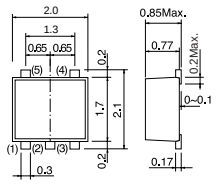
4V Drive Nch+SBD MOSFET

US5U2

●Structure
Silicon N-channel MOSFET /
Schottky barrier diode

●Dimensions (Unit : mm)

TUMT5



Abbreviated symbol : U02

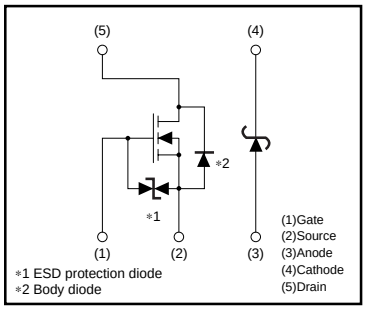
●Features
1) Nch MOSFET and schottky barrier diode are put in TUMT5 package.
2) High-speed switching, Low On-resistance.
3) 4V drive.
4) Built-in Low V_F schottky barrier diode.

●Applications
Switching

●Packaging specifications

Type	Package	Taping
	Code	TR
	Quantity (pcs)	3000
US5U2		○

●Inner circuit



●Absolute maximum ratings (Ta=25°C)
<MOSFET>

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	30	V
Gate-source voltage		V_{GSS}	20	V
Drain current	Continuous	I_D	±1.4	A
	Pulsed	I_{DP} *1	±5.6	A
Source current (Body diode)	Continuous	I_S	0.6	A
	Pulsed	I_{SP} *1	5.6	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}=20V, 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	$V_{GS\ (th)}$	1.0	–	2.5	V	V_{DS}= 10V, I_D= 1mA
Static drain-source on-state resistance	$R_{DS\ (on)}$*	–	170	240	mΩ	I_D= 1.4A, V_{GS}= 10V
		–	250	350	mΩ	I_D= 1.4A, V_{GS}= 4.5V
		–	270	380	mΩ	I_D= 1.4A, V_{GS}= 4V
Forward transfer admittance	$\|Y_{fs}\|$ *	1.0	–	–	S	V_{DS}= 10V, I_D= 1.4A
Input capacitance	C_{iss}	–	70	–	pF	V_{DS}= 10V
Output capacitance	C_{oss}	–	15	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	12	–	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	–	6	–	ns	V_{DD}≒ 15V I_D= 0.7A V_{GS}= 10V R_L= 21Ω R_G=10Ω
Rise time	t_r *	–	6	–	ns	
Turn-off delay time	$t_{d\ (off)}$ *	–	13	–	ns	
Fall time	t_f *	–	8	–	ns	
Total gate charge	Q_g *	–	1.4	2.0	nC	V_{DD}≒15V, V_{GS}= 5V
Gate-source charge	Q_{gs} *	–	0.6	–	nC	I_D= 1.4A
Gate-drain charge	Q_{gd} *	–	0.3	–	nC	R_L= 11Ω, 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= 0.6A, V_{GS}=0V

<Di>

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

●Electrical characteristics curves

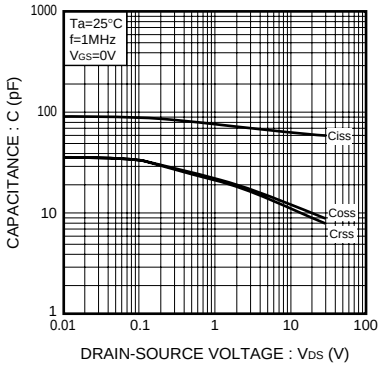


Fig.1 Typical Capacitance vs. Drain-Source Voltage

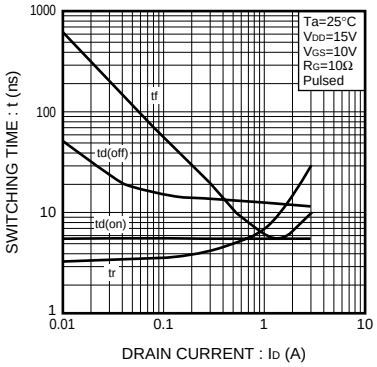


Fig.2 Switching Characteristics

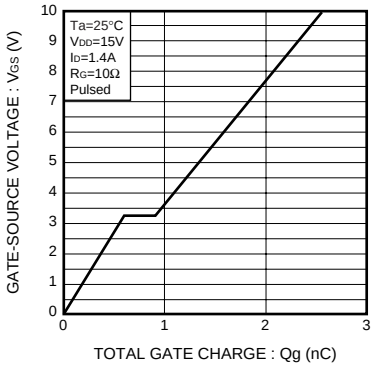


Fig.3 Dynamic Input Characteristics

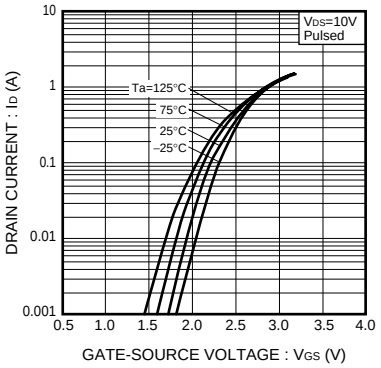


Fig.4 Typical Transfer Characteristics

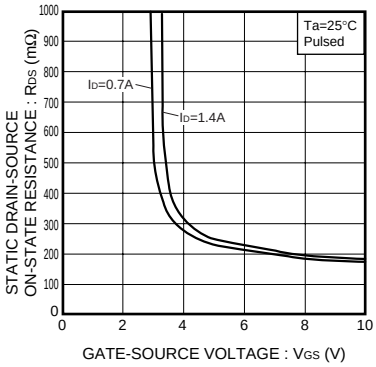


Fig.5 Static Drain-Source On-State Resistance vs. Gate-source Voltage

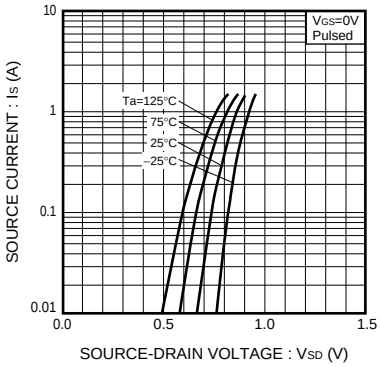


Fig.6 Source Current vs. Source-Drain Voltage

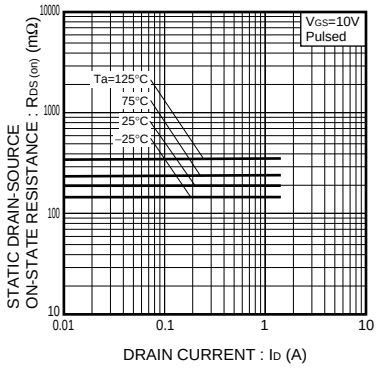


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (I)

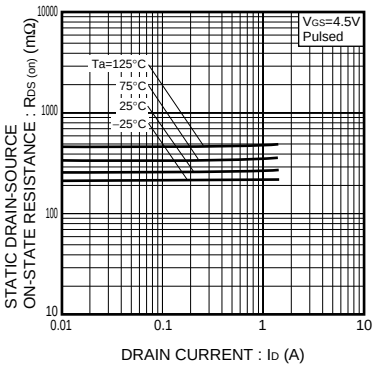


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (II)

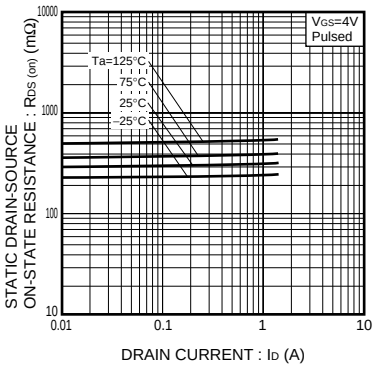


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (III)

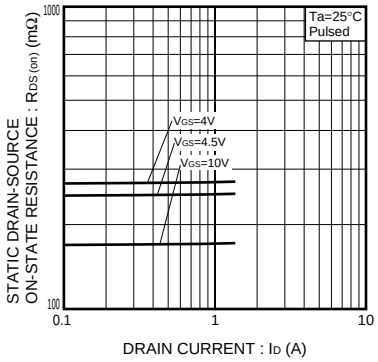


Fig.10 Static Drain-Source On-State Resistance vs. Drain Current (Ⅳ)

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JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

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   [h] Use of the Products in places subject to dew condensation

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7. De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

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2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

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This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

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1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   [a] the Products are exposed to sea winds or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [b] the temperature or humidity exceeds those recommended by ROHM
   [c] the Products are exposed to direct sunshine or condensation
   [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

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