

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# HAT2088R

Silicon N Channel MOS FET  
High Speed Power Switching

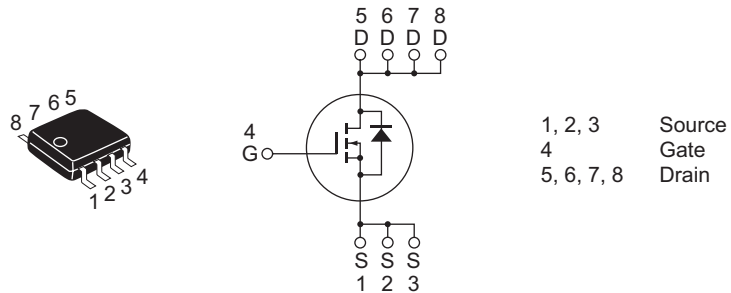
REJ03G1183-0200  
(Previous: ADE-208-1234)  
Rev.2.00  
Sep 07, 2005

## Features

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

## Outline

RENESAS Package code: PRSP0008DD-D  
(Package name: SOP-8 <FP-8DAV> )



## Absolute Maximum Ratings

(Ta = 25°C)

| Item                                   | Symbol                           | Value       | Unit |
|----------------------------------------|----------------------------------|-------------|------|
| Drain to source voltage                | $V_{DSS}$                        | 200         | V    |
| Gate to source voltage                 | $V_{GSS}$                        | $\pm 30$    | V    |
| Drain current                          | $I_D$                            | 2           | A    |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note 1</sup> | 16          | A    |
| Body-drain diode reverse drain current | $I_{DR}$                         | 2           | A    |
| Channel dissipation                    | $P_{ch}$ <sup>Note 2</sup>       | 2.5         | 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. When using the glass epoxy board (FR4 40 × 40 × 1.6 mm),  $PW \leq 10 s$ 

## Electrical Characteristics

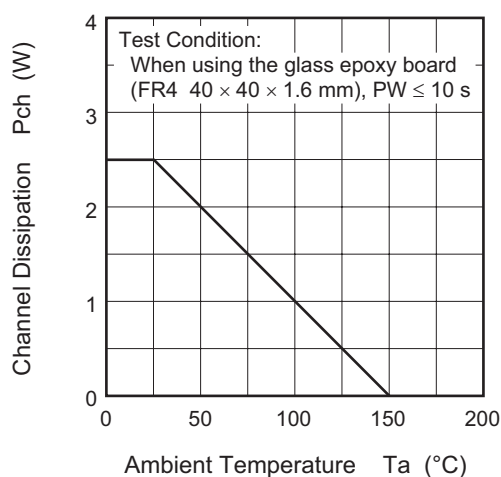
(Ta = 25°C)

| Item                                       | Symbol        | Min | Typ  | Max       | Unit     | Test Conditions                                                                                                          |
|--------------------------------------------|---------------|-----|------|-----------|----------|--------------------------------------------------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 200 | —    | —         | V        | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$                                                                                     |
| Gate to source leak current                | $I_{GSS}$     | —   | —    | $\pm 0.1$ | $\mu A$  | $V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$                                                                               |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —    | 1         | $\mu A$  | $V_{DS} = 200 \text{ V}$ , $V_{GS} = 0$                                                                                  |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 3.0 | —    | 4.5       | V        | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$                                                                           |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.35 | 0.44      | $\Omega$ | $I_D = 1 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 3</sup>                                                          |
| Forward transfer admittance                | $ y_{fs} $    | 1.5 | 2.5  | —         | S        | $I_D = 1 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 3</sup>                                                          |
| Input capacitance                          | $C_{iss}$     | —   | 450  | —         | pF       | $V_{DS} = 25 \text{ V}$ , $V_{GS} = 0$<br>$f = 1 \text{ MHz}$                                                            |
| Output capacitance                         | $C_{oss}$     | —   | 65   | —         | pF       |                                                                                                                          |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 13   | —         | pF       |                                                                                                                          |
| Total gate charge                          | $Q_g$         | —   | 13   | —         | nC       | $V_{DD} = 160 \text{ V}$<br>$V_{GS} = 10 \text{ V}$<br>$I_D = 2 \text{ A}$                                               |
| Gate to source charge                      | $Q_{gs}$      | —   | 2    | —         | nC       |                                                                                                                          |
| Gate to drain charge                       | $Q_{gd}$      | —   | 6    | —         | nC       |                                                                                                                          |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 19   | —         | ns       | $V_{GS} = 10 \text{ V}$ , $I_D = 1 \text{ A}$<br>$V_{DD} \cong 100 \text{ V}$<br>$R_L = 100 \Omega$<br>$R_g = 10 \Omega$ |
| Rise time                                  | $t_r$         | —   | 8.5  | —         | ns       |                                                                                                                          |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 48   | —         | ns       |                                                                                                                          |
| Fall time                                  | $t_f$         | —   | 11   | —         | ns       |                                                                                                                          |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.8  | 1.2       | V        | $I_F = 2 \text{ A}$ , $V_{GS} = 0$ <sup>Note 3</sup>                                                                     |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 65   | —         | ns       | $I_F = 2 \text{ A}$ , $V_{GS} = 0$<br>$di_F/dt = 100 \text{ A}/\mu s$                                                    |

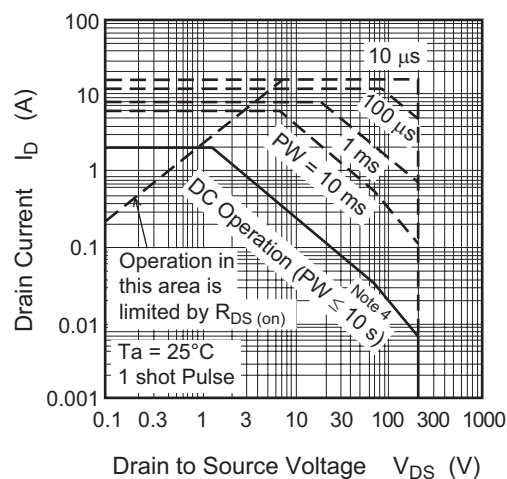
Note: 3. Pulse test

## Main Characteristics

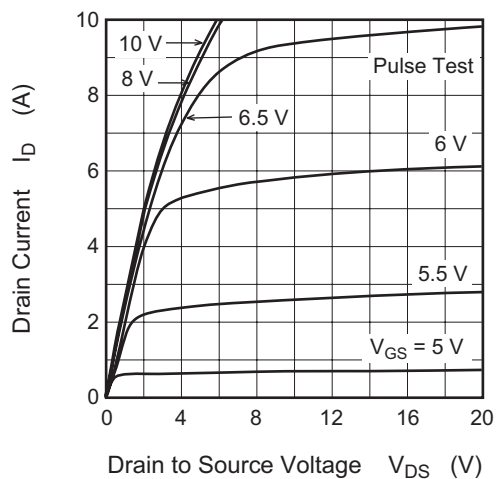
Power vs. Temperature Derating



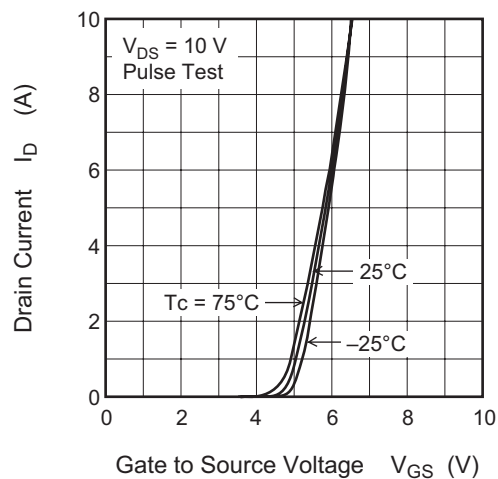
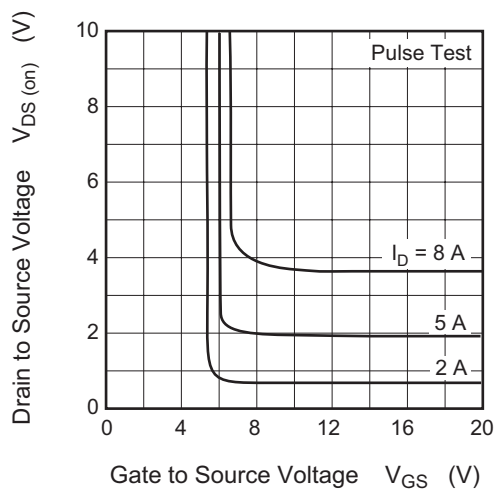
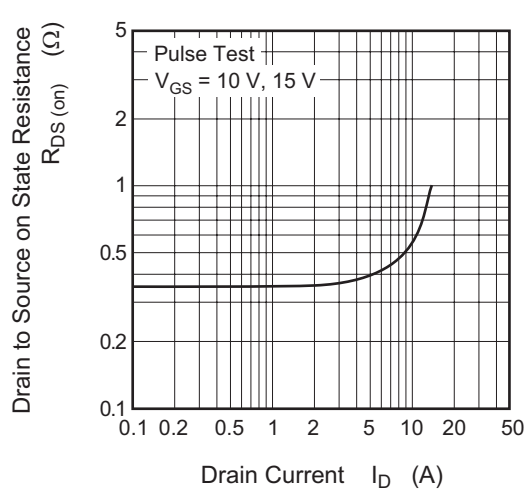
Maximum Safe Operation Area



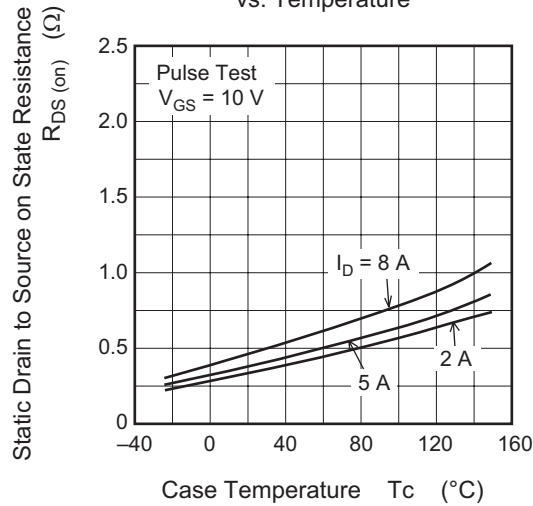
Typical Output Characteristics



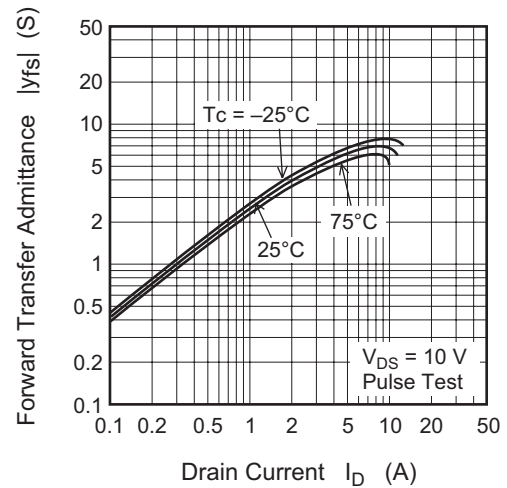
Typical Transfer Characteristics

Drain to Source Saturation Voltage vs.  
Gate to Source VoltageStatic Drain to Source on State Resistance  
vs. Drain Current

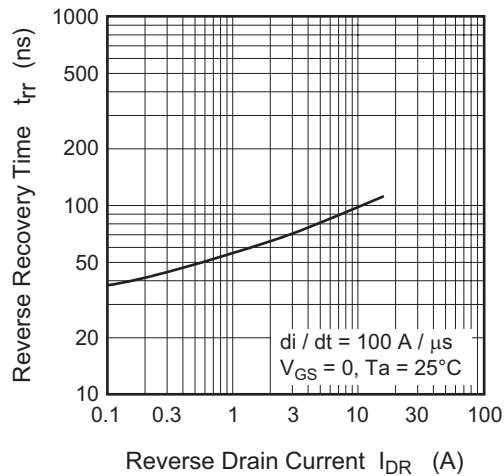
Static Drain to Source on State Resistance vs. Temperature



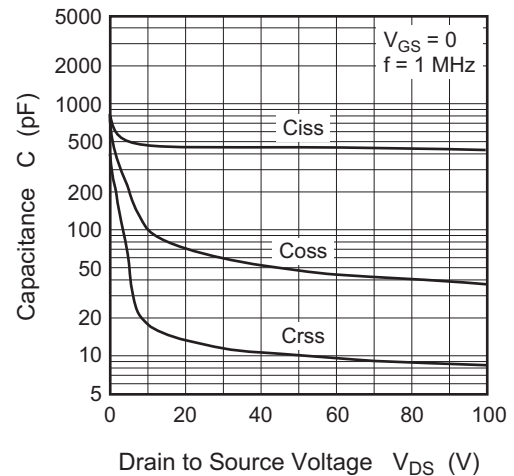
Forward Transfer Admittance vs. Drain Current



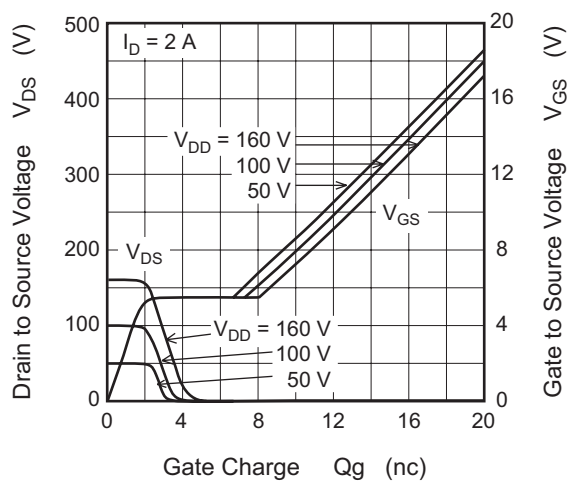
Body-Drain Diode Reverse Recovery Time



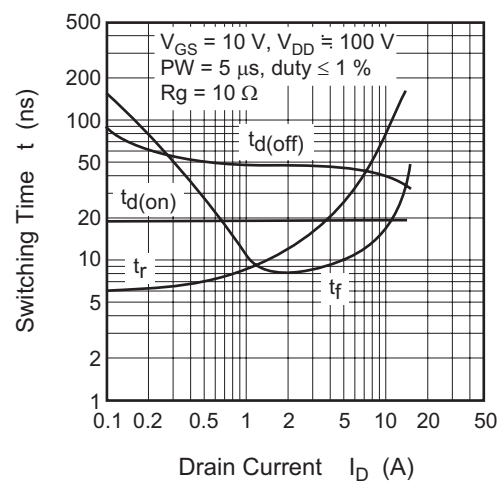
Typical Capacitance vs. Drain to Source Voltage

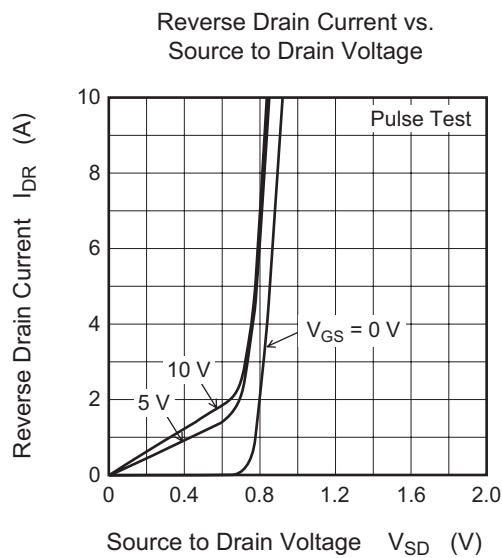
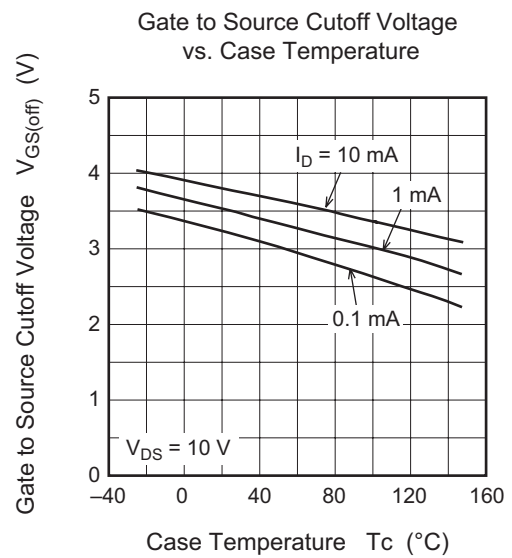
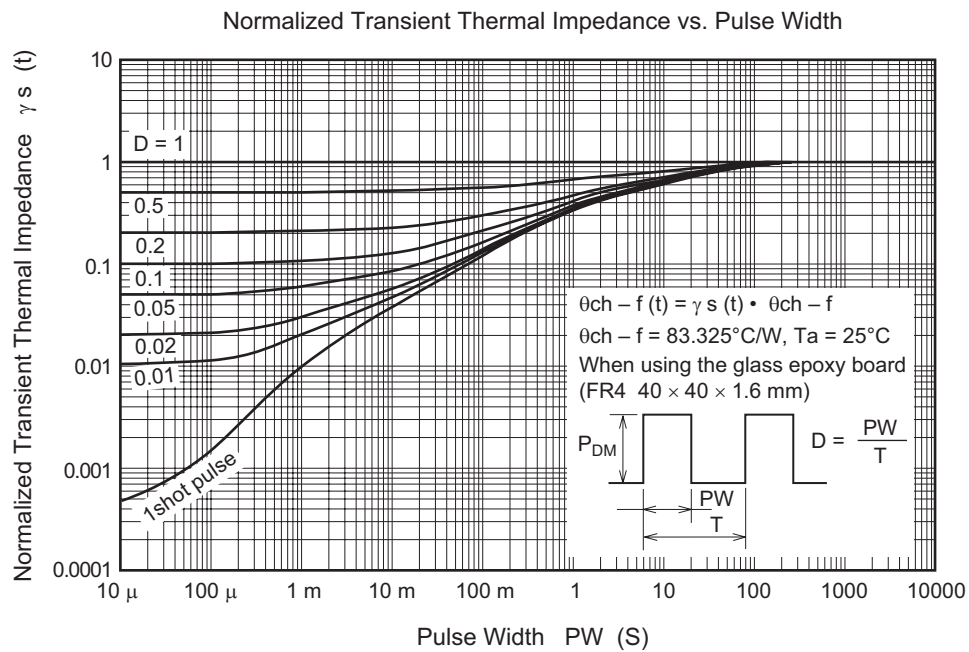


Dynamic Input Characteristics

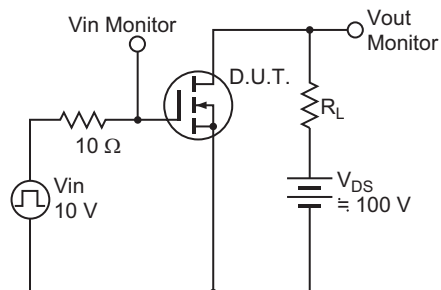


Switching Characteristics

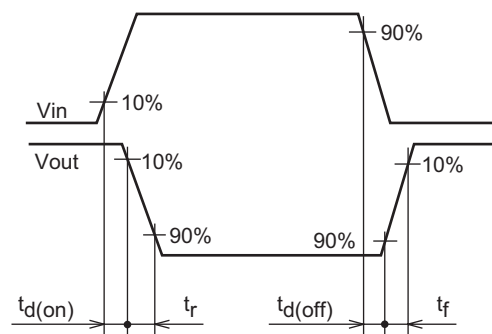




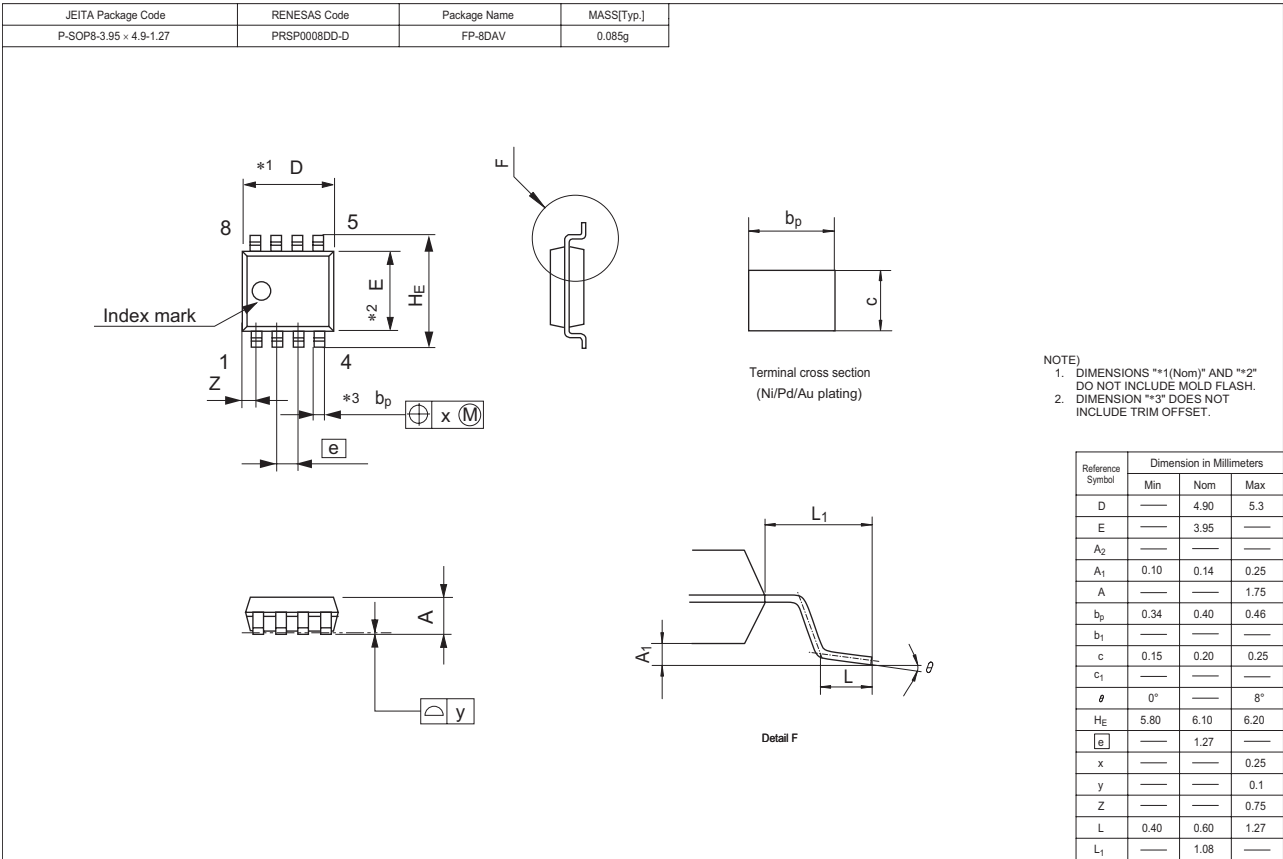
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

| Part Name     | Quantity | Shipping Container |
|---------------|----------|--------------------|
| HAT2088R-EL-E | 2500 pcs | Taping             |

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