2.5V Drive Nch+Nch MOS FET

QS6K1

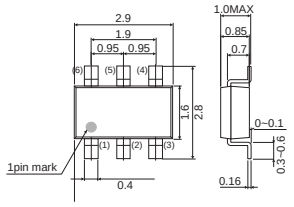
●Structure
Silicon N-channel
MOS FET

●Features
1) Low on-resistance.
2) Built-in G-S Protection Diode.
3) Small and Surface Mount Package (TSMT6).

●Application
Power switching, DC / DC converter.

●External dimensions (Unit : mm)

TSMT6



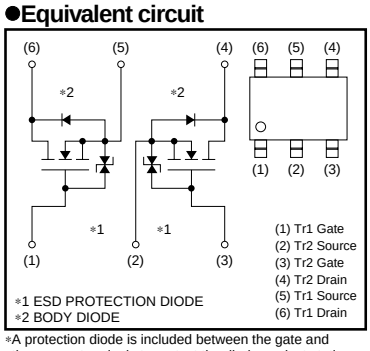
Each lead has same dimensions

Abbreviated symbol : K01

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS6K1		○

●Equivalent circuit



∗A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use the protection circuit when the fixed voltages are exceeded.

●Absolute maximum ratings (Ta=25°C)
<It is the same ratings for the Tr1 and Tr2>

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	30	V
Gate-source voltage		V_{GSS}	12	V
Drain current	Continuous	I_D	±1.0	A
	Pulsed	I_{DP} ∗1	±4.0	A
Source current (Body diode)	Continuous	I_S	0.8	A
	Pulsed	I_{SP} ∗1	4.0	A
Total power dissipation (T_C=25°C)		P_D ∗2	1.25	W / TOTAL
			0.9	W / ELEMENT
Channel temperature		Tch	150	°C
Storage temperature		Tstg	−55 to +150	°C

∗1 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
		139	°C / W / ELEMENT

∗ Mounted on a ceramic board

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

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	10	μA	V_{GS}=12V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	30	–	–	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	–	–	1	μA	V_{DS}=30V, V_{GS}=0V
Gate threshold voltage	$V_{GS\ (th)}$	0.5	–	1.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$ *	–	170	238	mΩ	I_D=1.0A, V_{GS}=4.5V
		–	180	252		I_D=1.0A, V_{GS}=4.0V
		–	260	364		I_D=1.0A, V_{GS}=2.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.0	–	–	S	I_D=1.0A, V_{DS}=10V
Input capacitance	C_{iss}	–	77	–	pF	V_{DS}=10V
Output capacitance	C_{oss}	–	25	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	15	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	7	–	ns	I_D=500mA, V_{DD} ≒15V
Rise time	t_r *	–	7	–	ns	V_{GS}=4.5V
Turn-off delay time	$t_{d\ (off)}$ *	–	15	–	ns	R_L=30.0Ω
Fall time	t_f *	–	6	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	1.7	2.4	nC	V_{DD} ≒15V
Gate-source charge	Q_{gs} *	–	0.4	–	nC	V_{GS}=4.5V
Gate-drain charge	Q_{gd} *	–	0.4	–	nC	I_D=1.0A

*Pulsed

●**Body diode characteristics** (Source-Drain) (Ta=25°C)

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD} *	–	–	1.2	V	I_S=3.2A, V_{GS}=0V

*Pulsed

●**Electrical characteristic curves**

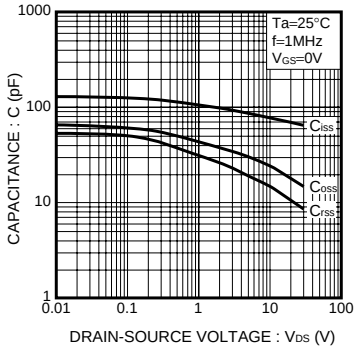


Fig.1 Typical Capacitance vs. Drain-Source Voltage

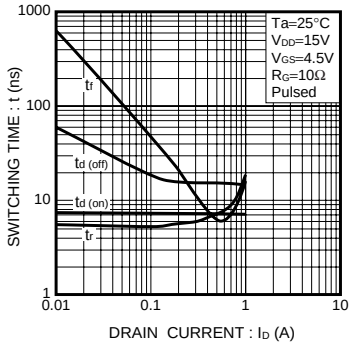


Fig.2 Switching Characteristics

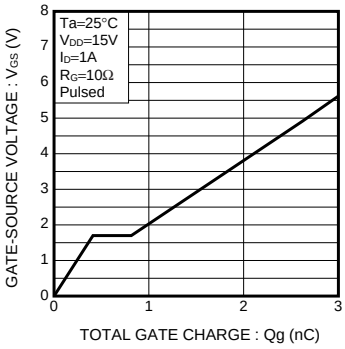


Fig.3 Dynamic Input Characteristics

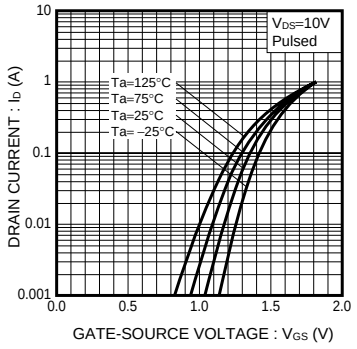


Fig.4 Typical Transfer Characteristics

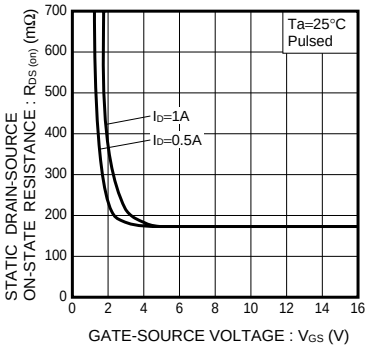


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

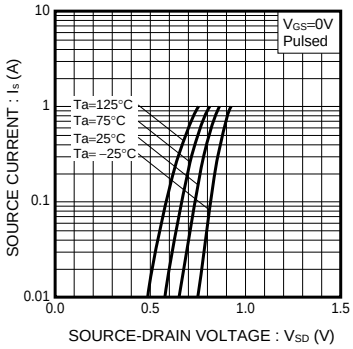


Fig.6 Source Current vs. Source-Drain Voltage

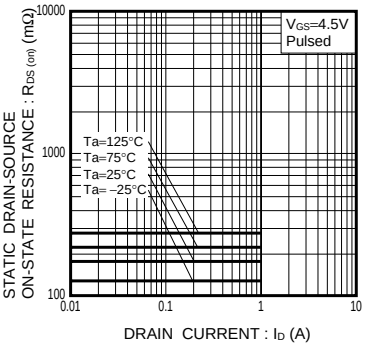


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

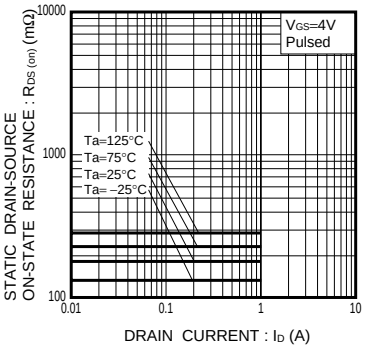


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

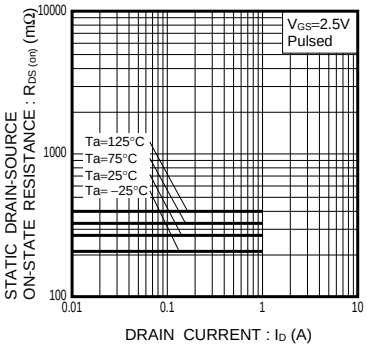


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

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