

# HAT2276R

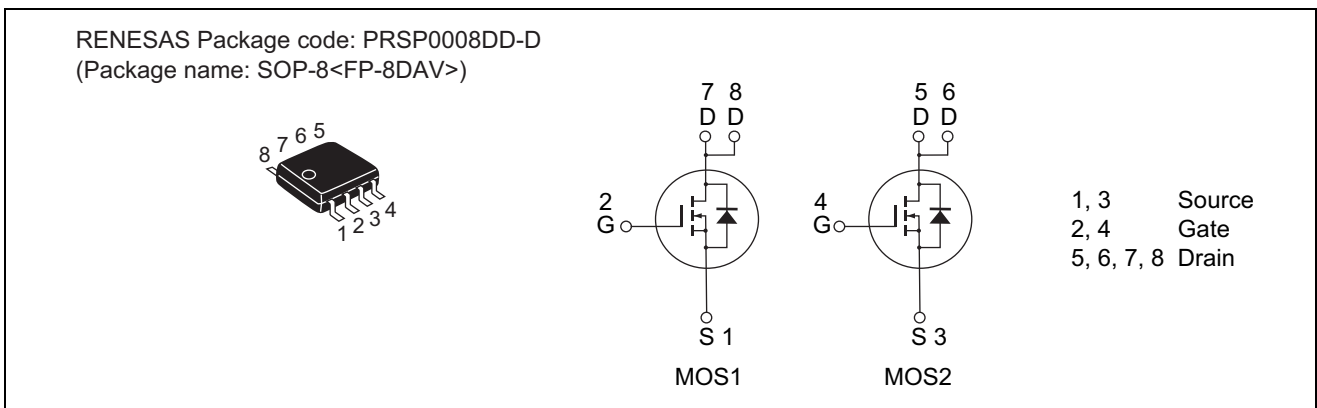
## Silicon N Channel Power MOSFET Power Switching

R07DS1371EJ0301  
Rev.3.01  
Jan 20, 2017

### Features

- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 21 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )

### Outline



### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

| Item                                   | Symbol                          | Ratings     | Unit             |
|--|---------------------------------|-------------|------------------|
| Drain to source voltage                | $V_{DSS}$                       | 30          | V                |
| Gate to source voltage                 | $V_{GSS}$                       | $\pm 20$    | V                |
| Drain current                          | $I_D$                           | 7.5         | A                |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note1</sup> | 60          | A                |
| Body-drain diode reverse drain current | $I_{DR}$                        | 7.5         | A                |
| Avalanche current                      | $I_{AP}$ <sup>Note 2</sup>      | 7.5         | A                |
| Avalanche energy                       | $E_{AR}$ <sup>Note 2</sup>      | 5.6         | mJ               |
| Channel dissipation                    | $P_{ch}$ <sup>Note3</sup>       | 1.5         | W                |
| Channel dissipation                    | $P_{ch}$ <sup>Note4</sup>       | 2.3         | 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. Value at  $T_{ch} = 25^\circ\text{C}$ ,  $R_g \geq 50 \Omega$
  3. 1 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10\text{s}$
  4. 2 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10\text{s}$

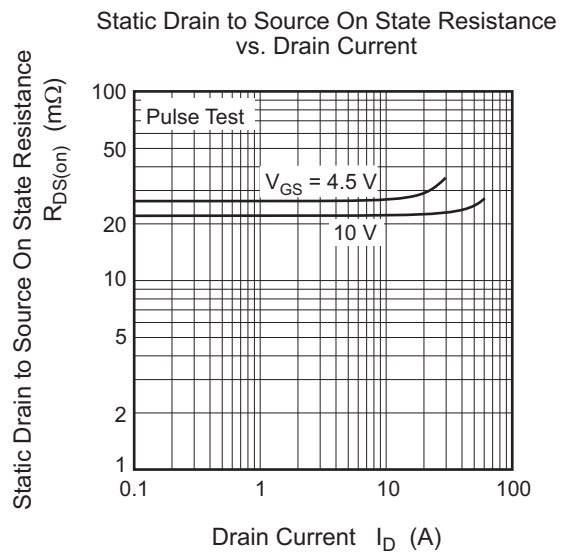
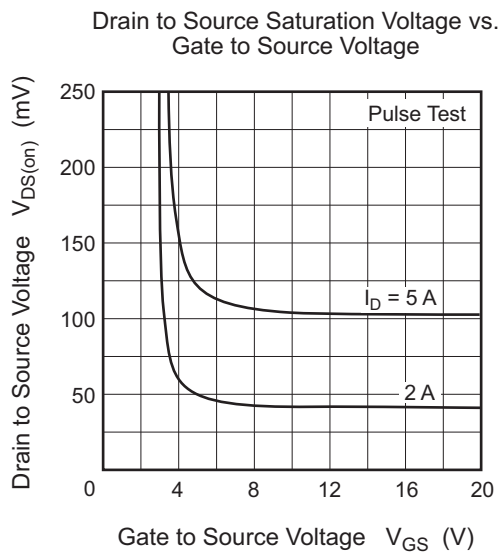
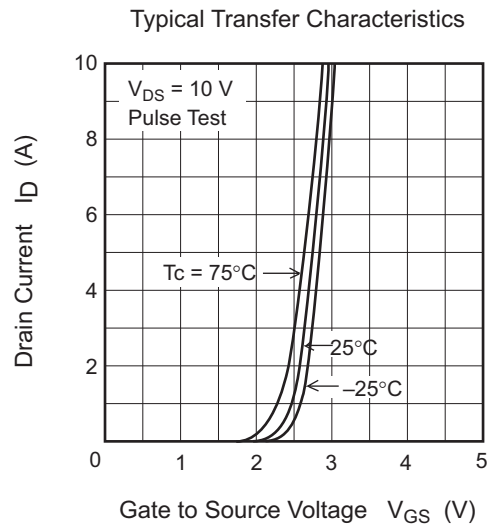
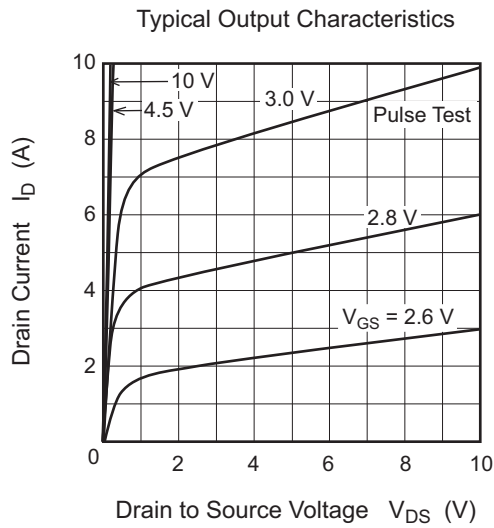
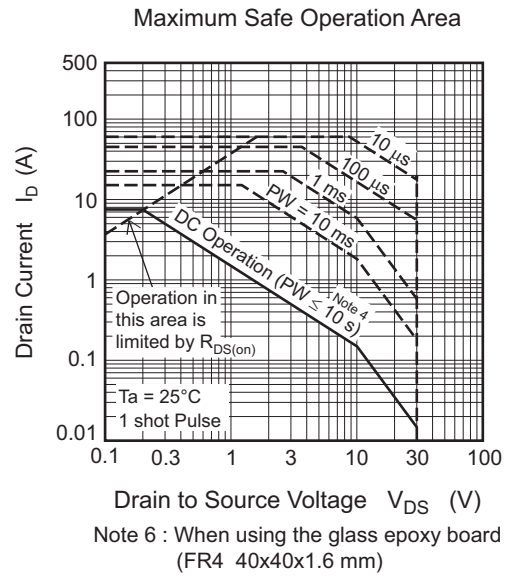
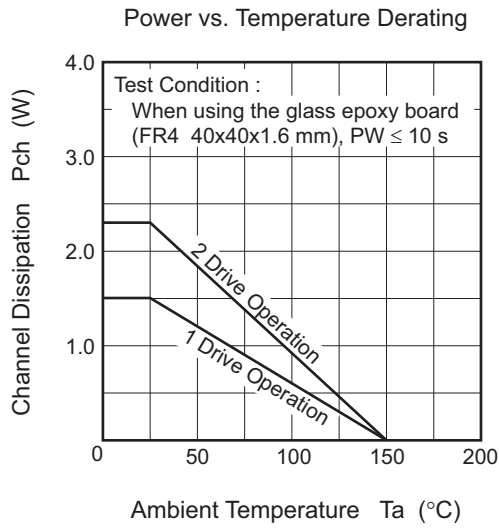
## Electrical Characteristics

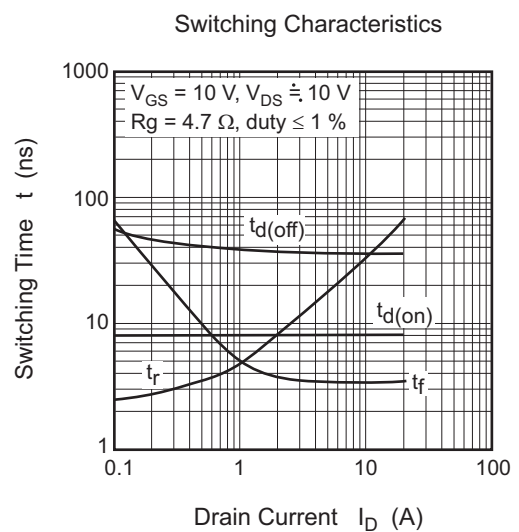
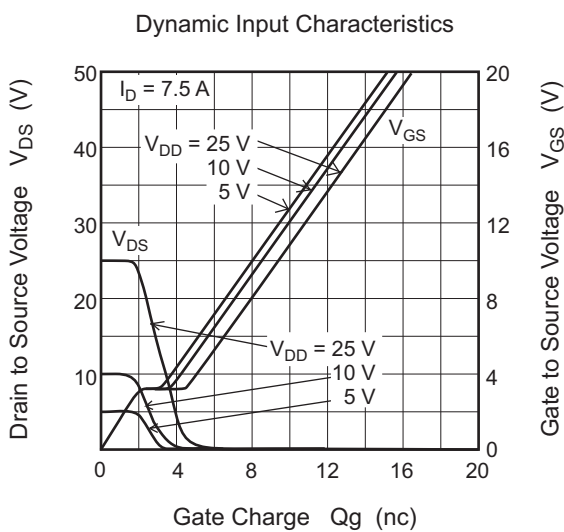
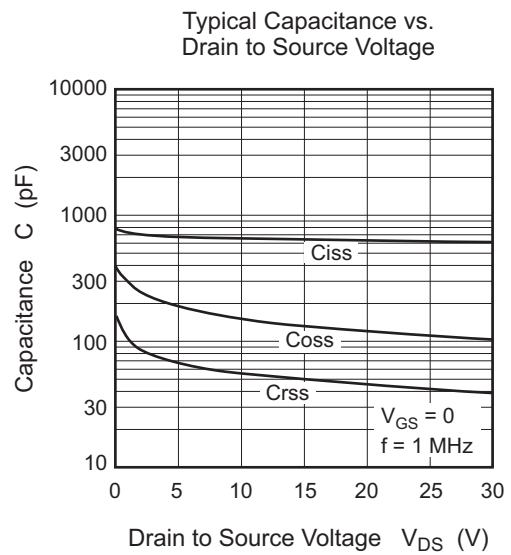
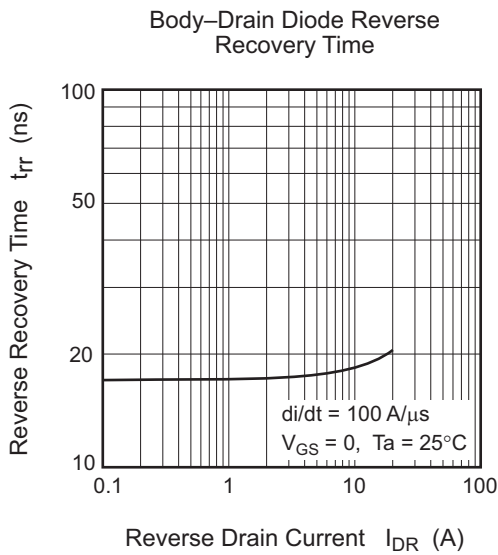
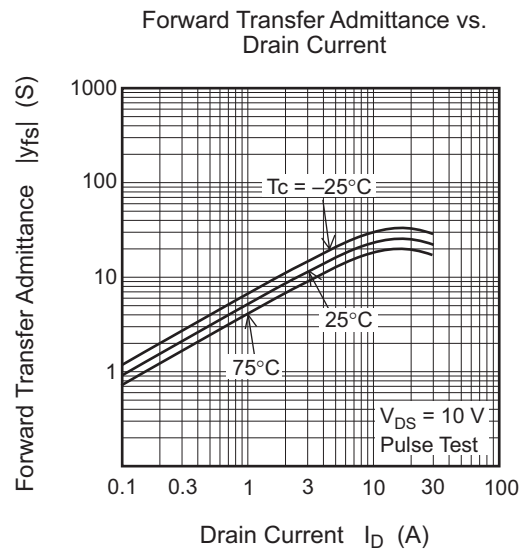
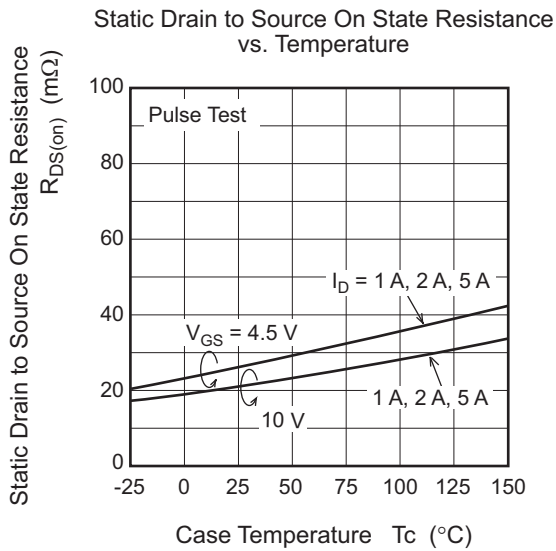
(Ta = 25°C)

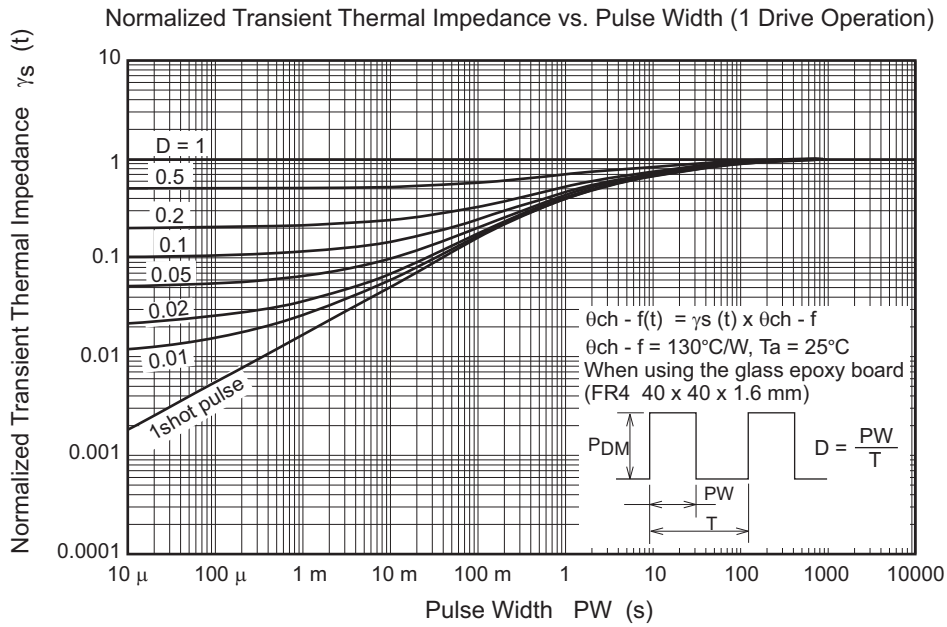
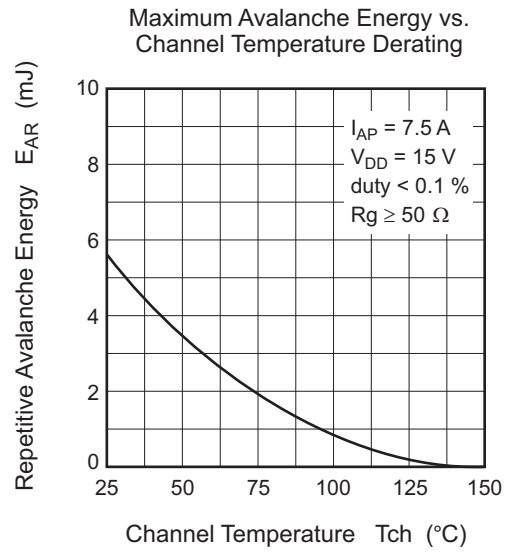
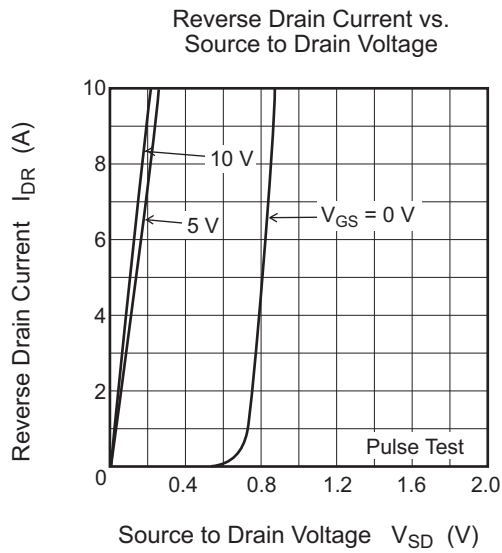
| Item                                       | Symbol        | Min | Typ  | Max       | Unit             | Test Conditions   |
|--|---------------|-----|------|-----------|------------------|---|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 30  | —    | —         | V                | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$  |
| Gate to source leak current                | $I_{GSS}$     | —   | —    | $\pm 0.1$ | $\mu\text{A}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$  |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —    | 1         | $\mu\text{A}$    | $V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$  |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.0 | —    | 2.5       | V                | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$  |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 21   | 26        | $\text{m}\Omega$ | $I_D = 3.75 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note5</sup>   |
|  | $R_{DS(on)}$  | —   | 26   | 37        | $\text{m}\Omega$ | $I_D = 3.75 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note5</sup>  |
| Forward transfer admittance                | $ y_{fs} $    | 7.8 | 13   | —         | S                | $I_D = 3.75 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note5</sup>   |
| Input capacitance                          | $C_{iss}$     | —   | 630  | —         | pF               | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1\text{MHz}$   |
| Output capacitance                         | $C_{oss}$     | —   | 155  | —         | pF               |   |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 57   | —         | pF               |   |
| Total gate charge                          | $Q_g$         | —   | 4.6  | —         | nc               | $V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ ,<br>$I_D = 7.5 \text{ A}$   |
| Gate to source charge                      | $Q_{gs}$      | —   | 2.2  | —         | nc               |   |
| Gate to drain charge                       | $Q_{gd}$      | —   | 1.2  | —         | nc               |   |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 7    | —         | ns               | $V_{GS} = 10 \text{ V}$ , $I_D = 3.75 \text{ A}$ ,<br>$V_{DD} \cong 10 \text{ V}$ , $R_L = 2.66 \Omega$ ,<br>$R_g = 4.7 \Omega$ |
| Rise time                                  | $t_r$         | —   | 14   | —         | ns               |   |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 36   | —         | ns               |   |
| Fall time                                  | $t_f$         | —   | 3.4  | —         | ns               |   |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 0.85 | 1.11      | V                | $I_F = 7.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note5</sup>   |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 17   | —         | ns               | $I_F = 7.5 \text{ A}$ , $V_{GS} = 0$<br>$diF/dt = 100 \text{ A}/\mu\text{s}$  |

Notes: 5. Pulse test

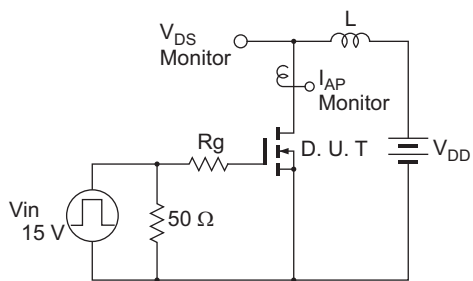
Main Characteristics



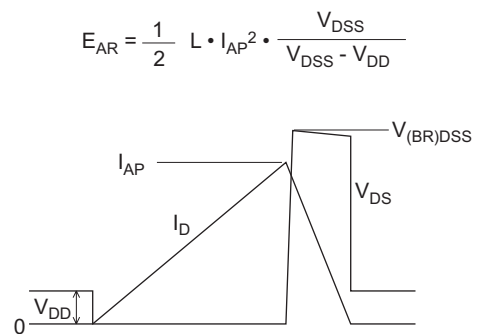


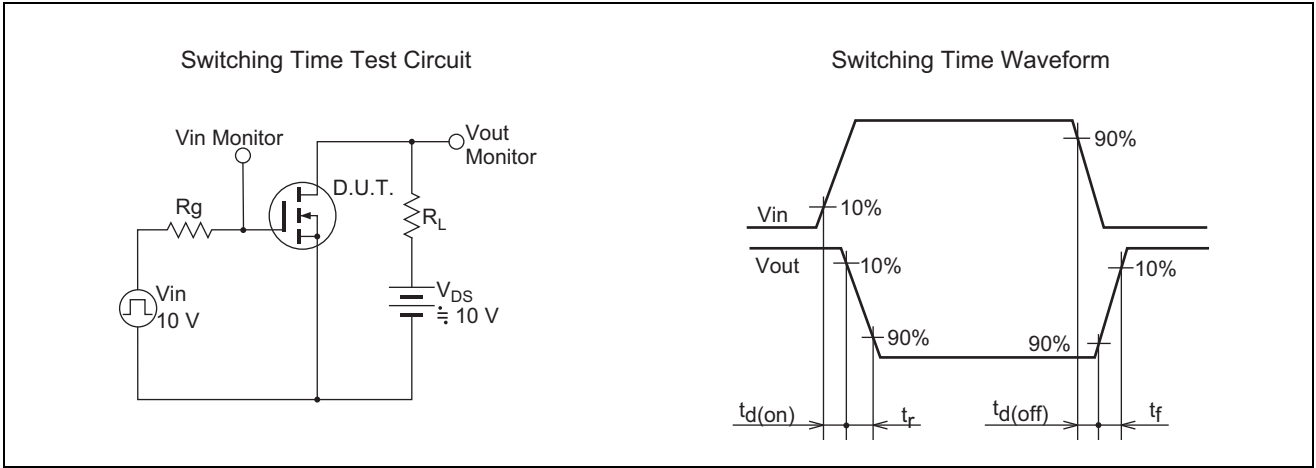


Avalanche Test Circuit

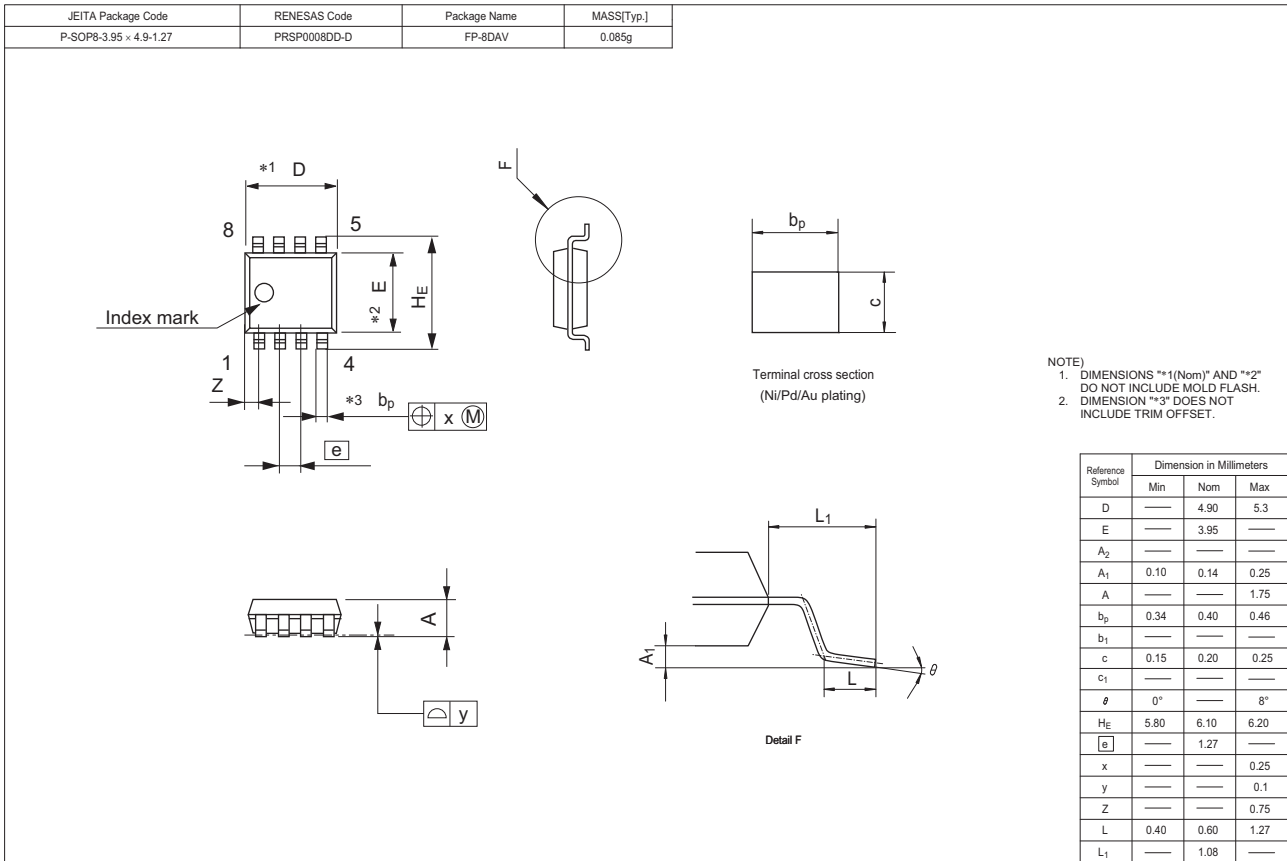


Avalanche Waveform





Package Dimensions



Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| HAT2276R-EL-E         | 2500 pcs | Taping             |

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