

Small switching (–20V, –1.5A)

QS6J3

●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

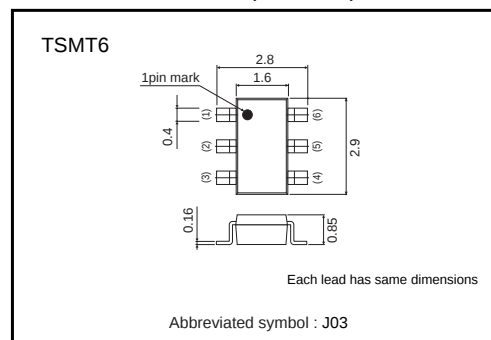
●Structure

Silicon P-channel MOSFET

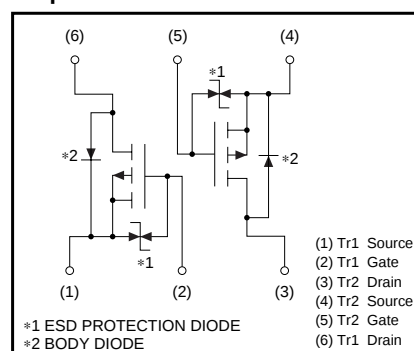
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS6J3		○

●External dimensions (Unit : mm)



●Equivalent circuit



●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DS}	–20	V
Gate-source voltage		V_{GS}	±12	V
Drain current	Continuous	I_D	±1.5	A
	Pulsed	I_{DP}	±6.0	A *1
Source current (Body diode)	Continuous	I_S	–0.75	A *1
	Pulsed	I_{SP}	–6.0	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 *

* Mounted on a ceramic board

Transistors

●Electrical characteristics (Ta=25°C)

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	m Ω	$I_D=-1.5A, V_{GS}=-4.5V$
		—	170	235	m Ω	$I_D=-1.5A, V_{GS}=-4V$ *
		—	310	430	m Ω	$I_D=-0.75A, V_{GS}=-2.5V$
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	$R_L=20\Omega$ *
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	$I_S=-0.75A, V_{GS}=0V$

●Electrical characteristic curves

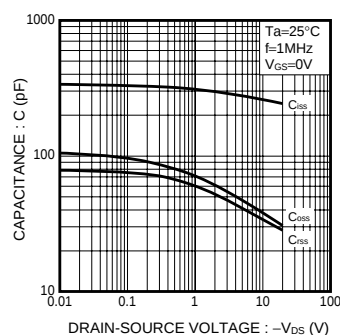


Fig.1 Typical Capacitance vs. Drain-Source Voltage

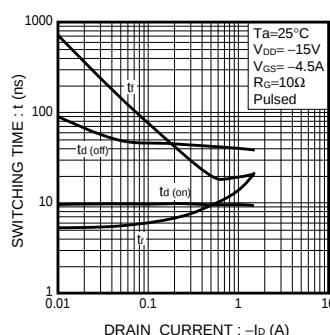


Fig.2 Switching Characteristics

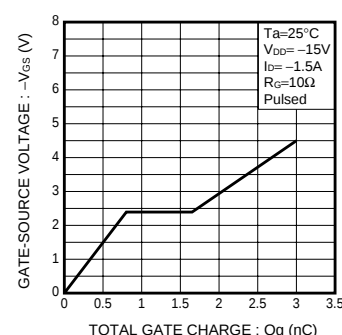


Fig.3 Dynamic Input Characteristics

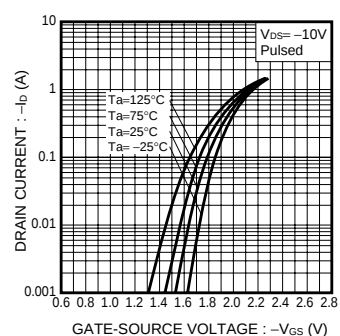


Fig.4 Typical Transfer Characteristics

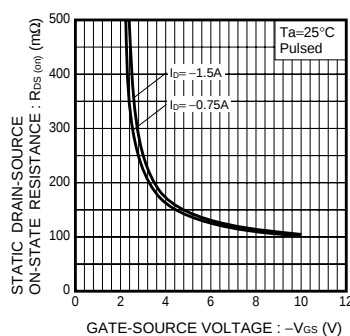


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

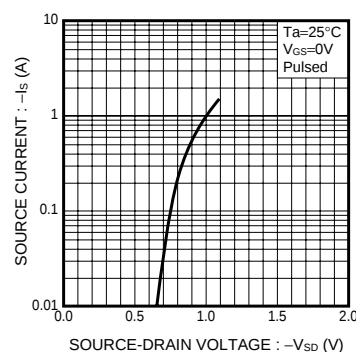


Fig.6 Source Current vs. Source-Drain Voltage

Transistors

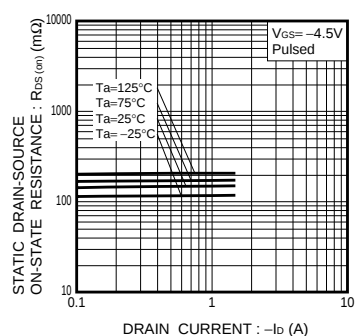


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

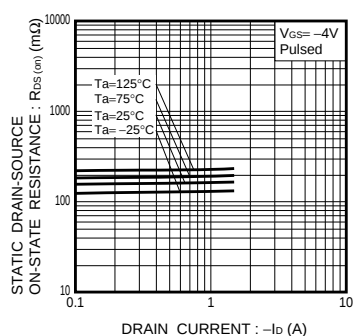


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

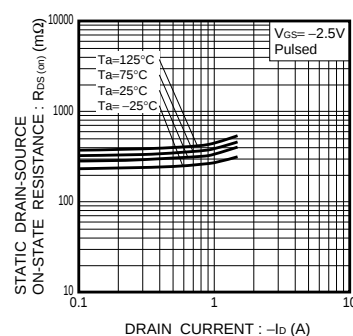


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

●Measurement circuits

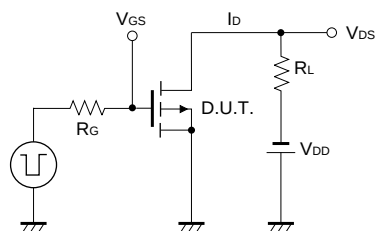


Fig.10 Switching Time Measurement Circuit

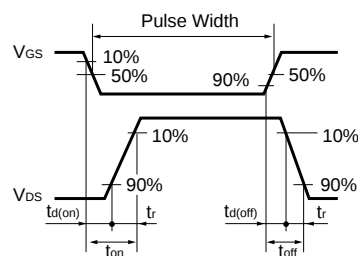


Fig.11 Switching Waveforms

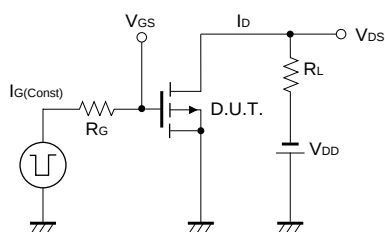


Fig.12 Gate Charge Measurement Circuit

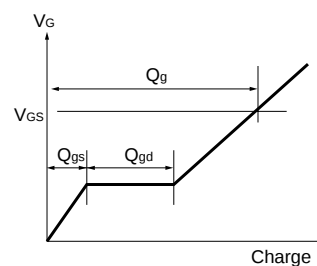


Fig.13 Gate Charge Waveform

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