

4V Drive Nch + Nch MOSFET

QS8K21

● **Structure**

Silicon N-channel MOSFET

● **Features**

- 1) Low on-resistance.
- 2) High power package(TSMT8).
- 3) Low voltage drive(4V drive).

● **Application**

Switching

● **Packaging specifications**

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS8K21		○

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DSS}	45	V
Gate-source voltage	V_{GSS}	±20	V
Drain current	Continuous	I_D	±4 A
	Pulsed	I_{DP}^{*1}	±12 A
Source current (Body Diode)	Continuous	I_s	1 A
	Pulsed	I_{sp}^{*1}	12 A
Power dissipation	P_D^{*2}	1.5	W / TOTAL
		1.25	W / ELEMENT
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 $\leq 1\%$

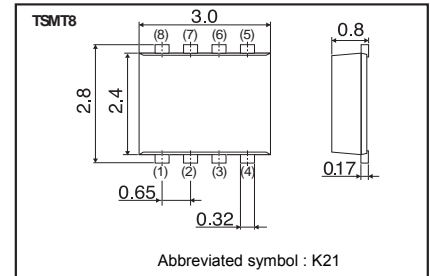
*2 Mounted on a ceramic board.

● **Thermal resistance**

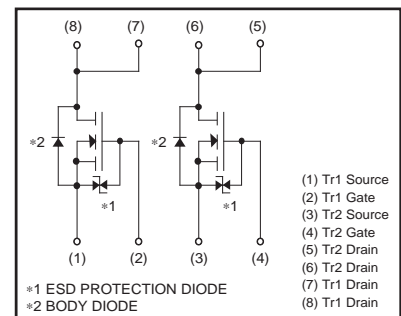
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th}(ch-a)^*$	83.3	°C / W / TOTAL
		100	C / W / ELEMENT

*Mounted on a ceramic board.

● **Dimensions (Unit : mm)**



● **Inner circuit**



●Electrical characteristics (Ta = 25°C)

<It is the same ratings for Tr1 and Tr2.>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	45	-	-	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=45V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	-	2.5	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	38	53	m Ω	$I_D=4A, V_{GS}=10V$
		-	48	67		$I_D=4A, V_{GS}=4.5V$
		-	53	75		$I_D=4A, V_{GS}=4.0V$
Forward transfer admittance	$ Y_{fs} ^*$	2	-	-	S	$I_D=4A, V_{DS}=10V$
Input capacitance	C_{iss}	-	460	-	pF	$V_{DS}=10V$
Output capacitance	C_{oss}	-	110	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	55	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	9	-	ns	$I_D=2A, V_{DD}=25V$
Rise time	t_r^*	-	25	-	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}^*$	-	30	-	ns	$R_L=12.5\Omega$
Fall time	t_f^*	-	7	-	ns	$R_G=10\Omega$
Total gate charge	Q_g^*	-	5.4	-	nC	$I_D=4A, V_{DD}=25V$
Gate-source charge	Q_{gs}^*	-	2.0	-	nC	$V_{GS}=5V, R_L=6.3\Omega$
Gate-drain charge	Q_{gd}^*	-	1.6	-	nC	$R_G=10\Omega$

*Pulsed

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

<It is the same ratings for Tr1 and Tr2.>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	1.2	V	$I_s=4A, V_{GS}=0V$

*Pulsed

●Electrical characteristics curves

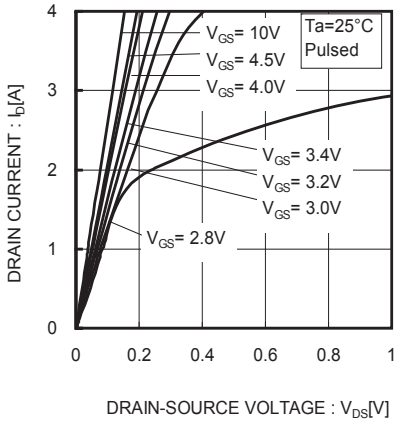


Fig.1 Typical Output Characteristics(I)

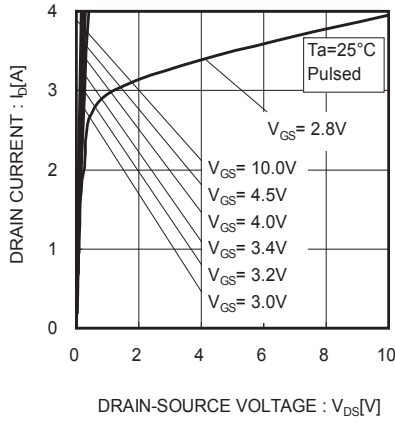


Fig.2 Typical Output Characteristics(II)

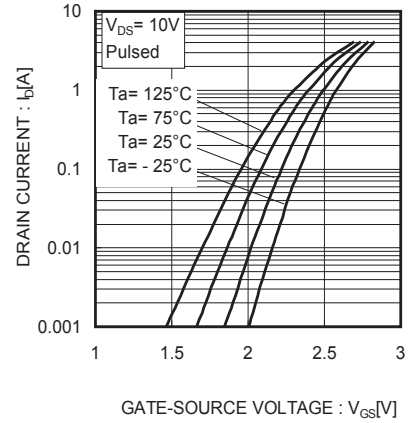


Fig.3 Typical Transfer Characteristics

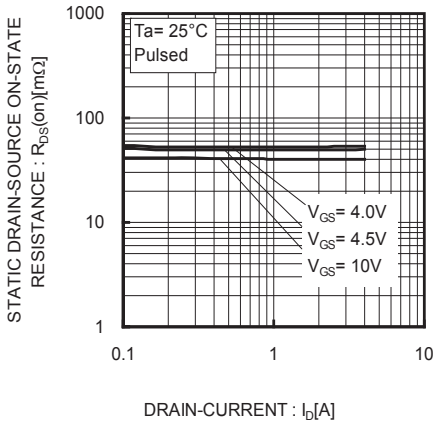


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

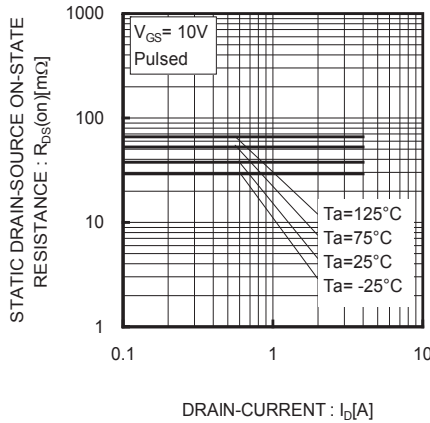


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

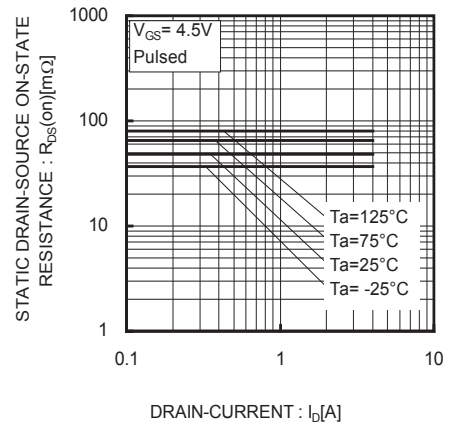


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

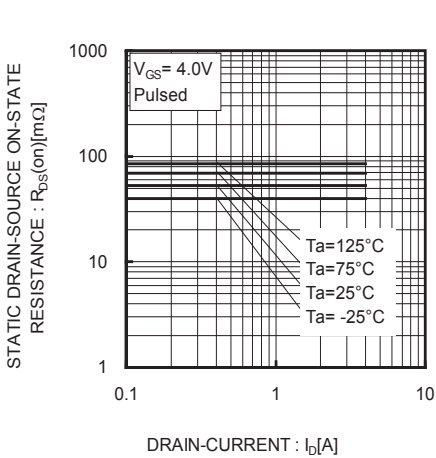


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

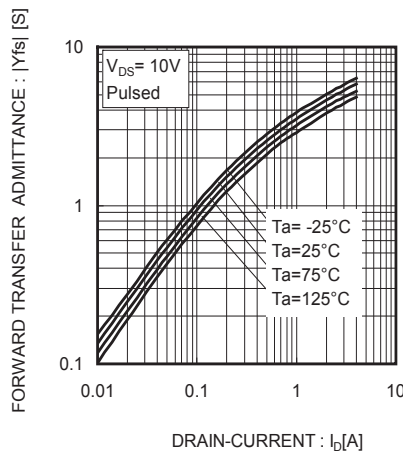


Fig.8 Forward Transfer Admittance vs. Drain Current

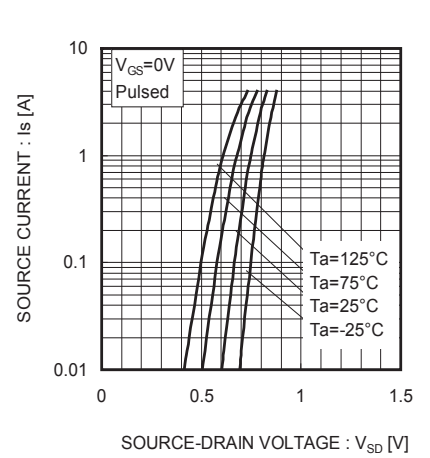


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

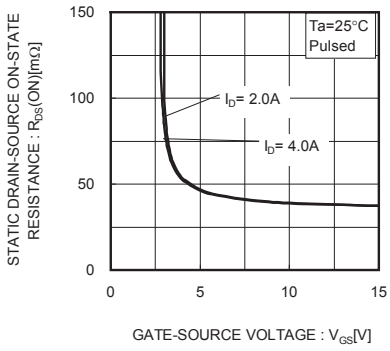


Fig.10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

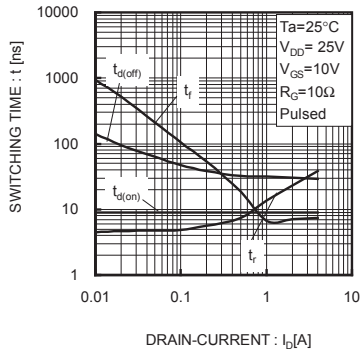


Fig.11 Switching Characteristics

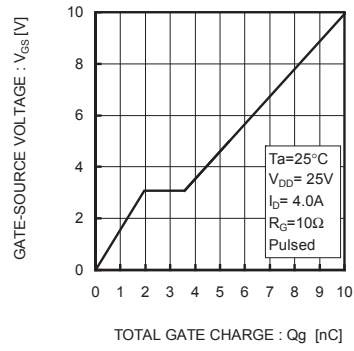


Fig.12 Dynamic Input Characteristics

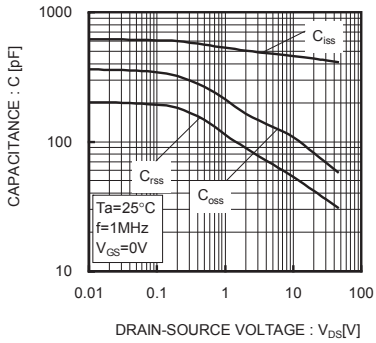


Fig.13 Typical Capacitance vs. Drain-Source Voltage

● Measurement circuits

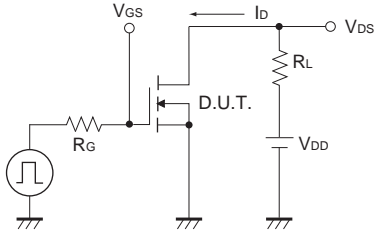


Fig.1-1 Switching time measurement circuit

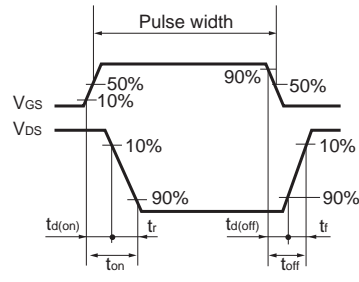


Fig.1-2 Switching waveforms

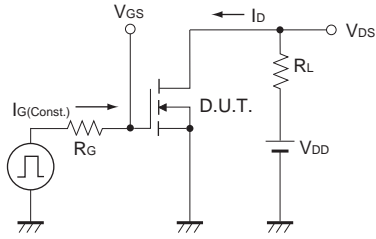


Fig.2-1 Gate charge measurement circuit

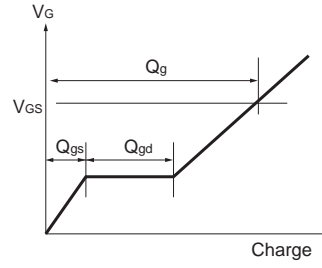


Fig.2-2 Gate charge waveform

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