

# 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 <sub>bss</sub>	60	V
Gate-source voltage	V <sub>gss</sub>	±20	V
Drain current	Continuous	I <sub>d</sub>	±300 mA
	Pulsed	I <sub>dp</sub> *1	±1.2 A
Source current (Body diode)	Continuous	I <sub>s</sub>	200 mA
	Pulsed	I <sub>sp</sub> *1	0.8 A
Total power dissipation	P <sub>d</sub> *2	200	mW
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\*1 P<sub>w</sub>≤10μs, Duty cycle≤1%

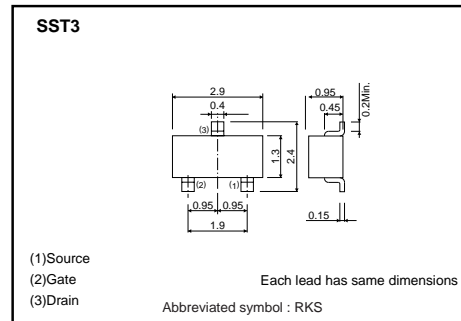
\*2 With each pin mounted on the recommended land.

**●Thermal resistance**

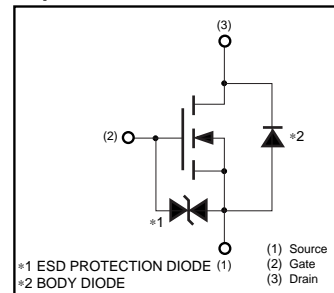
Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th (ch-a)</sub> *	625	°C / W

\* 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 <sub>GSS</sub>	–	–	±10	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	60	–	–	V	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V
Drain cutoff current	I <sub>DSS</sub>	–	–	1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	1	–	2.5	V	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA
Drain-source on-state resistance	R <sub>DS(on)</sub> *	–	0.7	1.0	Ω	I <sub>D</sub> =300mA, V <sub>GS</sub> =10V
		–	1.1	1.5		I <sub>D</sub> =300mA, V <sub>GS</sub> =4V
Forward transfer admittance	Y <sub>fs</sub>  *	0.2	–	–	S	V <sub>DS</sub> =10V, I <sub>D</sub> =300mA
Input capacitance	C <sub>iss</sub>	–	33	–	pF	V <sub>DS</sub> =10V
Output capacitance	C <sub>oss</sub>	–	14	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	9	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub> *	–	6	–	ns	I <sub>D</sub> =150mA, V <sub>DD</sub> =30V
Rise time	t <sub>r</sub> *	–	5	–	ns	V <sub>GS</sub> =10V
Turn-off delay time	t <sub>d(off)</sub> *	–	13	–	ns	R <sub>L</sub> =200Ω
Fall time	t <sub>f</sub> *	–	80	–	ns	R <sub>G</sub> =10Ω
Total gate charge	Q <sub>g</sub> *	–	3	6	nC	V <sub>DD</sub> =30V
Gate-source charge	Q <sub>gs</sub> *	–	0.6	–	nC	V <sub>GS</sub> =10V
Gate-drain charge	Q <sub>gd</sub> *	–	0.5	–	nC	I <sub>D</sub> =200mA

\* Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub> *	–	–	1.2	V	I <sub>S</sub> =300mA, V <sub>GS</sub> =0V

\*Pulsed

Transistors

● Electrical characteristic curves

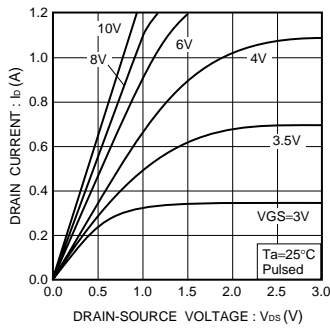


Fig.1 Typical output characteristics

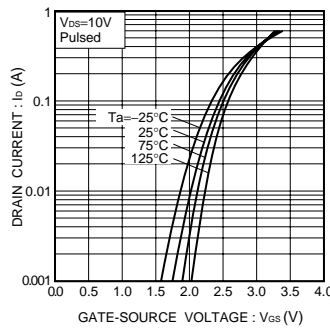


Fig.2 Typical transfer characteristics

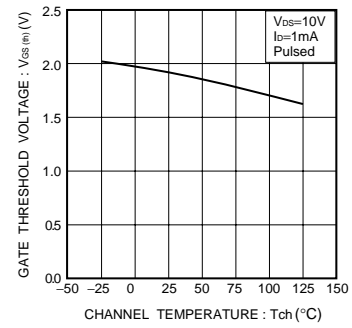


Fig.3 Gate threshold voltage vs. channel temperature

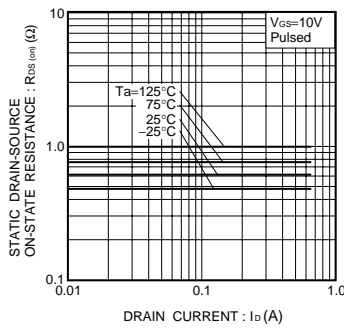


Fig.4 Static drain-source on-state resistance vs. drain current ( I )

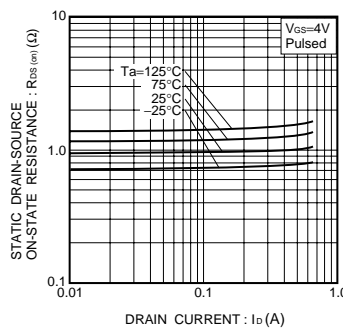


Fig.5 Static drain-source on-state resistance vs. drain current ( II )

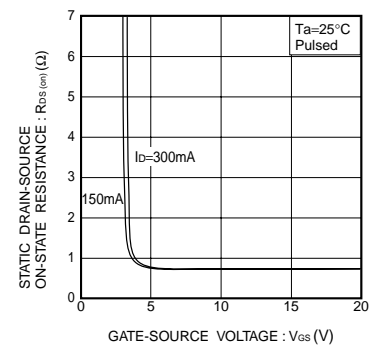


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

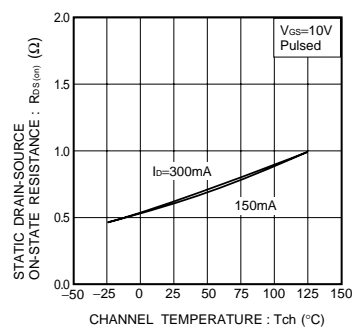


Fig.7 Static drain-source on-state resistance vs. channel temperature

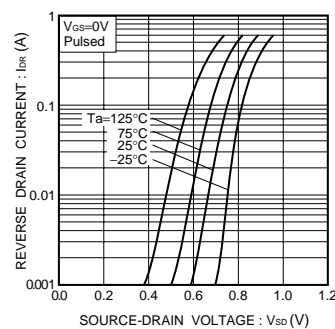


Fig.8 Reverse drain current vs. source-drain voltage ( I )

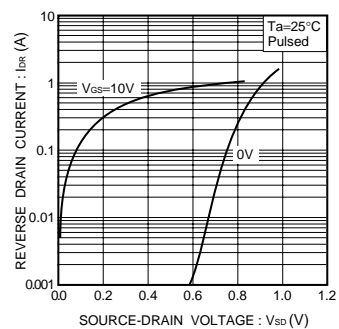


Fig.9 Reverse drain current vs. source-drain voltage ( II )

Transistors

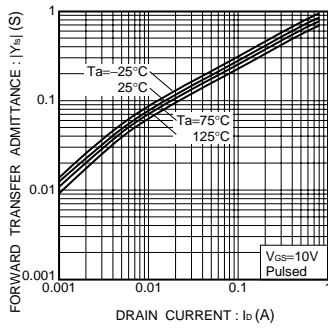


Fig.10 Forward transfer admittance vs. drain current

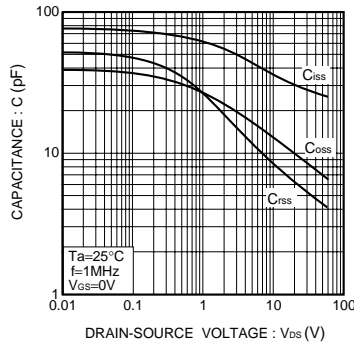


Fig.11 Typical capacitance vs. drain-source voltage

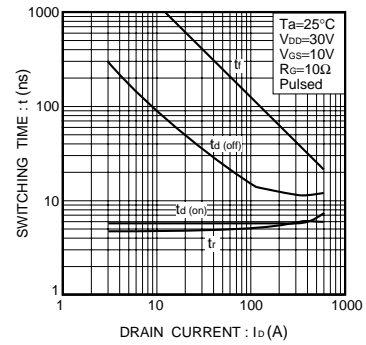


Fig.12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

● Switching characteristics measurement circuit

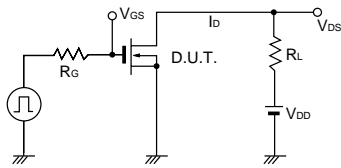


Fig.13 Switching time measurement circuit

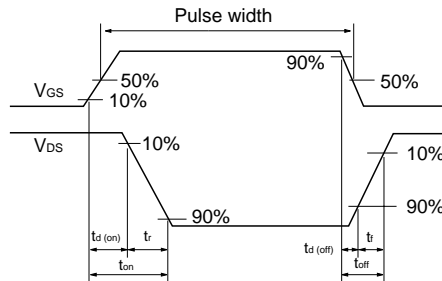


Fig.14 Switching time waveforms

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