

4V Drive Nch+Nch MOS FET

SP8K22

●Structure

Silicon N-channel
MOS FET

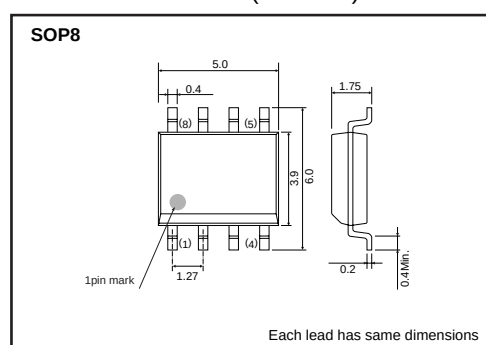
●Features

- 1) Built-in G-S Protection Diode.
- 2) Small surface Mount Package (SOP8).

●Applications

Power switching , DC / DC converter , Inverter

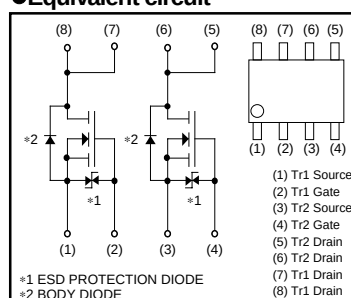
●External dimensions (Unit : mm)



●Packaging dimensions

Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
SP8K22		○

●Equivalent circuit



*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.

●Absolute maximum ratings (Ta=25°C)

<It is the same ratings for the Tr1 and Tr2.>

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DSS}	45	V
Gate-source voltage	V_{GSS}	20	V
Drain current	Continuous	I_D	± 4.5 A
	Pulsed	I_{DP} *1	± 18 A
Source current (Body diode)	Continuous	I_S	1 A
	Pulsed	I_{SP} *1	18 A
Total power dissipation	P_D *2	2	W / TOTAL
		1.4	W / ELEMENT
Channel temperature	T_{ch}	150	°C
Range of Storage temperature	T_{stg}	-55 to +150	°C

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

*2 Mounted on a ceramic board

Transistor

●Electrical characteristics (Ta=25°C)

<It is the same characteristics for the Tr1 and Tr2.>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	—	—	10	μA	$V_{GS}=20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR) DSS}$	45	—	—	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS}=45V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	—	2.5	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	—	33	46	m Ω	$I_D=4.5A, V_{GS}=10V$
		—	41	57	m Ω	$I_D=4.5A, V_{GS}=4.5V$
		—	46	64	m Ω	$I_D=4.5A, V_{GS}=4.0V$
Forward transfer admittance	$ Y_{fs} ^*$	3.5	—	—	S	$V_{DS}=10V, I_D=4.5A$
Input capacitance	C_{iss}	—	550	—	pF	$V_{DS}=10V$
Output capacitance	C_{oss}	—	140	—	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	—	70	—	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	—	12	—	ns	$V_{DD} \doteq 25V$ $I_D=2.5A$ $V_{GS}=10V$ $R_L=10\Omega$ $R_G=10\Omega$
Rise time	t_r^*	—	18	—	ns	
Turn-off delay time	$t_{d(off)}^*$	—	42	—	ns	
Fall time	t_f^*	—	12	—	ns	
Total gate charge	Q_g^*	—	6.8	9.6	nC	$V_{DD} \doteq 25V, V_{GS}=5V$
Gate-source charge	Q_{gs}^*	—	2.0	—	nC	$I_D=4.5A$
Gate-drain charge	Q_{gd}^*	—	2.9	—	nC	$R_L=5.6\Omega, R_G=10\Omega$

*Pulsed

●Body diode characteristics (Source-drain) (Ta=25°C)

<It is the same characteristics for the Tr1 and Tr2.>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_{SD}^*	—	—	1.2	V	$I_S=4.5A/V_{GS}=0V$

* pulsed

Transistor

●Electrical characteristic curves

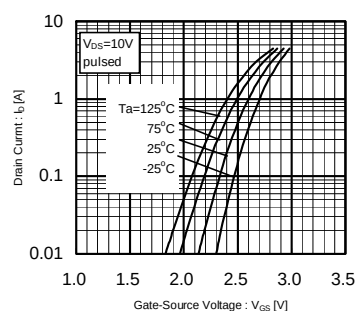


Fig.1 Typical Transfer Characteristics

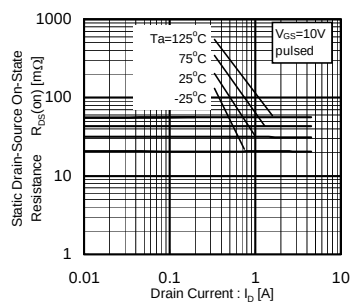


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current (1)

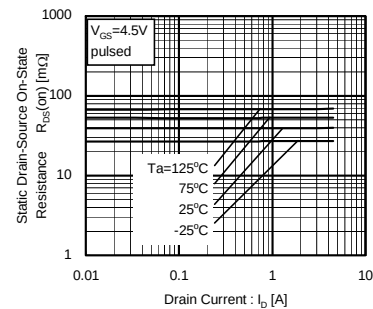


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current (2)

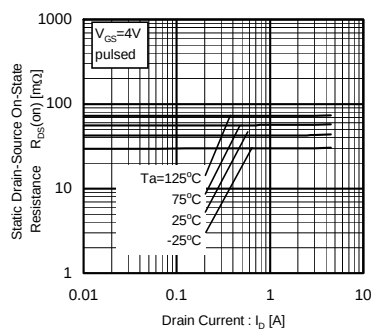


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (3)

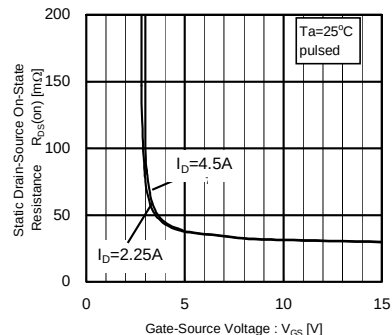


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

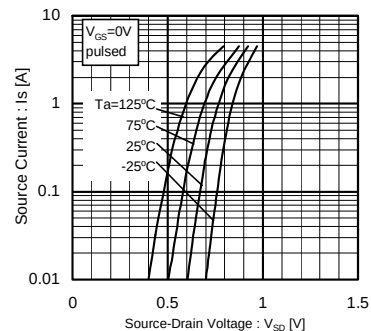


Fig.6 Source-Current vs. Source-Drain Voltage

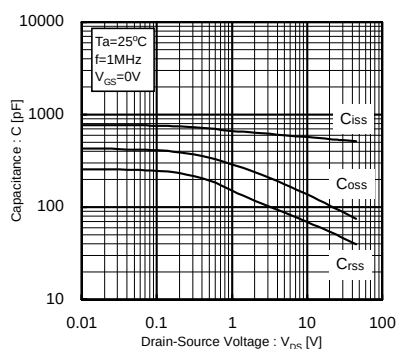


Fig.7 Typical capacitance vs. Source-Drain Voltage

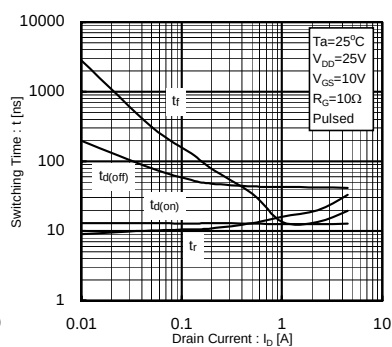


Fig.8 Switching Characteristics

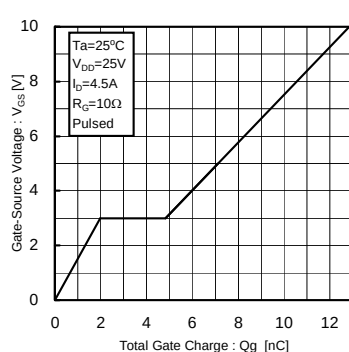


Fig.9 Dynamic Input Characteristics

Transistor

●Measurement circuits

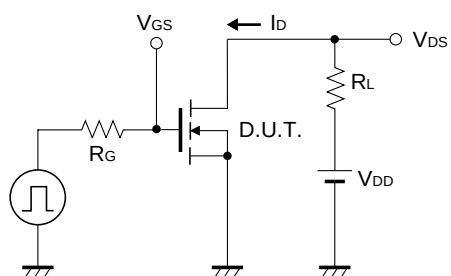


Fig.10 Switching Time Test Circuit

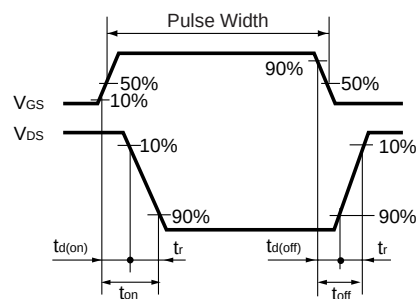


Fig.11 Switching Time Waveforms

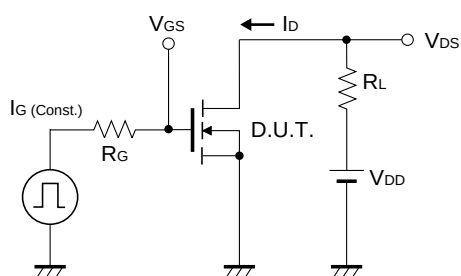


Fig.12 Gate Charge Test Circuit

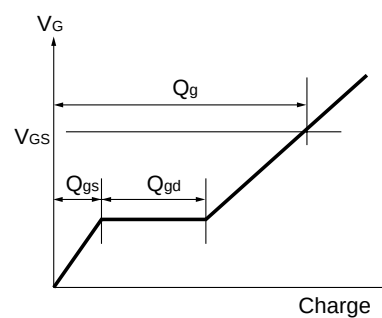


Fig.13 Gate Charge Waveform

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