

# 2.5V Drive Pch+Pch MOS FET

## QS6J1

### ●Structure

Silicon P-channel MOS FET

### ●Features

- 1) Two Pch MOS FET transistors in a single TSMT6 package.
- 2) Low on-state resistance with a fast switching.
- 3) Low voltage drive (2.5V).

### ●Applications

Switching

### ●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS6J1		○

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

<It is the same ratings for Tr1 and Tr2>

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V <sub>DSS</sub>	-20	V	
Gate-source voltage	V <sub>GSS</sub>	±12	V	
Drain current	Continuous	I <sub>D</sub>	±1.5	A
	Pulsed	I <sub>DP</sub> *1	±6	A
Source current (Body diode)	Continuous	I <sub>S</sub> *1	-0.75	A
	Pulsed	I <sub>SP</sub>	-6	A
Total power dissipation	P <sub>D</sub> *2	1.25	W / TOTAL	
		0.9	W / ELEMENT	
Channel temperature	T <sub>ch</sub>	150	°C	
Range of Storage temperature	T <sub>stg</sub>	-55 to +150	°C	

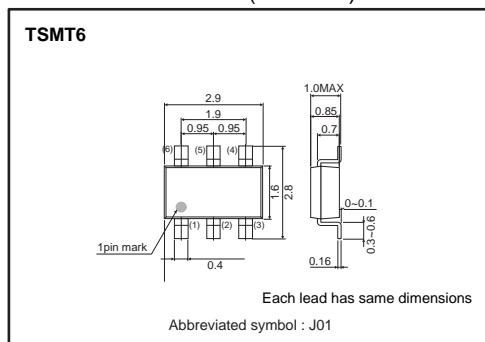
\*1 P<sub>w</sub> ≤ 10μs, Duty cycle ≤ 1% \*2 Mounted on a ceramic board

### ●Thermal resistance

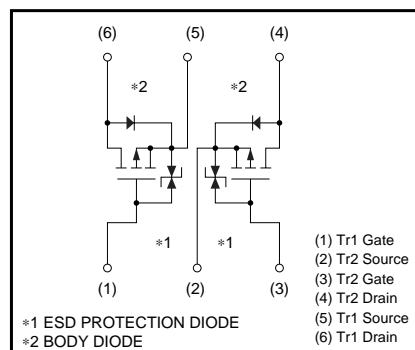
Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th (ch-a)</sub> *	100	°C / W / TOTAL
		139	°C / W / ELEMENT

\* Mounted on a ceramic board

### ●External dimensions (Unit : mm)



### ●Inner circuit



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

\*1 ESD PROTECTION DIODE  
\*2 BODY DIODE

Transistors

●Electrical characteristics (Ta=25°C)

<It is the same characteristics for Tr1 and Tr2 MOS FET>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	-	-	±10	μA	$V_{GS}=\pm 12V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-20	-	-	V	$I_D=-1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	-	-	-1	μA	$V_{DS}=-20V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	-0.7	-	-2.0	V	$V_{DS}=-10V, I_D=-1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	155	215	mΩ	$I_D=-1.5A, V_{GS}=-4.5V$
		-	170	235	mΩ	$I_D=-1.5A, V_{GS}=-4V$
		-	310	430	mΩ	$I_D=-0.75A, V_{GS}=-2.5V$
Forward transfer admittance	$ Y_{fs} $ *	1.0	-	-	S	$V_{DS}=-10V, I_D=-0.75A$
Input capacitance	$C_{iss}$	-	270	-	pF	$V_{DS}=-10V$
Output capacitance	$C_{oss}$	-	40	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	35	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	10	-	ns	$I_D=-0.75A$
Rise time	$t_r$ *	-	12	-	ns	$V_{DD}=-15V$
Turn-off delay time	$t_{d(off)}$ *	-	45	-	ns	$V_{GS}=-4.5V$
Fall time	$t_f$ *	-	20	-	ns	$R_L=20\Omega$ $R_G=10\Omega$
Total gate charge	$Q_g$ *	-	3.0	-	nC	$V_{DD}=-15V, R_L=10\Omega$
Gate-source charge	$Q_{gs}$ *	-	0.8	-	nC	$V_{GS}=-4.5V, R_G=10\Omega$
Gate-drain charge	$Q_{gd}$ *	-	0.85	-	nC	$I_D=-1.5A$

\*Pulsed

<Body diode (Source-drain)>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$	-	-	-1.2	V	$I_S=-0.75A, V_{GS}=0V$

Transistors

●Electrical characteristic curves

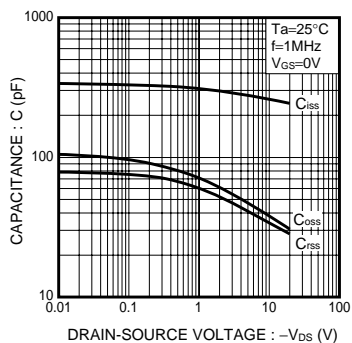


Fig.1 Typical Capacitance vs. Drain-Source Voltage

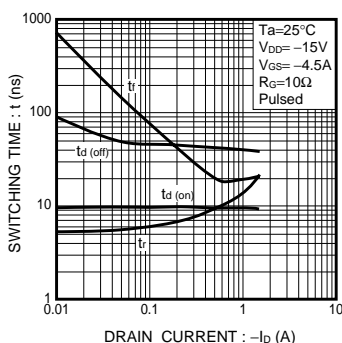


Fig.2 Switching Characteristics

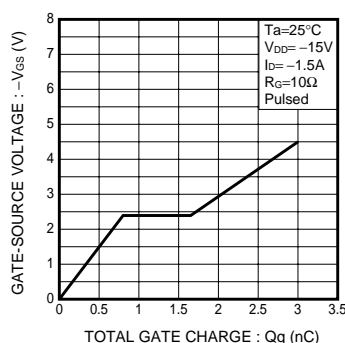


Fig.3 Dynamic Input Characteristics

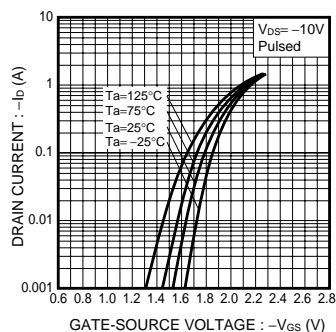


Fig.4 Typical Transfer Characteristics

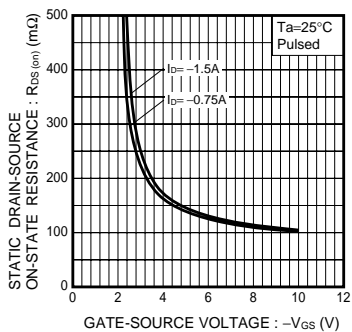


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

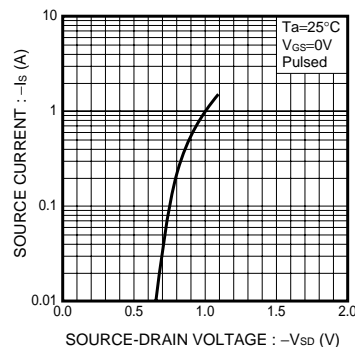


Fig.6 Source Current vs. Source-Drain Voltage

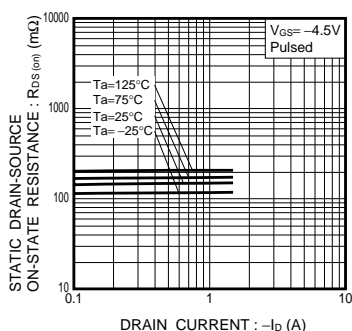


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

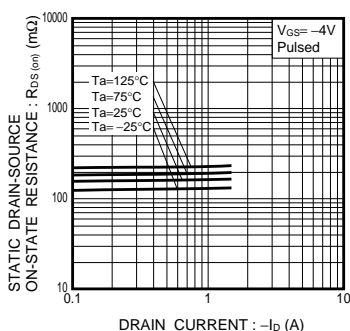


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

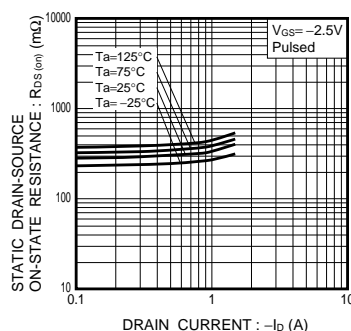


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

Transistors

●Measurement circuits

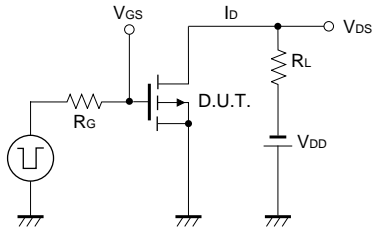


Fig.10 Switching Time Measurement Circuit

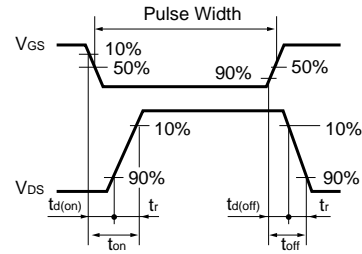


Fig.11 Switching Waveforms

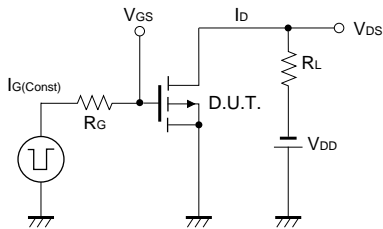


Fig.12 Gate Charge Measurement Circuit

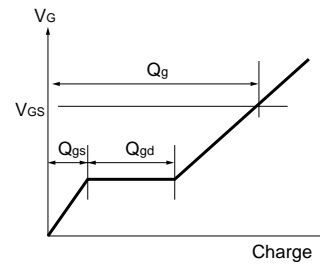


Fig.13 Gate Charge Waveform

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