

# 4V Drive Nch MOS FET

## 2SK2094

●Structure

Silicon N-channel MOS FET

●Features

- 1) Low On-resistance.
- 2) Fast switching speed.
- 3) Wide SOA (safe operating area).
- 4) 4V drive.
- 5) Drive circuits can be simple.
- 6) Parallel use is easy.

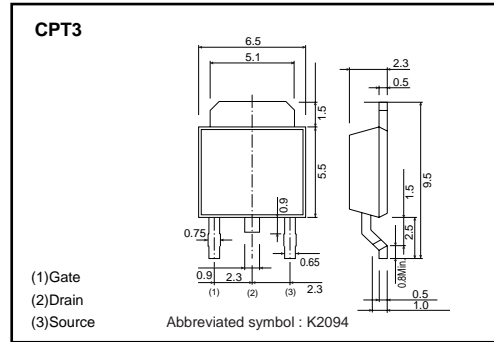
●Applications

Switching

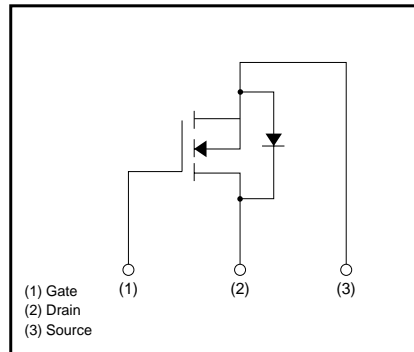
●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
2SK2094		○

●External dimensions (Unit : mm)



●Inner circuit



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V <sub>DSS</sub>	60	V	
Gate-source voltage	V <sub>GSS</sub>	±20	V	
Drain current	Continuous	I <sub>D</sub>	2	A
	Pulsed	I <sub>DP</sub> *	8	A
Reverse drain current	Continuous	I <sub>DR</sub>	2	A
	Pulsed	I <sub>DRP</sub> *	8	A
Total power dissipation(Tc=25°C)	P <sub>D</sub>	10	W	
Channel temperature	T <sub>ch</sub>	150	°C	
Storage temperature	T <sub>stg</sub>	-55 to +150	°C	

\* P<sub>w</sub> ≤ 300μs, Duty cycle ≤ 2%

## Transistors

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	I <sub>GSS</sub>	–	–	±100	nA	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
Zero gate voltage drain current	I <sub>DSS</sub>	–	–	100	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	1.0	–	2.5	V	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	–	0.3	0.35	Ω	I <sub>D</sub> =1A, V <sub>GS</sub> =10V
		–	0.4	0.5		I <sub>D</sub> =1A, V <sub>GS</sub> =4V
Forward transfer admittance	Y <sub>fs</sub>	1.0	–	–	S	V <sub>DS</sub> =10V, I <sub>D</sub> =1A
Input capacitance	C <sub>iss</sub>	–	400	–	pF	V <sub>DS</sub> =10V
Output capacitance	C <sub>oss</sub>	–	150	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	50	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	–	10	–	ns	I <sub>D</sub> =1A, V <sub>DD</sub> ≒30V
Rise time	t <sub>r</sub>	–	20	–	ns	V <sub>GS</sub> =10V
Turn-off delay time	t <sub>d(off)</sub>	–	100	–	ns	R <sub>L</sub> =30Ω
Fall time	t <sub>f</sub>	–	40	–	ns	R <sub>G</sub> =10Ω
Reverse recovery time (Body Diode)	t <sub>rr</sub>	–	100	–	ns	I <sub>DR</sub> =2A, V <sub>GS</sub> =0V, di/dt=50A/μs

Transistors

●Electrical characteristics curve

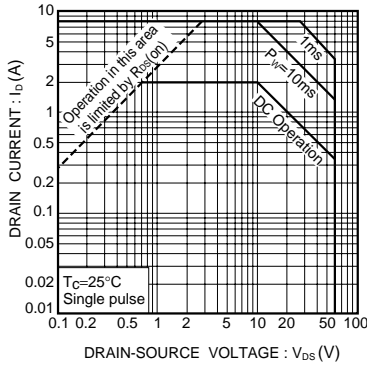


Fig.1 Maximum Safe Operating Area

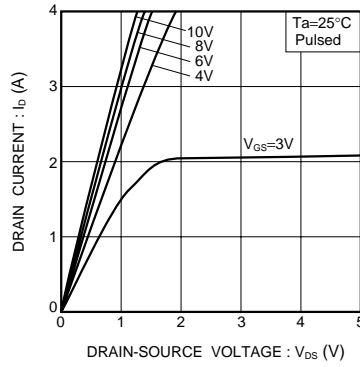


Fig.2 Typical Output Characteristics

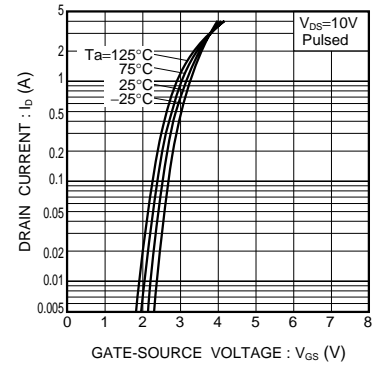


Fig.3 Typical Transfer Characteristics

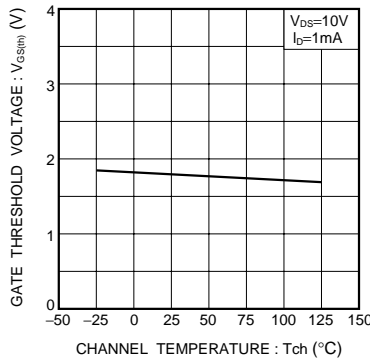


Fig.4 Gate Threshold Voltage vs. Channel Temperature

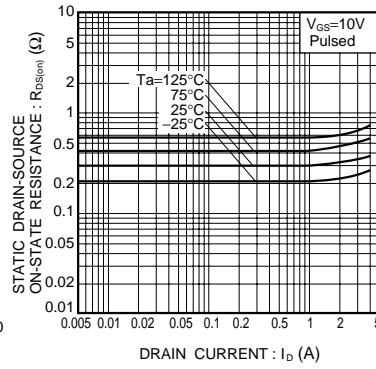


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current ( I )

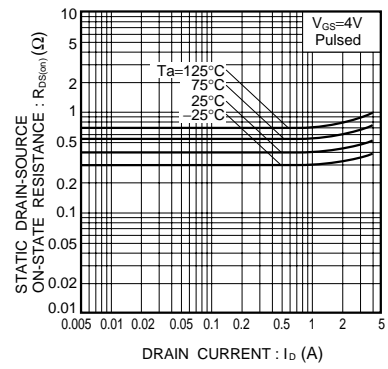


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current ( II )

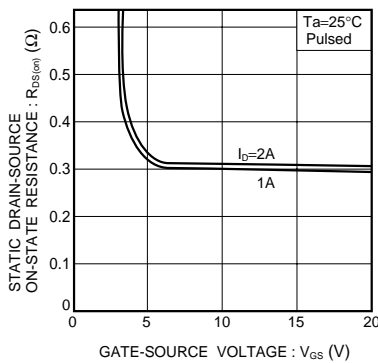


Fig.7 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

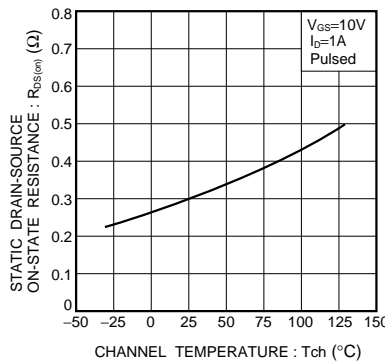


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

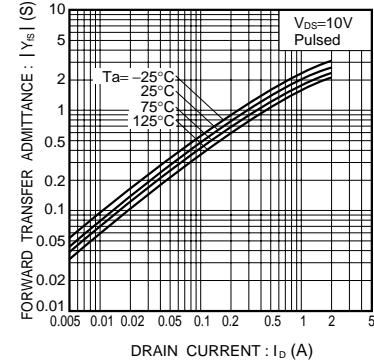


Fig.9 Forward Transfer Admittance vs. Drain Current

Transistors

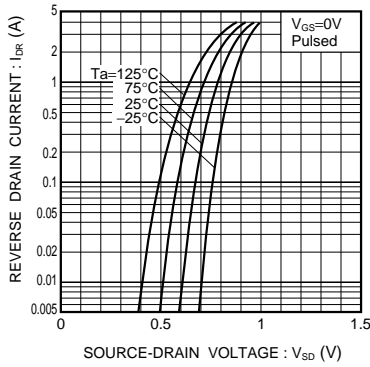


Fig.10 Reverse Drain Current vs. Source-Drain Voltage (I)

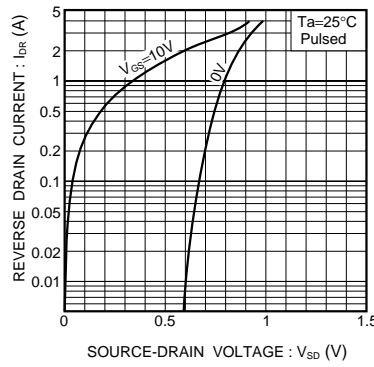


Fig.11 Reverse Drain Current vs. Source-Drain Voltage (II)

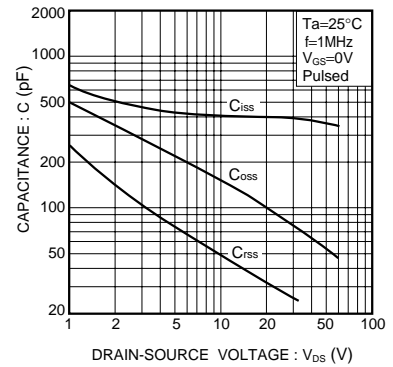


Fig.12 Typical Capacitance vs. Drain-Source Voltage

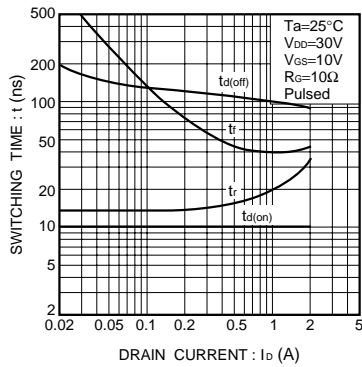


Fig.13 Switching characteristics (See Figure. 15 and 16 for the measurement circuit and resultant waveforms)

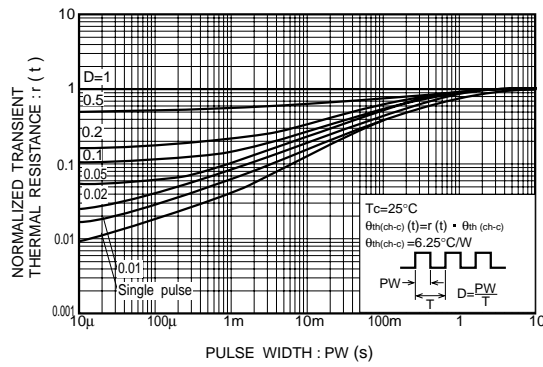


Fig.14 Normalized Transient Thermal Resistance vs. Pulse Width

● Switching characteristics measurement circuit

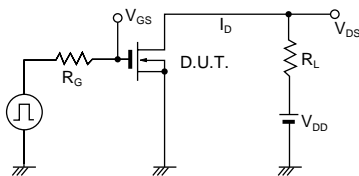


Fig.15 Switching Time Test Circuit

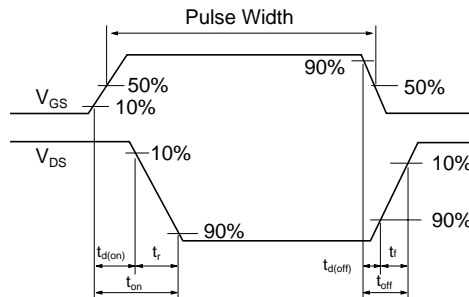


Fig.16 Switching Time Waveforms

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