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Switching (−30V, −5.0A)

RSS050P03

●Features

- 1) Low On-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small and Surface Mount Package (SOP8).

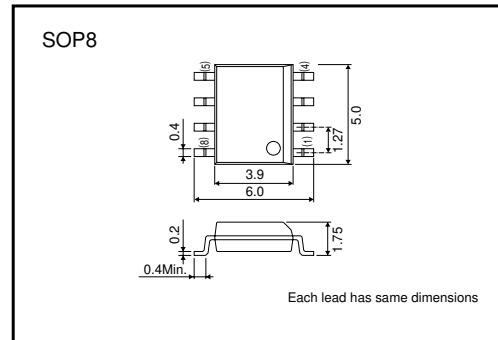
●Application

Power switching, DC / DC converter.

●Structure

Silicon P-channel
MOS FET

●External dimensions (Unit : mm)



●Packaging specifications

| Type | Package | Taping |
|-----------|------------------------------|--------|
| | Code | TB |
| | Basic ordering unit (pieces) | 2500 |
| RSS050P03 | | ○ |

●Absolute maximum ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|------------------------------|------------|-------------|----------|
| Drain-source voltage | V_{DSS} | −30 | V |
| Gate-source voltage | V_{GSS} | ±20 | V |
| Drain current | Continuous | I_D | ±5.0 A |
| | Pulsed | I_{DP} | ±20 A *1 |
| Source current (Body diode) | Continuous | I_S | −1.6 A |
| | Pulsed | I_{SP} | −20 A *1 |
| Total power dissipation | P_D | 2.0 | W *2 |
| Channel temperature | T_{ch} | 150 | °C |
| Range of Storage temperature | T_{stg} | −55 to +150 | °C |

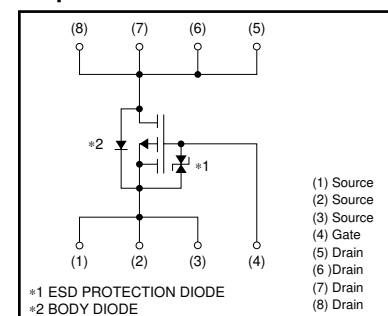
*1 $P_W \leq 10 \mu s$, Duty cycle $\leq 1\%$
*2 Mounted on a ceramic board

●Thermal resistance (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|--------------------|----------------|--------|----------|
| Channel to ambient | $R_{th}(ch-a)$ | 62.5 | °C / W * |

* Mounted on a ceramic board.

●Equivalent circuit



Transistors

●Electrical characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|----------------|------|------|----------|-----------|-----------------------------|
| Gate-source leakage | I_{GSS} | – | – | ± 10 | μA | $V_{GS}=\pm 20V, V_{DS}=0V$ |
| 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 | $R_{DS(on)}$ * | – | 30 | 42 | $m\Omega$ | $I_D=-5.0A, V_{GS}=-10V$ |
| | | – | 47 | 65 | $m\Omega$ | $I_D=-2.5A, V_{GS}=-4.5V$ |
| | | – | 55 | 77 | $m\Omega$ | $I_D=-2.5A, V_{GS}=-4.0V$ |
| Forward transfer admittance | $ Y_{fs} $ * | 5.0 | – | – | S | $V_{DS}=-10V, I_D=-2.5A$ |
| Input capacitance | C_{iss} | – | 1200 | – | pF | $V_{DS}=-10V$ |
| Output capacitance | C_{oss} | – | 250 | – | pF | $V_{GS}=0V$ |
| Reverse transfer capacitance | C_{rss} | – | 180 | – | pF | $f=1MHz$ |
| Turn-on delay time | $t_{d(on)}$ * | – | 12 | – | ns | $I_D=-2.5A$ |
| Rise time | t_r * | – | 25 | – | ns | $V_{DD}=-15V$ |
| Turn-off delay time | $t_{d(off)}$ * | – | 70 | – | ns | $V_{GS}=-10V$ |
| Fall time | t_f * | – | 35 | – | ns | $R_L=6\Omega$ |
| Total gate charge | Q_g | – | 13 | – | nC | $V_{DD}=-15V$ |
| Gate-source charge | Q_{gs} | – | 2.8 | – | nC | $V_{GS}=-5V$ |
| Gate-drain charge | Q_{gd} | – | 5.0 | – | nC | $I_D=-5.0A$ |

*Pulsed

Body diode characteristics (source-drain characteristics)

| | | | | | | |
|-----------------|----------|---|---|------|---|------------------------|
| Forward voltage | V_{SD} | – | – | –1.2 | V | $I_S=-1.6A, V_{GS}=0V$ |
|-----------------|----------|---|---|------|---|------------------------|

Transistors

●Electrical characteristic curves

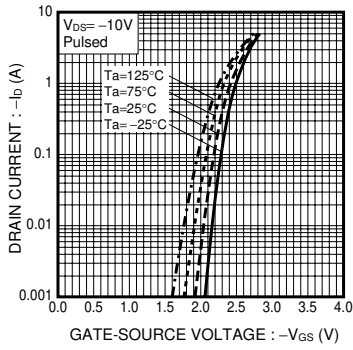


Fig.1 Typical Transfer Characteristics

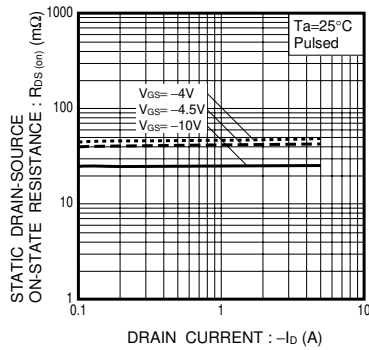


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

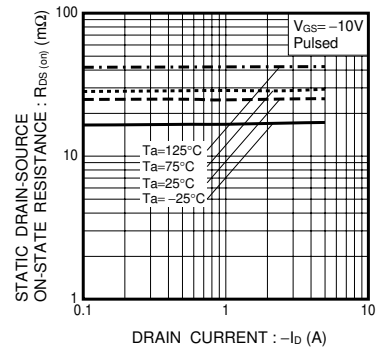


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

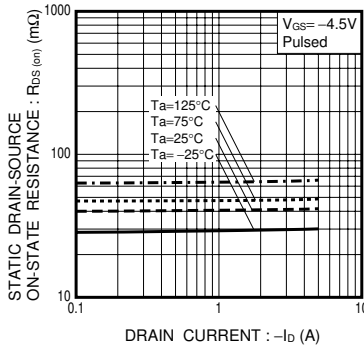


Fig.4 Static Drain-Source On-State vs. Drain Current

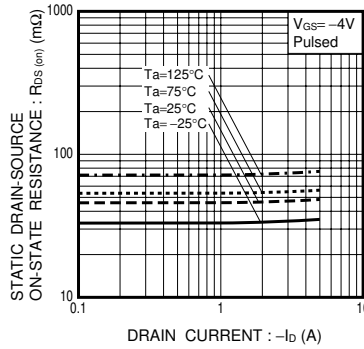


Fig.5 Static Drain-Source On-State vs. Drain Current

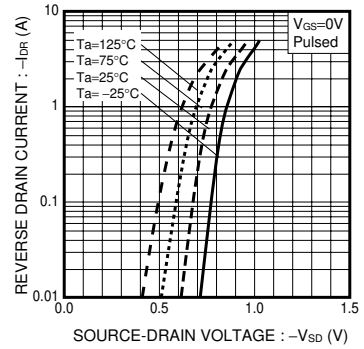


Fig.6 Reverse Drain Current Source-Drain Current

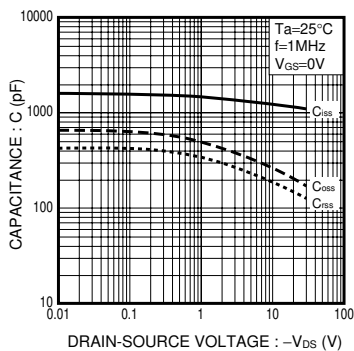


Fig.7 Typical Capacitance vs. Drain-Source Voltage

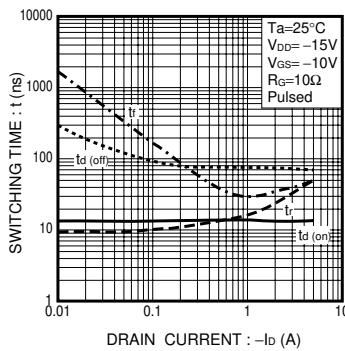


Fig.8 Switching Characteristics

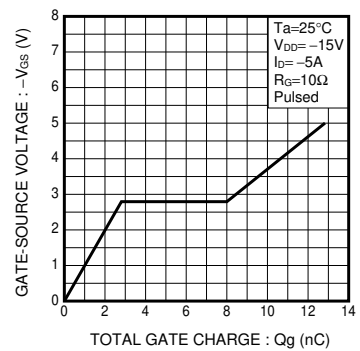


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

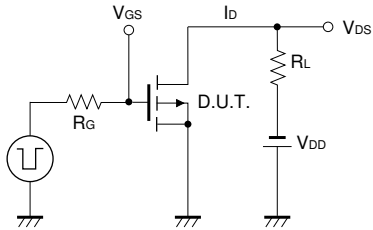


Fig.10 Switching Time Test Circuit

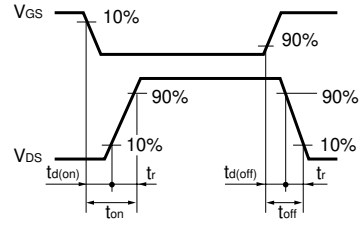


Fig.11 Switching Time Waveforms

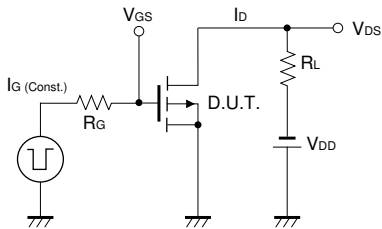


Fig.12 Gate Charge Test Circuit

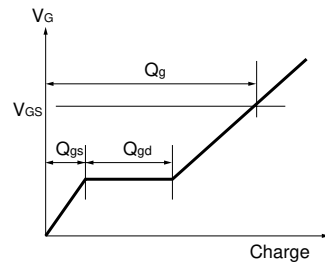


Fig.13 Gate Charge Waveform

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