

# RJK5009DPP

Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G1606-0100

Rev.1.00

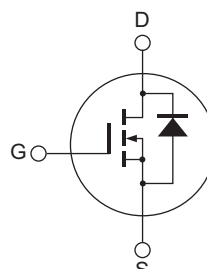
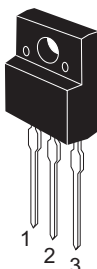
Dec 04, 2007

## Features

- Low on-resistance
- Low leakage current
- High speed switching

## Outline

RENESAS Package code: PRSS0003AB-A  
(Package name: TO-220FN)



1. Gate
2. Drain
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	500	V
Gate to source voltage	$V_{GSS}$	$\pm 30$	V
Drain current	$I_D$ <sup>Note4</sup>	20	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	60	A
Body-drain diode reverse drain current	$I_{DR}$	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ <sup>Note1</sup>	60	A
Avalanche current	$I_{AP}$ <sup>Note3</sup>	4	A
Avalanche energy	$E_{AR}$ <sup>Note3</sup>	0.88	mJ
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	40	W
Channel to case thermal impedance	$\theta_{ch-c}$	3.125	°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.  $STch = 25^\circ C$ ,  $T_{ch} \leq 150^\circ C$   
 4. Limited by maximum safe operation area

## Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$
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	$V_{GS(off)}$	3.0	—	4.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.260	0.325	$\Omega$	$I_D = 10 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note5</sup>
Input capacitance	$C_{iss}$	—	2100	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	220	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	27	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 25 \Omega$ $R_g = 10 \Omega$
Rise time	$t_r$	—	33	—	ns	
Turn-off delay time	$t_{d(off)}$	—	97	—	ns	
Fall time	$t_f$	—	17	—	ns	
Total gate charge	$Q_g$	—	52	—	nC	$V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 20 \text{ A}$
Gate to source charge	$Q_{gs}$	—	10.5	—	nC	
Gate to drain charge	$Q_{gd}$	—	22	—	nC	
Body-drain diode forward voltage	$V_{DF}$	—	1.0	1.6	V	$I_F = 20 \text{ A}$ , $V_{GS} = 0$ <sup>Note5</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	320	—	ns	$I_F = 20 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 5. Pulse test

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220FN	—	PRSS0003AB-A	—	2.0g

Unit: mm

The drawing illustrates the mechanical specifications of the TO-220FN package. The top view shows a rectangular body with a width of  $10 \pm 0.3$  mm and a height of  $15 \pm 0.3$  mm. A central circular feature has a diameter of  $\phi 3.2 \pm 0.2$  mm. The distance from the top edge to the center of this feature is  $3 \pm 0.3$  mm. The distance from the bottom edge to the center is  $6.5 \pm 0.3$  mm. The package has four leads extending from the bottom, with a total length of  $14 \pm 0.5$  mm. The distance between the centers of the two inner leads is  $1.1 \pm 0.2$  mm, and the distance between the centers of the two outer leads is  $1.1 \pm 0.2$  mm. The width of the lead area is  $2.54 \pm 0.25$  mm. The side view shows a total height of  $2.8 \pm 0.2$  mm. The detail view shows a trapezoidal base with a width of  $2.6 \pm 0.2$  mm and a height of  $4.5 \pm 0.2$  mm. The distance from the base to the top of the leads is  $0.75 \pm 0.15$  mm.

Part Name	Quantity	Shipping Container
RJK5009DPP-00-T2	1050 pcs	Box (Tube)

## Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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**Renesas Technology America, Inc.**  
450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**  
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

**Renesas Technology Hong Kong Ltd.**  
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2377-3473

**Renesas Technology Taiwan Co., Ltd.**  
10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

**Renesas Technology Singapore Pte. Ltd.**  
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**  
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**  
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510