



# H5N5004PL

Silicon N Channel MOS FET  
High Speed Power Switching

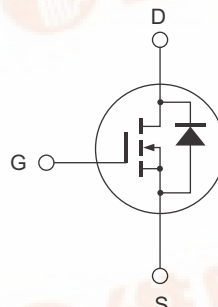
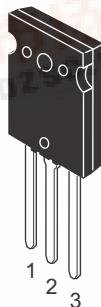
REJ03G1113-0200  
(Previous: ADE-208-1381)  
Rev.2.00  
Sep 07, 2005

## Features

- Low on-resistance:  $R_{DS(on)} = 0.09 \Omega$  typ.
- Low leakage current:  $I_{DSS} = 10 \mu A$  max (at  $V_{DS} = 500 V$ )
- High speed switching:  $t_f = 280 ns$  typ (at  $V_{GS} = 10 V$ ,  $V_{DD} = 250 V$ ,  $I_D = 25 A$ )
- Low gate charge:  $Q_g = 220 nC$  typ (at  $V_{DD} = 400 V$ ,  $V_{GS} = 10 V$ ,  $I_D = 50 A$ )
- Avalanche ratings
- Built-in fast recovery diode:  $trr = 190 ns$  typ

## 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	Value	Unit
Drain to source voltage	$V_{DSS}$	500	V
Gate to source voltage	$V_{GSS}$	$\pm 30$	V
Drain current	$I_D$	50	A
Drain peak current	$I_{D (pulse)}$ <sup>Note 1</sup>	200	A
Body-drain diode reverse drain current	$I_{DR}$	50	A
Body-drain diode reverse drain peak current	$I_{DR (pulse)}$ <sup>Note 1</sup>	200	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	15	A
Channel dissipation	$P_{ch}$ <sup>Note 2</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.  $T_{ch} \leq 150^\circ C$ 

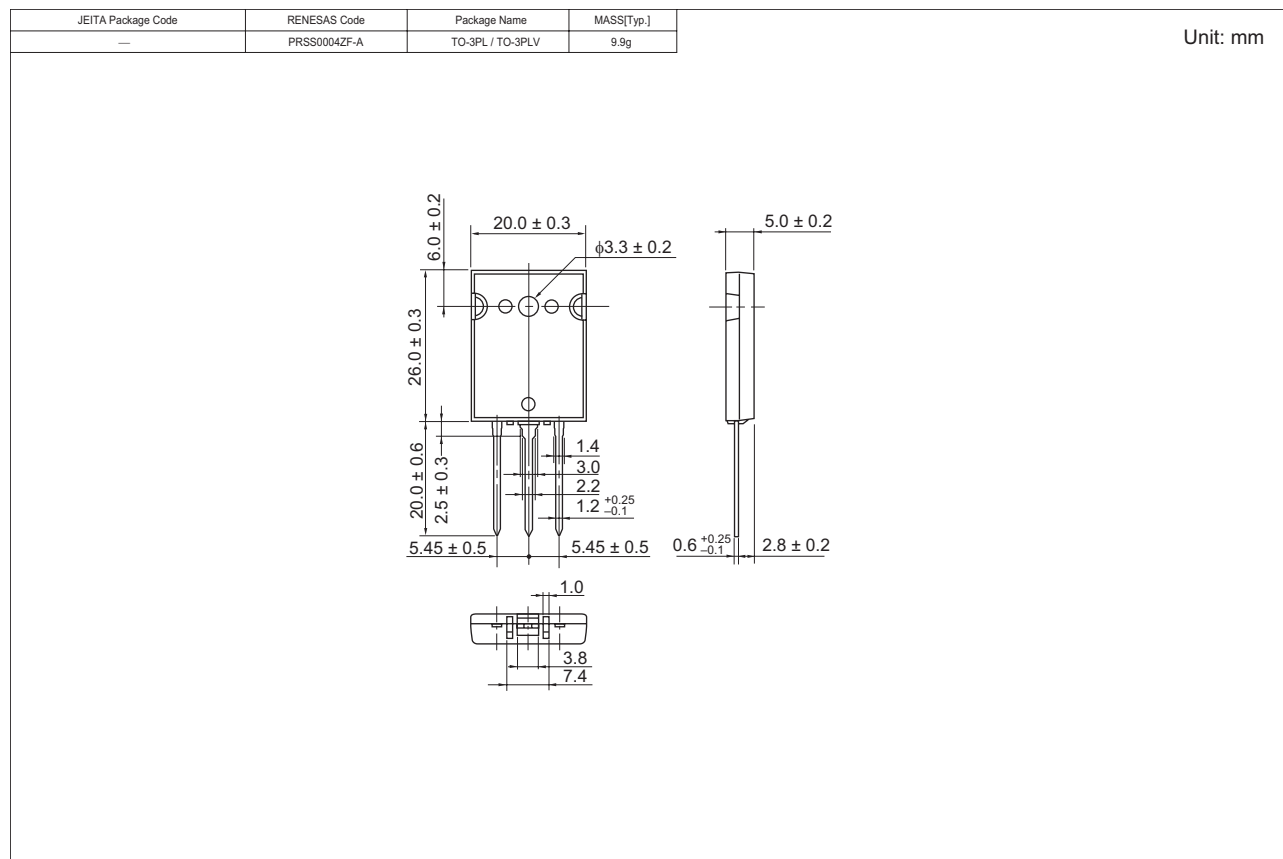
## Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR) DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu A$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS (off)}$	2.0	—	4.0	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS (on)}$	—	0.09	0.11	$\Omega$	$I_D = 25 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
Forward transfer admittance	$ y_{fs} $	27	45	—	S	$I_D = 25 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Input capacitance	$C_{iss}$	—	7630	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	770	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	160	—	pF	
Turn-on delay time	$t_{d (on)}$	—	90	—	ns	$I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 10 \Omega$ $R_g = 10 \Omega$
Rise time	$t_r$	—	340	—	ns	
Turn-off delay time	$t_{d (off)}$	—	370	—	ns	
Fall time	$t_f$	—	280	—	ns	
Total gate charge	$Q_g$	—	220	—	nC	$V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 50 \text{ A}$
Gate to source charge	$Q_{gs}$	—	30	—	nC	
Gate to drain charge	$Q_{gd}$	—	110	—	nC	
Body-drain diode forward voltage	$V_{DF}$	—	0.98	1.5	V	$I_F = 50 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	190	—	ns	$I_F = 50 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery charge	$Q_{rr}$	—	1.3	—	$\mu C$	$di_F/dt = 100 \text{ A}/\mu s$

Note: 4. Pulse test

## Package Dimensions



## Ordering Information

Part Name	Quantity	Shipping Container
H5N5004PL-E	500 pcs	Box (Case)

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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