

# RJK0222DNS

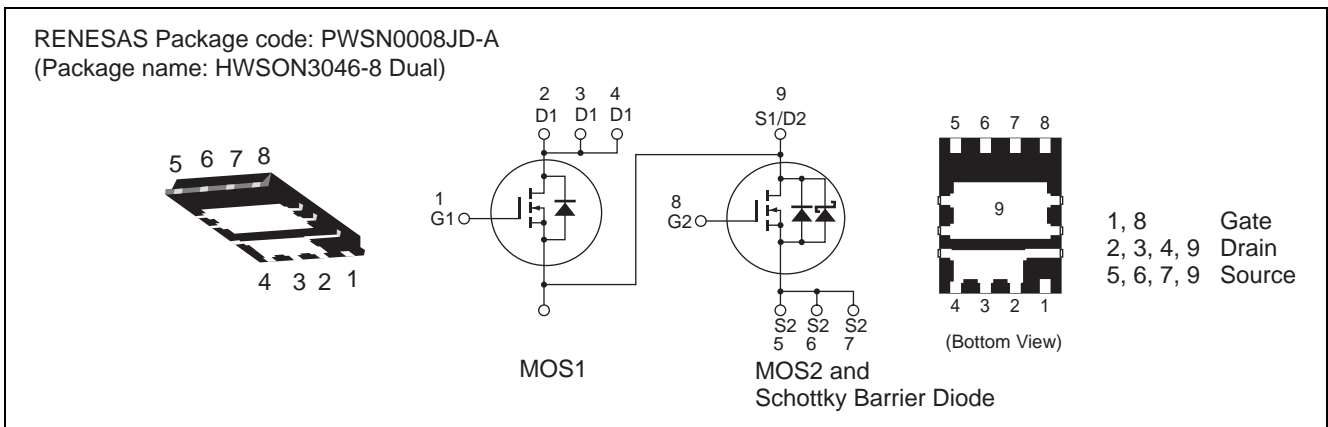
## Silicon N Channel Power MOS FET with Schottky Barrier Diode High Speed Power Switching

R07DS0125EJ0030  
(Previous: REJ03G1951-0020)  
Rev.0.30  
Sep 06, 2010

### Features

- Low on-resistance
- Capable of 4.5 V gate drive
- High density mounting
- Pb-free
- Halogen-free

### Outline



### Absolute Maximum Ratings

(Ta = 25°C)

| Item                    | Symbol                          | Ratings     |             | Unit |
|-------------------------|---------------------------------|-------------|-------------|------|
|                         |                                 | MOS1        | MOS2        |      |
| Drain to source voltage | $V_{DSS}$                       | 25          | 25          | V    |
| Gate to source voltage  | $V_{GSS}$                       | $\pm 20$    | $\pm 12$    | V    |
| Drain current           | $I_D$                           | 14          | 16          | A    |
| Drain peak current      | $I_{D(pulse)}$ <sup>Note1</sup> | 56          | 64          | A    |
| Reverse drain current   | $I_{DR}$                        | 14          | 16          | A    |
| Avalanche current       | $I_{AP}$ <sup>Note 2</sup>      | 5           | 8           | A    |
| Avalanche energy        | $E_{AR}$ <sup>Note 2</sup>      | 3.1         | 8.0         | mJ   |
| Channel dissipation     | $P_{ch}$ <sup>Note3</sup>       | 8           | 10          | W    |
| Channel temperature     | Tch                             | 150         | 150         | °C   |
| Storage temperature     | Tstg                            | -55 to +150 | -55 to +150 | °C   |

- Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$   
 2. Value at Tch = 25°C, Rg  $\geq 50 \Omega$   
 3. Tc = 25°C

## Electrical Characteristics

### • MOS1

(Ta = 25°C)

| Item                                       | Symbol        | Min | Typ  | Max       | Unit             | Test Conditions   |
|--|---------------|-----|------|-----------|------------------|---|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 25  | —    | —         | V                | $I_D = 10 \text{ mA}, V_{GS} = 0$   |
| Gate to source leak current                | $I_{GSS}$     | —   | —    | $\pm 0.1$ | $\mu\text{A}$    | $V_{GS} = \pm 20 \text{ V}, V_{DS} = 0$                                   |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —    | 1         | $\mu\text{A}$    | $V_{DS} = 25 \text{ V}, V_{GS} = 0$                                       |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.2 | —    | 2.5       | V                | $V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$                               |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 7.6  | 9.2       | $\text{m}\Omega$ | $I_D = 7 \text{ A}, V_{GS} = 10 \text{ V}$ <sup>Note4</sup>               |
|  | $R_{DS(on)}$  | —   | 10.5 | 13.7      | $\text{m}\Omega$ | $I_D = 7 \text{ A}, V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>              |
| Forward transfer admittance                | $ y_{fs} $    | —   | 30   | —         | S                | $I_D = 7 \text{ A}, V_{DS} = 5 \text{ V}$ <sup>Note4</sup>                |
| Input capacitance                          | $C_{iss}$     | —   | 810  | —         | pF               | $V_{DS} = 10 \text{ V}$   |
| Output capacitance                         | $C_{oss}$     | —   | 130  | —         | pF               | $V_{GS} = 0$  |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 74   | —         | pF               | $f = 1 \text{ MHz}$   |
| Gate Resistance                            | $R_g$         | —   | 1.2  | —         | $\Omega$         |   |
| Total gate charge                          | $Q_g$         | —   | 6.2  | —         | nC               | $V_{DD} = 10 \text{ V}$   |
| Gate to source charge                      | $Q_{gs}$      | —   | 2.8  | —         | nC               | $V_{GS} = 4.5 \text{ V}$  |
| Gate to drain charge                       | $Q_{gd}$      | —   | 1.9  | —         | nC               | $I_D = 14 \text{ A}$  |
| Turn-on delay time                         | $t_{d(on)}$   | —   | TBD  | —         | ns               | $V_{GS} = 10 \text{ V}, I_D = 7 \text{ A}$                                |
| Rise time                                  | $t_r$         | —   | TBD  | —         | ns               | $V_{DD} \approx 10 \text{ V}$   |
| Turn-off delay time                        | $t_{d(off)}$  | —   | TBD  | —         | ns               | $R_L = 1.42 \Omega$   |
| Fall time                                  | $t_f$         | —   | TBD  | —         | ns               | $R_g = 4.7 \Omega$  |
| Body–drain diode forward voltage           | $V_{DF}$      | —   | 0.84 | 1.10      | V                | $I_F = 14 \text{ A}, V_{GS} = 0$ <sup>Note4</sup>                         |
| Body–drain diode reverse recovery time     | $t_{rr}$      | —   | TBD  | —         | ns               | $I_F = 14 \text{ A}, V_{GS} = 0$<br>$di_F/dt = 100 \text{ A}/\mu\text{s}$ |

Notes: 4. Pulse test

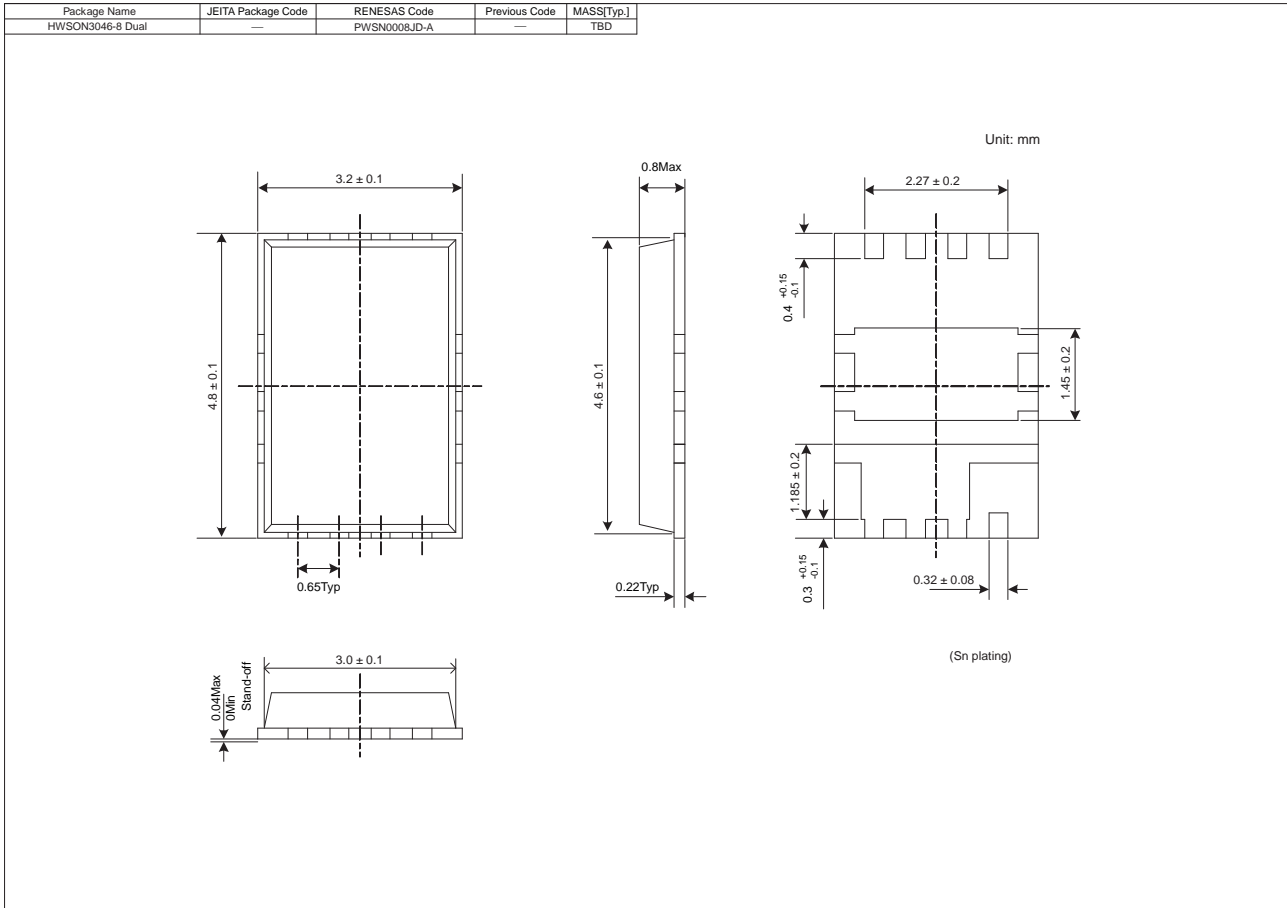
## • MOS2

(Ta = 25°C)

| Item                                       | Symbol        | Min | Typ  | Max       | Unit          | Test Conditions   |
|--|---------------|-----|------|-----------|---------------|---|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 25  | —    | —         | V             | $I_D = 10 \text{ mA}, V_{GS} = 0$   |
| Gate to source leak current                | $I_{GSS}$     | —   | —    | $\pm 0.1$ | $\mu\text{A}$ | $V_{GS} = \pm 12 \text{ V}, V_{DS} = 0$                                   |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —    | 1         | mA            | $V_{DS} = 25 \text{ V}, V_{GS} = 0$                                       |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.2 | —    | 2.5       | V             | $V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$                               |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 4.9  | 5.9       | m $\Omega$    | $I_D = 8 \text{ A}, V_{GS} = 8.0 \text{ V}$ <sup>Note4</sup>              |
|  | $R_{DS(on)}$  | —   | 6.2  | 8.1       | m $\Omega$    | $I_D = 8 \text{ A}, V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>              |
| Forward transfer admittance                | $ y_{fs} $    | —   | 37   | —         | S             | $I_D = 8 \text{ A}, V_{DS} = 5 \text{ V}$ <sup>Note4</sup>                |
| Input capacitance                          | $C_{iss}$     | —   | 1680 | —         | pF            | $V_{DS} = 10 \text{ V}$   |
| Output capacitance                         | $C_{oss}$     | —   | 259  | —         | pF            | $V_{GS} = 0$  |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 150  | —         | pF            | $f = 1 \text{ MHz}$   |
| Gate Resistance                            | $R_g$         | —   | 2.1  | —         | $\Omega$      |   |
| Total gate charge                          | $Q_g$         | —   | 11.8 | —         | nC            | $V_{DD} = 10 \text{ V}$   |
| Gate to source charge                      | $Q_{gs}$      | —   | 4.4  | —         | nC            | $V_{GS} = 4.5 \text{ V}$  |
| Gate to drain charge                       | $Q_{gd}$      | —   | 2.7  | —         | nC            | $I_D = 16 \text{ A}$  |
| Turn-on delay time                         | $t_{d(on)}$   | —   | TBD  | —         | ns            | $V_{GS} = 8 \text{ V}, I_D = 16 \text{ A}$                                |
| Rise time                                  | $t_r$         | —   | TBD  | —         | ns            | $V_{DD} \approx 10 \text{ V}$   |
| Turn-off delay time                        | $t_{d(off)}$  | —   | TBD  | —         | ns            | $R_L = 0.63 \Omega$   |
| Fall time                                  | $t_f$         | —   | TBD  | —         | ns            | $R_g = 4.7 \Omega$  |
| Schottky Barrier diode forward voltage     | $V_F$         | —   | 0.41 | —         | V             | $I_F = 2 \text{ A}, V_{GS} = 0$ <sup>Note4</sup>                          |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | TBD  | —         | ns            | $I_F = 16 \text{ A}, V_{GS} = 0$<br>$di_F/dt = 100 \text{ A}/\mu\text{s}$ |

Notes: 4. Pulse

### Package Dimensions



### Ordering Information

| Part No.         | Quantity | Shipping Container |
|------------------|----------|--------------------|
| RJK0222DNS-00-J5 | 3000 pcs | Taping             |

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