

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# H5N2513PL

Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G1243-0200

Rev.2.00

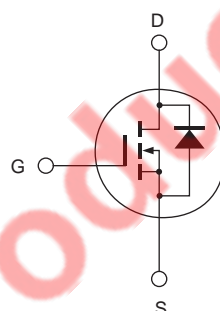
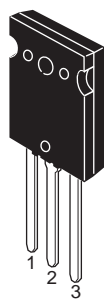
May 13, 2009

## Features

- Low on-resistance
- High speed switching
- Built-in fast recovery diode

## Outline

RENESAS Package code: PRSS0004ZF-A  
(Package name: TO-3PL)



1. Gate
2. Drain (Flange)
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

| Item  | Symbol                           | Ratings     | Unit |
|---|----------------------------------|-------------|------|
| Drain to source voltage                     | $V_{DSS}$                        | 250         | V    |
| Gate to source voltage                      | $V_{GSS}$                        | $\pm 30$    | V    |
| Drain current                               | $I_D$                            | 100         | A    |
| Drain peak current                          | $I_{D(pulse)}$ <sup>Note1</sup>  | 400         | A    |
| Body-drain diode reverse drain current      | $I_{DR}$                         | 100         | A    |
| Body-drain diode reverse drain peak current | $I_{DR(pulse)}$ <sup>Note1</sup> | 400         | A    |
| Avalanche current                           | $I_{AP}$ <sup>Note3</sup>        | 100         | A    |
| Avalanche energy                            | $E_{AR}$ <sup>Note3</sup>        | 625         | mJ   |
| Channel dissipation                         | $P_{ch}$ <sup>Note2</sup>        | 250         | W    |
| Channel to case thermal impedance           | $\theta_{ch-c}$                  | 0.5         | °C/W |
| Channel temperature                         | $T_{ch}$                         | 150         | °C   |
| Storage temperature                         | $T_{stg}$                        | -55 to +150 | °C   |

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2. Value at  $T_c = 25^\circ C$

3.  $STch = 25^\circ C$ ,  $T_{ch} \leq 150^\circ C$

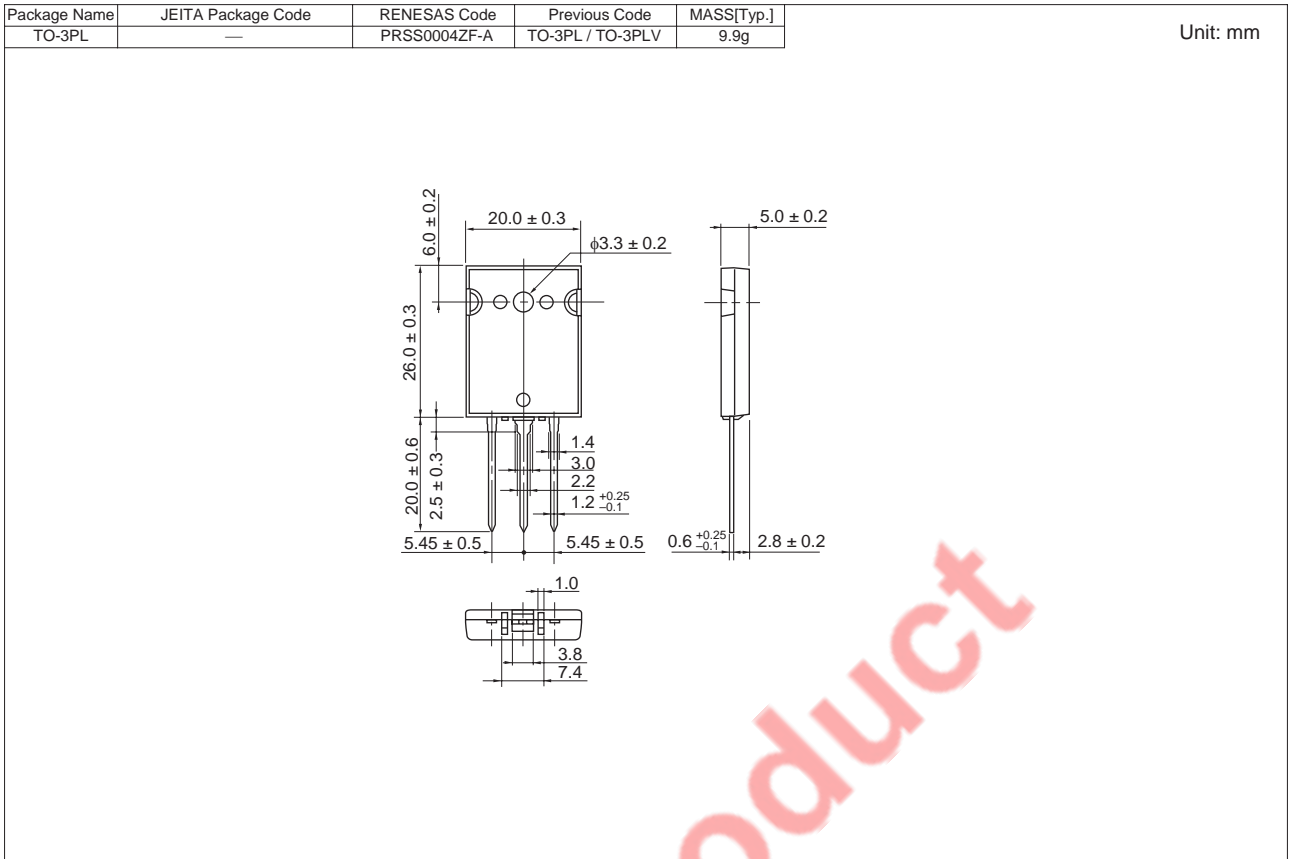
## Electrical Characteristics

(Ta = 25°C)

| Item                                       | Symbol        | Min | Typ   | Max       | Unit          | Test conditions  |
|--|---------------|-----|-------|-----------|---------------|--|
| Drain to Source breakdown voltage          | $V_{(BR)DSS}$ | 250 | —     | —         | V             | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$   |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —     | 10        | $\mu\text{A}$ | $V_{DS} = 250 \text{ V}$ , $V_{GS} = 0$  |
| Gate to source leak current                | $I_{GSS}$     | —   | —     | $\pm 0.1$ | $\mu\text{A}$ | $V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$   |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 2.0 | —     | 4.0       | V             | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$   |
| Forward transfer admittance                | $ y_{fs} $    | 39  | 65    | —         | S             | $I_D = 50 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>                            |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.020 | 0.026     | $\Omega$      | $I_D = 50 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>                            |
| Input capacitance                          | $C_{iss}$     | —   | 9300  | —         | pF            | $V_{DS} = 25 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$                            |
| Output capacitance                         | $C_{oss}$     | —   | 1200  | —         | pF            |  |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 280   | —         | pF            |  |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 90    | —         | ns            | $I_D = 50 \text{ A}$ , $V_{GS} = 10 \text{ V}$ ,<br>$R_L = 2.5 \Omega$ , $R_g = 10 \Omega$ |
| Rise time                                  | $t_r$         | —   | 420   | —         | ns            |  |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 550   | —         | ns            |  |
| Fall time                                  | $t_f$         | —   | 400   | —         | ns            |  |
| Total gate charge                          | $Q_g$         | —   | 330   | —         | nC            | $V_{DD} = 200 \text{ V}$ , $V_{GS} = 10 \text{ V}$<br>$I_D = 100 \text{ A}$                |
| Gate to source charge                      | $Q_{gs}$      | —   | 45    | —         | nC            |  |
| Gate to drain charge                       | $Q_{gd}$      | —   | 175   | —         | nC            |  |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 1.2   | 1.8       | V             | $I_F = 100 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>                                      |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 210   | —         | ns            | $I_F = 100 \text{ A}$ , $V_{GS} = 0$<br>$di_F/dt = 100 \text{ A}/\mu\text{s}$              |

Notes: 4. Pulse test

Package Dimensions



Ordering Information

| Part Name   | Quantity | Shipping Container |
|-------------|----------|--------------------|
| H5N2513PL-E | 250 pcs. | Box (Tube)         |

Notes:

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