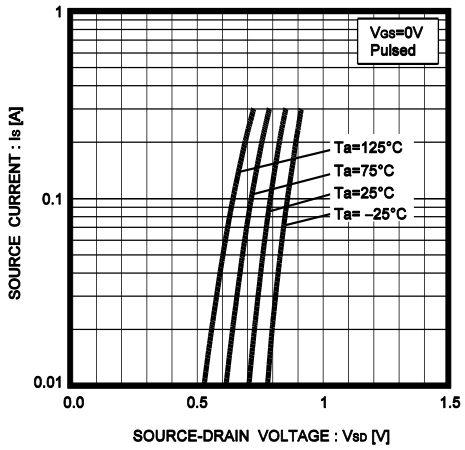


Fig.12 Static Drain-Source On-State Resistance vs. Gate Source Voltage

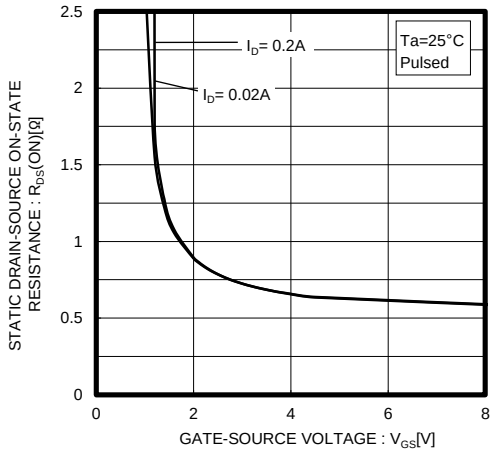


Fig.13 Switching characteristics

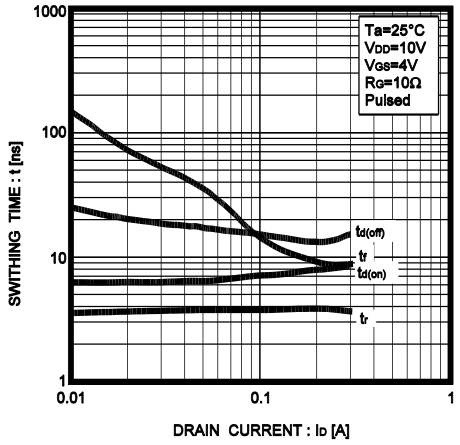
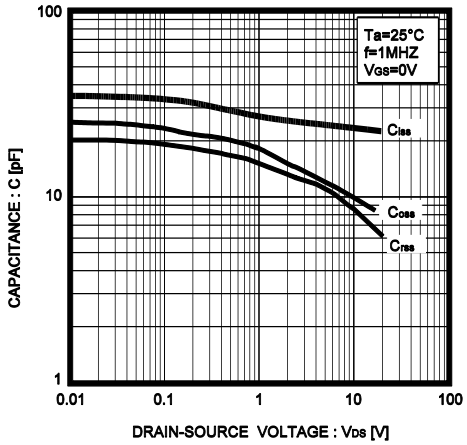


Fig.14 Typical capacitance vs. drain-source voltage



● **Measurement circuits**

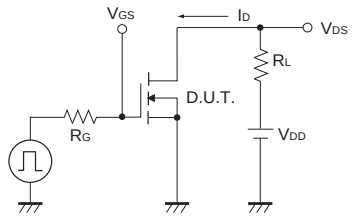


Fig.1-1 Switching Time Measurement Circuit

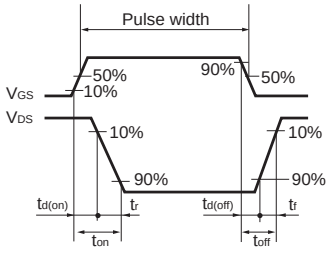


Fig.1-2 Switching Waveforms

● **Notice**

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

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