

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.

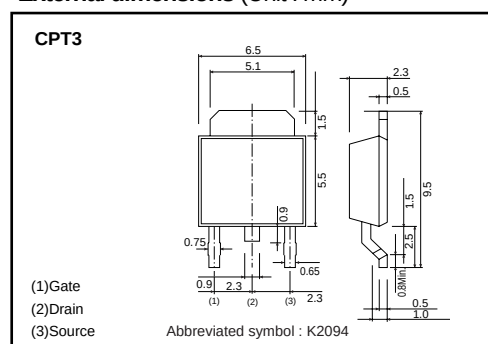
●Applications

Switching

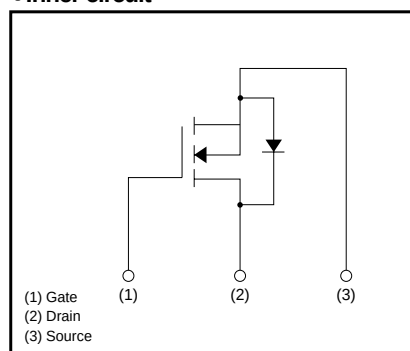
●Packaging specifications

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_{DS}	60	V
Gate-source voltage		V_{GS}	± 20	V
Drain current	Continuous	I_D	2	A
	Pulsed	I_{DP}^*	8	A
Reverse drain current	Continuous	I_{DR}	2	A
	Pulsed	I_{DRP}^*	8	A
Total power dissipation (Tc=25°C)		P_D	10	W
Channel temperature		T_{ch}	150	°C
Storage temperature		T_{stg}	-55 to +150	°C

* $P_w \leq 300\mu s$, Duty cycle $\leq 2\%$

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	I_{GSS}	–	–	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	–	–	V	$I_D = 1mA, V_{GS} = 0V$
Zero gate voltage drain current	I_{DSS}	–	–	100	μA	$V_{DS} = 60V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	–	2.5	V	$V_{DS} = 10V, I_D = 1mA$
Static drain-source on-state resistance	$R_{DS(on)}$	–	0.3	0.35	Ω	$I_D = 1A, V_{GS} = 10V$
		–	0.4	0.5		$I_D = 1A, V_{GS} = 4V$
Forward transfer admittance	$ Y_{fs} $	1.0	–	–	S	$V_{DS} = 10V, I_D = 1A$
Input capacitance	C_{iss}	–	400	–	pF	$V_{DS} = 10V$
Output capacitance	C_{oss}	–	150	–	pF	$V_{GS} = 0V$
Reverse transfer capacitance	C_{rss}	–	50	–	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	–	10	–	ns	$I_D = 1A, V_{DD} = 30V$
Rise time	t_r	–	20	–	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$	–	100	–	ns	$R_L = 30\Omega$
Fall time	t_f	–	40	–	ns	$R_G = 10\Omega$
Reverse recovery time (Body Diode)	t_{rr}	–	100	–	ns	$I_{DR} = 2A, V_{GS} = 0V, di/dt = 50A/\mu s$

Transistors

●Electrical characteristics curve

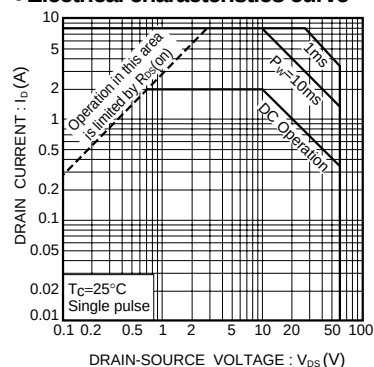


Fig.1 Maximum Safe Operating Area

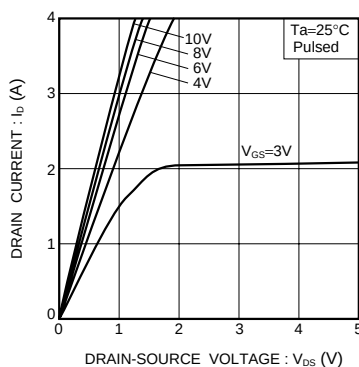


Fig.2 Typical Output Characteristics

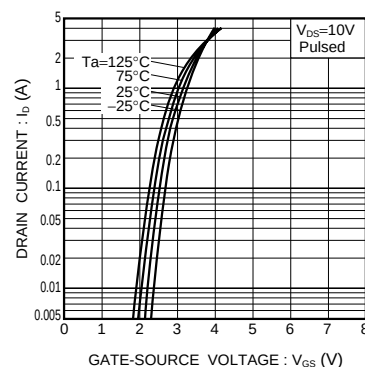


Fig.3 Typical Transfer Characteristics

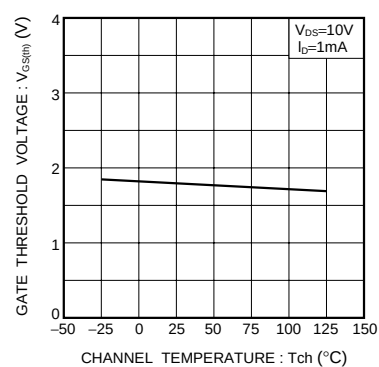


Fig.4 Gate Threshold Voltage vs. Channel Temperature

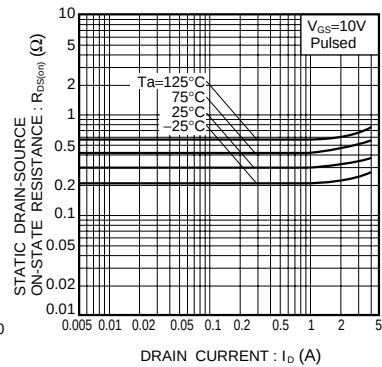


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (I)

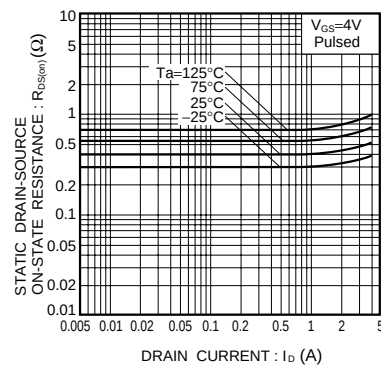


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (II)

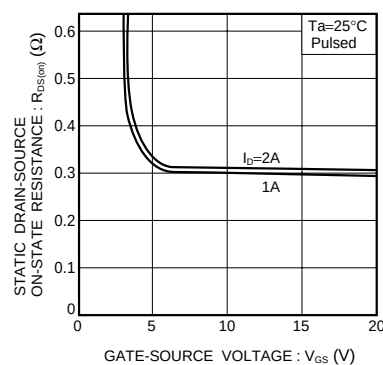


Fig.7 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

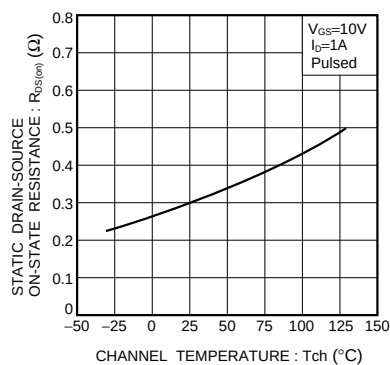


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

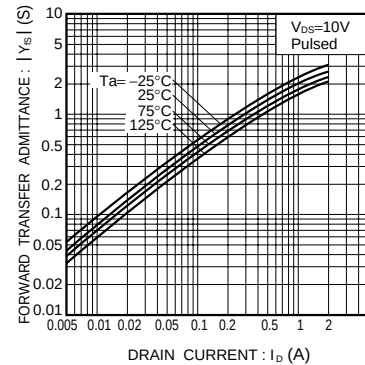


Fig.9 Forward Transfer Admittance vs. Drain Current

Transistors

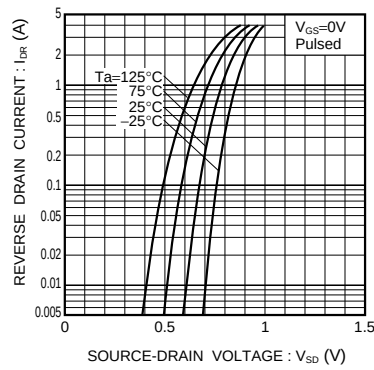


Fig.10 Reverse Drain Current vs. Source-Drain Voltage (I)

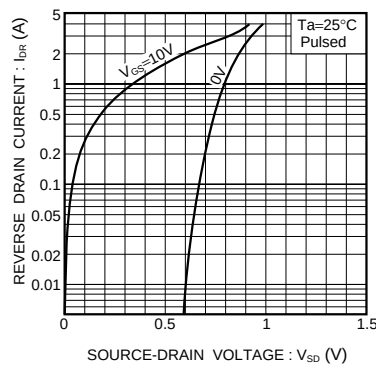


Fig.11 Reverse Drain Current vs. Source-Drain Voltage (II)

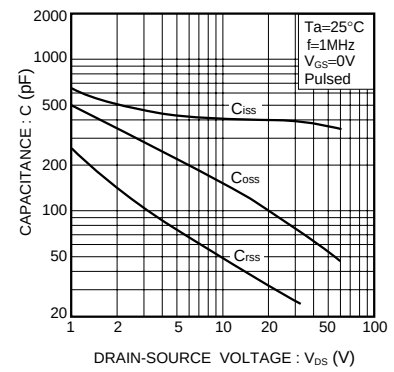


Fig.12 Typical Capacitance vs. Drain-Source Voltage

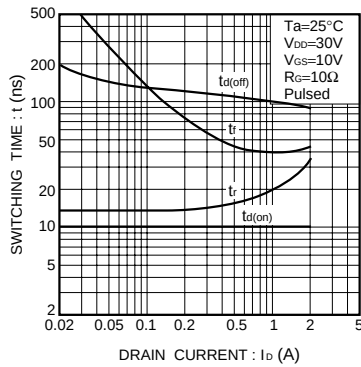


Fig.13 Switching characteristics (See Figure. 15 and 16 for the measurement circuit and resultant waveforms)

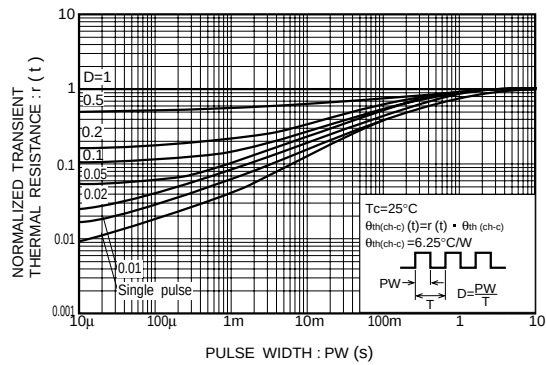


Fig.14 Normalized Transient Thermal Resistance vs. Pulse Width

● Switching characteristics measurement circuit

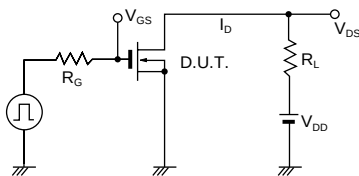


Fig.15 Switching Time Test Circuit

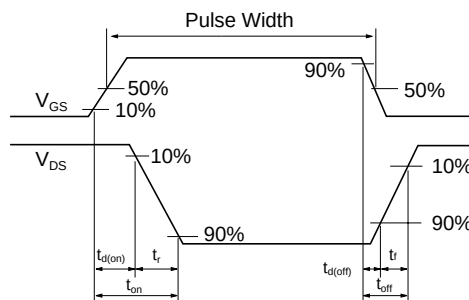


Fig.16 Switching Time Waveforms

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