

# 2.5V Drive Nch MOSFET

## QS8K2

### ● Structure

Silicon N-channel MOSFET

### ● Features

- 1) Low On-resistance.
- 2) High power package.
- 3) 2.5V drive.

### ● Application

Switching

### ● Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS8K2		○

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DSS}$	30	V
Gate-source voltage	$V_{GSS}$	$\pm 12$	V
Drain current	Continuous	$I_D$	$\pm 3.5$ A
	Pulsed	$I_{DP}^{*1}$	$\pm 12$ 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  $\leq 1\%$

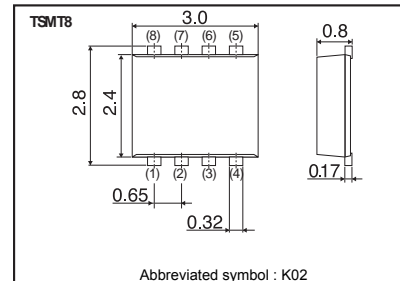
\*2 Mounted on a ceramic board.

### ● Thermal resistance

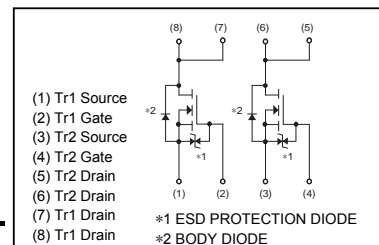
Parameter	Symbol	Limits	Unit
Channel to Ambient	$R_{th}(ch-a)^*$	83.3	°C / W / TOTAL
		100	°C / W / ELEMENT

\* 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	$V_{GS}=\pm 12V, V_{DS}=0V$
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	$R_{DS(on)}$ *	-	38	54	mΩ	$I_D=3.5A, V_{GS}=4.5V$
		-	40	56		$I_D=3.5A, V_{GS}=4V$
		-	55	77		$I_D=3.5A, V_{GS}=2.5V$
Forward transfer admittance	$ Y_{fs} $ *	3.0	-	-	S	$I_D=3.5A, V_{DS}=10V$
Input capacitance	$C_{iss}$	-	285	-	pF	$V_{DS}=10V$
Output capacitance	$C_{oss}$	-	90	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	-	55	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	8	-	ns	$I_D=1.7A, V_{DD}=15V$
Rise time	$t_r$ *	-	12	-	ns	$V_{GS}=4.5V$
Turn-off delay time	$t_{d(off)}$ *	-	29	-	ns	$R_L=8.8\Omega$
Fall time	$t_f$ *	-	13	-	ns	$R_G=10\Omega$
Total gate charge	$Q_g$ *	-	4.6	-	nC	$I_D=3.5A, V_{DD}=15V$
Gate-source charge	$Q_{gs}$ *	-	0.7	-	nC	$V_{GS}=4.5V, R_L=4.3\Omega$
Gate-drain charge	$Q_{gd}$ *	-	1.5	-	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	$I_s=3.5A, V_{GS}=0V$

\*Pulsed

● Electrical characteristic curves

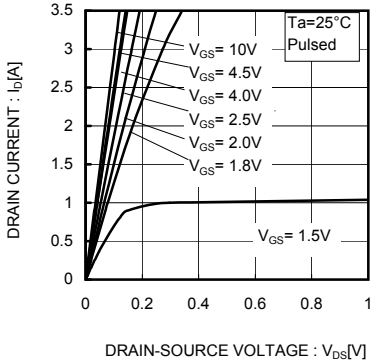


Fig.1 Typical Output Characteristics( I )

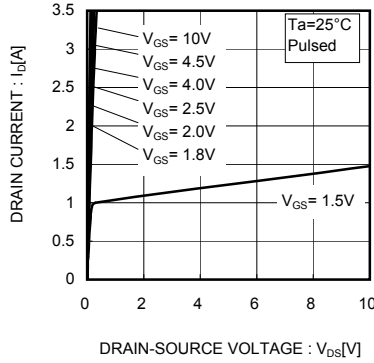


Fig.2 Typical Output Characteristics( II )

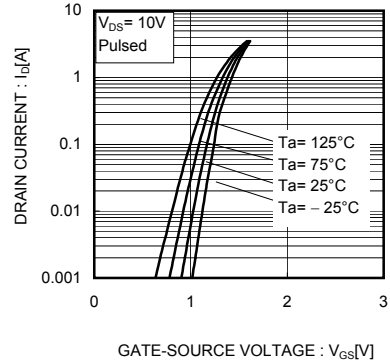


Fig.3 Typical Transfer Characteristics

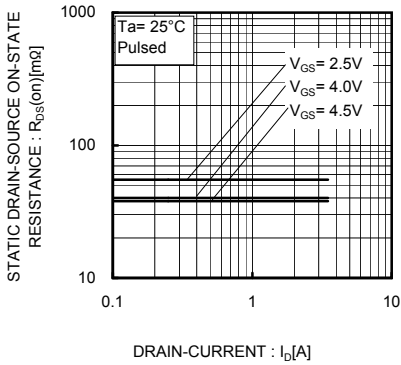


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current( I )

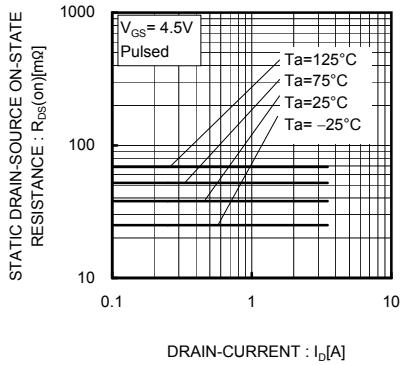


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current( II )

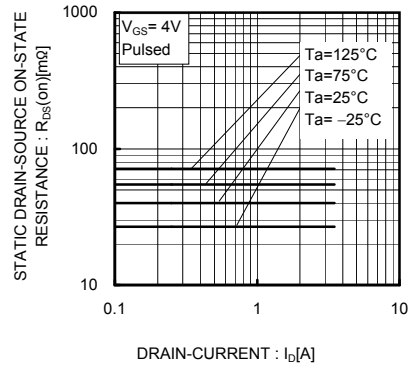


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current( III )

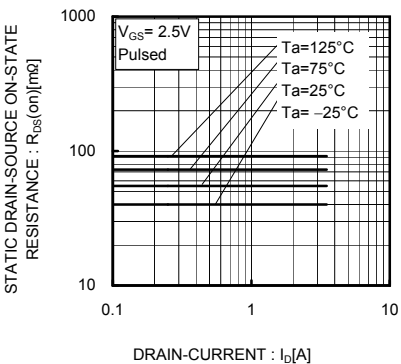


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

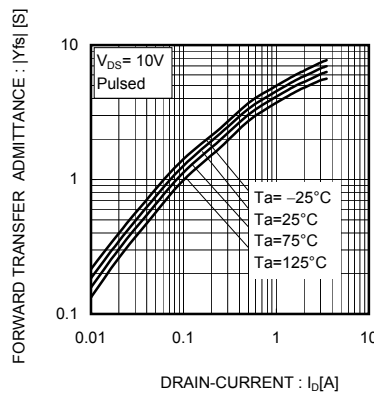


Fig.8 Forward Transfer Admittance vs. Drain Current

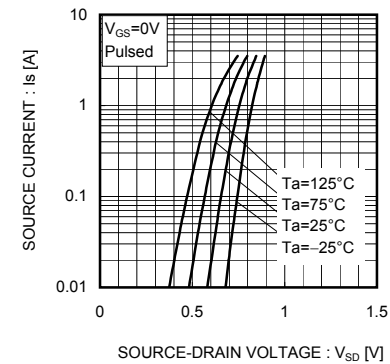


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

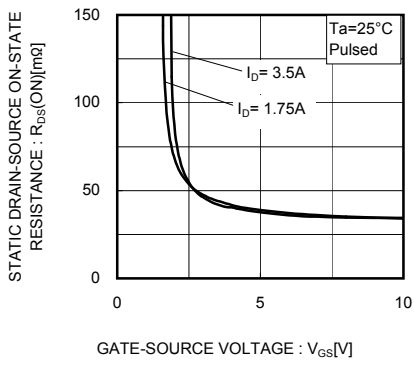


Fig. 10 Static Drain-Source On-State Resistance vs. Gate Source Voltage

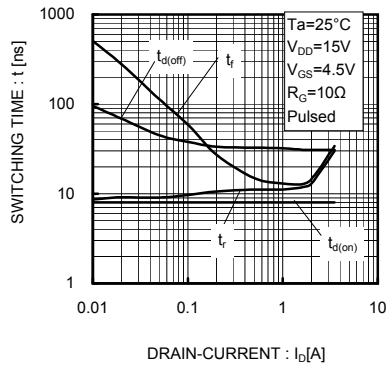


Fig. 11 Switching Characteristics

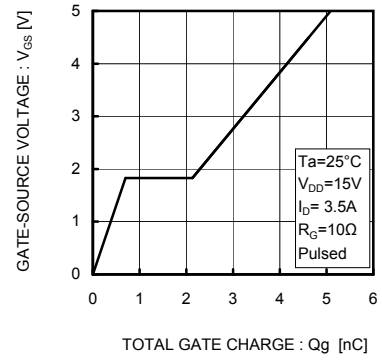


Fig. 12 Dynamic Input Characteristics

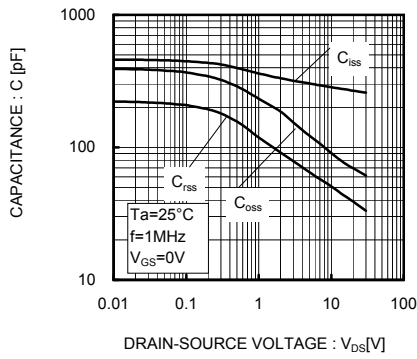


Fig. 13 Typical Capacitance vs. Drain-Source Voltage

● Measurement circuits

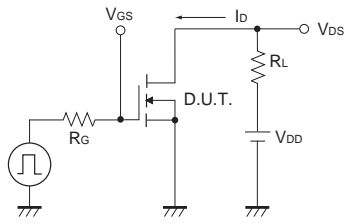


Fig.1-1 Switching time measurement circuit

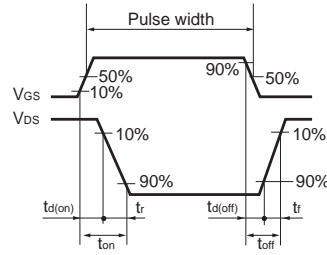


Fig.1-2 Switching waveforms

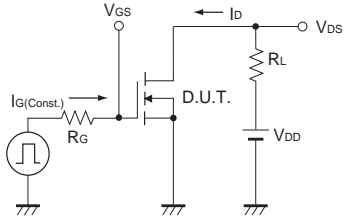


Fig.2-1 Gate charge measurement circuit

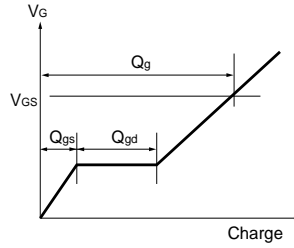


Fig.2-2 Gate Charge Waveform

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