Switching (–30V, –5.0A)

SP8J1

●Features

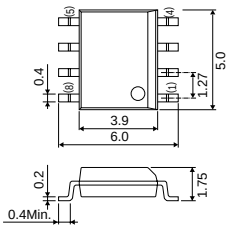
1) Low On-resistance. (40mΩ at 4.5V)
2) High Power Package.
3) High speed switching.
4) Low voltage drive. (4.5V)

●Applications

Power switching, DC-DC converter

●External dimensions (Unit : mm)

SOP8

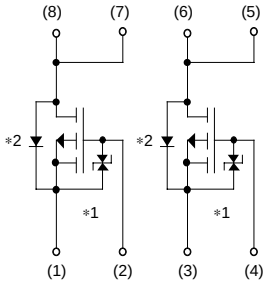


Each lead has same dimensions

●Structure

Silicon P-channel
MOS FET

●Equivalent circuit



∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

(1) Tr1 Source
(2) Tr1 Gate
(3) Tr2 Source
(4) Tr2 Gate
(5) Tr2 Drain
(6) Tr2 Drain
(7) Tr1 Drain
(8) Tr1 Drain

●Packaging specifications

Type	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
SP8J1		○

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

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	∗1
Source current (Body diode)	Continuous	I_S	−1.6	A	
	Pulsed	I_{SP}	−20	A	∗1
Total power dissipation		P_D	2.0	W	∗2
Channel temperature		Tch	150	°C	
Range of Storage temperature		Tstg	−55 to +150	°C	

∗1 Pw≤10µs, Duty cycle≤1%
∗2 Mounted on a ceramic board

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
Gate-source leakage	I_{GSS}	–	–	±10	µA	V_{GS}=±20V, V_{DS}=0V	
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	−30	–	–	V	I_D= −1mA, V_{GS}=0V	
Zero gate voltage drain current	I_{DSS}	–	–	−1	µA	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	$R_{DS\ (on)}$	–	30	42	mΩ	I_D= −5.0A, V_{GS}= −10V	∗
		–	40	56	mΩ	I_D= −2.5A, V_{GS}= −4.5V	∗
		–	45	63	mΩ	I_D= −2.5A, V_{GS}= −4.0V	∗
Forward transfer admittance	$\|Y_{fs}\|$	4.5	–	–	S	V_{DS}= −10V, I_D= −2.5A	∗
Input capacitance	C_{iss}	–	1400	–	pF	V_{DS}= −10V	
Output capacitance	C_{oss}	–	300	–	pF	V_{GS}=0V	
Reverse transfer capacitance	C_{rss}	–	230	–	pF	f=1MHz	
Turn-on delay time	$t_{d\ (on)}$	–	15	–	ns	I_D= −2.5A	∗
Rise time	t_r	–	30	–	ns	V_{DD}≒ −15V	∗
Turn-off delay time	$t_{d\ (off)}$	–	80	–	ns	V_{GS}= −10V R_L=6Ω	∗
Fall time	t_f	–	40	–	ns	R_{GS}=10Ω	∗
Total gate charge	Q_g	–	16	–	nC	V_{DD}≒ −15V	
Gate-source charge	Q_{gs}	–	3.5	–	nC	V_{GS}= −5V	
Gate-drain charge	Q_{gd}	–	6.5	–	nC	I_D= −5.0A	

∗Pulsed

Body diode characteristics (source-drain characteristics)

Forward voltage	VSD	–	–	−1.2	V	I_S= −1.6A, V_{GS}=0V

●**Electrical characteristic curves**

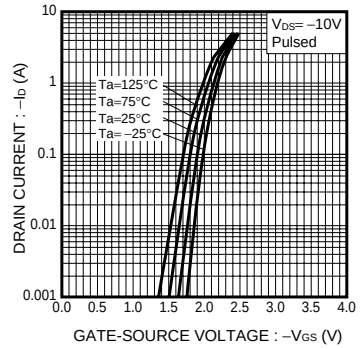


Fig.1 Typical Transfer Characteristics

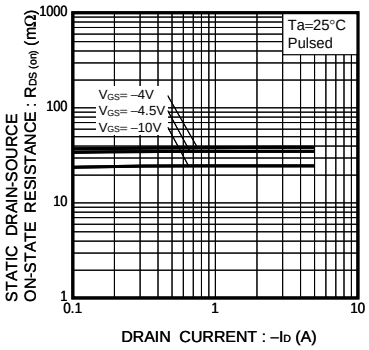


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

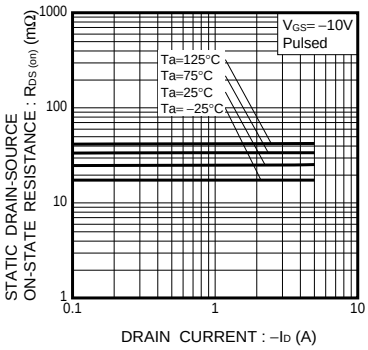


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

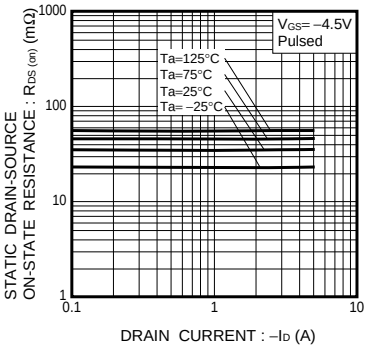


Fig.4 Static Drain-Source On-State vs. Drain Current

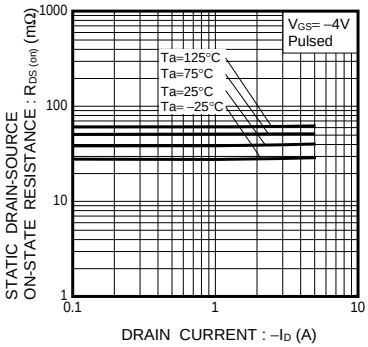


Fig.5 Static Drain-Source On-State vs. Drain Current

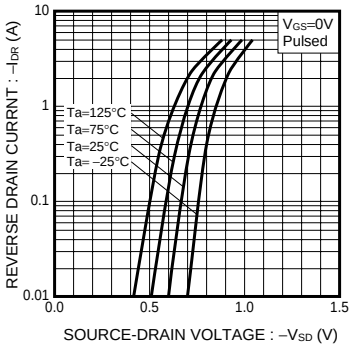


Fig.6 Reverse Drain Current Source-Drain Current

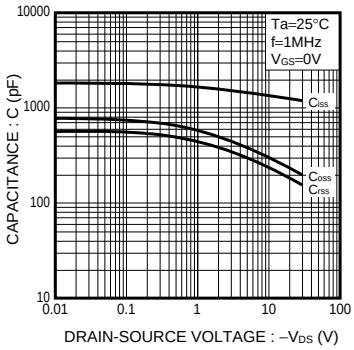


Fig.7 Typical Capacitance vs. Drain-Source Voltage

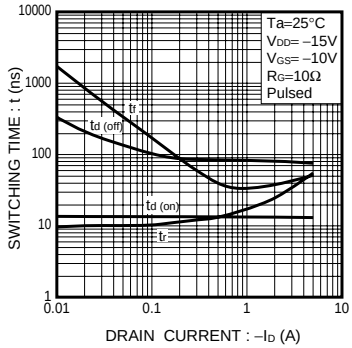


Fig.8 Switching Characteristics

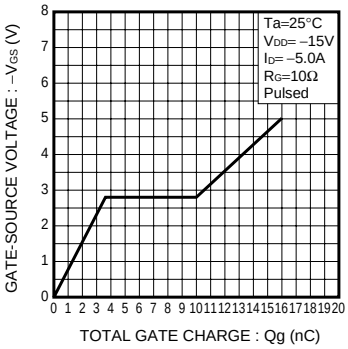


Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

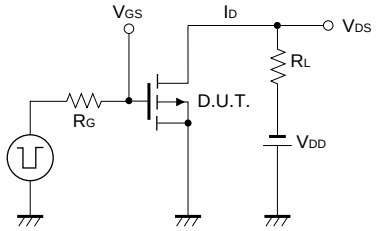


Fig.10 Switching Time Test Circuit

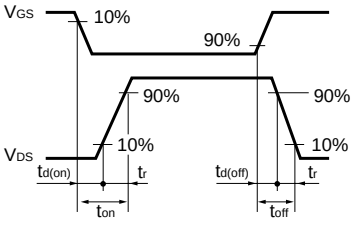


Fig.11 Switching Time Waveforms

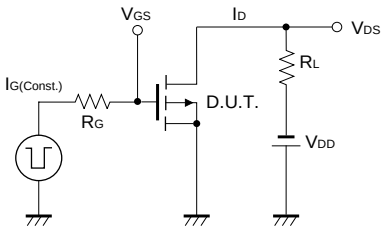


Fig.12 Gate Charge Test Circuit

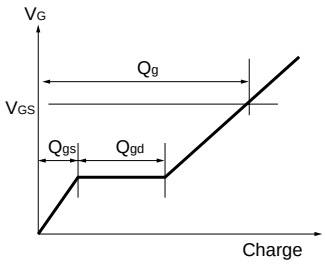


Fig.13 Gate Charge Waveform

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