TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

# SSM3K17FU

# High Speed Switching Applications Analog Switch Applications

- Suitable for high-density mounting due to compact package
- High drain-source voltage
- High speed switching

### Absolute Maximum Ratings (Ta = 25°C)

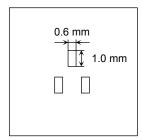
Characteristics		Symbol	Rating	Unit	
Drain-Source voltage		V <sub>DS</sub>	50	V	
Gate-Source voltage		$V_{GSS}$	±7	V	
Drain current	DC	I <sub>D</sub>	100	mA	
	Pulse	I <sub>DP</sub>	200		
Drain power dissipation (Ta = 25°C)		P <sub>D</sub> (Note 1)	150	mW	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the

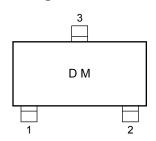
Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

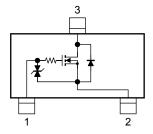
Note 1: Mounted on FR4 board (25.4 mm  $\times$  25.4 mm  $\times$  1.6 t, Cu Pad: 0.6 mm<sup>2</sup>  $\times$  3)



#### Marking

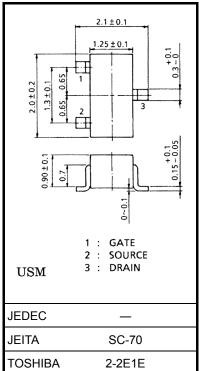
#### **Equivalent Circuit**





This transistor is a electrostatic sensitive device. Please handle with caution.

Start of commercial production 2001-09



Weight: 6 mg (typ.)

# **Electrical Characteristics (Ta = 25°C)**

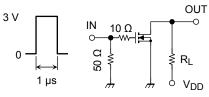
Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage current		I <sub>GSS</sub>	$V_{GS} = \pm 7 \text{ V}, V_{DS} = 0$	_	_	±5	μΑ
Drain-Source breakdown voltage		V (BR) DSS	I <sub>D</sub> = 0.1 mA, V <sub>GS</sub> = 0	50	_	_	V
Drain cut-off curre	ent	I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0	_	_	1	μΑ
Gate threshold vo	Itage	V <sub>th</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 1 μA	0.9	_	1.5	V
Forward transfer a	admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 10 mA	20	40	_	mS
Drain-Source ON resistance		R <sub>DS (ON)</sub>	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 4 V	-	12	20	Ω
			I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 2.5 V	-	22	40	
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1 MHz	-	7	_	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1 MHz	-	3	_	pF
Output capacitance		Coss	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1 MHz	-	7	_	pF
Switching time	Turn-on time	t <sub>on</sub>	$V_{DD} = 3 \text{ V}, I_D = 20 \text{ mA}, V_{GS} = 0 \text{ to } 3 \text{ V},$	_	100	_	ns
	Turn-off time	t <sub>off</sub>	$R_G$ = 10 Ω, $R_L$ = 150 Ω	_	40	_	

# **Switching Time Test Circuit**

## (a) Test circuit

(b) V<sub>IN</sub>

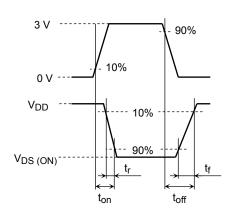
(c) V<sub>OUT</sub>

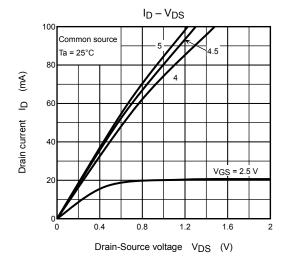


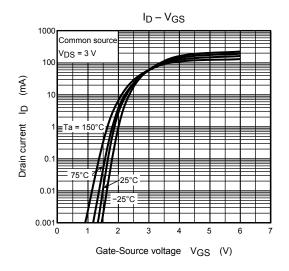
 $V_{DD}$  = 3 V Duty≤1%  $V_{IN}$ :  $t_r$ ,  $t_f$  < 5 ns

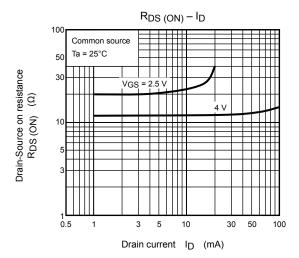
 $(Z_{out} = 50 \Omega)$ Common source

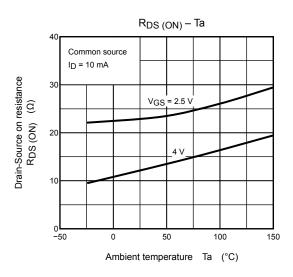
Ta = 25°C

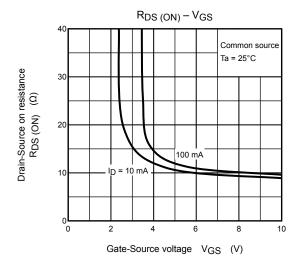


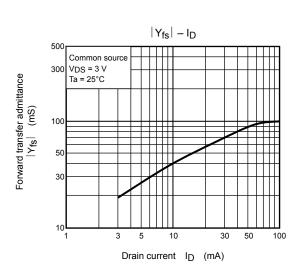




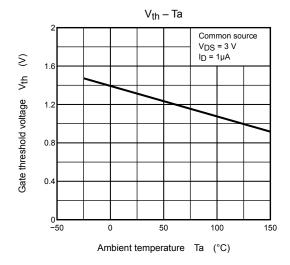


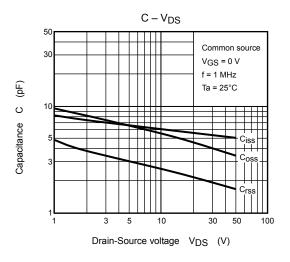


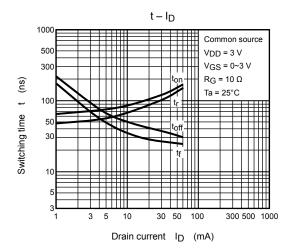


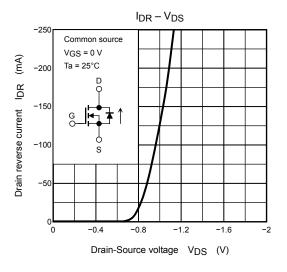


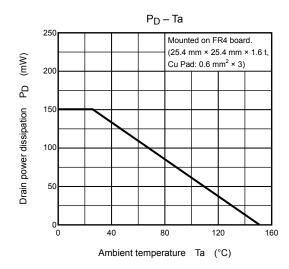
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