

# SSM6N7002FU

High Speed Switching Applications

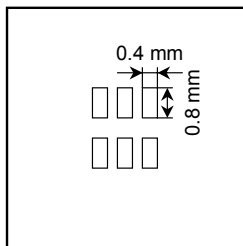
Analog Switch Applications

- Small package
- Low ON resistance :  $R_{on} = 3.3 \Omega$  (max) (@ $V_{GS} = 4.5 V$ )  
 :  $R_{on} = 3.2 \Omega$  (max) (@ $V_{GS} = 5 V$ )  
 :  $R_{on} = 3.0 \Omega$  (max) (@ $V_{GS} = 10 V$ )

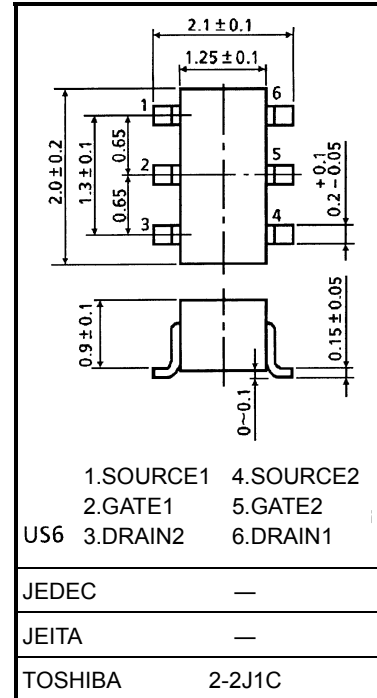
### Maximum Ratings ( $T_a = 25^\circ C$ ) (Q1, Q2 Common)

Characteristics		Symbol	Rating	Unit
Drain-Source voltage		$V_{DS}$	60	V
Gate-Source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC	$I_D$	200	mA
	Pulse	$I_{DP}$	800	
Drain power dissipation ( $T_a = 25^\circ C$ )		$P_D$ (Note)	300	mW
Channel temperature		$T_{ch}$	150	$^\circ C$
Storage temperature range		$T_{stg}$	-55~150	$^\circ C$

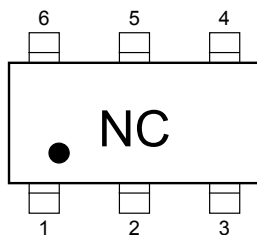
Note: Total rating, mounted on FR4 board  
 (25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.32mm<sup>2</sup> × 6)



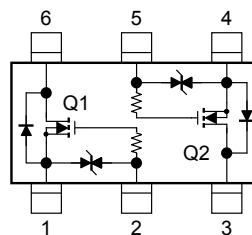
Unit: mm



### Marking



### Equivalent Circuit (top view)



### Handling Precaution

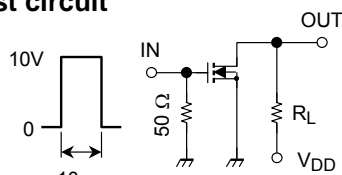
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

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

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit	
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0$	—	—	$\pm 10$	$\mu\text{A}$	
Drain-Source breakdown voltage	$V_{(BR)DSS}$	$I_D = 0.1 \text{ mA}, V_{GS} = 0$	60	—	—	V	
Drain cut-off current	$I_{DSS}$	$V_{DS} = 60 \text{ V}, V_{GS} = 0$	—	—	1	$\mu\text{A}$	
Gate threshold voltage	$V_{th}$	$V_{DS} = 10 \text{ V}, I_D = 0.25 \text{ mA}$	1.0	—	2.5	V	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 200 \text{ mA}$	170	—	—	mS	
Drain-Source ON resistance	$R_{DS(ON)}$	$I_D = 500 \text{ mA}, V_{GS} = 10 \text{ V}$	—	2.0	3.0	$\Omega$	
		$I_D = 100 \text{ mA}, V_{GS} = 5 \text{ V}$	—	2.1	3.2		
		$I_D = 100 \text{ mA}, V_{GS} = 4.5 \text{ V}$	—	2.2	3.3		
Input capacitance	$C_{iss}$	$V_{DS} = 25 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	17	—	pF	
Reverse transfer capacitance	$C_{rss}$		—	1.4	—	pF	
Output capacitance	$C_{oss}$		—	5.8	—	pF	
Switching time	Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30 \text{ V}, I_D = 200 \text{ mA}, V_{GS} = 0 \sim 10 \text{ V}$	—	2.4	4.0	ns
	Turn-off delay time	$t_{d(off)}$		—	26	40	

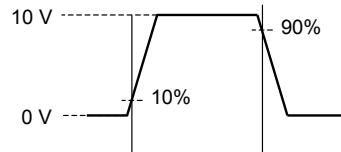
## Switching Time Test Circuit

(a) Test circuit

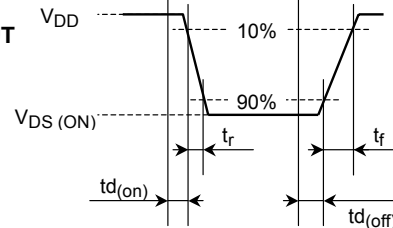


$V_{DD} = 30 \text{ V}$   
 Duty  $\leq 1\%$   
 $V_{IN}$ :  $t_r, t_f < 2 \text{ ns}$   
 $(Z_{out} = 50 \Omega)$   
 Common Source  
 $T_a = 25^\circ\text{C}$

(b)  $V_{IN}$



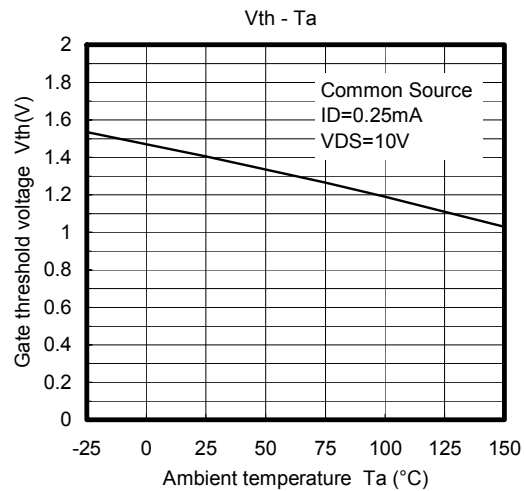
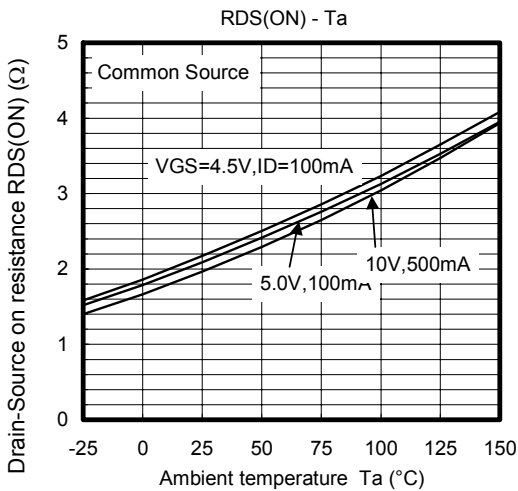
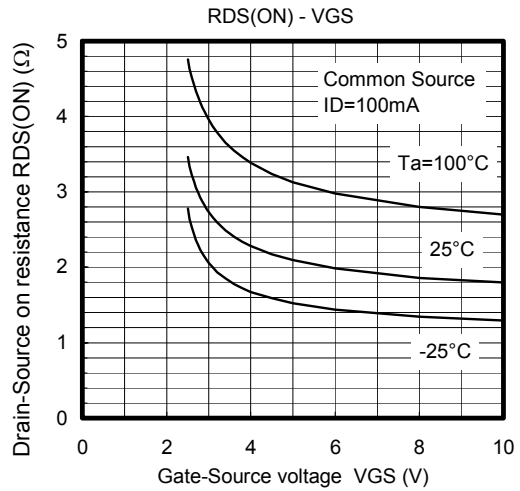
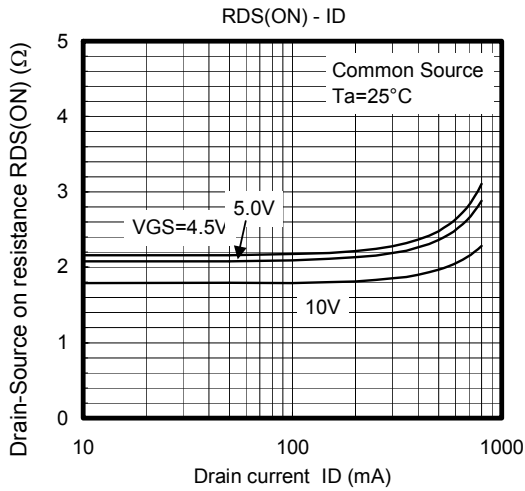
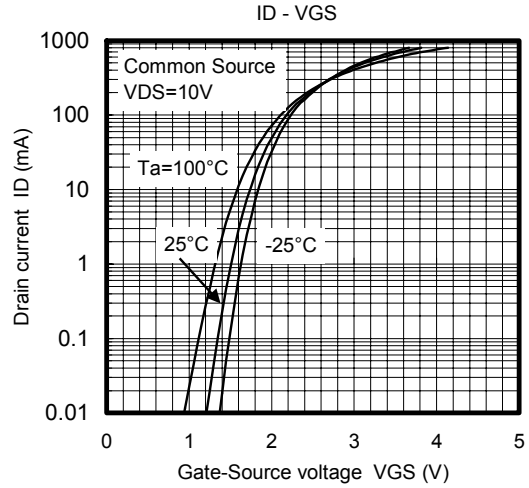
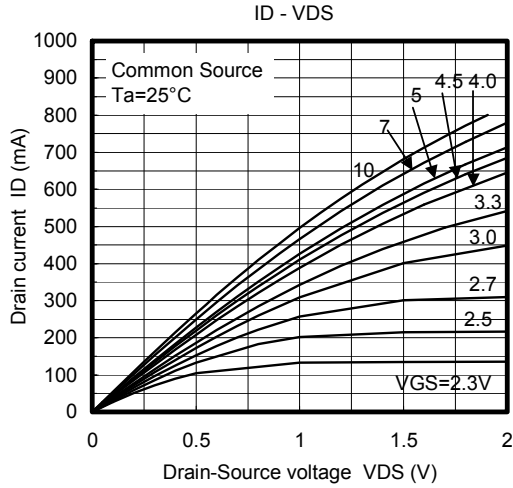
(c)  $V_{OUT}$

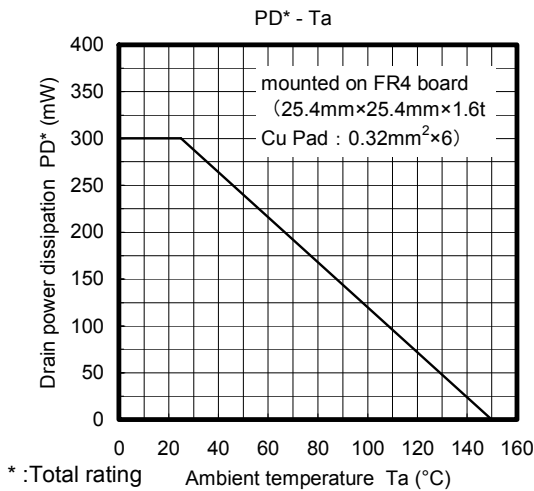
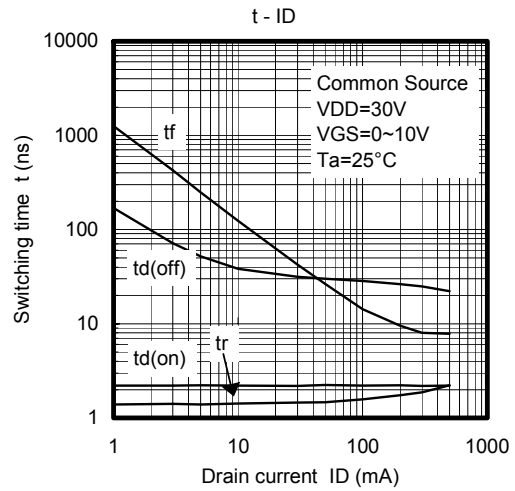
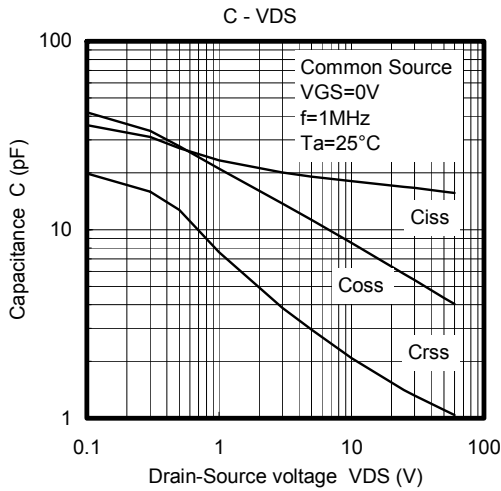
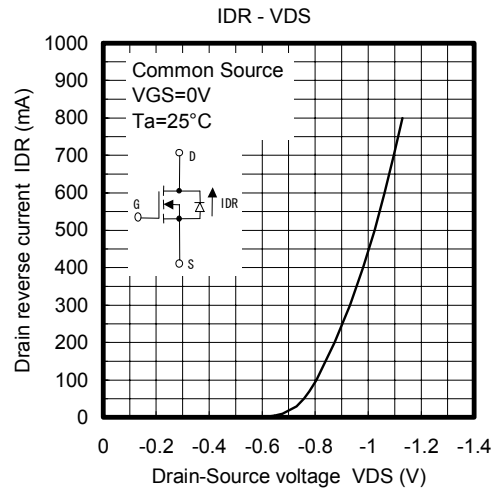
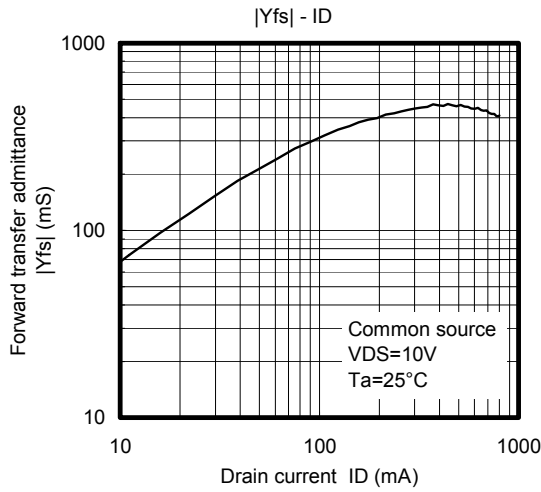


## Precaution

$V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D = 250 \mu\text{A}$  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 4.5 V or higher to turn on this product.





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