

# μPA2600T1R

N-CHANNEL MOSFET  
20 V, 7.0 A, 13.8 mΩ

R07DS0998EJ0101  
Rev.1.01  
Sep 04, 2013

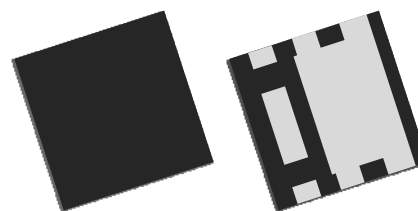
## Description

The μPA2600T1R is N-channel MOS Field Effect Transistors for switching application.

This device features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

## Features

- High Drain to Source Voltage  
—  $V_{DSS} = 20\text{ V}$  ( $V_{GS} = 0\text{ V}$ ,  $T_A = 25^\circ\text{C}$ )
- 2.5V drive available
- Low on-state resistance  
—  $R_{DS(on)1} = 13.8\text{ m}\Omega\text{ MAX.}$  ( $V_{GS} = 4.5\text{ V}$ ,  $I_D = 3.5\text{ A}$ )  
—  $R_{DS(on)2} = 19.1\text{ m}\Omega\text{ MAX.}$  ( $V_{GS} = 2.5\text{ V}$ ,  $I_D = 3.5\text{ A}$ )
- Built-in gate protection diode
- Lead-free and Halogen-free



6pinHUSON2020

## Ordering Information

| Part Number        | Package       |
|--------------------|---------------|
| μPA2600T1R-E2-AX*1 | 6pinHUSON2020 |

Note: \*1.Pb-free (This product does not contain Pb in the external electrode and other parts.)

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

| Item  | Symbol         | Ratings     | Unit             |
|---|----------------|-------------|------------------|
| Drain to Source Voltage ( $V_{GS} = 0\text{ V}$ ) | $V_{DSS}$      | 20          | V                |
| Gate to Source Voltage ( $V_{DS} = 0\text{ V}$ )  | $V_{GSS}$      | $\pm 12$    | V                |
| Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )   | $I_{D(DC)}$    | $\pm 7.0$   | A                |
| Drain Current (pulse)*1                           | $I_{D(pulse)}$ | $\pm 28$    | A                |
| Total Power Dissipation (5 s)*2                   | $P_T$          | 2.4         | 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  $\leq 1\%$

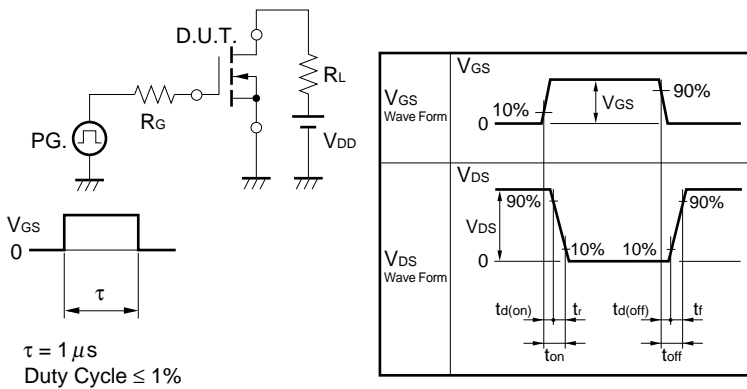
\*2. Mounted on glass epoxy board of 25.4mm x 25.4mm x 0.8mm

**Electrical Characteristics (T<sub>A</sub> = 25°C)**

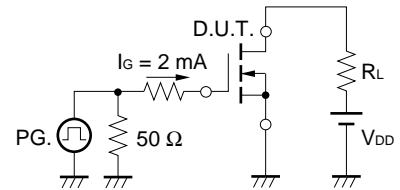
| Characteristics                        | Symbol               | MIN. | TYP. | MAX. | Unit | Test Conditions  |
|--|----------------------|------|------|------|------|--|
| Zero Gate Voltage Drain Current        | I <sub>DSS</sub>     |      |      | 1.0  | μA   | V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V  |
| Gate Leakage Current                   | I <sub>GSS</sub>     |      |      | ±10  | μA   | V <sub>GS</sub> = ±10 V, V <sub>DS</sub> = 0 V   |
| Gate Cut-off Voltage                   | V <sub>GS(off)</sub> | 0.5  |      | 1.5  | V    | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA  |
| Forward Transfer Admittance *1         | y <sub>fs</sub>      | 6.5  |      |      | S    | V <sub>DS</sub> = 5V, I <sub>D</sub> = 3.5 A   |
| Drain to Source On-state Resistance *1 | R <sub>DS(on)1</sub> |      | 11.1 | 13.8 | mΩ   | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.5 A  |
|  | R <sub>DS(on)2</sub> |      | 14.4 | 19.1 | mΩ   | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 3.5 A  |
| Input Capacitance                      | C <sub>iss</sub>     |      | 870  |      | pF   | V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V,<br>f = 1.0 MHz                                  |
| Output Capacitance                     | C <sub>oss</sub>     |      | 170  |      | pF   |  |
| Reverse Transfer Capacitance           | C <sub>rss</sub>     |      | 110  |      | pF   |  |
| Turn-on Delay Time                     | t <sub>d(on)</sub>   |      | 12   |      | ns   | I <sub>D</sub> = 3.5 A, V <sub>DD</sub> = 10 V,<br>V <sub>GS</sub> = 4 V, R <sub>G</sub> = 6 Ω |
| Rise Time                              | t <sub>r</sub>       |      | 10   |      | ns   |  |
| Turn-off Delay Time                    | t <sub>d(off)</sub>  |      | 42   |      | ns   |  |
| Fall Time                              | t <sub>f</sub>       |      | 9    |      | ns   | I <sub>D</sub> = 7.0 A, V <sub>DD</sub> = 16 V,<br>V <sub>GS</sub> = 10 V                      |
| Total Gate Charge                      | Q <sub>G</sub>       |      | 7.9  |      | nC   |  |
| Gate to Source Charge                  | Q <sub>GS</sub>      |      | 1.7  |      | nC   |  |
| Gate to Drain Charge                   | Q <sub>GD</sub>      |      | 2.8  |      | nC   |  |
| Body Diode Forward Voltage *1          | V <sub>F(S-D)</sub>  |      |      | 1.5  | V    | I <sub>F</sub> = 7.0 A, V <sub>GS</sub> = 0 V  |

Note: \*1. Pulsed

**TEST CIRCUIT 1 SWITCHING TIME**

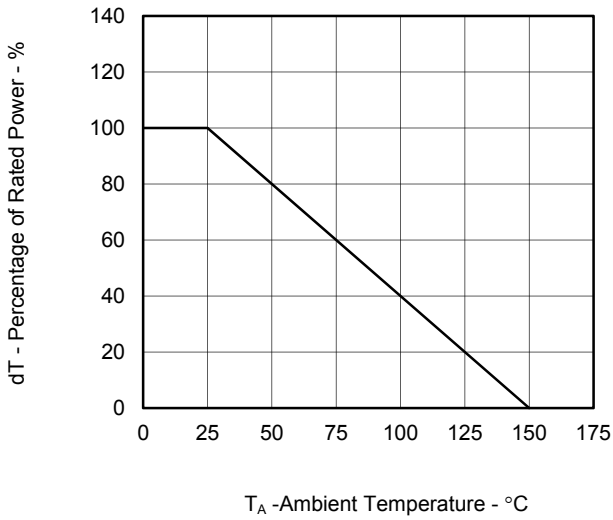


**TEST CIRCUIT 2 GATE CHARGE**

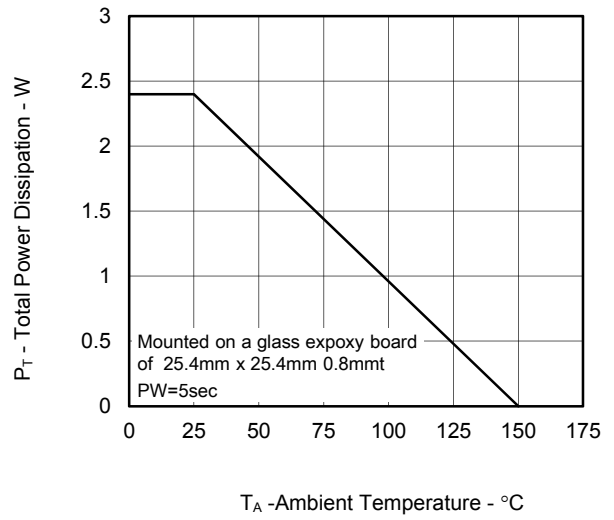


Typical Characteristics (T<sub>A</sub> = 25°C)

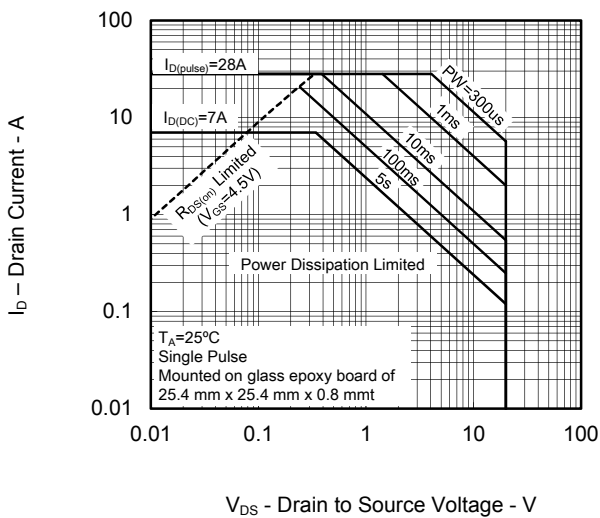
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



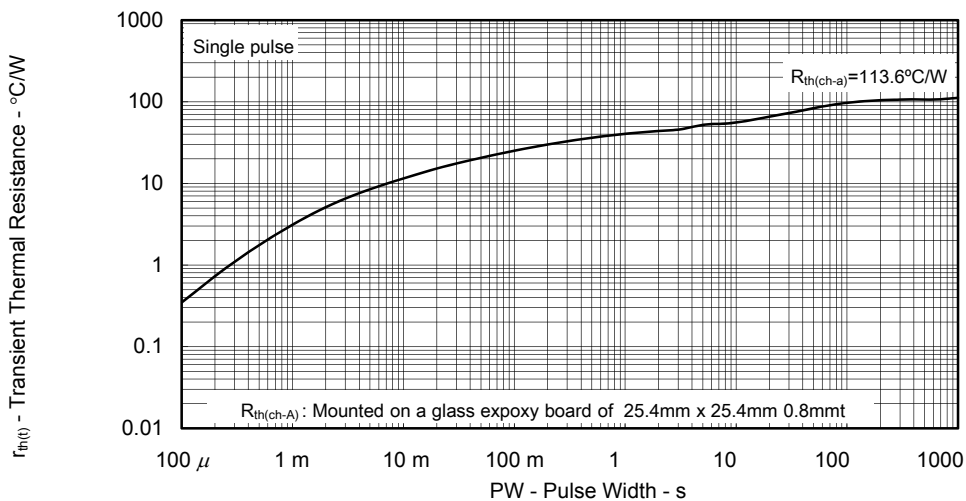
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



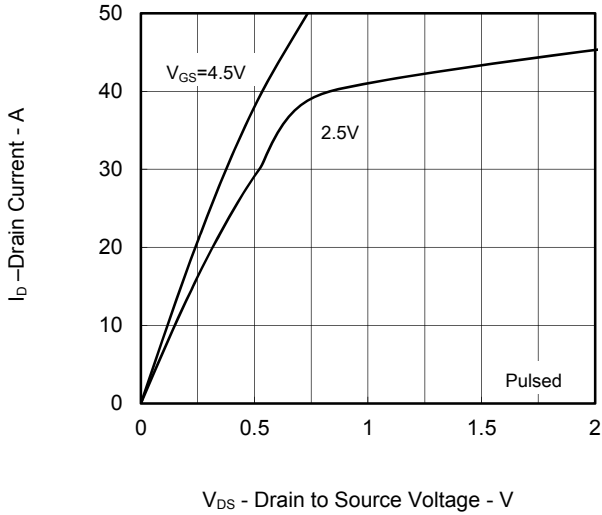
FORWARD BIAS SAFE OPERATING AREA



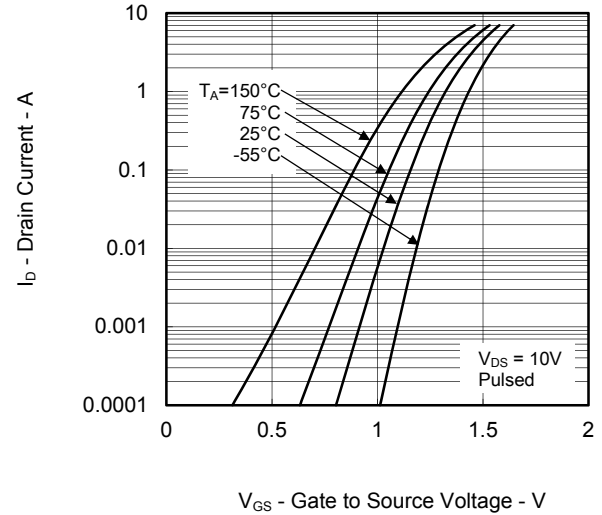
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



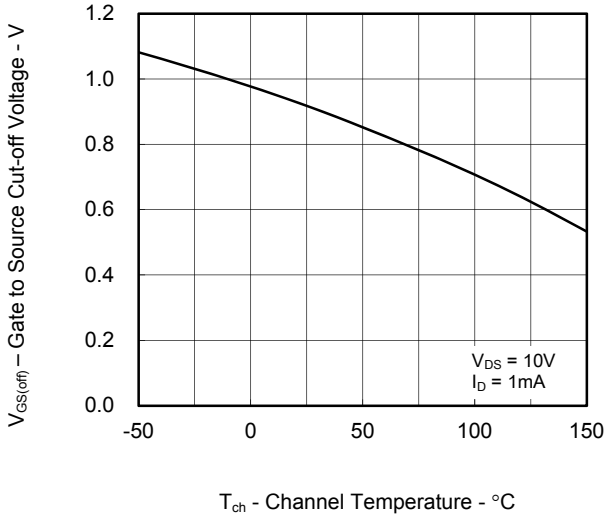
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



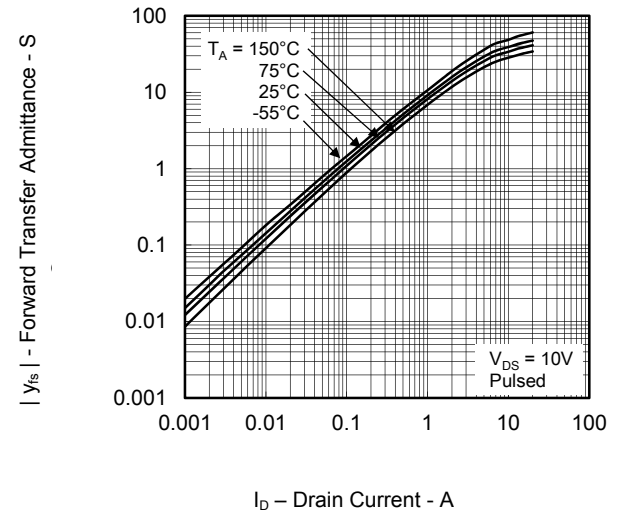
FORWARD TRANSFER CHARACTERISTICS



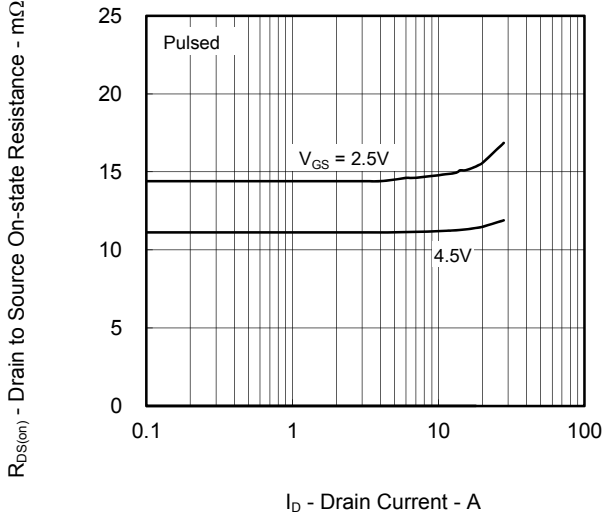
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



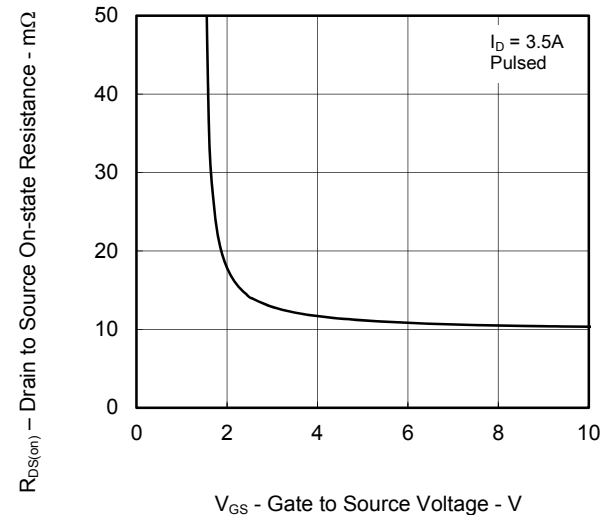
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



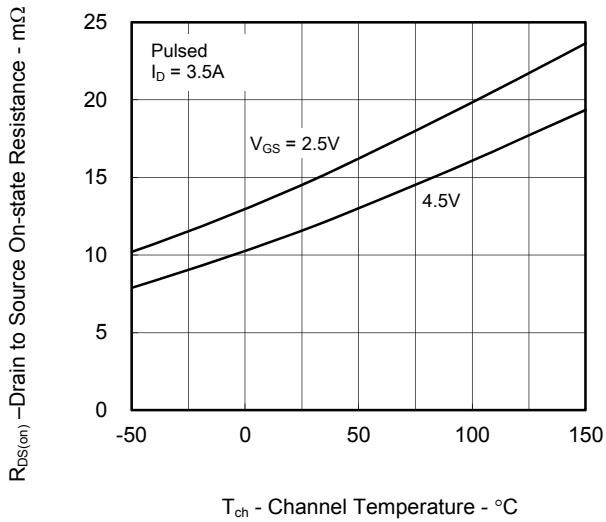
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



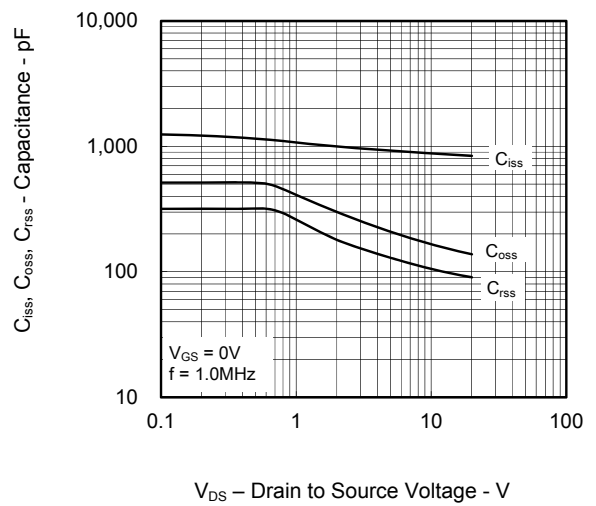
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



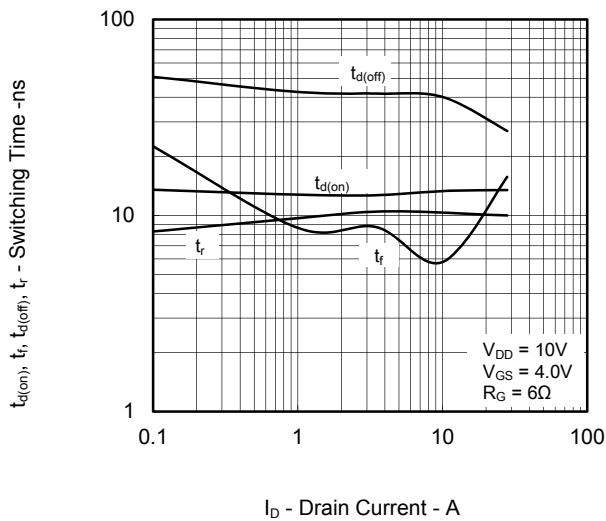
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



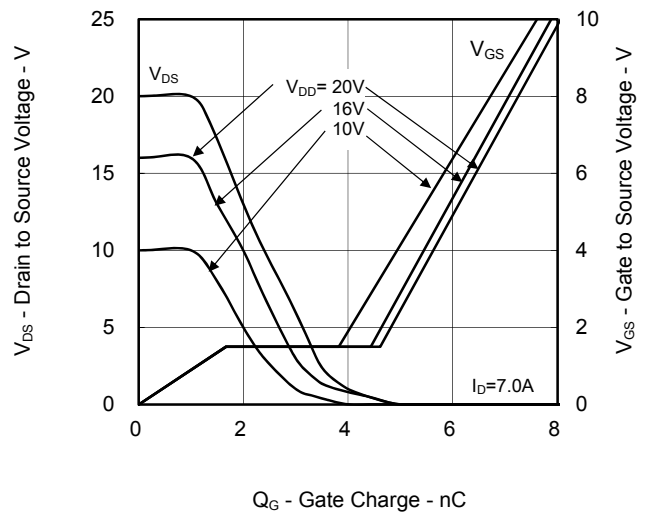
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



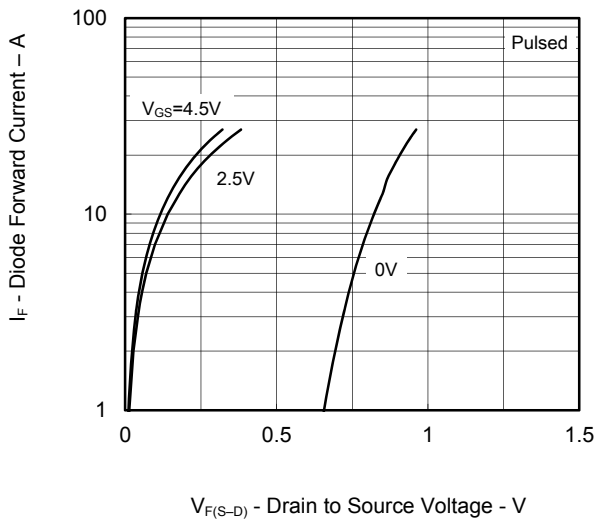
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS

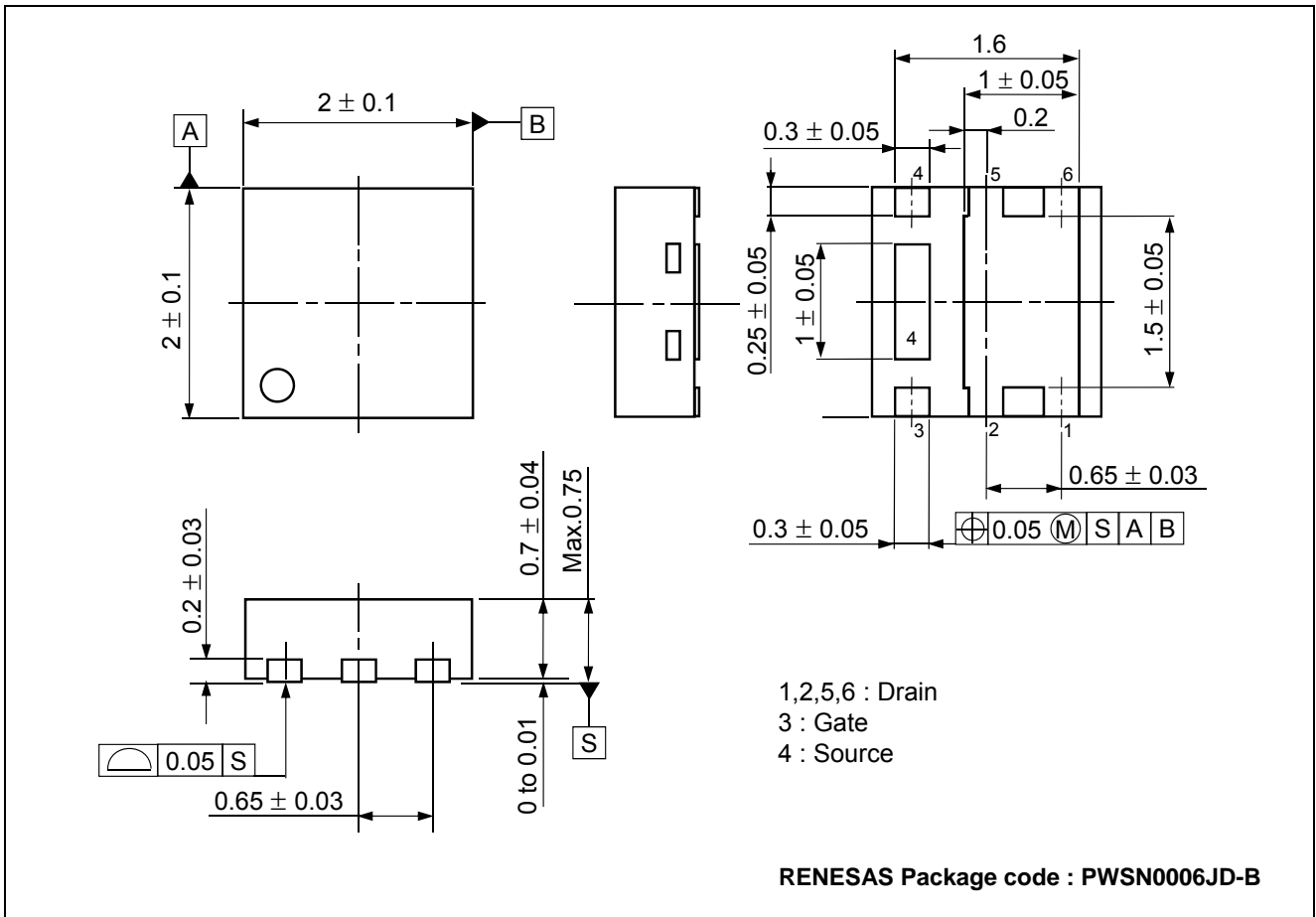


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

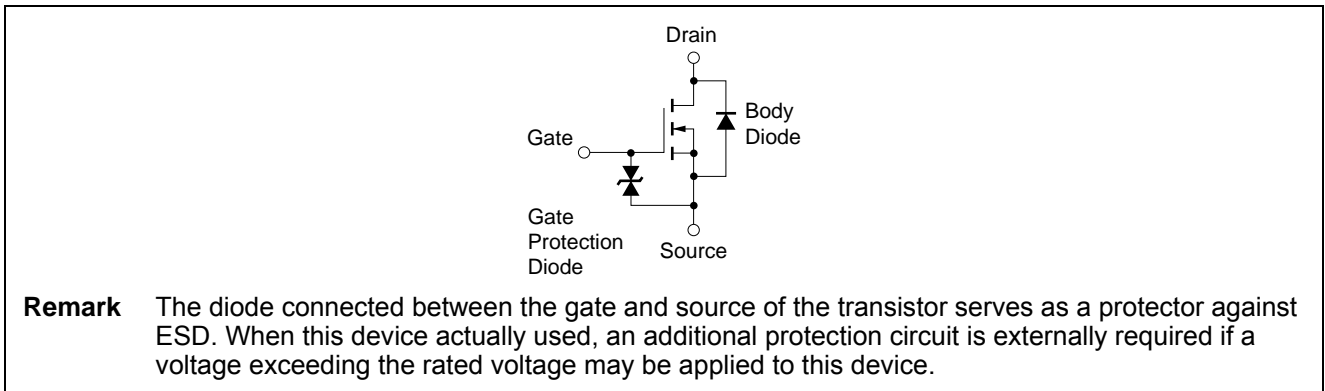


Package Drawings (Unit: mm)

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Equivalent Circuit



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