

## Transistors

## 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.

## ●Applications

Switching

## ●Package specifications

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

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

<MOSFET>

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	30	V	
Gate-source voltage	$V_{GSS}$	12	V	
Drain current	Continuous	$I_D$	$\pm 1.5$	A
	Pulsed	$I_{DP}$ *1	$\pm 6.0$	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	$^\circ\text{C}$	

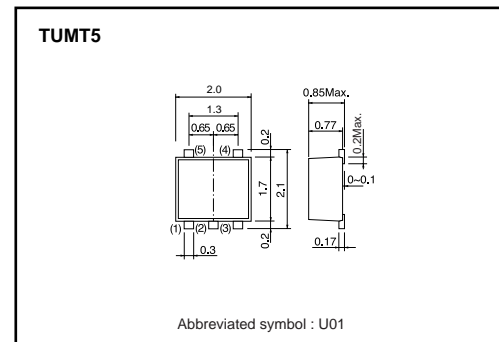
\*1  $P_w \leq 10\mu\text{s}$ , Duty cycle  $\leq 1\%$   
\*2 Mounted on a ceramic board

<Di>

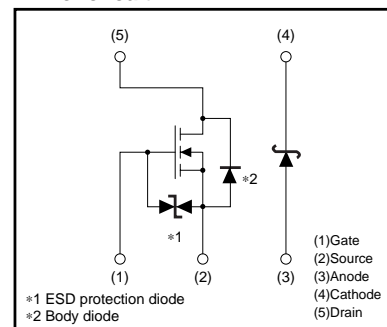
Parameter	Symbol	Limits	Unit
Repetitive peak reverse voltage	$V_{RM}$	30	V
Reverse voltage	$V_R$	20	V
Forward current	$I_F$	0.5	A
Forward current surge peak	$I_{FSM}$ *1	2.0	A
Power dissipation	$P_D$ *2	0.5	W / ELEMENT
Junction temperature	$T_j$	150	$^\circ\text{C}$

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

## ●Dimensions (Unit : mm)



## ●Inner circuit



## Transistors

&lt;MOSFET and Di&gt;

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)

&lt;MOSFET&gt;

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	$V_{GS}=4.5V$ $R_L=20\Omega$
Turn-off delay time	$t_{d(off)}$ *	–	15	–	ns	$R_G=10\Omega$
Fall time	$t_f$ *	–	6	–	ns	
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

&lt;Body diode characteristics (Source-drain)&gt;

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

&lt;Di&gt;

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

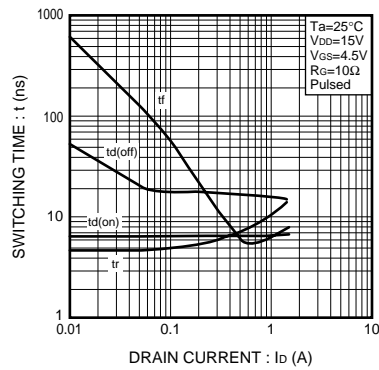


Fig.1 Switching Characteristics

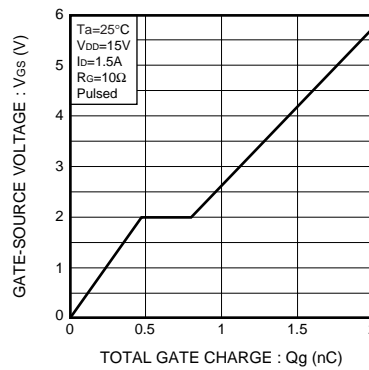


Fig.2 Dynamic Input Characteristics

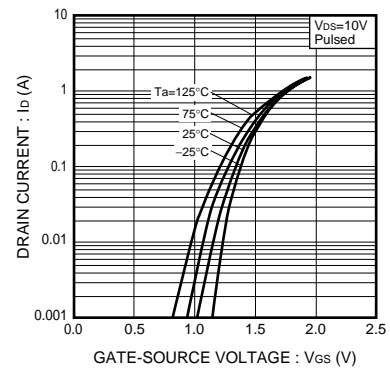


Fig.3 Typical Transfer Characteristics

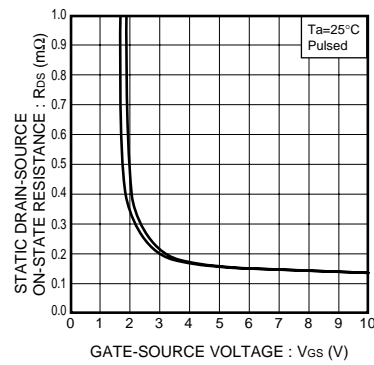


Fig.4 Static Drain-Source On-State Resistance vs. Gate source Voltage

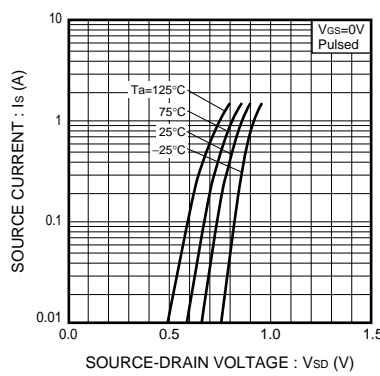


Fig.5 Source Current vs. Source-Drain Voltage

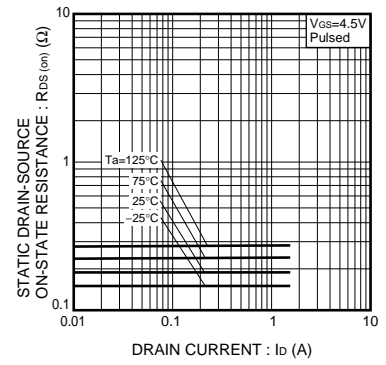


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current ( I )

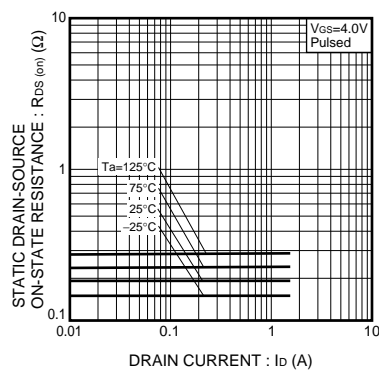


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current ( II )

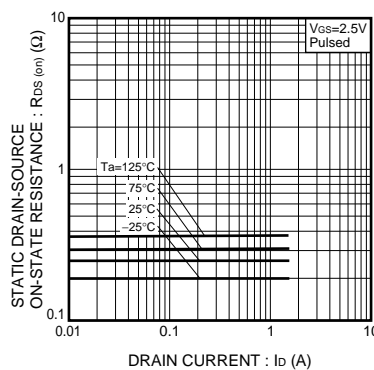


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current ( III )

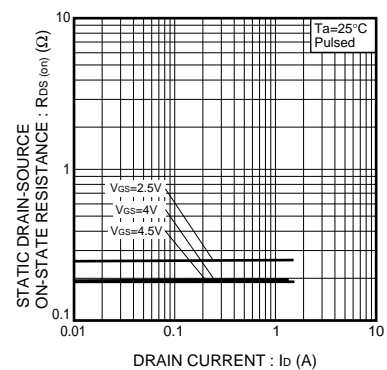


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current ( IV )

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