

# 2.5V Drive Pch+SBD MOSFET

## QS5U26

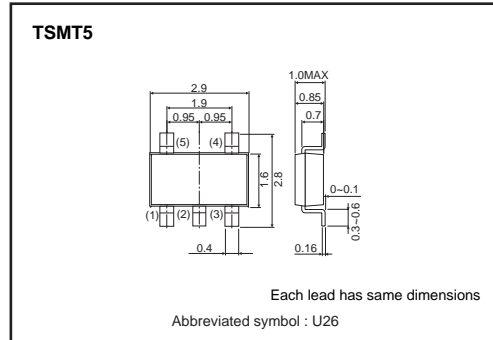
●Structure

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.

●Dimensions (Unit : mm)



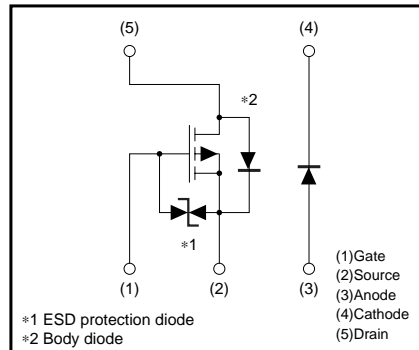
●Applications

Switching

●Packaging specifications

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

●Equivalent circuit



Transistor

●Absolute maximum ratings (Ta=25°C)

<MOSFET>

| Parameter                      | Symbol            | Limits             | Unit        |
|--------------------------------|-------------------|--------------------|-------------|
| Drain-source voltage           | V <sub>DSS</sub>  | -20                | V           |
| Gate-source voltage            | V <sub>GSS</sub>  | ±12                | V           |
| Drain current                  | Continuous        | I <sub>D</sub>     | ±1.5        |
|                                | Pulsed            | I <sub>DP</sub> *1 | ±6.0        |
| Source current<br>(Body diode) | Continuous        | I <sub>S</sub>     | -0.75       |
|                                | Pulsed            | I <sub>SP</sub> *1 | -3.0        |
| Channel temperature            | T <sub>ch</sub>   | 150                | °C          |
| Power Dissipation              | P <sub>D</sub> *3 | 0.9                | W / ELEMENT |

<Di>

| Parameter                       | Symbol              | Limits | Unit        |
|---------------------------------|---------------------|--------|-------------|
| Repetitive peak reverse voltage | V <sub>RM</sub>     | 30     | V           |
| Reverse voltage                 | V <sub>R</sub>      | 20     | V           |
| Forward current                 | I <sub>F</sub>      | 0.5    | A           |
| Forward current surge peak      | I <sub>FSM</sub> *2 | 2.0    | A           |
| Junction temperature            | T <sub>j</sub>      | 150    | °C          |
| Power Dissipation               | P <sub>D</sub> *3   | 0.7    | W / ELEMENT |

<MOSFET AND Di>

| Parameter                    | Symbol            | Limits     | Unit      |
|------------------------------|-------------------|------------|-----------|
| Total power dissipation      | P <sub>D</sub> *3 | 1.25       | W / TOTAL |
| Range of storage temperature | T <sub>stg</sub>  | -55 to 150 | °C        |

\*1 Pw≤10μs, Duty cycle≤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 <sub>GSS</sub>      | -    | -    | ±10  | μA   | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V      |
| Drain-source breakdown voltage           | V <sub>(BR)DSS</sub>  | -20  | -    | -    | V    | I <sub>D</sub> =-1mA, V <sub>GS</sub> =0V       |
| Zero gate voltage drain current          | I <sub>DSS</sub>      | -    | -    | -1   | μA   | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V      |
| Gate threshold voltage                   | V <sub>GS(th)</sub>   | -0.7 | -    | -2.0 | V    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA     |
| Static drain-source on-starte resistance | R <sub>Ds(on)</sub> * | -    | 160  | 200  | mΩ   | I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-4.5V   |
|  |                       | -    | 180  | 240  | mΩ   | I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-4V     |
|  |                       | -    | 260  | 340  | mΩ   | I <sub>D</sub> =-0.75A, V <sub>GS</sub> =-2.5V  |
| Forward transfer admittance              | Y <sub>fs</sub>  *    | 1.0  | -    | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.75A   |
| Input capacitance                        | C <sub>iss</sub>      | -    | 325  | -    | pF   | V <sub>DS</sub> =-10V                           |
| Output capacitance                       | C <sub>oss</sub>      | -    | 60   | -    | pF   | V <sub>GS</sub> =0V                             |
| Reverse transfer capacitance             | C <sub>rss</sub>      | -    | 40   | -    | pF   | f=1MHz  |
| Turn-on delay time                       | t <sub>d(on)</sub> *  | -    | 10   | -    | ns   | I <sub>D</sub> =-0.75A                          |
| Rise time                                | t <sub>r</sub> *      | -    | 10   | -    | ns   | V <sub>DD</sub> =-15V<br>V <sub>GS</sub> =-4.5V |
| Turn-off delay time                      | t <sub>d(off)</sub> * | -    | 35   | -    | ns   | R <sub>L</sub> =20Ω                             |
| Fall time                                | t <sub>f</sub> *      | -    | 10   | -    | ns   | R <sub>G</sub> =10Ω                             |
| Total gate charge                        | Q <sub>g</sub>        | -    | 4.2  | -    | nC   | V <sub>DD</sub> =-15V                           |
| Gate-source charge                       | Q <sub>gs</sub>       | -    | 1.0  | -    | nC   | V <sub>GS</sub> =-4.5V                          |
| Gate-drain charge                        | Q <sub>gd</sub>       | -    | 1.1  | -    | nC   | I <sub>D</sub> =-1.5A                           |

\* Pulsed

<Body diode (source-drain)>

| Parameter       | Symbol          | Min. | Typ. | Max. | Unit | Conditions                                  |
|-----------------|-----------------|------|------|------|------|---|
| Forward voltage | V <sub>SD</sub> | -    | -    | -1.2 | V    | I <sub>S</sub> =-0.75A, V <sub>GS</sub> =0V |

<Di>

| Parameter       | Symbol         | Min. | Typ. | Max. | Unit | Conditions           |
|-----------------|----------------|------|------|------|------|----------------------|
| Forward voltage | V <sub>F</sub> | -    | -    | 0.36 | V    | I <sub>F</sub> =0.1A |
|                 |                | -    | -    | 0.47 | V    | I <sub>F</sub> =0.5A |
| Reverse current | I <sub>R</sub> | -    | -    | 100  | μA   | V <sub>R</sub> =20V  |

Transistor

●Electrical characteristic curves

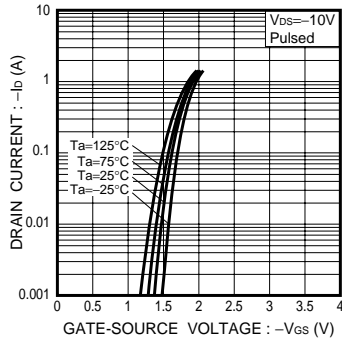


Fig.1 Typical Transfer Characteristics

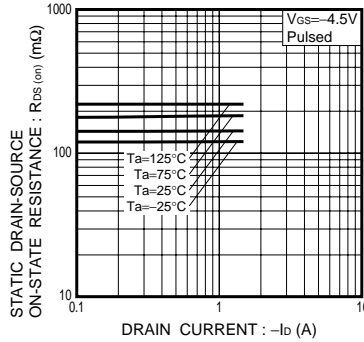


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current (I)

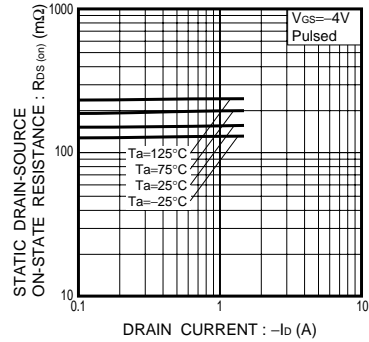


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current (II)

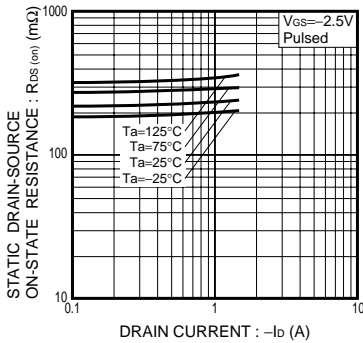


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (III)

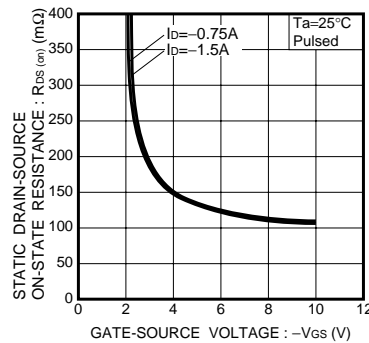


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

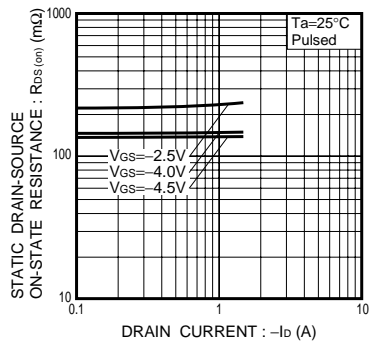


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current (IV)

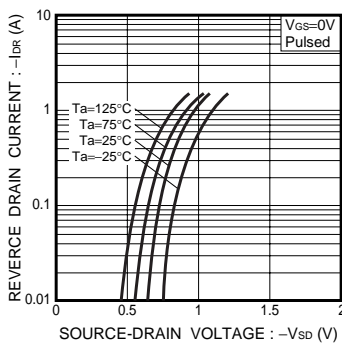


Fig.7 Reverse Drain Current vs. Source-Drain Current

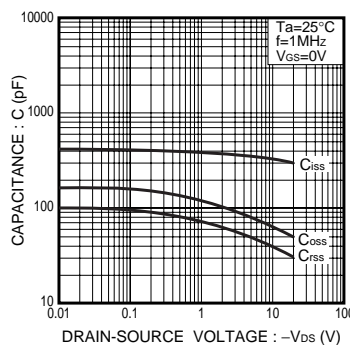


Fig.8 Typical Capacitance vs. Drain-Source Voltage

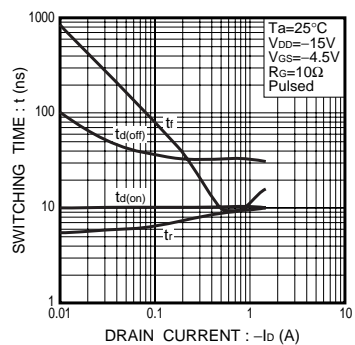


Fig.9 Switching Characteristics

Transistor

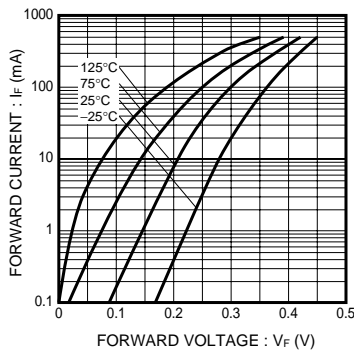


Fig.10 Forward Current vs. Forward Voltage

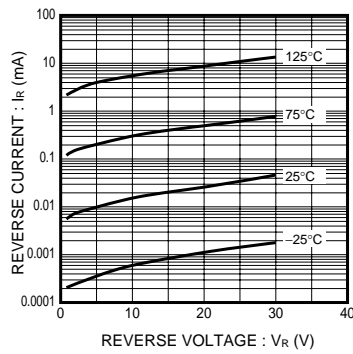


Fig.11 Reverse Current vs. Reverse Voltage

●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<sub>F</sub> characteristics and therefore, higher leak current. Please consider enough the surrounding temperature, generating heat of MOSFET and the reverse current.

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