

2.5V Drive Nch+SBD MOS FET

QS5U17

●Structure

Silicon N-channel MOSFET
Schottky Barrier DIODE

●Features

- 1) The QS5U17 combines Nch MOSFET with a Schottky barrier diode in a single TSMT5 package.
- 2) Low on-state resistance with fast switching.
- 3) Low voltage drive (2.5V).
- 4) The Independently connected Schottky barrier diode has low forward voltage.

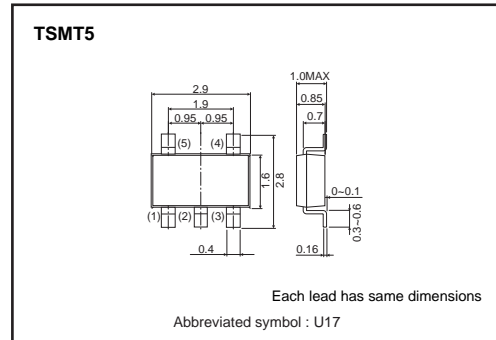
●Applications

Load switch, DC / DC conversion

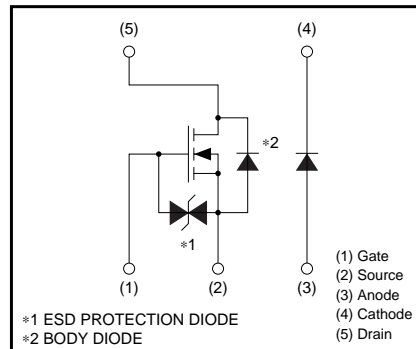
●Packaging specifications

| Type | Package | Taping |
|--------|------------------------------|--------|
| | Code | TR |
| | Basic ordering unit (pieces) | 3000 |
| QS5U17 | | ○ |

●External dimensions (Unit : mm)



●Equivalent circuit



Transistors

●Absolute maximum ratings (Ta=25°C)

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| Parameter | Symbol | Limits | Unit | |
|--------------------------------|-------------------|--------------------|-----------|---|
| Drain-source voltage | V _{DSS} | 30 | V | |
| Gate-source voltage | V _{GSS} | 12 | V | |
| Drain current | Continuous | I _D | ±2.0 | A |
| | Pulsed | I _{DP} *1 | ±8.0 | A |
| Source current (Body diode) | Continuous | I _S | 0.8 | A |
| | Pulsed | I _{SP} *1 | 3.2 | A |
| Channel temperature | T _{ch} | 150 | °C | |
| Power dissipation | P _D *3 | 0.9 | W/ELEMENT | |

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| | | | |
|---------------------------------|---------------------|-----|-----------|
| Repetitive peak reverse voltage | V _{RM} | 25 | V |
| Reverse voltage | V _R | 20 | V |
| Forward current | I _F | 1.0 | A |
| Forward current surge peak | I _{FSM} *2 | 3.0 | A |
| Junction temperature | T _j | 150 | °C |
| Power dissipation | P _D *3 | 0.7 | W/ELEMENT |

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| | | | |
|------------------------------|-------------------|-------------|-----------|
| Total power dissipation | P _D *3 | 1.25 | W / TOTAL |
| Range of Storage temperature | T _{stg} | -55 to +150 | °C |

*1 Pw≤10μs, Duty cycle≤1% *2 60Hz·1cyc. *3 Mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

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| 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)} * | - | 71 | 100 | mΩ | I _D =2.0A, V _{GS} =4.5V |
| | | - | 76 | 107 | mΩ | I _D =2.0A, V _{GS} =4V |
| | | - | 110 | 154 | mΩ | I _D =2.0A, V _{GS} =2.5V |
| Forward transfer admittance | Y _{fs} * | 1.5 | - | - | S | V _{DS} =10V, I _D =2.0A |
| Input capacitance | C _{iss} | - | 175 | - | pF | V _{DS} =10V |
| Output capacitance | C _{oss} | - | 50 | - | pF | V _{GS} =0V |
| Reverse transfer capacitance | C _{rss} | - | 25 | - | pF | f=1MHz |
| Turn-on delay time | t _{d(on)} * | - | 8 | - | ns | I _D =1.0A |
| Rise time | t _r * | - | 10 | - | ns | V _{DD} ≐15V |
| Turn-off delay time | t _{d(off)} * | - | 21 | - | ns | V _{GS} =4.5V |
| Fall time | t _f * | - | 8 | - | ns | R _L =15Ω |
| Total gate charge | Q _g * | - | 2.8 | 3.9 | nC | V _{DD} ≐15V |
| Gate-source charge | Q _{gs} * | - | 0.6 | - | nC | V _{GS} =4.5V |
| Gate-drain charge | Q _{gd} * | - | 0.8 | - | nC | I _D =2.0A |

*Pulsed

<Body diode (source-drain)>

| | | | | | | |
|-----------------|-------------------|---|---|-----|---|--|
| Forward voltage | V _{SD} * | - | - | 1.2 | V | I _S =3.2A / V _{GS} =0V |
|-----------------|-------------------|---|---|-----|---|--|

* Pulsed

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| | | | | | | |
|-----------------|----------------|---|---|------|----|----------------------|
| Forward voltage | V _F | - | - | 0.45 | V | I _F =1.0A |
| Reverse current | I _R | - | - | 200 | μA | V _R =20V |

Transistors

●Electrical characteristic curves

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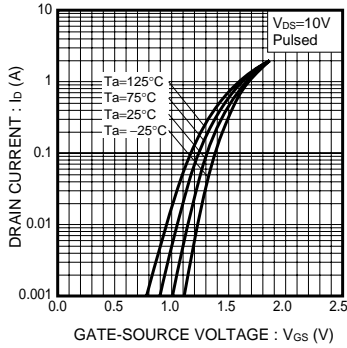


Fig.1 Typical Transfer Characteristics

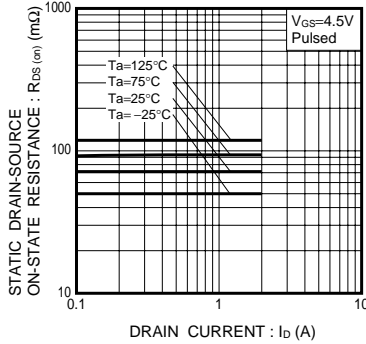


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

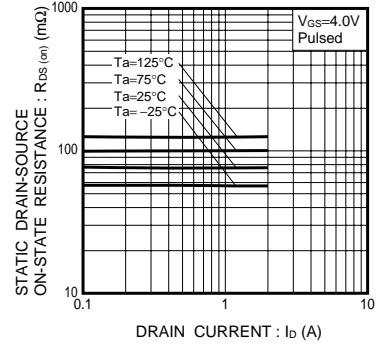


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

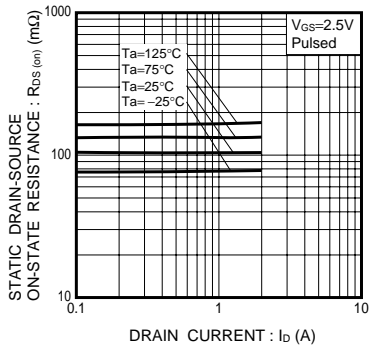


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

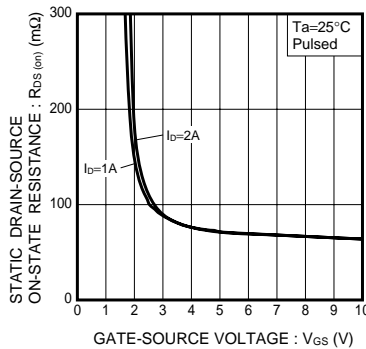


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

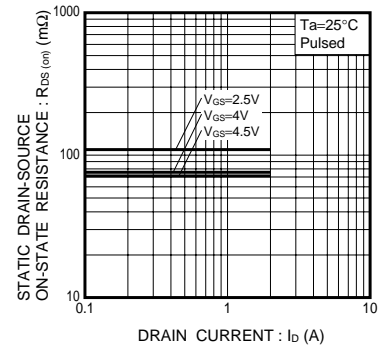


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

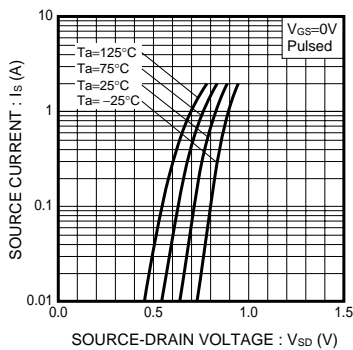


Fig.7 Reverse Drain Current vs. Source-Drain Current

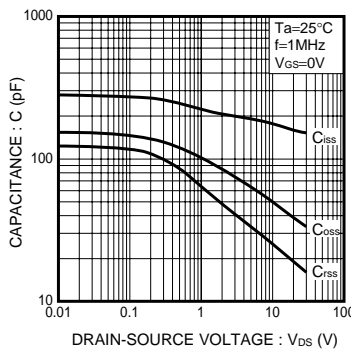


Fig.8 Typical Capacitance vs. Drain-Source Voltage

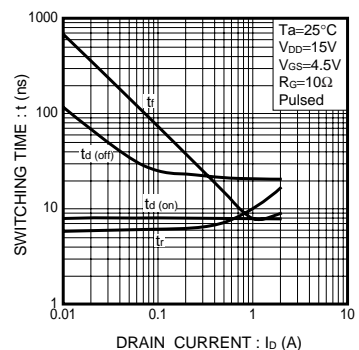


Fig.9 Switching Characteristics

Transistors

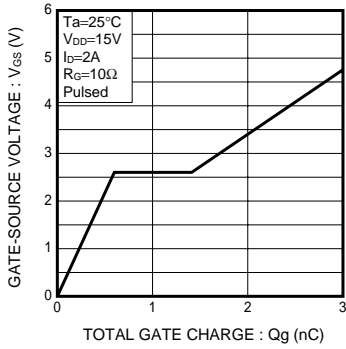


Fig.10 Dynamic Input Characteristics

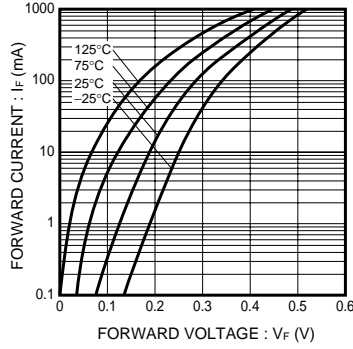


Fig.11 Forward Current vs. Forward Voltage

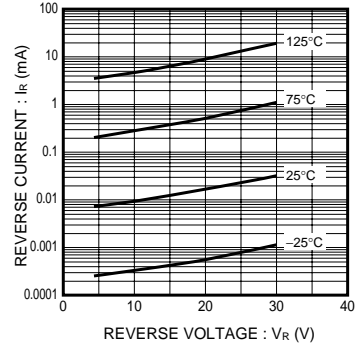


Fig.12 Reverse Current vs. Reverse Voltage

●Measurement circuits

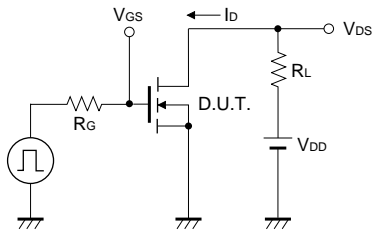


Fig.13 Switching Time Measurement Circuit

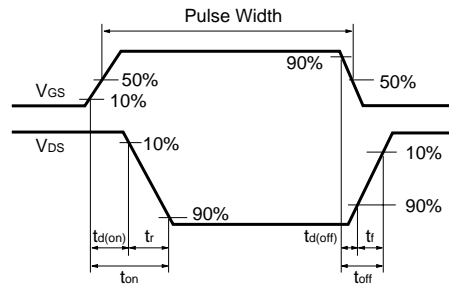


Fig.14 Switching Waveforms

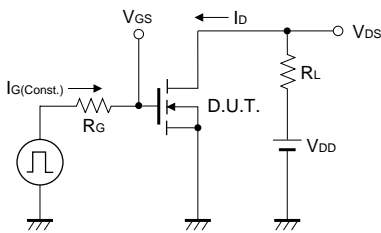


Fig.15 Gate Charge Measurement Circuit

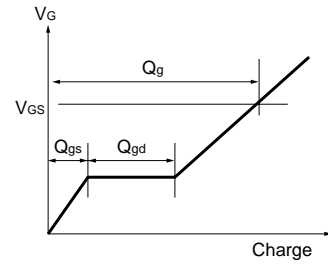


Fig.16 Gate Charge Waveform

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