

# Switching (800V, 3A)

## 2SK2294

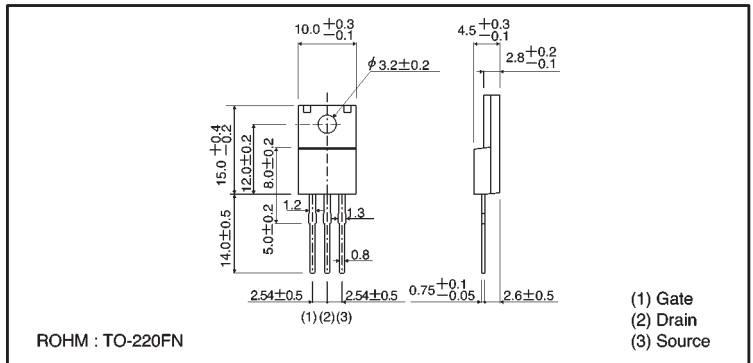
### ●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Wide SOA (safe operating area).
- 4) Gate-source voltage ( $V_{GS}$ ) guaranteed to be  $\pm 30V$ .
- 5) Easily designed drive circuits.
- 6) Easy to parallel.

### ●Structure

Silicon N-channel  
MOSFET

### ●External dimensions (Units: mm)



### ●Absolute maximum ratings ( $T_a = 25^\circ C$ )

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DS}$	800	V	
Gate-source voltage	$V_{GS}$	$\pm 30$	V	
Drain current	Continuous	$I_D$	3	A
	Pulsed	$I_{DP}^*$	6	A
Reverse drain current	Continuous	$I_{DR}$	3	A
	Pulsed	$I_{DRP}^*$	6	A
Total power dissipation ( $T_c=25^\circ C$ )	$P_D$	30	W	
Channel temperature	$T_{ch}$	150	$^\circ C$	
Storage temperature	$T_{stg}$	$-55 \sim +150$	$^\circ C$	

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

### ●Packaging specifications

Type	Package	Bulk
	Code	—
	Basic ordering unit (pieces)	500
2SK2294		○

●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 30V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR), DSS}$	800	—	—	V	$I_D = 1mA, V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	—	—	100	$\mu A$	$V_{DS} = 800V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	2.0	—	4.0	V	$V_{DS} = 10V, I_D = 1mA$
Static drain-source on-state resistance	$R_{DS(on)}$	—	3.0	4.0	$\Omega$	$I_D = 1.5A, V_{GS} = 10V$
Forward transfer admittance	$ Y_{fs} $	1.0	2.5	—	S	$I_D = 1.5A, V_{DS} = 10V$
Input capacitance	$C_{iss}$	—	740	—	pF	$V_{DS} = 10V$
Output capacitance	$C_{oss}$	—	120	—	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	—	35	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	—	10	—	ns	$I_D = 1.5A, V_{DD} \approx 150V$
Rise time	$t_r$	—	14	—	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$	—	53	—	ns	$R_L = 100\Omega$
Fall time	$t_f$	—	49	—	ns	$R_G = 10\Omega$
Reverse recovery time	$t_{rr}$	—	800	—	ns	$I_{DR} = 3A, V_{GS} = 0V,$
Reverse recovery charge	$Q_{rr}$	—	4.4	—	$\mu C$	$di/dt = 100A/\mu s$

●Electrical characteristic curves

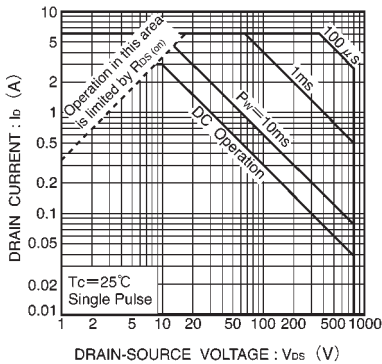


Fig.1 Maximum safe operating area

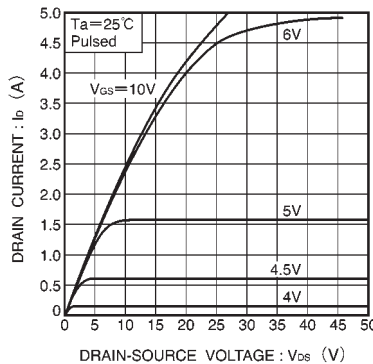


Fig.2 Typical output characteristics

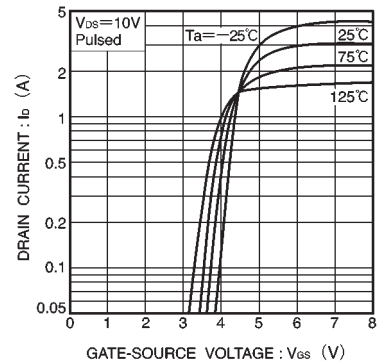


Fig.3 Typical transfer characteristics

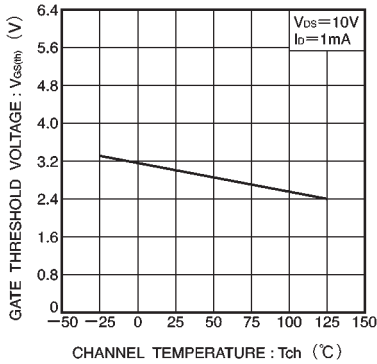


Fig.4 Gate threshold voltage vs. channel temperature

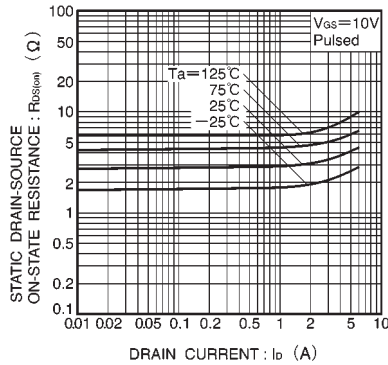


Fig.5 Static drain-source on-state resistance vs. drain current

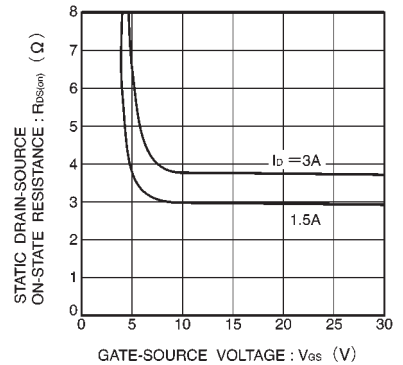


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

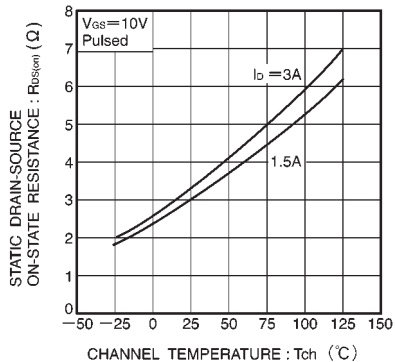


Fig.7 Static drain-source on-state resistance vs. channel temperature

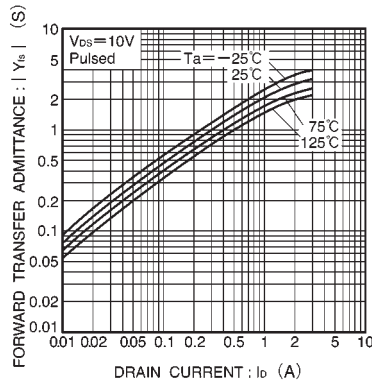


Fig.8 Forward transfer admittance vs. drain current

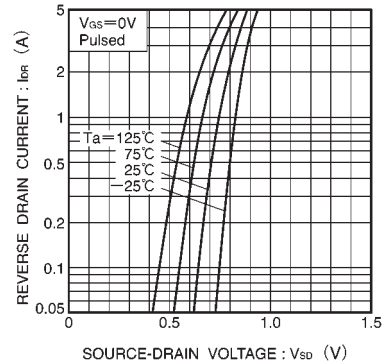


Fig.9 Reverse drain current vs. source-drain voltage ( I )

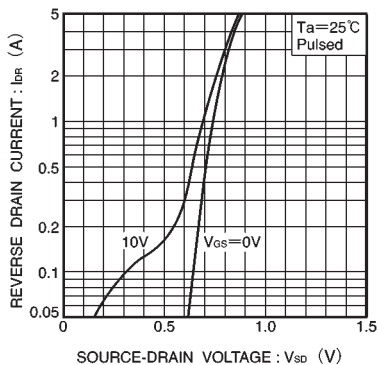


Fig.10 Reverse drain current vs. source-drain voltage ( II )

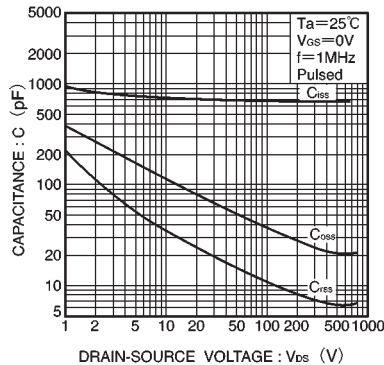


Fig.11 Typical capacitance vs. drain-source voltage

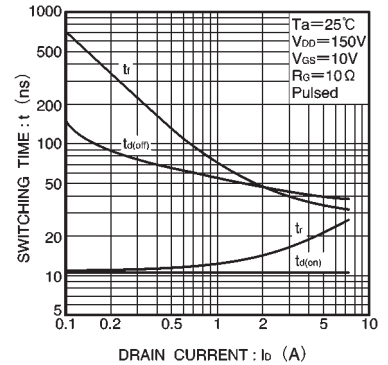


Fig.12 Switching characteristics ( See Figures 16 and 17 for the measurement circuit and resultant waveforms )

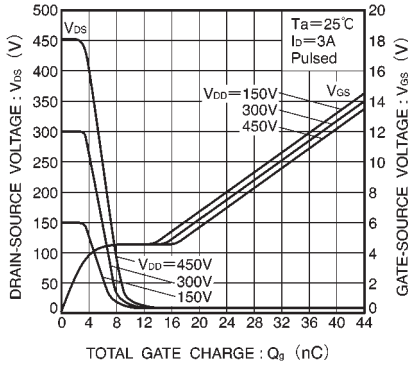


Fig. 13 Dynamic input characteristics (See Figure. 18 for measurement circuit)

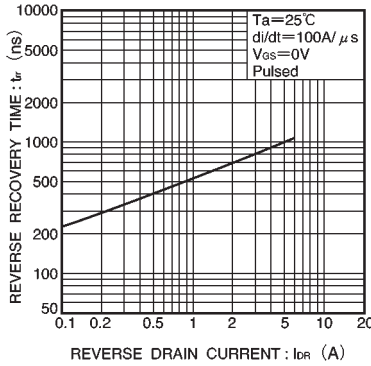


Fig. 14 Reverse recovery time vs. reverse drain current

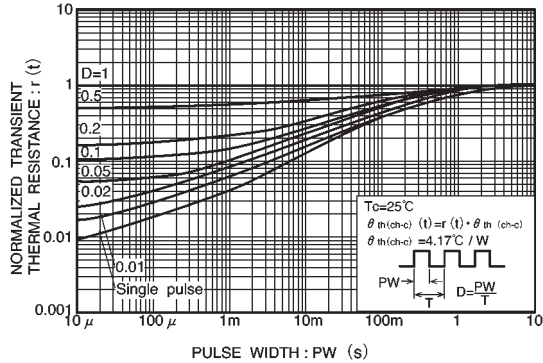


Fig. 15 Normalized transient thermal resistance vs. pulse width

● Switching characteristics measurement circuit

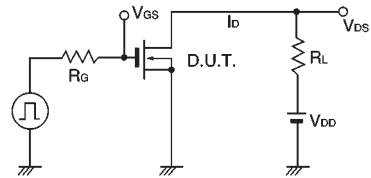


Fig. 16 Switching time measurement circuit

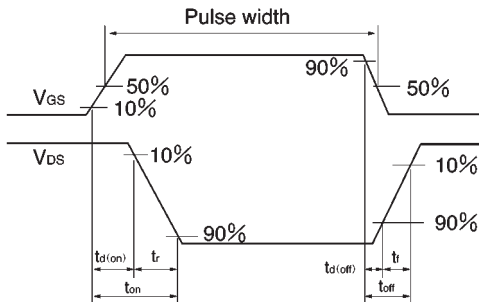


Fig. 17 Switching time waveforms

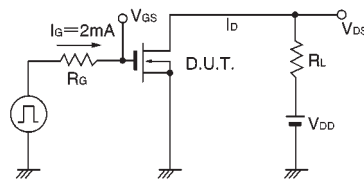


Fig. 18 Gate charge measurement circuit