

# Switching (30V, 5.0A)

## SP8K1

### ●Features

- 1) Low on-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small and Surface Mount Package (SOP8).

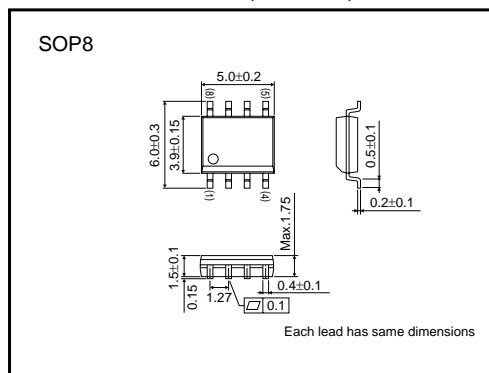
### ●Application

Power switching, DC / DC converter.

### ●Structure

Silicon N-channel  
MOS FET

### ●External dimensions (Unit : mm)



### ●Absolute maximum ratings (Ta=25°C)

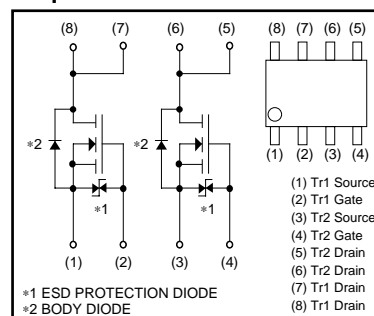
It is the same ratings for the Tr. 1 and Tr. 2.

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DSS}$	30	V
Gate-source voltage	$V_{GSS}$	20	V
Drain current	Continuous	$I_D$	±5.0 A
	Pulsed	$I_{DP}$	±20 A
Source current (Body diode)	Continuous	$I_S$	1.6 A
	Pulsed	$I_{SP}$	6.4 A
Total power dissipation	$P_D$	2	W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

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

\*2 MOUNTED ON A CERAMIC BOARD.

### ●Equivalent circuit



\*1 A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use the protection circuit when the fixed voltages are exceeded.

### ●Thermal resistance (Ta=25°C)

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$	62.5	°C / W

\*MOUNTED ON A CERAMIC BOARD.

## Transistors

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

It is the same characteristics for the Tr. 1 and Tr. 2.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	–	–	10	$\mu A$	$V_{GS}=20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	–	–	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	–	–	1	$\mu A$	$V_{DS}=30V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	–	2.5	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	36	51	m $\Omega$	$I_D=5.0A, V_{GS}=10V$
		–	52	73		$I_D=5.0A, V_{GS}=4.5V$
		–	58	82		$I_D=5.0A, V_{GS}=4V$
Forward transfer admittance	$ Y_{fs} $ *	3.0	–	–	S	$I_D=5.0A, V_{DS}=10V$
Input capacitance	$C_{iss}$	–	230	–	pF	$V_{DS}=10V$
Output capacitance	$C_{oss}$	–	80	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	–	50	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	6	–	ns	$I_D=2.5A, V_{DD}\doteq 15V$
Rise time	$t_r$ *	–	8	–	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}$ *	–	22	–	ns	$R_L=6\Omega$
Fall time	$t_f$ *	–	5	–	ns	$R_{GS}=10\Omega$
Total gate charge	$Q_g$ *	–	3.9	5.5	nC	$V_{DD}\doteq 15V$
Gate-source charge	$Q_{gs}$ *	–	1.1	–	nC	$V_{GS}=5V$
Gate-drain charge	$Q_{gd}$ *	–	1.4	–	nC	$I_D=5.0A$

\*Pulsed

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

It is the same characteristics for the Tr. 1 and Tr. 2.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$ *	–	–	1.2	V	$I_S=6.4A, V_{GS}=0V$

\*Pulsed

Transistors

●Electrical characteristic curves

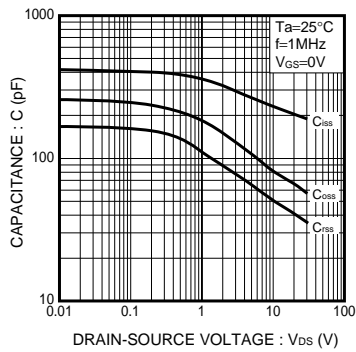


Fig.1 Typical Capacitance vs. Drain-Source Voltage

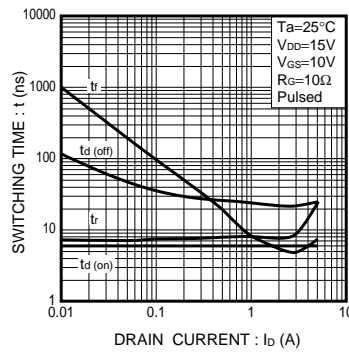


Fig.2 Switching Characteristics

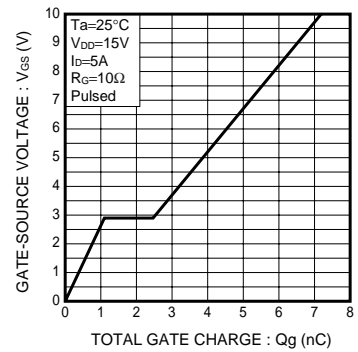


Fig.3 Dynamic Input Characteristics

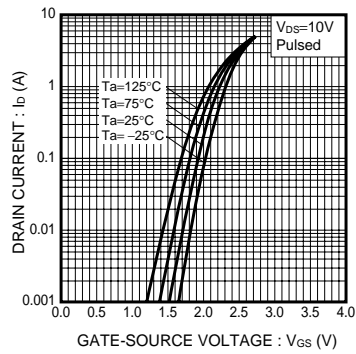


Fig.4 Typical Transfer Characteristics

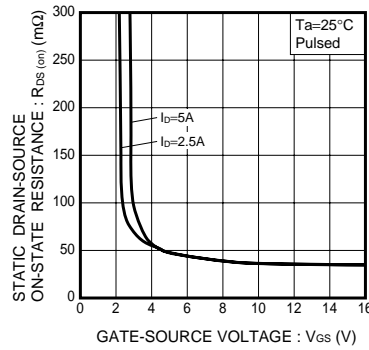


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

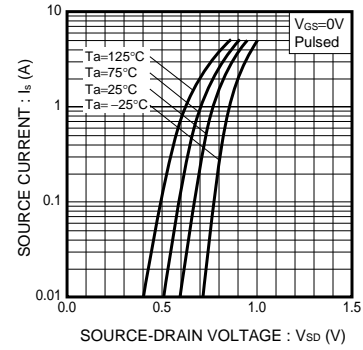


Fig.6 Source Current vs. Source-Drain Voltage

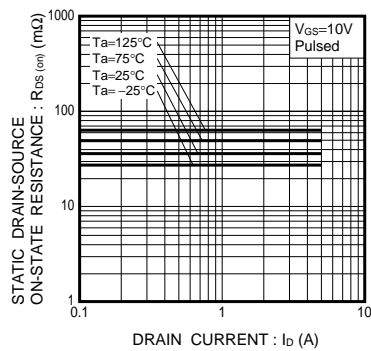


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

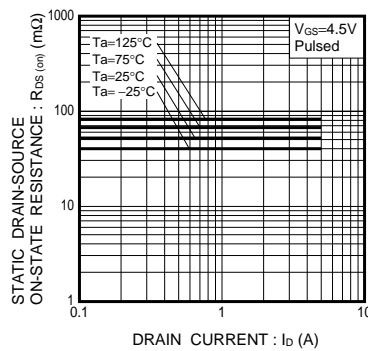


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

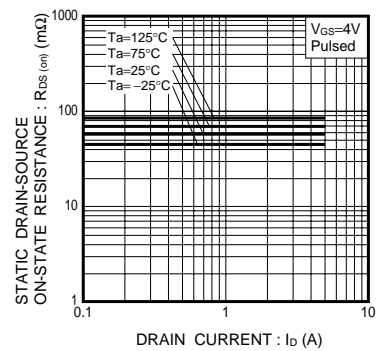


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

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