

# μPA2826T1S

N-channel MOSFET

20 V , 27 A , 4.3 mΩ

R07DS0989EJ0100

Rev.1.00

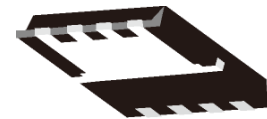
Dec 25, 2012

## Description

The μPA2826T1S is N-channel MOS Field Effect Transistor designed for power management applications of portable equipment .

## Features

- $V_{DSS} = 20\text{ V}$  ( $T_A = 25^\circ\text{C}$ )
- Low on-state resistance  
—  $R_{DS(on)} = 4.3\text{ m}\Omega$  MAX. ( $V_{GS} = 8.0\text{ V}$ ,  $I_D = 13.5\text{ A}$ )
- 2.5 V Gate-drive available
- Small & thin type surface mount package with heat spreader
- Pb-free and Halogen free



HWSON-8

## Ordering Information

| Part No.                       | LEAD PLATING | PACKING          | Package                 |
|--------------------------------|--------------|------------------|-------------------------|
| μPA2826T1S-E2-AT <sup>*1</sup> | Pure Sn(Tin) | Tape 5000 p/reel | HWSON-8<br>0.022 g TYP. |

Note: \*1. Pb-free (This product does not contain Pb in 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 ( $V_{DS} = 0\text{ V}$ )     | $V_{GSS}$      | ±12         | V    |
| Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )      | $I_{D(DC)}$    | ±27         | A    |
| Drain Current (pulse) <sup>*1</sup>                  | $I_{D(pulse)}$ | ±81         | A    |
| Total Power Dissipation <sup>*2</sup>                | $P_{T1}$       | 1.5         | W    |
| Total Power Dissipation (PW = 10 sec) <sup>*2</sup>  | $P_{T2}$       | 3.8         | W    |
| Total Power Dissipation ( $T_C = 25^\circ\text{C}$ ) | $P_{T3}$       | 20          | W    |
| Channel Temperature                                  | $T_{ch}$       | 150         | °C   |
| Storage Temperature                                  | $T_{stg}$      | -55 to +150 | °C   |

## Thermal Resistance

|   |                |      |      |
|---|----------------|------|------|
| Channel to Ambient Thermal Resistance <sup>*2</sup> | $R_{th(ch-A)}$ | 83.3 | °C/W |
| Channel to Case(Drain) Thermal Resistance           | $R_{th(ch-C)}$ | 6.25 | °C/W |

Notes: \*1.  $PW \leq 10\ \mu\text{s}$ , Duty Cycle  $\leq 1\%$

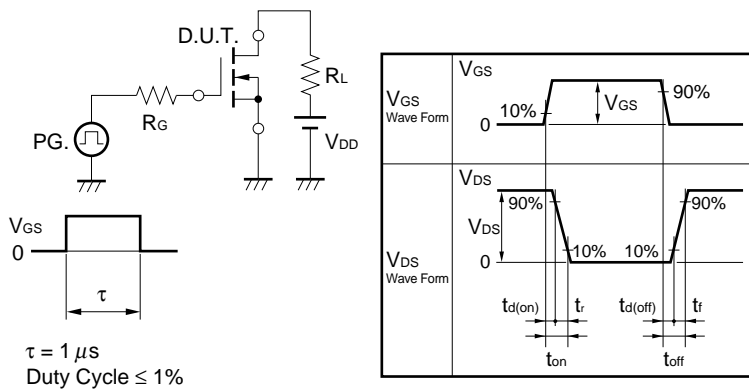
\*2. Mounted on a glass epoxy board of 25.4 mm x 25.4 mm x 0.8 mm

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

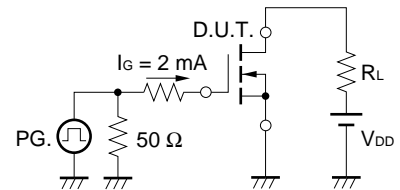
| Item                                   | Symbol               | MIN. | TYP. | MAX. | Unit | Test Conditions   |
|--|----------------------|------|------|------|------|---|
| Zero Gate Voltage Drain Current        | I <sub>DSS</sub>     |      |      | 1    | μA   | V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V   |
| Gate Leakage Current                   | I <sub>GSS</sub>     |      |      | ±10  | μA   | V <sub>GS</sub> = ±12 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>      | 25   |      |      | S    | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 6.8 A  |
| Drain to Source On-state Resistance *1 | R <sub>DS(on)1</sub> |      | 3.4  | 4.3  | mΩ   | V <sub>GS</sub> = 8.0 V, I <sub>D</sub> = 13.5 A  |
|  | R <sub>DS(on)2</sub> |      | 3.9  | 4.8  | mΩ   | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 13.5 A  |
|  | R <sub>DS(on)3</sub> |      | 5.4  | 9.9  | mΩ   | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 6.8 A   |
| Input Capacitance                      | C <sub>iss</sub>     |      | 3610 |      | pF   | V <sub>DS</sub> = 10 V,<br>V <sub>GS</sub> = 0 V,<br>f = 1 MHz  |
| Output Capacitance                     | C <sub>oss</sub>     |      | 1230 |      | pF   |   |
| Reverse Transfer Capacitance           | C <sub>rss</sub>     |      | 1130 |      | pF   |   |
| Turn-on Delay Time                     | t <sub>d(on)</sub>   |      | 50   |      | ns   | V <sub>DD</sub> = 10 V, I <sub>D</sub> = 13.5 A,<br>V <sub>GS</sub> = 4.0 V,<br>R <sub>G</sub> = 10 Ω |
| Rise Time                              | t <sub>r</sub>       |      | 94   |      | ns   |   |
| Turn-off Delay Time                    | t <sub>d(off)</sub>  |      | 120  |      | ns   |   |
| Fall Time                              | t <sub>f</sub>       |      | 120  |      | ns   |   |
| Total Gate Charge                      | Q <sub>G</sub>       |      | 37   |      | nC   | V <sub>DD</sub> = 10 V,<br>V <sub>GS</sub> = 4.0 V,<br>I <sub>D</sub> = 27 A                          |
| Gate to Source Charge                  | Q <sub>GS</sub>      |      | 7    |      | nC   |   |
| Gate to Drain Charge                   | Q <sub>GD</sub>      |      | 18   |      | nC   |   |
| Body Diode Forward Voltage *1          | V <sub>F(S-D)</sub>  |      | 0.82 |      | V    | I <sub>F</sub> = 27 A, V <sub>GS</sub> = 0 V  |
| Reverse Recovery Time                  | t <sub>rr</sub>      |      | 73   |      | ns   | I <sub>F</sub> = 27 A, V <sub>GS</sub> = 0 V,   |
| Reverse Recovery Charge                | Q <sub>rr</sub>      |      | 70   |      | nC   | di/dt = 100 A/μs  |

Note: \*1. Pulsed

**TEST CIRCUIT 1 SWITCHING TIME**

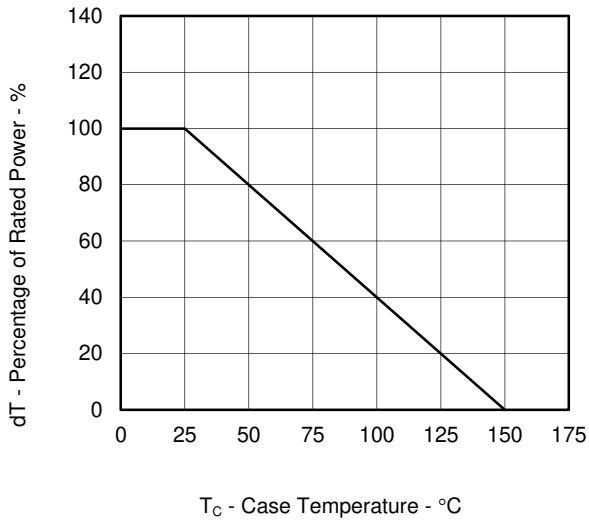


**TEST CIRCUIT 2 GATE CHARGE**

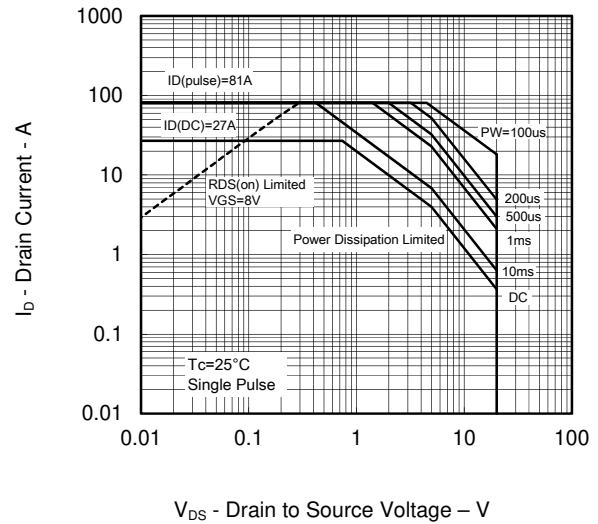


TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

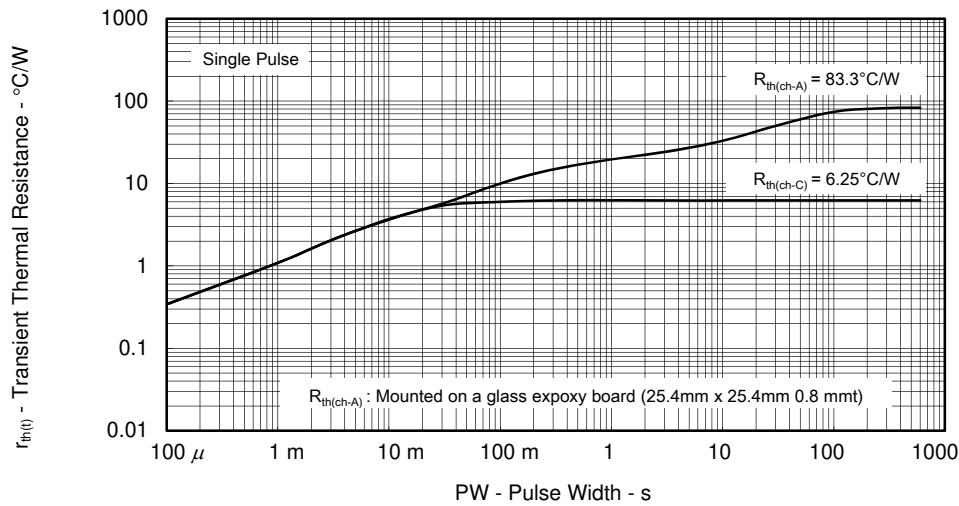
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



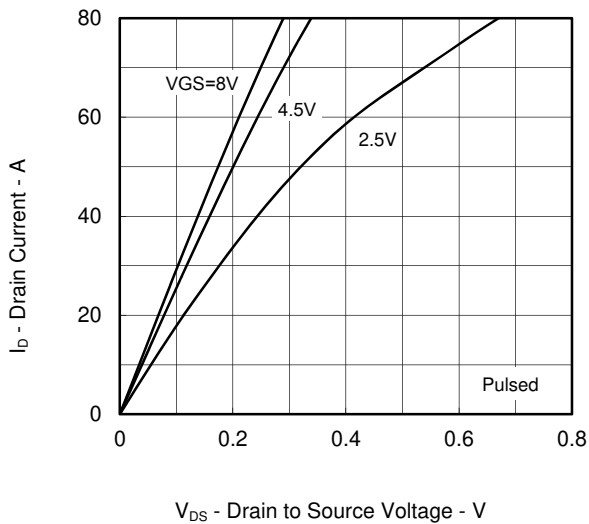
FORWARD BIAS SAFE OPERATING AREA



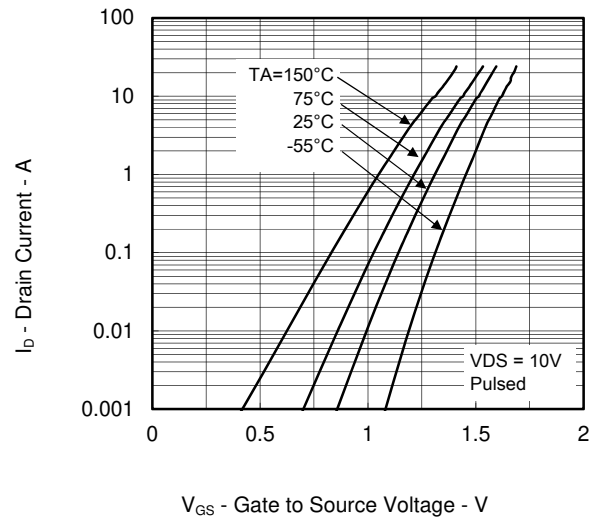
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



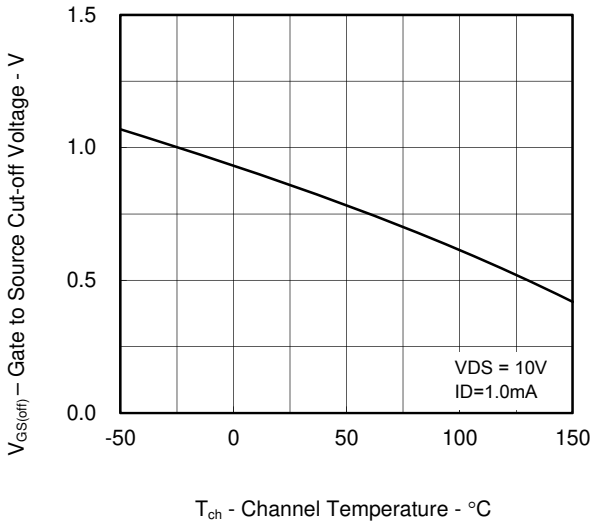
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



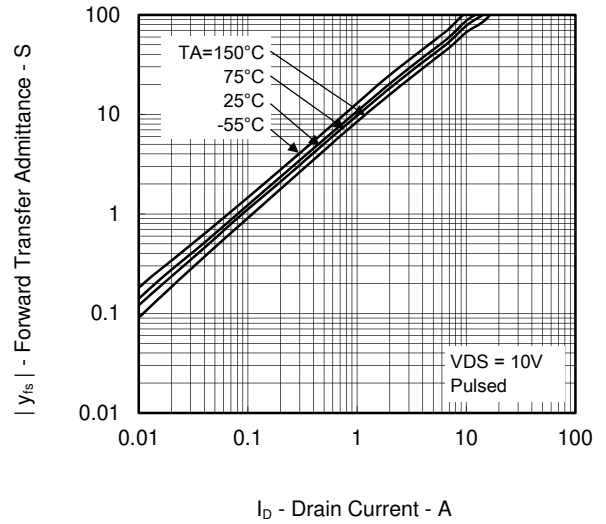
FORWARD TRANSFER CHARACTERISTICS



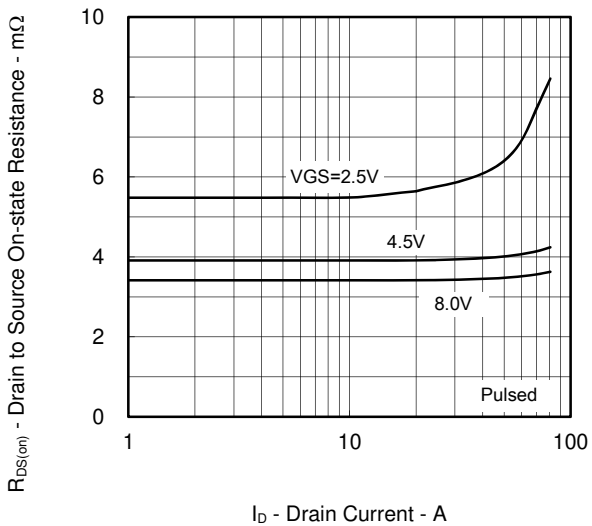
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



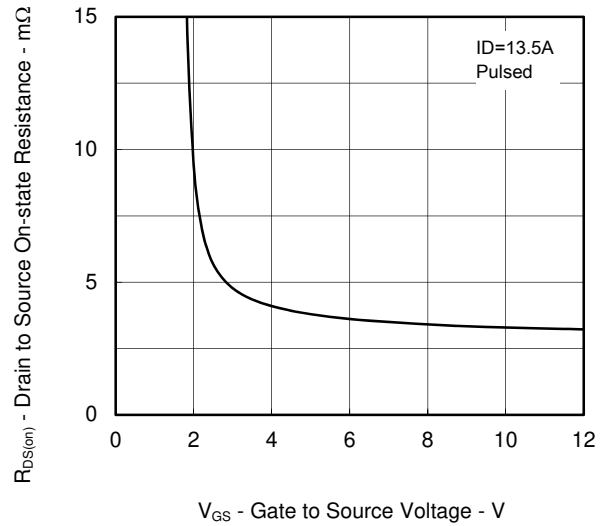
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



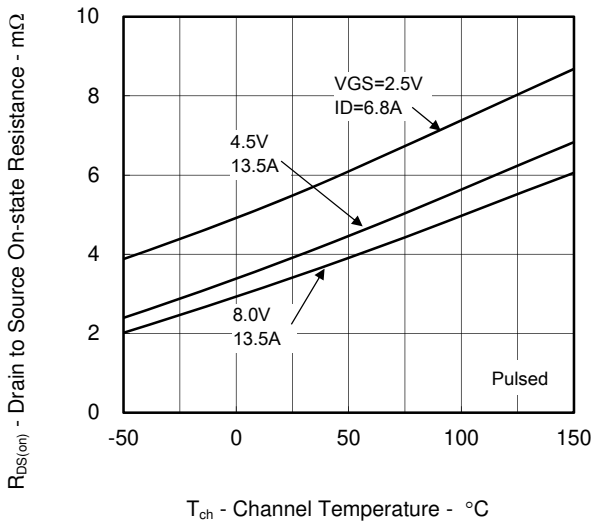
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



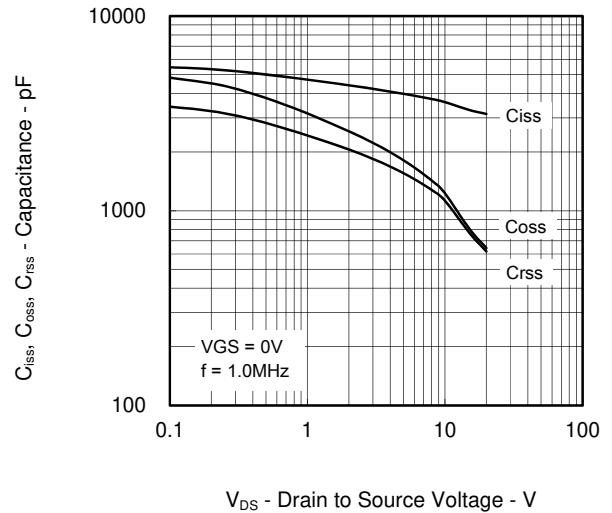
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



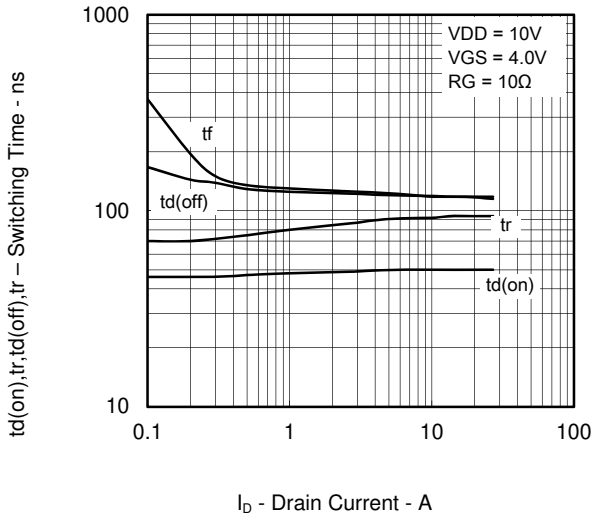
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



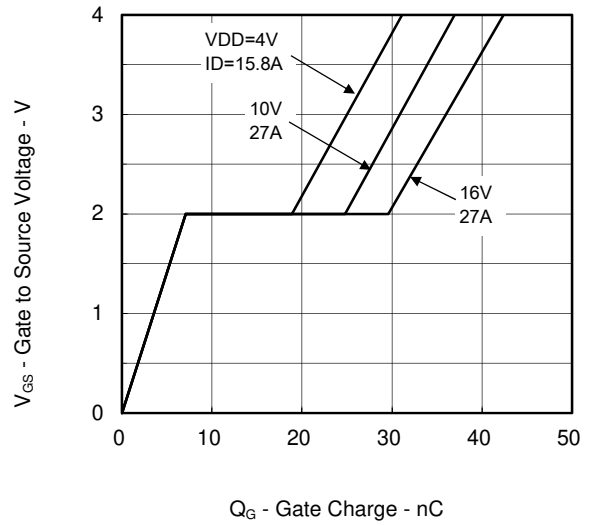
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



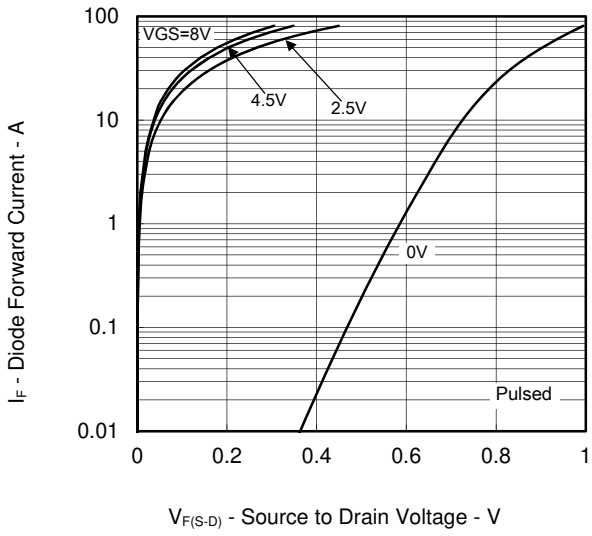
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS

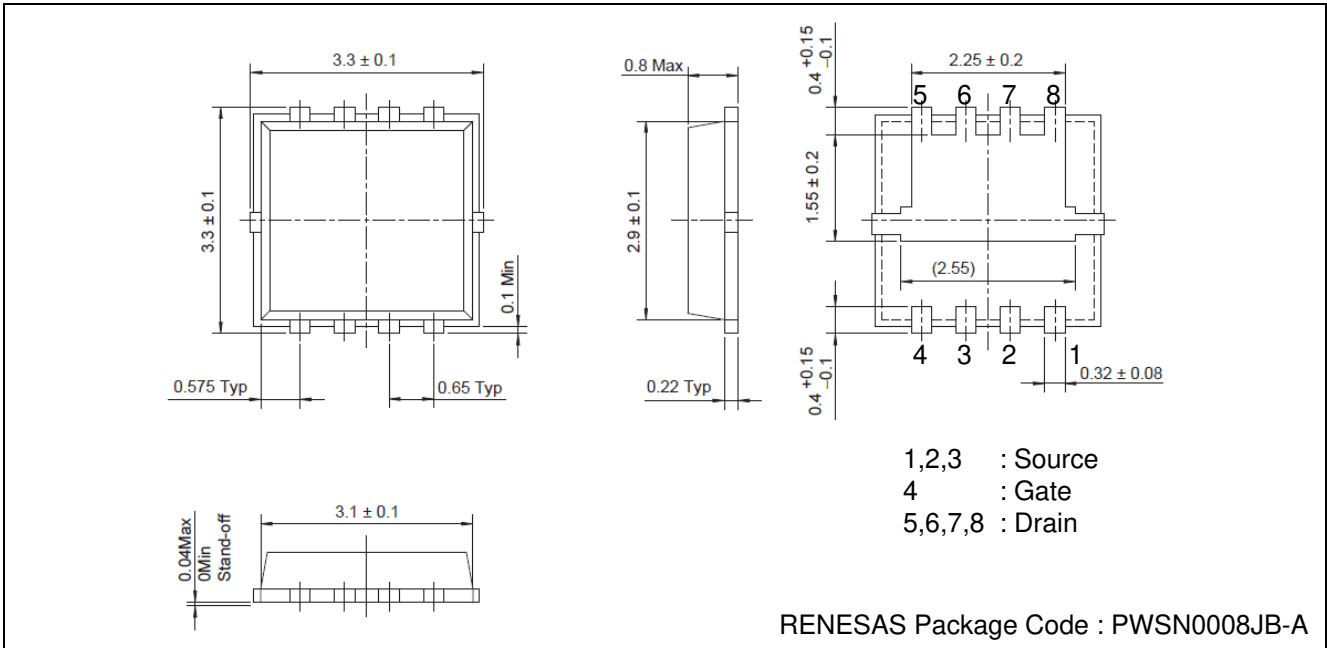


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

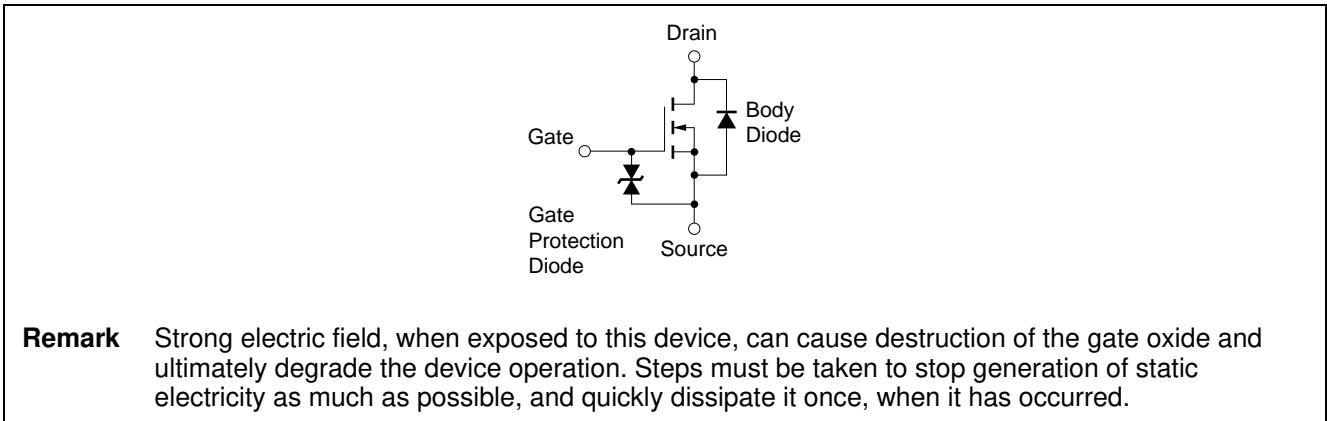


### Package Drawings (Unit: mm)

#### HWSO-8



### Equivalent Circuit



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