2.5V Drive Pch+SBD MOS FET

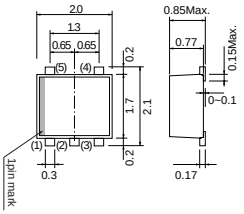
US5U29

●Structure
Silicon P-channel MOS FET
Schottky Barrier DIODE

●Features
1) The US5U29 combines Pch MOS FET with a Schottky barrier diode in a TUMT5 package.
2) Low on-resistance with fast switching.
3) Low voltage drive (2.5V).
4) Built-in schottky barrier diode has low forward voltage.

●External dimensions (Unit : mm)

TUMT5



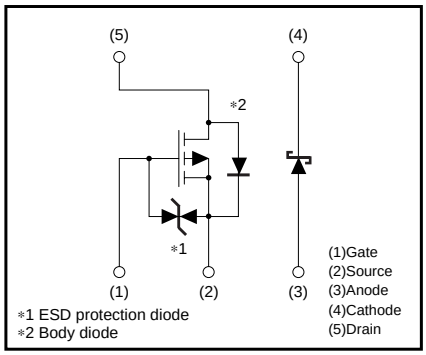
Abbreviated symbol : U29

●Applications
Load switch, DC/DC conversion

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US5U29		○

●Equivalent circuit



*1 ESD protection diode
*2 Body diode

●Absolute maximum ratings (Ta=25°C)

<MOSFET>

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	−20	V
Gate-source voltage		V_{GSS}	±12	V
Drain current	Continuous	I_D	±1	A
	Pulsed	I_{DP} *1	±4	A
Source current (Body diode)	Continuous	I_S	−0.4	A
	Pulsed	I_{SP} *1	−4	A
Channel temperature		Tch	150	°C
Power dissipation		P_D *3	0.7	W / ELEMENT

<Di>

Repetitive peak reverse voltage	V_{RM}	25	V
Reverse voltage	V_R	20	V
Forward current	I_F	0.7	A
Forward current surge peak	I_{FSM} *2	3.0	A
Junction temperature	Tj	150	°C
Power dissipation	P_D *3	0.5	W / ELEMENT

<MOSFET AND Di>

Total power dissipation	P_D *3	1.0	W / TOTAL
Range of Storage 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}=±12V, 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	$V_{GS\ (th)}$	−0.7	–	−2.0	V	V_{DS}=−10V, I_D=−1mA
Static drain-source on-starte resistance	$R_{DS\ (on)}$ *	–	280	390	mΩ	I_D=−1A, V_{GS}=−4.5V
		–	310	430	mΩ	I_D=−1A, V_{GS}=−4V
		–	570	800	mΩ	I_D=−0.5A, V_{GS}=−2.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	0.7	–	–	S	V_{DS}=−10V, I_D=−0.5A
Input capacitance	C_{iss}	–	150	–	pF	V_{DS}=−10V
Output capacitance	C_{oss}	–	20	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	20	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	9	–	ns	I_D=−0.5A
Rise time	t_r *	–	8	–	ns	V_{DD}≒−15V
Turn-off delay time	$t_{d\ (off)}$ *	–	25	–	ns	V_{GS}=−4.5V R_L=30Ω
Fall time	t_f *	–	10	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	2.1	–	nC	V_{DD}≒−15V V_{GS}=−4.5V
Gate-source charge	Q_{gs} *	–	0.5	–	nC	I_D=−1A
Gate-drain charge	Q_{gd} *	–	0.5	–	nC	R_L=15Ω R_G=10Ω

* Pulsed

<Body diode (source−drain)>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}	–	–	−1.2	V	I_S=−0.4A, V_{GS}=0V

<Di>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage drop	V_F	–	–	0.49	V	I_F=0.7A
Reverse current	I_R	–	–	200	µA	V_R=20V

●**Electrical characteristic curves**

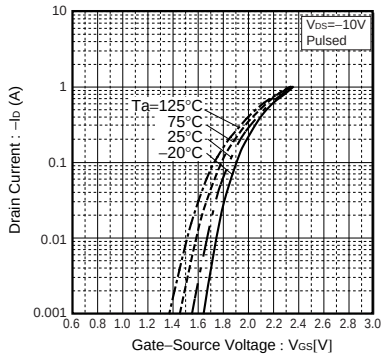


Fig.1 Typical Transfer Characteristics

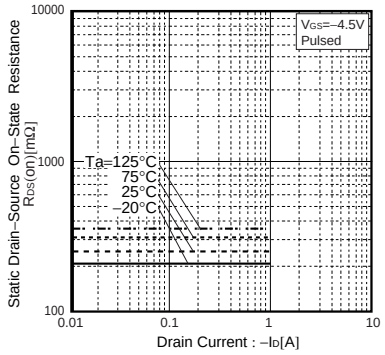


Fig.2 Static Drain−Source On−State Resistance vs.Drain Current (I)

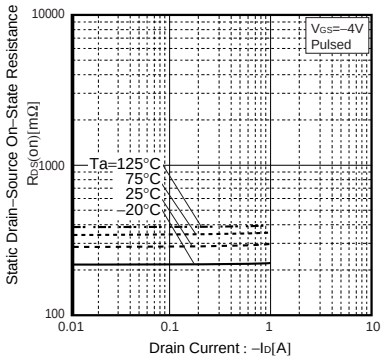


Fig.3 Static Drain−Source On−State Resistance vs.Drain Current (II)

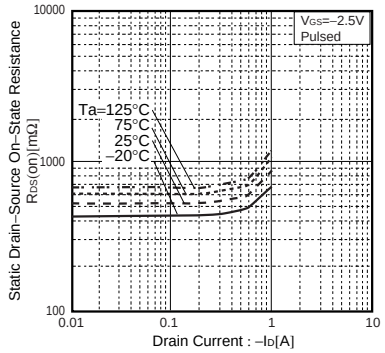


Fig.4 Static Drain−Source On−State Resistance vs.Drain−Current (III)

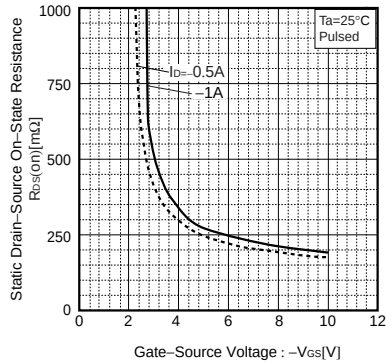


Fig.5 Static Drain−Source On−State Resistance vs.Gate−Source Voltage

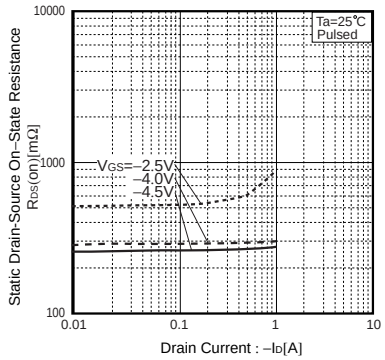


Fig.6 Static Drain−Source On−State Resistance vs.Drain Current

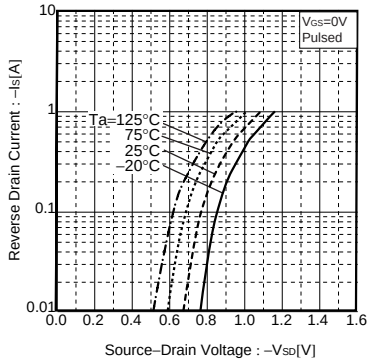


Fig.7 Reverse Drain Current vs. Source-Drain Current

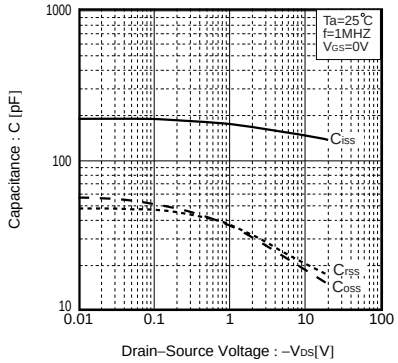


Fig.8 Typical Capactitance vs.Drain−Source Voltage

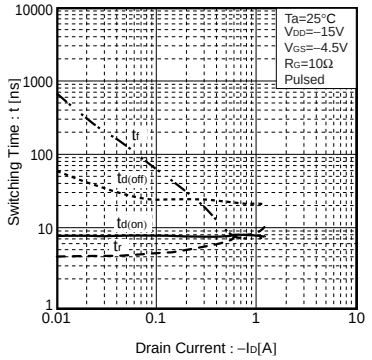


Fig.9 Switching Characteristics

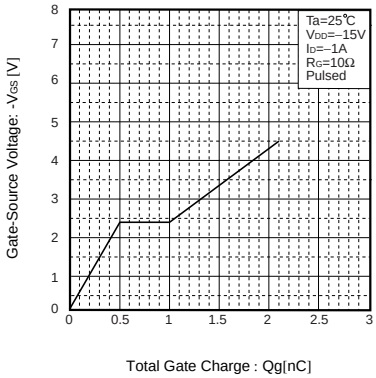


Fig.10 Dynamic Input Characteristics

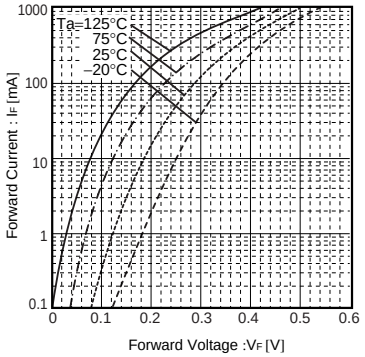


Fig.11 Forward Temperature Characteristics

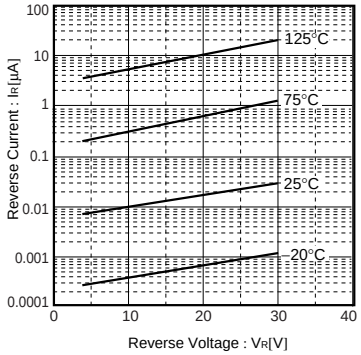


Fig.12 Reverse Temperature Characteristics

●Measurement circuits

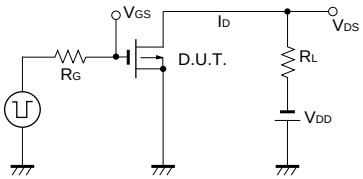


Fig.13 Switching Time Measurement Circuit

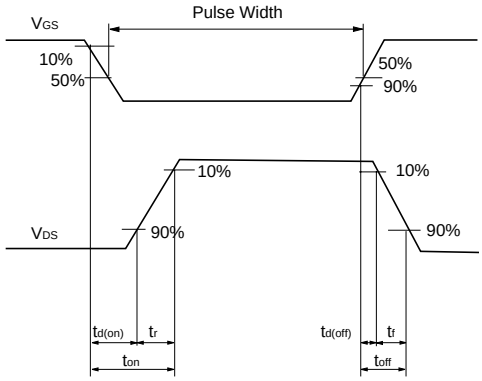


Fig.14 Switching Waveforms

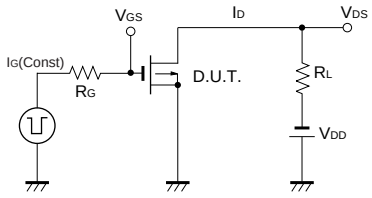


Fig.15 Gate Charge Measurement Circuit

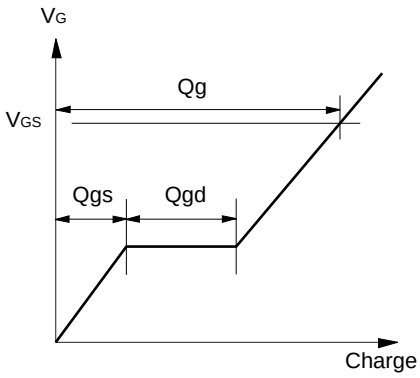


Fig.16 Gate Charge Waveforms

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