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Transistors

# Switching (-30V, -4.5A)

## SP8J2

**●Features**

- 1) Low On-resistance. (57mΩ at 4.5V)
- 2) High Power Package.
- 3) High speed switching.
- 4) Low voltage drive. (4.5V)

**●Applications**

Power switching, DC-DC converter

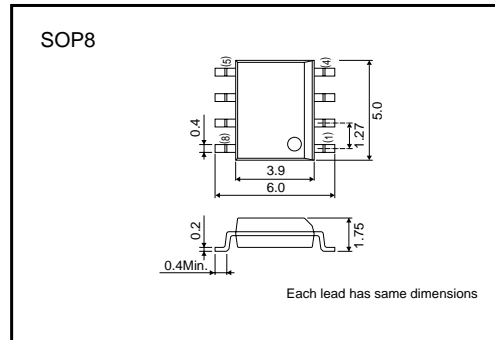
**●Structure**

Silicon P-channel  
MOS FET

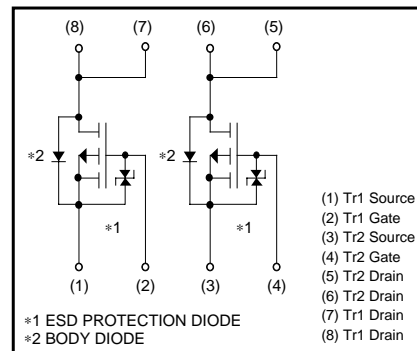
**●Packaging specifications**

| Type  | Package                      | Taping |
|-------|------------------------------|--------|
|       | Code                         | TB     |
|       | Basic ordering unit (pieces) | 2500   |
| SP8J2 |                              | ○      |

**●External dimensions (Unit : mm)**



**●Equivalent circuit**



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●Absolute maximum ratings (Ta=25°C)

| Parameter                    | Symbol           | Limits          | Unit     |
|------------------------------|------------------|-----------------|----------|
| Drain-source voltage         | V <sub>DSS</sub> | -30             | V        |
| Gate-source voltage          | V <sub>GSS</sub> | ±20             | V        |
| Drain current                | Continuous       | I <sub>D</sub>  | ±4.5 A   |
|                              | Pulsed           | I <sub>DP</sub> | ±18 A *1 |
| Source current (Body diode)  | Continuous       | I <sub>S</sub>  | -1.6 A   |
|                              | Pulsed           | I <sub>SP</sub> | -18 A *1 |
| Total power dissipation      | P <sub>D</sub>   | 2.0             | W *2     |
| Channel temperature          | T <sub>ch</sub>  | 150             | °C       |
| Range of Storage temperature | T <sub>stg</sub> | -55 to +150     | °C       |

\*1 P<sub>w</sub>≤10μs, 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 <sub>GSS</sub>      | -    | -    | ±10  | μA   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V      |
| Drain-source breakdown voltage          | V <sub>(BR) DSS</sub> | -30  | -    | -    | 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> =-30V, V <sub>GS</sub> =0V      |
| Gate threshold voltage                  | V <sub>GS(th)</sub>   | -1.0 | -    | -2.5 | V    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA     |
| Static drain-source on-state resistance | R <sub>DS(on)</sub>   | -    | 40   | 56   | mΩ   | I <sub>D</sub> =-4.5A, V <sub>GS</sub> =-10V *  |
|   |                       | -    | 57   | 80   | mΩ   | I <sub>D</sub> =-2.5A, V <sub>GS</sub> =-4.5V * |
|   |                       | -    | 65   | 90   | mΩ   | I <sub>D</sub> =-2.5A, V <sub>GS</sub> =-4.0V * |
| Forward transfer admittance             | Y <sub>fs</sub>       | 3.5  | -    | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-2.5A *  |
| Input capacitance                       | C <sub>iss</sub>      | -    | 850  | -    | pF   | V <sub>DS</sub> =-10V                           |
| Output capacitance                      | C <sub>oss</sub>      | -    | 190  | -    | pF   | V <sub>GS</sub> =0V                             |
| Reverse transfer capacitance            | C <sub>rss</sub>      | -    | 120  | -    | pF   | f=1MHz  |
| Turn-on delay time                      | t <sub>d(on)</sub>    | -    | 10   | -    | ns   | I <sub>D</sub> =-2.5A *                         |
| Rise time                               | t <sub>r</sub>        | -    | 25   | -    | ns   | V <sub>DD</sub> ≐-15V *                         |
| Turn-off delay time                     | t <sub>d(off)</sub>   | -    | 60   | -    | ns   | V <sub>GS</sub> =-10V *                         |
| Fall time                               | t <sub>f</sub>        | -    | 25   | -    | ns   | R <sub>L</sub> =6.0Ω *                          |
| Total gate charge                       | Q <sub>g</sub>        | -    | 8.5  | -    | nC   | V <sub>DD</sub> ≐-15V                           |
| Gate-source charge                      | Q <sub>gs</sub>       | -    | 2.5  | -    | nC   | V <sub>GS</sub> =-5V                            |
| Gate-drain charge                       | Q <sub>gd</sub>       | -    | 3.0  | -    | nC   | I <sub>D</sub> =-4.5A                           |

\*Pulsed

Body diode characteristics (source-drain characteristics)

| Parameter       | Symbol          | Min. | Typ. | Max. | Unit | Conditions                                 |
|-----------------|-----------------|------|------|------|------|--|
| Forward voltage | V <sub>SD</sub> | -    | -    | -1.2 | V    | I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0V |

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●Electrical characteristic curves

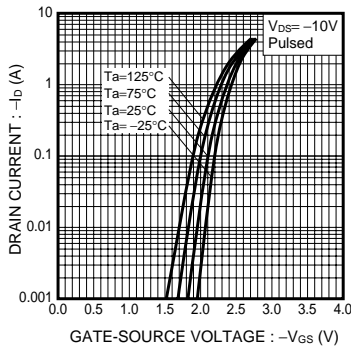


Fig.1 Typical Transfer Characteristics

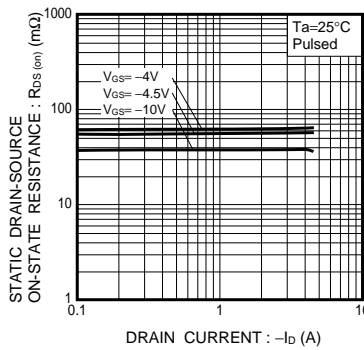


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

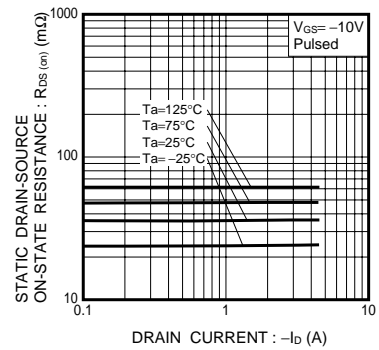


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

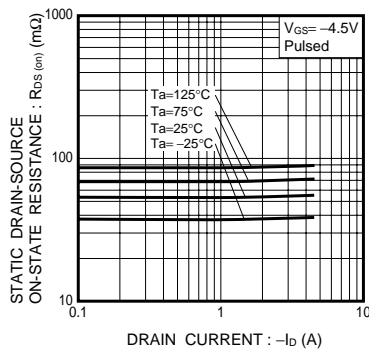


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

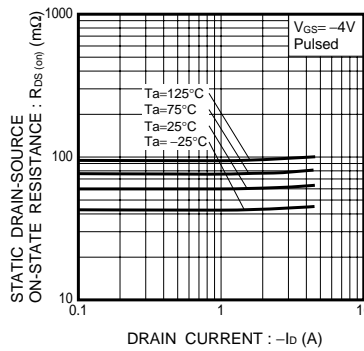


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

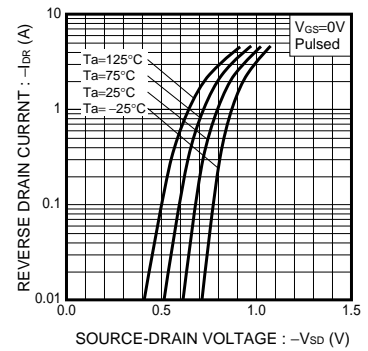


Fig.6 Reverse Drain Current Source-Drain Current

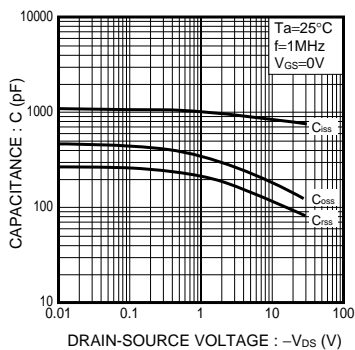


Fig.7 Typical Capacitance vs. Drain-Source Voltage

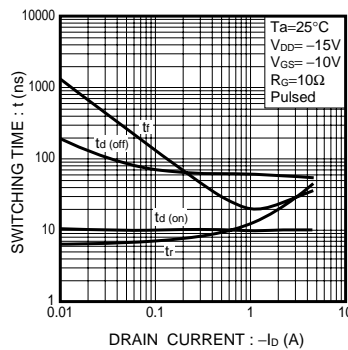


Fig.8 Switching Characteristics

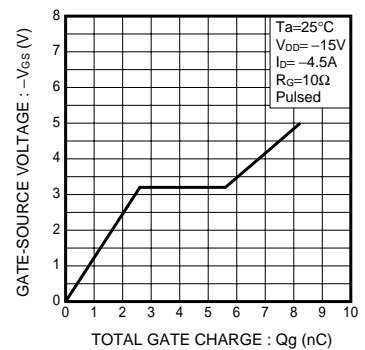


Fig.9 Dynamic Input Characteristics

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●Measurement circuits

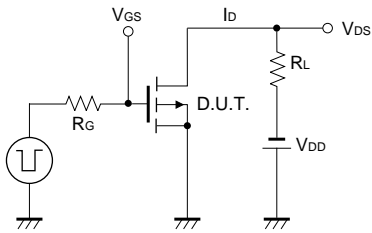


Fig.10 Switching Time Test Circuit

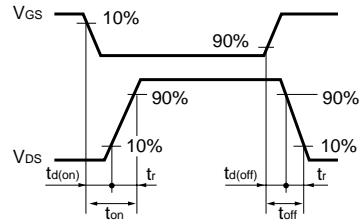


Fig.11 Switching Time Waveforms

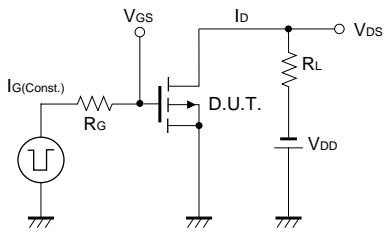


Fig.12 Gate Charge Test Circuit

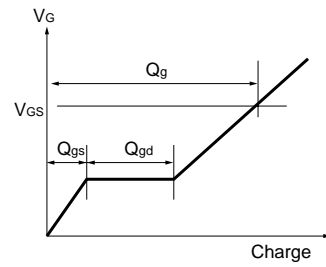


Fig.13 Gate Charge Waveform

## Appendix

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