

Transistors

# 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).

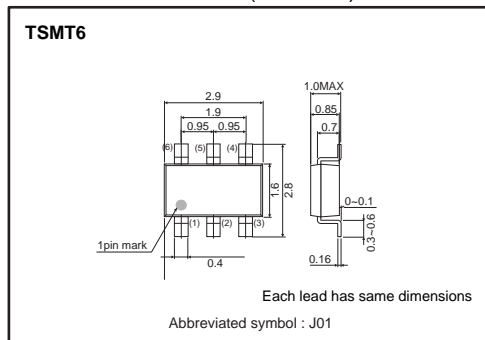
●Applications

Switching

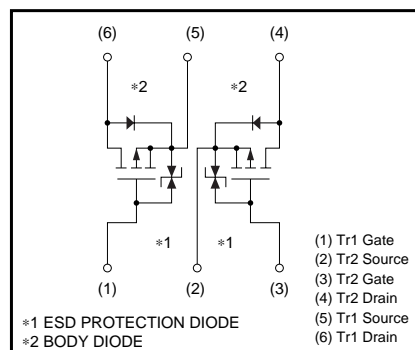
●Packaging specifications

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

●External dimensions (Unit : mm)



●Inner circuit



●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</sub> (ch-a) *	100	°C / W / TOTAL
		139	°C / W / ELEMENT

\* Mounted on a ceramic board

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●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 <sub>GSS</sub>	–	–	±10	μA	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR) DSS</sub>	-20	–	–	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> = -20V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS (th)</sub>	-0.7	–	-2.0	V	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1mA
Static drain-source on-state resistance	R <sub>DS (on)</sub> *	–	155	215	mΩ	I <sub>D</sub> = -1.5A, V <sub>GS</sub> = -4.5V
		–	170	235	mΩ	I <sub>D</sub> = -1.5A, V <sub>GS</sub> = -4V
		–	310	430	mΩ	I <sub>D</sub> = -0.75A, V <sub>GS</sub> = -2.5V
Forward transfer admittance	Y <sub>fs</sub>   *	1.0	–	–	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.75A
Input capacitance	C <sub>iss</sub>	–	270	–	pF	V <sub>DS</sub> = -10V
Output capacitance	C <sub>oss</sub>	–	40	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	35	–	pF	f=1MHz
Turn-on delay time	t <sub>d (on)</sub> *	–	10	–	ns	I <sub>D</sub> = -0.75A
Rise time	t <sub>r</sub> *	–	12	–	ns	V <sub>DD</sub> ≐ -15V V <sub>GS</sub> = -4.5V
Turn-off delay time	t <sub>d (off)</sub> *	–	45	–	ns	R <sub>L</sub> =20Ω
Fall time	t <sub>f</sub> *	–	20	–	ns	R <sub>G</sub> =10Ω
Total gate charge	Q <sub>g</sub> *	–	3.0	–	nC	V <sub>DD</sub> ≐ -15V R <sub>L</sub> =10Ω
Gate-source charge	Q <sub>gs</sub> *	–	0.8	–	nC	V <sub>GS</sub> = -4.5V R <sub>G</sub> =10Ω
Gate-drain charge	Q <sub>gd</sub> *	–	0.85	–	nC	I <sub>D</sub> = -1.5A

\*Pulsed

<Body diode (Source-drain)>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub>	–	–	-1.2	V	I <sub>S</sub> = -0.75A, V <sub>GS</sub> =0V

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●Electrical characteristic curves

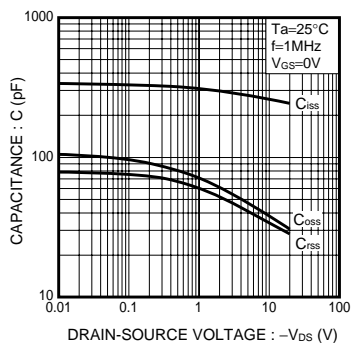


Fig.1 Typical Capacitance vs. Drain-Source Voltage

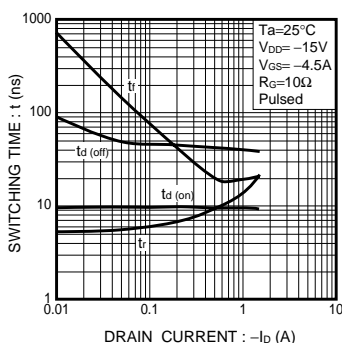


Fig.2 Switching Characteristics

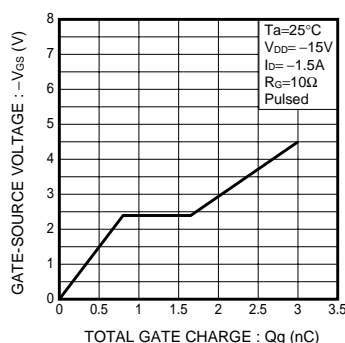


Fig.3 Dynamic Input Characteristics

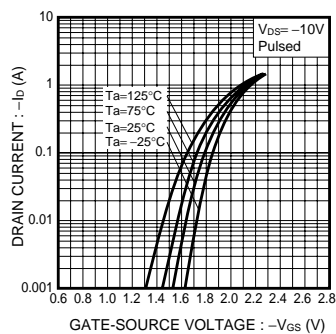


Fig.4 Typical Transfer Characteristics

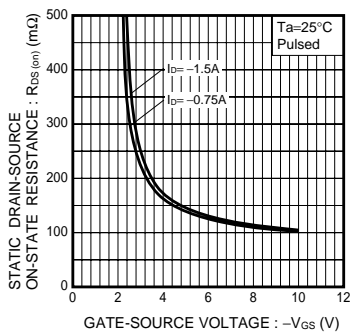


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

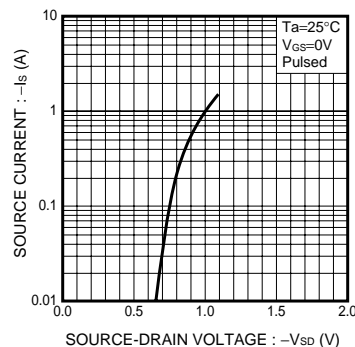


Fig.6 Source Current vs. Source-Drain Voltage

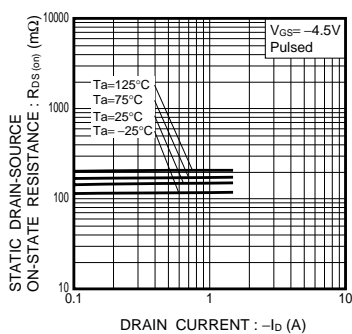


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

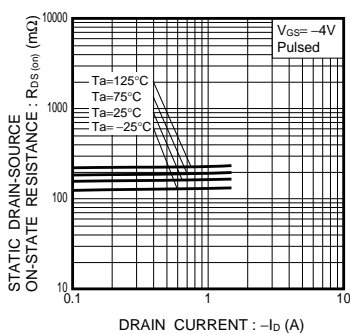


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

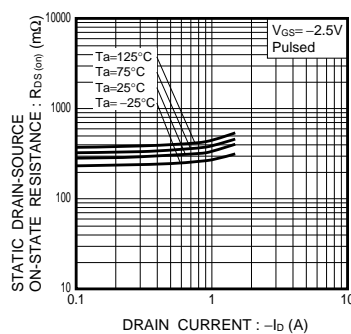


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

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●Measurement circuits

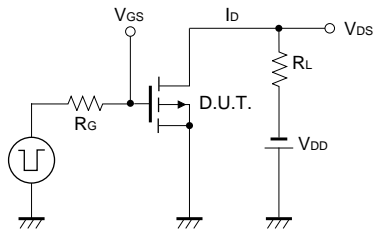


Fig.10 Switching Time Measurement Circuit

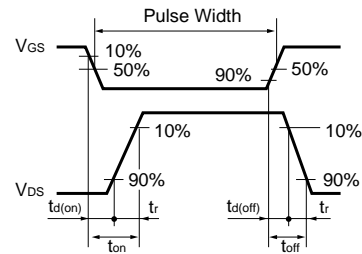


Fig.11 Switching Waveforms

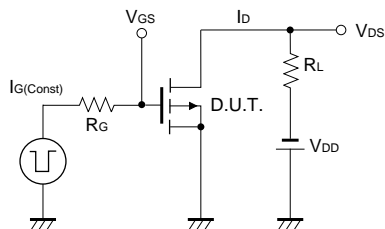


Fig.12 Gate Charge Measurement Circuit

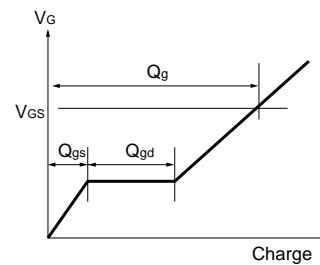


Fig.13 Gate Charge Waveform

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