2.5V Drive Nch+SBD MOSFET

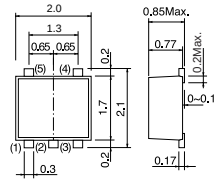
US5U1

●Structure
Silicon N-channel MOSFET /
Schottky barrier diode

●Features
1) Nch MOSFET and schottky barrier diode are put in TUMT5 package.
2) High-speed switching, Low On-resistance.
3) Low voltage drive (2.5V drive).
4) Built-in Low V_F schottky barrier diode.

●Dimensions (Unit : mm)

TUMT5



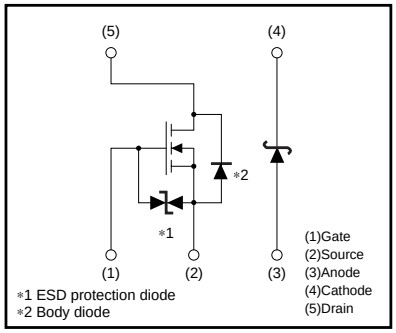
Abbreviated symbol : U01

●Applications
Switching

●Package specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US5U1		○

●Inner circuit



∗1 ESD protection diode
∗2 Body diode

●Absolute maximum ratings (Ta=25°C)

<MOSFET>

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	30	V
Gate-source voltage		V_{GSS}	12	V
Drain current	Continuous	I_D	±1.5	A
	Pulsed	I_{DP} ∗1	±6.0	A
Source current (Body diode)	Continuous	I_S	0.75	A
	Pulsed	I_{SP} ∗1	6.0	A
Power dissipation		P_D ∗2	0.7	W / ELEMENT
Channel temperature		Tch	150	°C

∗1 Pw≤10μs, Duty cycle≤1%
∗2 Mounted on a ceramic board

<Di>

Parameter	Symbol	Limits	Unit
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} ∗1	2.0	A
Power dissipation	P_D ∗2	0.5	W / ELEMENT
Junction temperature	Tj	150	°C

∗1 60Hz・1cycle
∗2 Mounted on ceramic board

<MOSFET and Di>

Parameter	Symbol	Limits	Unit
Total power dissipation	P_D *1	1.0	W / TOTAL
Range of storage temperature	Tstg	−55 to +150	°C

*1 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	$V_{(BR)\ DSS}$	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	$V_{GS\ (th)}$	0.5	–	1.5	V	V_{DS}= 10V, I_D= 1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	–	170	240	mΩ	I_D= 1.5A, V_{GS}= 4.5V
		–	180	250	mΩ	I_D= 1.5A, V_{GS}= 4V
		–	240	340	mΩ	I_D= 1.5A, V_{GS}= 2.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.5	–	–	S	V_{DS}= 10V, I_D= 1.5A
Input capacitance	C_{iss}	–	80	–	pF	V_{DS}= 10V
Output capacitance	C_{oss}	–	14	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	12	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	7	–	ns	V_{DD} ≒ 15V
Rise time	t_r *	–	9	–	ns	I_D= 0.75A
Turn-off delay time	$t_{d\ (off)}$ *	–	15	–	ns	V_{GS}= 4.5V R_L= 20Ω
Fall time	t_f *	–	6	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	1.6	2.2	nC	V_{DD} ≒ 15V, V_{GS}= 4.5V
Gate-source charge	Q_{gs} *	–	0.5	–	nC	I_D= 1.5A
Gate-drain charge	Q_{gd} *	–	0.3	–	nC	R_L= 10Ω, R_G= 10Ω

*Pulsed

<Body diode characteristics (Source-drain)>

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

<Di>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_F	–	–	0.36	V	I_S= 0.1A
		–	–	0.47	V	I_S= 0.5A
Reverse current	I_R	–	–	100	μA	I_S= 20V

●**Electrical characteristics curves**

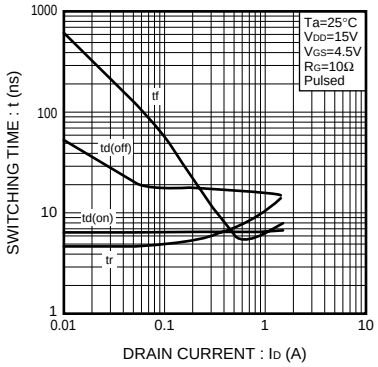


Fig.1 Switching Characteristics

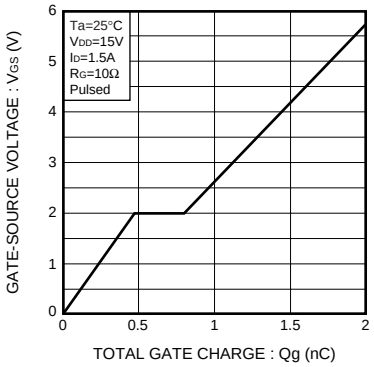


Fig.2 Dynamic Input Characteristics

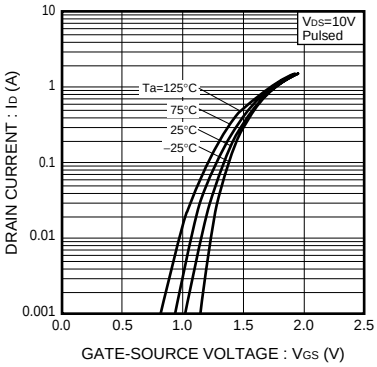


Fig.3 Typical Transfer Characteristics

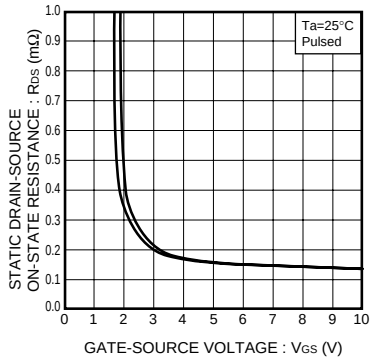


Fig.4 Static Drain-Source On-State Resistance vs. Gate source Voltage

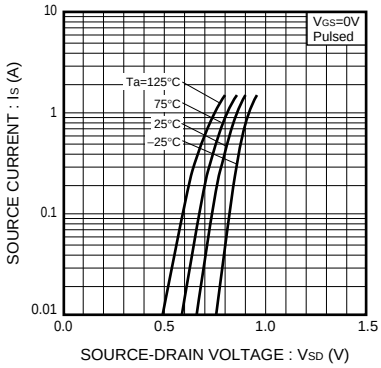


Fig.5 Source Current vs. Source-Drain Voltage

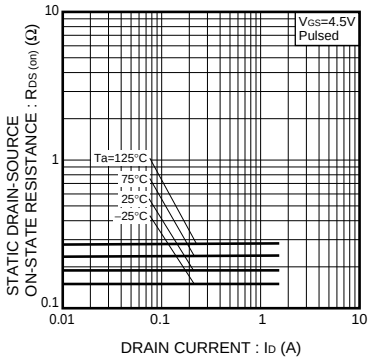


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (I)

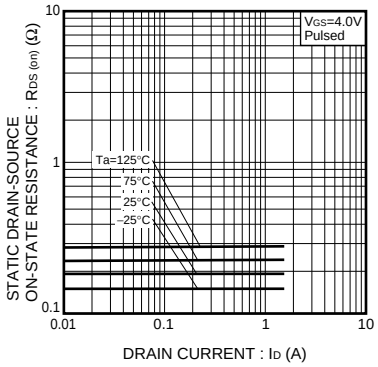


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (II)

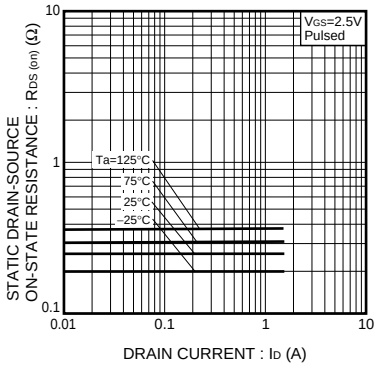


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (III)

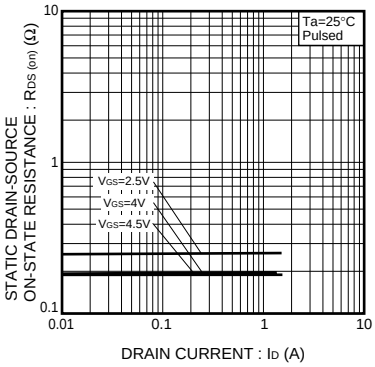


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (IV)

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