AEC-Q101 Qualified

4V Drive Nch+Nch MOSFET SP8K33FRA

Structure

Silicon N-channel MOSFET

Features

- 1) Low on-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small surface Mount Package (SOP8).

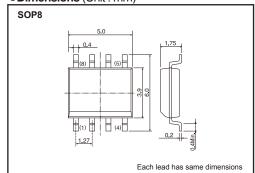
Application

Switching

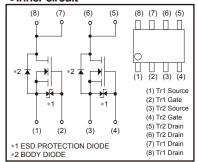
Packaging specifications

Туре	Package	Taping
	Code	TB
	Basic ordering unit (pieces)	2500
SP8K33FRA	0	

●Dimensions (Unit: mm)



●Inner 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		VDSS	60	V	
Gate-source voltage		V _{GSS}	±20	V	
Dunin account	Continuous	I _D	±5.0	Α	
Drain current	Pulsed	I _{DP} *1	±20	A	
Source current	Continuous	Is	1.0	Α	
(Body diode)	Pulsed	I _{SP} *1	20	Α	
Total power dissipation		P _D *2	2.0	W/TOTAL	
Channel temperature		Tch	150	°C	
Range of storage temperature		Tstg	-55 to +150	°C	

^{*1} Pw≤10μs, Duty cycle≤1% *2 Mounted on a ceramic board.

●Electrical characteristics (Ta=25°C)

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

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Gate-source leakage	Igss	-	_	±10	μА	Vgs=±20V, Vps=0V
Drain-source breakdown voltage	V _(BR) DSS	60	_	_	V	I _D =1mA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}	-	-	1	μА	V _{DS} =60V, V _{GS} =0V
Gate threshold voltage	V _{GS (th)}	1.0	-	2.5	٧	V _{DS} =10V, I _D =1mA
Otation during a survey of a fate	state R _{DS (on)} - 34 - 38 - 40	_	34	48		ID=5.0A, VGS=10V
Static drain-source on-state resistance		38	54	mΩ	I _D =5.0A, V _{GS} =4.5V	
resistance		_	40	56		I _D =5.0A, V _{GS} =4.0V
Forward transfer admittance	Y _{fs} *	5.0	-	_	S	I _D =5.0A, V _{DS} =10V
Input capacitance	Ciss	_	620	_	pF	V _{DS} =10V
Output capacitance	Coss	-	145	_	pF	V _{GS} =0V
Reverse transfer capacitance	Crss	-	70	_	pF	f=1MHz
Turn-on delay time	t d (on) *	-	12	_	ns	I _D =2.5A, V _{DD} ≒30V
Rise time	tr *	_	20	_	ns	Vgs=10V
Turn-off delay time	t _{d (off)} *	-	40	_	ns	R _L =12Ω
Fall time	t _f *	_	20		ns	R _G =10Ω
Total gate charge	Qg *	_	8.0	12	nC	ID=5.0A, VDD≒30V
Gate-source charge	Qgs *	_	2.0	_	nC	V _{GS} =5V
Gate-drain charge	Q _{gd} *	_	2.6	_	nC	$R_L=6\Omega$, $R_G=10\Omega$

^{*}Pulsed

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

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

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Forward voltage	V _{SD} *	_	_	1.2	V	I _S =5.0A, V _{GS} =0V

^{*}Pulsed

Electrical characteristic curves

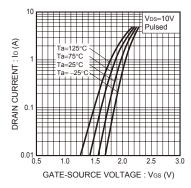


Fig.1 Typical Transfer Characteristics

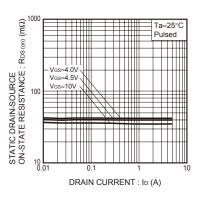


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current(I)

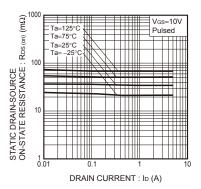


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current(II)

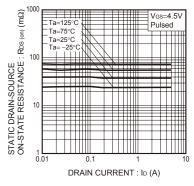


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(III)

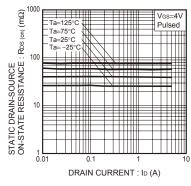


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(IV)

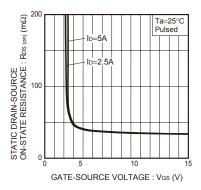


Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

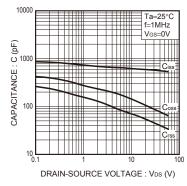


Fig.7 Typical Capacitance vs. Drain-Source Voltage

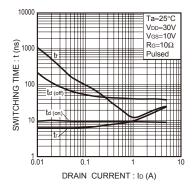


Fig.8 Switching Characteristics

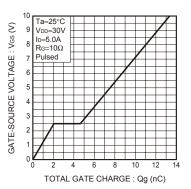


Fig.9 Dynamic Input Characteristics

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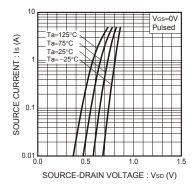


Fig.10 Source Current vs. Source-Drain Voltage

Measurement circuit

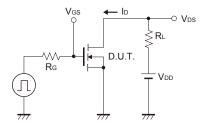


Fig.11 Switching Time Test Circuit

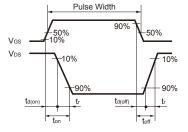


Fig.12 Switching Time Waveforms

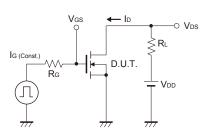


Fig.13 Gate Charge Test Circuit

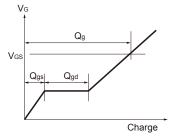


Fig.14 Gate Charge Waveform

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(Note1) Medical Equipment Classification of the Specific Applications

(140to 1) Micdical Equipment Classification of the Openine Applications							
JAPAN	PAN USA EU		CHINA				
CLASSⅢ	CLASSⅢ	CLASSIIb	CLASSIII				
CLASSIV	CLASSIII	CLASSⅢ	CLASSIII				

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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
- 4. The Products are not subject to radiation-proof design.
- 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.
- 7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- 8. Confirm that operation temperature is within the specified range described in the product specification.
- 9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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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.

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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 lonizer, 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
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- 3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 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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