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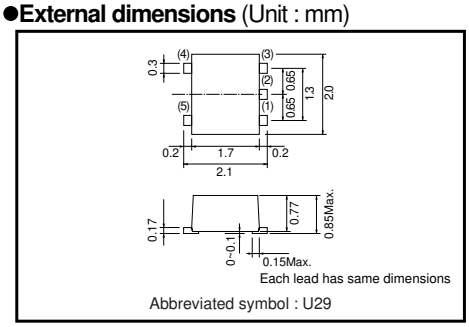
Small switching (–20V, –1.5A)

US5U29

●Features

1) The US5U29 conbines Pch MOSFET with a Schottky barrier diode in a single TSMT5 package.
2) Pch MOSFET have a low on-state resistance with a fast switching.
3) Pch MOSFET is reacted a low voltage drive(2.5V)
4) The Independently connected Schottky barrier diode have a low forward voltate.

●External dimensions (Unit : mm)



Abbreviated symbol : U29

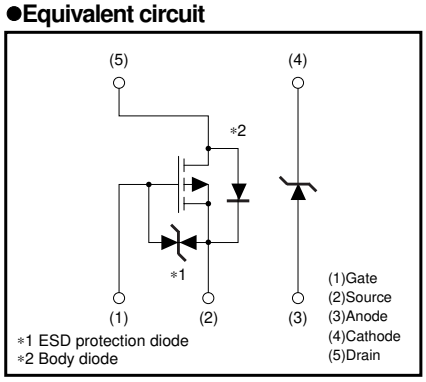
●Applications

Load switch, DC/DC conversion

●Structure

Silicon P-channel MOSFET
Schottky Barrier DIODE

●Equivalent circuit



*1 ESD protection diode
*2 Body diode

●Packaging specifications

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

●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}	±4	A	PW≤10μs DUTY CYCLE≤1%
Source current (Body diode)	Continuous	I_S	−0.4	A	
	Pulsed	I_{SP}	−4	A	PW≤10μs DUTY CYCLE≤1%
Channel temperature		Tch	150	℃	

< 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}	3.0	A 60HZ / 1CYC.
Junction temperature	Tj	150	℃

< MOSFET AND Di >

Total power dissipation	P_D	1.0	W/TOTAL/MOUNTED ON A CERAMIC BOARD
Range of storage temperature	Tstg	−55 to 150	℃

●**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 V_{DD}≒–15V V_{GS}=–4.5V R_L=30Ω R_G=10Ω
Rise time	t_r *	–	8	–	ns	
Turn-off delay time	$t_{d\ (off)}$ *	–	25	–	ns	
Fall time	t_f *	–	10	–	ns	
Total gate charge	Q_g	–	2.1	–	nC	V_{DD}≒–15V V_{GS}=–5V I_D=–1A R_L=15Ω R_G=10Ω
Gate-source charge	Q_{gs}	–	0.5	–	nC	
Gate-drain charge	Q_{gd}	–	0.5	–	nC	

* Pulsed

<MOSFET>

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 leakage	I_R	–	–	200	μA	V_R=20V

●Electrical characteristic curves

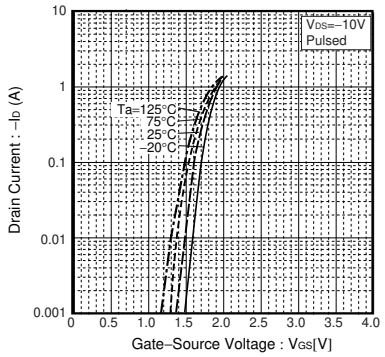


Fig.1 Typical Transfer Characteristics

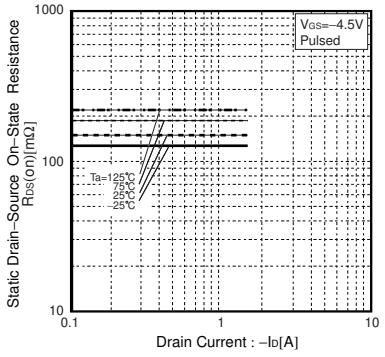


Fig.2 Static Drain−Source On−State Resistance vs.Drain Current

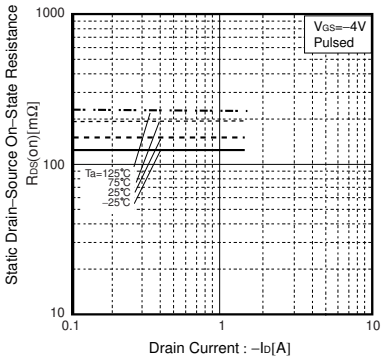


Fig.3 Static Drain−Source On−State Resistance vs.Drain Current

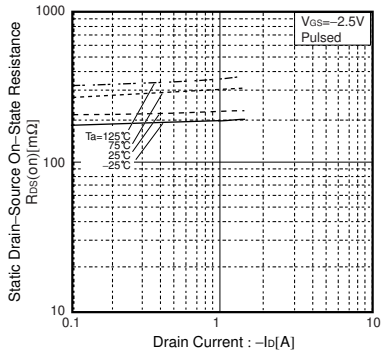


Fig.4 Static Drain−Source On−State Resistance vs.Drain−Current

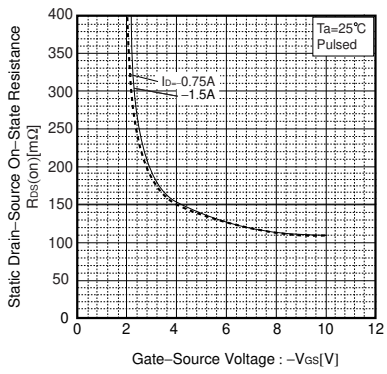


Fig.5 Static Drain−Source On−State Resistance vs.Gate−Source Voltage

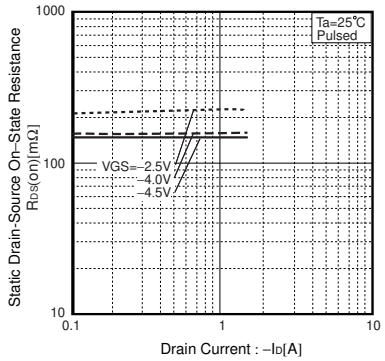


Fig.6 Static Drain−Source On−State Resistance vs.Drain Current

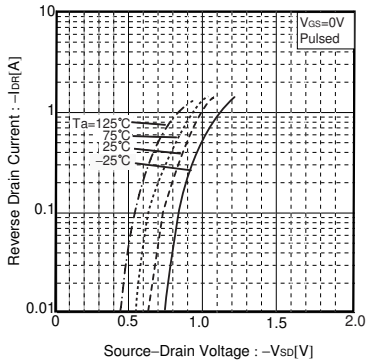


Fig.7 Reverse Drain Current vs. Source-Drain Current

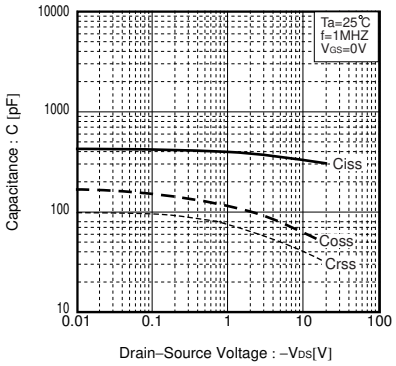


Fig.8 Typical Capactitance vs.Drain−Source Voltage

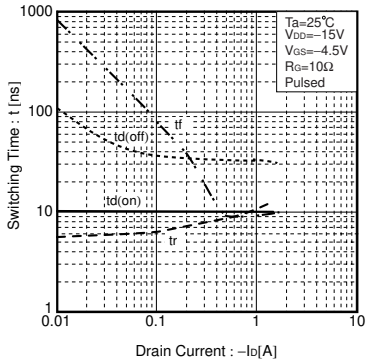


Fig.9 Switching Characteristics

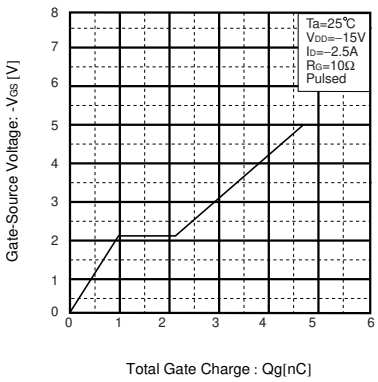


Fig.10 Dynamic Input Characteristics

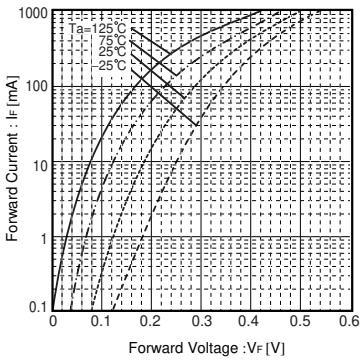


Fig.11 Forward Temperature Characteristics

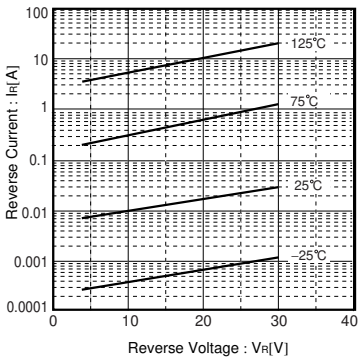


Fig.12 Reverse Temperature Characteristics

●Measurement circuits

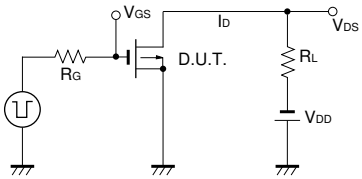


Fig.13 Switching Time Measurement Circuit

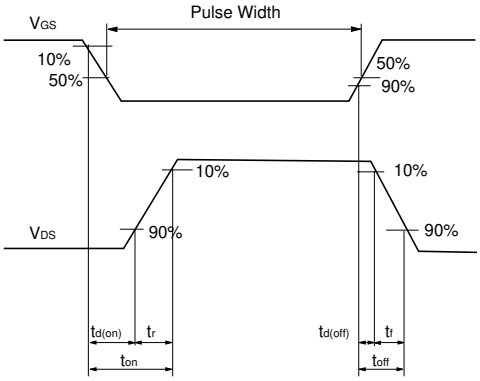


Fig.14 Switching Waveforms

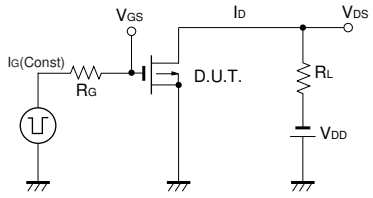


Fig.15 Gate Charge Measurement Circuit

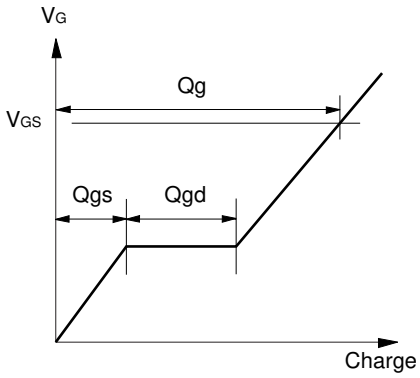


Fig.16 Gate Charge Waveforms

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