4V Drive Pch+SBD MOSFET

QS5U33

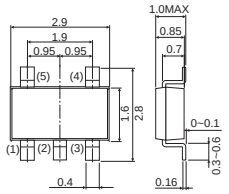
●Structure
Silicon P-channel MOSFET
Schottky Barrier DIODE

●Features
1) The QS5U33 combines Pch MOSFET with a Schottky barrier diode in TSMT5 package.
2) Low on-state resistance with fast switching.
3) Low voltage drive (4V).
4) Built-in schottky barrier diode has low forward voltage.

●Applications
Load switch, DC/DC conversion

●Dimensions (Unit : mm)

TSMT5



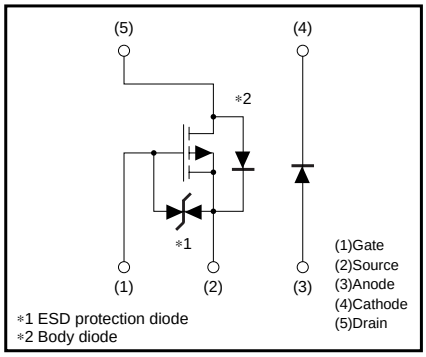
Each lead has same dimensions

Abbreviated symbol : U33

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS5U33		○

●Equivalent circuit



∗1 ESD protection diode
∗2 Body diode

∗ A protection diode has been buitt in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when rated voltages are exceeded.

●Absolute maximum ratings (Ta=25°C)

〈MOSFET〉

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	−30	V
Gate-source voltage		V_{GSS}	±20	V
Drain current	Continuous	I_D	±2.0	A
	Pulsed	I_{DP} *1	±8.0	A
Source current (Body diode)	Continuous	I_S	−0.75	A
	Pulsed	I_{SP} *1	−8.0	A
Channel temperature		Tch	150	°C
Power dissipation		P_D *3	0.9	W/ELEMENT

〈Di〉

Parameter	Symbol	Limits	Unit
Repetitive peak reverse voltage	V_{RM}	25	V
Reverse voltage	V_R	20	V
Forward current	I_F	1.0	A
Forward current surge peak	I_{FSM} *2	3.0	A
Junction temperature	Tj	150	°C
Power dispation	P_D *3	0.7	W/ELEMENT

〈MOSFET AND Di〉

Parameter	Symbol	Limits	Unit
Total power dissipation	P_D *3	1.25	W/TOTAL
Range of strage temperature	Tstg	−55 to +150	°C

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

●Electrical characteristics (Ta=25°C)

〈MOSFET〉

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±10	μA	V_{GS}= ±20V, 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	$V_{GS\ (th)}$	−1.0	–	−2.5	V	V_{DS}= −10V, I_D= −1mA
Static drain-source on-starte resistance	$R_{DS\ (on)}$ *	–	95	135	mΩ	I_D= −2A, V_{GS}= −10V
		–	145	205	mΩ	I_D= −1A, V_{GS}= −4.5V
		–	160	225	mΩ	I_D= −1A, V_{GS}= −4.0V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.4	–	–	S	V_{DS}= −10V, I_D= −1A
Input capacitance	C_{iss}	–	310	–	pF	V_{DS}= −10V
Output capacitance	C_{oss}	–	55	–	pF	V_{GS}= 0V
Reverse transfer capacitance	C_{rss}	–	45	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	7	–	ns	V_{DD}≒ −15V
Rise time	t_r *	–	6	–	ns	V_{GS}= −10V
Turn-off delay time	$t_{d\ (off)}$ *	–	25	–	ns	I_D= −1A
Fall time	t_f *	–	6	–	ns	R_L≒15Ω
						R_G ≒10Ω
Total gate charge	Q_g *	–	3.4	–	nC	V_{DD}≒ −15V
Gate-source charge	Q_{gs} *	–	1.0	–	nC	V_{GS}= −5V
Gate-drain charge	Q_{gd} *	–	1.3	–	nC	I_D= −2A
						R_L≒7.5Ω
						R_G ≒10Ω

* Pulsed

〈MOSFET〉 Body diode (Source-drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}	–	–	−1.2	V	I_S= −0.75V , V_{GS}= 0V

〈Di〉

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_F	–	–	0.45	V	I_F= 1.0V
Reverse current	I_R	–	–	200	μA	V_R= 20V

●Electrical characteristic curves

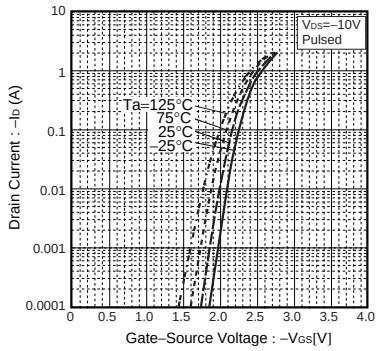


Fig.1 Typical Transfer Characteristics

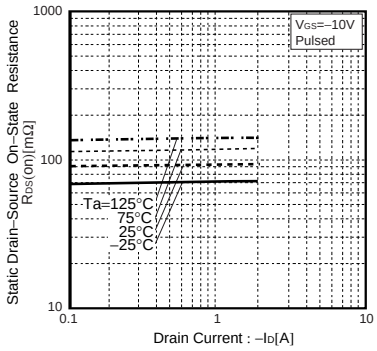


Fig.2 Static Drain−Source On−State Resistance vs.Drain Current

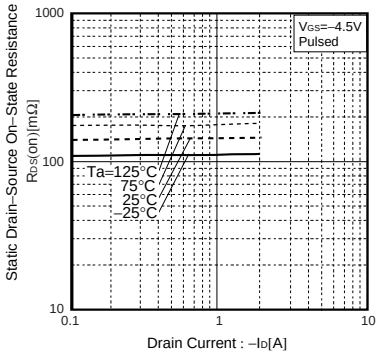


Fig.3 Static Drain−Source On−State Resistance vs.Drain Current

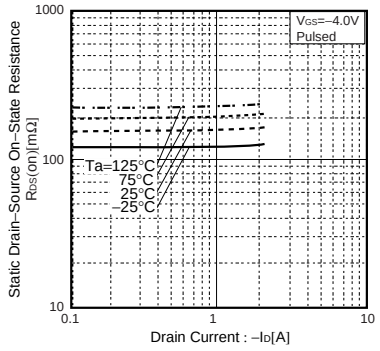


Fig.4 Static Drain−Source On−State Resistance vs.Drain−Current

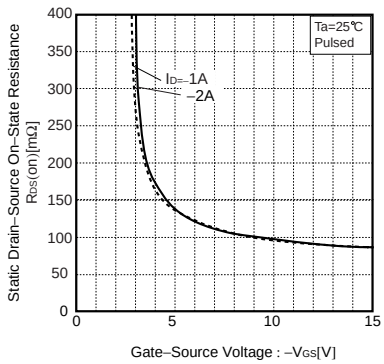


Fig.5 Static Drain−Source On−State Resistance vs.Gate−Source Voltage

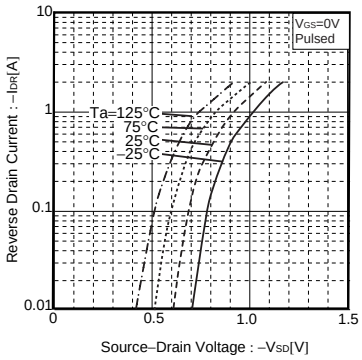


Fig.6 Reverse Drain Current vs. Source-Drain Current

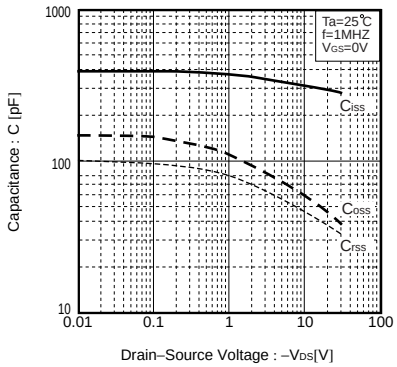


Fig.7 Typical Capactitance vs.Drain−Source Voltage

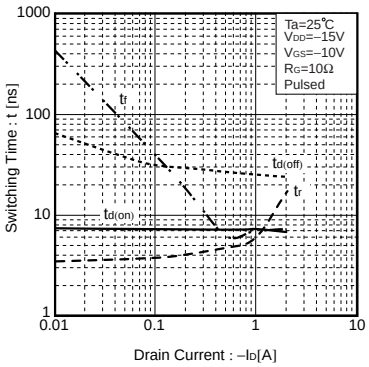


Fig.8 Switching Characteristics

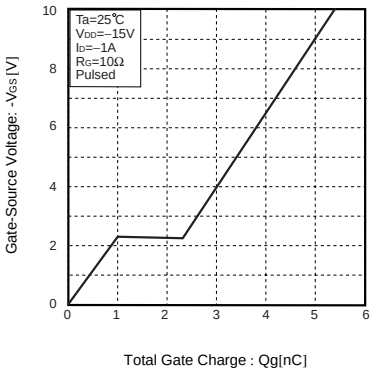


Fig.9 Dynamic Input Characteristics

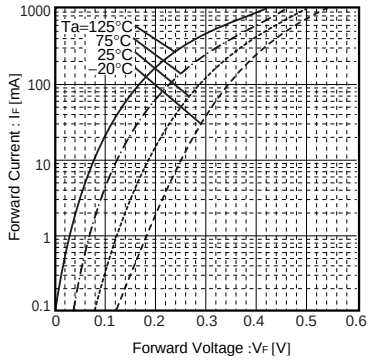


Fig.10 Forward Temperature Characteristics

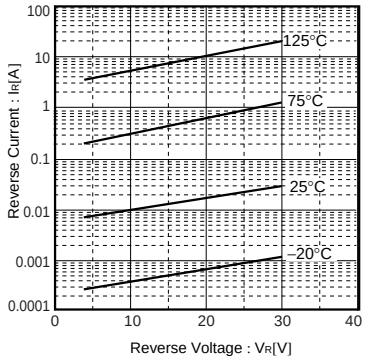


Fig.11 Reverse Temperature Characteristics

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