

2.5V Drive Nch+Nch MOS FET

AEC-Q101 Qualified

QS6K1FRA

●Structure

Silicon N-channel
MOS FET

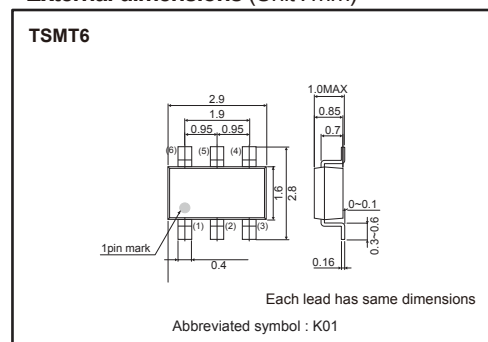
●Features

- 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)



●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS6K1FRA		○

●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 (Tc=25°C)	P_D *2	1.25	W / TOTAL
		0.9	W / ELEMENT
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

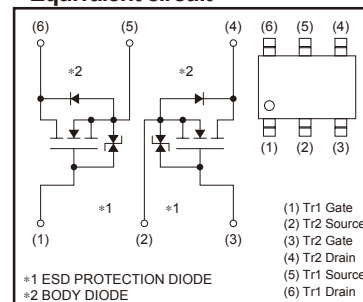
*1 $P_w \leq 10 \mu s$, Duty cycle $\leq 1\%$
*2 Mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$ *	100	°C / W / TOTAL
		139	°C / W / ELEMENT

* Mounted on a ceramic board

●Equivalent circuit



*1 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.

Transistors

●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

Transistors

●Electrical characteristic curves

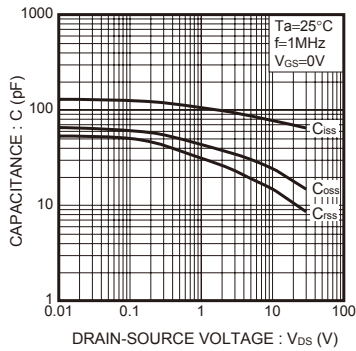


Fig.1 Typical Capacitance vs. Drain-Source Voltage

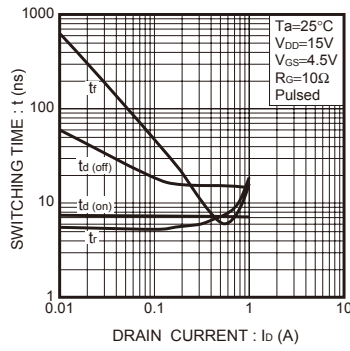


Fig.2 Switching Characteristics

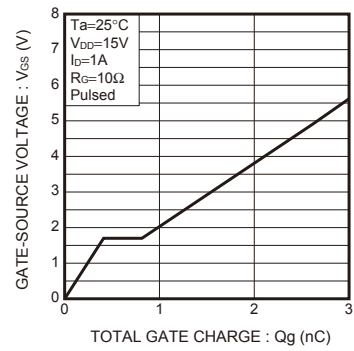


Fig.3 Dynamic Input Characteristics

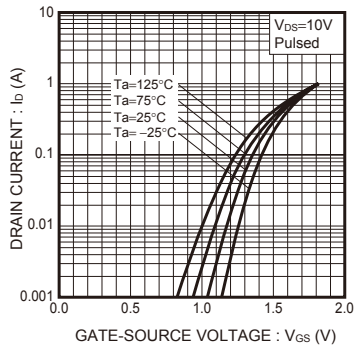


Fig.4 Typical Transfer Characteristics

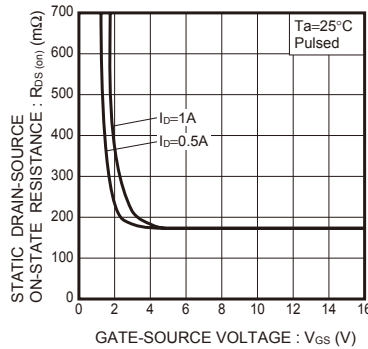


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

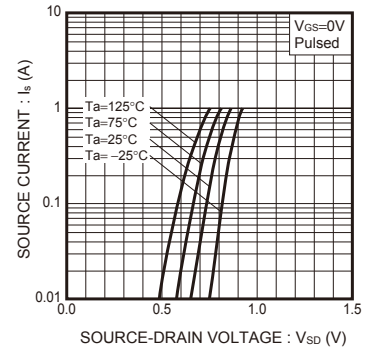


Fig.6 Source Current vs. Source-Drain Voltage

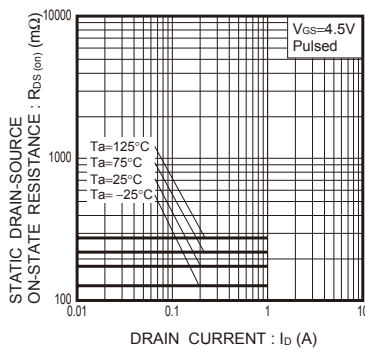


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

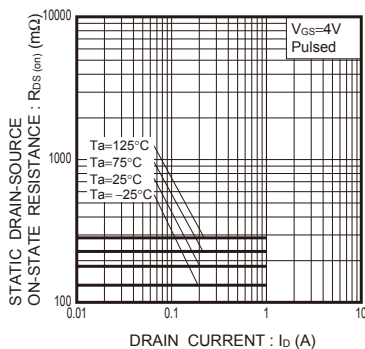


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

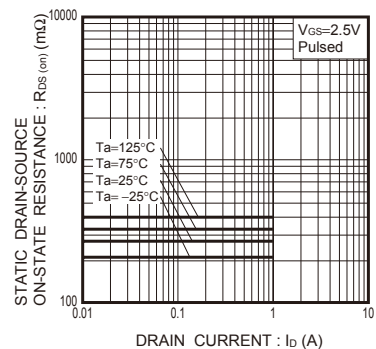


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

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JAPAN	USA	EU	CHINA
CLASS III	CLASS III	CLASS II b	CLASS III
CLASS IV		CLASS III	

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 - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
 - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - [f] Sealing or coating our Products with resin or other coating materials
 - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - [h] Use of the Products in places subject to dew condensation
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5. Please verify and confirm characteristics of the final or mounted products in using the Products.
6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
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8. Confirm that operation temperature is within the specified range described in the product specification.
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2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

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This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

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 - [b] the temperature or humidity exceeds those recommended by ROHM
 - [c] the Products are exposed to direct sunshine or condensation
 - [d] the Products are exposed to high Electrostatic
2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
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4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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