

# RJK0701DPP-E0

N-Channel MOS FET  
75 V, 100 A, 3.8 mΩ

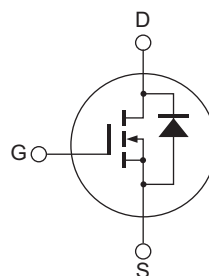
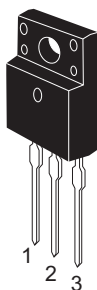
R07DS0628EJ0200  
Rev.2.00  
Oct 17, 2012

## Features

- High speed switching
- Low drive current
- Low on-resistance  $R_{DS(on)} = 3.0 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )
- Package TO-220FP

## Outline

RENESAS Package code: PRSS0003AG-A  
(Package name: TO-220FP)



1. Gate
2. Drain
3. Source

## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

| Item                                   | Symbol                          | Ratings     | Unit               |
|----------------------------------------|---------------------------------|-------------|--------------------|
| Drain to source voltage                | $V_{DSS}$                       | 75          | V                  |
| Gate to source voltage                 | $V_{GSS}$                       | $\pm 20$    | V                  |
| Drain current                          | $I_D$                           | 100         | A                  |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note1</sup> | 300         | A                  |
| Body-drain diode reverse drain current | $I_{DR}$                        | 100         | A                  |
| Avalanche current                      | $I_{AP}$ <sup>Note2</sup>       | 50          | A                  |
| Avalanche energy                       | $E_{AS}$ <sup>Note2</sup>       | 375         | mJ                 |
| Channel dissipation                    | $P_{ch}$ <sup>Note3</sup>       | 30          | W                  |
| Channel to case thermal impedance      | $\theta_{ch-c}$                 | 4.17        | $^\circ\text{C/W}$ |
| Channel temperature                    | $T_{ch}$                        | 150         | $^\circ\text{C}$   |
| Storage temperature                    | $T_{stg}$                       | -55 to +150 | $^\circ\text{C}$   |

Notes: 1.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$   
 2. Value at  $L = 100 \mu\text{H}$ ,  $T_{ch} = 25^\circ\text{C}$ ,  $R_g \geq 50\Omega$ ,  
 3.  $T_c = 25^\circ\text{C}$

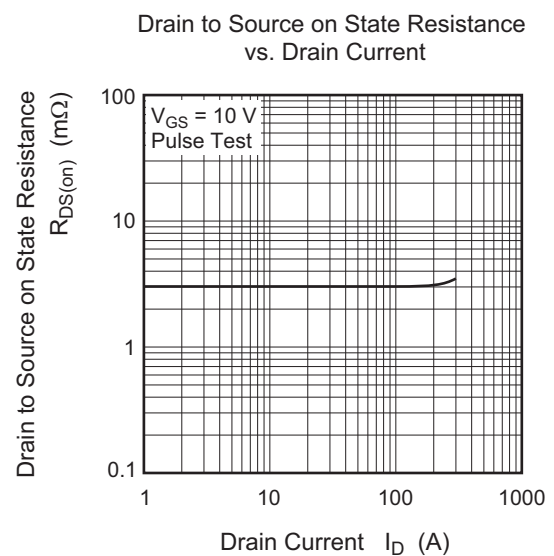
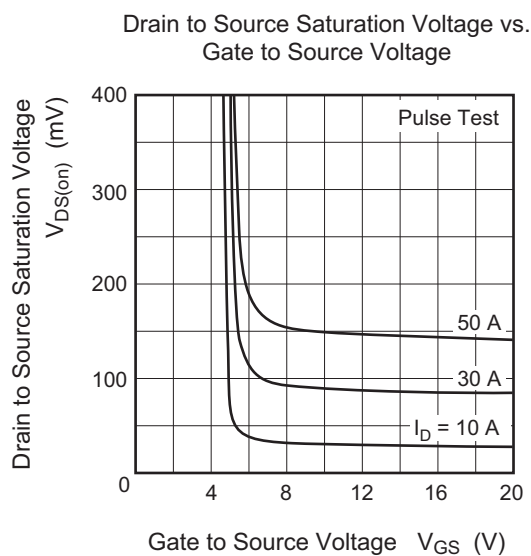
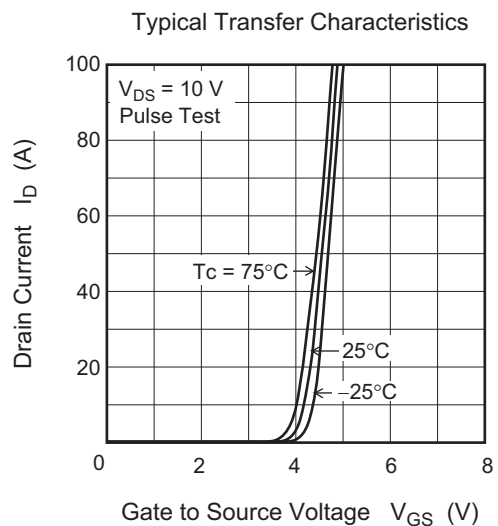
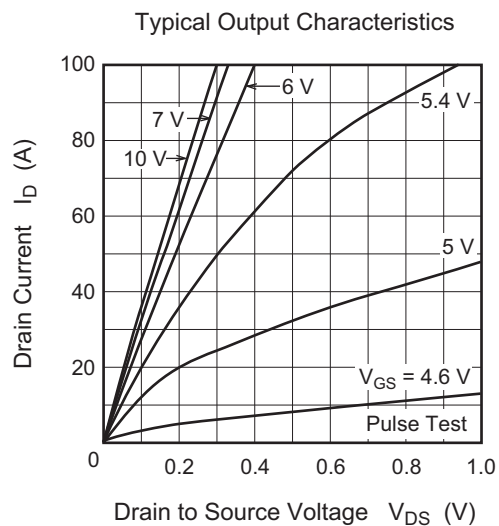
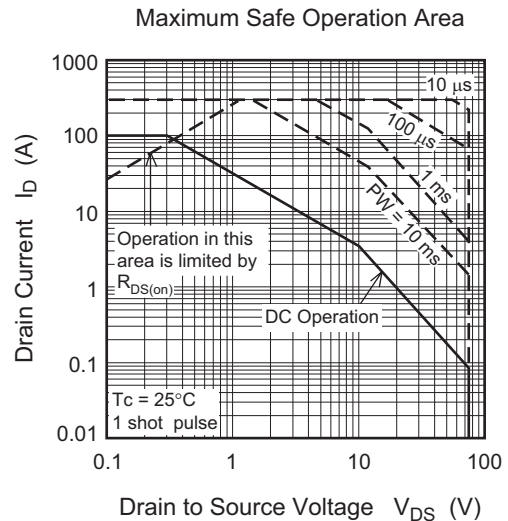
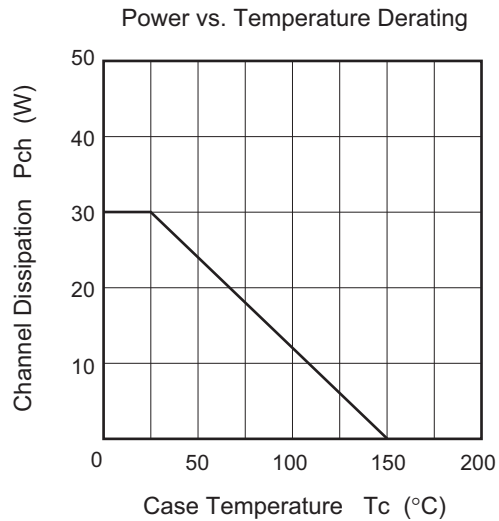
## Electrical Characteristics

(Ta = 25°C)

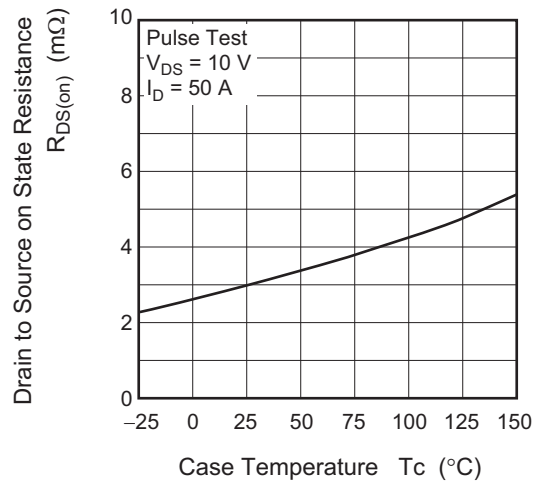
| Item                                       | Symbol        | Min | Typ   | Max       | Unit             | Test conditions                                                                                          |
|--------------------------------------------|---------------|-----|-------|-----------|------------------|----------------------------------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 75  | —     | —         | 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         | $\mu\text{A}$    | $V_{DS} = 75\text{ V}$ , $V_{GS} = 0$                                                                    |
| 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 | $R_{DS(on)}$  | —   | 3.0   | 3.8       | $\text{m}\Omega$ | $I_D = 50\text{ A}$ , $V_{GS} = 10\text{ V}$ <sup>Note4</sup>                                            |
| Forward transfer admittance                | $ y_{fs} $    | —   | 130   | —         | S                | $I_D = 50\text{ A}$ , $V_D = 10\text{ V}$ <sup>Note4</sup>                                               |
| Input capacitance                          | $C_{iss}$     | —   | 10000 | —         | pF               | $V_{DS} = 10\text{ V}$<br>$V_{GS} = 0$<br>$f = 1\text{ MHz}$                                             |
| Output capacitance                         | $C_{oss}$     | —   | 1900  | —         | pF               |                                                                                                          |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 480   | —         | pF               |                                                                                                          |
| Gate Resistance                            | $R_g$         | —   | 1.6   | —         | $\Omega$         |                                                                                                          |
| Total gate charge                          | $Q_g$         | —   | 140   | —         | nC               | $V_{DD} = 25\text{ V}$<br>$V_{GS} = 10\text{ V}$ ,<br>$I_D = 50\text{ A}$                                |
| Gate to source charge                      | $Q_{gs}$      | —   | 50    | —         | nC               |                                                                                                          |
| Gate to drain charge                       | $Q_{gd}$      | —   | 21    | —         | nC               |                                                                                                          |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 53    | —         | ns               | $V_{GS} = 10\text{ V}$<br>$I_D = 50\text{ A}$<br>$V_{DD} \cong 30\text{ V}$<br>$R_g = 4.7\text{ }\Omega$ |
| Rise time                                  | $t_r$         | —   | 25    | —         | ns               |                                                                                                          |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 100   | —         | ns               |                                                                                                          |
| Fall time                                  | $t_f$         | —   | 24    | —         | ns               |                                                                                                          |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.85  | 1.5       | V                | $I_F = 100\text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>                                                     |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 65    | —         | ns               | $I_F = 100\text{ A}$ , $V_{GS} = 0$<br>$di_F/dt = 100\text{ A}/\mu\text{s}$                              |

Notes: 4. Pulse test

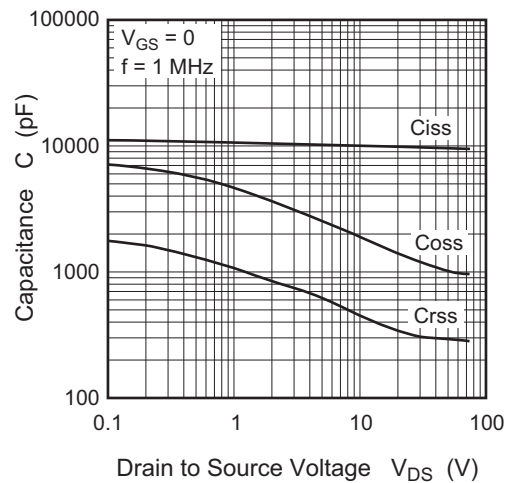
## Main Characteristics



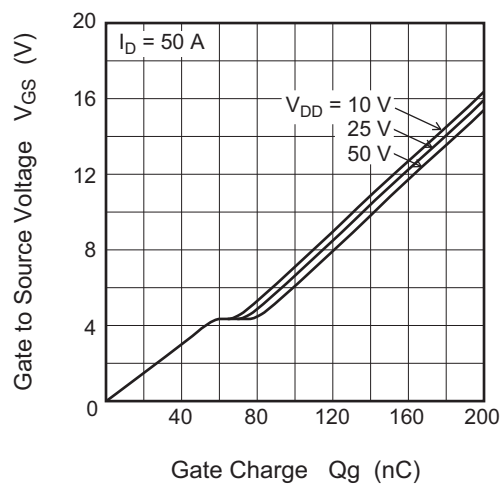
Drain to Source on State Resistance  
vs. Temperature



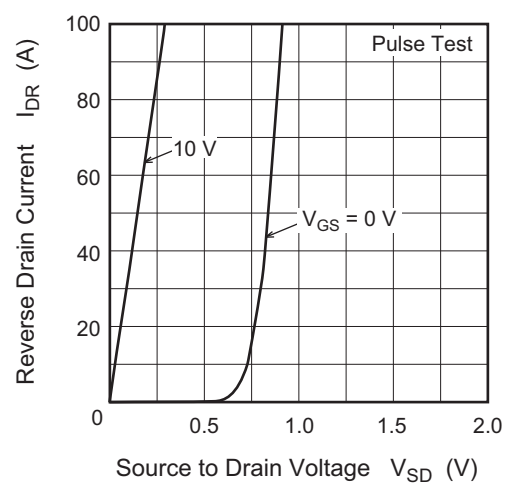
Typical Capacitance vs.  
Drain to Source Voltage



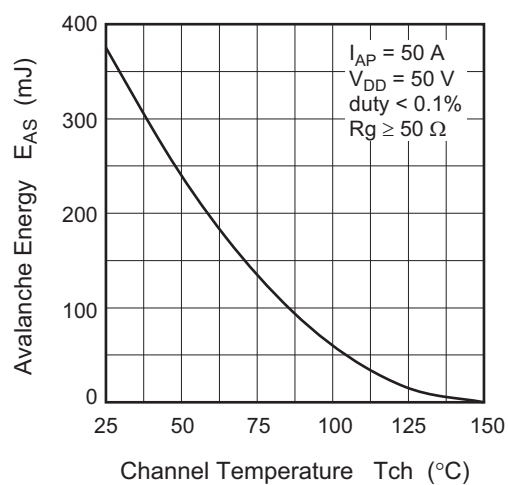
Dynamic Input Characteristics



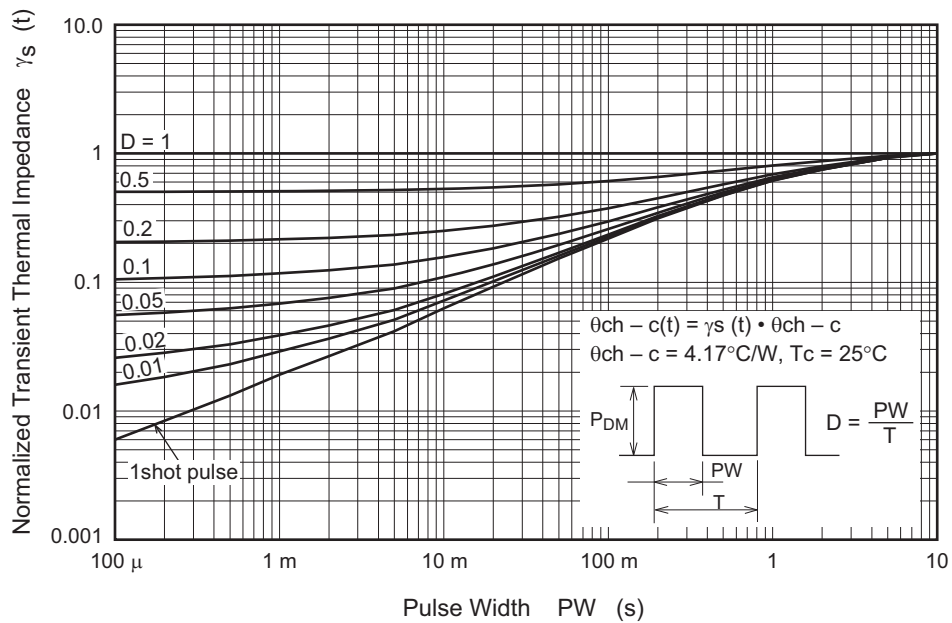
Reverse Drain Current vs.  
Source to Drain Voltage



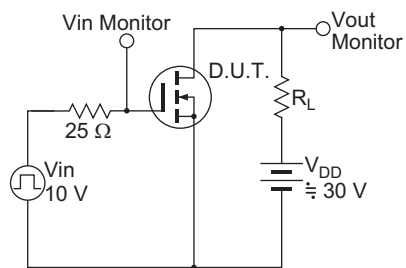
Maximum Avalanche Energy vs.  
Channel Temperature Derating



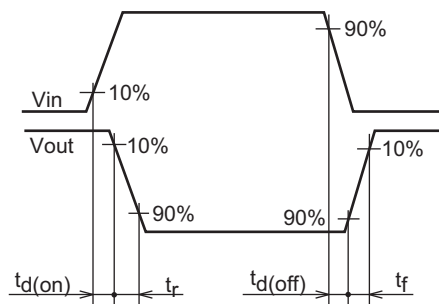
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] | Unit: mm |
|--------------|--------------------|--------------|---------------|------------|----------|
| TO-220FP     | —                  | PRSS0003AG-A | —             | 1.9g       |          |

Technical drawing of the RJK0701DPP-E0 TO-220FP package showing dimensions in mm:

- Top View:**
  - Overall width:  $10.16 \pm 0.20$
  - Overall height:  $15.87 \pm 0.20$
  - Pin pitch (center-to-center):  $3.18 \pm 0.10$
  - Pin diameter:  $\phi 3.18 \pm 0.10$
  - Distance from top edge to pin center line:  $3.3 \pm 0.2$
  - Distance from pin center line to bottom edge:  $12.98 \pm 0.30$
  - Distance from pin center line to mounting hole center:  $1.28 \pm 0.30$
  - Mounting hole diameter:  $1.28 \pm 0.30$
  - Distance from mounting hole center to bottom edge:  $5.08 \pm 0.20$
  - Pin length (Max):  $1.47$
  - Pin width:  $0.80 \pm 0.20$
- Side View:**
  - Overall height:  $2.54 \pm 0.20$
  - Distance from top edge to pin center line:  $2.76 \pm 0.20$
  - Pin diameter:  $0.50^{+0.10}_{-0.05}$
- Bottom View:**
  - Overall width:  $5.08 \pm 0.20$
  - Overall height:  $4.7 \pm 0.2$

## Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| RJK0701DPP-E0-T2      | 50 pcs   | Magazine (Tube)    |

Note: The symbol of 2nd "-" is occasionally presented as "#".

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