

4V Drive Nch MOS FET

RK7002A

●Structure

Silicon N-channel MOS FET transistor

●Features

- 1) Low on-resistance.
- 2) High ESD
- 3) High-speed switching.
- 4) Low-voltage drive (4V).
- 5) Drive circuits can be simple.
- 6) Parallel use is easy.

●Applications

Switching

●Packaging specifications

Type	Package	Taping
	Code	T116
	Basic ordering unit (pieces)	3000
RK7002A		○

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Drain current	Continuous	I_D	± 300 mA
	Pulsed	I_{DP}^{*1}	± 1.2 A
Source current (Body diode)	Continuous	I_S	200 mA
	Pulsed	I_{SP}^{*1}	0.8 A
Total power dissipation	P_D^{*2}	200	mW
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

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

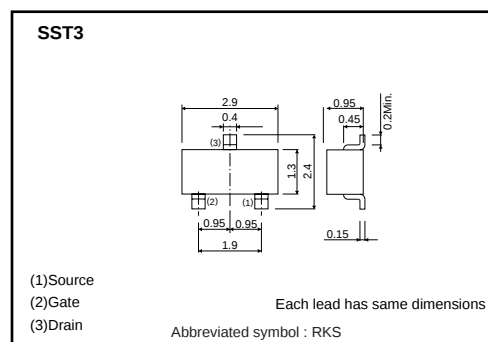
*2 With each pin mounted on the recommended land.

●Thermal resistance

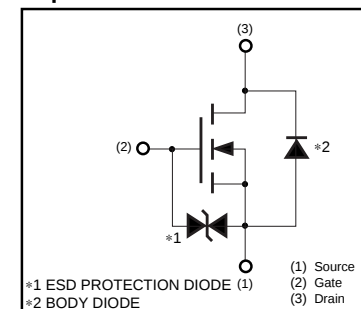
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)^*$	625	°C / W

* With each pin mounted on the recommended land.

●External dimensions (Unit : mm)



●Equivalent circuit



* A protection diode has been built in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when fixed voltages are exceeded.

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate leakage current	I_{GSS}	—	—	±10	μA	$V_{GS}=\pm 20V$, $V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR) DSS}$	60	—	—	V	$I_D=1mA$, $V_{GS}=0V$
Drain cutoff current	I_{DSS}	—	—	1	μA	$V_{DS}=60V$, $V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1	—	2.5	V	$V_{DS}=10V$, $I_D=1mA$
Drain-source on-state resistance	$R_{DS(on)}^*$	—	0.7	1.0	Ω	$I_D=300mA$, $V_{GS}=10V$
		—	1.1	1.5		$I_D=300mA$, $V_{GS}=4V$
Forward transfer admittance	$ Y_{fs} ^*$	0.2	—	—	S	$V_{DS}=10V$, $I_D=300mA$
Input capacitance	C_{iss}	—	33	—	pF	$V_{DS}=10V$
Output capacitance	C_{oss}	—	14	—	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	—	9	—	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	—	6	—	ns	$I_D=150mA$, $V_{DD}=30V$ $V_{GS}=10V$ $R_L=200\Omega$ $R_G=10\Omega$
Rise time	t_r^*	—	5	—	ns	
Turn-off delay time	$t_{d(off)}^*$	—	13	—	ns	
Fall time	t_f^*	—	80	—	ns	
Total gate charge	Q_g^*	—	3	6	nC	$V_{DD}=30V$
Gate-source charge	Q_{gs}^*	—	0.6	—	nC	$V_{GS}=10V$
Gate-drain charge	Q_{gd}^*	—	0.5	—	nC	$I_D=200mA$

* Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}^*	—	—	1.2	V	$I_S=300mA$, $V_{GS}=0V$

*Pulsed

Transistors

●Electrical characteristic curves

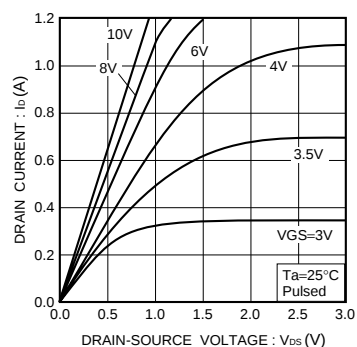


Fig.1 Typical output characteristics

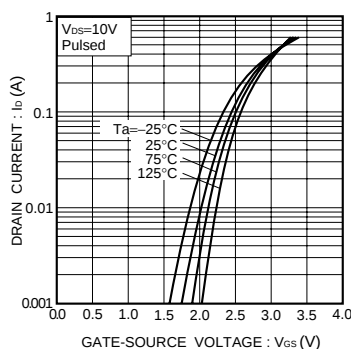
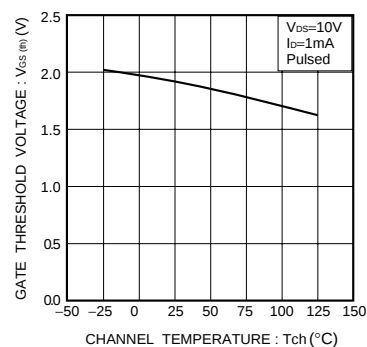
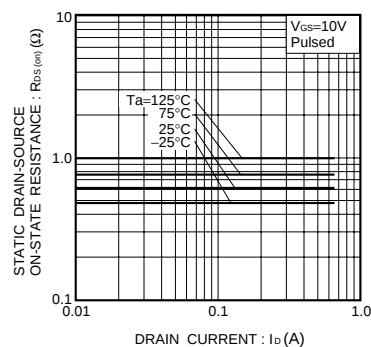
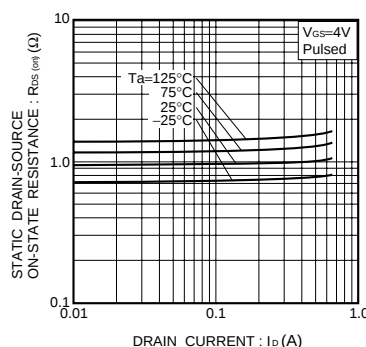
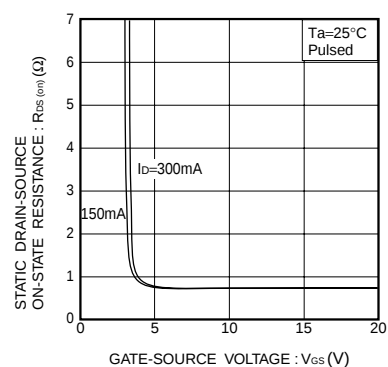
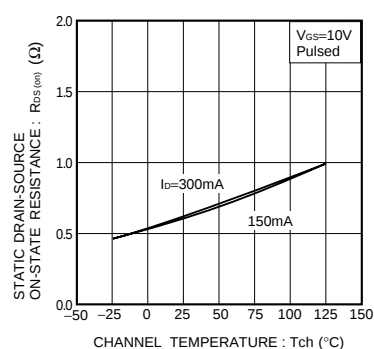
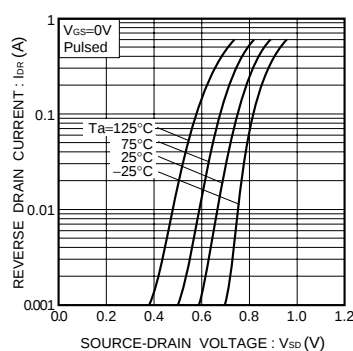
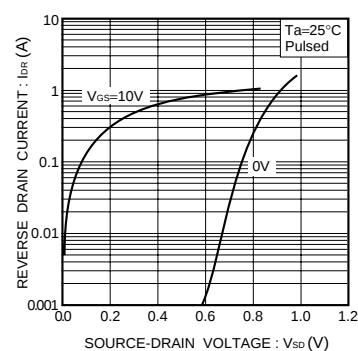


Fig.2 Typical transfer characteristics

Fig.3 Gate threshold voltage
vs. channel temperatureFig.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. gate-source voltageFig.7 Static drain-source on-state
resistance vs. channel temperatureFig.8 Reverse drain current vs.
source-drain voltage (I)Fig.9 Reverse drain current vs.
source-drain voltage (II)

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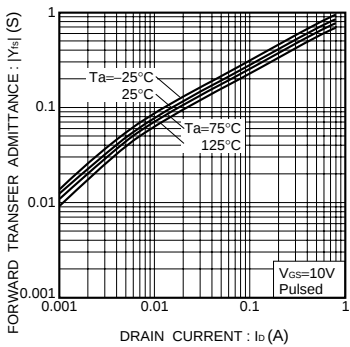


Fig.10 Forward transfer admittance vs. drain current

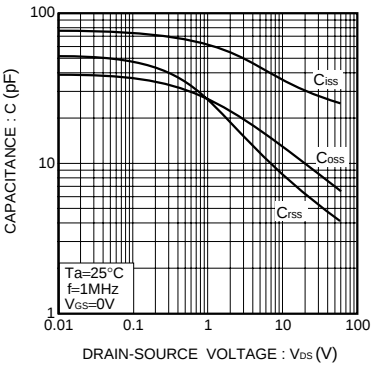


Fig.11 Typical capacitance vs. drain-source voltage

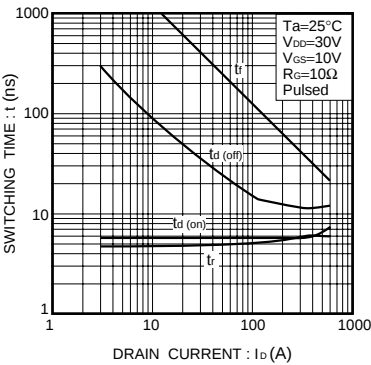


Fig.12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

●Switching characteristics measurement circuit

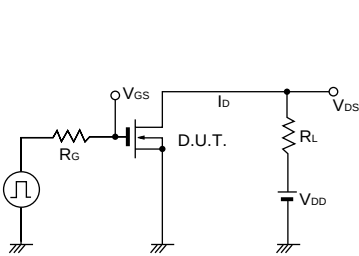


Fig.13 Switching time measurement circuit

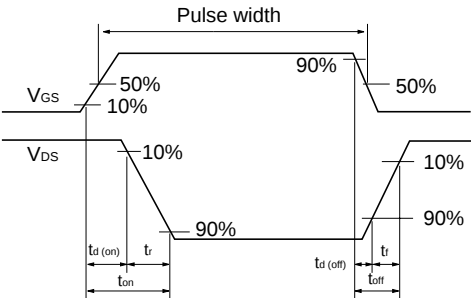


Fig.14 Switching time waveforms

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