# Small switching (-20V, -1.5A)

# **QS6J1**

#### Features

- 1) Two Pch MOSFET transistors in a single TSMT6 package.
- 2) Pch Treueh MOSFET have a low on-state resistance with a fast switching.
- 3) Nch Treueh MOSFET is reacted a low voltage drive (2.5V).

# Applications

Switch

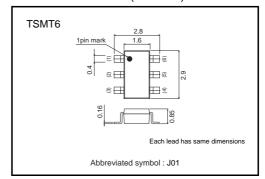
#### Structure

Silicon P-channel MOSFET

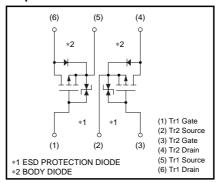
#### Packaging specifications

	Package	Taping
Туре	Code	TR
	Basic ordering unit (pieces)	3000
QS6J1		0

# ●External dimensions (Unit: mm)



#### ●Equivalent circuit



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

Parameter		Symbol Limits		Unit		
Drain-source voltage		$V_{DSS}$	-20	V		
Gate-source voltage		V <sub>GSS</sub>	±12	V		
Drain accurant	Continuous	ID	±1.5	Α		
Drain current	Pulsed	I <sub>DP</sub>	±6	Α	*1	
Source current	Continuous	Is	-0.75	Α	*1	
(Body diode)	Pulsed	I <sub>SP</sub>	-6	Α		
Total power dissipation		P <sub>D</sub>	1.25	W / Total	*2	
Channel temperature		Tch	150	င		
Range of Storage temperature		Tstg	-55 to +150	င		

<sup>\*1</sup> Pw ≤10μs, Duty cycle ≤1% \*2 Mounted on a ceramic board

## ●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	Rth (ch-a)	100	°C / W / Total



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

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	-	-	±10	μΑ	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	IDSS	-	-	-1	μΑ	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		-	155	215	mΩ	I <sub>D</sub> = -1.5A, V <sub>G</sub> s= -4.5V
	RDS (on)	-	170	235	mΩ	I <sub>D</sub> = -1.5A, V <sub>G</sub> s= -4V *
		-	310	430	mΩ	I <sub>D</sub> = -0.75A, V <sub>G</sub> s= -2.5V
Forward transfer admittance	Yfs	1.0	-	_	S	Vps= -10V, Ip= -0.75A *
Input capacitance	Ciss	-	270	_	pF	V <sub>DS</sub> = -10V
Output capacitance	Coss	-	40	_	pF	V <sub>G</sub> s=0V
Reverse transfer capacitance	Crss	-	35	_	pF	f=1MHz
Turn-on delay time	td (on)	-	10	_	ns	ID= -0.75A *
Rise time	tr	-	12	_	ns	VDD≒ -15V *
Turn-off delay time	td (off)	-	45	_	ns	$V_{GS} = -4.5V$ $R_{L} = 20\Omega$
Fall time	tf	-	20	-	ns	R <sub>G</sub> =10Ω *
Total gate charge	Qg	-	3.0	-	nC	V <sub>DD</sub> ≒ −15V R <sub>L</sub> =10Ω
Gate-source charge	Qgs	-	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.	Тур.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub>	_	_	-1.2	V	I <sub>S</sub> = -0.75A, V <sub>GS</sub> =0V

# •Electrical characteristic curves

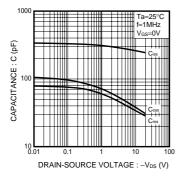


Fig.1 Typical Capacitance vs. Drain-Source Voltage

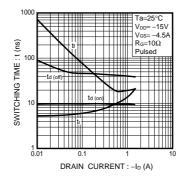


Fig.2 Switching Characteristics

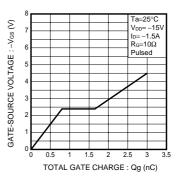


Fig.3 Dynamic Input Characteristics

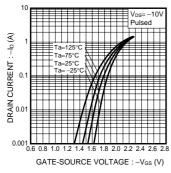


Fig.4 Typical Transfer Characteristics

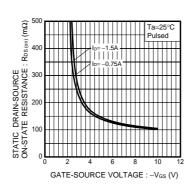


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

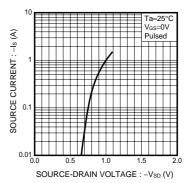


Fig.6 Source Current vs. Source-Drain Voltage



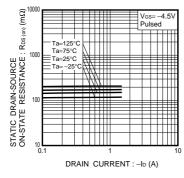


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

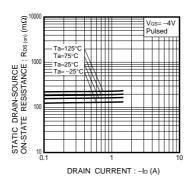


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

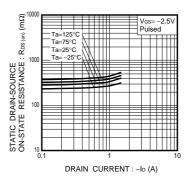


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

#### Measurement circuits

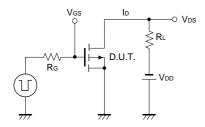


Fig.10 Switching Time Measurement Circuit

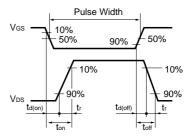


Fig.11 Switching Waveforms

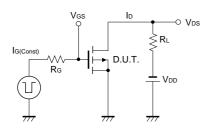


Fig.12 Gate Charge Measurement Circuit

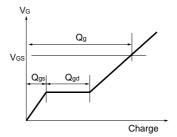


Fig.13 Gate Charge Waveform

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