

SSM6N16FU

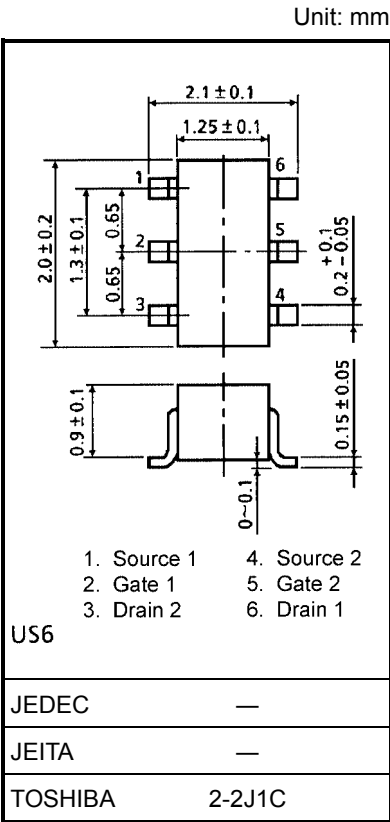
High Speed Switching Applications  
Analog Switch Applications

- Suitable for high-density mounting due to compact package
- Low on resistance:  $R_{on} = 3.0\ \Omega$  (max) (@ $V_{GS} = 4\text{ V}$ )  
                          :  $R_{on} = 4.0\ \Omega$  (max) (@ $V_{GS} = 2.5\text{ V}$ )  
                          :  $R_{on} = 15\ \Omega$  (max) (@ $V_{GS} = 1.5\text{ V}$ )

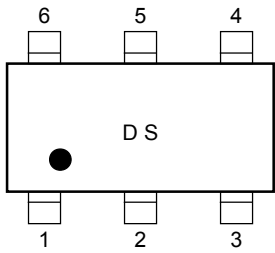
Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

| Characteristics                     |       | Symbol       | Rating   | Unit |
|-------------------------------------|-------|--------------|----------|------|
| Drain-Source voltage                |       | $V_{DS}$     | 20       | V    |
| Gate-Source voltage                 |       | $V_{GSS}$    | $\pm 10$ | V    |
| Drain current                       | DC    | $I_D$        | 100      | mA   |
|                                     | Pulse | $I_{DP}$     | 200      |      |
| Drain power dissipation (Ta = 25°C) |       | $P_D$ (Note) | 200      | mW   |
| Channel temperature                 |       | $T_{ch}$     | 150      | °C   |
| Storage temperature range           |       | $T_{stg}$    | -55~150  | °C   |

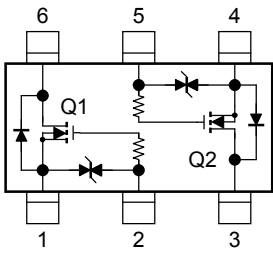
Note: Total rating



Marking



Equivalent Circuit



Weight:      g

Handling Precaution

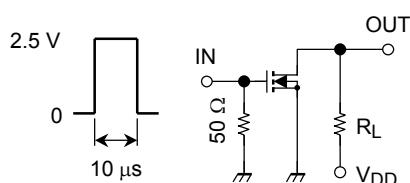
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

| Characteristics                | Symbol        | Test Condition                                                             | Min | Typ. | Max     | Unit          |
|--------------------------------|---------------|----------------------------------------------------------------------------|-----|------|---------|---------------|
| Gate leakage current           | $I_{GSS}$     | $V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$                                    | —   | —    | $\pm 1$ | $\mu\text{A}$ |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 0.1 \text{ mA}, V_{GS} = 0$                                         | 20  | —    | —       | V             |
| Drain cut-off current          | $I_{DSS}$     | $V_{DS} = 20 \text{ V}, V_{GS} = 0$                                        | —   | —    | 1       | $\mu\text{A}$ |
| Gate threshold voltage         | $V_{th}$      | $V_{DS} = 3 \text{ V}, I_D = 0.1 \text{ mA}$                               | 0.6 | —    | 1.1     | V             |
| Forward transfer admittance    | $ Y_{fs} $    | $V_{DS} = 3 \text{ V}, I_D = 10 \text{ mA}$                                | 40  | —    | —       | mS            |
| Drain-Source ON resistance     | $R_{DS(ON)}$  | $I_D = 10 \text{ mA}, V_{GS} = 4 \text{ V}$                                | —   | 1.5  | 3.0     | $\Omega$      |
|                                |               | $I_D = 10 \text{ mA}, V_{GS} = 2.5 \text{ V}$                              | —   | 2.2  | 4.0     |               |
|                                |               | $I_D = 1 \text{ mA}, V_{GS} = 1.5 \text{ V}$                               | —   | 5.2  | 15      |               |
| Input capacitance              | $C_{iss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                      | —   | 9.3  | —       | pF            |
| Reverse transfer capacitance   | $C_{rss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                      | —   | 4.5  | —       | pF            |
| Output capacitance             | $C_{oss}$     | $V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$                      | —   | 9.8  | —       | pF            |
| Switching time                 | Turn-on time  | $V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0 \sim 2.5 \text{ V}$ | —   | 70   | —       | ns            |
|                                | Turn-off time |                                                                            | —   | 125  | —       |               |

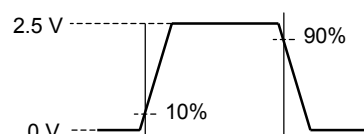
## Switching Time Test Circuit

### (a) Test circuit

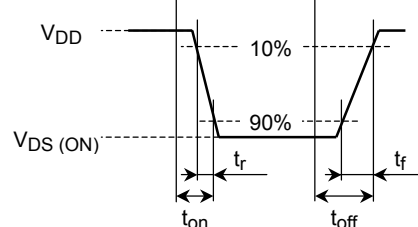


$V_{DD} = 3 \text{ V}$   
 Duty  $\leq 1\%$   
 $V_{IN}$ :  $t_r, t_f < 5 \text{ ns}$   
 $(Z_{out} = 50 \Omega)$   
 Common Source  
 $T_a = 25^\circ\text{C}$

### (b) $V_{IN}$



### (c) $V_{OUT}$

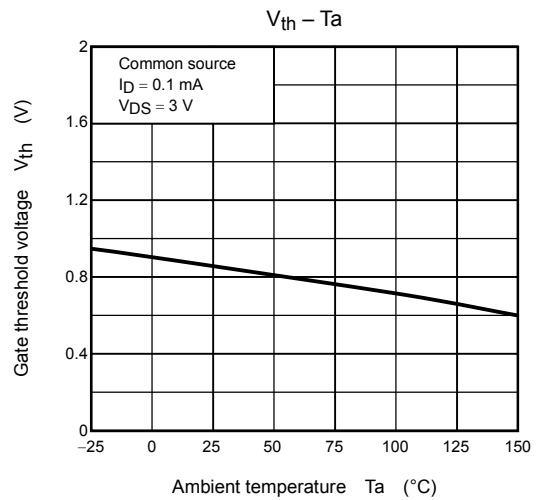
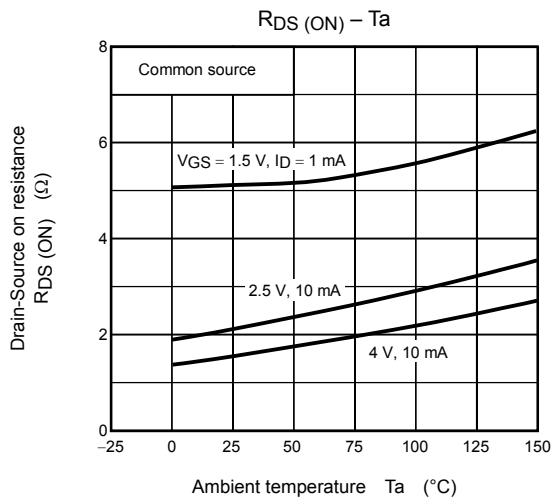
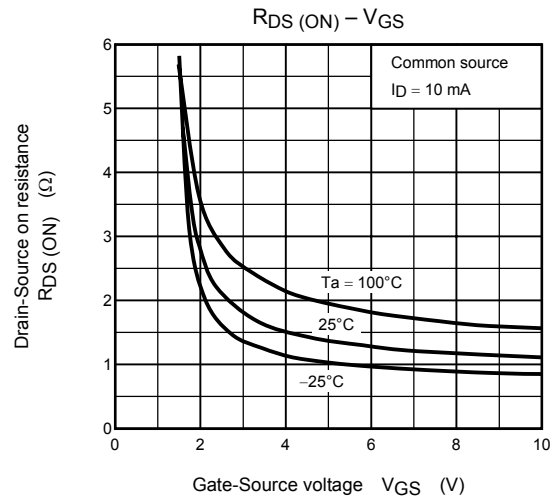
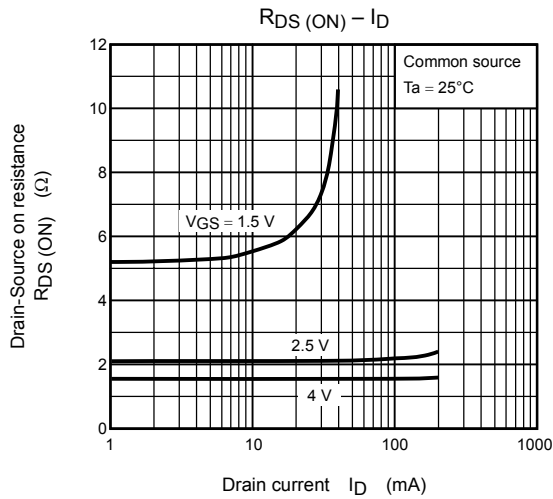
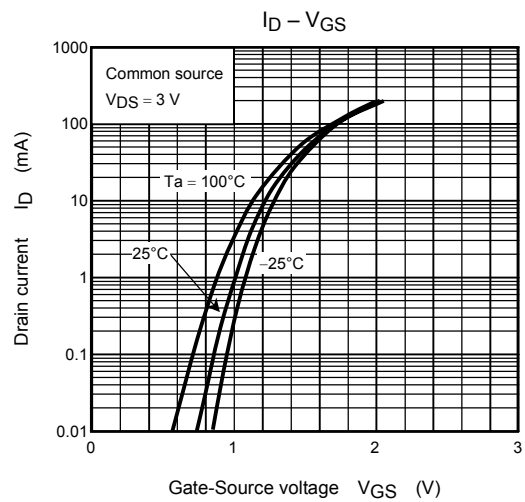
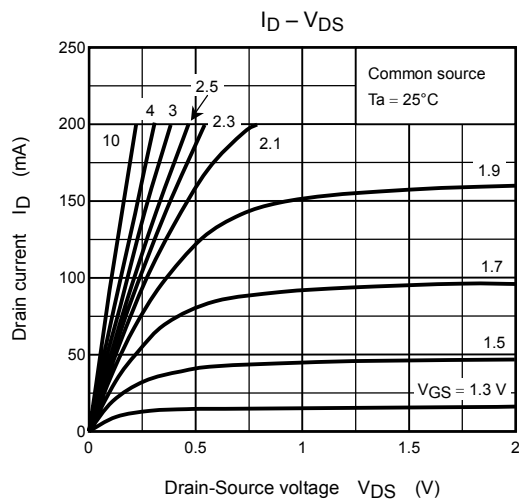


## Precaution

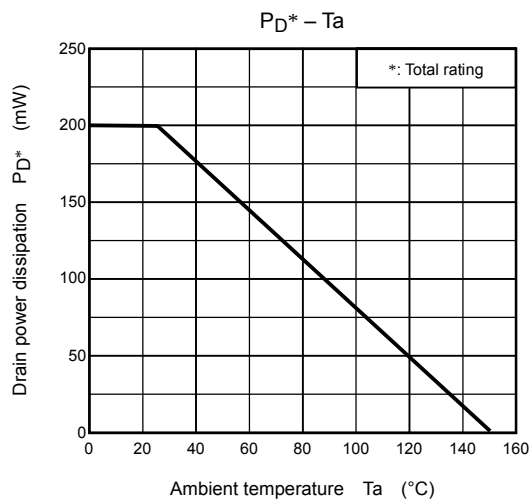
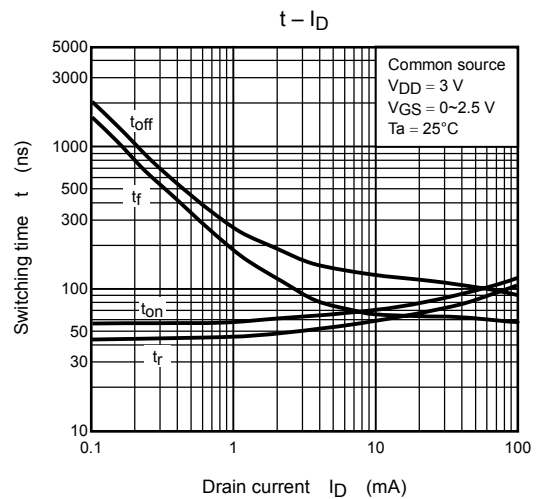
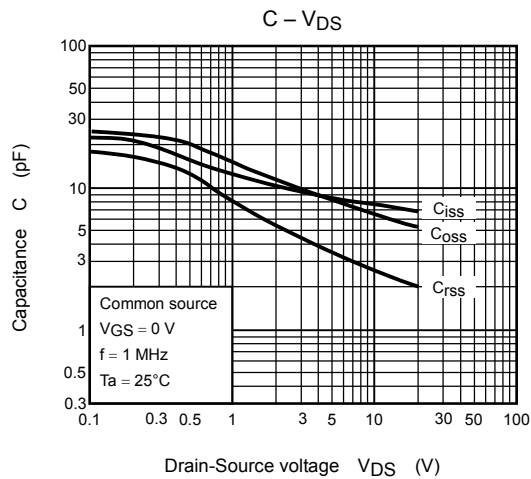
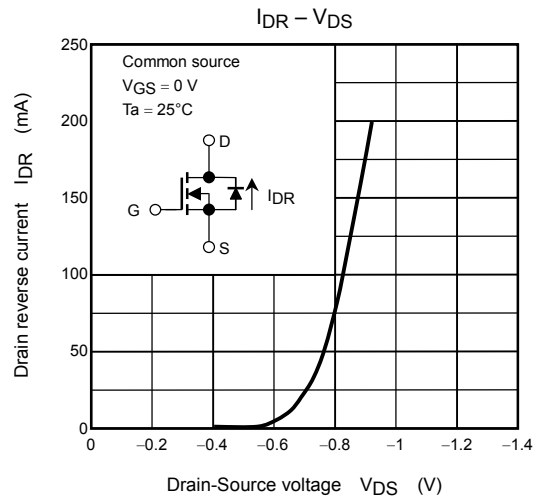
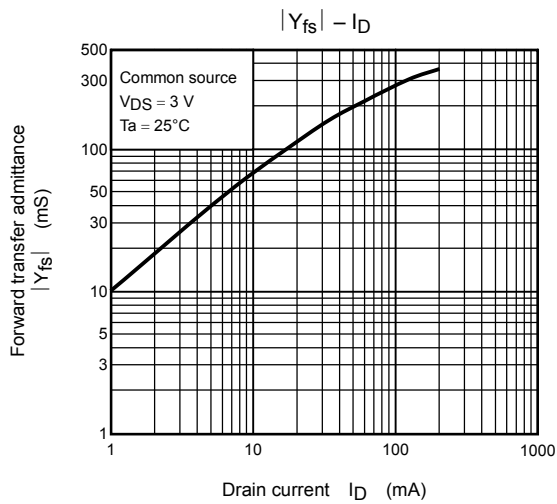
$V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D = 100 \mu\text{A}$  for this product. For normal switching operation,  $V_{GS(on)}$  requires higher voltage than  $V_{th}$  and  $V_{GS(off)}$  requires lower voltage than  $V_{th}$ . (Relationship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

Please take this into consideration for using the device.  $V_{GS}$  recommended voltage of 1.5 V or higher to turn on this product.

(Q1, Q2 common)



(Q1, Q2 common)



**RESTRICTIONS ON PRODUCT USE**

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