

1.8V Drive Nch+SBD MOSFET

QS5U34

●Structure

Silicon N-channel MOSFET
Schottky Barrier DIODE

●Features

- 1) The QS5U34 combines Nch MOSFET with a Schottky barrier diode in a single TSMT5 package.
- 2) Low on-state resistance with fast switching.
- 3) Low voltage drive (1.8V).
- 4) The Independently connected Schottky barrier diode has low forward voltage.

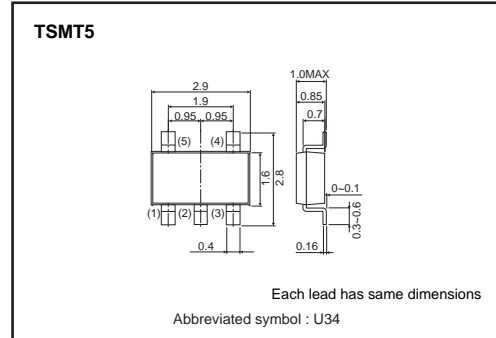
●Applications

Load switch, DC / DC conversion

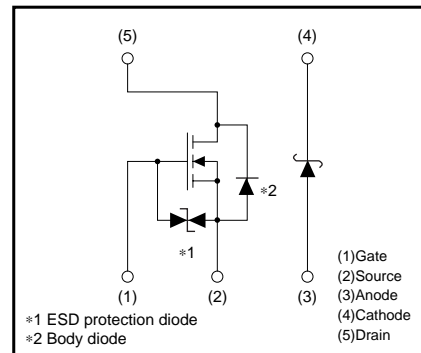
●Packaging specifications

Type	Package	Taping
	Code	TR
	Quantity (pcs)	3000
QS5U34		○

●Dimensions (Unit : mm)



●Equivalent circuit



Transistors

●Absolute maximum ratings (Ta=25°C)

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Parameter	Symbol	Limits	Unit	
Drain-source voltage	V _{DSS}	20	V	
Gate-source voltage	V _{GSS}	10	V	
Drain current	Continuous	I _D	±1.5	A
	Pulsed	I _{DP} *1	±3.0	A
Source current (Body diode)	Continuous	I _S	0.6	A
	Pulsed	I _{SP} *1	2.4	A
Channel temperature	T _{ch}	150	°C	
Power dissipation	P _D *3	0.9	W/ELEMENT	

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Repetitive peak reverse voltage	V _{RM}	30	V
Reverse voltage	V _R	20	V
Forward current	I _F	0.5	A
Forward current surge peak	I _{FSM} *2	2.0	A
Junction temperature	T _J	150	°C
Power dissipation	P _D *3	0.7	W/ELEMENT

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Total power dissipation	P _D *3	1.25	W / TOTAL
Range of Storage temperature	T _{stg}	-55 to +150	°C

*1 Pw≤10μs, Duty cycles≤1% *2 60Hz·1cyc. *3 Mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

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Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I _{GSS}	-	-	10	μA	V _{GS} =10V / V _{DS} =0V
Drain-source breakdown voltage	V _{(BR) DSS}	20	-	-	V	I _D =1mA, / V _{GS} =0V
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =20V / V _{GS} =0V
Gate threshold voltage	V _{GS(th)}	0.3	-	1.3	V	V _{DS} =10V / I _D =1mA
Static drain-source on-state resistance	R _{DS(on)} *	-	130	180	mΩ	I _D =1.5A, V _{GS} =4.5V
		-	170	240	mΩ	I _D =1.5A, V _{GS} =2.5V
		-	220	310	mΩ	I _D =0.8A, V _{GS} =1.8V
Forward transfer admittance	Y _{fs} *	1.6	-	-	S	V _{DS} =10V, I _D =1.5A
Input capacitance	C _{iss}	-	110	-	pF	V _{DS} =10V
Output capacitance	C _{oss}	-	18	-	pF	V _{GS} =0V
Reverse transfer capacitance	C _{riss}	-	15	-	pF	f=1MHz
Turn-on delay time	t _{d(on)} *	-	5	-	ns	I _D =1.0A
Rise time	t _r *	-	5	-	ns	V _{DD} ≐10V
Turn-off delay time	t _{d(off)} *	-	20	-	ns	V _{GS} =4.5V
Fall time	t _f *	-	3	-	ns	R _L =10Ω
Total gate charge	Q _g *	-	1.8	2.5	nC	R _G =10Ω
Gate-source charge	Q _{gs} *	-	0.3	-	nC	V _{DD} ≐10V
Gate-drain charge	Q _{gd} *	-	0.3	-	nC	V _{GS} =4.5V
						I _D =1.5A

*Pulsed

<MOSFET>Body diode (source-drain)

Forward voltage	V _{SD}	-	-	1.2	V	I _S =0.6A / V _{GS} =0V
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Forward voltage	V _F	-	-	0.36	V	I _F =0.1A
		-	-	0.47	V	I _F =0.5A
Reverse current	I _R	-	-	100	μA	V _R =20V

Transistors

●Electrical characteristic curves

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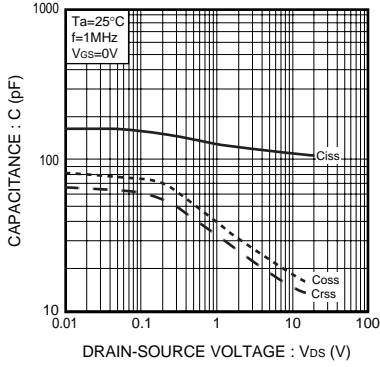


Fig.1 Typical Capacitance vs. Drain-Source Voltage

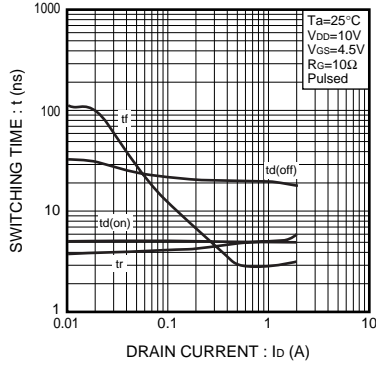


Fig.2 Switching Characteristics

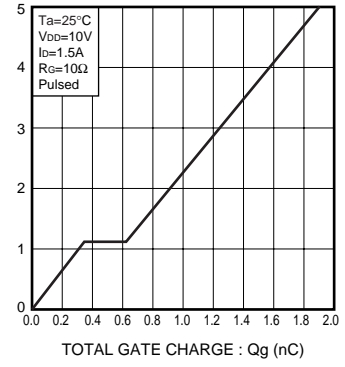


Fig.3 Dynamic Input Characteristics

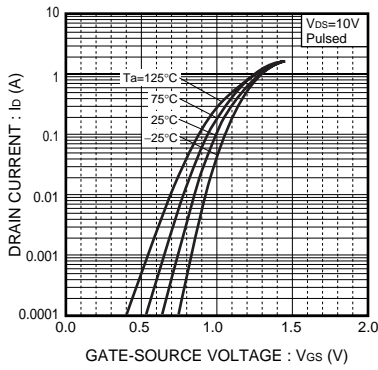


Fig.4 Typical Transfer Characteristics

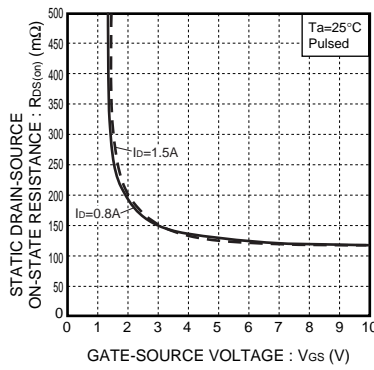


Fig.5 Static Drain-Source On-State Resistance vs. Gate-source Voltage

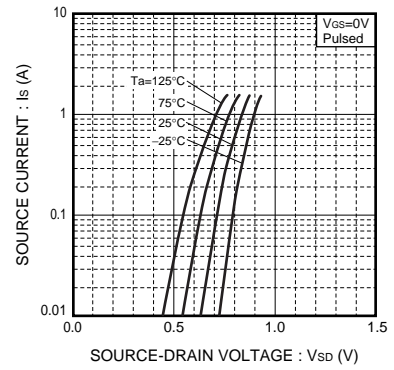


Fig.6 Source Current vs. Source-Drain Voltage

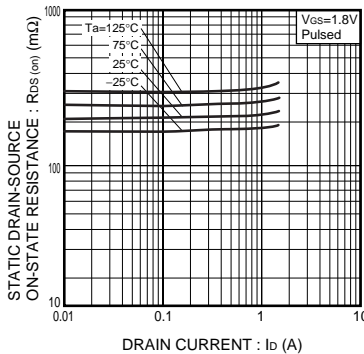


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

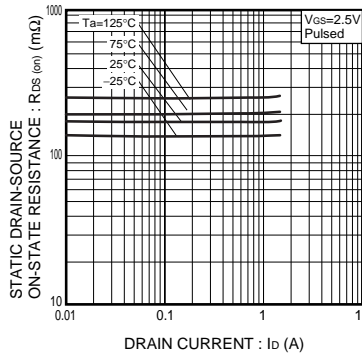


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

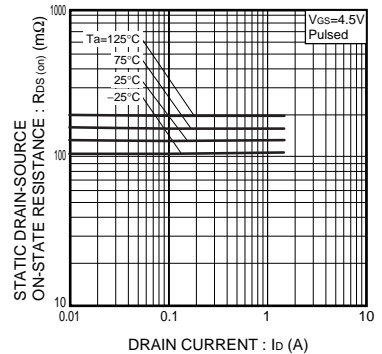


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

Transistors

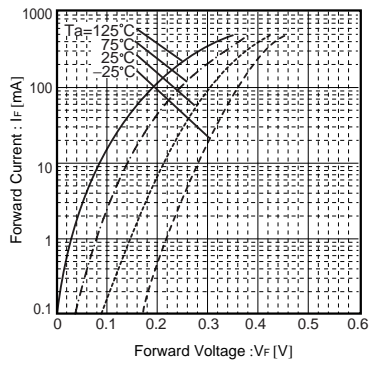


Fig.10 Forward Temperature Characteristics

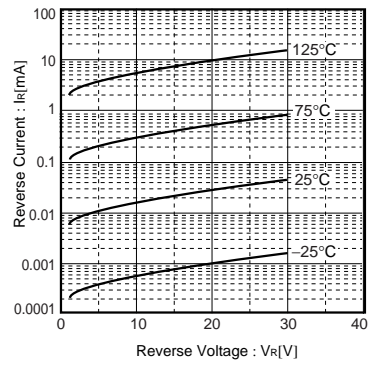


Fig.11 Reverse Temperature Characteristics

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(Note1) Medical Equipment Classification of the Specific Applications

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

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 - Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - Sealing or coating our Products with resin or other coating materials
 - Use of our Products without cleaning residue of flux (Exclude cases where no-clean type fluxes is used. However, recommend sufficiently about the residue.) ; or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - Use of the Products in places subject to dew condensation
- The Products are not subject to radiation-proof design.
- Please verify and confirm characteristics of the final or mounted products in using the Products.
- 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.
- De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.
- Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

- When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 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 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.
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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