

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

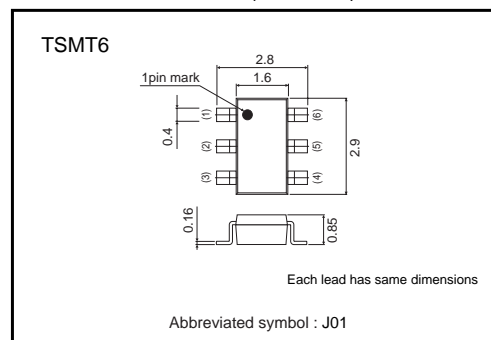
●Structure

Silicon P-channel MOSFET

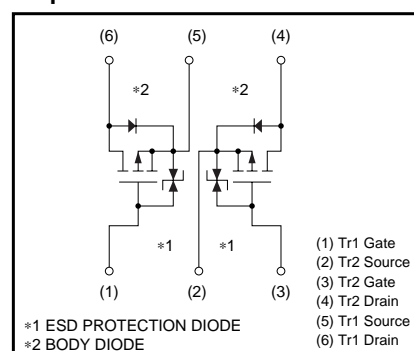
●Packaging specifications

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

●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_{GSS}	±12	V
Drain current	Continuous	I_D	±1.5 A
	Pulsed	I_{DP}	±6 A *1
Source current (Body diode)	Continuous	I_S	−0.75 A *1
	Pulsed	I_{SP}	−6 A
Total power dissipation	P_D	1.25	W / Total *2
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	$R_{th}(ch-a)$	100	°C / W / Total

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I _{GSS}	-	-	±10	μA	V _{GS} =±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 =20Ω *
Total gate charge	Q _g	-	3.0	-	nC	V _{DD} =-15V R _L =10Ω
Gate-source charge	Q _{gs}	-	0.8	-	nC	V _{GS} =-4.5V R _G =10Ω
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

●Electrical characteristic curves

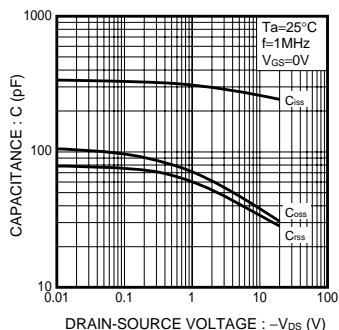


Fig.1 Typical Capacitance vs. Drain-Source Voltage

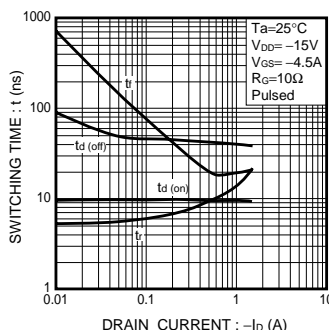


Fig.2 Switching Characteristics

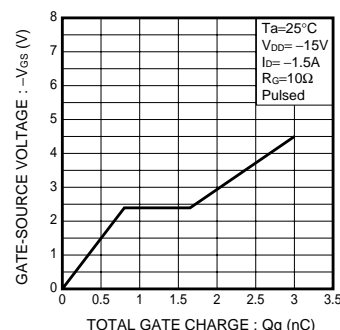


Fig.3 Dynamic Input Characteristics

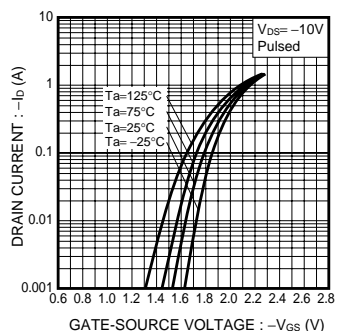


Fig.4 Typical Transfer Characteristics

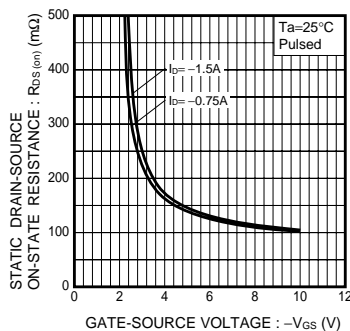


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

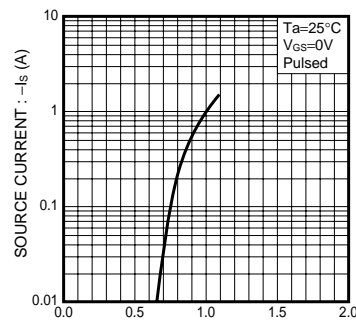


Fig.6 Source Current vs. Source-Drain Voltage

Transistors

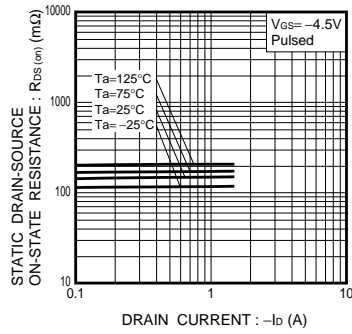


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

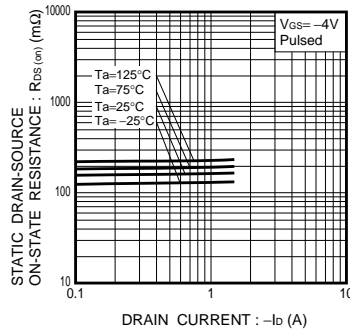


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

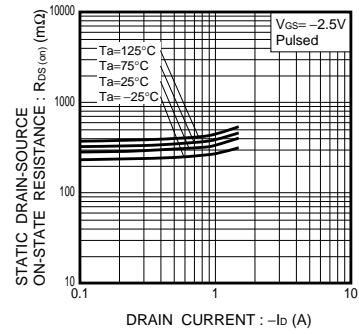


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

●Measurement circuits

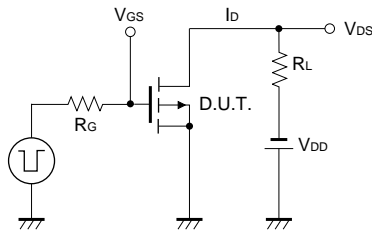


Fig.10 Switching Time Measurement Circuit

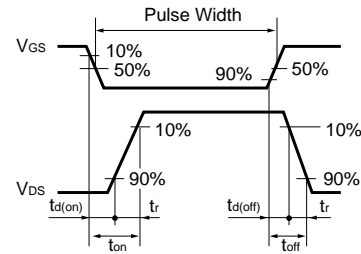


Fig.11 Switching Waveforms

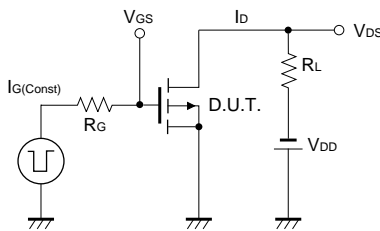


Fig.12 Gate Charge Measurement Circuit

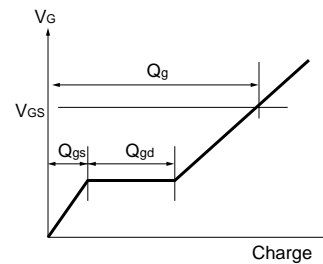


Fig.13 Gate Charge Waveform

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