

2.5V Drive Nch+SBD MOSFET

US5U1

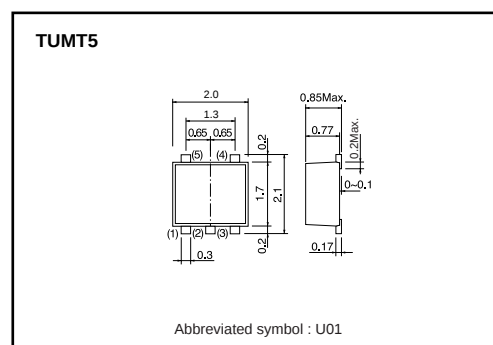
●Structure

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)



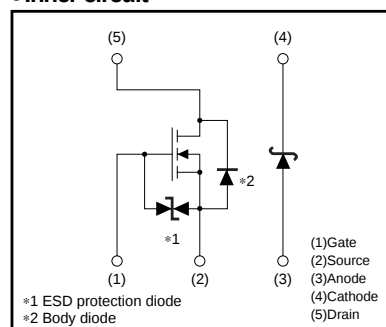
●Applications

Switching

●Package specifications

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

●Inner circuit



●Absolute maximum ratings ($T_a=25^\circ\text{C}$)

<MOSFET>

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	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	T_{ch}	150	$^\circ\text{C}$

*1 $P_{WS} \leq 10\text{mW}$, Duty cycles $\leq 1\%$
*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	T_j	150	$^\circ\text{C}$

*1 60Hz $\cdot$ 1cycle
*2 Mounted on ceramic board

Transistors

<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	$V_{DD}=15V$ $I_D=0.75A$
Rise time	t_r *	—	9	—	ns	$V_{GS}=4.5V$
Turn-off delay time	$t_{d(off)}$ *	—	15	—	ns	$R_L=20\Omega$
Fall time	t_f *	—	6	—	ns	$R_G=10\Omega$
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	$R_L=10\Omega, R_G=10\Omega$

*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	$I_S=20V$

Transistors

●Electrical characteristics curves

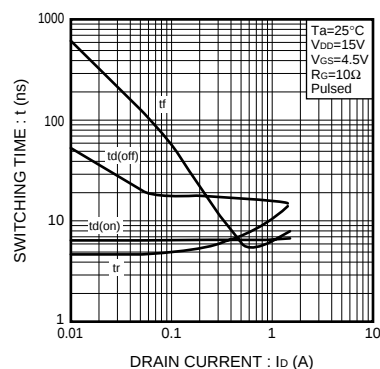


Fig.1 Switching Characteristics

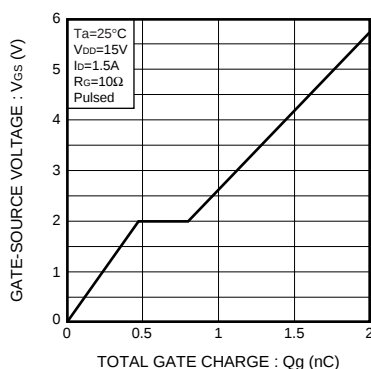


Fig.2 Dynamic Input Characteristics

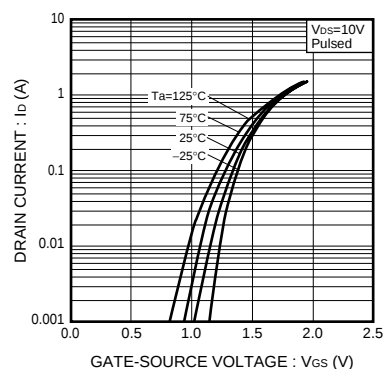


Fig.3 Typical Transfer Characteristics

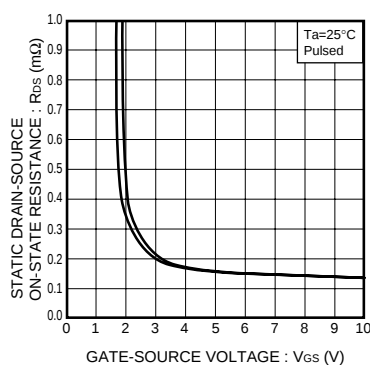


Fig.4 Static Drain-Source On-State Resistance vs. Gate source Voltage

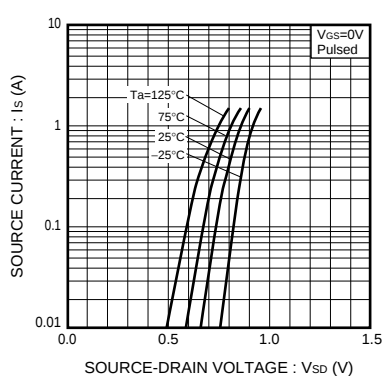


Fig.5 Source Current vs. Source-Drain Voltage

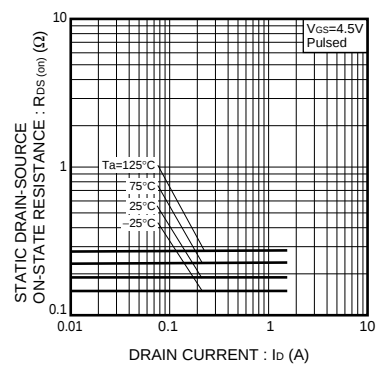


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (I)

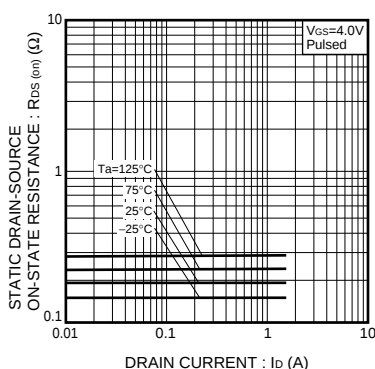


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (II)

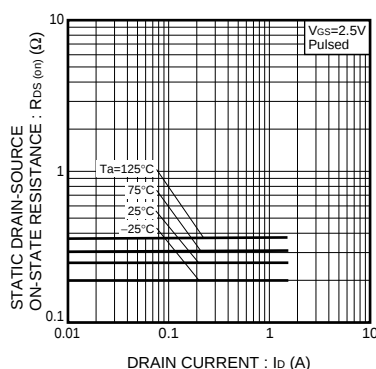


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (III)

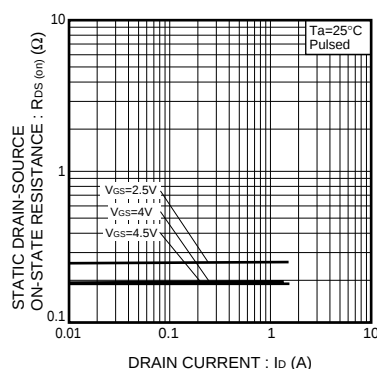


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (IV)

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Промышленная ул, дом № 19, литера Н,
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