

# HAT2187WP

## Silicon N Channel Power MOS FET Power Switching

REJ03G0535-0500

Rev.5.00

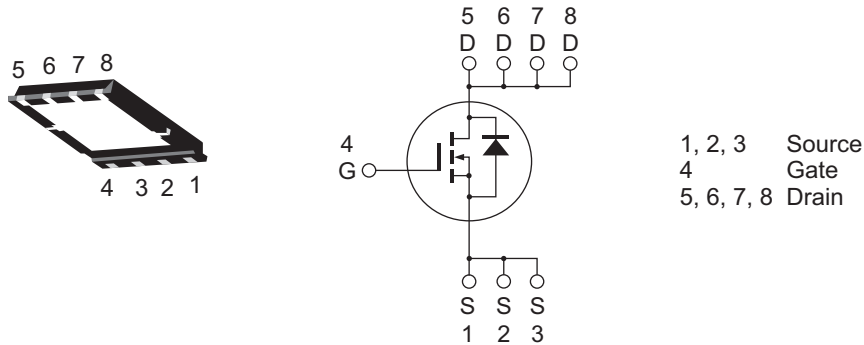
Sep.02,2005

### Features

- Low on-resistance
- Low drive current
- High density mounting

### Outline

RENESAS Package code: PWSN0008DA-A  
(Package name: WPAK)



### Absolute Maximum Ratings

(Ta = 25°C)

| Item                                        | Symbol                           | Ratings     | Unit |
|---------------------------------------------|----------------------------------|-------------|------|
| Drain to source voltage                     | $V_{DSS}$                        | 200         | V    |
| Gate to source voltage                      | $V_{GSS}$                        | $\pm 30$    | V    |
| Drain current                               | $I_D$                            | 17          | A    |
| Drain peak current                          | $I_{D(pulse)}$ <sup>Note1</sup>  | 34          | A    |
| Body-drain diode reverse drain current      | $I_{DR}$                         | 17          | A    |
| Body-drain diode reverse drain peak current | $I_{DR(pulse)}$ <sup>Note1</sup> | 34          | A    |
| Avalanche current                           | $I_{AP}$ <sup>Note3</sup>        | 17          | A    |
| Avalanche energy                            | $E_{AR}$ <sup>Note3</sup>        | 19.2        | mJ   |
| Channel dissipation                         | $P_{ch}$ <sup>Note2</sup>        | 30          | W    |
| Channel to case thermal impedance           | $\theta_{ch-c}$                  | 4.17        | °C/W |
| Channel temperature                         | $T_{ch}$                         | 150         | °C   |
| Storage temperature                         | $T_{stg}$                        | -55 to +150 | °C   |

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2. Value at  $T_c = 25^\circ C$

3.  $STch = 25^\circ C$ ,  $T_{ch} \leq 150^\circ C$

## Electrical Characteristics

(Ta = 25°C)

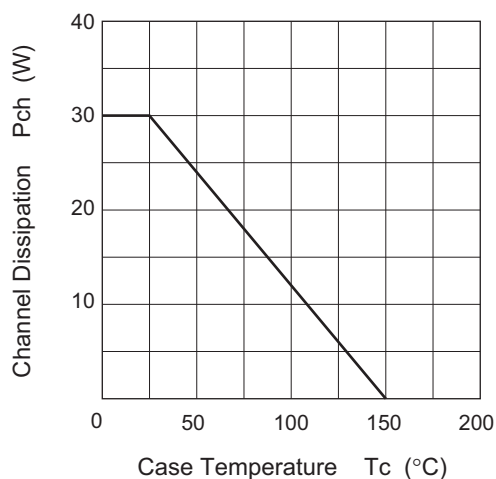
| Item                                       | Symbol        | Min | Typ   | Max       | Unit          | Test conditions                                                                              |
|--------------------------------------------|---------------|-----|-------|-----------|---------------|----------------------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 200 | —     | —         | V             | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$                                                         |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —     | 1         | $\mu\text{A}$ | $V_{DS} = 200 \text{ V}$ , $V_{GS} = 0$                                                      |
| 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 | —     | 4.5       | V             | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$                                               |
| Forward transfer admittance                | $ y_{fs} $    | 8   | 14    | —         | S             | $I_D = 8.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>                             |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.084 | 0.094     | $\Omega$      | $I_D = 8.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>                             |
| Input capacitance                          | $C_{iss}$     | —   | 1200  | —         | pF            | $V_{DS} = 25 \text{ V}$<br>$V_{GS} = 0$<br>$f = 1 \text{ MHz}$                               |
| Output capacitance                         | $C_{oss}$     | —   | 220   | —         | pF            |                                                                                              |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 19    | —         | pF            |                                                                                              |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 31    | —         | ns            | $I_D = 8.5 \text{ A}$<br>$V_{GS} = 10 \text{ V}$<br>$R_L = 11.8 \Omega$<br>$R_g = 10 \Omega$ |
| Rise time                                  | $t_r$         | —   | 37    | —         | ns            |                                                                                              |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 69    | —         | ns            |                                                                                              |
| Fall time                                  | $t_f$         | —   | 8     | —         | ns            |                                                                                              |
| Total gate charge                          | $Q_g$         | —   | 26    | —         | nC            | $V_{DD} = 160 \text{ V}$<br>$V_{GS} = 10 \text{ V}$<br>$I_D = 17 \text{ A}$                  |
| Gate to Source charge                      | $Q_{gs}$      | —   | 7     | —         | nC            |                                                                                              |
| Gate to drain charge                       | $Q_{gd}$      | —   | 10    | —         | nC            |                                                                                              |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.9   | 1.4       | V             | $I_F = 17 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>                                         |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 130   | —         | ns            | $I_F = 17 \text{ A}$ , $V_{GS} = 0$<br>$diF/dt = 100 \text{ A}/\mu\text{s}$                  |

Notes: 4. Pulse test

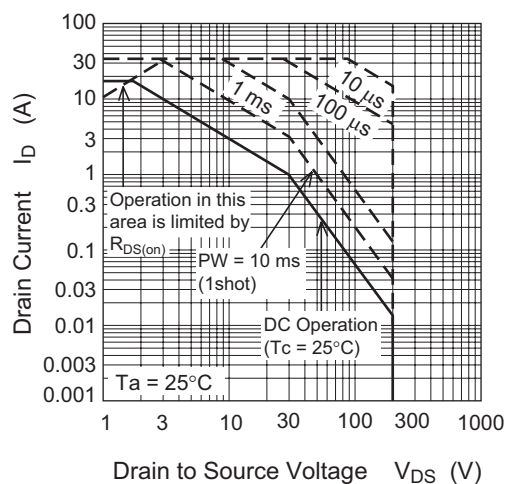
## Main Characteristics

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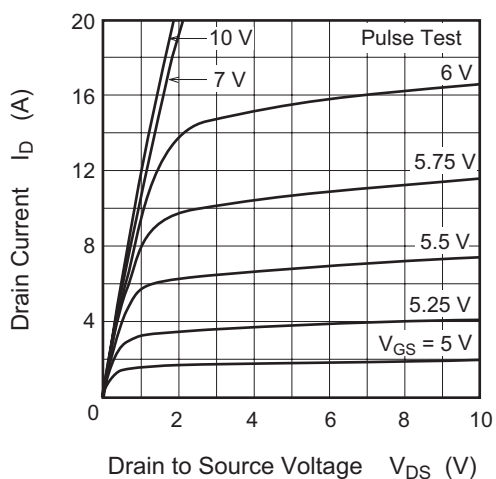
Power vs. Temperature Derating



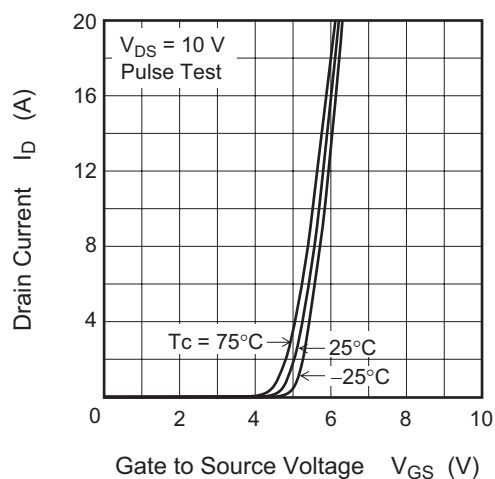
Maximum Safe Operation Area



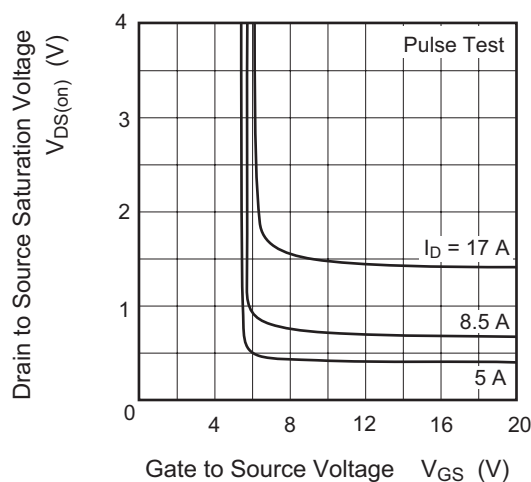
Typical Output Characteristics



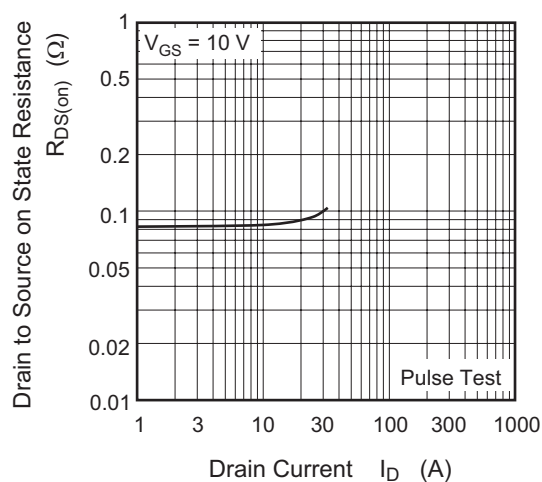
Typical Transfer Characteristics

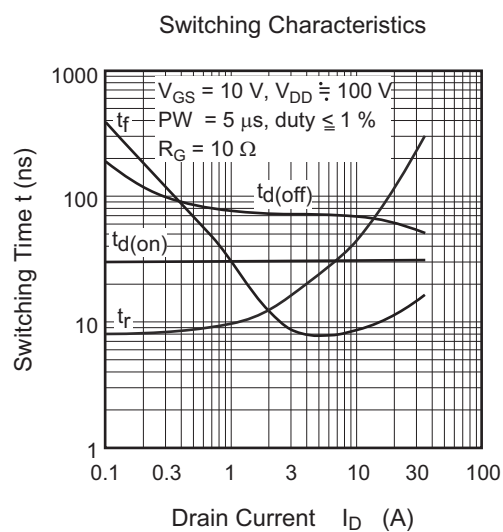
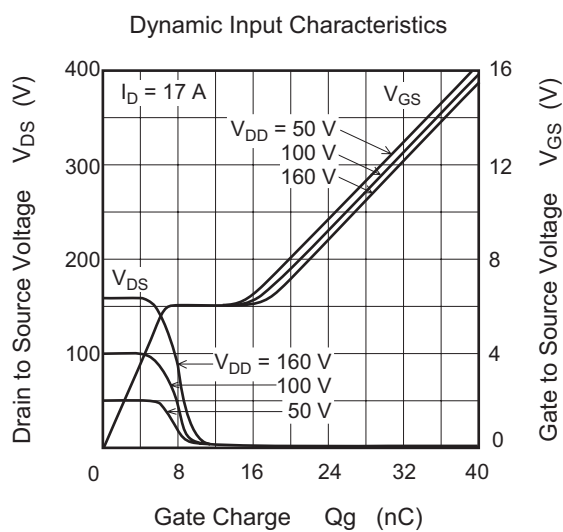
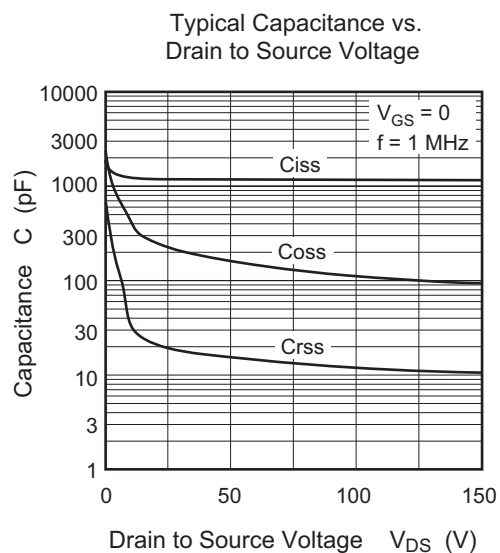
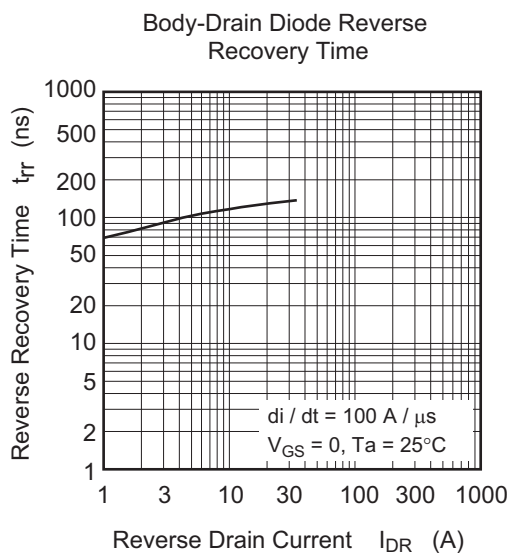
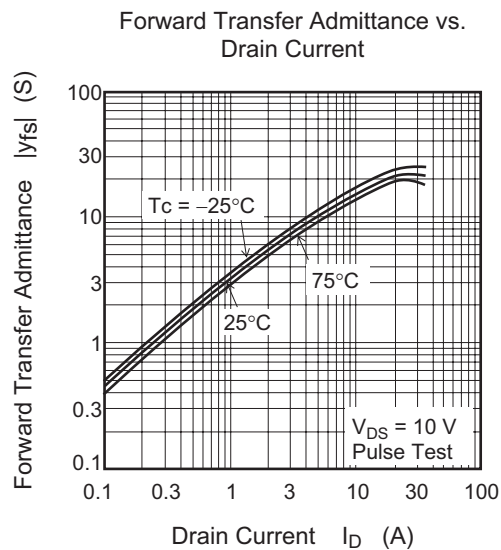
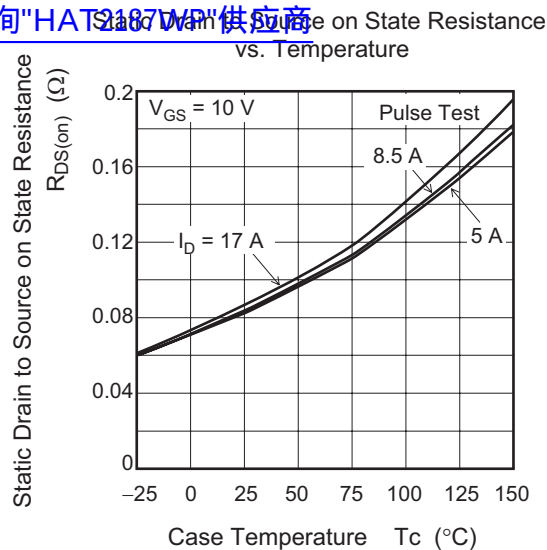


Drain to Source Saturation Voltage vs. Gate to Source Voltage



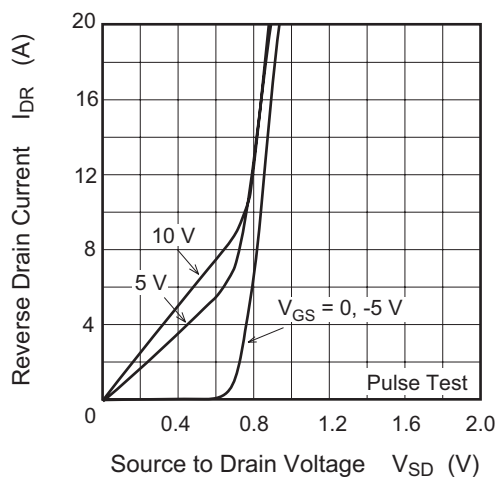
Static Drain to Source on State Resistance vs. Drain Current



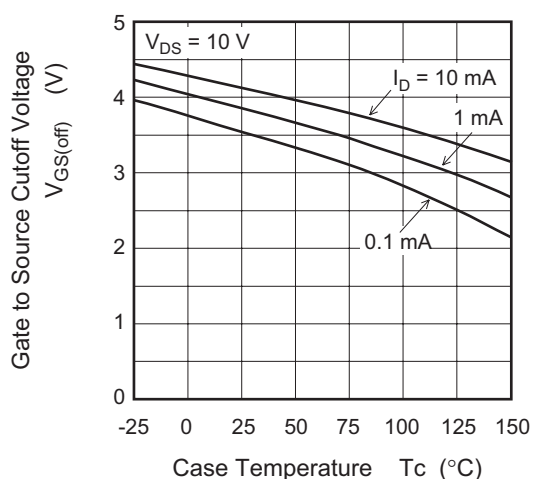
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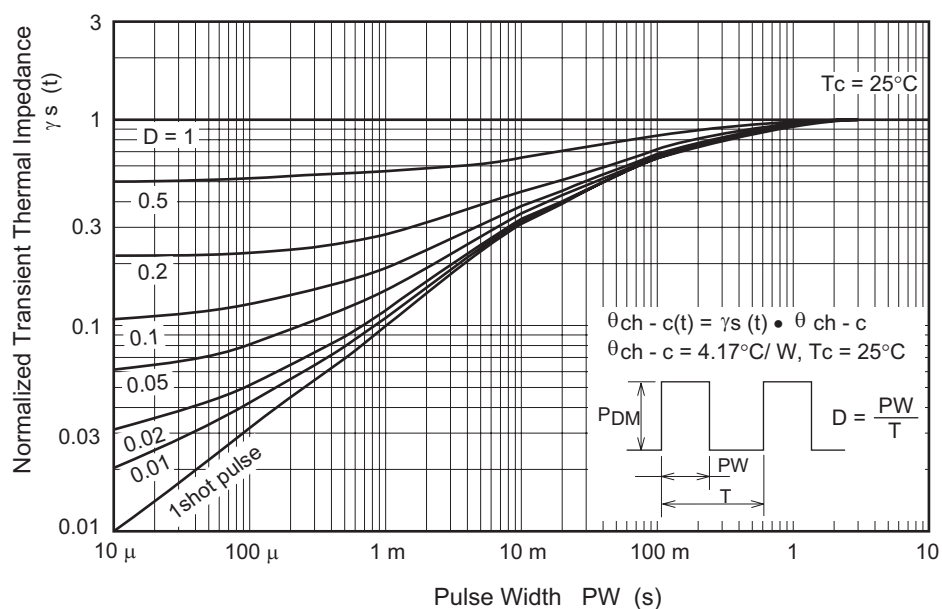
Reverse Drain Current vs. Source to Drain Voltage



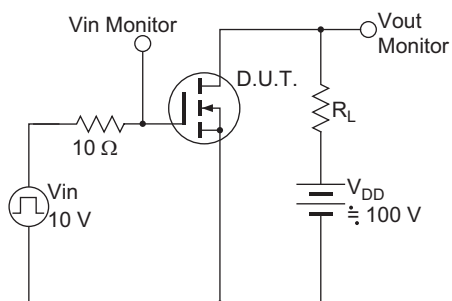
Gate to Source Cutoff Voltage vs. Case Temperature



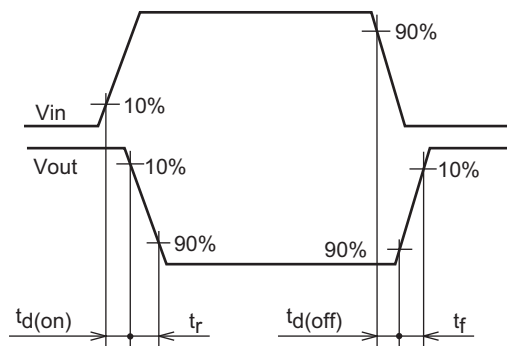
Normalized Transient Thermal Impedance vs. Pulse Width



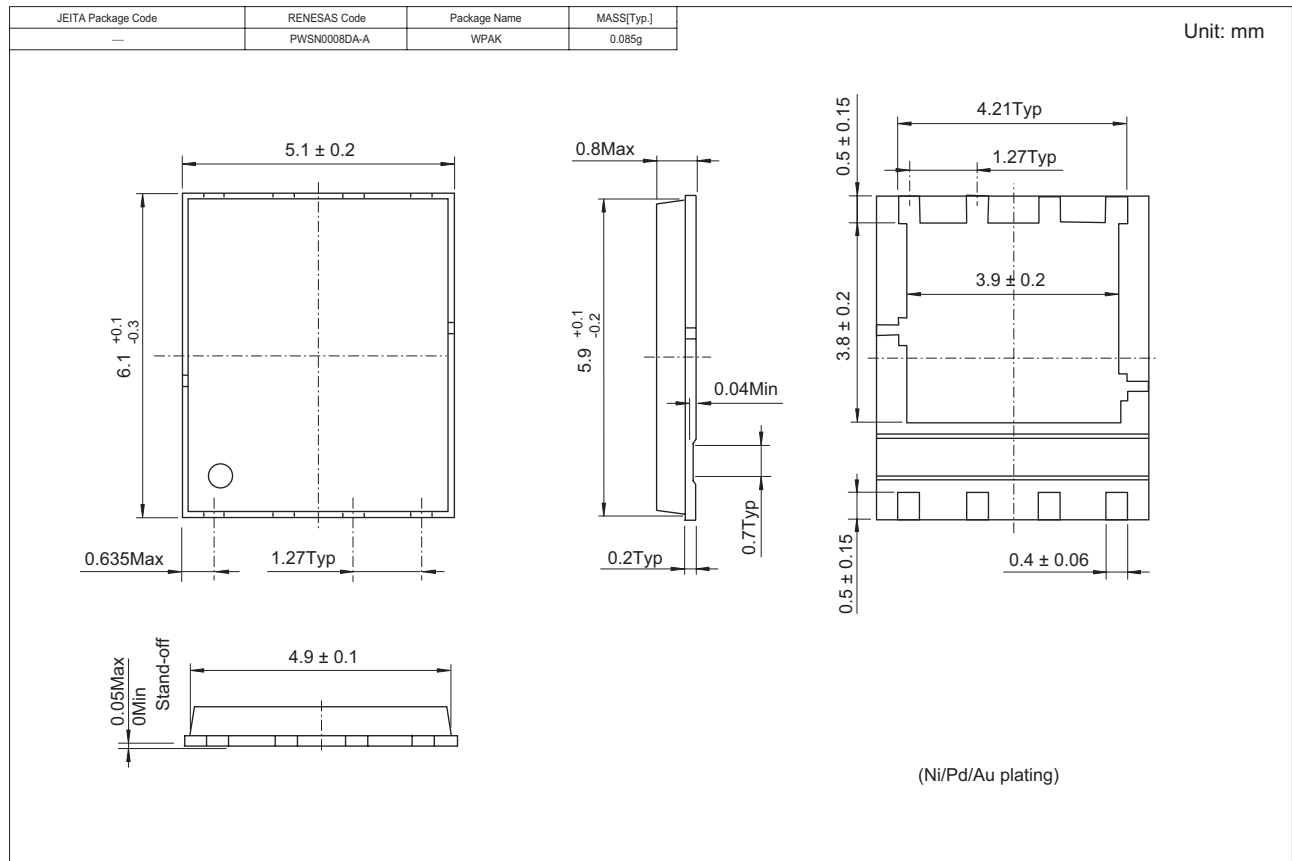
Switching Time Test Circuit



Waveform



## Package Dimensions



## Ordering Information

| Part Name      | Quantity | Shipping Container |
|----------------|----------|--------------------|
| HAT2187WP-EL-E | 2500 pcs | Taping             |

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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