

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

# SSM6K06FU

## High Speed Switching Applications

- Small package
- Low on resistance:  $R_{on} = 160 \text{ m}\Omega \text{ max (@}V_{GS} = 4 \text{ V)}$   
 $\quad \quad \quad : R_{on} = 210 \text{ m}\Omega \text{ max (@}V_{GS} = 2.5 \text{ V)}$
- Low gate threshold voltage

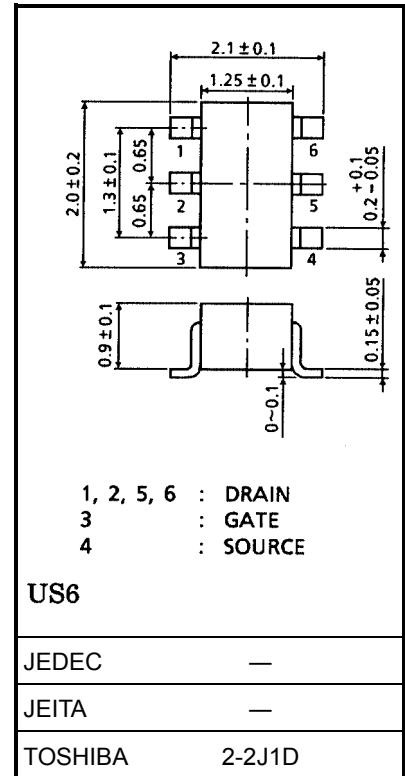
## Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	$V_{DS}$	20	V
Gate-source voltage	$V_{GSS}$	$\pm 12$	V
Drain current	DC	$I_D$	1.1
	Pulse	$I_{DP}$	2.2
Drain power dissipation (Ta = 25°C)	$P_D$ (Note 1)	300	mW
Channel temperature	$T_{ch}$	150	°C
Storage temperature range	$T_{stg}$	-55~150	°C

Note 1: Mounted on FR4 board.

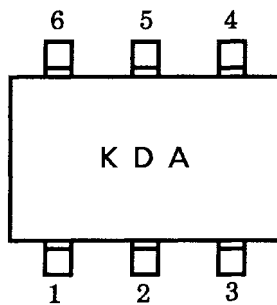
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 0.32 mm<sup>2</sup> × 6) Figure 1.

Unit: mm

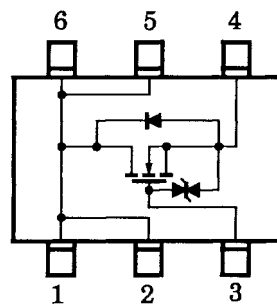


Weight: 6.8 mg (typ.)

## Marking



## Equivalent Circuit (top view)



## Handling Precaution

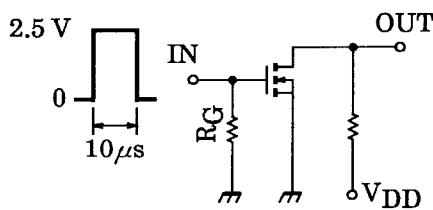
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

## Electrical Characteristics (Ta = 25°C)

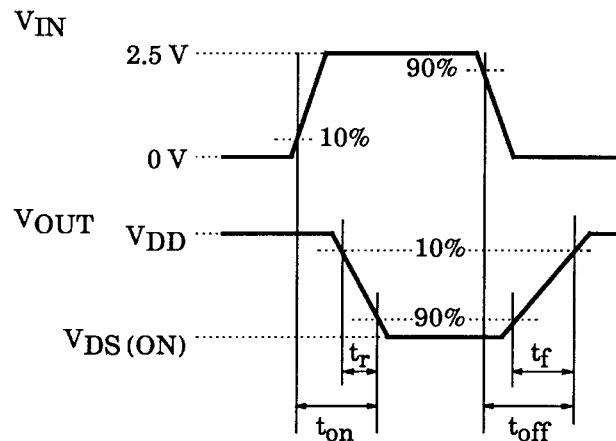
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GSS}$	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0$	—	—	$\pm 1$	$\mu\text{A}$
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 1\text{ mA}, V_{GS} = 0$	20	—	—	V
Drain cut-off current		$I_{DSS}$	$V_{DS} = 20\text{ V}, V_{GS} = 0$	—	—	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} $	$V_{DS} = 3\text{ V}, I_D = 0.5\text{ A}$ (Note 2)	1.2	—	—	S
Drain-source ON resistance		$R_{DS(ON)}$	$I_D = 0.5\text{ A}, V_{GS} = 4\text{ V}$ (Note 2)	—	120	160	m $\Omega$
			$I_D = 0.5\text{ A}, V_{GS} = 2.5\text{ V}$ (Note 2)	—	160	210	
Input capacitance		$C_{iss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	125	—	pF
Reverse transfer capacitance		$C_{rss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	30	—	pF
Output capacitance		$C_{oss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	75	—	pF
Switching time	Turn-on time	$t_{on}$	$V_{DD} = 10\text{ V}, I_D = 0.5\text{ A}, V_{GS} = 0\sim 2.5\text{ V}, R_G = 4.7\ \Omega$	—	42	—	ns
	Turn-off time	$t_{off}$		—	100	—	

Note 2: Pulse test

## Switching Time Test Circuit



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



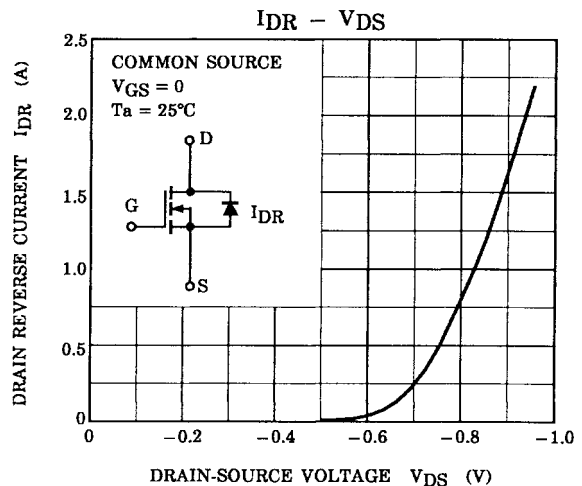
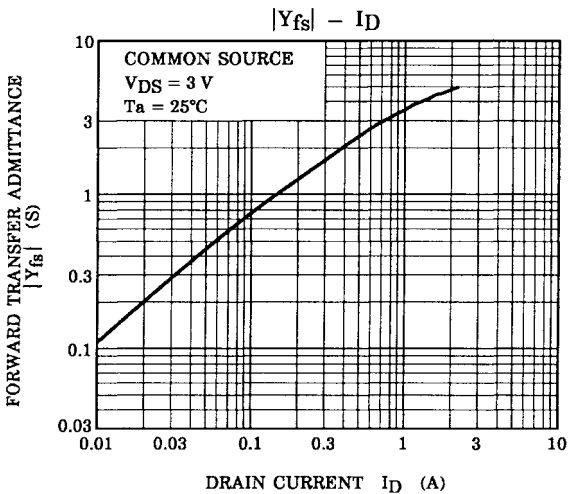
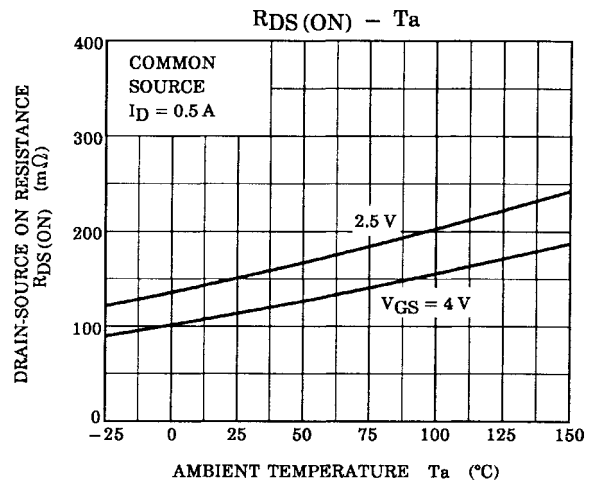
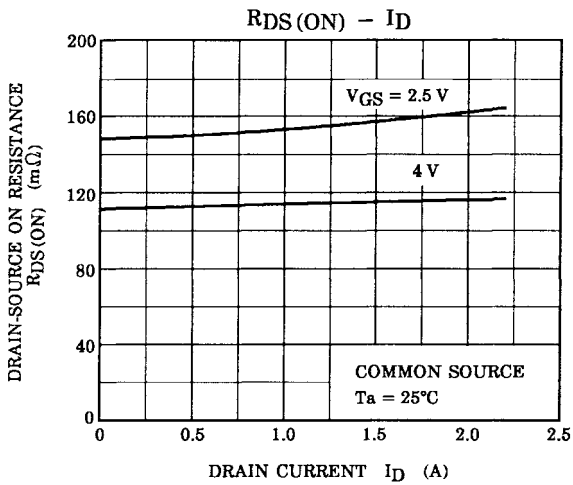
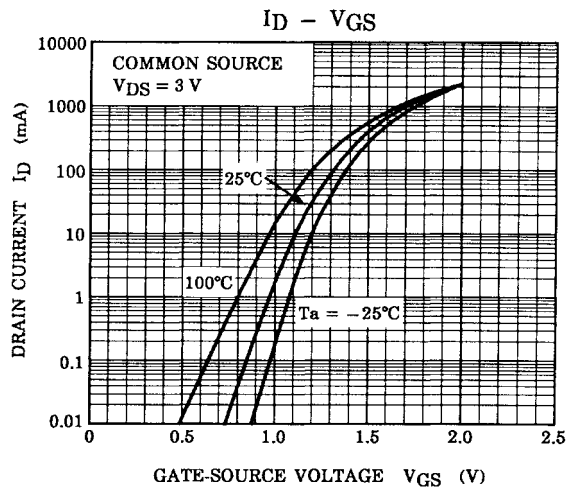
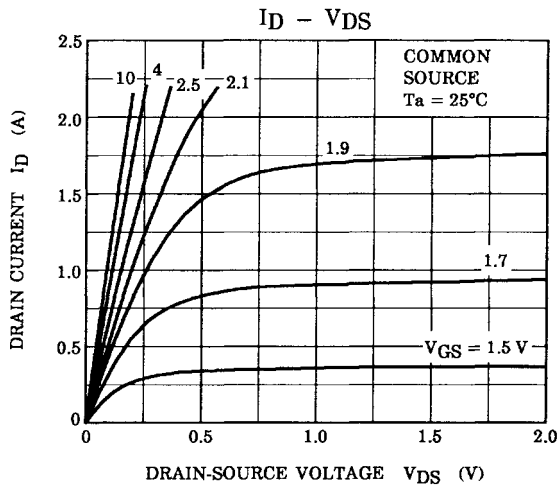
## Precaution

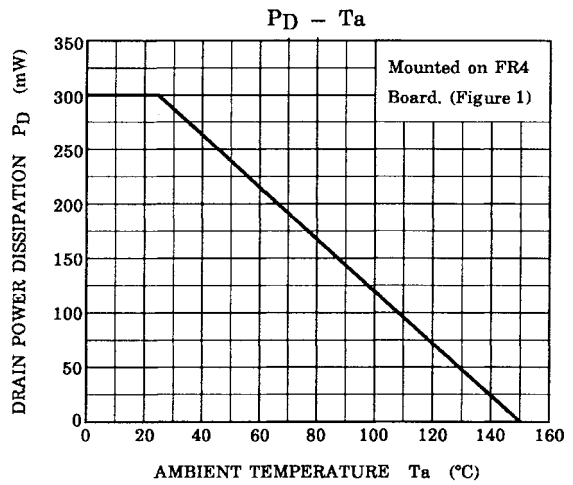
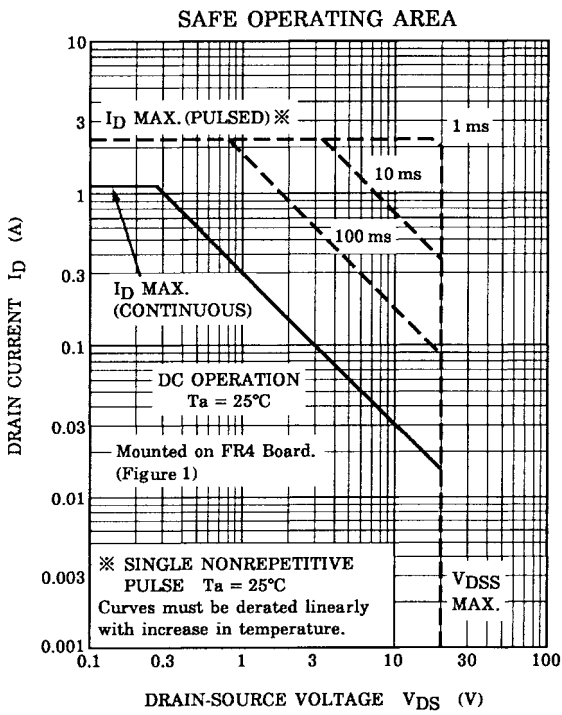
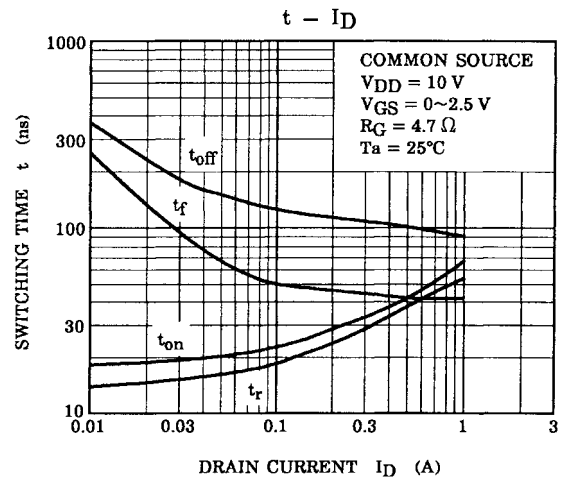
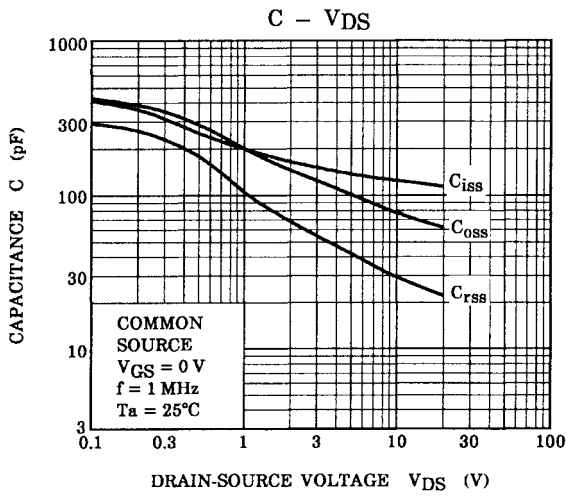
$V_{th}$  can be expressed as voltage between gate and source when low operating current value is  $I_D = 100\ \mu\text{A}$  for this product. For normal switching operation,  $V_{GS(on)}$  requires higher voltage than  $V_{th}$  and  $V_{GS(off)}$  requires lower voltage than  $V_{th}$ .

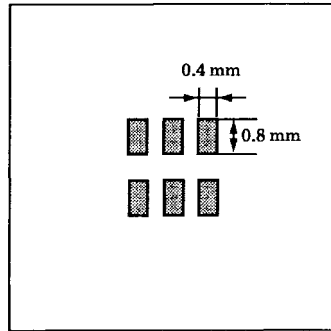
(Relationship can be established as follows:  $V_{GS(off)} < V_{th} < V_{GS(on)}$ )

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

**RESTRICTIONS ON PRODUCT USE**

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