

DC-DC Converter (-20V, -2.0A)

RTL020P02

●Features

- 1) Low on-resistance. (80mΩ at 2.5V)
- 2) High power package.
- 3) High speed switching.
- 4) Low voltage drive. (2.5V)

●Applications

DC-DC converter

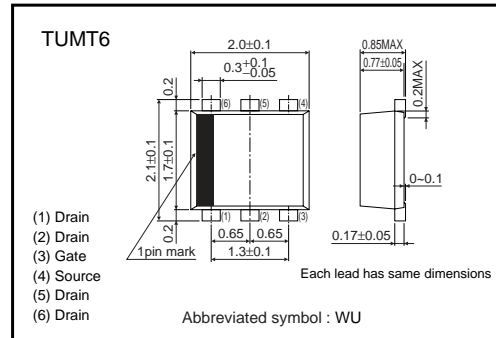
●Structure

Silicon P-channel
MOS FET

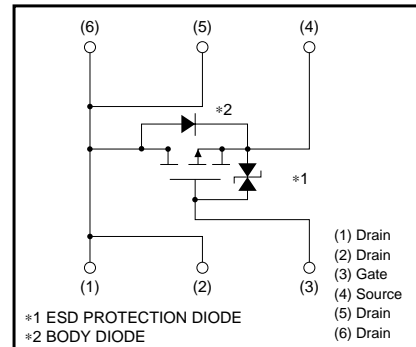
●Packaging specifications

| Type | Package | Taping |
|-----------|------------------------------|--------|
| | Code | TR |
| | Basic ordering unit (pieces) | 3000 |
| RTL020P02 | | ○ |

●External dimensions (Unit : mm)



●Equivalent circuit



Transistors

●Absolute maximum ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|--------------------------------|------------------|-----------------|--------------|
| Drain-source voltage | V _{DSS} | -20 | V |
| Gate-source voltage | V _{GSS} | ±12 | V |
| Drain current | Continuous | I _D | ±2 A |
| | Pulsed | I _{DP} | ±8 A *1 |
| Source current (Body diode) | Continuous | I _S | -0.8 A *1 |
| | Pulsed | I _{SP} | -3.2 A |
| Total power dissipation | P _D | 1 | W *2 |
| Channel temperature | T _{ch} | 150 | °C |
| Range of Storage temperature | T _{stg} | -55 to +150 | °C |

*1 P_W≤10ms, Duty cycle≤1%

*2 Mounted on a ceramic board

●Electrical characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|-----------------------|------|------|------|------|---|
| Gate-source leakage | I _{GSS} | - | - | ±10 | ∞A | V _{GS} =±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 | ∞A | 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-state resistance | R _{DS(on)} * | - | 100 | 135 | mΩ | I _D =-2A, V _{GS} =-4.5V |
| | | - | 110 | 150 | mΩ | I _D =-2A, V _{GS} =-4V |
| | | - | 180 | 250 | mΩ | I _D =-1A, V _{GS} =-2.5V |
| Forward transfer admittance | Y _{fs} * | 1.2 | - | - | S | V _{DS} =-10V, I _D =-1A |
| Input capacitance | C _{iss} | - | 430 | - | pF | V _{DS} =-10V |
| Output capacitance | C _{oss} | - | 80 | - | pF | V _{GS} =0V |
| Reverse transfer capacitance | C _{rss} | - | 55 | - | pF | f=1MHz |
| Turn-on delay time | t _{d(on)} * | - | 11 | - | ns | I _D =-1A |
| Rise time | t _r * | - | 13 | - | ns | V _{DD} ≐-15V V _{GS} =-4.5V |
| Turn-off delay time | t _{d(off)} * | - | 38 | - | ns | R _L =15Ω |
| Fall time | t _f * | - | 12 | - | ns | R _{GS} =10Ω |
| Total gate charge | Q _g | - | 4.9 | - | nC | V _{DD} ≐-15V R _L ≐7.5Ω |
| Gate-source charge | Q _{gs} | - | 1.2 | - | nC | V _{GS} =-4.5V R _{GS} =10Ω |
| Gate-drain charge | Q _{gd} | - | 1.3 | - | nC | I _D =-2A |

*Pulsed

Body diode characteristics (source-drain characteristics)

| | | | | | | |
|-----------------|-----------------|---|---|------|---|--|
| Forward voltage | V _{SD} | - | - | -1.2 | V | I _S =-0.8A, V _{GS} =0V |
|-----------------|-----------------|---|---|------|---|--|

Transistors

●Electrical characteristic curves

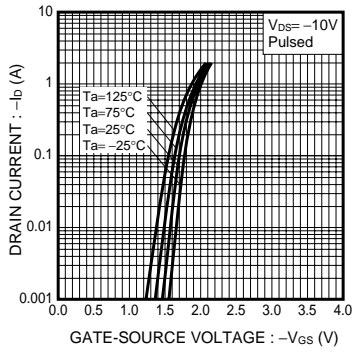


Fig.1 Typical Transfer Characteristics

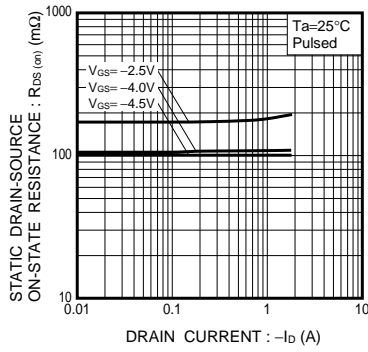


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

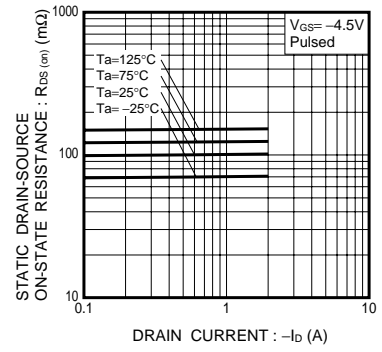


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

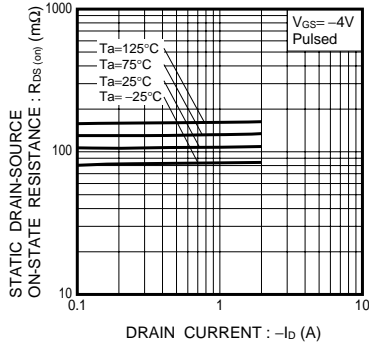


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

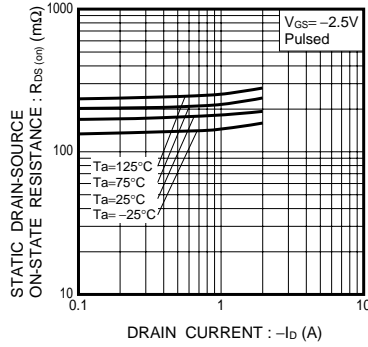


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

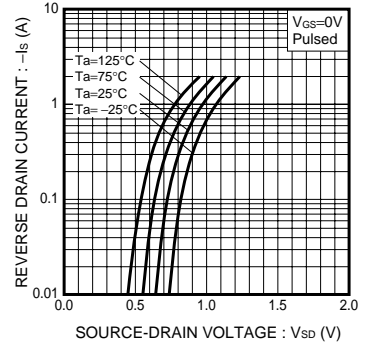


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

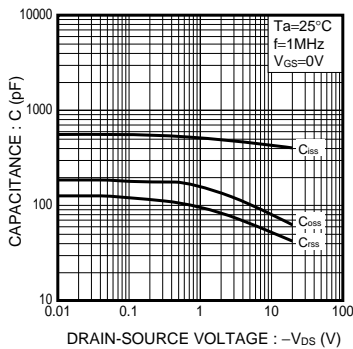


Fig.7 Typical Capacitance vs. Drain-Source Voltage

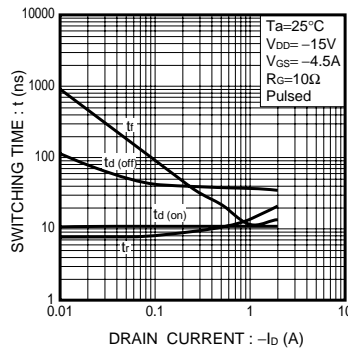


Fig.8 Switching Characteristics

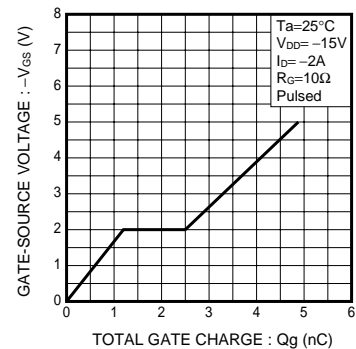


Fig.9 Dynamic Input Characteristics

Transistors

● Measurement circuits

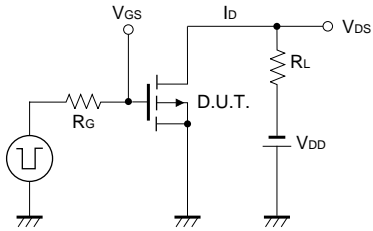


Fig.10 Switching Time Measurement Circuit

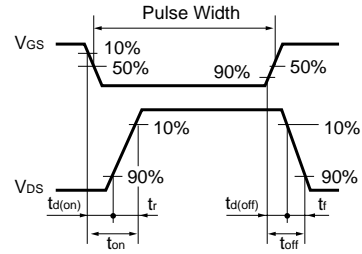


Fig.11 Switching Waveforms

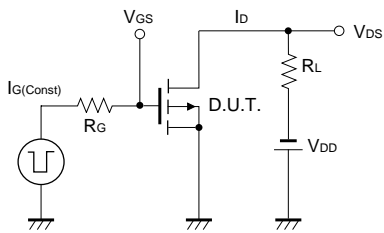


Fig.12 Gate Charge Measurement Circuit

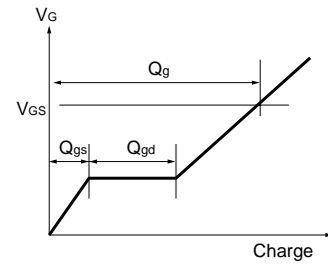


Fig.13 Gate Charge Waveforms

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