

TOSHIBA Transistor Silicon P Channel MOS Type

# SSM6J07FU

Power Management Switch

High Speed Switching Applications

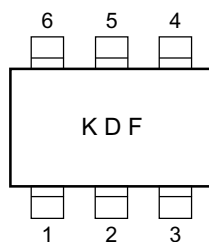
- Small package
- Low on resistance  
 $R_{on} = 450 \text{ m}\Omega \text{ (max) (@} V_{GS} = -10 \text{ V)}$   
 $R_{on} = 800 \text{ m}\Omega \text{ (max) (@} V_{GS} = -4 \text{ V)}$

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DS}$	-30	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC	$I_D$	-0.8	A
	Pulse	$I_{DP}$	-1.6	
Drain power dissipation		$P_D$ (Note1)	300	mW
Channel temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55~150	$^\circ\text{C}$

Note1: Mounted on FR4 board  
 $(25.4 \text{ mm} \times 25.4 \text{ mm} \times 1.6 \text{ t, Cu Pad: } 0.32 \text{ mm}^2 \times 6)$  Figure 1.

## Marking



## Equivalent Circuit (top view)

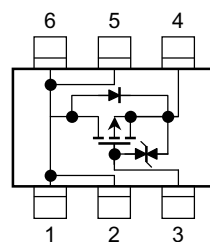
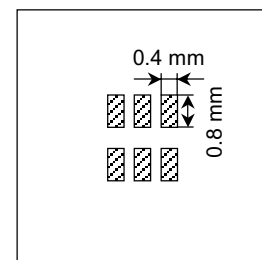


Figure 1:  $25.4 \text{ mm} \times 25.4 \text{ mm} \times 1.6 \text{ t}$ ,  
Cu Pad:  $0.32 \text{ mm}^2 \times 6$



## 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.

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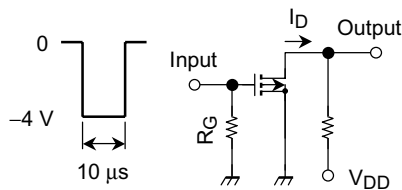
## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0	—	—	±1	μA
Drain-source breakdown voltage		V <sub>(BR)</sub> DSS	I <sub>D</sub> = −1 mA, V <sub>GS</sub> = 0	−30	—	—	V
Drain cut-off current		I <sub>DSS</sub>	V <sub>DS</sub> = −30 V, V <sub>GS</sub> = 0	—	—	−1	μA
Gate threshold voltage		V <sub>th</sub>	V <sub>DS</sub> = −5 V, I <sub>D</sub> = −0.1 mA	−1.1	—	−1.8	V
Forward transfer admittance		Y <sub>fs</sub>	V <sub>DS</sub> = −5 V, I <sub>D</sub> = −0.4 A (Note2)	0.7	—	—	S
Drain-source ON resistance		R <sub>DS</sub> (ON)	I <sub>D</sub> = −0.4 A, V <sub>GS</sub> = −10 V (Note2)	—	350	450	mΩ
			I <sub>D</sub> = −0.4 A, V <sub>GS</sub> = −4 V (Note2)	—	570	800	
			I <sub>D</sub> = −0.4 A, V <sub>GS</sub> = −3.3 V (Note2)	—	0.7	1.6	Ω
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = −15 V, V <sub>GS</sub> = 0, f = 1 MHz	—	130	—	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = −15 V, V <sub>GS</sub> = 0, f = 1 MHz	—	16	—	pF
Output capacitance		C <sub>oss</sub>	V <sub>DS</sub> = −15 V, V <sub>GS</sub> = 0, f = 1 MHz	—	52	—	pF
Switching time	Turn-on time	t <sub>on</sub>	V <sub>DD</sub> = −15 V, I <sub>D</sub> = −0.4 A,	—	28	—	ns
	Turn-off time	t <sub>off</sub>	V <sub>GS</sub> = 0~−4 V, R <sub>G</sub> = 10 Ω	—	38	—	ns

Note2: Pulse test

## Switching Time Test Circuit

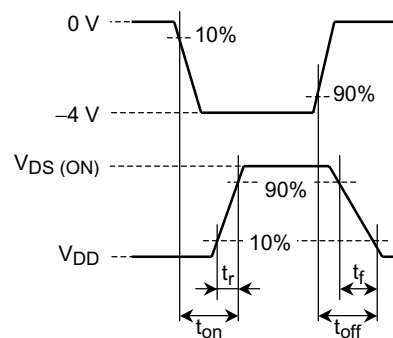
### (a) Test circuit



$V_{DD} = -15 \text{ V}$   
 $R_G = 10 \Omega$   
 D.U.  $\leq 1\%$   
 Input:  $t_r, t_f < 5 \text{ ns}$   
 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  $-4.0 \text{ V}$  or higher to turn on this product.

