

2.5V Drive Pch+SBD MOSFET

QS5U26

●Structure

Silicon P-channel MOSFET
Schottky Barrier DIODE

●Features

- 1) The QS5U26 combines Pch MOSFET with a Schottky barrier diode in a TSMT5 package.
- 2) Low on-state resistance with fast switching.
- 3) Low voltage drive (2.5V).
- 4) Built-in schottky barrier diode has low forward voltage.

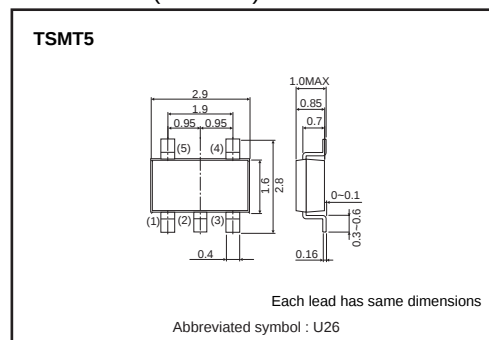
●Applications

Switching

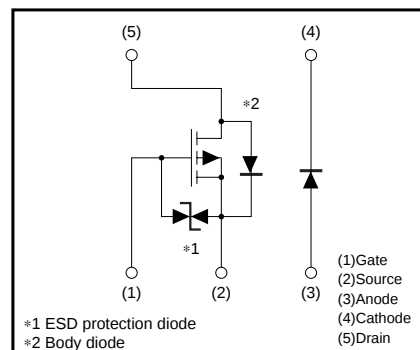
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QS5U26		○

●Dimensions (Unit : mm)



●Equivalent circuit



Transistor

●Absolute maximum ratings (Ta=25°C)

<MOSFET>

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DS}	-20	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}	-3.0 A
Channel temperature	T_{ch}	150	°C
Power Dissipation	P_D^{*3}	0.9	W / ELEMENT

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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}^{*2}	2.0	A
Junction temperature	T_J	150	°C
Power Dissipation	P_D^{*3}	0.7	W / ELEMENT

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Parameter	Symbol	Limits	Unit
Total power dissipation	P_D^{*3}	1.25	W / TOTAL
Range of storage temperature	T_{stg}	-55 to 150	°C

*1 $P_w \leq 10 \mu s$, Duty cycle $\leq 1\%$ *2 60Hz -1cyc. *3 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	$V_{GS} = \pm 12V$, $V_{DS} = 0V$
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-start resistance	$R_{DS(on)}^{*}$	-	160	200	m Ω	$I_D = -1.5A$, $V_{GS} = -4.5V$
		-	180	240	m Ω	$I_D = -1.5A$, $V_{GS} = -4V$
		-	260	340	m Ω	$I_D = -0.75A$, $V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} ^{*}$	1.0	-	-	S	$V_{DS} = -10V$, $I_D = -0.75A$
Input capacitance	C_{iss}	-	325	-	pF	$V_{DS} = -10V$
Output capacitance	C_{oss}	-	60	-	pF	$V_{GS} = 0V$
Reverse transfer capacitance	C_{rss}	-	40	-	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}^{*}$	-	10	-	ns	$I_D = -0.75A$
Rise time	t_r^{*}	-	10	-	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}^{*}$	-	35	-	ns	$V_{GS} = -4.5V$
Fall time	t_f^{*}	-	10	-	ns	$R_L = 20\Omega$
Total gate charge	Q_g	-	4.2	-	nC	$R_G = 10\Omega$
Gate-source charge	Q_{gs}	-	1.0	-	nC	$V_{DD} = -15V$
Gate-drain charge	Q_{gd}	-	1.1	-	nC	$V_{GS} = -4.5V$

* Pulsed

<Body diode (source-drain)>

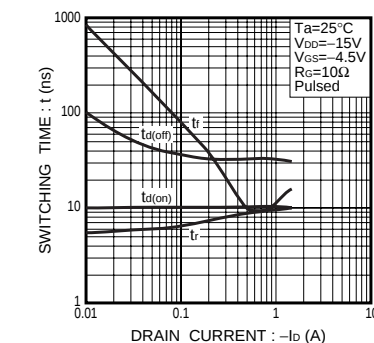
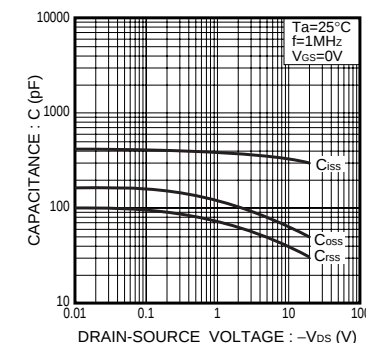
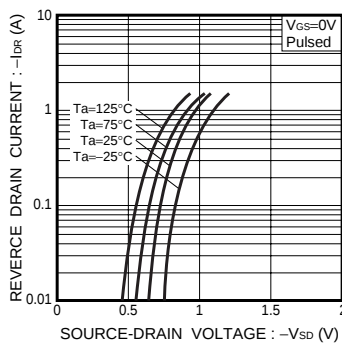
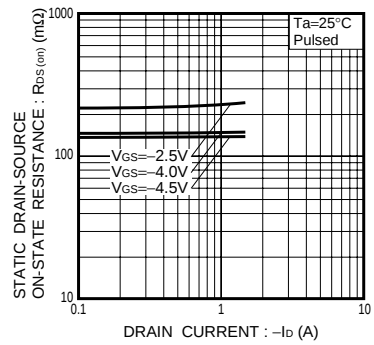
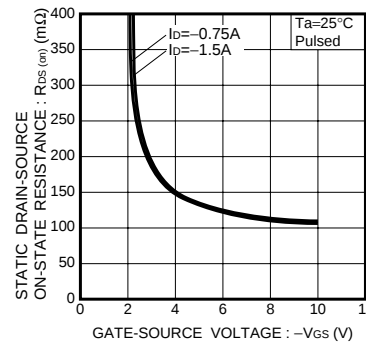
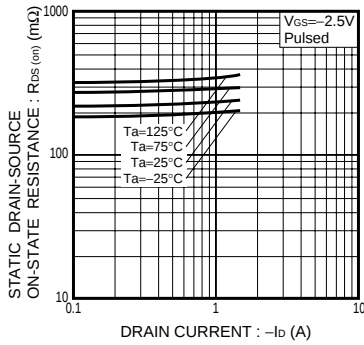
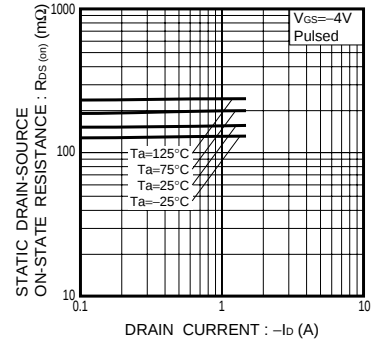
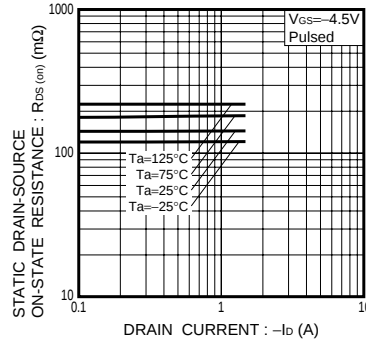
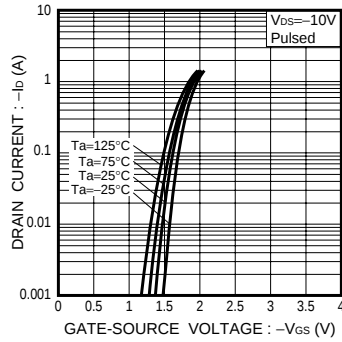
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}	-	-	-1.2	V	$I_S = -0.75A$, $V_{GS} = 0V$

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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	$V_R = 20V$

Transistor

●Electrical characteristic curves



Transistor

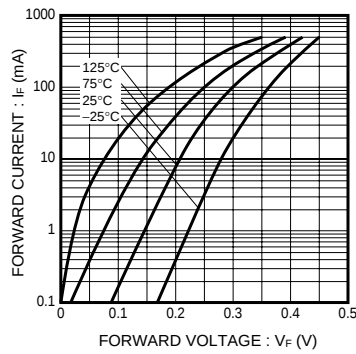


Fig.10 Forward Current
vs. Forward Voltage

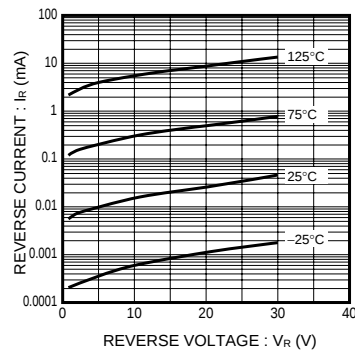


Fig.11 Reverse Current
vs. Reverse Voltage

●Notice

SBD has a large reverse leak current compared to other type of diode. Therefore; it would raise a junction temperature, and increase a reverse power loss. Further rise of inside temperature would cause a thermal runaway.

This built-in SBD has low V_F characteristics and therefore, higher leak current. Please consider enough the surrounding temperature, generating heat of MOSFET and the reverse current.

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