



# H5N3003P

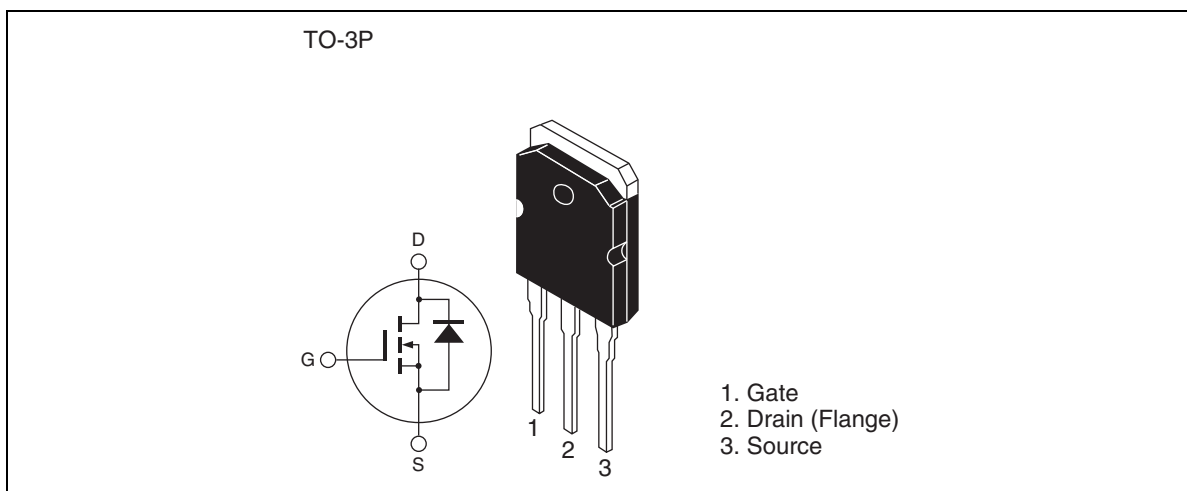
Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G0007-0200Z  
(Previous ADE-208-1547A(Z))  
Rev.2.00  
Aug.01.2003

## Features

- Low on-resistance
- Low leakage current
- High Speed Switching

## Outline



**Absolute Maximum Ratings**

(Ta = 25°C)

| Item                                        | Symbol                                   | Ratings     | Unit  |
|---------------------------------------------|------------------------------------------|-------------|-------|
| Drain to source voltage                     | V <sub>DSS</sub>                         | 300         | V     |
| Gate to source voltage                      | V <sub>GSS</sub>                         | ±30         | V     |
| Drain current                               | I <sub>D</sub>                           | 40          | A     |
| Drain peak current                          | I <sub>D</sub> (pulse) <sup>Note1</sup>  | 160         | A     |
| Body-drain diode reverse drain current      | I <sub>DR</sub>                          | 40          | A     |
| Body-drain diode reverse drain peak current | I <sub>DR</sub> (pulse) <sup>Note1</sup> | 160         | A     |
| Avalanche current                           | I <sub>AP</sub> <sup>Note3</sup>         | 30          | A     |
| Channel dissipation                         | P <sub>ch</sub> <sup>Note2</sup>         | 150         | W     |
| Channel to case Thermal Impedance           | θ <sub>ch-c</sub>                        | 0.833       | °C /W |
| Channel temperature                         | T <sub>ch</sub>                          | 150         | °C    |
| Storage temperature                         | T <sub>stg</sub>                         | –55 to +150 | °C    |

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

2. Value at Tc = 25°C

3. T<sub>ch</sub> ≤ 150°C

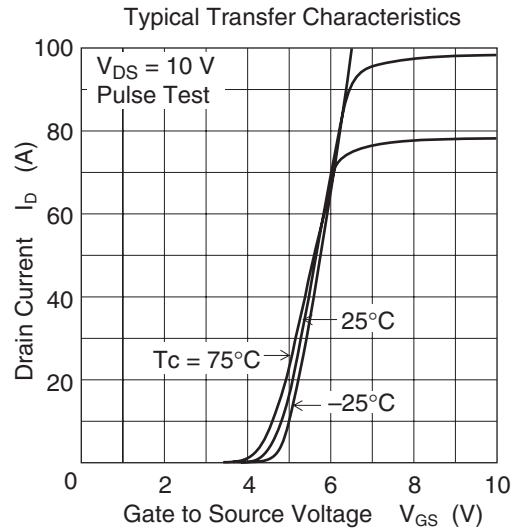
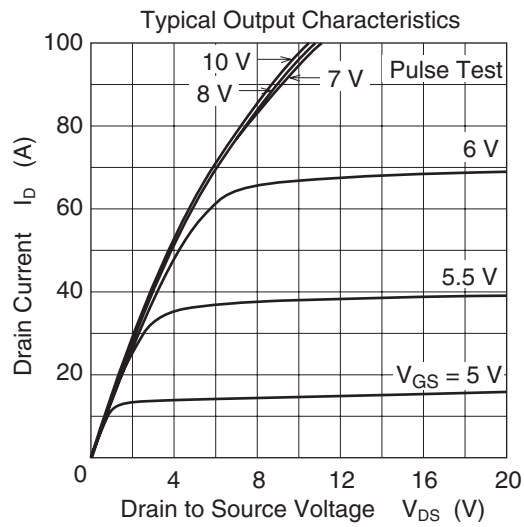
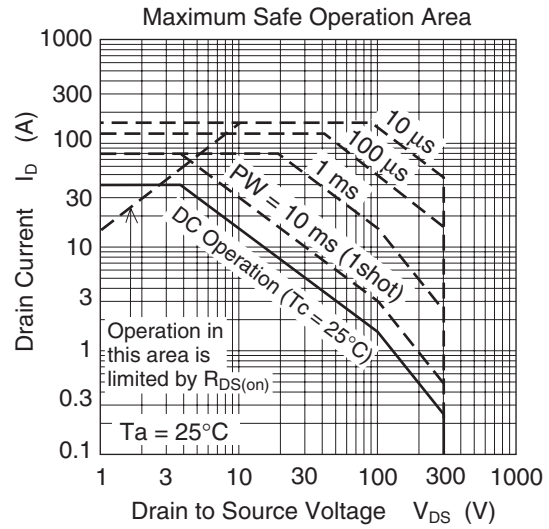
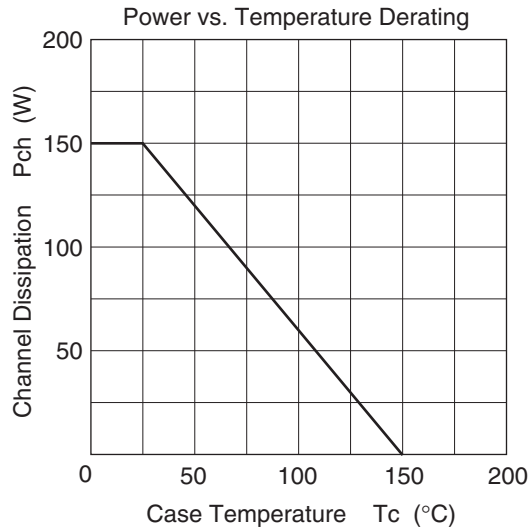
## Electrical Characteristics

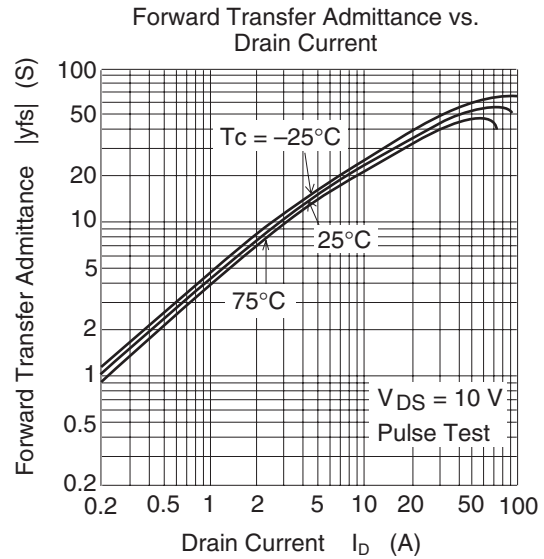
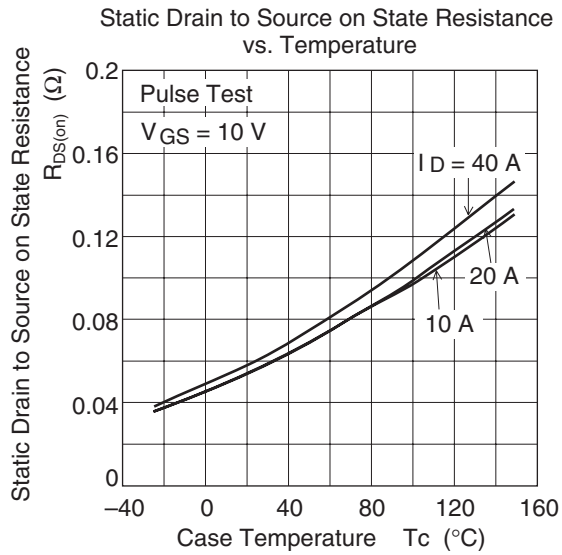
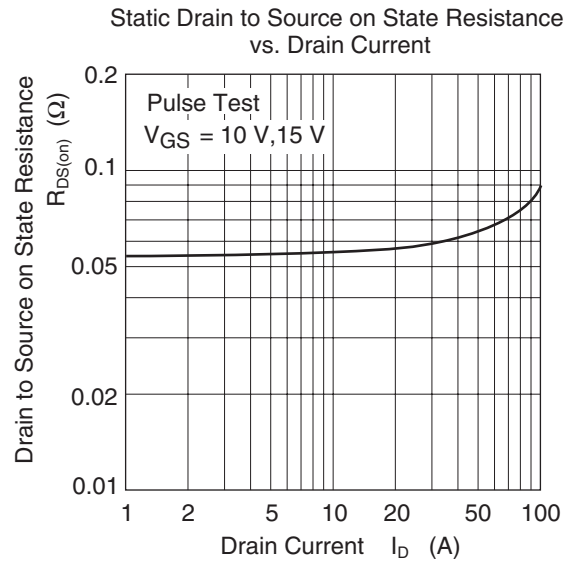
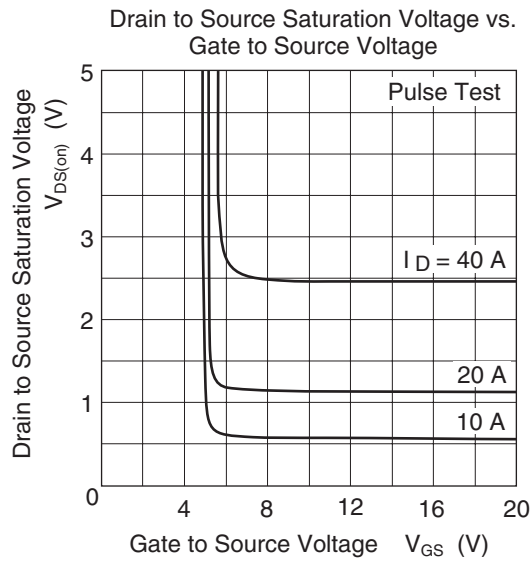
(Ta = 25°C)

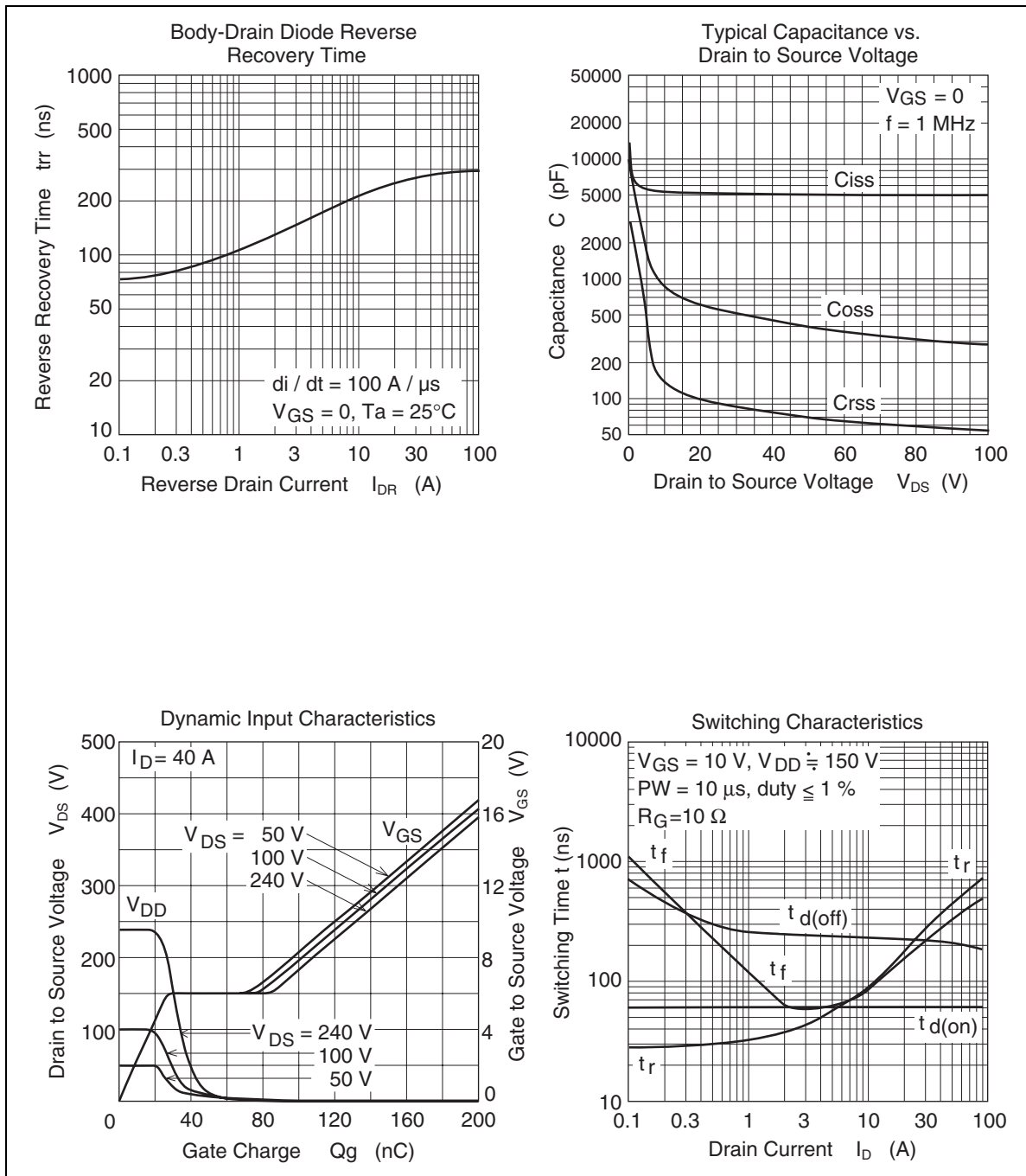
| Item                                       | Symbol        | Min | Typ   | Max       | Unit          | Test Conditions                                                          |
|--------------------------------------------|---------------|-----|-------|-----------|---------------|--------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 300 | —     | —         | V             | $I_D = 10\text{mA}$ , $V_{GS} = 0$                                       |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —     | 1         | $\mu\text{A}$ | $V_{DS} = 300\text{V}$ , $V_{GS} = 0$                                    |
| 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 | —     | 4.0       | V             | $V_{DS} = 10\text{V}$ , $I_D = 1\text{mA}$                               |
| Forward transfer admittance                | $ y_{fs} $    | 20  | 35    | —         | S             | $I_D = 20\text{A}$ , $V_{DS} = 10\text{V}$ <sup>Note4</sup>              |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.058 | 0.069     | $\Omega$      | $I_D = 20\text{A}$ , $V_{GS} = 10\text{V}$ <sup>Note4</sup>              |
| Input capacitance                          | $C_{iss}$     | —   | 5150  | —         | pF            | $V_{DS} = 25\text{V}$                                                    |
| Output capacitance                         | $C_{oss}$     | —   | 560   | —         | pF            | $V_{GS} = 0$                                                             |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 90    | —         | pF            | $f = 1\text{MHz}$                                                        |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 60    | —         | ns            | $I_D = 20\text{A}$                                                       |
| Rise time                                  | $t_r$         | —   | 185   | —         | ns            | $R_L = 7.5\Omega$                                                        |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 220   | —         | ns            | $V_{GS} = 10\text{V}$                                                    |
| Fall time                                  | $t_f$         | —   | 150   | —         | ns            | $R_g = 10\Omega$                                                         |
| Total gate charge                          | $Q_g$         | —   | 130   | —         | nC            | $V_{DD} = 240\text{V}$                                                   |
| Gate to source charge                      | $Q_{gs}$      | —   | 25    | —         | nC            | $V_{GS} = 10\text{V}$                                                    |
| Gate to drain charge                       | $Q_{gd}$      | —   | 60    | —         | nC            | $I_D = 40\text{A}$                                                       |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 1.0   | 1.5       | V             | $I_F = 40\text{A}$ , $V_{GS} = 0$                                        |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 280   | —         | ns            | $I_F = 40\text{A}$ , $V_{GS} = 0$<br>$di_F/dt = 100\text{A}/\mu\text{s}$ |
| Body-drain diode reverse recovery charge   | $Q_{rr}$      | —   | 2.5   | —         | $\mu\text{C}$ |                                                                          |

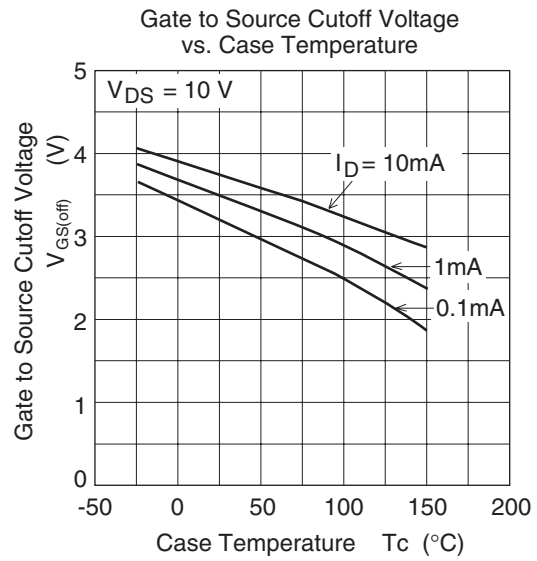
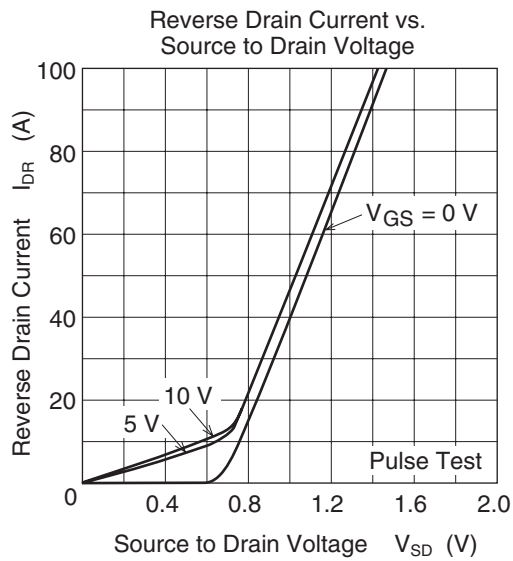
Notes: 4. Pulse test

## Main Characteristics

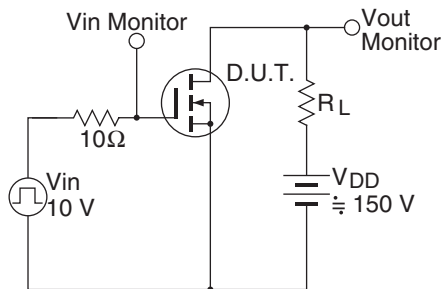




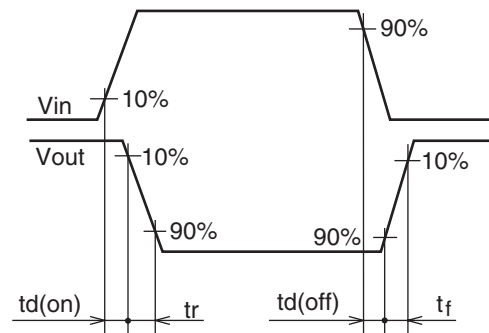


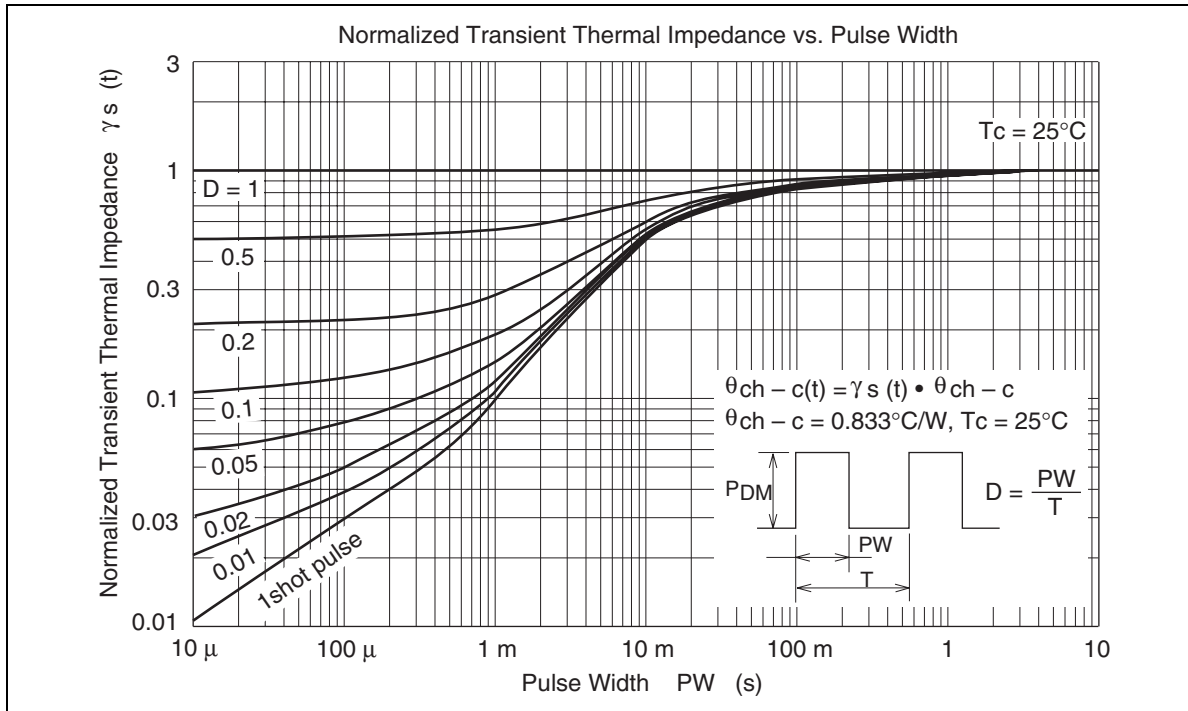


Switching Time Test Circuit

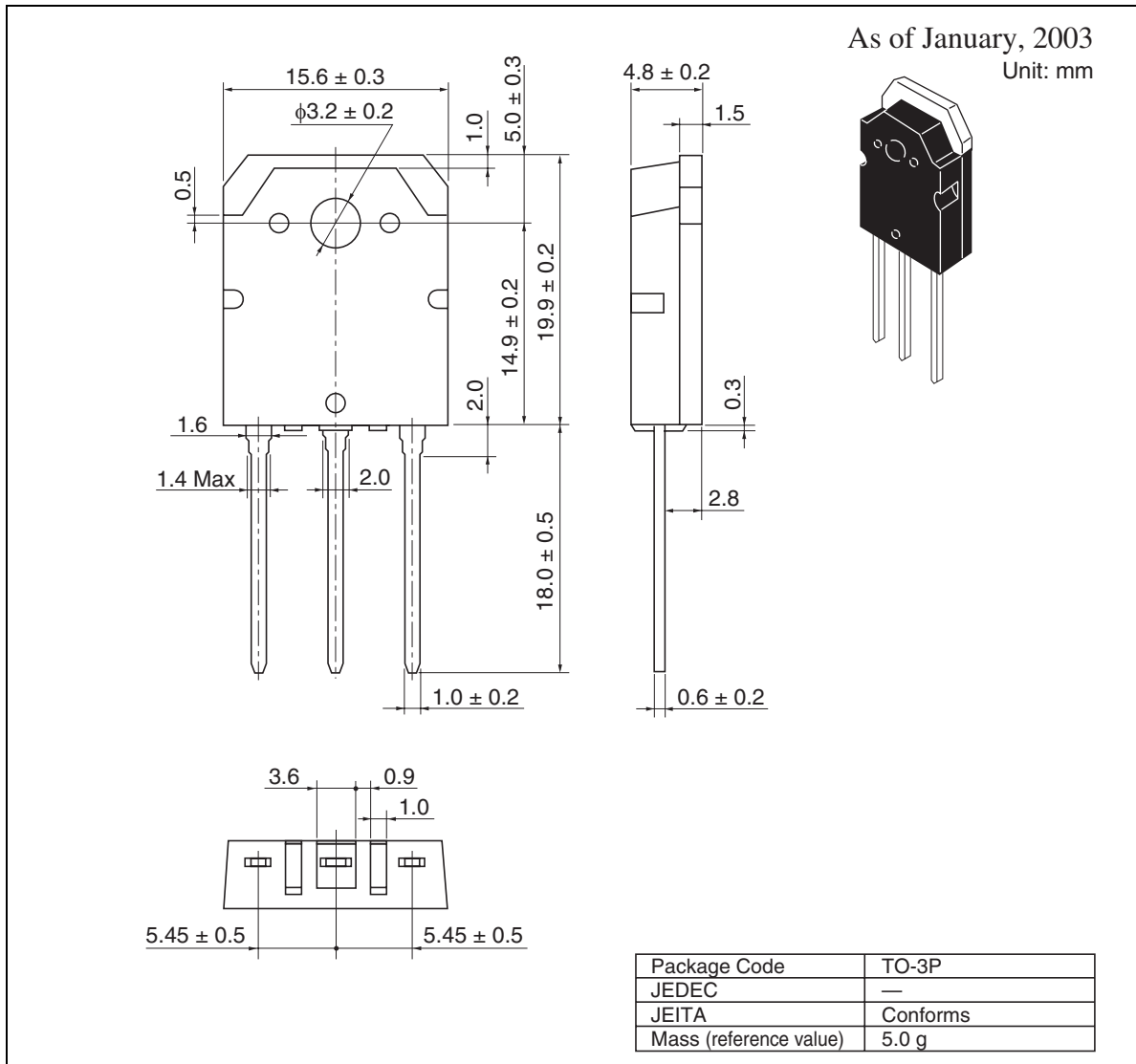


Waveform





## Package Dimensions



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

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