

TOSHIBA Field Effect Transistor Silicon P Channel MOS Type

## SSM6J06FU

Power Management Switch

High Speed Switching Applications

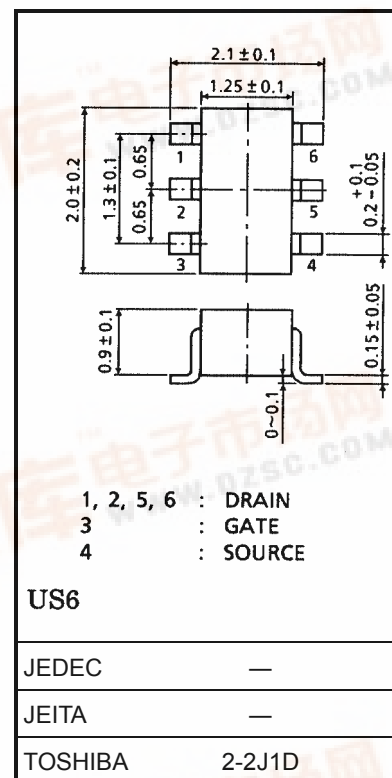
Unit: mm

- Small package
- Low on resistance :  $R_{on} = 0.5 \Omega$  max ( $V_{GS} = -4$  V)  
:  $R_{on} = 0.7 \Omega$  max ( $V_{GS} = -2.5$  V)
- Low gate threshold voltage

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

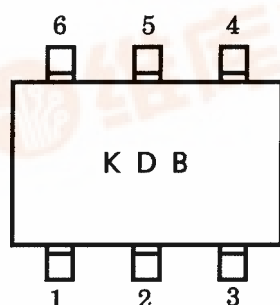
Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DS}$	-20	V
Gate-source voltage		$V_{GSS}$	$\pm 12$	V
Drain current	DC	$I_D$	-650	mA
	Pulse	$I_{DP}$	-1300	
Drain power dissipation ( $T_a = 25^\circ\text{C}$ )		$P_D$ (Note 1)	300	mW
Channel temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55~150	$^\circ\text{C}$

Note 1: Mounted on FR4 board.

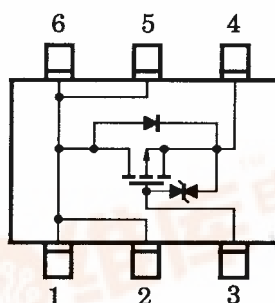
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 0.32 mm<sup>2</sup> × 6) Figure 1.

Weight: 6.8 mg (typ.)

## Marking



## Equivalent Circuit



## Handling Precaution

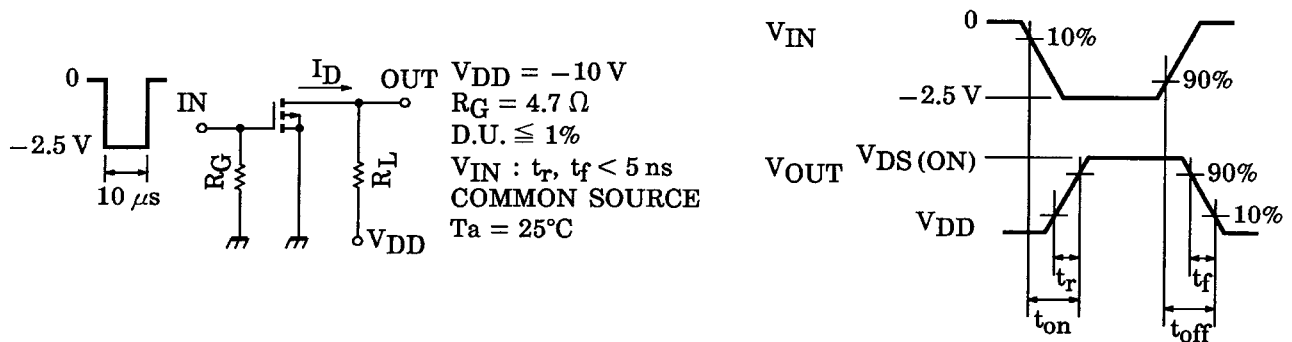
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

## Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 12 \text{ V}, V_{DS} = 0$	—	—	$\pm 1$	$\mu\text{A}$
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = -1 \text{ mA}, V_{GS} = 0$	-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} $	$V_{DS} = -3 \text{ V}, I_D = -0.3 \text{ A}$ (Note 2)	0.6	—	—	S
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = -0.3 \text{ A}, V_{GS} = -4 \text{ V}$ (Note 2)	—	0.4	0.5	$\Omega$
		$I_D = -0.3 \text{ A}, V_{GS} = -2.5 \text{ V}$ (Note 2)	—	0.55	0.7	
Input capacitance	$C_{iss}$	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	160	—	pF
Reverse transfer capacitance	$C_{rss}$	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	25	—	pF
Output capacitance	$C_{oss}$	$V_{DS} = -10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	90	—	pF
Switching time	Turn-on time	$V_{DD} = -10 \text{ V}, I_D = -0.3 \text{ A},$ $V_{GS} = 0 \sim -2.5 \text{ V}, R_G = 4.7 \Omega$	—	27	—	ns
	Turn-off time		—	43	—	

Note 2: Pulse test

## Switching Time Test Circuit



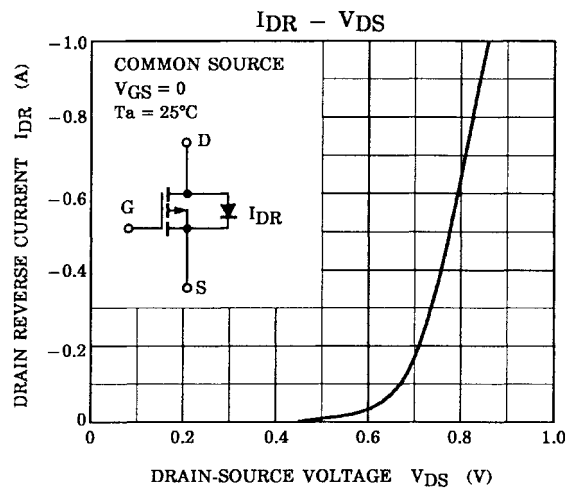
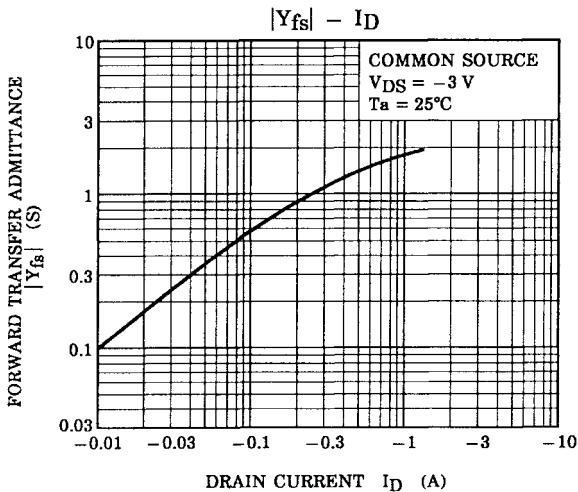
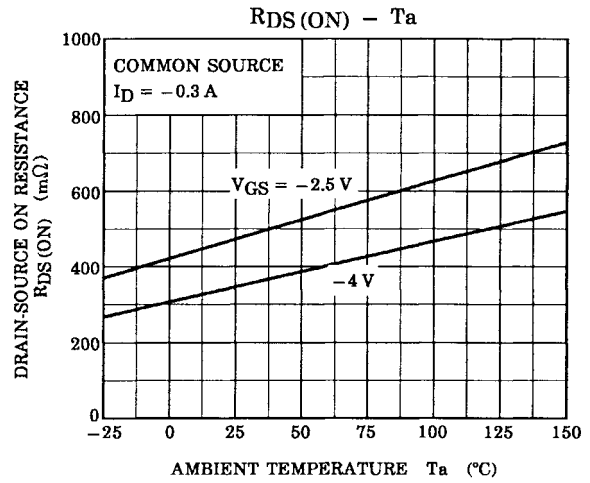
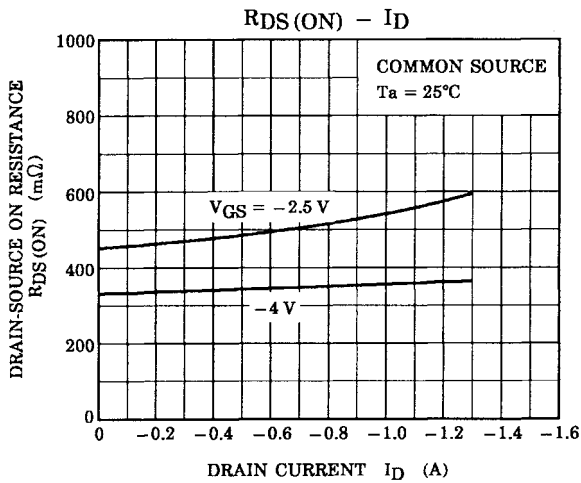
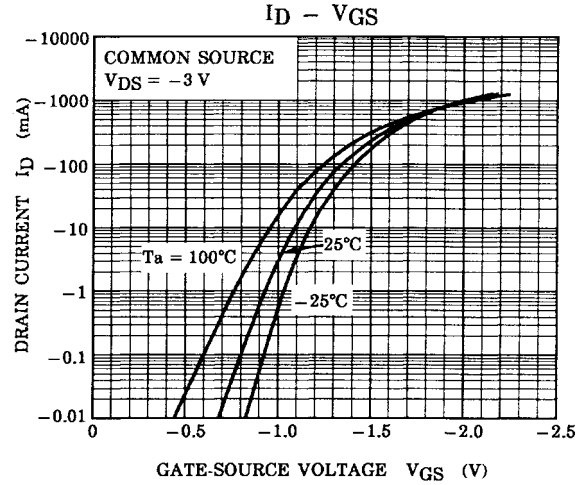
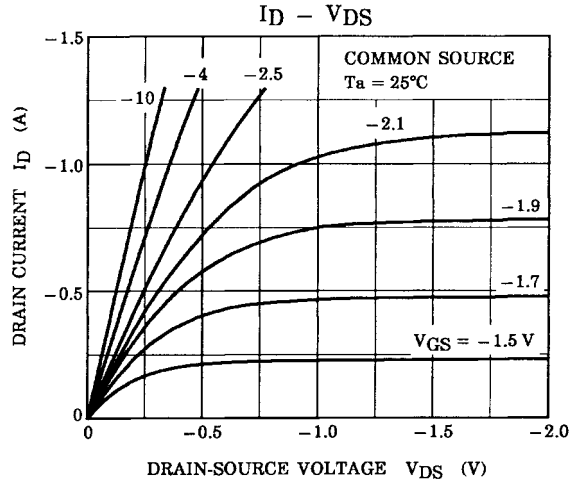
## Precaution

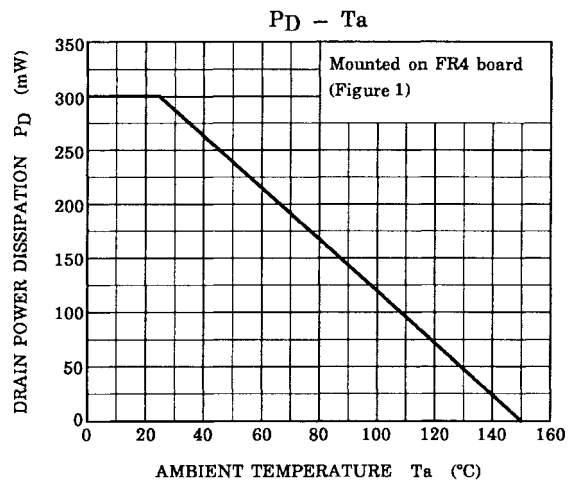
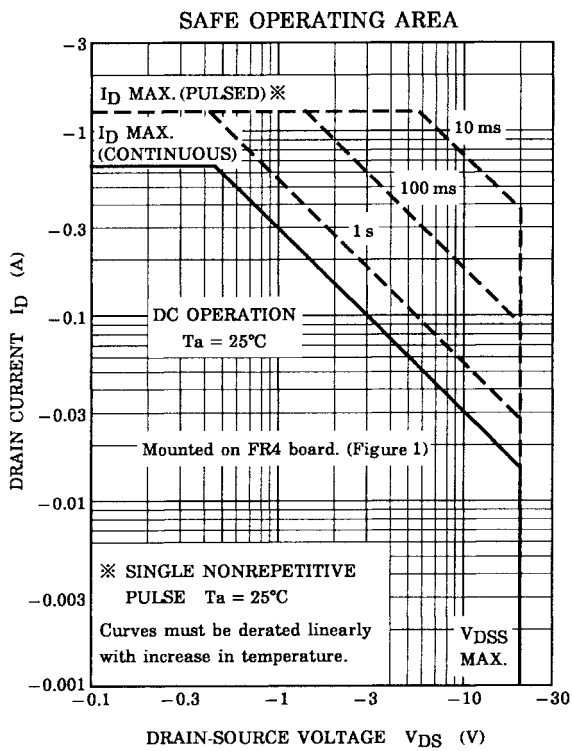
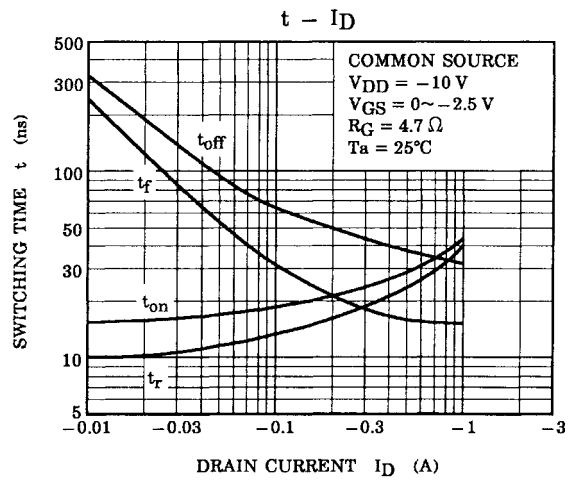
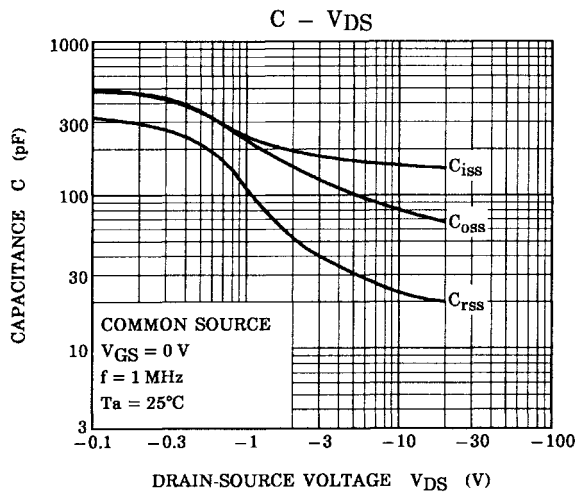
$V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D = -100 \mu\text{A}$  for this product. For normal switching operation,  $V_{GS(ON)}$  requires higher voltage than  $V_{th}$  and  $V_{GS(OFF)}$  requires lower voltage than  $V_{th}$ .

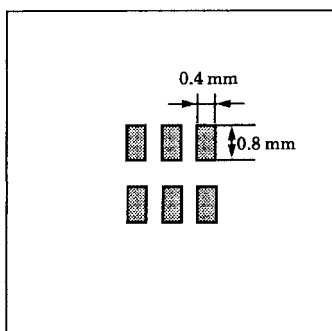
(Relationship can be established as follows:  $V_{GS(OFF)} < V_{th} < V_{GS(ON)}$ )

Please take this into consideration for using the device.

$V_{GS}$  recommended voltage of -2.5 V or higher to turn on this product.







**Figure 1** 25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.32 mm<sup>2</sup> × 6

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