

# RJK0601DPN-E0

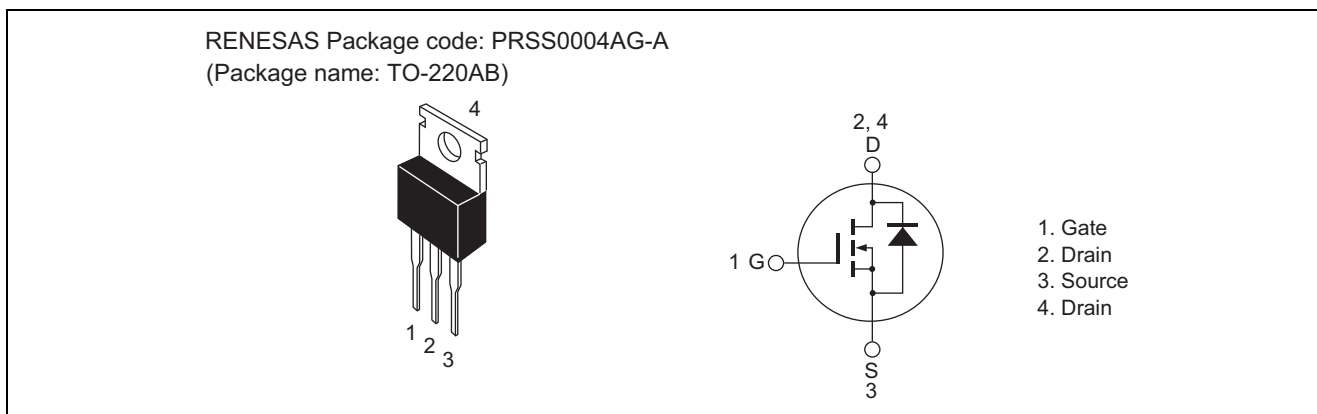
N-Channel MOS FET  
60 V, 110 A, 3.1 mΩ

R07DS0652EJ0200  
Rev.2.00  
Aug 24, 2012

## Features

- High speed switching
- Low drive current
- Low on-resistance  $R_{DS(on)} = 2.5 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )
- Package TO-220AB

## Outline



## Absolute Maximum Ratings

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

| Item                                   | Symbol                          | Ratings     | Unit                      |
|--|---------------------------------|-------------|---------------------------|
| Drain to source voltage                | $V_{DSS}$                       | 60          | V                         |
| Gate to source voltage                 | $V_{GSS}$                       | $\pm 20$    | V                         |
| Drain current                          | $I_D$                           | 110         | A                         |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note1</sup> | 330         | A                         |
| Body-drain diode reverse drain current | $I_{DR}$                        | 110         | A                         |
| Avalanche current                      | $I_{AP}$ <sup>Note2</sup>       | 55          | A                         |
| Avalanche energy                       | $E_{AS}$ <sup>Note2</sup>       | 227         | mJ                        |
| Channel dissipation                    | $P_{ch}$ <sup>Note3</sup>       | 200         | W                         |
| Channel to case thermal impedance      | $\theta_{ch-c}$                 | 0.63        | $^\circ\text{C}/\text{W}$ |
| 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.  $T_c = 25^\circ\text{C}$

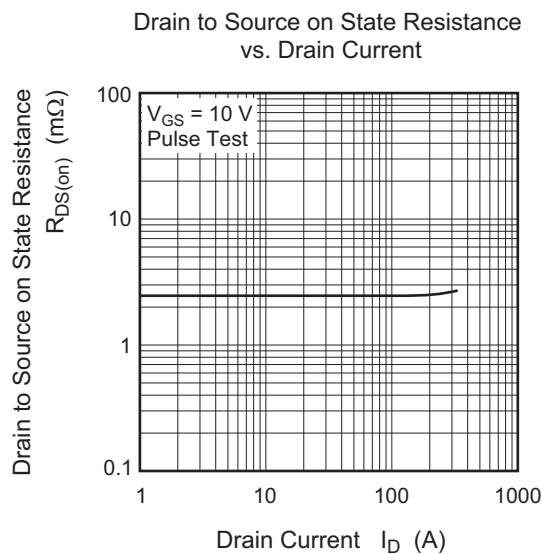
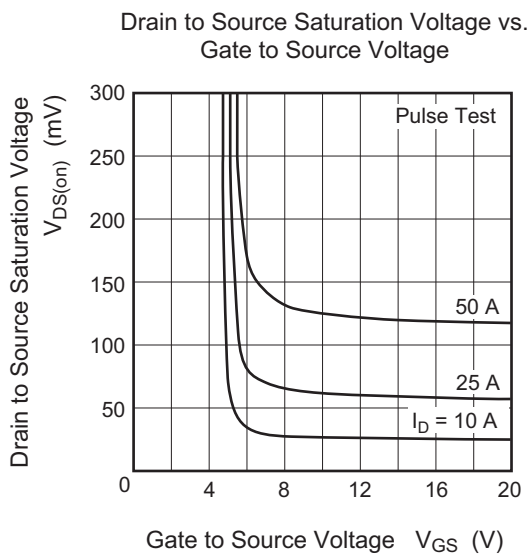
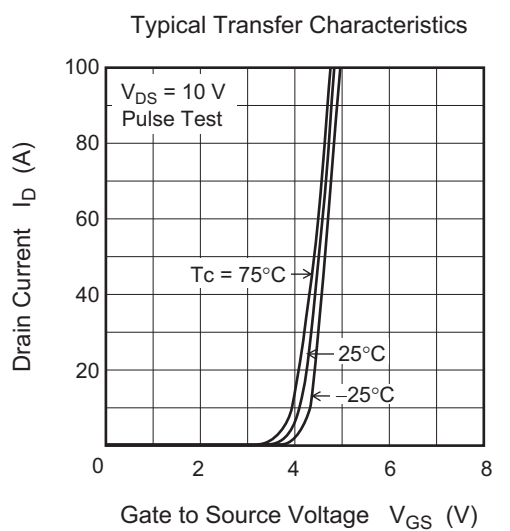
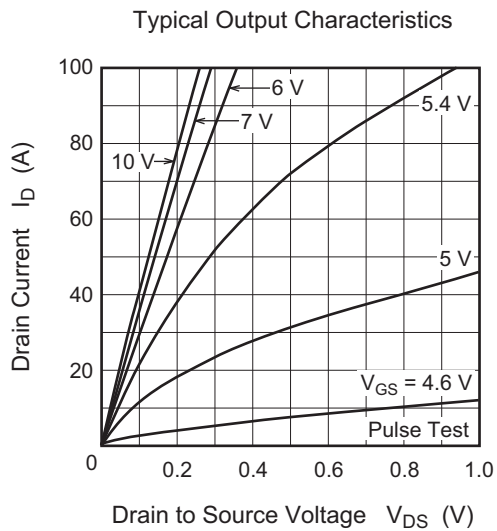
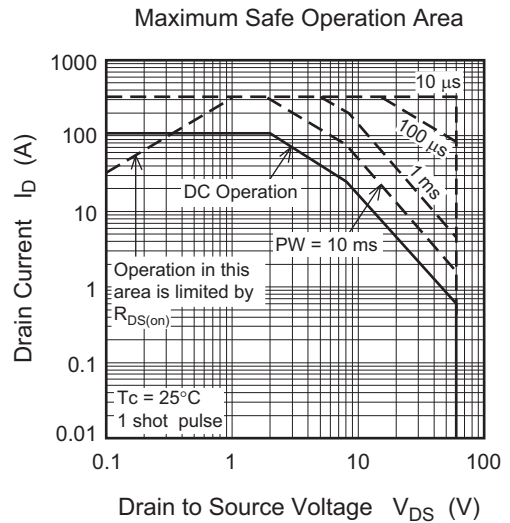
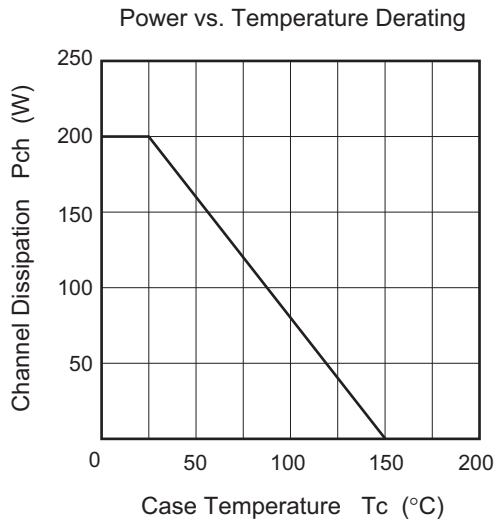
## Electrical Characteristics

(Ta = 25°C)

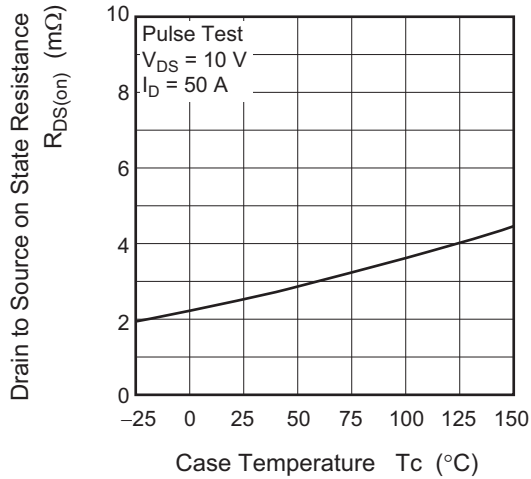
| Item                                       | Symbol        | Min | Typ   | Max       | Unit             | Test conditions   |
|--|---------------|-----|-------|-----------|------------------|---|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 60  | —     | —         | V                | $I_D = 10\text{mA}$ , $V_{GS} = 0$  |
| 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         | $\mu\text{A}$    | $V_{DS} = 60\text{V}$ , $V_{GS} = 0$                                      |
| 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 | $R_{DS(on)}$  | —   | 2.5   | 3.1       | $\text{m}\Omega$ | $I_D = 55\text{A}$ , $V_{GS} = 10\text{V}$ <sup>Note4</sup>               |
| Forward transfer admittance                | $ y_{fs} $    | —   | 120   | —         | S                | $I_D = 55\text{A}$ , $V_D = 10\text{V}$ <sup>Note4</sup>                  |
| Input capacitance                          | $C_{iss}$     | —   | 10000 | —         | pF               | $V_{DS} = 10\text{V}$   |
| Output capacitance                         | $C_{oss}$     | —   | 2150  | —         | pF               | $V_{GS} = 0$  |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 500   | —         | pF               | $f = 1\text{MHz}$   |
| Gate Resistance                            | $R_g$         | —   | 1.6   | —         | $\Omega$         |   |
| Total gate charge                          | $Q_g$         | —   | 141   | —         | nC               | $V_{DD} = 25\text{V}$   |
| Gate to source charge                      | $Q_{gs}$      | —   | 50    | —         | nC               | $V_{GS} = 10\text{V}$ ,   |
| Gate to drain charge                       | $Q_{gd}$      | —   | 25    | —         | nC               | $I_D = 55\text{A}$  |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 53    | —         | ns               | $V_{GS} = 10\text{V}$   |
| Rise time                                  | $t_r$         | —   | 27    | —         | ns               | $I_D = 55\text{A}$  |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 100   | —         | ns               | $V_{DD} \cong 30\text{V}$   |
| Fall time                                  | $t_f$         | —   | 29    | —         | ns               | $R_g = 4.7\ \Omega$   |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.85  | 1.5       | V                | $I_F = 110\text{A}$ , $V_{GS} = 0$ <sup>Note4</sup>                       |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 65    | —         | ns               | $I_F = 110\text{A}$ , $V_{GS} = 0$<br>$di_F/dt = 100\text{A}/\mu\text{s}$ |

Notes: 4. Pulse test

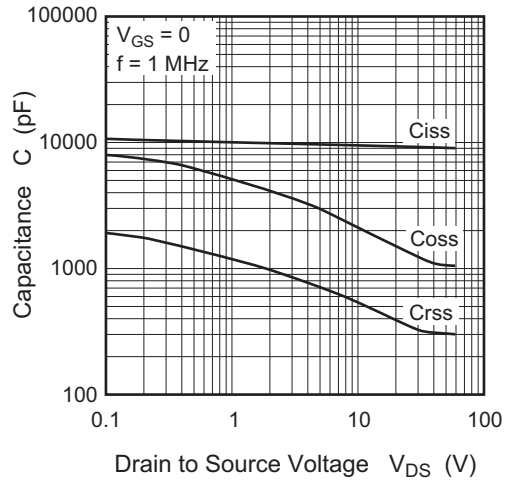
Main Characteristics



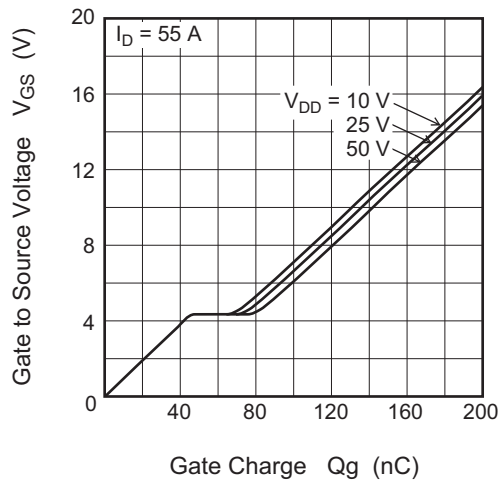
Drain to Source on State Resistance vs. Temperature



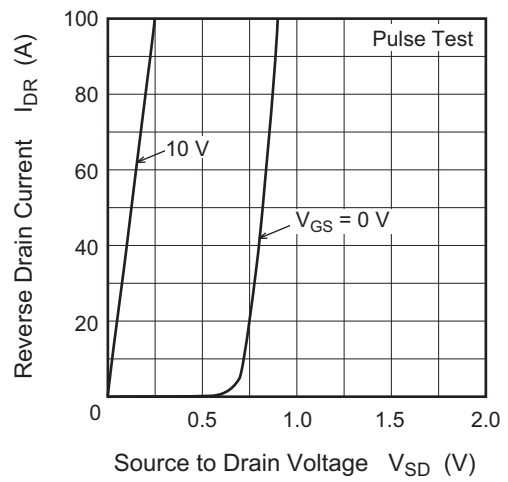
Typical Capacitance vs. Drain to Source Voltage



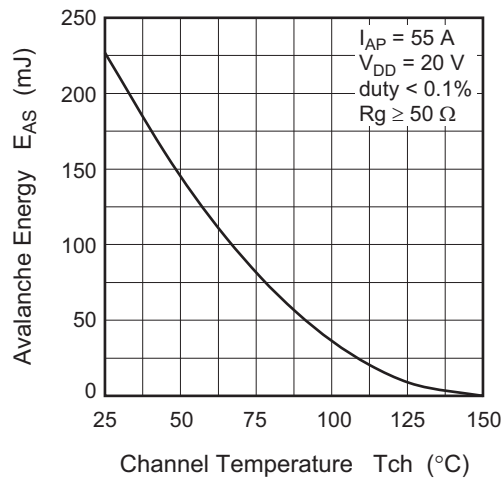
Dynamic Input Characteristics



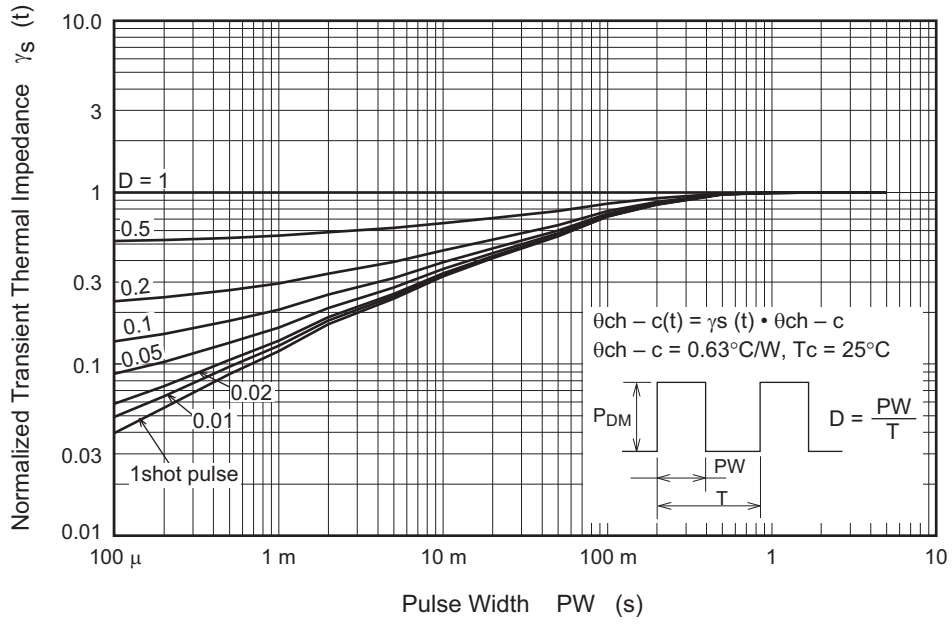
Reverse Drain Current vs. Source to Drain Voltage



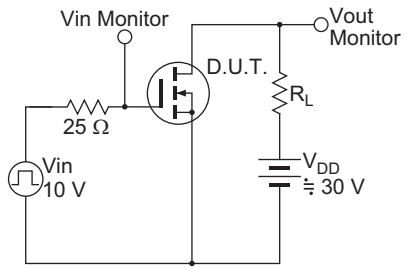
Maximum Avalanche Energy vs. Channel Temperature Derating



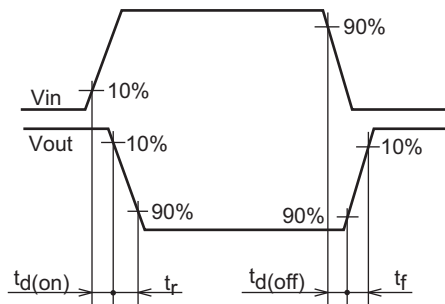
Normalized Transient Thermal Impedance vs. Pulse Width



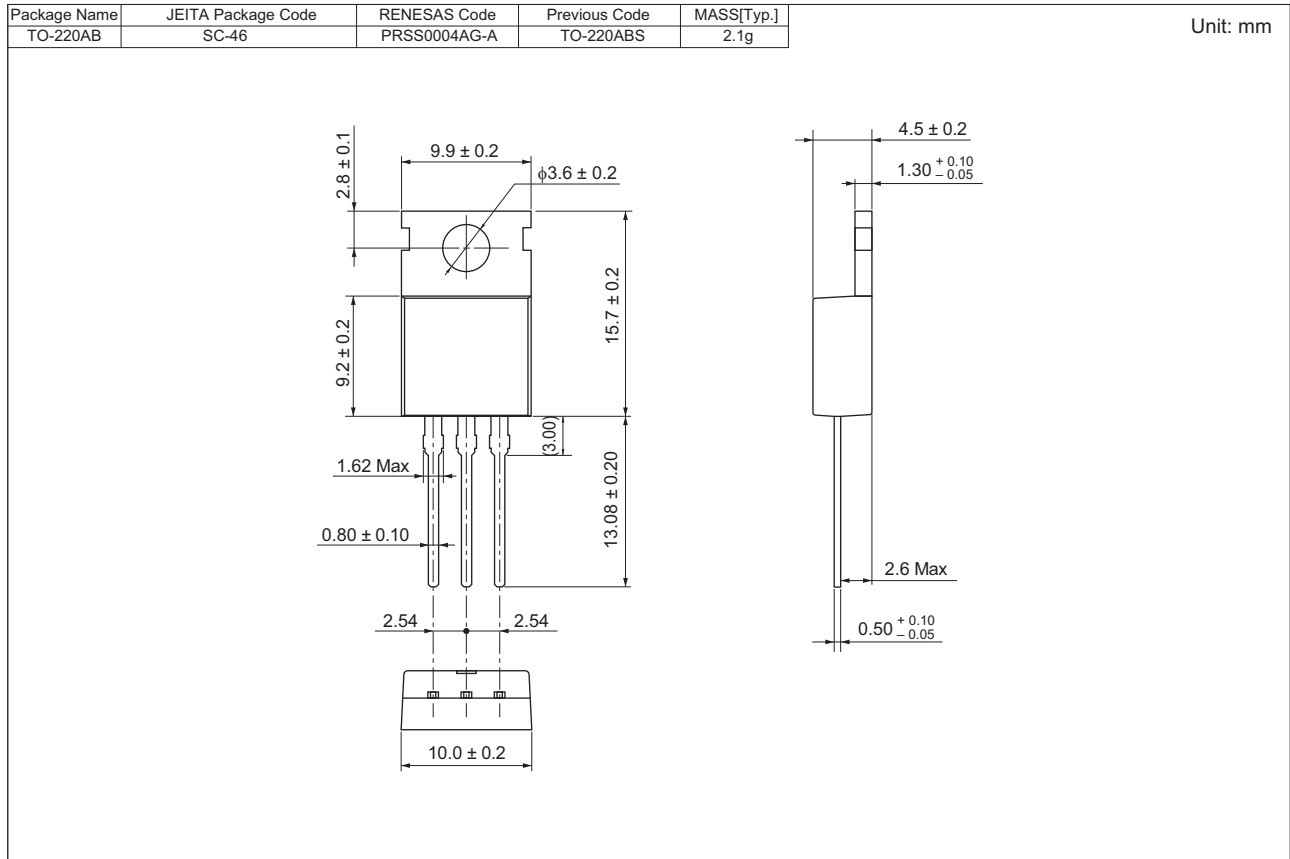
Switching Time Test Circuit



Waveform



### Package Dimensions



### Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| RJK0601DPN-E0-T2      | 50 pcs   | Magazine (Tube)    |

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

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