

## SSM6J25FE

### High Speed Switching Applications

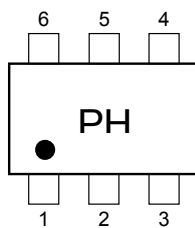
- Optimum for high-density mounting in small packages
- Low on-resistance:  $R_{on} = 260\text{m}\Omega$  (max) (@ $V_{GS} = -4\text{ V}$ )  
 $R_{on} = 430\text{m}\Omega$  (max) (@ $V_{GS} = -2.5\text{ V}$ )

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

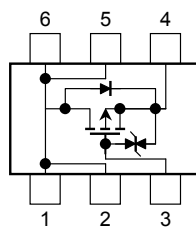
| Characteristics           | Symbol           | Rating   | Unit             |
|---------------------------|------------------|----------|------------------|
| Drain-Source voltage      | $V_{DS}$         | -20      | V                |
| Gate-Source voltage       | $V_{GSS}$        | $\pm 12$ | V                |
| Drain current             | DC               | $I_D$    | A                |
|                           | Pulse            | $I_{DP}$ |                  |
| Drain power dissipation   | $P_D$<br>(Note1) | 500      | mW               |
| Channel temperature       | $T_{ch}$         | 150      | $^\circ\text{C}$ |
| Storage temperature range | $T_{stg}$        | -55~150  | $^\circ\text{C}$ |

Note1: Mounted on FR4 board.  
(25.4 mm  $\times$  25.4 mm  $\times$  1.6 t, Cu Pad: 645 mm<sup>2</sup>)

### Marking



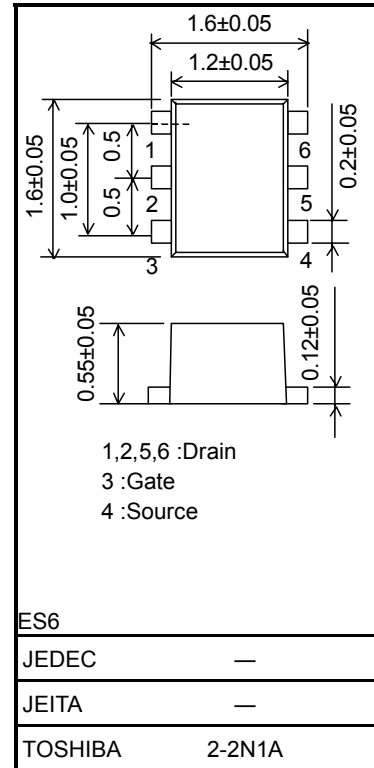
### Equivalent Circuit (top view)



### Handling Precaution

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

Unit: mm



Weight: 3.0 mg (typ.)

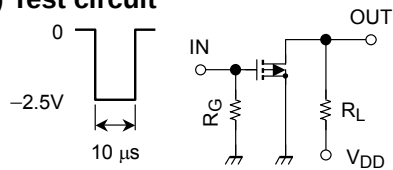
## Electrical Characteristics (Ta = 25°C)

| Characteristics                | Symbol        | Test Condition                             | Min  | Typ. | Max     | Unit      |
|--------------------------------|---------------|--------------------------------------------|------|------|---------|-----------|
| Gate leakage current           | $I_{GSS}$     | $V_{GS} = \pm 12V, V_{DS} = 0$             | —    | —    | $\pm 1$ | $\mu A$   |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | $I_D = -1 mA, V_{GS} = 0$                  | -20  | —    | —       | V         |
|                                | $V_{(BR)DSX}$ | $I_D = -1 mA, V_{GS} = +12 V$              | -8   | —    | —       |           |
| Drain cut-off current          | $I_{DSS}$     | $V_{DS} = -20 V, V_{GS} = 0$               | —    | —    | -1      | $\mu A$   |
| Gate threshold voltage         | $V_{th}$      | $V_{DS} = -3 V, I_D = -0.1 mA$             | -0.5 | —    | -1.1    | V         |
| Forward transfer admittance    | $ Y_{fs} $    | $V_{DS} = -3 V, I_D = -0.25 A$ (Note2)     | 0.65 | 1.3  | —       | S         |
| Drain-Source on-resistance     | $R_{DS(ON)}$  | $I_D = -0.25 A, V_{GS} = -4 V$ (Note2)     | —    | 210  | 260     | $m\Omega$ |
|                                |               | $I_D = -0.25 A, V_{GS} = -2.5 V$ (Note2)   | —    | 310  | 430     |           |
| Input capacitance              | $C_{iss}$     | $V_{DS} = -10 V, V_{GS} = 0, f = 1 MHz$    | —    | 218  | —       | pF        |
| Reverse transfer capacitance   | $C_{rss}$     | $V_{DS} = -10 V, V_{GS} = 0, f = 1 MHz$    | —    | 42   | —       | pF        |
| Output capacitance             | $C_{oss}$     | $V_{DS} = -10 V, V_{GS} = 0, f = 1 MHz$    | —    | 52   | —       | pF        |
| Switching time                 | Turn-on time  | $V_{DD} = -10 V, I_D = -0.25 A,$           | —    | 16   | —       | ns        |
|                                | Turn-off time | $V_{GS} = 0 \sim -2.5 V, R_G = 4.7 \Omega$ | —    | 15   | —       |           |

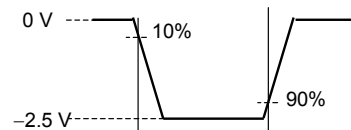
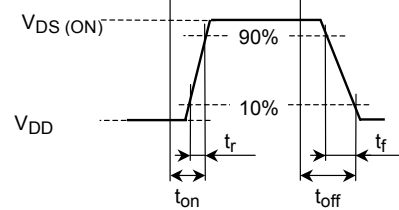
Note2: Pulse test

## Switching Time Test Circuit

(a) Test circuit



$V_{DD} = -10 V$   
 $R_G = 4.7 \Omega$   
 $D.U. \leq 1\%$   
 $V_{IN}: t_r, t_f < 5 ns$   
 Common Source  
 $T_a = 25^\circ C$

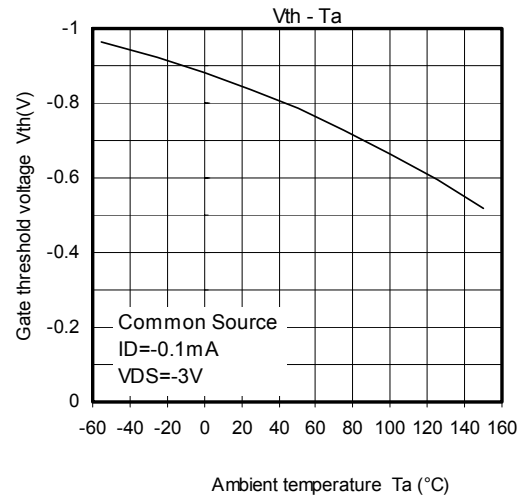
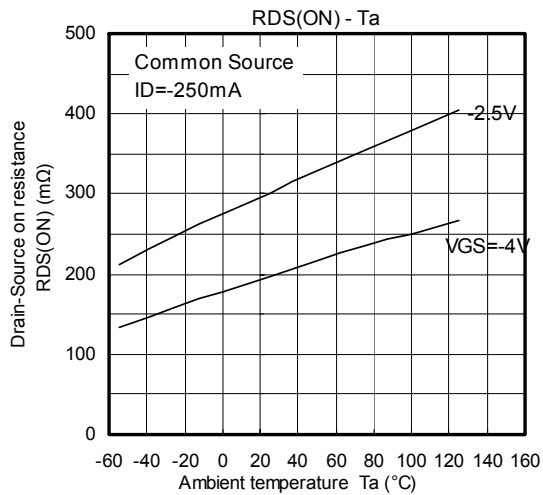
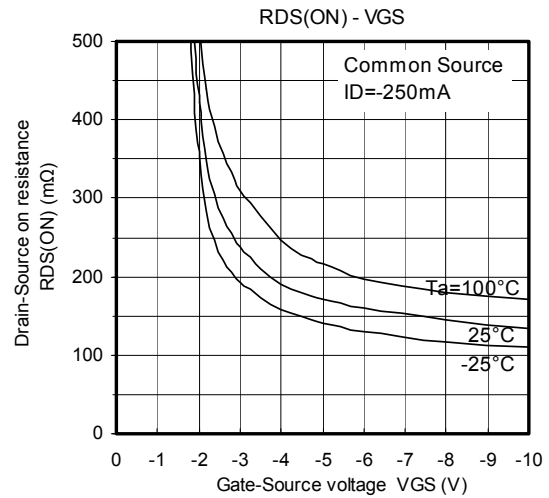
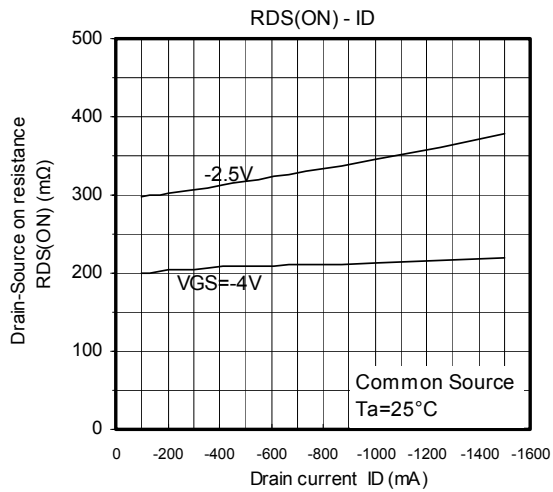
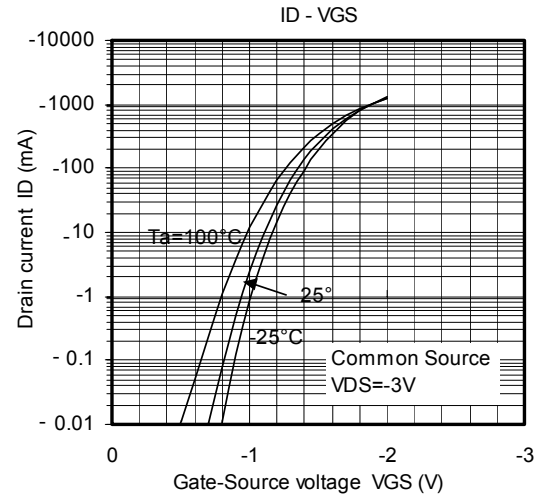
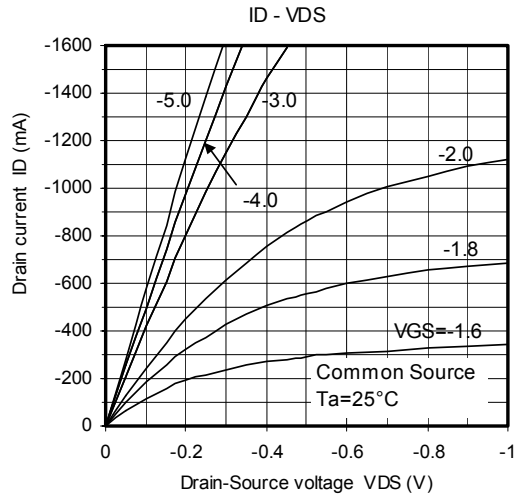
(b)  $V_{IN}$ (c)  $V_{OUT}$ 

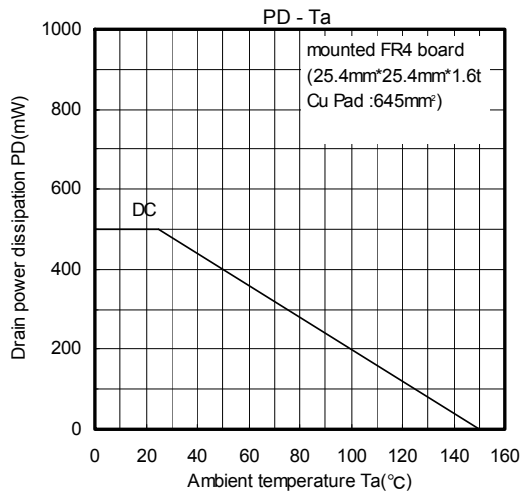
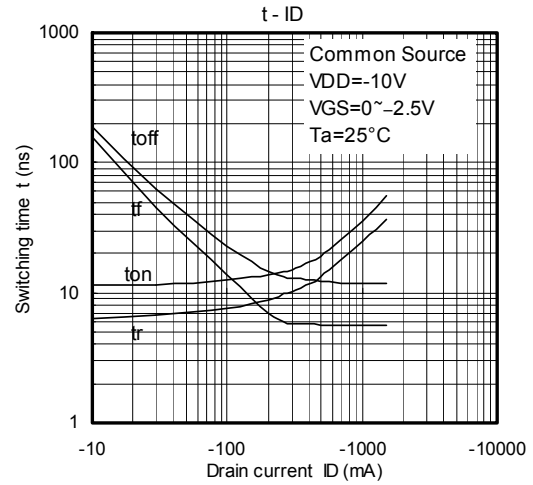
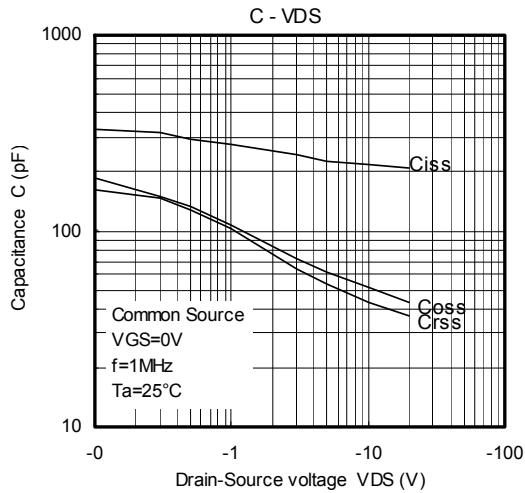
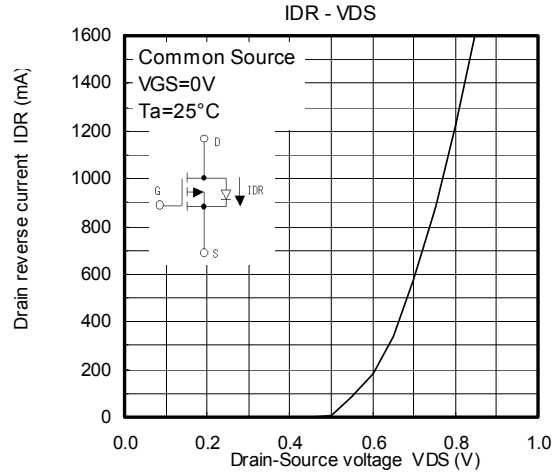
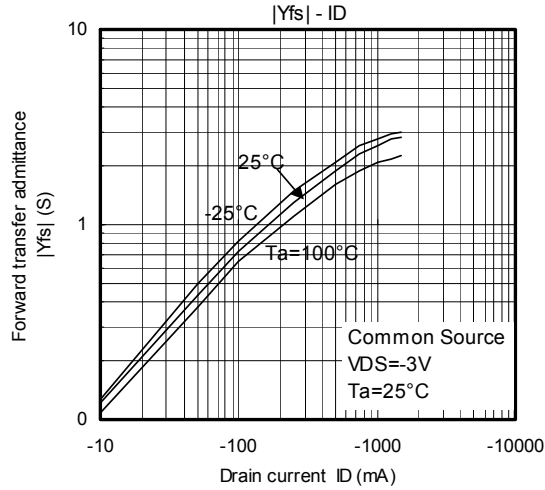
## Precaution

$V_{th}$  can be expressed as the voltage between gate and source when the low operating current value is  $I_D = -100 \mu A$  for this product. For normal switching operation,  $V_{GS(on)}$  requires a higher voltage than  $V_{th}$  and  $V_{GS(off)}$  requires a lower voltage than  $V_{th}$ .

(The relationship can be established as follows:  $V_{GS(off)} < V_{th} < V_{GS(on)}$ )

Please take this into consideration when using the device. The  $V_{GS}$  recommended voltage for turning on this product is  $-2.5 V$  or higher.





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