

Small switching (60V, 2A)

2SK2094

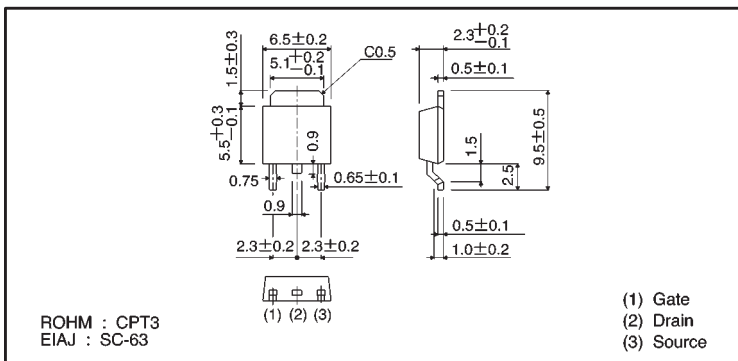
●Features

- 1) Low on-resistance.
- 2) Fast switchig speed.
- 3) Wide SOA (safe operating area).
- 4) Low-voltage drive (4V).
- 5) Easily designed drive circuits.
- 6) Easy to parallel.

●Structure

Silicon N-channel
MOSFET

●External dimensions (Units: mm)



●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	20	W
Channel temperature		T_{ch}	150	°C
Storage temperature		T_{stg}	-55~+150	°C

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

●Packaging specifications

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

●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	$I_D = 1A$, $V_{DD} \approx 30V$
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	t_{rr}	—	100	—	ns	$I_{DR} = 2A$, $V_{GS} = 0V$, $di/dt = 50A/\mu s$

●Electrical characteristic curves

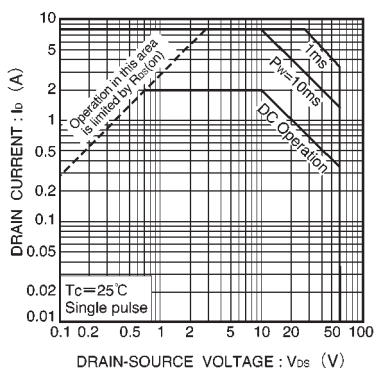


Fig.1 Maximum safe operating area

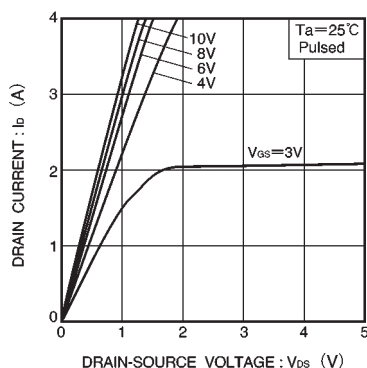


Fig.2 Typical output characteristics

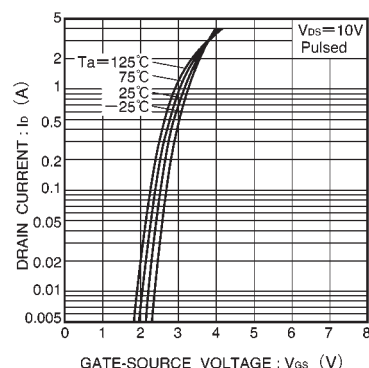


Fig.3 Typical transfer characteristics

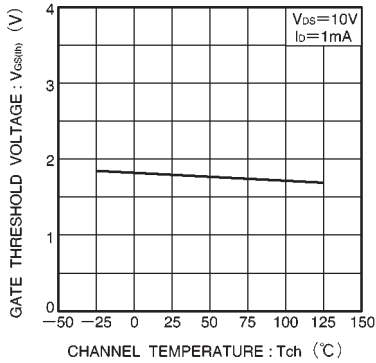


Fig.4 Gate threshold voltage vs. channel temperature

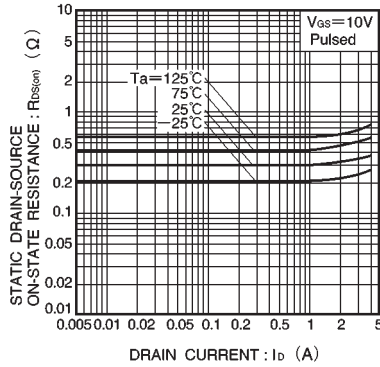


Fig.5 Static drain-source on-state resistance vs. drain current (I)

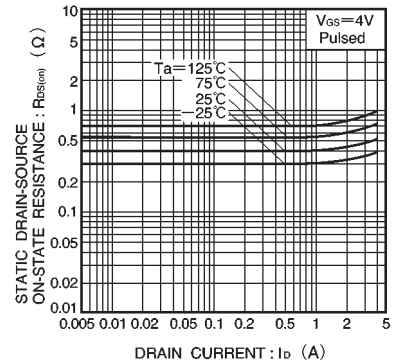


Fig.6 Static drain-source on-state resistance vs. drain current (II)

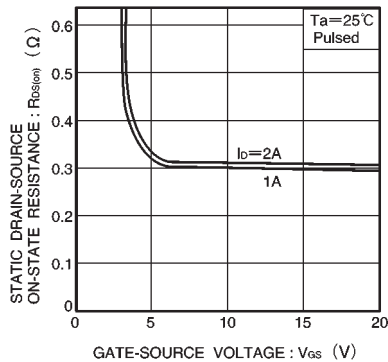


Fig.7 Static drain-source on-state resistance vs. gate-source voltage

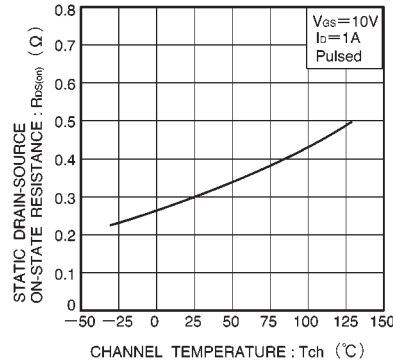


Fig.8 Static drain-source on-state resistance vs. channel temperature

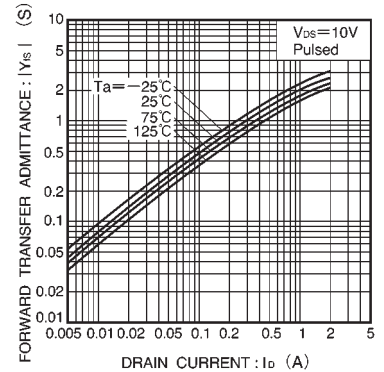


Fig.9 Forward transfer admittance vs. drain current

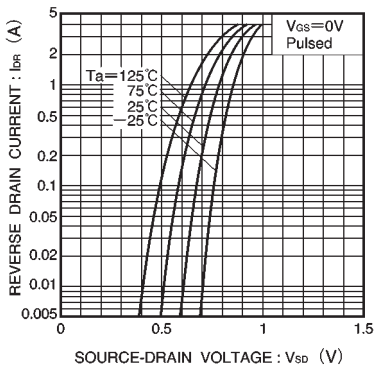


Fig.10 Reverse drain current vs. source-drain voltage (I)

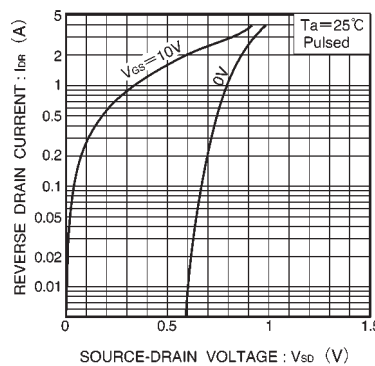


Fig.11 Reverse drain current vs. source-drain voltage (II)

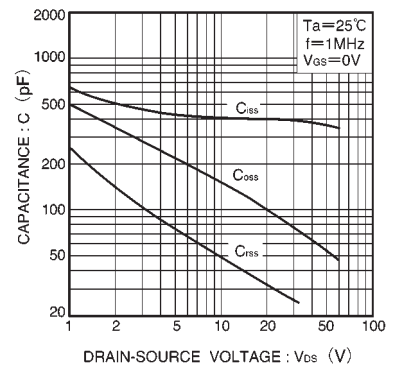


Fig.12 Typical capacitance vs. drain-source voltage

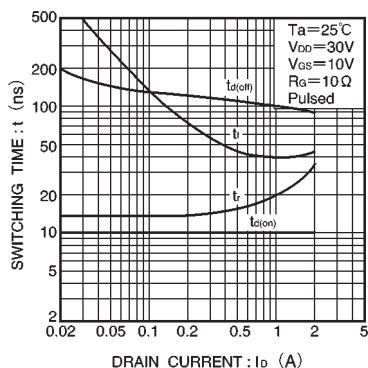


Fig.13 Switching characteristics
(See Figure. 15 and 16 for
the measurement circuit and
resultant waveforms)

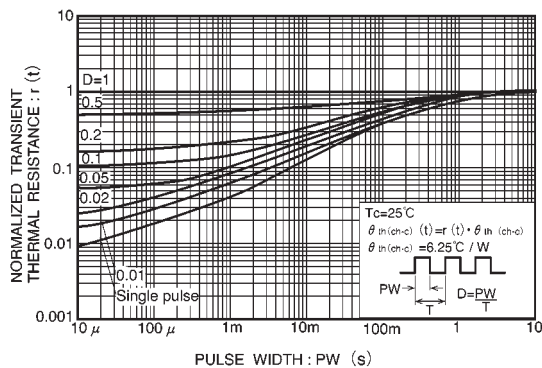


Fig.14 Normalized transient thermal resistance vs.
pulse width

● Switching characteristics measurement circuit

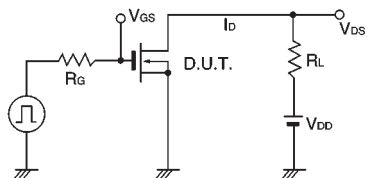


Fig.15 Switching time measurement circuit

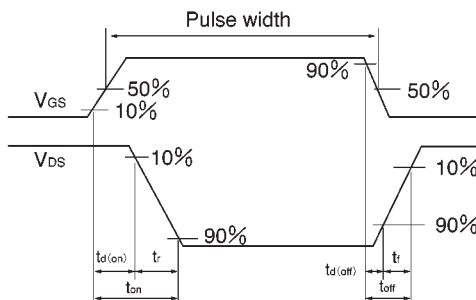


Fig.16 Switching time waveforms