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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# 1.5V Drive Pch+Pch MOSFET

## QS8J1

### ●Structure

Silicon P-channel MOSFET

### ●Features

- 1) Low On-resistance.
- 2) Low voltage drive. (1.5 V)
- 3) High power package.

### ●Applications

Switching

### ●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS8J1		○

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

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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	-12	V	
Gate-source voltage	$V_{GSS}$	±10	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	1.5	W / TOTAL	
		1.25	W / ELEMENT	
Channel temperature	$T_{ch}$	150	°C	
Range of Storage temperature	$T_{stg}$	-55 to +150	°C	

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

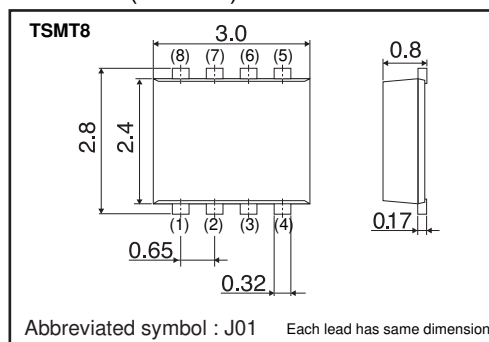
\*2 Mounted on a ceramic board

### ●Thermal resistance

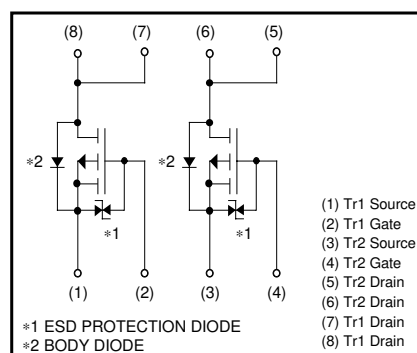
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$ *	83.3	°C/W / TOTAL
		100	°C/W / ELEMENT

\* Mounted on a ceramic board.

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

\*1 ESD PROTECTION DIODE  
\*2 BODY DIODE

Transistors

●Electrical characteristics (Ta=25°C)

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	–	–	±10	μA	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR) DSS</sub>	–12	–	–	V	I <sub>D</sub> = –1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	–	–	–1	μA	V <sub>DS</sub> = –12V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	–0.3	–	–1.0	V	V <sub>DS</sub> = –6V, I <sub>D</sub> = –1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub> *	–	21	29	mΩ	I <sub>D</sub> = –4.5A, V <sub>GS</sub> = –4.5V
		–	27	38	mΩ	I <sub>D</sub> = –2.2A, V <sub>GS</sub> = –2.5V
		–	36	54	mΩ	I <sub>D</sub> = –2.2A, V <sub>GS</sub> = –1.8V
		–	49	98	mΩ	I <sub>D</sub> = –0.9A, V <sub>GS</sub> = –1.5V
Forward transfer admittance	Y <sub>fs</sub>   *	6.5	–	–	S	V <sub>DS</sub> = –6V, I <sub>D</sub> = –4.5A
Input capacitance	C <sub>iss</sub>	–	2450	–	pF	V <sub>DS</sub> = –6V
Output capacitance	C <sub>oss</sub>	–	320	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	290	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub> *	–	12	–	ns	V <sub>DD</sub> ≐ –6V
Rise time	t <sub>r</sub> *	–	75	–	ns	V <sub>GS</sub> = –4.5V I <sub>D</sub> = –2.2A
Turn-off delay time	t <sub>d(off)</sub> *	–	390	–	ns	R <sub>L</sub> ≐ 2.7Ω
Fall time	t <sub>f</sub> *	–	215	–	ns	R <sub>G</sub> =10Ω
Total gate charge	Q <sub>g</sub> *	–	31	–	nC	V <sub>DD</sub> ≐ –6V V <sub>GS</sub> = –4.5V
Gate-source charge	Q <sub>gs</sub> *	–	4.5	–	nC	I <sub>D</sub> = –4.5A
Gate-drain charge	Q <sub>gd</sub> *	–	4.0	–	nC	R <sub>L</sub> ≐ 1.3Ω / R <sub>G</sub> =10Ω

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub> *	–	–	–1.2	V	I <sub>S</sub> = –4.5A, V <sub>GS</sub> =0V

\* Pulsed

Transistors

●Electrical characteristic curves

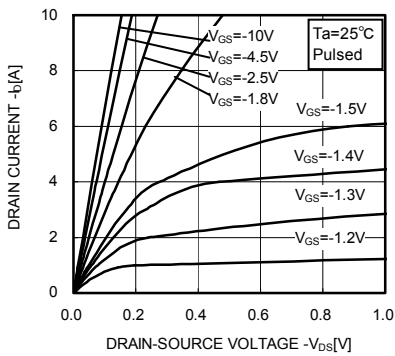


Fig.1 Typical Output Characteristics ( I )

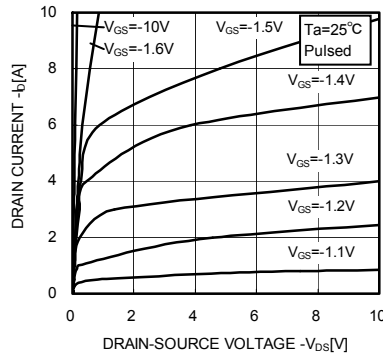


Fig.2 Typical Output Characteristics (II )

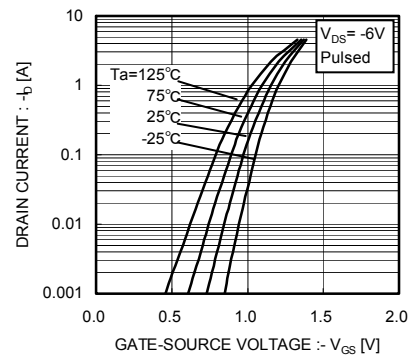


Fig.3 Typical Transfer Characteristics

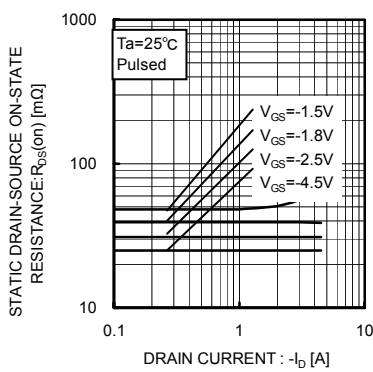


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current ( I )

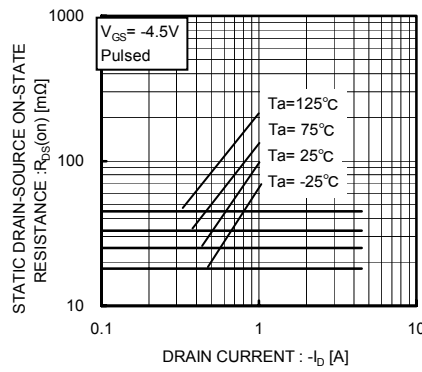


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II )

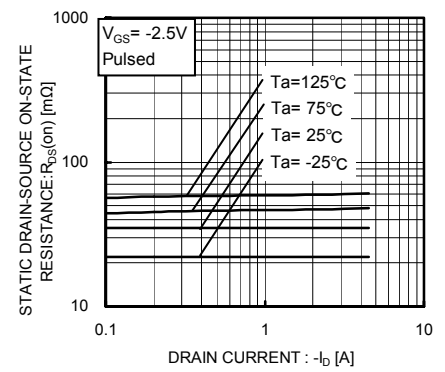


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (III)

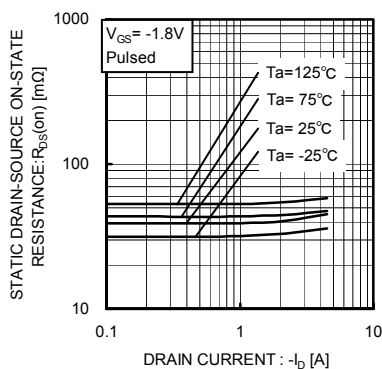


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (IV)

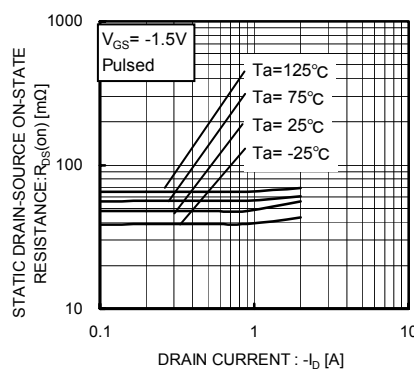


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (V)

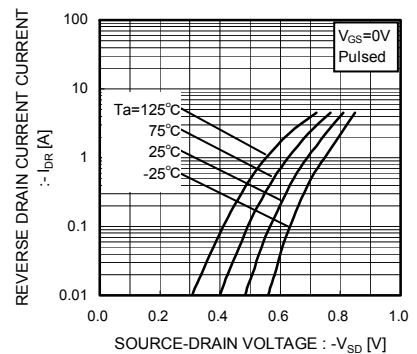


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

Transistors

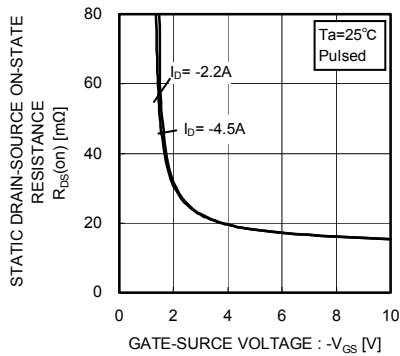


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

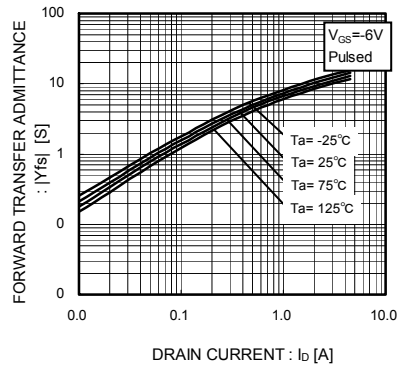


Fig.11 Forward Transfer Admittance vs. Drain Current

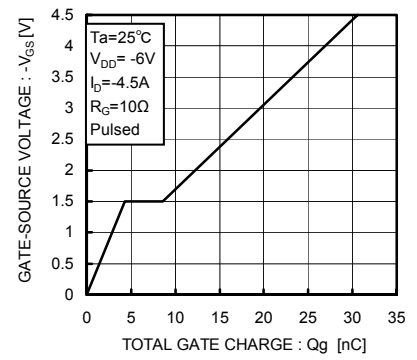


Fig.12 Dynamic Input Characteristics

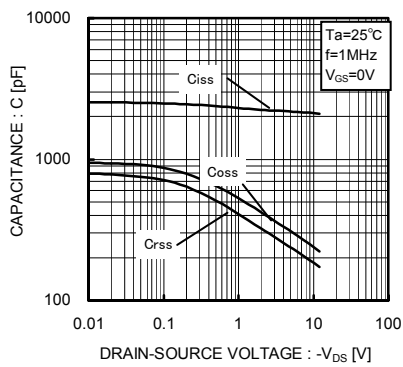


Fig.13 Typical Capacitance vs. Drain-Source Voltage

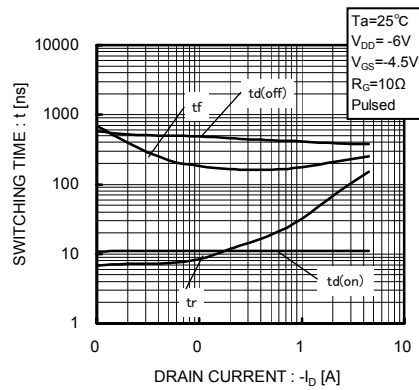


Fig.14 Switching Characteristics

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●Measurement circuits

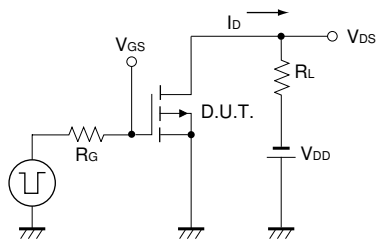


Fig.1-1 Switching Time Measurement Circuit

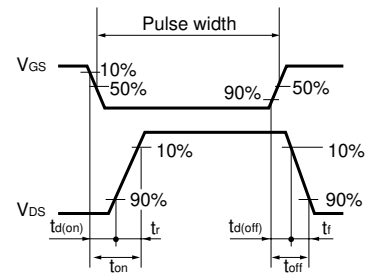


Fig.1-2 Switching Time Waveforms

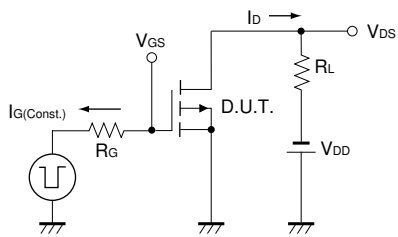


Fig.2-1 Gate Charge Measurement Circuit

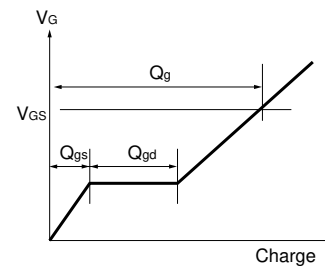


Fig.2-2 Gate Charge Waveform

●Notice

This product might cause chip aging and breakdown under the large electrified environment.  
Please consider to design ESD protection circuit.

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