Unit: mm

TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type

## SSM3K16CT

# High-Speed Switching Applications Analog Switch Applications

• Suitable for high-density mounting due to compact package

• Low ON-resistance :  $R_{on} = 3.0 \Omega (max) (@V_{GS} = 4 V)$ 

:  $R_{on} = 4.0 \Omega (max) (@V_{GS} = 2.5 V)$ 

:  $R_{on} = 15 \Omega (max) (@V_{GS} = 1.5 V)$ 

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

Characteristics		Symbol	Rating	Unit	
Drain-Source voltage		$V_{DS}$	20	V	
Gate-Source voltage		$V_{GSS}$	±10	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)	100	mW	
Channel temperature		T <sub>ch</sub>	150	°C	
Storage temperature		T <sub>stg</sub>	-55~150	°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.

CST3

JEDEC JEITA TOSHIBA 2-1J1B

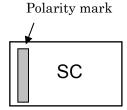
Weight: 0.75 mg (typ.)

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

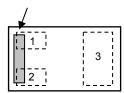
 $(10 \text{ mm} \times 10 \text{ mm} \times 1.0 \text{ t}, \text{ Cu Pad: } 100 \text{ mm}^2)$ 

#### Marking (Top View)



#### Pin Condition (Top View)

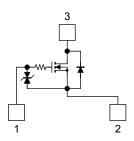
Polarity mark (on the top)



- 1. Gate
- 2. Source
- 3. Drain

\*Electrodes: on the bottom

#### **Equivalent Circuit**



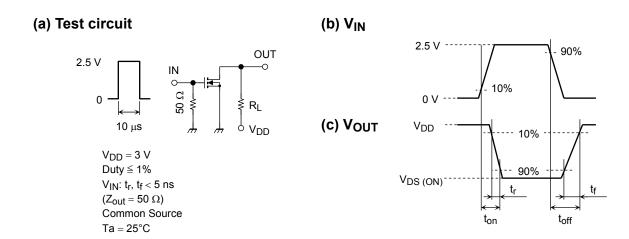
#### **Handling Precaution**

When handling individual devices that are not yet mounted on a circuit board, ensure that the environment is protected against electrostatic discharge. 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	Тур.	Max	Unit
Gate leakage current		I <sub>GSS</sub>	$V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$	_	_	±1	μА
Drain-Source breakdown voltage		V (BR) DSS	$I_D = 0.1 \text{ mA}, V_{GS} = 0$	20	_	_	V
Drain cut-off curre	ent	I <sub>DSS</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0	_	_	1	μА
Gate threshold vo	Itage	V <sub>th</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 0.1 mA	0.6	_	1.1	V
Forward transfer a	admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 10 mA	40	_	_	mS
Drain-Source ON-resistance		R <sub>DS</sub> (ON)	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 4 V	_	1.5	3.0	Ω
			I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 2.5 V	_	2.2	4.0	
			I <sub>D</sub> = 1 mA, V <sub>GS</sub> = 1.5 V	_	5.2	15	
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1 MHz	_	9.3	_	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1 MHz	_	4.5	_	pF
Output capacitance		C <sub>oss</sub>	$V_{DS} = 3 V$ , $V_{GS} = 0$ , $f = 1 MHz$	_	9.8	_	pF
Switching time	Turn-on time	t <sub>on</sub>	$V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0~2.5 \text{ V}$	_	70	_	ns
	Turn-off time	t <sub>off</sub>			125	_	

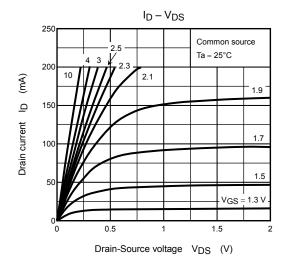
### **Switching Time Test Circuit**

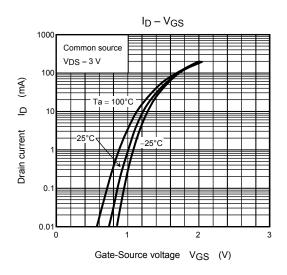


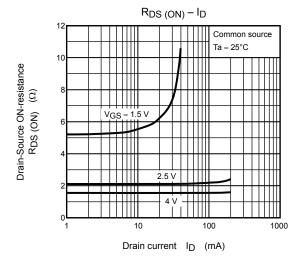
#### **Precaution**

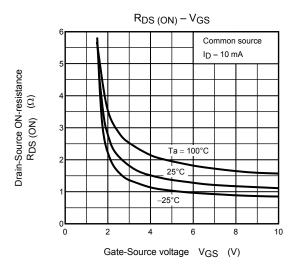
 $V_{th}$  can be expressed as the voltage between gate and source when the low operating current value is  $I_D$  = 100  $\mu$ A for this product. For normal switching operation,  $V_{GS\ (on)}$  requires a higher voltage than  $V_{th}$  and  $V_{GS\ (off)}$  requires a lower voltage than  $V_{th}$ .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

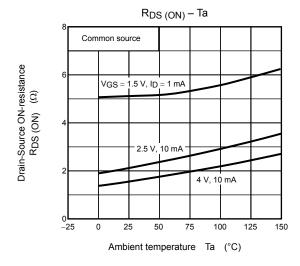
Take this into consideration when using the device.

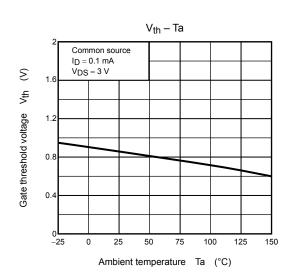




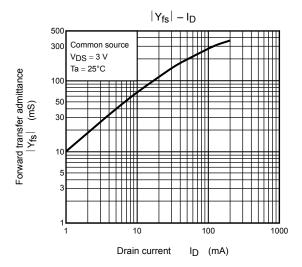


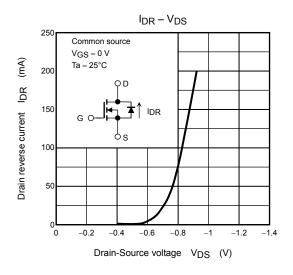


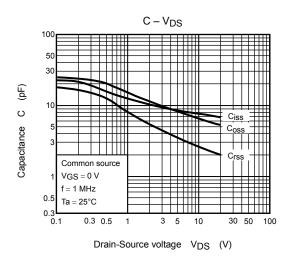


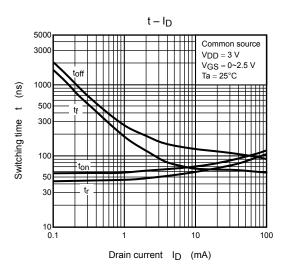


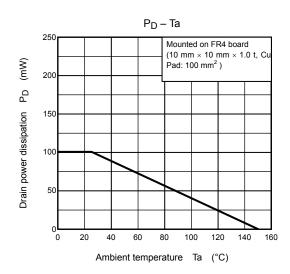
3











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